

Networks of Circular Economy Villages

Political Economic Principles and Spatial Potentials

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Abstract

Faced with the challenges to restructure societies for long term sustainability, greater attention should be given to the design of human settlements and their relationship to each other. This thesis explores the pattern of human settlements and the possibility of finding a solution in the form of networks of Circular Economy Villages (CEVs).

Each CEV would integrate energy, water, food and building infrastructure, aligning these with local ecological cycles. This would maximise local production and improve energy efficiency, while reducing both financial and ecological costs.

The research question is: *How would human habitats be structured in a political economic paradigm wherein populations were mobilised to regenerate natural systems and, through this, to rehabilitate and regenerate the human condition?* Asking the question in reverse: *How might a disruptive model for building human habitats enable the development of such a regenerative political economic paradigm?*

Critiques are most effective when accompanied by a viable alternative vision and an implementation strategy. The vision is therefore described at the outset, contrasting it with present political economic arrangements. The latter centralises production in densely populated cities, surrounded by less-densely populated towns and villages. The vision proposes a more even distribution of populations—a network of communities, each responsible for, and dependent on, the land upon which they are located.

This thesis adopts a dialectical method, comparing centralised with distributed systems, extractive with regenerative processes, and linear with circular economies. Circular patterns underpin and connect all the chapters, exploring relational, temporal, spatial and holistic perspectives of circularity.

By contrasting present circumstances with a possible future, various implementation strategies are developed—including town planning policies, a financial plan, and design principles for building networks of CEVs.

Acknowledgement of Country and Indigenous wisdom

I wish to acknowledge the tradition of land custodianship practiced by Indigenous communities throughout this continent for thousands of years. I also recognise the practical relevance of Indigenous wisdom to this thesis topic and appreciate the value it has added. The insights gained from numerous people and written texts have benefitted me personally and substantially expanded my understanding of sustainable living.

I would like readers to reflect on a challenge put to me by an Indigenous elder: How do we integrate the best of modern technologies with an Indigenous way of living, for the benefit of all?

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When proposing new ways of living it is essential that both feminine and masculine perspectives are understood and incorporated. It was through my relationship with Nil that I was able to appreciate the Chinese concept of yin and yang—the harmony of opposites—that was so critical in the early development of this thesis. Talking through our experiences of different places and communities helped formulate or crystallise various ideas. It was also Nilmini's engaging personality that often connected us to new people and ideas, helping to deepen or strengthen various concepts.

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Statement of Originality

I certify that the intellectual content of this thesis is the product of my own work and that all the assistance received in preparing this thesis and sources have been acknowledged.

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1. Introduction

If a man does not know what harbour he seeks, any wind is the right wind

~Lucius Annaeus Seneca

This thesis explores how we might describe and build a positive and healthy future for ourselves and the generations to come. Fundamental transformations of our society are already occurring due to technological developments and because of initiatives to address social and environmental issues. As a society, we must attempt to grasp the scale, scope, and nature of that change, articulate the best imaginable future, and then plot a path to that future.

Highlighting the need for the reorganisation of political economic systems, Stilwell (2016) argues that:

any program to drive political economic change requires critique, vision, strategy and organisation...We need a clear critique of the current political economic arrangements; a vision of a preferred alternative; a strategy for getting from here to there; and one or more organisational vehicles to take us on the journey. (p. 146)

In a similar vein, (Robinson, 1982) coined the term 'backcasting' to distinguish it from forecasting the future. Rather than projecting present circumstances to determine a *likely* future, the backcasting method starts with the specification of goals—a *desirable* future—and then determines how those goals can be met. This is particularly relevant to programs such as the transition to an all-electric, renewable energy future.

Braun (2015) suggests that political economists tend to focus too heavily on critique and not sufficiently on experimentation, creativity, play and invention. The focus on critique will therefore be sufficient only to reiterate the substantial body of literature that already provides a comprehensive assessment of the current dominant economic system. Greater attention will be given to the vision—articulating it at the outset—to allow for a fuller development of strategies and organisational structures for implementing that vision. Engaging with both the critique and vision in a dialectical process, this thesis develops a recommended implementation strategy.

The proposed vision was initially developed in *Rethinking the City* (Liaros, 2014), which concluded with a proposed Transition Charter, articulating the vision for a global network of local communities. That charter has been modified through the development of this thesis and is included in the Appendix in the updated form.

1.1. A brief critique points to a vision

A significant body of existing literature already provides a comprehensive critique of the mainstream economic system. The challenges of environmental sustainability and the tensions between economic, social, and environmental goals are well known. The impacts of economic systems on the environment have been recognised at least since the publication of *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind*, (Meadows et al., 1972). Similarly, the adverse social impacts of inequality are now well understood as articulated, for example, in *The Price of Inequality: How Today's Divided Society Endangers Our Future* (Stiglitz, 2012) and *Capital in the*

Twenty-First Century (Picketty, 2013). Referencing this substantial body of literature, the proposed program for social transition must respond to the challenges of both environmental sustainability and social inequality. The general direction of exploration will be to identify the characteristics of a political economy that would deliver positive social and environmental outcomes, offering a practical and implementable alternative to capitalist globalisation and corporate authoritarianism. Responding directly to Margaret Thatcher's claim that 'there is no alternative', this thesis develops an alternative path to prosperity that does not require continued privatisation of public goods and endless economic growth.

Characteristic of many critiques of the currently dominant economic paradigm is the notion of wicked problems—problems that are difficult to resolve because of conflicting or contradictory priorities. Yet tensions between economy, society and environment can sometimes be labelled as wicked problems simply because of an unwillingness to question the imperative of unlimited economic growth. Economic growth is the dominant emphasis in the current mainstream economic *strategy* but there is no clear *vision* of where this will lead and what prosperity looks like.

Ecological economists (e.g., Boulding, Georgescu-Roegen and Daly) have long challenged the orthodoxy of economic growth and have proposed alternative economic models such as the steady state economy (Daly, 1973). Some ecological economists (e.g., Schneider et al., 2010; Kallis, 2011; Nelson & Schneider, 2018) argue that developed countries have significantly exceeded their optimal economic scale and the urgent project is one of economic degrowth. Irrespective of differences, all argue that social equity and ecological sustainability can only be achieved by challenging the orthodoxy that economic growth leads to prosperity. Since the Global Financial Crisis (GFC) and with the publication of Tim Jackson's *Prosperity without Growth: The Transition to a Sustainable Economy* (2009), there appears to be an increasing acceptance that a new economic narrative is needed:

Every society clings to a myth by which it lives. Ours is the myth of economic growth...The reasons for this collective blindness are easy enough to find. The modern economy is structurally reliant on economic growth for its stability. When growth falters—as it has done recently—politicians panic. Businesses struggle to survive. People lose their jobs and sometimes their homes. A spiral of recession looms. Questioning growth is deemed to be the act of lunatics, idealists and revolutionaries.

But question it we must. The myth of growth has failed us...It has failed, spectacularly, in its own terms, to provide economic stability and secure people's livelihoods...

Prosperity consists in our ability to flourish as human beings—within the ecological limits of a finite planet. The challenge for our society is to create the conditions under which this is possible. It is the most urgent task of our times. (p. 5)

To resolve the problems posed by apparently competing economic, social and ecological priorities, it is necessary to reframe the conversation. Instead of assuming economic growth as an imperative, and casting economy, society and environment as three competing domains, Kate Raworth argues that the economy is a human construct that should be designed to achieve certain social goals within certain environmental limitations. Raworth offers the conceptual framework of social and planetary boundaries known as the Doughnut. Doughnut economics, she argues, is a "new model of human wellbeing ... [that] depends on

enabling every person to lead a life of dignity and opportunity, while safeguarding the integrity of Earth's life-supporting systems" (Raworth, 2017, p. 48).

How might an economic system be constructed such that it provides a foundation for human wellbeing while maintaining or even enhancing the health of natural systems? A premise of this thesis is that humans are a part of nature and therefore human health is dependent upon environmental health. Accordingly, what improves the health of the environment will likely also improve human health and wellbeing.

Sustainable development is therefore not an abstract concept but relates to the development of buildings and infrastructure systems—an actual *society*, living in the physical *environment*, doing a range of *economic* activities. The way we build our cities, towns and villages influences the arrangement, and relationship between, various social and economic activities.

Such a system must also work at different scales, at the individual, local community, bioregional and global scales. The proposed vision is therefore of a complex adaptive system. That is, future cities ought to be imagined as non-linear, self-organising and nested systems. Complex systems consist of a dynamic network of interactions that adapt, learn and change in response to external influences. Ultimately, cities should be understood as living systems. The design, scale and spatial arrangement of human settlements in the landscape is an ideal framework for examining sustainable development.

This is a live discussion within the field of urban planning. Norman (2018) argues that "current planning approaches need to be adapted to embrace concepts including green growth, planetary boundaries, healthy cities and longer-term sustainability". Davidson and Gleeson (2013) are similarly critical of neoliberal urbanists who promote unlimited economic growth coupled with "technological fixes" to deliver sustainable environments:

Critical social scientists have repeatedly refuted the neoliberal vision of utopia, pointing to the inherent inequalities, the lack of awareness of social justice, the commodification of creativity, and the separation of urban dwellers from the natural environment encouraged by the market focus of the urbanologists (p. 72)

Urban political ecologists argue that current processes of urbanisation involve political, economic, social and ecological processes that create highly uneven landscapes and, consequently, an uneven distribution of wealth (Davidson and Gleeson, 2013, p. 61).

Davidson and Gleeson (2013, p. 62) suggest that "no framework exists that systematically considers the issues of uneven urban socio-ecological change that relate solely to the spatial patterns of the distribution of environmental amenities formed within urban capitalism". The contrast between the proposed distributed model of community-scale settlements and the current settlement pattern of centralised cities surrounded by under-resourced and under-populated rural townships offers a useful framework for critique.

The vision in this thesis, for networks of Circular Economy Villages (CEVs), implies a more even distribution of settlements in the landscape, encouraging a more even distribution of wealth. The circular economy terminology relates, amongst other things, to the alignment of the local economic and social systems of a village community with natural ecological cycles of their locality. The vision seeks to integrate the latest technologies with the wisdom of Indigenous peoples who understood, and lived in harmony with, the rhythms of the natural world. This requires that we view the world as Indigenous peoples did and so this thesis

develops this ontology, suggesting that the transition from a linear to a circular economy is consistent with a shift towards a more Indigenous worldview. The landscape then becomes a network of waterholes connected by storylines. The waterholes each provide a discrete community with access to basic necessities—food, water, energy and housing. The storylines refer to the physical and virtual connections, information sharing, and collaboration between villages for the satisfaction of more complex needs and the sharing of rarer skills. Settlements within a bioregion would collaborate and support each other, perhaps forming a local trading network. Virtual connectivity, enabled by the internet, would mean that villages become nodes within a globally networked society. Whilst global connectivity is retained, the localisation of production and consumption would be preferred to current global supply chains. Where necessary, global trade would mostly involve the transporting of information to a local 3D printer or other production system, powered by local renewable energy. This would allow for most production to be as close as possible to the end user. Local waste-to-resource micro-factories (Sahajwalla & Gaikwad, 2018) would provide a large proportion of the input materials needed for production, substantially reducing the need for global transport of fossil fuels, materials, and goods.

Another framework for comparing present settlement patterns with the proposed vision is through the current deliberate separation of food systems from people through the urban/rural dichotomy, with settlements that integrate and co-locate food production and consumption. Nelson and Edwards, in *Food for Degrowth* (2021, p.1) suggest that “food provisioning is a key space for contemporary efforts to transform practices to achieve global environmental sustainability”. Their compilation of practical examples illustrates the breadth of interest and variety of approaches to “food sufficiency, food security and food sovereignty”. Nelson and Edwards seek to align the efforts of alternative food networks with advocates of degrowth:

to reinforce common threads such as predispositions to social, shared, simple and slow approaches where aspects of quality, autonomy, frugality, reuse, ethics, reciprocity, traditional approaches and a connection to people, nature and place are valued over economic gain. (p. 7)

This thesis also seeks to synthesise efforts of various groups with aligned values, providing additional political economic rigour in support of these efforts. Importantly, the intention is to provide an implementation pathway that helps navigate the present political economic system and create the new.

1.2. Strategy options

You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.

~Richard Buckminster Fuller

To shift the weight of political economic debates—from critique of the current system to the vision for a new system—it is necessary to develop the strategies for implementing the desired vision. In *How to Be an Anti-capitalist for the 21st Century*, Erik Olin Wright (2016) argues that there are four types of strategies that may be adopted as shown in figure 1. Wright’s analysis is couched in terms of dealing with capitalism as the systemic obstacle to a more egalitarian and sustainable social order. Setting aside the question of whether that

applies in the case of CEVs, his analysis offers pertinent lessons for a more general consideration of how fundamental social, economic and political change may be driven.

Wright quickly dismisses the first option, which is to ‘smash capitalism’: “the evidence of the revolutionary tragedies of the 20th century is that smashing capitalism doesn’t work as a strategy for social emancipation” (Wright, 2016, p. 10). The lessons of history indeed show that conflict and violence, as well as being materially destructive and wasteful, inevitably lead to authoritarian rule enforced by further violence.

Figure 1 Wright’s four anti-capitalist strategies

		Goal of Strategies	
		Neutralizing Harms	Transcending Structures
Primary Target of Strategies	Macro-Political	<i>Taming Capitalism</i>	<i>Smashing Capitalism</i>
	Micro-Social	<i>Escaping Capitalism</i>	<i>Eroding Capitalism</i>

Source: Wright (2016, p.8)

The second option is to ‘tame capitalism’, which is the approach that underpins social democratic politics—to create institutions and systems that ameliorate or neutralise the harms caused by capitalism. Wright argues that taming capitalism “remains a viable expression of anti-capitalism” (Wright, 2016, p. 13). Yet, in this era of globalisation, the power, capacity and willingness of state institutions to tame global corporations continues to diminish. Three decades of inaction on climate change issues suggests that the challenge of achieving global political consensus and then acting on it is beyond national governments. Irrespective of these challenges, a total reliance on national governments also disempowers local communities. Rather than simply advocating for change, communities should be entrusted, encouraged and empowered to enact change.

While this thesis does not preclude the goal of taming capitalism nor discourage continued attempts to pursue international agreements, the focus here is to explore strategies that empower individuals and communities, thus mobilising populations to act. The dichotomy between bottom-up and top-down strategies, though, is problematic as current legal, administrative and institutional frameworks can constrain or facilitate change.

Moving beyond Wright’s first two options—categorised as ‘macro-political’—his other two options are ‘micro-social’ strategies. These are strategies initiated by small groups of people acting collectively to transform their own lives. The two micro-social strategies proposed by Wright are to *escape* capitalism and to *erode* it. This thesis seeks to combine the best elements of the two micro-social strategies, together with certain targeted strategies for taming capitalism.

Typical examples of escaping capitalism are the many ecovillages and intentional communities that usually reject the consumer lifestyle and build alternative village-scale communities, often based on principles such as voluntary simplicity, environmental sustainability and community cooperation. Religious communities such as the Amish and monastic communities generally, can be described as escapees from capitalism. A further, less obvious escape option offered by Wright is the household and family “as a non-competitive social space of reciprocity and caring in which one can find refuge from the heartless competitive world of capitalism” (Wright, 2016, p. 14).

The fourth option, eroding capitalism, is based on the idea that capitalism is just one system—albeit the dominant one—amongst many other parallel systems. Other systems include community networks, member-owned cooperatives, non-profit organisations and peer-to-peer networks engaged in collaborative production and distribution. The strategy for eroding capitalism is to encourage these alternatives, thus increasing their influence and, eventually, displacing capitalism from its dominant role.

Adopting this approach, the proposal here is to erode capitalism by building an ever-expanding network of regenerative villages. Whereas individual ecovillages may be regarded as an ‘escape from capitalism’, the process of replication would create a network. With each new village the network would increase in capacity and resilience thus eroding capitalism. As more and more communities become self-sufficient and self-governing, a diminishing proportion of the population will be participating in the mainstream political economy. At least, the role of central governments and major corporations would diminish as certain commodities, such as food, water and energy are produced and distributed locally, through collaborative processes rather than market exchange.

To erode capitalism in this way it is necessary to develop a replicable development process for building such villages, drawing capital investment and economic activity into that process.

The replication of non-capitalist villages thereby offers a transition strategy to physically build a new political economy. Conceived as a network from the outset, each village can be understood as a cell in the broader social organism. If each cell is regenerative, such that people have a positive impact on each other and surrounding ecosystems, then the larger social organism will also have a positive impact on earth systems. The project therefore relates both to the design of the regenerative nodes in the network as well as the design of a process to enable these nodes to be readily replicated to create a network.

1.3. Potential obstacles

The strategy to be developed must work within current political and economic processes so that these continue to enable, support and facilitate the development of not just one or a few Circular Economy Villages, but a continually expanding network.

The most obvious challenge with this is the need to function within the legal and administrative framework of the nation state—with the aim of diminishing its power! Why would the state undermine its own authority? Would powerful capitalist vested interests allow it to do so even if this was in the public interest? Even if these obstacles were overcome and a new political economic framework was available, how readily can it transform existing spatial forms, big cities and existing large-scale infrastructure?

In navigating a pathway through these obstacles, it is important to recognise that neither the nation state nor capitalist vested interests are monolithic structures. Their power is concentrated in existing major cities. Whilst legally they are part of the state apparatus, local councils in rural areas often regard cities, state authorities and corporations as antagonistic to local interests. When councils work closely with their local communities to develop town planning strategies for their local area it can be very difficult for the state to override their wishes. Local autonomy and authority can be further amplified when the development of a new village offers a return for investors while being more affordable than traditional housing.

The strategy therefore is to develop the first CEVs outside existing cities on available rural land and with communities and councils that support this approach. The prototypes would demonstrate the viability of this development model and thereby help to generate demand for more to be built.

The implementation strategies for bringing the vision into reality may include outlining changes in laws and regulations, the development of strategic town plans and policies, as well as financial strategies or business plans that allow others involved in land development to convert the underlying ideals into real, physical structures and infrastructure that form cities and patterns of human settlements. This converts the problem of capitalist capture into the solution. Capital and resources are invested to create local gift economies. People work on the planning, design and building of villages that liberate future residents of those villages from endless labour and dependence on the capitalist system. As unnecessary labour and 'bullshit jobs' (Graeber, 2018) are eliminated, there would be more time for relaxation, relationships and creativity. Whilst the concept of 'bullshit jobs' is contested, the systemic reproduction of jobs as the only means by which individuals can access their basic needs must be questioned.

1.4. Origins of the research question

This research originated as a town planning history question: What was so special about the city-states of Athens during its golden age in the 5th century BCE, and Florence during the Renaissance, that resulted in such a concentrated flourishing of creativity? This creativity was expressed in numerous disciplines such as the arts, architecture, science, philosophy and politics, although these disciplines were not then regarded as separate. If this initial question—what was so special about Classical Athens and Renaissance Florence?—could be answered, then perhaps it may be possible to replicate those conditions and facilitate another renaissance.

Initially it was assumed that the creativity stemmed from the compact urban form or size of the city, but very quickly it became clear that the political structures and economic organisation were also significant, so a broader interdisciplinary research method was needed. The field of political economy, with its openness to interdisciplinarity, allowed for the reorienting of this research from a purely urban planning project to one that explores the political and economic structures that create the urban form.

One commonality between these two cities—Athens and Florence—differentiating them from present-day cities was that they were politically self-determining and relatively self-reliant economically. The small size of the community also appeared to be an important

factor in enabling a creative culture. Slowly, a vision of hyper-creative city-states began to emerge.

The research then evolved into an exploration of ecovillages—perhaps the closest modern equivalent to a small-scale city-state. Most ecovillage communities are relatively small, they establish systems of self-governance and strive towards self-reliance for certain necessities.

The project formally commenced in 2012 at Griffith University as urban research before transferring to The University of Sydney's Department of Political Economy in 2015. During the Griffith University stage, in 2013, the author spent seven months in Europe, India and Sri Lanka with partner and co-explorer, Nilmini De Silva, visiting ecovillages, intentional communities, transition towns and co-housing developments. Many similar projects were also explored in Australia before and after this period. The relocation of the research aligned with a reframing of the project. Instead of seeking to learn about existing ecovillages, the aim became to explore why mainstream political economic structures appear to obstruct widespread development of sustainable village projects.

A striking commonality amongst many ecovillages was the extremely long lead time from conception to realisation, resulting in a high failure rate. Why was this so? In the long view of history, the village is the most common form of human settlement. Nation states, global economies and mega-cities are recent innovations. Why is it so difficult to do what we, as a species, have always done? Approval processes, development expertise and funding were often beyond the control or capacity of the community and so the power imbalance between communities and the nation-state was identified as an important concern.

It also became clear that, despite wishing to create a new political economy, people living within ecovillages often remain substantially dependent on the mainstream political economic system. Beyond providing basic necessities, ecovillages are generally not able to innovate, create or build complex technologies. Kish and Quilley (2017) articulate the issue:

There has always been a strand of Romantic critique—Morris, Ruskin, Kropotkin, Gandhi, Schumacher—that harks back to smaller scale, more autonomous, less integrated and more artisanal, localized forms of economy. Schumacher's injunction that 'small is beautiful' has become emblematic for radical environmentalists seeking to define a new kind of localized, green political economy (Hopkins, 2014). The question is whether it might be possible to move in this direction, without sacrificing technical capacity and innovation, a high degree of individuation and the benefits of a networked and integrated global society. (p. 315)

Is it possible to achieve the social and environmental benefits of re-localisation without sacrificing technical capacity, innovation, and other benefits of a networked, global society? Perhaps this wicked problem of scale and complexity can be resolved by the Internet, which could conquer the tyranny of distance with respect to communication, while also unravelling complex global supply chains. The proposed vision then developed from singular city-states to an interconnected network of city-states whereby complexity and scale are achieved through organic networking, not by growing bigger.

In 2020, as the effects of the COVID-19 pandemic unfolded, the fragility of global supply chains became evident, highlighting the need to become more locally resilient. Patterns of work also dramatically changed and some, like Joel Kotkin in *The Coming Age of Dispersion*

(2020), began describing the end of the megacity era. The benefits of telecommuting include less time stuck in traffic, more flexibility, and the ability to relocate to more affordable regional locations. Barns (2020) also noted that these technological trends are being accelerated by our response to the pandemic and asked whether a new urban form may take root. Recalling Ebenezer Howard's Garden City and Patrick Geddes' city as a bio-social unit, Barns suggests that:

Like the radical suburban experiments of a bygone era, this public health crisis may yet allow for renewed kinds of making and connecting in previously dormant suburbs and neglected peripheral spaces. It may not be a "flight to the suburbs" in a retrograde sense, but a casting off of rigid modes of separation between home and work, industry and nature, as expressed in city forms. Australia's suburbs may yet be well-suited to a coming era of biophilic urbanism, one that embraces "green infrastructure", regenerative agriculture and productive allotments of either low or high-density urban farms. (Barns, 2020)

The destructive Australian bushfires in the summer of 2019–20 had a similar effect, with many imploring that we 'build back better'. Norman et al. (2021) offer a strikingly similar vision to that proposed here:

Australia decides not to just bounce back, but to bounce forward as good resilient settlements must do, adapting and mitigating as they rebuild...Establishing more sustainable...centres with distributed solar power and water...These sustainable...centres quickly adopt another role as solar recharge hubs for community batteries, electric cars, bikes and small vans...People come to live in such villages as they are part of the zero-carbon transition and there is a new mood of hope in the community as they demonstrate leadership. The model quickly spreads across Australia, building on a long history of distributed power and water systems in remote areas. (p. 6)

This thesis seeks to challenge the current mainstream political economic norms that suggest that centralisation of populations and economic activities in cities leads to greater efficiencies and that economic growth leads to prosperity for all—that bigger is better. These normative statements are often contrasted with similarly normative statements, such as small is beautiful, and that smaller scale, more autonomous and localised forms of political economy are better. As with most belief systems, both propositions contain some truths that can be justified empirically.

The aim of this thesis is to propose a shift away from normative proselytising and develop an evidence basis for the preferred model that incorporates the benefits of small-scale settlements with the complementary benefits of scale and the complexity that arises through the networking of settlements.

The development of this evidence in the following chapters seeks to convert the vision from a normative desire to a positive, empirically justifiable proposition. Yet the process for developing this evidence basis requires a different way of thinking, one in which the world is not viewed as collection of separate settlements but a *pattern* of settlements. The proposed pattern of a more evenly distributed population in networks of circular economy villages may then be contrasted with the existing land development pattern, consisting of highly concentrated populations in cities surrounded by less-densely populated towns and villages.

1.5. A pattern language

The Timeless Way of Building by Christopher Alexander (1979) and *A Pattern Language* (Alexander et al., 1977) are, according to the authors, two halves of a single work that seek to describe an entirely new attitude to architecture and planning. *A Pattern Language* presents “one possible pattern language of the kind called for in *The Timeless Way*” (Alexander et al., 1977, p. x).

This thesis follows the philosophy of *The Timeless Way*, developing a pattern language with many similarities but some minor differences from that developed by Alexander et al (1977). The focus here will be on the larger scale patterns related to town planning rather than detailed architectural design of buildings. In architecture, concepts such as biophilic design and biomimicry have emerged from the pattern language approach. It is argued that a form of biophilic design is necessary for town planning. Given that “[p]attern language has the structure of a network” (Alexander et al., 1977, p. xviii), the emphasis will be on examining settlement patterns that form an organic network, creating inter-dependencies between numerous settlements.

Alexander sought to create an architectural language based on the patterns of natural systems in a place. These patterns necessarily vary from place to place, not just because of differences in climate and geography, but also due to cultural differences between people living in different places. For Alexander, the natural environment shaped the culture of the people in a place, who then transformed their environment so that it was suitable for habitation. This process of environmental transformation has the effect of transforming the local culture. It was this evolving, dialectical process of ever-changing patterns of human activity in an ever-changing landscape that underpins the philosophy of *The Timeless Way*. Good architecture, according to this theory, is ageless or timeless; change eventually slows dramatically, expressing a balance between human activity, structures, infrastructure, and the web of nature within which they are located. It has the quality of resting comfortably within its landscape, displaying “a subtle kind of freedom from inner contradictions” (Alexander, 1979, p. 26).

Yet, like the patterns developed in *A Pattern Language*, those developed in this thesis must be assumed to be “alive and evolving... each pattern represents our current best guess as to what arrangement of the physical environment will work to solve the problem presented” (Alexander et al., 1977, p. xv).

The term ‘network’ described here explicitly relates to an organic interpretation of that word. Organic networks consist of nodes and connections to numerous other nodes in the network. The connections are not optional, they are an intrinsic part of the networked system. Indeed, it is the connections that make the overall pattern visible. A network of villages must necessarily include interdependency-by-design between villages, something that is not evident in, for example, the Global Ecovillage Network (GEN). Although GEN does excellent work in sharing information, providing training, education, and other support to ecovillages around the world, they may be better described as an association, perhaps with the aspiration of becoming a network.

In addition to network patterns, the next section shows how circular patterns can be used to describe human settlements that sit comfortably in the landscape and that are free of inner contradictions.

1.6. Circular economy and the dialectical research method

While circular economy debates often focus on waste management and product life cycles, there are over 100 different definitions of a circular economy (Kirchherr et al., 2017) and it remains a contested concept (Korhonen et al., 2018). This thesis expands the concept of a circular economy by exploring how circular patterns, and Indigenous ontologies can inform the development of a circular political economy in other ways.

Product life cycles reflect a form of *temporal circularity* related to patterns of events over time (Alexander, 1979, chapter 4). Places experience various patterns of events, not just economic activities but also recurring social, cultural, and political events. Whereas in the past, the dominant patterns may have been religious or cultural, today, the dominant ones are the result of recurring economic activities. “A building or town is given its character, essentially, by those events which keep on happening there most often” (Alexander, 1979, p. 66). These patterns give the built environment a certain form and structure (Alexander, 1979, p. 69).

The concept of temporal circularity can be expanded chronologically to describe the patterns of events through human history creating economic cycles. This helps to identify the points in these cycles when great transitions occur—the death of an old system and the renaissance of a new system. The current speed of technological change, together with the pressing social and environmental issues, are signals of a system in its late stages on the cusp of a renaissance.

In addition to temporal circularity, or rather because of it, the concept of *spatial circularity* can be used to describe the distances traversed by resources, people and goods through a product life cycle. These are inscribed in the landscape in the form of roads, railways and other transport infrastructure. Given that a circular economy seeks to eliminate waste and pollution, more localised circulation would waste less energy and resources in the process of distributing goods and managing waste.

A circle can also enclose a system, suggesting a pattern that may be referred to as *holistic circularity*. Human settlement patterns may be understood as holistic systems incorporating private, public and non-human domains.

The pursuit of circularity is also consistent with what Paul Mason (2015) describes as *Project Zero*—zero waste, zero emissions, zero marginal cost production and zero unnecessary labour. Striving for zero (an empty circle) may be contrasted with the present linear pursuit of infinite economic growth.

A fifth pattern is reciprocity or *relational circularity*. Whilst reciprocity generally has a positive connotation—suggesting giving and taking in equal measure—relationships can generate tension when there is an imbalance between these forces. People, buildings, places or systems that are consistent with ‘the timeless way’ have “a subtle kind of freedom from inner contradictions. A system has this quality when it is at one with itself; it lacks it when it is divided” (Alexander 1979, p. 26).

The methodology adopted for developing a pattern language must follow a pattern itself. Dialectics as the adopted method is consistent with this theme, suggesting a shift from linear logic, with embedded assumptions and inevitable externalities, to a more holistic and relational approach to human reasoning. As a method, dialectics acknowledges

relationships between opposing concepts, aiming to reconcile contradictions. Tensions between competing stakeholders cannot be resolved by highlighting the differences but by building relationships 'across the divide'. Dialectics offers the opportunity for a discourse between opposing viewpoints with the aim of arriving at some truth through reasoned argumentation.

The dialectical method adopted in this thesis seeks to identify a range of such opposing forces and examine the tensions that arise between them. Political economic literature often adopts the dialectical method, seeking to highlight and examine contradictions and tensions between opposing ideas. David Harvey's *Seventeen Contradictions and the End of Capitalism* is an example. Harvey (2014, p. 1) describes contradictions as "when two seemingly opposed forces are simultaneously present within a particular situation".

This thesis questions whether such opposing forces must inevitably lead to conflict or whether they may be reconciled or resolved in some manner. Accordingly, an ancient theory of dualities—of complementary rather than contradictory opposites, is adopted. A foundational philosophical principle for numerous societies was that, to maintain harmony, communities must firstly acknowledge and accept the various opposing forces within them. This is evidenced in symbols such as the hexagram, also known as the Star of David, the Indian *anahata* or heart chakra and the Chinese yin–yang symbol, the *taijitu*.

These symbols illustrate that the 'whole' or a holistic perspective always consists of two opposing forces, usually referred to as feminine and masculine qualities. The two triangles in the hexagram represent the masculine blade, which points toward heaven and the feminine chalice, which points to the earth. These earth-bound and heaven-seeker qualities were said to exist in everyone and everything. They did not relate to gender. They referred to the competing desires for, on the one hand, safety and security within our comfort zone (household or community) and, on the other, the desire for discovery and travel with associated risks outside our comfort zone. The heart chakra also includes these same triangles and represents the balance between the three upper chakras, that relate to connections outside of ourselves, with the three lower chakras that relate to our inner physical body.

The harmony of opposites is most eloquently expressed in the flowing circular, black and white form of the *taijitu*. Opposites here are not in competition or contradiction but in perfect union. The feminine and masculine—earth-bound and heaven-seeker—are two parts of the whole, the one flowing into the other. When one becomes dominant it sprouts the seed of its opposite, indicating that excessive domination leads to revolution.

Hence, these symbols illustrate the ideal of synthesis and harmony between opposing forces such as the real and the ideal, the physical and the spiritual, stability and mobility, safety and risk-taking, certainty and flexibility, belonging and discovery, necessity and freedom, and between satisfaction and aspiration.

Karl Polanyi's concept of a double movement may be regarded as having somewhat similar characteristics in the field of political economy. This concept describes how the expansion of markets generates a response in society, usually for greater government regulation. The tensions between liberalisation and regulation, flexibility and certainty, are key drivers of social change. The dialectical discourse in this thesis will identify such universal opposing

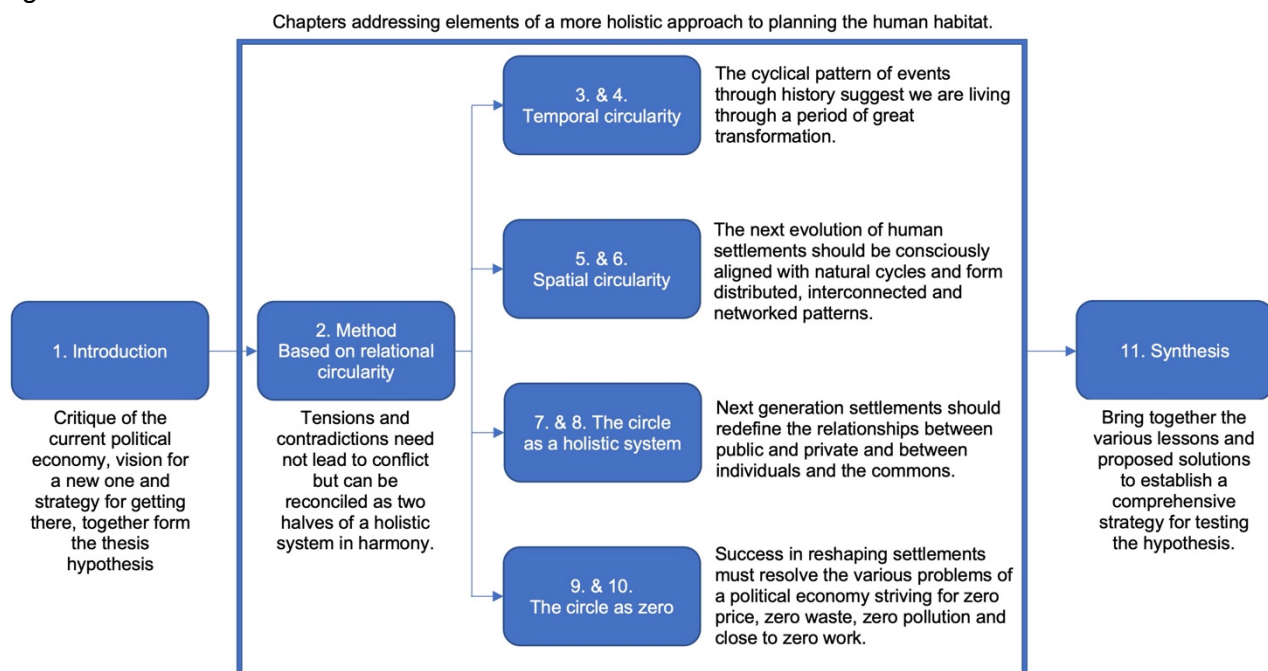
forces and explore how they may be embraced within a broader, more inclusive social system.

The continual flow also implies perpetual change and that harmony between opposites is possible only through the acceptance of change.

1.7. Principal research question and thesis structure

Adopting the dialectical method, this thesis is structured as a discourse. Each chapter takes a different approach, examining a different body of literature, to explore the inter-relationship between political economic theory and the organisation and pattern of human settlements, whether historical, currently existing, or prospective. The chapters are complementary, so that, across the chapters, connections can be developed on various issues such as technological change over time, governance, ownership, and settlement planning. Each chapter will offer a different perspective on the proposed vision of a network of Circular Economy Villages (CEVs), emphasising the fundamental shift from linearity to circularity. An illustration of the thesis structure is provided in Figure 2:

Figure 2 Thesis structure



The approach adopted also incorporates the dialectic between theory and practice; the author's practical experiences inform the theory, while early attempts to implement the new model have helped to further refine the theory.

The principal research question is:

How would human habitats be structured in a political economic paradigm wherein populations were mobilised to regenerate natural systems and, through this, to rehabilitate and regenerate the human condition?

The proposed vision of a network of villages answers this question in broad terms and has many similarities with the 'small is beautiful' vision of the Global Ecovillage Network (GEN),

as well as advocates of degrowth and many others, who argue for more localised economies and community empowerment.

Despite this aligned vision, this thesis is differentiated from ecovillage research in the strategy for achieving that vision. Ecovillage researchers and practitioners tend to examine existing ecovillages and then build another, learning from past practices and always aiming to draw mainstream practice towards their practices by example.

The strategy in this thesis aims to *direct mainstream practice towards the vision*. This requires an examination of the trajectory of past events as they have influenced current settlement patterns—existing cities, towns and villages—and the political economic frameworks that have created these patterns. The focus is therefore on settlement patterns including the connections and relationships between them, rather than the design solely of individual settlements. The intention therefore is to create a *replicable development model* that can be incorporated into planning schemes.

The principal research question can then be reframed in reverse:

How might a disruptive model for building human habitats enable the development of such a regenerative political economic paradigm?

This requires the development of strategies, processes, narratives, and structures for implementing the vision. The aim of the thesis therefore is to clarify the vision and develop the replicable processes—policy frameworks, financial strategies, and design principles—for developing a pipeline of CEV projects.

Chapter 2, Reconciling Contradictions, expands on the discussion above regarding contradictions and asks how the deep divisions in society may be reconciled. It is argued that conflict arises from divergent patterns of thought, each founded on a different worldview. Our view of reality and of truth (ontology) underpins the ways in which we develop new knowledge (epistemology), how we reason, what we believe is right and wrong, and ultimately how we act in the world.

Chapter 2 seeks to develop the ontology, epistemology, and analytical method for the thesis. As the proposed vision represents a paradigm shift in the organisation of human settlement patterns, this must be underpinned by a fundamentally different worldview. Indigenous worldviews are considered to align closely with the circular perspectives outlined above, including reciprocity, systems thinking and cyclical time. The indigenous ontology underpins the epistemology and methodology—it is a way of seeing the world, of acquiring knowledge and a way of acting in the world.

Accordingly, this also offers a way of structuring this thesis. Epistemologically, knowledge is acquired by adding more detail to a particular way of seeing the world. We have started with a hypothesis that describes the world as a network of circular economy villages. The validity or otherwise of this is assessed according to whether that system is *internally consistent*, whether the parts are congruent with the whole. While each of the following chapters explore different fields of study, they nevertheless contribute aspects or perspectives of the whole system.

Methodologically, each of the subsequent chapters, tests the hypothesis against different bodies of literature, adding further substance to it and clarifying various aspects. Each chapter stands alone as a complete analysis but also contributes to the understanding of

the overall system as proposed. The analysis adopts a dialectical method, comparing the present system with the hypothetical future.

In its simplest terms, the hypothesis is that the reorganisation of human settlement patterns into networks of circular economy villages can address a range of economic, social, and environmental issues. This can only be tested, and verified or otherwise, by the actual development of new settlements in the form proposed. This planning, financing, design and building work is outside the scope of this thesis.

The contribution of this thesis is to formulate the hypothesis in as much detail as possible to identify a clear path forward. The next steps in implementation are summarised in the final chapter.

Chapter 3, Great Transitions through History, examines the temporal dimension of circularity, the cycles of change through time. Economic cycles have long been a subject of economic analysis, but this chapter examines the longest possible cycles beginning at the dawn of human societies with the Cognitive Revolution and the beginning of oral storytelling at least 70,000 years ago. Human history can be described by reference to changes in the pattern of human settlements: (a) temporary settlements for nomadic hunter-gatherers, (b) permanent agricultural settlements operating as a trading network of city states and then (c) large scale territorial empires with centralised control in capital cities. Each represents a different political economic paradigm that is conceived, grows to maturity, is adopted by people in other places and eventually collapses and dies when a new and more appealing political economy is conceived.

Like Alexander (1979, p. 69), Harvey (2014, p. 146) notes that a political economy is “writ large and given material form in the geographical landscape”. This chapter will illustrate how changes in settlement patterns through time offer a clear overview of the political economic history of our species.

Adopting the materialist conception of history, this chapter highlights how changes in the technologies of communication led to each of the great transitions in history. New forms of communication changed the social relation of production—oral storytelling made us active land managers, then basic writing and record keeping allowed the formation of permanent settlements and the beginning of agriculture. Written literature as a new means of storytelling together with coins as a means of communicating value ushered in the Age of Empires. The Renaissance and the Reformation of the church occurred soon after the invention of the printing press.

The purpose of this chapter is to show this pattern of change over time, whereby a dominant system is disrupted by new communication technologies. It lays the groundwork for consideration of disruptions being caused by the internet, hinting at the significance of its impact.

Chapter 4, The Internet and Another Great Transition, builds on this interpretation of history to describe how the internet—the latest technological revolution in communication—is fundamentally transforming human societies, including patterns of human settlement. The distributed character of the internet—the fact that it has no centre and no borders—together with the new possibility of distributed energy systems, underpins the proposition that human settlement patterns have the potential to become more distributed.

This chapter is divided into two parts. The first part theorises the concept of a great transition through two theories of economic change over time: Marx's materialist conception of history and Schumpeter's creative destruction. The second part outlines specific examples of how the social relations of production are changing.

Changes in the social relations of production cause economic disruptions. Already, numerous information industries have been disrupted—music, books, movies, journalism, and photography. Energy industries such as electricity and transport are now following.

These disruptions in different industries are also converging. For example, transport and information disruptions converge whereby mobile phone apps enable car sharing or where telecommuting reduces the need for physical commuting. Tony Seba's (2014) analysis of economic disruptions and their convergence will be extended to show how these early changes will also cause disruptions in food systems, water cycle management and housing, and ultimately disrupt patterns of working and living.

Precinct-scale infrastructure—renewable energy micro-grids and water micro-grids—are increasingly being incorporated into housing developments. This has positive implications for the viability of a transport disruption, enabling a community to power and share a small fleet of electric vehicles. Disruptions in energy, water, transport, and housing can then converge and facilitate the much-needed disruption of industrial agriculture in favour of precinct-scale regenerative agriculture.

It is through the analysis of these disruptive potentials that this chapter explains the logic of seeing the present era as pregnant with possibilities for new urban forms.

Chapter 5, Centralisation or a Distributed Network, examines the spatial dimension of circularity, asking how far do resources, goods and people travel in order to close the loop in a circular economy? Given that local cycles would be more energy efficient than global cycles, the development of precinct-scale, village settlements with integrated infrastructure, as proposed in the previous chapter, is worthy of further consideration.

Yet, the design of human settlements does not only relate to individual villages but also how they scale and connect to form the broader social fabric. The relationship between an individual village and the broader society is conceptualised as a node in a network of villages. The exploration of patterns of human settlements invites a discussion of utopian town planning ideas, particularly of Le Corbusier, Lewis Mumford, Frank Lloyd Wright, and Ebenezer Howard's theory for building new settlements. A broad theme emerges of a distinction between the urban mechanical city and an organic city, leading to a set of guiding principles for the development of a network of organic villages.

One of the key design principles proffered by Mumford is that "urban, rural and natural landscapes [should be] meshed in synergistic fashion" (as cited in Stephenson, 2018, p. 284). The dissolution of the urban/rural and built environment/natural environment dichotomies challenges the assertion that the industrialisation of agriculture led to increased efficiency of food production. It also challenges the parallel assertion in mainstream economics that the agglomeration of industries in urban areas leads to increased efficiency. In both instances, the efficiency referred to is of production, while the resulting decreasing efficiency of fossil fuel dependent distribution is essentially ignored. The two-region, core-periphery model used in economic geography to explain, mathematically, why industries

and economic activities agglomerate in larger cities fails to account for the increasing costs of distribution as goods are produced further and further from their point of consumption.

This chapter argues that when the efficiency of production *plus* distribution is accounted for, the only stable equilibrium condition is where populations are evenly distributed.

Chapter 6, New Towns and Settlement Research, examines how the town planning theory for building new settlements has been implemented in practice. The dialectical discourse also compares and contrasts the mainstream development of greenfield precincts with the development of ecovillages. The dichotomy between the accepted norms and alternative lifestyles is shown to be dissolving as new mainstream ‘co-living’ development models and sustainable suburbs emerge.

The chapter draws from experiences with ecovillages undertaken early in this research project that sought to identify the many issues and challenges with alternative development forms. These challenges arise because these alternatives are not recognised in the mainstream financial and town planning systems. Important lessons, concepts and examples from these experiences offer a useful starting point in the development of the patterns identified for the networked CEV development model.

This experience highlighted the significant demand for alternatives, but also illustrated that to mobilise populations it is necessary to develop a specific model that may be readily replicated—funded through existing financial structures and designed in accordance with best practice technical principles. The strategy needed to deliver the desired vision is to construct a clear planning approval pathway for *Circular Economy Villages* so they may be readily financed and built; much like *apartment buildings* or *detached dwellings* have clear approval pathways in planning policies. Consideration of these issues moves the thesis onto the practical terrain of implementing change.

Chapter 7, A Social Foundation for Aspiration, further develops the village-scale, food producing, regenerative settlement model. This chapter explores holistic circularity and examines the household/city dialectic. The proposition is that rather than the household as the basic unit of society, a regenerative village community should be adopted as the basic unit. Whereas previously the village is described as node in a network, in this chapter it is conceived as a cell in a larger social organism.

The identification of the household as the basic unit of society arises with the separation of the *private household* from the *public/ political domain*—respectively the domains of women and men—in Greece’s Archaic period (c. 800–500BCE). Referred to as ‘*oikonomia*’ (household management) and ‘*politía*’, the separation of the domains of necessity and freedom became a central construct of the Western imaginary. An integrated political economy must therefore re-imagine and synthesise the relationship between the basic unit of society and the society at large.

Examining the critiques offered in feminist economics, the current economic system can be understood as consisting of two operating systems: a *gift economy* within households and local communities, which provides a foundation for the broader *exchange economy*.

The ecological economics critique similarly argues that natural ecosystems provide a foundation for the exchange economy. The concept of a social foundation can also be found in literature on a Universal Basic Income (UBI). Yannis Varoufakis (2016) insists on the

necessity to build a “foundation, not a [safety] net, a floor on which to stand, solidly, and to be able to reach for the sky”.

Rather than a central government providing a UBI, this chapter seeks to align with the general principles of such progressive public policy proposals, while remaining consistent with the strategy of empowering people and communities. Accordingly, it is argued that a more sustainable option would be to build places where people could work together—and with the land on which they are located—to provide basic necessities for all in their community.

Chapter 8, Commoning for Thriving Individuals, moves the analysis forward by looking more specifically at social principles for managing ‘the commons’. It reviews the literature related to the commons from Garrett Harden’s *The Tragedy of the Commons* to the work of Elinor Ostrom. It examines the dialectical relationship between the individual and the collective, showing how Ostrom’s principles for local governance and stewardship of the land can be used as a system of governance for CEVs.

Some of the literature related to the commons—and commoning as an activity—promotes the benefits of collaboration as an antidote to the excessive individualism of modern society. Rather than casting this as a binary choice, a synthesis is proposed, suggesting that individuality is best pursued in community and through collaboration. That is, one’s individuality emerges through the identification of a role or contribution in the efficient provision of basic needs for all members of the community. By sustaining everyone efficiently, all will then have the time and space to pursue their individual passions and interests. Efficiency for the pursuit of liberty and liberty for the pursuit of happiness.

Collective management of the commons implies a relationship to land more akin to stewardship than to individual ownership, control and exclusion. The ensuing proposal for collective land ownership identifies the necessary property rights and system of land tenure. A system of shared ownership of a CEV is proposed, the title of which is held by a company or trust, together with individual rental agreements setting out management responsibilities. This provides a better balance between access and ownership and reconciles the binary choice between ownership and renting.

New development models referred to as ‘build-to-rent’ and ‘co-living’ are similar to retirement villages and student housing, but for all age groups. These precinct-scale developments integrate housing with shared facilities and services, and are held in single ownership. The collective term Housing as a Service (HaaS) could be adopted for such models as a parallel to the emerging concept of Mobility as a Service (MaaS). In a CEV, the operator would be the community managing their common assets and collectively owning the site. This ensures that the benefits from capital improvements accrue to the residents rather than external developers, financiers, or shareholders. A further circular economy perspective is that money, wealth, or benefits should circulate locally as much as possible with minimal extraction from the community.

Through analysis of these issues, the chapter concludes that holding, operating and maintaining assets post-construction requires a different attitude to design and construction. It is more likely that financing strategies will use life-cycle costing, seeking to maximise durability and quality to minimise ongoing maintenance issues.

Chapter 9, From Extractive Scarcity to Regenerative Abundance, further develops the political economic logic that underpins the network of regenerative settlements, proposing a shift from scarcity to abundance. Scarce commodities have a high price, while for abundant commodities their over-supply should drive the price towards zero.

The proposed CEV model for localisation—which strives for abundance—is compared with proposals for voluntary simplicity or frugal living as posited by Trainer, Alexander, and others. Trainer (2014, p. 1) responds to the limits to growth and excessive consumption by arguing for a more frugal lifestyle as a vision that liberates us to enjoy a higher quality of life.

This chapter explores the implications and limitations of this viewpoint, identifying the many similarities and certain critical differences. The key challenge for simplicity, sometimes called the sufficiency economy, is in implementation. Who decides how much is sufficient and how is this calculated? The calculation debate of the early 20th century is therefore discussed leading to questions about the efficient allocation of capital and whether alternative systems stifle or encourage innovation. An important consideration is to determine how production levels are to be determined when the price is zero.

The economic design of CEVs resolves the calculation problem by planning for a discrete population and planning only for their essential needs. Planning for a fixed and discrete population stabilises the overall demand for basic necessities such as food, water, energy and shelter. With an estimate for overall demand, it is possible to efficiently allocate the capital resources needed to build the local infrastructure and supply that demand. Co-location of producers with consumers makes distribution highly efficient also.

These alternative approaches to the extractive scarcity model leads to this chapter ultimately contrasting two strategies, the present political economy pursuing infinity and the prospective one pursuing zero. The aspirational pursuit of infinite economic growth is contrasted with the pursuit of zero waste, free commodities and freely accessible public infrastructure, all within the emerging zero marginal cost society (Rifkin, 2014). Mason calls this Project Zero and also proposes the reduction of necessary labour time as close as possible to zero.

Chapter 10, The Freedom to Remake Our Cities, further examines how the latter vision ought to be brought to fruition. It explores the dialectical relationship between necessity and freedom and the increasing freedom that could arise through a reduction of labour time towards zero. A critical contradiction in the mainstream economic narrative is the simultaneous pursuit of liberty as the highest ideal together with the endless creation of jobs and work.

The chapter begins with a clarification that freedom should always be defined in relation to something that the subject wishes to be free from and something that the subject wishes to be free to do. The proposed vision creates a framework that potentially can free everyone from economic necessity. Those who are already free from necessity are free to remake the city as a network of CEVs, which can liberate more people from necessity.

The ideals of liberty and equality are also discussed through the perspectives of historical idealism, historical materialism, by reference to David Harvey's *The Right to the City* (2008) and *Rebel Cities* (2012) as well as Francis Fukuyama's *The End of History?* (1989).

Various other perspectives of freedom are examined, such as freedom from authority, freedom from being settled and freedom to be a minimalist.

As in the previous chapter, the problem of zero continually arises. Can a society function when something is given for nothing? Is it wise to give people the freedom to do nothing? A brief history of the development of zero as a concept identifies the distinction between nothing as a void or emptiness, compared with doing nothing as the free time and space to recuperate, recalibrate and recreate. While these concerns may seem somewhat abstract, the chapter concludes that such changes in cultural norms and values—particularly with respect to the relationship between work and freedom—are fundamental to realising the vision articulated in this thesis.

Chapter 11, Synthesis and Implementation, brings together the arguments developed throughout this thesis to provide:

- (a) A justification for the proposed shift from the status quo to the proposed vision.
- (b) A pathway for overcoming the numerous obstacles to such a transition.
- (c) Narratives for change, including those describing the transition process and the desired vision.
- (d) Connections with alternative visions, such as for degrowth, simple living, the global ecovillage network and the steady state economy.
- (e) Recommended federal and state policies that may be incorporated in proposals for a 'Green New Deal'.
- (f) Suggested necessary local government policies, strategies, and processes to enable the development of CEVs in a local government area.
- (g) Suggested financial plan and design principles for the development of CEVs.

The final chapter, therefore, summarises the key elements of the vision and outlines the next steps in its implementation. As the vision requires a paradigm shift from current normal practice, the narratives are critical in facilitating the necessary cultural changes. The narratives developed in the thesis include: 'from centralised to distributed', 'from extractive to regenerative', and 'from linear to circular'. Concise descriptors of the proposed vision include 'a network of circular economy villages', and, from an Australian Indigenous perspective: 'a network of waterholes connected by storylines'.

2. Reconciling contradictions

The tendency in political discourse is to create an absolutist imaginary. For example, that China is an authoritarian state and Australia is a free market democracy; or that politicians on the right of the political spectrum are advocates of a 'free' market, while those on the left are authoritarians. Consequently, these competing ideas, perceived in an imagined pure form, are framed as extreme opposites and necessarily in conflict. Opposing views, held rigidly, are unlikely to engender a healthy debate through which an appropriate blending of these extremes may be developed. Politics has become a 'competition of ideas' with a 'winner-take-all' attitude on both sides. Whereas 'divide and conquer' was a principle used throughout history by invaders and colonisers, it has now become an organising principle of modern societies. The Westminster System is an extreme case in point, encouraging conflict between government and opposition.

In this chapter it is argued that any proposed vision for a better future—such as the case for new settlement patterns developed in this thesis—must have broad appeal, embrace opposing perspectives, seeking to heal the significant divisions in society today.

The first step in this process ought to require a suspension of certainty. How is it that each side can be absolutely certain that they are right and equally certain that the others are, to be polite, misguided? What is the truth? What is reality? Furthermore, how do we arrive at a conclusion that something is true or real?

Ontology is the philosophical study of *what is*; for example, what is real or what is true. Epistemology relates to the study of knowledge; *how we know* what is. Our views of reality and of truth underpin—often unknowingly—the ways in which we develop new knowledge, how we reason, what we believe is right and wrong, and ultimately how we act in the world. Together, all these patterns of thought form what Thomas Kuhn referred to as a paradigm. In *The Structure of Scientific Revolutions* (1962), Kuhn argued that periods of 'normal science'—the cumulative building of knowledge—are occasionally interrupted by discontinuities or paradigm shifts. The transition from Newtonian mechanics to Einstein's theory of relativity and quantum theory was a paradigm shift. The rules of physics changed as our understanding of the universe changed. Before the shift, normal science assumed a mechanistic, deterministic, rational universe that can be studied objectively. After the shift, normal science assumes a probabilistic and relativistic universe—a universe that changes according to our perspective and is therefore subjective.

Herman Daly adopts Kuhn's argument and argues that there is "an emerging paradigm shift in political economy" (1973, p.1) from a growth economy to a steady state economy. Indeed, the mainstream political economic paradigm still assumes a mechanistic universe that science abandoned more than a century ago. The widely accepted ontological presumption in the current paradigm is that only a growth-oriented system can generate social progress. Economists and politicians alike cling to the myth of economic growth because it is the reality through which they understand and act in the world. Despite all the evidence of environmental and social damage caused by the growth paradigm, they are not able to perceive the world in any other way. Growth and progress are expected to continue on an upward trajectory over the long term. Boom and bust cycles are simply fluctuations within a

trend that is considered inevitable. Or is it? How can we be certain? How many empires in the past were certain that they were in control—just before collapse?

This thesis adopts a non-linear view of historical processes. The ontological position is that the ebb and flow of history reflects a universe, or a world, in constant flux. Change is constant and inevitable. The best we can do is to try and understand the patterns of past changes to inform possible futures. I have formed the view that these patterns can be understood as cycles. In the introduction I used the term temporal circularity—cyclical change over time. This view has been informed by ancient Chinese philosophical perspectives—the flow between yin and yang—as well as by Indigenous philosophies. For Indigenous peoples everywhere, time is cyclical (Abram, 1997, p. 183; Watson, 2015; Yunkaporta, 2019). Time follows the patterns of the natural world. A stage of growth leads to maturity, followed by decay, then death. The cycle does not end with death as after a return to the earth, new life is born to again repeat the cycle (Yunkaporta, 2019, p.44). Maturity—of individuals and society collectively—occurs upon the acknowledgement that the growth phase has ended, and it is time to consciously manage the subsequent phases of decay and death. It is not possible to defy these natural cycles and continue growth beyond natural limits.

A foundational ontological position adopted in this thesis is that the cyclical patterns of the natural world must govern all human behaviour. According to this relational view (Graham & Maloney, 2019, p. 389), collective political economic systems must be informed and guided by the patterns and processes of natural systems.

Irene Watson's *Raw Law: Aboriginal Peoples, Colonialism and International Law* (2015) has perhaps been the most influential and most thorough in describing the difference between an Indigenous worldview, referred to as relational philosophy or relational economics, from a non-Indigenous perspective. This comparison is summarised in table 1. Additional descriptions have been included in brackets expressing this contrast using language that is used elsewhere in this thesis.

Table 1 Contrast between Indigenous and non-Indigenous political economic philosophy

Indigenous	Non-Indigenous
Obligations to renew land	Land ownership
Balance and renewal	Progress, accumulation, control
Lateral thinking (holistic, systems thinking)	Linear thinking
Consensus (based on equality)	Hierarchical patriarchy
Reciprocity (intersubjectivity)	One-way exchange (subject-object relationships)
Justice, harmony	Adversarial punishment
Relationships (dualities)	Binaries (and dichotomies)
Eternal time (cyclical time)	Linear or machine time

Source: Watson (2015, p. 14)

These contrasting paradigms, represent very different ways of understanding the world, of reasoning and developing new knowledge, and ultimately of acting in the world.

This chapter articulates the ontology and epistemology for this thesis, guided by the aim of facilitating a shift from non-Indigenous to the Indigenous worldview as posited by Watson. It

is, of course, acknowledged that individuals from either cultural framework can hold the opposite worldview. The intention here is to engage in a dialectical discourse contrasting the traditional Indigenous political economy with the present mainstream one.

This thesis will refine the opening hypothesis—that the reorganisation of human settlement patterns into networks of regenerative villages can address a range of economic, social, and environmental issues. The author's version of this hypothesis is summarised in the appendix. This hypothesis has been developed both intuitively by many ecovillage residents and inductively through various bodies of research, including into ecovillages (Litfin, 2014; Andreas and Wagner, 2012). No further social science research is deemed necessary for the purposes of this thesis. Instead, starting with this hypothesis, a deductive research project is initiated, whereby the hypothesis can ultimately be tested through the actual development of new settlements in the form proposed. This thesis adds substance, depth and rigour to the hypothesis (see Figure 2) before undertaking the costly exercise of planning, financing, designing, and building a pilot village project to test the hypothesis. This is necessary to ensure that there is as much clarity as possible with respect to the vision, and to identify a clear path forward.

The next steps in the proposed strategy are summarised in the final chapter. Each of the intervening chapters test the hypothesis against different bodies of literature, adding detail to it and clarifying various aspects such as urban design, governance, scale, tenure, economic objectives and so on. The analysis in these chapters adopts a dialectical method where possible to compare the present system and the hypothetical future.

The path forward must, according to the cyclical view of change discussed above, carefully manage the death of the current system, to give birth to new political economic paradigm. This implies an endeavour that retains the useful elements of the current system and blends them with the new worldview. The current system is arguably already in decay, having exceeded the limits to growth. The imperative is to avoid collapse that would likely result in a loss of knowledge and capabilities, as well as causing widespread misery.

Meticulously developing the hypothesis aligns with the practice of careful reflection prior to action. This allows us to fully absorb existing knowledge and appreciate current circumstances before determining the path forward. Consistent with an indigenous ontology, epistemology, and methodology, this is a way of seeing the world, a way of acquiring knowledge and a way of acting in the world.

Pausing and reflecting allows us to observe patterns in the landscape and the pattern of events that occur in a place. This observation and understanding of the rhythms of a place is a precondition to finding a connection to Country. The connection is established when political economic systems are informed by and integrated into these rhythms and patterns. As discussed in more detail in chapter 8, the land teaches people the law (Graham & Maloney, 2019, p. 389)—social systems are informed by natural systems. From this perspective, the natural science questions—related to, for example, energy efficiency and thermodynamics—must prevail over social science questions—such as human preferences and traditional practices—if a society is to be embedded in the natural world.

The remainder of this chapter, therefore, provides a discussion contrasting Indigenous and non-Indigenous political economic perspectives, by reference to some of the characteristics identified by Watson in table 1. The aim is to better appreciate the indigenous worldview,

which, as discussed in chapter 3, translates into a distributed governance system and regenerative land management practices. To acknowledge and value these perspectives and practices, it is imperative that pre-industrial societies are no longer regarded as pre-civilised, wherein life was supposedly “solitary, poor, nasty, brutish, and short” (Hobbes, 1651, p. 78).

The epistemology—how we accumulate knowledge—must follow the holistic ontology. As this thesis seeks to describe a complete system, its validity or otherwise should be principally assessed according to whether that system is internally consistent, and whether the parts are congruent with the whole. While each of the following chapters explore different fields of study, they nevertheless contribute aspects or perspectives of the whole system.

The methodology could then be described as reflecting on a hypothetical vision of the world. By observing it from various perspectives, patterns, rhythms, and common features are identified. In the final chapter these different perspectives are threaded together into a rigorous, integrated strategy for developing a regenerative political economic system.

2.1. Relationships versus binaries

Watson (2015, p. 13) suggests that one difference between Indigenous and non-Indigenous worldviews is that the former is relational whereas the latter divides, creating binaries such as ‘us and them’, ‘left and right’ and so on. This is consistent with the opening discussion relating to an absolutist imaginary.

From the second world war until about 1980, the dominant view in political economy held that the state had a significant role in managing the market. With the election of Margaret Thatcher in the UK and Ronald Reagan in the US the neoliberal era commenced wherein the role of the market was paramount, with the state considered to be an obstruction to the freedom of the market. The view that either the state or the market should dominate, and the other should be submissive, is binary. The view that these are two parts of one socially constructed system is relational.

Karl Polanyi, in his 1944 work, *The Great Transformation*, articulated this relationship between market and state. He proposed the concept of the double movement, which refers to the dialectical process of social change through history, whereby “the market expanded continuously but this movement was met by a countermovement checking the expansion in definite directions” (Polanyi, 2001, p. 136). Polanyi (2001, p. 148) was critical of the principle of self-regulating markets in an absolute form, arguing that there is always a dialectical relationship between markets and state regulation, stating that “in our view the concept of a self-regulating market was Utopian, and its progress was stopped by the realistic self-protection of society”.

According to Polanyi, these opposing forces are in constant flux, with one dominating, then the other. While Polanyi identifies a relationship between market and state, that relationship is not necessarily healthy and accepting of its mutuality. David Harvey uses the term ‘contradictions’, that is, “when two seemingly opposed forces are simultaneously present within a particular situation, an entity, a process or an event” (Harvey, 2014, p. 1).

Should such opposing forces necessarily conflict, must the competition of ideas lead to one dominating over the other or can they be harmoniously integrated within a social system?

A significant challenge when framing such a nuanced discussion is in the careful and precise use of language. Precision in the use of language may be dismissed as ‘just semantics’ but misunderstandings and conflict often arise due to different interpretations of, and connotations evoked by, words. When referring to opposing concepts or ideas, various words are utilised, including contradictions, dualities, binaries, dichotomies and dyads. Each of these will be utilised in a specific way and in accordance with their literal meaning as obtained from the Macquarie Dictionary (2003):

- Contradiction: “direct *opposition* between things compared”. Literally to speak against or oppose in speech. Contradiction shall be used where opposing forces are in conflict.
- Duality: “composed or consisting of two parts”. Duality shall be used where opposing forces are embraced within a system.
- Binary: “inclined to adopt a view which allows only two clear-cut possibilities”. Binary shall be used to refer to a choice between two mutually exclusive options.
- Dichotomy: “division into two parts”. Dichotomy shall be used to describe the division of something into two, usually to suggest the inappropriateness of such a division. Contradictions may be created through the division into two of something better understood as a duality.
- Dyad: “a group of two; a couple”. Dyad can be used as a neutral term to refer to any of the terms, contradiction, duality or a binary choice.

Interpreted in this context, Polanyi’s double movement can be seen as the motor of change over time, resulting from the interaction of market forces and government regulation. The two form a dyad within the political economic system. There is no binary choice as both are necessary for the proper functioning of the system. The perceived dichotomy between market and state creates the perception of contradictions, which in turn, leads to conflict. A more holistic approach would embrace the role of each as mutually dependent parts of the market/state duality.

By adopting the dialectical method, this thesis seeks to recognise, develop and express relationships between opposing forces within a society. A healthy dialogue allows connections to form between contrasting perspectives, binding them into a mutually beneficial relationship.

When developing a *vision* for society, the choices are rarely, if ever, between binary options such as between absolute authoritarianism or absolute liberty. Instead, everything is relative, and questions should be framed in terms of more, or less, government control than is currently the case. Binary choices can arise, though, in the development of a *strategy*. A strategy or specific policies can allow greater individual freedoms or more centralised control but not both. *A strategy, therefore, would set the direction of change towards one or other utopian extreme but always with the aim of finding a balance or equilibrium between these extremes.* This balance between opposing extremes has variously been called the Middle Way, the Golden Mean or simply, moderation.

In the present circumstances, where there are deep divisions between those on the political right and left it is necessary for both sides to suspend their certainty. The consequent tribalism probably reflects the need to belong to a group rather than being a means of framing a debate. On the left are the liberals while the libertarians are on the right! Leftists may be labelled as authoritarians when they demand greater state regulation or taxation,

yet the oligopoly control of our daily lives by a few major corporations can also be described as authoritarianism.

In a relational worldview, left and right are two halves of the social body. They are complementary opposites and equally necessary.

2.2. Reciprocity versus exchange

The distinction between reciprocity and one-way exchange, as proposed by Watson, is that the former are more organic and fluid, while the latter are mechanistic and rigid. Exchange relationships become mechanistic because they are mediated by laws, regulations and money systems imposed by others outside the exchange relationship. These externally imposed constructs inhibit the direct and meaningful engagement between the parties that is necessary for true reciprocity.

Another distinction is that reciprocity implies giving and taking in equal measure, so there are no winners and losers. By contrast, market exchange is essentially designed on the assumption that producers can extract profits, creating a political economic system that assumes that extraction is a fundamental requirement for its functioning.

In the mechanistic, exchange view, producers are separate from consumers, whereas a more organic appreciation might recognise that all members of society contribute in some way to production, and all are consumers.

These differing perceptions of the same phenomena is the field of concern of the branch of philosophy called phenomenology. Phenomenology literally means the study of appearances. How the world appears to an observer suggests as much about the observer as the subject of observation. Founded by Edmund Husserl in the early 20th century, phenomenologists reject the notion of objective research, which implies a separation between the observing subject and the object of study. Coining the term *intersubjectivity*, Husserl enabled a shift in emphasis from a separate subject and object to the *relationship* between two subjects.

Intersubjectivity, like dialectics, has a number of implications for a research project. It challenges the assumed objectivity of scientific study, proposing instead that the act of observation, study or research necessarily influences, and is influenced by, the *object* of study. Phenomenologist David Abram (1997, p. 38) notes that intersubjectivity transforms the project of science into “a striving to achieve a greater consensus, greater agreement or consonance among a plurality of subjects”.

2.3. The relational city

Adopting this interpretation by Abram, the objective of a relational city may be described as a striving to achieve greater harmony (a) between the various citizens within a city, (b) between individual citizens and the city as a whole and (c) between the natural ecosystems in a locality and the human habitat constructed within them.

To establish a mutually beneficial, inter-subjective, consensual, relationship between humans and natural ecosystems, the concept of control and ownership of land must be revised. The many benefits of a healthy landscape are accompanied by obligations to renew and regenerate the land. This land stewardship requires some form of collective, rather than

individual, ownership to identify the community responsible for a particular geographical area.

To further develop this appreciation of the city as relational, it is necessary to expand our perspective of what a city is. Dialectics is a useful method for doing this as it also expands our perspective of the world. Instead of looking at one thing, we look at two or more things plus the relationship between them. Bertell Ollman (2003) refers to this as the process of abstraction:

Dialectics restructures our thinking about reality by replacing the common sense notion of “thing” (as something that has a history and has external connections with other things) with notions of “process” (which contains its history and possible futures) and “relation” (which contains as part of what it is its ties with other relations). Nothing that didn’t already exist has been added here. Rather, it is a matter of where and how one draws boundaries and establishes units (the dialectical term is “abstracts”) in which to think about the world. (Ollman, 2003, Chapter 1)

Ollman notes (2003, Chapter 5) that Marx’s method starts with the “real concrete...world as it presents itself to us”. His next step is the process of *abstraction*; “the intellectual activity of breaking this whole down into the mental units with which we think about it”.

For our purposes, the ‘real concrete world’ is the human habitat, and the process of abstraction involves breaking this down into mental units. The mental units usually adopted are individual settlements that are referred to as cities, towns or villages. If the spatial abstraction is broadened we may consider a number of settlements and the spatial relations and connections between them. The human habitat also includes temporal relations, such as the process of planning, design and construction of a settlement. Post-construction processes include ongoing political governance, as well as economic management and maintenance of infrastructure. Each of these must ultimately fit together into a human habitat that includes all spatial and temporal sub-systems.

Dialectics brings into view parts of the system that are not readily visible. For example, the current abstraction of the ‘city’ assumes city limits that separate urban from rural areas. The urban/rural dichotomy could become a duality by expanding the notion of city to incorporate food systems, resource extraction and waste disposal as internal parts of the city system. The city could therefore be recast as a system that provides for the needs of its citizens. There is also a growing body of research encouraging a decentring of the human from city planning, promoting the ‘more-than-human’ city (Clarke et al., 2019; Steele, 2020). The more-than-human city is consistent with the proposal here to break down the artificial boundaries between urban, rural areas and natural landscapes.

The emphasis on settlements may obscure the fact that before the advent of settled agriculture, humans were nomadic. Permanent human settlements are a relatively recent phenomenon, arising during an unusually stable climatic period. Should human settlements accommodate nomadic lifestyles? Grey nomads and ‘van-lifers’ would argue in the affirmative, as would many ‘digital nomads’ who work online and so need not be anchored to any particular place. Therefore, references to ‘human settlements’, as the abstract system under consideration, may lead to the prioritising of *settlements* over the connections between settlements and also the *settled life* over the nomadic life. From the perspective of nomads, settlements can be perceived as ‘waterholes’, temporary places of rest, where food

and water may be found. The broader landscape, therefore, may be viewed as a network of waterholes, connected by storylines.

For the sake of clarity, this thesis uses the terms ‘human settlements’ or ‘settlements’ when referring to the nodes in the network, while the whole network may be referred to as the human habitat or the network of settlements. While this terminology may appear to contradict the more-than-human city, which is implicit in the proposed vision, the explicit language—more-than-human—has not been adopted for simplicity.

2.4. Balance versus progress

Another abstraction that broadens our perspective is the inter-relationship between our social ideals and the reality ‘on the ground’—in the way we organise cities. This reflects the dialectic between our ideals and material reality. The dialectical method, in the form developed by Georg Hegel, may be used to reorient towards a worldview that strives for balance, and away from one that strives for progress through economic growth.

According to Maybee (2020), Hegel argued that logic may be presented as a dynamic process consisting of three moments. “The first moment—the moment of understanding—is the moment of fixity, in which concepts or forms have a seemingly stable definition or determination”. This is the statement of a proposition or thesis. “The second moment—the ‘dialectical’...is the moment of instability” (Maybee, 2020, section 1). This is created when a logical case can be made for the opposite of the proposition.

According to Maybee (2020, section 3) Hegel believed that dialectics is in everything because nothing is fixed and stable; everything is in a constant state of change. Therefore, every thesis implies within it an antithesis.

In our example, the prevailing proposition is that economic growth in all circumstances and at all times is the pathway to prosperity for all. This has generated the antithesis, where many (Schneider et al., 2010; Kallis, 2011; Trainer, 2014; Liegey & Nelson, 2020) argue that developed countries have significantly exceeded their optimal economic scale and the urgent project is one of economic degrowth. Yet this antithesis is also unsatisfactory because the benefits of economic development are unevenly distributed so many people and regions would benefit from growth and development.

Hegel’s third moment—synthesis—“grasps the unity of the opposition between the first two determinations” (Maybee, 2020, section 1). Neither of the first two are negated. Instead, their inter-relationship offers a broader perspective.

Therefore, growth and degrowth, thesis and antithesis, may be brought together, synthesised, to describe a political economy in a state of constant change between growth and degrowth. Economic systems are already understood to experience cycles of growth followed by recession; that is, boom and bust cycles. The result of planning only for growth is that the economy inevitably experiences unplanned downturns and recessions. A dialectical approach would acknowledge cyclical change and manage both the growth and decay phases of the economic cycle, like the cycles of change in natural systems. Hegel’s dialectical method—thesis, antithesis, synthesis—applied in this context, might be expressed as follows:

- Thesis: economic growth leads to a prosperous future for all.
- Antithesis: the unconstrained pursuit of economic growth has caused environmental degradation, impacting on health and wellbeing of humans and other species. Degrowth is now necessary to support natural systems that are the foundation of economic prosperity.
- Synthesis: Natural systems display cycles of growth and decay, followed by death and regeneration leading to new growth. Economic systems should therefore not just manage growth but also decay, death and regeneration. They should therefore mimic natural cycles and align with natural ecosystems.

Degrowth scholars argue that the term is an intentionally “provocative slogan” (Liegey & Nelson, 2020, p. 2) intended to challenge the growth mentality that is so much a part of mainstream economic thinking and practice. Degrowth encourages a shift from quantity of production to quality of life. This objective is entirely consistent with the proposition in this thesis, but words matter when aiming to mobilise populations.

Degrowth, like growth, implies a linear, one-directional logic. Degrowth is the antithesis of growth. The current connotation, the sense evoked by growth, is of the pathway to prosperity. Accordingly, the connotation of degrowth is of a pathway to poverty. Whilst the objectives of degrowth are supported, the term itself is not proposed to be included in the *strategy* to be developed here.

2.5. The balanced city

The preferred strategy is to work towards a balanced city, aligning with the concept of a steady state economy and functioning in harmony with local ecological conditions. The steady state economy was proposed by Herman Daly (1973), who also argued that environmental degradation is caused by excessive economic growth. The term ‘steady state’ comes from the field of thermodynamics and refers to an energy system that is dynamic but stable.

The balanced city strives for balanced relationships between citizens, between individuals and the collective, and between the collective and the land on which they are located. Ecosystems operate as thermodynamic systems, capturing and circulating energy from the sun. Balanced political economic systems would similarly operate by capturing and circulating energy, while minimising energy losses.

Such a balanced economy would not exceed the capacity of natural ecosystems to provide resources and absorb waste. The carrying capacity of ecosystems should therefore determine the optimal population and scale of economic activity. Herman Daly articulates it clearly: “the goal of a steady state is to sustain a constant, sufficient stock of real wealth and people for a long time” (Daly, 2010, p. 21). The desired strategy for human settlements should therefore have the goal of sustaining a discrete population in their environment for a long time within a built environment of fixed and sufficient scale. To sustain a population means not just to house them but also to provide other natural needs such as food, water, and energy. The flow or circulation of materials, goods, and services through and around the settlement should provide these essential needs while enhancing the capacity of natural systems to absorb waste and regenerate. The system is dynamic in that there is constant economic activity, but it is stable and does not need to grow in scale.

The need to determine the optimal scale applies to the stock of capital assets and number of people, as well as the rate of flow of activity. Optimisation by balancing growth and decay would achieve a thermodynamically stable economy rather than one that is subject to both excessive growth and unstable collapse. In advocating for a steady state economy, Stilwell argues that the goal of:

maximising economic variables ...should be replaced by optimising, which is a process of seeking balance between diverse, interrelated goals. The emphasis would then be on blending the satisfaction of basic economic needs with the pursuit of broader goals of personal and social development, advance of scientific knowledge and cultural enrichment, allowing people adequate time and space for their engagement in whatever forms of culture and creativity are personally fulfilling.
(Stilwell, 2016, p. 149,150)

This is similar to the objectives pursued by degrowth advocates, but the steady state economy proposes a shift from maximising to optimising, while degrowth would seek to minimise.

The proposed synthesis of growth and degrowth as an alignment with natural cycles is also consistent with the adoption of a circular economy as both a strategy for change and a vision for the future. Most current advocates of the circular economy promote it as a strategy for maximising profits, job creation and economic growth. Yet the circular economy can also carry the connotations of systems thinking and life-cycle planning. Other connotations of a circular economy include holistic outlooks and dynamic cycles.

While the objectives in this thesis are consistent with both degrowth and the steady state economy, the circular economy terminology has wider implications and already has broader appeal as a narrative for change.

2.6. Consensus versus hierarchy

The circle is also the archetypal depiction of equality; a community of equals sitting in a circle discussing, negotiating, planning together. This may be contrasted with a social order based on hierarchical structures.

The first challenge raised when proposing the consensus model is its capacity to maintain social order. Some argue (e.g. Hobbes, 1651) that hierarchical structures are essential to maintain social cohesion and order. Friedrich Hayek (1973, p. 36) defines social order as a state of affairs in which an individual or group can reasonably form correct expectations about others.

Advocating for less government regulation and control, Hayek acknowledges that some form of social order is essential and, in *Law, Legislation and Liberty* (1973), he contrasts two ways in which order may be created. Hayek refers to these by use of the Greek words: *taxis* and *cosmos*. *Taxis* refers to an exogenous 'made order', an artificial construct imposed on a system from the outside. *Cosmos*, by contrast, refers to an endogenous, self-generating, spontaneous or natural order developed within a system. Connecting this with systems theory, self-organising systems are complex, non-linear, diverse, adaptable and emergent. Emergent properties and behaviours are those that do not exist in the intrinsic parts but emerge from their interaction.

In contrast with current town planning regulations and policies that are imposed on the land and its inhabitants by a remote central government, an endogenous order would be developed by the people living in a place. A local governance system would naturally grow out of the efficient management of the local environmental conditions to optimise the availability of food, clean water, energy and shelter.

A subsequent challenge to the consensus model is that although it may work on a small scale, it cannot work at larger scales. This is a matter of perception. Even a nation of millions consists of numerous small communities, whether they are discrete communities in rural villages or woven together in dense urban environments. All societies can be perceived as a network of small communities.

If seeking to encourage consensus, the relevant question is how much power should be retained by central authorities, and how much is devolved to empower local communities. This may also be expressed in the tensions between uniformity and diversity, conformity and plurality.

These questions should not be answered in a rigid, deterministic manner. With some issues, central administration and broad uniformity are appropriate. In others, local control and diversity are preferable. In the current political economic framework local communities are generally fragmented and disempowered. Empowering communities to self-organise, managing themselves and the land on which they live, would likely alleviate governments of numerous regulatory responsibilities.

While the empowerment of local communities is encouraged, supported, and facilitated, some would argue that communities cannot be trusted to self-organise. On this question, I concur with Bregman (2020) that people are not selfish and destructive, as suggested by Hobbes (1651) but inherently kind, generous, and collaborative as countered by Jean-Jacques Rousseau.

A final challenge to the consensus model is that hierarchies reflect a natural order. That some people are naturally superior, and others need to be led. This argument was proposed by Plato in *The Republic* and in *Timaeus*. In his view the natural world was hierarchical: educated men were naturally superior to uneducated men, women were further down the hierarchy, followed by four legged animals, then snakes that slithered on the ground, while the most ignorant were the fish, and other aquatic animals. Of course, we now understand that the natural world is not hierarchical but an integrated, inter-dependent system. All parts are necessary for the proper, healthy functioning of the system.

2.7. Birthing a new political economy

The ontological and epistemological framework for this thesis informs the structure and design of new settlements. That framework must also inform the process of transitioning to a new paradigm.

The concept of historical materialism developed by Karl Marx can usefully be applied for this purpose. According to Marx's materialist conception of history, the means of producing and reproducing the necessities of life—including available technologies and social relations of production—form the foundation upon which the overall social organisation is constructed.

In other words, Marx argues that the political system is constructed upon the foundations of the economic system:

The totality of these relations of production constitutes the economic structure of society, the real foundation, on which arises a legal and political superstructure and to which correspond definite forms of social consciousness. The mode of production of material life conditions the general process of social, political and intellectual life. It is not the consciousness of men that determines their existence, but their social existence that determines their consciousness. (Marx, 1977, Preface)

The creation of a disruptive model for building human habitats would incorporate newly available technologies, new ways of providing for our basic needs, and renewed social relations of production. Could this give rise to new legal and political superstructures?

If a community can form a new set of social relations within a settlement, such that all contribute to the provision of food, water, energy and shelter *for all*, then this reformation should influence the broader legal and political superstructures at a regional or national scale.

A critical problem with this is that a different form of social consciousness is a *precondition* to establishing the collaborative social relations within *and between* villages. Contra to the quote from Marx above, social relations of production and political structures, should not be viewed as foundation and superstructure but rather as mutually interdependent and in dialectical relationship. Accordingly, the building of regenerative villages and the construction of political economic systems that bind them together, must be complementary and contemporaneous projects.

One reason for hope that a new form of social consciousness is already emerging is that the internet and renewable energy systems are altering our social relations of production. The internet enables instant communication and access to information to a previously unimaginable degree. Local renewable energy systems allow communities to take control of their energy systems, and with this, they can manage a water system, which in turn amplifies their ability to produce food. These new information and energy systems are peer to peer, whereas in the industrial era they were centralised, with a clear separation between the producers and consumers.

This empowerment of individuals and communities—their ability to control, produce and distribute basic necessities—would fundamentally transform the social relations of production. Yet the *potential* for communities to allocate resources, then produce and distribute goods and services, is not the same as actually doing these things.

The social relations of production are formed by and through the physical environment in which they operate; governed by access rights, entitlements, and exclusions within that environment. Therefore, buildings, infrastructure and assets, as well as the legal framework within which these operate, should support and reinforce the desired social relations. Fences, exclusive ownership rights, competing stakeholders, unclear allocation of responsibilities and the division everywhere between private and public all hinder the desired social relations, which should be inclusive, distributed, participatory, collaborative, flexible, and regenerative.

Spatial arrangements also have temporal consequences. How the human habitat is organised spatially determines the time and energy needed to satisfy our basic economic

needs. If these daily activities consume too much time and energy—working to pay the mortgage, commuting to work, doing the shopping, cleaning the house—then the opportunities to satisfy the broader goals of personal and social development are limited. This is the dialectical relationship between necessity and freedom—between basic natural needs for survival and the broader pursuits related to our aspirations for personal development.

For decades, many people have sought to rearrange the built environment and social relations of productions by creating ecovillages, intentional communities, cohousing and the like. This thesis seeks to advance this agenda by identifying a replicable development model.

The replicability would be based on the identification of certain common characteristics. These would offer a degree of uniformity, while diversity in form, design and governance systems would arise due to the local conditions of each. For example, all people require shelter, and access to food and water. Everyone needs a place to belong as well as the freedom to travel, although how much of each may vary significantly.

Identifying such commonalities also simplifies implementation. The diversity in form and scale of ecovillage projects has meant that they are not presently recognised as a development type in many planning schemes. As such, no clear development controls are established by local authorities, making it very difficult to issue a development approval. Identifying common characteristics that may be uniformly adopted allows for the establishment of development controls and approval processes. This would provide certainty for investors and future residents, allowing numerous developments to occur in a cost-effective manner.

2.8. Conclusions

This chapter has woven together issues of ontology, epistemology, and dialectical method to show the underpinnings of the work as a whole. It has illustrated that Indigenous ways of being and doing offer an avenue for pursuing a shift from a linear to a circular ontological perspective. Circularity can imply reciprocity, in the sense of balanced relationships between citizens, between individuals and the collective, and between the collective and the land on which they are located. Land and ecosystems operate as thermodynamic systems, capturing and circulating energy from the sun. Political economic systems must similarly operate by capturing and circulating energy, while minimising energy losses.

A balanced city therefore operates as a steady state economy, managing the assets and the circular flow of resources to sustain a discrete population in their environment for a long time.

To achieve such balance requires that all parts of the system are valued equally for their contribution to the system as whole. Artificial structures that attribute greater value to some roles over others distort the operation of the system. Consensus models of collaboration are therefore more aligned with ecological systems than are hierarchies.

Cyclical change over time includes a growth phase until maturity, followed by stages of decay, death and regeneration. It was argued that the birth of a new social consciousness is needed to manage the decay of old ways of thinking. This is being facilitated by distributed

communication technologies, that enable the distributed social relations of production needed for the desired changes.

Political economic systems, built environments, and technologies must all be designed and organised to affirm the new, regenerative and distributed, worldview. In a reciprocal dialectical relationship, cities and citizens shape each other. We shape our cities, thereafter they shape us, until we pause, reflect and choose a new course. The analyses in the following chapters seek to crystalise this circular ontology as the foundation for building a network of circular economy villages.

3. Great transitions through history

The development of strategies for moving forward towards a desired future vision should be constructed upon a clear understanding of the past. This chapter adopts the framework of human history as emerging not as a linear process but through the ebb and flow of cycles of change, including periods of regression and ‘moments’ of fundamental revolutionary transformation—paradigm shifts. An appreciation of past revolutions or discontinuities supports the proposition that current technological changes, particularly with respect to communication, have the potential to lead to another great transition in our own time.

The reference here to revolutionary transformation should not be confused with events such as the French or American Revolutions. Rather, it is argued that there have been four great transitions through human history, each of which led to a fundamental reorganisation of human societies and patterns of human settlement. All of these also aligned with what will be described as communication revolutions: (a) the beginning of language and storytelling, (b) writing and record keeping, (c) written literature and (d) the printing press. The internet—the latest communication revolution—will result in a fifth great transition.

There are several different interpretations of history describing the concept of a great transition. Writing more than half a century ago, Kenneth Boulding identifies two such revolutions, the first being the Agricultural Revolution, while the “twentieth century marks the middle period of ... the second great transition in the history of mankind” (Boulding, 1965, p. 1). Boulding apparently did not consider the scientific and industrial revolutions as sufficiently significant to be referred to as ‘great transitions’. Yet much of the literature in political economy focuses on the changes that have resulted from the Scientific and Industrial Revolutions. Karl Polanyi, for example, refers to the parallel rise of the modern state and the market economy over the past few centuries as the Great Transformation.

According to Harari (2015) the Cognitive Revolution, some 70,000 years ago, introduced language and oral storytelling and led to a shift in the human relationship with the land from passive to active land managers. The earliest writing, mainly consisting of record-keeping, enabled the development of larger and more complex social systems. This led to the Agricultural Revolution and the development of the earliest cities. As writing became more complex, it eventually led to the transition from oral to written storytelling around 2,800 years ago. Soon after, around 2,600 years ago, coins were introduced as a means of communicating value. This technology enabled the creation of the first multi-national and secular empire: the Achaemenid Persian Empire was the prototype of the modern nation-state (Ryan, 2012). The next great transition occurred around 500 years ago with the advent of the printing press. This allowed information to be produced, reproduced and distributed by anyone, undermining centralised control of the flow of information and ideas. Constant change followed, beginning with the Renaissance and the Reformation.

The purpose of this chapter is to show this cyclical pattern of change, whereby a dominant system is disrupted by new communication technologies. The shift from centrally controlled communication to peer-to-peer communication undermines the power of the centralised system. This chapter will show how the pattern of human settlements also changed with each great transition.

3.1. Communication revolutions and settlement patterns

As proposed by Thomas Kuhn, history is punctuated by paradigm shifts, which I argue, are caused by communication revolutions. The great transitions in history might therefore be defined as periods of transformational change arising due to changes in the way communication is shared in a society. New means of communication facilitate transformations in the social relations of production as well as human relationships with the land. A great transition will have occurred when these altered relationships between people, and between people and the land, are finally expressed in a rearrangement of human settlement patterns. Given the scale, complexity and time taken for such changes they are most clearly identified in retrospect.

Such changes may not be apparent until after the fact because they are not linear but iterative and dialectical. For example, the Agricultural Revolution resulted in a shift from nomadic lifestyles to permanent settlements. Agricultural production requires a different set of social relationships than nomadic lifestyles and has a different relationship to the land. Social groups are much larger and therefore more complex to manage, requiring certain transactional relationships to be recorded. As record-keeping becomes more refined the social group can grow larger, offering economies of scale and a wider set of skills for more complex agricultural practices but also requiring more complex political arrangements and still more record-keeping. Communication systems for management of larger social groups and the systems of food production and distribution would have co-evolved.

Past revolutions are relevant today in order to grasp the ultimate consequences of numerous economic disruptions and to assess the validity of arguments suggesting the imminent collapse of capitalism. In *The Zero Marginal Cost Society: The Internet of Things, the Collaborative Commons, and the Eclipse of Capitalism* (2014), Jeremy Rifkin argues that “capitalism’s operating logic is designed to fail by succeeding” (2014, p. 2). In *PostCapitalism: A Guide to Our Future*, Paul Mason (2015) similarly argues that communication technology fundamentally undermines the very principles upon which capitalism is built, creating abundance where capitalism relies on scarcity, driving prices toward zero. Taking a more positive approach to political economic transformation, Joanna Macy (2009) writes:

A revolution is under way because people are realizing that our needs can be met without destroying our world. We have the technical knowledge, the communication tools, and material resources to grow enough food, ensure clean air and water, and meet rational energy needs. Future generations, if there is a livable world for them, will look back at the epochal transition we are making to a life-sustaining society. And they may well call this the time of the Great Turning. It is happening now. (paragraph 3)

In *Sapiens: A Brief History of Humankind*, Yuval Noah Harari (2015) provides a useful introduction into this concept of great transitions through history:

Three important revolutions shaped the course of history: the Cognitive Revolution kick-started history about 70,000 years ago [oral storytelling]. The Agricultural Revolution sped it up about 12,000 years ago [record keeping]. The Scientific Revolution, which got under way only 500 years ago [with the invention of the printing press], may well end history and start something completely different. (p. 3)

The proposed framework includes these three revolutions and a fourth, about 2,800 years ago referred to by Karl Jaspers as the beginning of the Axial Age. Notable and formative written literature of that period includes the *Torah* attributed to Moses and Homer's *Iliad* and *Odyssey*.

By understanding these cycles, including stages of progress, regression and revolution, it is possible to move beyond common caricatures of primitive societies and of inefficient systems of barter described in introductory courses to mainstream economics. Economic change over time, when not interpreted as a linear process of growth, progress and development, can offer insights into concepts such as land stewardship that were practised more perfectly in the past by Indigenous communities than today by our so-called civilised and advanced societies.

Looking at the history of settlement patterns from this perspective offers a means of understanding how they relate to forms of economic and political organisation.

3.2. The Cognitive Revolution and oral narratives

Human settlements are an expression of the human capacity to control and reshape the natural environment for our own benefit. Humans have been shaping the environment long before the advent of agriculture, probably as far back as the Cognitive Revolution. Complex technologies such as “boats, oil lamps, bows and arrows and needles” (Harari, 2015, p. 23) were invented between 70,000 and 30,000 years ago. These technologies were likely the result of an increased complexity and suppleness of language that allows humans to share communication. The ability to transmit information also allowed for the domestication of animals and the development of systems of fire management that resulted in the clearing of forests. Perhaps this could be understood as the beginning of our separation from nature, wherein we were no longer part of nature but adopted the role of land managers. Harari notes (2015):

Yet the truly unique feature of our language is not its ability to transmit communication about... [the real world but] the ability to transmit communication about things that do not exist at all. Legends, myths, gods and religions appeared for the first time with the Cognitive Revolution... This ability to speak about fictions is the most unique feature of Sapiens language...

But fiction has enabled us not merely to imagine things but to do so collectively. We can weave common myths such as the biblical creation story, the Dreamtime myths of Aboriginal Australia, and the nationalist myths of modern states. (p. 27)

The dialectical relationship between technologies and mythologies seems to have existed ever since the Cognitive Revolution when humans began to *consciously* form societies. Mythologies are the means by which social groups coordinate themselves to use and develop the available technologies. As technologies change and evolve, so do the social mythologies.

That social systems are built upon the material conditions of the time—and in particular, the means by which the people satisfy their need for food and shelter—is consistent with Marx's dialectical materialism and the materialist conception of history. Whether language and stories emerged first, or the increased complexity of technology required language, is

irrelevant. They have been co-evolving—with incremental changes in one enabling incremental changes in the other—for at least 70,000 years.

Human settlements are also more than a collection of buildings and infrastructure but rather a dynamic system. Changes in the dynamics of the system, the means of producing and accessing food, the movement of people, the flow of communication, can all change the organisation of the built environment. Similarly, a reorganisation of the built environment to take advantage of previously unavailable technology can change the dynamics of the political system.

3.3. Pre-agricultural political economies

While it is generally suggested that the Agricultural Revolution occurred from about 12,000 years ago, nomadic hunter-gatherers still exist to the present day. Also, the reshaping of the environment likely began as early as 70,000 years ago. The Agricultural Revolution, therefore, should not be regarded as a singular event in time but rather the gradual process of transition from a principally nomadic lifestyle to permanent settlements. At some point in time a tipping point was reached whereby nomadic lifestyles were either not feasible or not preferred and permanent settlements became the dominant form of human habitation on the land, particularly on the Eurasian continents. To appreciate how the Agricultural Revolution transformed human settlements, it is necessary to move beyond the simplistic narrative of a transition from a nomadic lifestyle to a settled lifestyle and recognise that nomads are sometimes settled, and the settled lifestyles include movement.

The cause or causes of this transition should be described by comparing with the earlier system. Given the Australian context of this work and the availability of a significant body of recent literature about the political economy of Australia before European settlement, the Australian Aboriginal political economy is used to illustrate the likely conditions prior to what is referred to as the Agricultural Revolution in other parts of the world.

Bruce Pascoe's *Dark Emu: Aboriginal Australia and the Birth of Agriculture* (2018), provides evidence of many agricultural or proto-agricultural practices, describing how these were expressed in physical infrastructure:

Australia's idea of history is based [on] the journals and diaries of explorers and colonists [which reveal]...a much more complicated Aboriginal economy than the primitive hunter-gatherer lifestyle we had been told...But as I read these early journals, I came across repeated references to people building dams and wells; planting, irrigating, and harvesting seed; preserving the surplus and storing it in houses, sheds, or secure vessels; and creating elaborate cemeteries and manipulating the landscape—none of which fitted the definition of a hunter-gatherer. Could it be that the accepted view of Indigenous Australians simply wandering from plant to plant, kangaroo to kangaroo, in a hapless opportunism, was incorrect? (p. 1)

This characterisation of hunter-gatherers as hapless opportunists has been persistently used as a narrative for maintaining social order in modern 'civilised' societies as it justifies the existence of governments to maintain law and order. Many have quoted Thomas Hobbes' pithy concluding sentence from *Leviathan*:

during the time men live without a common power to keep them all in awe, they are in that condition which is called war; ... In such condition there is ...no culture of the earth...no society; and which is worst of all, continual fear, and danger of violent death; and the life of man, solitary, poor, nasty, brutish, and short. (p. 77, 78)

The evidence confirms the opposite. There was culture of the earth and there was a governance system—one that was distributed rather than centralised. The evidence of the latter is provided again from the journals and diaries of the first Europeans to arrive in Australia in Bill Gammage's *The Biggest Estate on Earth: How Aborigines Made Australia* (2011). Gammage describes how hundreds of different cultures and languages across the continent were bound together by a common worldview:

Estate [definition]: Although comprising many ways of maintaining land, and managers mostly unknown to each other, this vast area [Australia] was governed by a single religious philosophy, called in English the Dreaming. The Dreaming and its practices made the continent a single estate. (Gammage, 2011)

And again:

There was no wilderness. The Law—an ecological philosophy enforced by religious sanction—compelled people to care for all their country... an uncertain climate and nature's restless cycles demanded myriad practices shaped and varied by local conditions. Management was active not passive, alert to season and circumstance, committed to a balance of life.

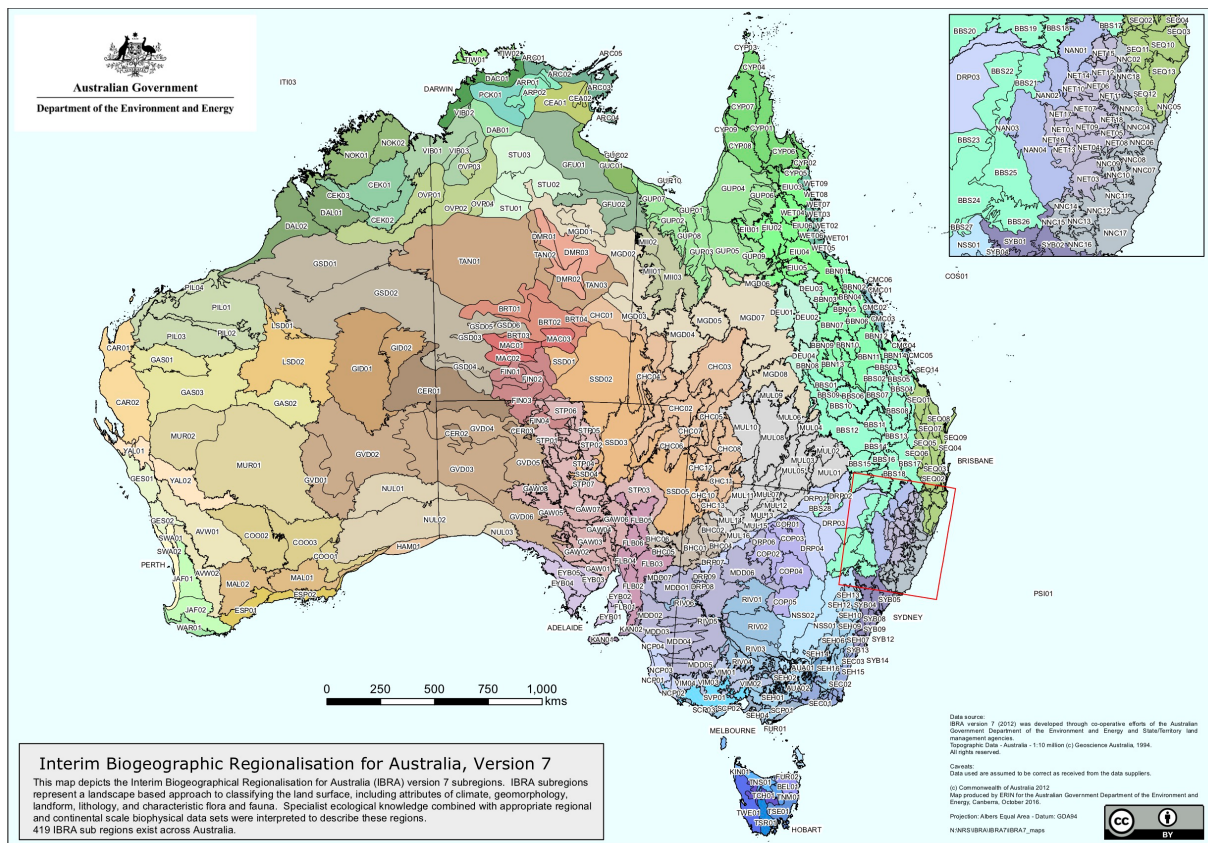
The chief ally was fire. [this was] a planned, precise, fine-grained local caring. ...Means were local, ends were universal. Successfully managing such diverse material was an impressive achievement; making from it a single estate was a breathtaking leap of imagination. (p. 2)

This is an example of plurality and diversity bound together by a common narrative. Local communities were autonomous and also respectful of the autonomy of their neighbours. There was no central government enforcing its views on the entire population but a network of societies all choosing to be responsible for their part of the country and their local community. Prior to the arrival of Europeans there were over 500 different nations, "many with distinctive cultures beliefs and languages" (Australian Government, 2021).

If this was to guide the development of a vision for the future of human settlements on the Australian continent, then it should be recognised that these earlier national boundaries correlate approximately with the 419 sub-bioregions identified by the Australian Department of Environment and Energy in figure 3. Sub-regional boundaries would ideally replace the current state and territory boundaries as autonomous but inter-dependent regions, each of which would be responsible for the management of their region and communities within it.

For Indigenous Australians, the land taught people the law. The law was a system for managing the land to ensure an abundance of food. It was not a set of agreed rules, negotiated through endless compromise and then imposed on the land. To learn from the land, it is necessary for each community to align their work and activities with local natural systems, so the political division into bioregions acknowledges that these regions each have different climates, different geographies and consequently different ecological systems. Land management will therefore require different patterns of working, different priorities, and different political and economic organisation.

Figure 3 Australia's 419 sub-bioregions



Source: Australian Government, Department of Agriculture, Water and the Environment (www.environment.gov.au/land/nrs/science/ibra/australias-bioregions-maps)

The means were local, but the ends were universal. These ends were to create an abundance of life, which ensured not just a healthy landscape, but also minimal effort required to obtain food. Minimising work ensured that liberty—the time for play, relationships, and ceremony—was maximised.

This highlights the importance of ‘becoming indigenous’ (lower case) in our thinking (Liaros, 2019, May 22), in order to truly live harmoniously with the rest of the natural world. Such a shift in attitude will be expressed in an altered relationship with the land when building human settlements. Rather than mechanical cities disconnected from the natural world, settlements would be perceived as waterholes—places where water, food, fire and shelter can be accessed. These waterholes would be connected with many other waterholes in a vast landscape that can be navigated only when one has learnt the stories of this land. The landscape would then be envisioned as a vast network of waterholes connected by storylines.

3.4. The Agricultural Revolution

Harari describes the Agricultural Revolution as “history’s biggest fraud” as it:

...left farmers with lives generally more difficult and less satisfying...[it] certainly enlarged the sum total of food... but the extra food did not translate into a better diet or more leisure. Rather it translated into population explosions and pampered elites. (Harari, 2015, p. 90)

While bigger social groups made food production more efficient, the necessary social relations of production created a political hierarchy, which led to an unequal distribution of that food. In addition, the more diverse diet that was previously consumed diminished as societies focused on the production of a narrow variety of foods. In addition, farmers' lives were more difficult and less satisfying as agriculture required a dramatic increase in energy use—significantly more human labour plus the energy of domesticated animals.

Another consequence of the Agricultural Revolution was a shift in worldview, from collective responsibility for a bioregion to an attitude of individual responsibility for a fenced-off area of land. The invented artificial boundaries—fences and borders—created a separation between the community and the broader environment and a point of conflict between neighbours. Humans ceased to be indigenous and were no longer connected to the whole of the land.

A further perspective on this issue of connection to country can be appreciated by the distinction between temporary and permanent settlements. Permanent settlements represent a collection of assets constructed over time. This investment not only formalises the system of social organisation but also creates a sense of primacy of this place over other places outside the city limits. This, in turn, justifies the extraction of resources and disposal of waste outside the city limits. In contrast, temporary settlements constructed by nomads created a very different mindset. As with permanent settlements, temporary ones were built where water was available. This usually meant that food was also in greater abundance. When the resources around a temporary settlement were exhausted, the nomads moved on to another part of their territory and allowed the land to rehabilitate. The patterns of movement from waterhole to waterhole were governed by social narratives, sometimes described as storylines or song-lines. Storylines guided people as they navigated the land by reference to natural features. More importantly, they provided the instruction as to when to travel to each place to ensure optimal access to food, how to utilise or not utilise different plants and also how best to prepare food.

Whereas we now imagine our home as a singular place, Australian Aboriginal peoples imagined their home as a network of waterholes connected by storylines. We can further describe this in political economic terms wherein the waterholes provided the natural economic needs—water, food, fire and shelter—and the storylines represented the political and cultural framework that guided the economic system.

It is not proposed to return to a nomadic lifestyle and temporary settlements but rather to suggest that there is much to learn from these earlier ways of living, particularly with respect to the relationship between human settlement patterns and the political economy. Is it possible to plan for future settlements as networks of waterholes connected by storylines? Can settlements be designed not just for settlers but also as waterholes for travellers? Can the ownership and stewardship arrangements in the political economy of a settlement be such as to provide the water, food, energy and shelter efficiently and so maximise leisure for settlers and freedom for travellers?

3.5. Credit economies of early settlements

The increasing population in these relatively autonomous agricultural settlements supported a wider array of available skills, as well as opportunities to perfect them and pass them on.

This led to a division of labour and the consequent formation of local credit economies. Credit economies that pre-existed the use of currency are described by Graeber in *Debt: The First 5,000 years*: “As with many *actual* small communities, everyone simply keeps track of who owes what to whom” (2011, chapter 2).

While these local credit economies were more efficient, they bound people in a myriad of mutual responsibilities and obligations, substantially restricting their movement relative to previous nomadic cultures. The satisfaction of their various needs became more dependent upon others within their community. This had the effect of binding the local community more tightly together but to the exclusion of all others outside the community. These social relations of production within the community became social norms, cultural practices and eventually legal obligations.

It was not until the Literature Revolution that people were again liberated to travel and share ideas. Yet in addition to this freedom to travel many were also displaced. In contrast to the more fluid relationship between settlement and travel in nomadic cultures, the Agricultural Revolution and ensuing community obligations meant that a more definite distinction was now made between those who belonged to a community and those who did not.

3.6. From city-states to empires

One of the most famous lines of *The Communist Manifesto*, written by Marx and Engels in 1848, states that: “The history of all hitherto existing society is the history of class struggles.” The following quote is from a footnote to this sentence written by Engels in the 1888 English edition of the manifesto:

That is, all written history. In 1847, the pre-history of society, the social organisation existing previous to recorded history, all but unknown. Since then, August von Haxthausen (1792-1866) discovered common ownership of land in Russia, Georg Ludwig von Maurer proved it to be the social foundation from which all Teutonic races started in history, and, by and by, village communities were found to be, or to have been, the primitive form of society everywhere from India to Ireland. The inner organisation of this primitive communistic society was laid bare, in its typical form, by Lewis Henry Morgan's (1818-1861) crowning discovery of the true nature of the gens and its relation to the tribe (Marx & Engels, 2010, p. 20)

Engels suggests that throughout Europe and Asia, prior to written history, the common ownership of land by village communities was the usual form of social organisation and perhaps the beginning of written history marks a turning point in a longer interpretation of human history. From this point in history the previous village communities were somehow transformed into a social order that was characterised by a constant struggle between classes. The proposition in this section is that the increase in scale of the political economy, from the village or city state to the scale of a large territorial empire, is the principal reason for increasing tensions and class struggles.

This transition from the village-scale political economy to the nation-state represents a second great transition. Engels can be interpreted as suggesting that this aligned with the transition from oral to written history.

One of the earliest known class struggles in history is recorded in the book of Exodus. This refers to events more than 3,000 years ago in which the workers, who felt like slaves,

eventually won a six-day work week and one day of rest. Of course, this only occurred after the collapse of the New Kingdom of Egypt and the establishment of a new civilisation with a new God and a new social order.

The collapse of the New Kingdom of Egypt, at the same time as other civilisations around the eastern Mediterranean, Asia Minor and the Near East, is referred to as the Late Bronze Age collapse. The simultaneous collapse of numerous societies within a relatively brief period, just prior to 3,000 years ago, is an indication that they were highly inter-dependent and connected through trade networks.

3.6.1. The Literature Revolution

The Bronze Age collapse, and subsequent emergence of new systems of social organisation over the following 600 years, marks a second great transition in human history. David Graeber (2011) adopts the terminology of Karl Jaspers and marks 800BCE as the beginning of the Axial Age. Jaspers searched for an “axis in history” and argued that during the Axial Age, “the spiritual foundations of humanity were laid simultaneously and independently in China, India, Persia, Judea, and Greece. And these are the foundations upon which humanity still subsists today” (Jaspers, 1954, p. 98). He continues:

Extraordinary events are crowded into this period. In China lived Confucius and Lao Tse, all the trends in Chinese philosophy arose...In India it was the age of the Upanishads and of Buddha; as in China, all philosophical trends, including skepticism and materialism, sophistry and nihilism, were developed. In Iran [Persia] Zarathustra put forward his challenging conception of the cosmic process as a struggle between good and evil; in Palestine prophets arose: Elijah, Isaiah, Jeremiah, Deutero-Isaiah; Greece produced Homer, the philosophers Parmenides, Heraclitus, Plato, the tragic poets, Thucydides and Archimedes. All the vast development of which these names are a mere intimation took place in those few centuries, independently and almost simultaneously in China, India and the West (Jaspers, 1954, p. 99-100).

As sophisticated, intelligent people began to reflect on the collapse of their society they started to tell stories about how to live a good life—or at least a life that won’t lead the society to inevitable collapse. This collective self-examination is evident in Greek theatre. The critical characteristic of classical Greek tragedies is the tragic flaw. This is usually an error in judgement or weakness in character, that despite all other positive attributes ultimately and inevitably leads to tragedy.

While these religious, moral and cultural narratives are all essential in framing, describing and defining a society, it has already been asserted that social mythologies co-evolved with technologies. What role did technologies play in the transition?

The events in *Exodus* and in Homer’s *Iliad*—both describing the collapse of Bronze Age empires—were conveyed orally for centuries until they were compiled in written form. Although writing existed in the Bronze Age it was mostly used for accounting purposes or to recount the exploits of kings. In the Axial Age, ideas are being conveyed in writing on papyrus scrolls. While this technology also existed before, it began to be used to convey ideas across distance and time. The consistent reading and repeating of unadulterated ideas, to educate much greater populations than was previously possible, has the effect of shaping cultures.

Undoubtedly, the five books of the *Torah*, attributed to Moses, and the *Iliad* and *Odyssey*, attributed to Homer, would be regarded as foundational texts in Western culture. The *Torah* underpins the Judeo-Christian-Islamic teachings, while Homer is regarded as the teacher of Classical Greece. Homer's stories told of hubris, respect and honour, fate and destiny and were foundational for the creation of a new society. Greek democracy, art, sport and philosophy—including scientific notions of observation, logic and reason—emerge from Homeric foundations.

These texts, amongst others, form what is described here as the Literature Revolution. Yet it is one thing for ideas to be documented and quite another for these to be transported to other places. Given our argument that communities were more anchored to place and bound to others in their community, how was this literature transmitted?

3.6.2. The introduction of coins

Coins are a means of communicating value and the largest empire the world had yet seen arose immediately after the introduction of the first coins in Lydia around 600BCE. Coins enable freedom of movement and the transmission of ideas contained in literature.

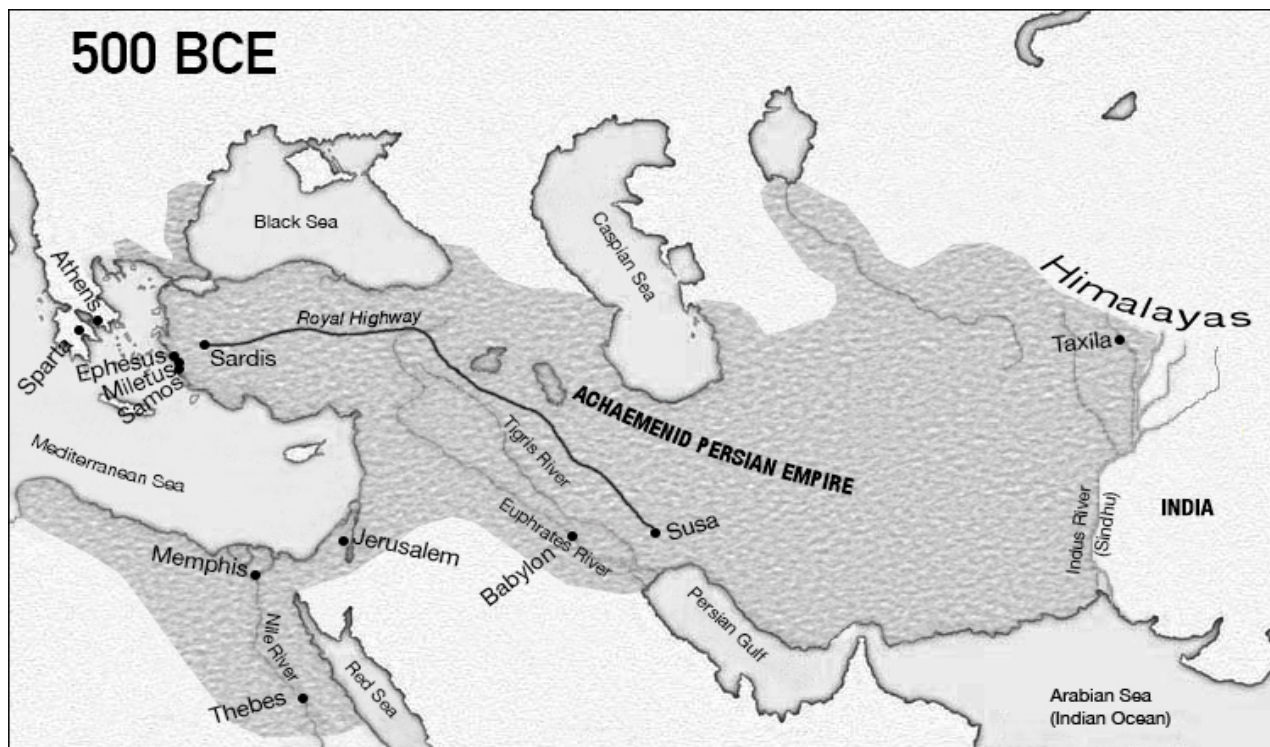
In this section it will be shown that primitive or original accumulation of capital therefore occurred neither through differences in productivity of workers as proposed by Adam Smith, nor through dispossession of land as suggested by Karl Marx. Instead, it was the replacement of local, cultural laws and land management practices, by remote state laws and the obligation to pay taxes. This had the effect of extracting wealth from local communities, centralising and accumulating that wealth in the capital city.

This accords with the state or chartalist theory of money. The chartalist theory of money—first developed by G.F. Knapp in 1905—argues that the state creates markets and directs economic activity. Usually, it is contrasted with Adam Smith's assertion that the "propensity to truck, barter, and exchange" was inherent in human nature and gave rise to markets and the division of labour.

How do coins enable freedom of movement and the transmission of ideas contained in literature? It is clear that if a person had enough coins, they did not need to rely on mutual credit relationships with others in their community. As people travelled, trading goods and services, they took their ideas with them. For this to occur it is necessary to have a common currency across a region.

It was Cyrus the Great (reigned 559–530 BCE) and the Achaemenid Persian Empire that provided this. Alan Ryan, in *On Politics: The History of Political Thought from Herodotus to the Present* (2012), describes the Achaemenid Persian Empire as "the prototype of the modern nation state... The essence of a modern state is centralised authority, bureaucratic management, [and] the efficient delivery of public services that only a state can provide". Cyrus inherited a relatively small territory at the mouth of the Tigris River, on the Persian Gulf, and by the time of his death had created an empire that stretched from the Mediterranean Sea in the west to the Indus River in the east. He built an empire based upon the circulation of money. By 500BCE Darius (c. 550–486 BCE) had expanded the empire to its greatest extent as shown in figure 4 and introduced the 'daric' as the common currency.

Figure 4 Extent of the Achaemenid Persian empire under Darius



The events that Jaspers suggests occurred independently and almost simultaneously across the Eurasian continent were, in fact, not independent. The Persian empire connected China, India and the West through the ancient Silk Road. Cyrus built the first highway—the Royal Highway—along a key section of the Silk Road and manned it with a standing army.

To fully appreciate the impact of the introduction of coins it is necessary to challenge the myth of barter. David Graeber (2011) notes that most economics textbooks suggest that, prior to the use of coins, societies had to rely on barter, which, they argue, was highly inefficient as it requires a double coincidence of wants. Archaeological and historical evidence, though, confirms that this was not the case and that societies operated by recording credits and debits, mostly mentally but also on clay, papyrus, wood and stone. Any person can now visit the archaeological site of the Bronze Age port city of Akrotiri—as I did in 2017—buried by a volcanic eruption 3,500 years ago on the island of Santorini. This site attests to the sophistication of Bronze Age societies some 900 years before the introduction of coins: two- and three-storey timber-framed buildings structurally designed to withstand earthquakes, beautiful frescoes on the walls and pottery from all around the Mediterranean indicating a wide trading network.

According to Doumas et al. (2015, p. 15), Akrotiri traded metallurgical products for cereals from Crete in a system of mutual co-operation. The rugged windswept cliffs of Santorini could not grow grains but had an abundance of minerals. Crete had the opposite problem and so trade was mutually beneficial—strangely, a double coincidence of wants! This form of trade also existed across the Australian continent for thousands of years. Ochre was used by most communities in ceremonial practices but was not available everywhere, so each community traded its speciality, or product from its land, in exchange for ochre.

This form of barter and exchange that is a win-win for both communities is a natural human expression of cooperation and reflects the natural human tendency to “truck, barter and exchange” (Smith, 2007). What Cyrus did was to redirect economic activity away from mutual cooperation, creating new markets by introducing coins, thus prioritising the payment of taxes above all other responsibilities of subordinate communities. David Graeber (2011) describes how the state creates markets:

Say a king wishes to support a standing army of fifty thousand men. Under ancient or medieval conditions, feeding such a force was an enormous problem... one would need to employ almost as many men and animals just to locate, acquire, and transport the necessary provisions. On the other hand, if one simply hands out coins to the soldiers and then demands that every family in the kingdom was obliged to pay one of those coins back to you, one would, in one blow, turn one's entire national economy into a vast machine for the provisioning of soldiers, since now every family, in order to get their hands on the coins, must find some way to contribute to the general effort to provide soldiers with things they want. Markets are brought into existence as a side effect. (Graeber, 2011, chapter 3)

With a common currency accepted over such a large territory, individuals seeking to make their fortune move more freely beyond their local community or region and throughout the empire, thus enabling the free movement of ideas.

With the establishment of a market economy and regular flow of taxation, the Persians became fabulously wealthy—consistent with the concept of original or primitive accumulation. To justify their authority, the Persians used some of the taxation revenue to fund public services and infrastructure, and a standing army to maintain this new social order. Retail trade and the payment of taxes, some of which provided services and infrastructure, became a self-reinforcing institutionalised system.

The social narrative eventually emerged that individuals should focus only on the satisfaction of their private needs and no longer needed to be concerned about public or shared needs, which were to be delivered through tax revenue by the state. This system is the basis for the modern political economy. It is founded on the narrative that if everyone works hard and pays taxes, both the individual and the society will benefit. Accordingly, the constant growth in total economic activity and the corresponding growth in taxation revenue, are indicators of growing prosperity.

This highly centralised social structure disrupted the previous trading network of small scale, relatively autonomous cities. Rather than maintaining the complex credit arrangements within and between local communities, individuals focused on earning money so they could pay the obligatory taxes. The taxes funded massive infrastructure works, roads, irrigation systems and temples. The rebuilding of the Temple of Jerusalem after the Persians conquered the Babylonians is one example:

This is what Cyrus, king of Persia says: ‘The Lord, the God of Heaven has given me all the kingdoms of the earth and he appointed me to build a temple for him at Jerusalem in Judah. Any of his people among you may go up and may the Lord their God be with them.’ (2 Chronicles, 36:23)

Thus, Cyrus became the messiah who returned the Jewish people to the promised land, liberating them from their Babylonian exile. Cyrus repatriated the Jewish people to their land while subjugating their local laws to Persian state laws and obligations. The written word,

when regularly repeated, becomes the accepted truth of a society. When that written word is portrayed as the word of god, it becomes substantially more influential than the spoken word, even of a king. Ironically, Cyrus' achievement was to create the secular state, divorcing political and economic organisation from local religious laws. Also known as the 'King of Kings', Cyrus and his successors allowed their subordinate states to practise their own religions, provided they paid their taxes.

Having created a system for extracting wealth from the majority for the benefit of the few, redistributing that wealth at the complete discretion of the elites, Cyrus sowed the seeds of the ultimate Greek tragedy, an endless cycle of class struggles, leading to revolutions, then societal collapse into chaos before a new renaissance and a new cycle begins.

3.7. Globalisation of the state with the printing press

The Persian model of a large-scale territorial empire and secular governance over ethnically, culturally, and religiously diverse populations was adopted and perfected by the Romans. Despite their initial acceptance of plurality, the dominant political and religious institutions eventually imposed a uniform social order. The diversity of the early Roman period became increasingly more rigid, particularly as it transitioned from a republic to an empire. The empire nearly collapsed during the 'Crisis of the 3rd century' and in 324CE Constantine (later 'the Great') relocated the capital from Rome to Byzantium. Byzantium was colloquially known as New Rome and what is now referred to as the Byzantine Empire was then still considered the Roman empire but with one significant difference. The plurality of Rome was replaced by orthodoxy. Orthodoxy, an invented concept, literally means 'correct belief' and the Nicene Creed, the symbol of faith, was adopted in 325CE. This singular, 'correct' belief was imposed on all citizens, and heresy—which in Greek means 'choice'—was not tolerated. According to Constantine and the authors of the Nicene Creed, social order requires conformity to the established correct belief. The symbol of the empire changed from the Roman eagle to the two headed eagle of the Byzantine empire. The two heads representing the equal status of the secular and religious authorities in governing over a single body of citizens.

By the time Constantinople eventually fell to the Ottoman Empire in 1453, the latter had already established itself as simultaneously a state and a caliphate. Like the Persians and Romans, though, they were far more tolerant of other religions than the Byzantines, very likely because they prioritised maximisation of trade and taxation revenue over enforcing moral codes.

The modern European political economic system has been derived from this Achaemenid Persian, Roman, Byzantine and Ottoman legacy. The European contribution was not so much the separation of religious authority from the state, which Cyrus had already accomplished some 2,600 years ago, but rather the complete abandonment of religious authority and with it the abandonment of any moral restrictions on the maximisation of trade that may have tempered the potential excesses of such a system. A notable example was the prohibitions of usury—the making of loans that unfairly enrich the lender—in the medieval period. The other significant European contribution is the granting to banks of the power to create money through debt.

The rigid Byzantine and Holy Roman social order was only able to be overthrown when a number of technologies again converged in the 15th century for Johannes Gutenberg to produce the first printing press. Communication, knowledge, and ideas were again liberated from centralised control and were able to be circulated between people, peer to peer, unmediated by a central authority, triggering the Renaissance and the Protestant Reformation. The decline of papal and royal power was inevitable as new social narratives, thoughts and ideas emerged from trading networks rather than from the central authority.

With European colonisation, the territorial-state model was transplanted all around the world. The expression 'territorial-state' is used to bracket together the territorial empire and the nation-state as a single political economic system and to contrast it with the city-state. Expanding on Alan Ryan's (2012) definition of the modern nation state, the essential characteristics of this system are as follows:

- (a) The agglomeration of many local communities to enable trade between them using a common currency,
- (b) A central government, which maintains social order through a standing army (modern police force) to maximise trade and therefore maximise taxation revenue,
- (c) A portion of the taxation revenue is used to build infrastructure such as connecting transport networks, to provide services and also to build military and economic power relative to other territorial-states,
- (d) A central bureaucracy standardises and requires conformity with the objectives, expectations, and codes of the state, necessarily prohibiting different ways of living and working, which historically emerged as a response to local environmental conditions and circumstances.

This demand for conformity eventually quashes plurality and enforces the social order, or orthodoxy, imposed by the state, the result of which is:

- (a) A rise in tension between obligations to the state and moral codes,
- (b) A consequent rise in tension between growth and stability,
- (c) Increasing inequality between the elites and the people,
- (d) Class struggles arise when the state is unable to maintain growth, resulting in instability as communities question the imposed social order.

This thesis supports some form of agglomeration of many local communities for the mutual benefit of all but will argue that the territorial-state model is not the optimal approach to deliver these benefits. Indeed, it will be argued that a more organic and flexible bioregional network of communities is preferable to a crude geographic and territorial agglomeration.

3.8. Conclusions

The above overview seeks to illustrate that history is not a linear process but can be expressed as a cyclical pattern of events. A case has been made to suggest that these cycles each commence with a revolution in communication systems:

- (1) The use of language leads to oral storytelling and the transition of humans to active land managers. The new system can be described as indigenous bioregional land management.

- (2) The adoption of writing enables record keeping, creating larger, more complex societies, the first permanent settlements and the commencement of agriculture. A trading network of city-states becomes the dominant system.
- (3) Written literature, and coins as a means of communicating value, enable the formation of territorial empires. Connection to place is no longer as important as conformity to laws imposed by the capital. Freedom of movement is possible with the adoption of a common currency. The free movement of people results in a mixing of customs, practices and oral stories—collectively referred to as lore. Lore, which originated as a system of bioregional land management, is converted into law—a moral code constructed by institutions that support the interests of the empire's capital.
- (4) The printing press made knowledge much more widely available, leading to broader access to education and increasing challenges to the authority of the capital. Freedom of movement leads to global exploration and then colonisation. Territorial empires expand and the model is replicated to form nation states throughout the world.

This pattern of events can be interpreted in at least two ways. Firstly, the great transitions in the way information is shared, alter all social relations and therefore also the social relations of production. Inevitably, this re-organisation also reshapes the human habitat. New communication technologies need not lead to greater freedom for individuals. Writing triggered the agricultural revolution, which Harari (2015, p.90) notes was history's biggest fraud—resulting in a poorer diet and more work. Similarly, coins ushered in the age of empires and nation states. This may have liberated a few elites but for the majority it just meant more work and less security. Unlike these earlier transitions, the printing press and the internet, do indeed open up emancipatory possibilities because they make it more difficult for authorities to centrally control cultural narratives. This implies a much longer cycle of events with respect to freedom of individuals. The substantial freedoms enjoyed by indigenous peoples were disrupted by the Agricultural Revolution, from which point individuals have been trapped by more and more work in increasingly complicated systems. Beginning with the printing press and dramatically accelerated by the internet, the wider sharing of knowledge and ideas opens the possibility of increasing liberty for individuals.

A second pattern is that each cycle consists of a growth phase as the political economic system slowly increases in complexity. The growth phase continues until one of three things occur: (a) the system reaches maturity and continues in a relatively stable state, as with the example of Australian Indigenous peoples, or (b) communities willingly adopt new political economic systems as with the somewhat organic expansion of agricultural practices throughout Eurasia, or (c) political economic systems are imposed on communities by other communities as with the example of European colonisation across the globe.

Today, the internet opens the possibility of another new political economy, one that can be managed as a steady state. The challenge is whether such a system is willingly and methodically adopted, or eventually imposed on remaining human communities after current systems have collapsed.

4. The internet and another great transition

This chapter focuses on the internet as the latest communication technology that can trigger another great transition. In line with Boulding (1965, p. 1), this is likely to be of a scale and scope of change matched only by the Agricultural Revolution.

To make this case, this chapter examines the details of the current transition through two theories of economic change over time: Marx's materialist conception of history and Schumpeter's creative destruction. It will be shown that the recent and emerging economic disruptions in various industries have established the preconditions for a paradigm shift in both the political economy and the pattern of human settlements.

As outlined in section 3.6, when Marx and Engels wrote, in *The Communist Manifesto*, that the history of all hitherto existing society is a history of class struggles, they were interpreting the period of history that has been influenced by written literature and territorial-states:

Freeman and slave, patrician and plebeian, lord and serf, guild-master and journeyman, in a word, oppressor and oppressed, stood in constant opposition to one another, carried on an uninterrupted, ... fight that each time ended, either in a revolutionary reconstitution of society at large, or in the common ruin of the contending classes. (Marx & Engels, 2010, p. 20)

These modes of production, from ancient slave labour to feudal serfdom and ultimately to the capitalist labour market, all existed within large scale political economies with hierarchical social structures consisting of a few elites at the top and a large workforce constituting the majority of society. The logical conclusion drawn by Marx is that as the class of workers becomes conscious of its subservient condition it will rise up and the ensuing revolution will transform society. These are important transitions, but they are not the types of transitions relevant to this thesis.

Our understanding of history and pre-history interpreted from archaeology has expanded immensely since Marx's time, allowing his theory to be extended chronologically. In particular, we can examine the political economies that existed before territorial-states. Acknowledging that earlier political economies provided people with lives that were rich, complex, healthy and intimately connected with natural systems, we can dispense with the caricature that the life of man was solitary, poor, nasty, brutish and short (Hobbes, 1651, p. 78). Acceptance of possibilities prior to the territorial-state also allows us to imagine what might come after.

The case was made in the previous chapter that adoption of technologies that were not previously available, can enable political economic systems that were not previously possible. Critics of technological determinism (Bernes, 2018) suggest that it is not possible to pick and choose 'good' technologies, discard 'bad' technologies and through this process create a better society. Yet new technologies are constantly being adopted and obsolete ones discarded, so it is of critical interest to understand the drivers of that change. It is often suggested that technological change is driven by the quest for productivity-driven profit. Whilst this is invariably true of industry incumbents, it is not necessarily the case in the circumstance of a disruption, which usually comes from outside the industry.

No sooner had Sony's digital cameras disrupted the business model of Kodak and Fuji, than they themselves were disrupted by smartphone cameras produced by Apple and Samsung, who at the same time undermined the business model of mobile phone manufacturers Nokia and Blackberry. The critical point here is that disruption invariably occurs from outside an industry and "does not respect industry insiders" (Seba, 2014, location 2744). Applying this concept to this thesis, a property developer would have no problem undermining the energy industry or the interests of big agriculture, if it is in their interests to do so by incorporating energy and food systems into a land development project. New technologies can create tension between capitalists leading to these disruptions.

The internet, computers, mobile phones, and other communication technologies can also empower individuals, enabling them to organise, acquire capital and become producers. The sharp divisions within and between classes of capital and labour are dissipating, thus also changing the social relations of production.

All these disruptions represent more efficient business models that indeed incorporate new technologies. They are driven by new ways of connecting, sharing information, and communicating via the internet. Communication technologies play a unique role in both maintaining and disrupting political economic systems. New ways of communicating can enable business models that were not previously possible, while also being the medium for marketing, connecting producers with consumers, sharing ideas, even developing new cultural narratives. The internet—the computers and cables—as a new communication technology does not cause social change but the ideas and cultural narratives conveyed through this technology can.

This is not a linear process either, where technology is the cause and social change is the effect. The argument throughout this thesis is dialectical, in this case requiring cultural narratives to be transmitted along the new communication technology. More connected access to information, knowledge and ideas can then accelerate the development of other technologies and of new political economic systems where these are consistent with the new cultural narrative. If the new cultural narrative supports distributed and regenerative systems, then distributed renewable energy technologies will emerge together with associated business models and distributed governance systems.

A new paradigm can arise through the convergence of transitions in various industries—including information, energy, water, food, housing and transport—to form a political economic system which, it is argued, aligns closely with that proposed in the ten-point plan of *The Communist Manifesto*:

9. Combination of agriculture with manufacturing industries; gradual abolition of the distinction between town and country, by a more equable distribution of the population over the country (Marx & Engels, 2010, p. 51).

As was the case in the past, disruptions in communication systems will be shown to instigate the creative destructive forces that collapse the old and make the new system feasible. Marx (1977, Preface) suggests that the era of social revolution begins with changes in the economic foundation, and this is followed by the transformation of the social and political superstructure. This thesis focuses on the basic necessities listed above as this economic foundation and this chapter discusses how the systems for producing each of these is being fundamentally transformed. Chapter 7 provides further discussion on basic necessities as a

social foundation and these terms are used to define both our *natural* needs—food, water, energy, housing—and the *means of connecting* with others to form a society—communication and transport. Human settlement patterns reflect the arrangements for the satisfaction of these needs.

There are many possible futures, and disruptions need not converge in the manner suggested. This is why understanding historical transitions and current disruptions may allow us to anticipate the pattern of human settlements that are consistent with new technologies and emerging social relations of production. Empowered by this knowledge, we can overcome fear of economic and climate disruptions by applying our energies to the development of a pattern of human settlements that can facilitate the emergence of an economically, socially and environmentally regenerative political economic paradigm.

4.1. The Crisis of Capitalism and a new paradigm

A significant body of literature has emerged during the last decade about the crisis of capitalism (Jackson, 2009; Harvey, 2014), proposals for new economic thinking (Raworth, 2017), business analyses predicting dramatic technological disruptions in the coming decade (Seba, 2014) and the emergence of a post-capitalist economies (Daly, 1973; Alexander, 2015; Rifkin, 2014; Mason, 2015).

The case being made is that we are approaching a discontinuity as “Capitalism’s operating logic is designed to fail by succeeding” (Rifkin, 2014, p. 2). Social systems create technologies that further modify social systems in a continual dialectical process that eventually leads “sooner or later to the transformation of the whole immense [social and political] superstructure” (Marx, 1977, Preface).

A contradiction arises due to the structural tendency in capitalism to mechanise or automate processes wherever possible. Consequently, the need for labour in the delivery of goods and services is reduced. Capital progressively replaces labour through investment in new and more efficient technologies. The consequent trend in producers’ cost structure is increasing capital costs but significantly lower marginal production costs for each additional unit of output.

Extrapolating this to its hypothetical conclusion, this tendency will eventually lead to all work being done by machines, computers, and robots. In this techno-utopia, goods and services would be efficiently produced for near zero marginal cost. John Maynard Keynes (1930) anticipated this future and hoped that, having solved the economic problem, we would prefer to devote our time and energy to non-economic purposes and the arts of life. From this simplistic perspective, we can see the benefits for people, who would be liberated from unnecessary toil, now free to relax, enjoy life and do only those activities that are meaningful.

The problem, though, lies in the distribution of the benefits of mechanisation and automation. Rifkin focuses on the consequences for the production side of the economy, suggesting “the capitalist era is passing...not quickly but inevitably. A new economic paradigm—the Collaborative Commons—is rising in its wake (2014, p. 1)”. In Rifkin’s schema, consumers will become their own producers and products are nearly free, having been produced at near zero marginal cost. What happens, though, to all the workers who have not become ‘prosumers’ and have instead been displaced, have insufficient, insecure or no work and

consequently inadequate income? Will they be able to access the abundant outputs of production?

This thesis argues that the collaborative commons is not an abstract workplace operating in the proverbial cloud and that it must be anchored on the ground. The proposed networks of circular economy villages are collaborative commons for those parts of the economy that are dependent on natural ecosystems. The virtual collaborative commons must be built upon the foundation of material living environments for prosumers of food, water, energy, and housing in a new, zero marginal cost economic paradigm that serves everyone.

4.1.1. Possible transition processes

Eric Rahim (2009) offers a comparison of the theories of economic development of Karl Marx and Joseph Schumpeter. Both generally agree that the internal operating logic of capitalism will inevitably lead to its own end. Schumpeter describes this as 'creative destruction'. Both also agree that the collapse of capitalism will result in some form of socialism. Yet Rahim notes that they envisaged very different processes by which socialism is achieved: "In Schumpeter's schema there is no economic breakdown, no impoverishment of the masses and no class struggle. On the contrary, long-term economic expansion results in the improvement in labour's standard of living" (Rahim, 2009, p. 70).

Schumpeter emphasises the role of exceptional individuals—innovators and entrepreneurs—in the process of economic development as they cause technological change and business innovation. Marx, on the other hand, emphasises the collective and social forces, rather than individual. This reflects a difference in emphasis rather than an irreconcilable difference. From a dialectical perspective, the interrelationship between individual and collective forces in society is perhaps the best way to understand social processes, including social change. Societies do consist of leaders and followers. Exceptional individuals are leaders. Some may drive technological change, social change, or both. For leaders to successfully enact change, people must choose to follow.

For Marx, the transition to socialism is never accidental but requires conscious action from the working class. Mobilising populations, rather than asking governments to act on our behalf, is central to the strategy proposed in this thesis. Politicians and corporate bosses are not necessarily leaders. In early 2020, unprecedented bushfires ravaged the Australian continent for months and yet the national government was not willing to increase efforts to better manage the environment. Unless there is conscious action by the citizenry, our most likely future is to sleepwalk into environmental collapse, which also means social and economic collapse.

Schumpeter expressed concern that the broadening of social welfare may result in a country sleepwalking into socialism (Rahim, 2009, p. 71). A premature assessment of the roll-out of social security measures—Job Keeper and Job-Seeker payments—as responses to the COVID-19 pandemic may have suggested he was right. One might have imagined the conversion of these payments into a Universal Basic Income (UBI). Yet how a nation could adopt a UBI under its current operating logic is unclear, nor is it likely that a person in a position of power would willingly introduce a mechanism that liberates workers from dependence on the capitalist system that underpins their power.

Therefore, the proposed strategy is to create places where residents can collaborate locally to provide everyone in their community with their basic needs. Such a strategy ensures the direct delivery of basic needs—consumed by the producing community—rather than the provision of money, through a UBI, to pay for the purchase of these same needs. This approach not only addresses the social issue of inequality of wealth distribution but also redirects processes of wealth creation to address environmental degradation. It requires that communities take responsibility for and regenerate their local environment, enhancing local ecosystems to support their local community.

4.1.2. Preconditions for transition

Marx argues that prior to a transition, capitalism will, through its own logic, have established all the essential elements of the successor mode of production. The three pre-conditions identified by Marx are (a) productive efficiency, leading to (b) abundance and then (c) awareness. This should not be interpreted as a linear process, where technological efficiency is the cause and social change is the effect, as inferred by technological determinism. It is a constantly evolving, iterative, and dialectical process. Certain technological changes, such as the creation of the internet, can improve productive efficiency, lead to an abundance of information and ideas, and increase awareness of new possibilities. This drives other technological changes, perhaps in energy systems, which, in turn, drive further social changes. Various technologies can also converge—telephony with photography—or have implications in numerous areas—battery technology impacting communication, stationary energy, and transport. The interplay between new technologies, new ideas and social change can have a cascading effect, influencing all areas of economic and political life.

In Marx's time the agglomeration of industries in cities maximised productive efficiency and created an abundance, leading to a rising awareness within the working class that they were not sharing in that abundance. Under present-day conditions of even greater productive efficiency and abundance, the proximity of workers is no longer necessary for the raising of awareness. Instead, the internet now allows people to share their experiences and create a collective consciousness without being co-located. In *Revolution 2.0*, Wael Ghonim (2012) describes how the Arab Spring started as a Facebook group with the youth building their support base online before moving into the town square. The Occupy movement followed a similar pattern. The global protest movements that started in 2019, such as 'School Strike for Climate' and 'Extinction Rebellion', show how small actions in one place can resonate—or go viral—on the internet, creating a global movement in the real world.

The power of virtual platforms for building social movements also highlights the diminishing role of industrial worker collectives. In *Rebel Cities* (2012), David Harvey makes the case that since the mid 19th century our political debate has been framed in terms of capitalists versus the working class. Yet the number of people identifying as working class continues to diminish, demanding a profound shift in the nature of our political debate. The 'anti-capitalist struggle' should shift from the workplace to the neighbourhood and from workers to all citizens reclaiming the right to the city (Harvey, 2012, p. 139).

This reinforces our emphasis on settlement planning in the development of a new political economy. Yet the city should no longer be imagined as the place where industries and industrial workers agglomerate but rather the intersection of real and virtual town squares,

where the actions of even one person (e.g., Greta Thunberg) can motivate communities around the world.

4.1.3. The role of infrastructure in the transition

The modern notion of economic disruption is analogous to Schumpeter's duality of creative destruction, which itself is based on the work of Karl Marx, who argued (Marx, 1973, p. 667) that the destruction of capital value—making fixed capital structures and infrastructure obsolete—was one of the ways in which capitalism overcomes its internal contradictions.

As new infrastructure is constructed, creating or enabling new modes of production, the old modes of production are destroyed. For example, as bi-directional communication infrastructure for the internet is constructed, it displaces one-directional mass media infrastructure. Those who have access to this new infrastructure can be both producers and consumers of information, whereas with television and radio, a few are producers of content and the majority are simply consumers. Similarly, energy technologies enable more people to be both producers and consumers of renewable energy. In this way, new scientific knowledge is translated into fixed capital through normal capitalist processes, generating a crisis as existing information and energy producers become less viable. Energy drives the entire economic system and as it shifts from fossil fuels to zero marginal cost renewables, the power over the economic system also shifts away from centralised providers.

Distributed energy also means distributed power. Economic disruptions necessarily cause political disruption as the power dynamics in the social system also change. Mason (2015, p. 268) argues that the transition to post-capitalism is a transition from hierarchies to networks where the “key principle is to create democratic social control over aggregated information, and to prevent its monopolization or misuse by states and corporations”. Tony Seba similarly argues:

The industrial era of energy and transportation is giving way to an information technology and knowledge-based energy and transportation era... The new energy architecture will be distributed, mobile, intelligent and participatory. It will overturn the existing energy architecture, which is centralized, command-and-control oriented, secretive and extractive. (Seba, 2014, p. 2)

What might human settlements look like if the economic system is distributed, mobile, intelligent and participatory? The creation of physical environments that embody this post-capitalist political economy is the objective of this thesis.

4.2. Current political and economic disruptions

To bring this theory into the context of present-day events, the following discussion describes how recent technological innovations, new capital infrastructure and business models are already creating the modes of production of the successor to capitalism. I start with changes in political and governance systems to illustrate that these are not a consequence of technological change but are occurring in parallel. I then discuss the communications revolution, which I have argued drives all other technological change. Transitions in water, energy, housing, and transport systems that are already underway are then described.

To further reinforce the case that this is not an argument for technological determinism, I then discuss the role of agriculture and food systems more generally. Bernes (2018), a critic of technological determinism, argues that revolutionary change is dependent instead, on the restructuring of food systems:

this will mean, by necessity, a return to the old nineteenth-century project of abolishing the division between town and country...the sensible path will be to localize food production as much as possible, not only in order to cut down on energy use in transportation but also to establish a situation in which some large portion of people's food needs is immediately available and ready to hand, within some reasonable distance, making it much harder for them to be subjugated by a bureaucratic layer, a hostile power, or an emergent attempt at capitalist restoration. (Bernes, 2018, p.359)

My argument is entirely consistent with this acknowledgment of the significant role of food systems but, as Bernes himself acknowledges, technology is not a series of discrete tools but an ensemble of interconnected systems (Bernes, 2018, p.333). Food systems depend on water and energy systems. They require workers that must be housed and who need to move within and beyond the farm using transport systems. Technological systems can converge into an integrated ensemble of infrastructure that forms a human settlement.

4.2.1. Collaboration in local infrastructure delivery

The transitions from centrally controlled systems to networks implies a substantial change in the relationship between governments and individuals. Such a change is already occurring in town planning as private developers and governments increasingly collaborate in the delivery of public infrastructure.

Costs of public infrastructure have significantly increased in recent decades. This is due, firstly, to increased public expectations with respect to the quality and scope of public infrastructure. Secondly, councils have increasing obligations to manage risks in the public domain and thirdly, state governments—experiencing their own cost pressures—have shifted various responsibilities, and therefore costs, to local governments.

These concerns came into particular focus in the late 1990s as the property market in Sydney was booming. The underutilised industrial areas to the south of the Sydney CBD were being transformed into residential apartments. Former workers' cottages and terrace houses were being gentrified. The demand for high-quality apartment living escalated as, for the first time in two generations, a house in the suburbs was no longer the only Great Australian Dream.

The now defunct South Sydney City Council had a problem. Public infrastructure was ageing and utilitarian roads suitable for industrial areas and ageing stormwater systems were no longer adequate. High-quality private accommodation demands similarly high-quality public spaces: parks and recreation areas, trees, street furniture and lighting, community facilities, public art and so on.

With the increasing population, traffic increased, and the traffic management engineers commenced a works program to widen roads. At the same time, the transport planners sought to address the same problem by narrowing road carriageways and widening footpaths. Although counter-intuitive, it had long been recognised that increasing road

capacity simply attracts more vehicles and so road widening does not solve the problem of congestion. Diametrically opposite solutions to the same problem made it clear that the council needed a comprehensive plan for the public domain. A new position was created, and I was appointed Public Domain Planning Manager in mid-2000.

Our team was able to step back from daily pressures and look at the city holistically. The strategic process included mapping the existing assets, infrastructure, and facilities, identifying gaps and pressure points, and then determining what new works would be needed. Yet the key challenges were how to pay for these works and how to engage the development industry to deliver some of them.

Engagement with the development industry to share costs and infrastructure delivery responsibilities raises a few issues. Firstly, there is no question that essential utilities, such as water supply, sewage discharge, electricity and telecommunications, are fully the responsibility of the property developer. Also, roadworks required to provide access to the development must be paid for and provided by the developer. Beyond the curtilage of the development though, the apportionment of responsibilities becomes more difficult. Each development increases the population, which has a marginal but meaningful impact on demand for open space, community facilities, roads, and other infrastructure.

Commencing in NSW in 1992, the *Environmental Planning & Assessment Amendment (Contributions Plans) Act 1991*, required councils to prepare development contributions plans. The plans would identify local needs as a comprehensive and costed works program. The cost of these works would then be apportioned between the existing population—to be paid by the council—and the projected incoming population, to be paid by developers. This approach can work when the pace of development is slow, and council can reasonably estimate and plan for the required public infrastructure.

In the 1990s population growth in the South Sydney Local Government Area (LGA) was dramatic in both actual numbers and the rate of growth. Planning for this growth included the preparation of the South Sydney Development Control Plan (DCP) 1997. At the time, the DCP established the maximum Floor Space Ratio (FSR) that a development could achieve. That is, the maximum achievable development floor space, relative to the subject site area. Taking an innovative approach to the provision of public infrastructure and recognising the nexus with new development, the DCP included the following provision, seeking to engage with developers on the provision of infrastructure. Clause 2.2 in Part E: Environmental Design Criteria reads:

A bonus floorspace incentive of up to 0.25:1 of the total site area, may be applicable to sites requiring the provision of:

- Dedication of land...
- Provision of the right of public access in otherwise private space...
- Streetscape, bicycle, and pedestrian enhancement works...
- Public art, thematic street furniture, fountains and water features
- Social development projects such as provision and upgrade of community buildings
- Stormwater amplification, integrated water treatment facilities and large-scale detention systems and other civil infrastructure projects;

- Public transport projects ...
- Enhancements to existing parks such as play equipment, lighting, sports facilities, furniture, landscaping, etc.
- Aerial bundling or undergrounding of cables, improved street lighting, new street masts, solar lighting etc;
- Any other works or improvements at the discretion of council

As far as I am aware, this is the first instance in which a council extended beyond simply regulating what a developer must provide and attempted to engage in a formal negotiation. In this example, additional private, developable floor space was being offered in exchange for the provision of additional public infrastructure. Upon taking up the position as Public Domain Planning Manager, I developed the legal, town planning, administrative and financial processes for negotiating agreements with developers. From 2000 till I left Council in 2004, dozens of these deeds had been negotiated, signed and delivered.

Numerous legal issues were raised in establishing this process, not least of which was the conflict between the council's responsibilities as a regulator and its responsibilities as a provider of public assets. Section 22 of the *Local Government Act 1993* explicitly identifies both of these as legitimate council responsibilities and also states that council—being a statutory corporation—has legal personhood and so may enter into contracts and deeds pursuant to Common Law processes. This was possible because the relevant legislation—the *Local Government Act 1993* and the *Environmental Planning and Assessment Act 1979*—were both silent on the permissibility of negotiated arrangements.

These legal issues have been addressed in more detail in an article for the *Local Government Law Journal* (Liaros, 2004). The purpose of that article was:

...to articulate a process by which any departures from development standards, consistent with good planning, translate in a fair, equitable and transparent way to provide appropriate sharing of benefits between the developer and the community. It is the author's view that, given the increased tendency to enter into such agreements, legislation is necessary, either to standardise and make these arrangements transparent in every instance, or alternatively to make them explicitly illegal. (p. 73)

Without suggesting that correlation necessarily implies causation, the *Environmental Planning and Assessment Amendment (Development Contributions) Act 2005 No 19* commenced on 8 July 2005. It provided that a planning authority may enter into a planning agreement with a developer, also setting out the process for this to occur.

The purpose of this discussion is to illustrate that the perceived hierarchical relationship between the city and citizens, that is, between government and the people, is changing. This aligns with the evolving maturity of the city/citizen relationship. Foth (2018) summarises this evolution in which citizens were regarded initially as residents, then consumers, participants and eventually co-creators. From this perspective, citizen involvement need not be limited to participating in the delivery of particular infrastructure associated with a specific project. Citizens should be involved in the development of the overall strategic vision for their area. To emphasise this, my concluding thoughts (in Liaros, 2004) were as follows:

It is the author's opinion that the generation of a long-term works program should be a statutory requirement but should be extracted from the s94 plan. Section 94, along with each of the other funding tools, including s64 of the Local Government Act 1993 (NSW), planning agreements, special and ordinary rates, grants and any others should each make reference to the same long-term works program. The management plan could then also make reference to this separately articulated program. (p. 82)

An independent inquiry into the sustainability of NSW local government (Allan et al., 2006, p. 31) recommended that "All councils develop and adopt a long-term strategic and financial plan in close consultation with their communities". This was adopted in the *Local Government Amendment (Planning and Reporting) Act 2009 No 67*, requiring councils to prepare 10-year Community Strategic Plans, which are intended to guide all aspects of local development, including financial management, planning for the built and natural environment and community development.

The pre-conditions for a new political economic paradigm, the legal and administrative mechanisms and the necessary flexibility in development controls are available. These allow a developer or any group of people to plan, design, build and manage, not just housing but a full ensemble of associated infrastructure systems.

4.2.2. The communication revolution

In 2013, my partner, Nilmini De Silva, joined me in this research project and we set up our town planning consultancy, PolisPlan. We decided the business would run a paperless office. All our information would be on the cloud so we could access anything we needed, where-ever we were, through our devices. The tools—computers, applications and subscription-based services—are all available. The pre-conditions for a new way of producing, accessing and sharing information have already been developed. We chose to become digital nomads to identify the issues for digital nomads operating in an information and service economy but dealing with mindsets, institutions and systems that were designed in the industrial era of mass production.

Like Mason (2015) and Seba (2014), Yochai Benkler in *The Wealth of Networks: How Social Production Transforms Markets and Freedom* (2006), describes the shift from centralised, capital-intensive communication infrastructure to distributed networks:

The current networked stage of the information economy emerged when the barrier of high capital costs was removed. The total capital cost of communication and creation did not necessarily decline. Capital investment, however, became widely distributed in small dollops, owned by individuals connected in a network. We came to a stage where the core economic activities of the most advanced economies—the production and processing of communication—could be achieved by pooling physical capital owned by widely dispersed individuals and groups, who have purchased the capital means for personal, household, and small-business use. Then, human creativity and existing information were left as the main remaining core inputs... (p. 463)

The information revolution is characterised by networks of prosumers that might trade peer to peer but will also collaborate outside market exchange systems. The capital infrastructure costs are low and so the economic system is not predicated on, and framed by, the capital. When capital is distributed, the importance of the capitalist who controls the means of production is diminished, while the importance of communication systems increases.

The internet is revolutionising both economics and politics. We have already mentioned how social networking has transformed public debate by reference to the various protest movements. From an economic perspective, the internet decreases the importance of the city centre as the location of capital and associated work opportunities. Working online, or tele-commuting from remote work hubs, reduces the need for people to commute to the city centre to participate in work. These transitions accelerated in 2020 as working from home became an imperative during COVID-19 pandemic lockdowns.

The internet also makes online sales and direct delivery from producer to consumer possible. If these possibilities are broadly adopted and coupled with 3D printing of products ‘on-demand’, then the demand for mass production factories, warehouses, logistics infrastructure and retail outlets would diminish. Complex global supply chains would not be needed as only information would be transported—the blueprint for a product—directly to the 3D printer that is closest to the consumer. How would this transform our cities?

Conversations in relation to economics are often quite abstract. Yet, at its most basic level, economics is about how we organise ourselves to satisfy our needs and wants. This is not an abstract concept. It relates to the structure and arrangement of our cities; the spatial relationship between living spaces, workspaces and their connection to food, water, energy and other resources needed for surviving and thriving. The organisation of economic activities, and the choice of what activities are necessary, determines the organisation of our cities, towns and villages.

4.2.3. The water management transition

Prior to joining me to set up PolisPlan in 2013, Nilmini, who has a Masters in Hydraulics and Hydrology, was a leader in the field of flood risk management in NSW. She had led cutting-edge water management projects that restored wetlands and creek-lines, and reclaimed floodplains. The ‘Restoring the Waters’ project in Western Sydney, which she joined in the latter part of its first stage, was a vision of the Australian Conservation Foundation triggered by the Rio Earth Summit in 1992. It involved removing a concrete channel and restoring a natural creek-line (Frost & De Silva, 2002). The improvement in water quality, slowing of the water velocity, introduction of plant diversity and establishment of aquatic habitats resulted in the appearance of fish, birds and other species in the section of creek-line that had concrete channels both upstream and downstream. As life returned, the adjoining parkland attracted greater use by locals for picnics and recreation.

Despite the success of the first stage of this project, as well as strong support from the local community and designs for the next stage ready for tender, the project did not proceed. The \$1.33 million cost for the first 500-metre stage invited the suggestion that the cost of future stages did not justify the benefits. This would not be a surprise to anyone who works to advance projects that offer social or environmental benefits. While it would be easy to blame councillors or those who hold the purse-strings for not valuing social and environmental goods, it is more useful to ask how we might penetrate this obstacle of cost-benefit analyses based solely on monetary values? It should be noted that the Restoring the Waters project leaders placed a significant focus on advancing community engagement techniques throughout, yet the project still failed in one of its identified desired outcomes, that is, to “Provide a catalyst to connect open space corridors along restored drainage easements throughout metropolitan Sydney as ‘corridors of green and blue’” (Frost & De Silva, 2002, p.

7). As previously stated, this is one of the key concerns of this thesis: how to mobilise populations and catalyse action to advance social and environmental values. In other words, how do we value these outcomes above the money that pays for them? What kind of demonstration project might catalyse action?

Perhaps, thinking holistically, we could move beyond water as the central focus, to a systemic design that integrates water systems with open space, built infrastructure, utilities and other components of the design of places for human habitation. Engineers and others in the water management industry have recognised this as the necessary direction for advancing water management. This approach is generally referred to in the industry as Water Sensitive Urban Design (WSUD). In 2012, a consortium of university, industry and local government partners received funding from the federal government to establish a Cooperative Research Centre:

The Cooperative Research Centre for Water Sensitive Cities (CRCWSC) was established in July 2012. Its purpose is to help change the way we design, build and manage our cities and towns by valuing the contribution water makes to economic development and growth, our quality of life, and the ecosystems of which cities are a part. (CRCWSC website)

Designing water sensitive cities is about integrating water systems planning with land use planning. Much research has been carried out, many case studies have been showcased and a raft of tools and products have been developed. WSUD is now considered best practice for stormwater management, at least for new precinct-scale developments. We

Figure 5 Lochiel Park masterplan



Source: RenewalSA (2020)

visited one of the better projects, Lochiel Park in Adelaide, just after it was completed in December 2015. A project by the state-owned Renewal SA, it has achieved substantial savings in water demand:

Water efficiency measures include rainwater for re-use as hot water and ... recycled stormwater for toilets, washing machines and irrigation contribute reaching a target of 78% saving of potable water (against the 2004 average). (Renewal SA website)

Such significant reductions in demand for potable water serve to illustrate just how wasteful our current single-use water management systems are. They also demonstrate that we have the technology and expertise to design cities in a far more water efficient manner. Yet, as the Lochiel Park

masterplan in figure 5 shows, on-site water management requires significant land area for reservoirs and wetlands.

In addition, the project was only financially feasible because it was delivered on state-owned land (a former education institution) by a state-owned entity. Whilst some of the larger property developers do include similar measures, such projects are more the exception than the rule. Once again, this is because the economics of property development do not support the inclusion of water sensitive urban design measures. Authorities regulate to require their inclusion, and this becomes an additional development cost, which is difficult to recoup because the price of housing is set by the broader market. Therefore, increased costs often translate into a smaller profit margin. From a purely financial perspective, the developer incurs an increase in capital costs, while the benefit accrues to the future residents as lower life-cycle costs. Also, the capital works require land that may previously have been used for additional housing.

Despite this current perceived financial dilemma, the pressure to find a solution will continue to increase. According to Sydney Water, 80 percent of Sydney's water comes from Warragamba Dam. For South Australia the situation is more critical. According to SA Water (2020), "South Australia is the driest state in the driest inhabited continent on Earth" and, in 2018–19, 82.95 percent of its water was sourced from the Murray River. The Murray–Darling catchment is the most contested water source in the country, with irrigators from Queensland, New South Wales and Victoria placing increasing demands for its water before it can reach South Australia.

The pre-conditions for the successor mode of production of water have now been established. There is an imminent crisis that will trigger change. The technology and expertise to deliver an alternative is available. A substantial reduction (in the order of 78 percent) in demand for potable water from centralised supplies can potentially be achieved if cities are designed as a network of precincts that each capture, store, clean and recycle their own water. It is more difficult to retrofit existing suburbs, but we can, at least, not continue to make the same mistakes with new precincts. Rural towns will be less difficult to retrofit where they have their own water supply and are surrounded by rural land. All that is needed is a new financial strategy for the successor mode of production.

4.2.4. The energy transition

The energy transition is better publicised than the water transition. The transition from fossil fuel energy sources —coal, oil and gas—to renewable energy harvested from the environment, substantially reduces our impact on the environment. This is the main driver of the energy transition but there are other consequences for our economic system. As is the case for water, the mode of energy production is transitioning from a one-directional system with a few providers to a two-directional system with many producers, most of whom are also consumers. This shift, from a centralised to a distributed energy system, challenges the logic of markets that have traditionally been understood as places where contracts are made between producers and consumers who are separate and have different interests. The term '*prosumer*', meaning 'production by consumers', is increasingly used to express this idea.

As more people and companies become producers of energy, the demand for *peer-to-peer trading* of energy grows. Consider the following hypothetical example. Rather than selling energy to the grid operator for 10 cents/kWh (the feed-in tariff) when you have an excess and then buying it for 30 cents/kWh when you are not generating enough, agreeing to trade with your neighbours for 20 cents/kWh would be a win-win scenario. Such trading of energy between neighbours is currently prohibited by regulation. As a result, companies like Power Ledger (powerledger.io) are using blockchain technology to enable peer to peer trading of energy. Blockchain is the technology upon which bitcoin and other virtual currencies are constructed. The use of such alternative ledgers and currencies challenges not just the financial and economic system but also the legal and political structures upon which they depend.

It is important to recognise that traditional energy systems require inputs of fuel and labour to produce energy, whereas renewable energy has no such inputs. Energy is produced at close to zero marginal cost. If the cost is zero then there is no point in trading at all. The emerging mode of production may be that community precinct-scale micro-grids provide energy for all in the community without the costs associated with measuring and trading at the individual or household scale. Capital infrastructure requirements would be determined for servicing the entire community and would be funded by the community. Management, maintenance, refinements, and replacement of infrastructure would be arranged through a separate management plan.

The consequence of this is that communities will be responsible for delivering and managing the supply of energy. It will therefore be in their interest to minimise the demand, minimise waste and maximise efficiency.

4.2.5. Housing transitions

The delivery of both water and energy infrastructure at a precinct-scale and the possibilities created by the internet are perfectly suited to emerging 'build-to-rent' land development models. Rather than building housing for sale, with common assets becoming the responsibility of a body corporate, utility provider or government authority, an entire precinct is retained in the ownership of the developer (or a Large Corporate Landlord (LCL)) and housing is made available for rent. This allows the developer to plan and design for common assets and for the entire life of a precinct. In such circumstances, it is in their interests to maximise durability and on-site resilience as this reduces the costs of management and maintenance of infrastructure. In turn, this should reduce life-cycle costs for residents.

According to the Australian Housing and Urban Research Institute (AHURI, 2019), build-to-rent is an established practice in both the UK and USA but has not been taken up in Australia. The AHURI brief cites tax settings designed for the build to sell model, in particular land taxes, GST provisions, and income tax levels for overseas investors, as impediments to uptake in Australia. Nevertheless, it appears that several major developers are pressing ahead and lobbying for change. In Victoria, the Department of Environment, Land, Water and Planning established a build-to-rent standing advisory committee in September 2018 as "part of the government's efforts to facilitate the development of a BTR sector in Victoria". Its terms of reference include "the development of a model agreement subject to section 173 of the Act", which relates to the provision of supporting infrastructure in conjunction with a housing development.

With the COVID-19 crisis in 2020 and consequent economic fragility emerging, policy support for the build-to-rent sector progressed substantially. In a media release in July 2020, the New South Wales state government announced:

The NSW Government will introduce a land tax discount for new build-to-rent housing projects until 2040 and a new Housing Diversity SEPP to provide more housing options, greater surety for renters, boost construction and support jobs during the COVID-19 recovery. (Ministerial Media Release, 29.07.2020)

The proposed *State Environmental Planning Policy Housing Diversity* (Housing Diversity SEPP) proposes to introduce three new housing types: build-to-rent housing, student housing and co-living.

Housing innovation arises in this form and becomes an imperative due to certain social and demographic trends. For example, an ageing population is leading to a rapid expansion in the development of retirement villages. Kennedy and Buys (2020) recently sought to “identify ways to prepare and adapt Australian cities to capitalise on older Australians living longer, healthier and more productive lives”. Together with stakeholders their workshop concluded that designing for older people involves inclusive design that enables elderly people to continue to make creative and productive contributions.

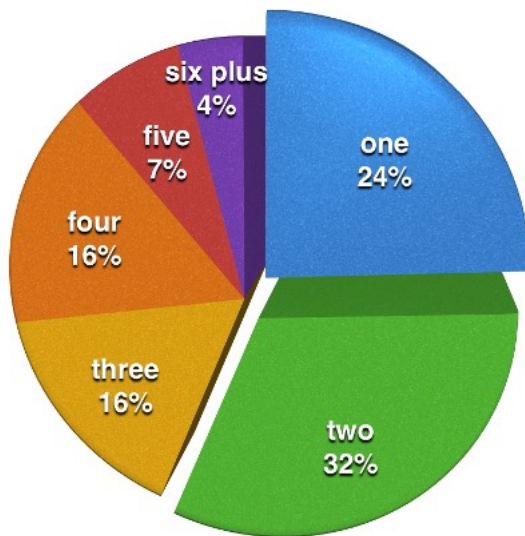
By creating inclusive infrastructure, such as closely connected living and learning “micro-neighbourhoods”, people of all ages remain the “heart” of the economic, social and cultural life of communities. A mobility “ecosystem”, including automated buses and electric ride sharing, could connect specialist knowledge and skill centres to local hubs. (Kennedy & Buys, 2020)

Another social trend relating to older people is the significant growth in numbers of grey nomads travelling around the country, while younger travellers tend to call themselves ‘vanlifers’. There are also many young people who are becoming mobile in different ways. The emergence of a significant market segment of digital nomads is the principal driver for the co-living development model. Digital nomads work online and so do not necessarily need to be located in a particular place. They may work in a particular location for up to a year and then move on.

Rather than planning for these market segments separately, the retirement village concept could become a more comprehensive development unit. Micro-neighbourhoods could be planned for diverse populations of all ages with housing integrated with a range of services.

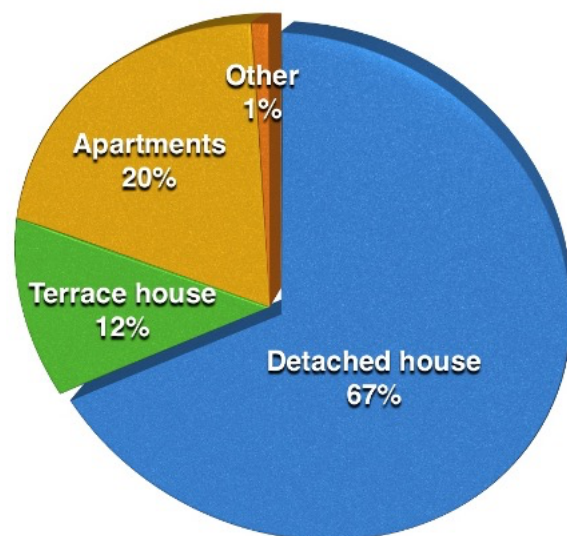
This highlights the commonalities between seniors housing, student housing, build-to-rent and co-living. Student housing and co-living for digital nomads reflects housing expectations at an early life stage prior to the need for a larger family home. Seniors Living similarly reflects the life stage after raising a family. The reason why one and two person households are growing as a market segment is that these two life stages have lengthened relative to the family stage. Figures 6 and 7 illustrate the disconnect between household sizes and the dwelling structures. Whereas 67 percent of all dwellings are detached houses, essentially designed for families, 56 percent of households have only one or two occupants.

Figure 6 Occupants per occupied dwelling in NSW



Source: ABS (2016) Census of Population and Housing, table G31

Figure 7 Dwelling structure in NSW of occupied dwellings



Source: ABS (2016) Census of Population and Housing, table G32

This disconnect illustrates the need for better planning for different life stages—life-cycle planning—and the necessity for more options that are tailored to one and two person households that are collectively managed with shared facilities and services. These housing options would have a smaller housing footprint but access to shared assets and spaces that encourage community connection. They would also have more flexible but secure tenancy arrangements rather than ownership.

To accommodate the demands of one and two person households, not as peripheral alternatives but as a majority segment of housing demand, requires a substantial restructuring of strategic and statutory planning processes. Such a review is further complicated by the blending of different land uses, such as by Airbnb, which enables the use of residential accommodation as tourist accommodation. This has caused the hotel industry to adapt, and many are encouraging digital nomads to stay longer, transforming foyers into remote work hubs and, like new master-planned housing precincts, they are using app-based engagement and concierge platforms. Essentially these hotels could be characterised as co-living developments with foyers converted into co-working hubs (Minett, 2019).

One important aspect of this review of planning processes would be to adopt a parent term, such as Housing as a Service, that includes seniors housing, student housing, build-to-rent, co-living, boarding houses and hotel accommodation. In our submission to the department on the Housing Diversity SEPP, the following definition was suggested:

Housing as a Service means a building or place that contains 3 or more rooms or dwellings that are offered separately for rent and:

- is held within a single ownership;
- is operated by a single management entity;

- includes shared assets, rooms and services; and
- includes on-site management.

4.2.6. Consequences for transport

The development of micro-neighbourhoods with mobility ecosystems as proposed by Kennedy and Buys implies a substantial transformation of transport systems. A compact built environment, with housing and work opportunities co-located, substantially increases walk to work opportunities and reduces the need for long work commutes in private vehicles and public transport. Other options like electric bicycles and electric golf carts would be feasible to facilitate movement within the village. Given that transport systems are designed for the peak commute times, the rollout of a network of such diverse micro-neighbourhoods will reduce demand for both private vehicles and public transport.

A renewable energy micro-grid incorporated within the precinct could be designed to power a small fleet of shared electric vehicles. In his analysis of economic disruptions, Seba (2014) emphasises that disruption is rarely, if ever, caused by individual technologies but by the convergence of a number of different technologies. In this case, a renewable energy micro-grid was proposed to be included for other reasons—cheaper electricity and to cycle water through the site—but can be expanded and used for transport. The transport industry is already being disrupted by electric vehicles and our proposal advances both the household electricity and transport transitions.

Transportation is also being disrupted by car sharing platforms like Uber. A mobile phone application, used to book other rooms and facilities, could also be used to book any of the fleet of shared electric vehicles. From the perspective of a precinct with its own energy micro-grid, car-sharing electric vehicles makes financial sense as there will be fewer vehicles, and these will be managed and maintained collectively.

4.3. Convergence through regenerative agriculture

The demand for organic produce, interest in urban agriculture and new platforms connecting farmers with consumers, all suggest that there is growing consumer demand for a change in our food system. For farmers, though, it is more of a necessity than a desire for change. Industrial agriculture in Australia is under severe stress. The effects of a warming climate on agriculture are clear, with increased incidences of extreme weather conditions including droughts, floods, bushfires and hailstorms. These extreme conditions are further compounded by excessive extraction of water from creek and river systems and consequent damage of water systems. Deforestation has resulted in soil depletion and increased salinity. Industrial farming practices over the past 100 years have decreased biodiversity in landscapes and soils. This has resulted in falling productivity and increasing risks to food production. Recognition of all these factors indicates that agriculture is in desperate need of a revolution.

A revolution in agriculture would reshape our cities, just as it did through the Industrial Revolution. Numerous examples of the seeds of this revolution—referred to as regenerative agriculture—are described in Charles Massy's *Call of the Reed Warbler: A New Agriculture, a New Earth* (2017). He identifies the principles of regenerative agriculture as follows:

- (1) Maximising the capture of solar energy by fixing as many plant sugars as possible via photosynthesis.
- (2) Improving the water cycle, maximising water infiltration, storage and recycling in the soil.
- (3) Improving the soil-mineral cycle by creating healthy soils that contain and recycle a rich lode of diverse minerals and chemicals.
- (4) Maximising biodiversity and health of integrated, dynamic ecosystems at all levels.

Massy argues that a fifth requirement is a change in human attitudes. Only human agency can trigger landscape regeneration by working in harmony with natural systems. The necessary shift in attitude is from an extractive to a regenerative mindset. Instead of just taking from the land, we take and give back in equal measure. This concept of regeneration is equivalent to the 'closing the loop' narrative of the circular economy. Closing the loop implies thinking in systems and striving for zero waste because there is no waste in nature.

The principles of regenerative agriculture and of the circular economy provide the basis for a new approach for building human settlements. Such an approach would, firstly, treat the city as a community of citizens with a regenerative attitude that ensures their actions have a positive impact on the land. The city would need to capture as much solar energy as possible, manage the water cycle, improve soil health, maximise biodiversity and minimise or eliminate waste. This approach not only guarantees food but also energy and water.

4.4. Conclusions

This chapter has shown that revolutions—or economic disruptions—occur when disruptions in various industries converge. If current emerging disruptions in water and energy systems, and in housing, were to converge with regenerative food systems, then a transformative change in the whole economic system could ensue.

It is hypothesised that the ability to generate energy on-site enables the regenerative agriculture revolution. It is now possible to develop a built environment together with an energy micro-grid, powering a water micro-grid, which in turn irrigates a local regenerative food system. Such an integrated system would enable the harvesting, storage, and distribution of these basic needs locally at a village or precinct scale. Together with a built environment that is designed to minimise energy demand, a substantially more energy efficient approach to land development is possible.

Designing the built environment with smaller private spaces and a wide range of accessible shared spaces and facilities to minimise energy demand would simultaneously provide opportunities for social interaction and connection. This would also align with new build-to-rent and co-living development models mentioned above. Disruptions in food, water, energy and land development systems are therefore all converging to disrupt the approach to building cities.

Creating such nodes in a network is obviously difficult for densely populated areas but represents a significant opportunity and point of difference for the nearly 50 percent of the world's population that live in rural areas.

The way we think about cities and town planning is anchored in an increasingly irrelevant past. Currently, town planning encourages centralisation, reflecting the industrial era

demand for agglomeration of industries and workers. It then must address the consequences of centralisation, such as loss of privacy, amenity, congestion, loneliness, and disconnection from nature. Planning should instead address the issues arising from centralisation by enabling redistribution of populations, utilising distributed information and energy systems. We need a new way of thinking about cities—a new paradigm for town planning that attempts to extrapolate the future from the world as it is today, not from the world of the Industrial Revolution.

5. Centralisation or a distributed network

The development of precinct-scale or village settlements with integrated infrastructure is only one component of the proposed new human settlement design. It is also necessary to ask how they scale and how they connect to form the broader social fabric.

In this chapter it is proposed to discuss the connection between settlements by conceptualising the relationship between the village and the broader society as a node in a network of villages. Through this discussion the design principles needed to efficiently distribute populations will be identified. The analogy of a village as a node in a network can be contrasted with that of a village as a cell within a larger social organism, which will be discussed in the next chapter. Both analogies describe organic settlement patterns that may be contrasted with the present clinical, mechanically organised urban environment.

Human settlements—cities, towns and villages—are already scattered across the face of the Earth and are connected by transport and information networks, so one might therefore suggest that the human settlement pattern is already a network, with settlements as nodes in that network. This is true, but the distribution at the global scale is countered by centralisation at the regional scale, where cities draw people, food and resources in from surrounding towns and rural areas. This chapter will examine the efficiency of the existing network as a whole and the role of food in creating more organic settlements.

A number of interconnected debates will inform this discussion. Firstly, this chapter offers a critique of urban planning as it is currently practised—emphasising the exclusion of the food system from planning processes—and describes how cities are primarily shaped by the food system. Whilst the first cities were formed with the advent of agriculture, modern mega-cities emerged because of industrial agricultural practices. Town planning practices have evolved over the past century or so to address the many urban problems caused by their massive scale.

To reimagine town planning processes, it is necessary to make a clean break from much of the present urban planning debate that is so dominated by ‘urbanologists’ “who support the political economic status quo” and “cheerfully ignore the structural circuitry of power” (Davidson & Gleeson, 2013, p. 74). The triumph of the city trumpeted by Glaeser, Florida, Brugmann and others also ignores the impacts of cities on areas outside the city limits. It is the identification of urban zones as distinct and separate from rural and environmental zones outside the city limits that “locates our species outside the natural environment and [consequently] ... assumes immunity from natural and material limits” (Davidson & Gleeson, 2013, p. 74).

Instead, it is proposed to build on the work of a number of key thinkers from the early 20th century—including Ebenezer Howard, le Corbusier, Lewis Mumford, John Nolen and Frank Lloyd Wright—who contrasted the urban, mechanical city with the organic city. A key outcome of this discussion is that the strategy for population redistribution should be spontaneous and healthy rather than planned and directed by government. Some design principles for the development of settlements in the proposed network will also be assimilated from this discussion. Relevantly, a key design principle is that each settlement should to some degree be self-governed and self-sufficient, in other words have some level of political economic autonomy.

With the incorporation of food systems into the town planning process, it becomes possible to appreciate cities as systems that serve the needs of their citizens; providing food, water, energy, housing and work as well as access to transport and communication services.

In proposing to shift from industrial agriculture to a networked system of regenerative agriculture the question is raised as to whether this would result in a reduction in efficiency of food production. Similarly, economists have posited that the agglomeration of industry in mega-cities leads to increased productive efficiency, so a shift to a network of small settlements would also result in a reduction in manufacturing efficiency. These questions are each addressed separately before the concluding section, which provides a more detailed discussion about the concept of efficiency.

In economic discourse, discussions about efficiency tend to focus on the efficiency of production. Given that an economic system is defined as “a system of resource allocation, production *and distribution* of goods and services within a society or a given geographic area”, then economic success should be measured not only in terms of volume of production output but also how efficiently goods and services are distributed in a geographic area.

5.1. Industrialisation and the growth of cities

The materialist conception of history, originally proposed by Karl Marx, suggests that human societies are constantly being reorganised over time through the interaction of technology and the social relations of production—together referred to as the means of producing and reproducing the necessities of life. Writing from the mid 19th century, Marx was witnessing the substantial reorganisation of society resulting from the industrial revolution.

Advances in science and technology through the Industrial Revolution caused a drastic reorganisation of human settlement patterns, particularly due to the industrialisation of agricultural processes. According to Grigg (1987, p. 93), this transformed the role of agriculture in the economies of the Western world. “In the early eighteenth-century farmers and farm workers made up three-quarters or more of the labour force in nearly every country.” Yet by the late 20th century this had fallen to as low as two percent of the workforce in Sweden, Switzerland, the UK and the US, while in Europe it employs about eight percent (Grigg, 1987, p. 95).

This increase in agricultural efficiency meant that a much smaller proportion of the total population could sustain an ever-increasing proportion of urban dwellers. With a substantial reduction in the work needed to feed a given population; human settlement patterns dramatically changed as non-food-producing urban populations increased. The study of town planning over the last century or so evolved to address the problems of congestion and pollution caused by this agglomeration of manufacturing and factory workers in cities. With the massive upscaling of fossil-fuel-burning factories, it was necessary to maintain healthy living environments, so regulations to protect health and amenity were introduced. Polluting workplaces were also separated from the places where people lived through land use zoning. This, in turn, created the need for transport infrastructure to get people to work. The ever-increasing size and density of cities over the 20th century made these problems—of conflict between different uses, as well as managing transport and amenity—ever more acute. Whilst these urban problems are important, the urban environment was created, and its inhabitants are sustained, by agriculture. The division between urban and

rural areas is an artificial boundary that puts food outside the city limits and therefore beyond the scope of urban planning. In recent decades the emphasis on these 'urban' problems has resulted in many planners preferring the label 'urban planner' rather than 'town planner'.

It is argued that the city should instead be understood as a system that provides for the needs of the citizens. Food is a fundamental need and therefore the production of the food needed to sustain urban populations should be an essential part of the city system and town planning processes.

5.2. Three strategies for managing growth

To rectify this issue and integrate food systems into the design of the city, a useful starting point is to compare the three main ways in which town planning processes manage population growth by reference to the three great utopian thinkers of the twentieth century (Fishman, 1977). These are (a) increasing density in a city centre (Le Corbusier), (b) new greenfield, suburban development at the city periphery (Frank Lloyd Wright) and (c) the building of new towns (Ebenezer Howard).

5.2.1. Apartments in the city centre

As more and more human activities were mechanised, organised and rationalised, the city began to be conceived as a machine. Le Corbusier's *Ville Radieuse* (Radiant City), originally proposed in 1930, epitomised this attitude. His response to the congestion and disorder of the urban environment was to raze it to the ground and rebuild it in an ordered, symmetrical and standardised manner. Tower buildings would serve as vertical villages, allowing for more green space between the buildings. This vision for the ideal city was a blueprint for social reform founded on Le Corbusier's syndicalist ideas of worker-based local organisation. The vision was never fully implemented but has been highly influential in urban planning, ironically because it justified the demolition of inner-city areas occupied by workers, replacing them with apartment buildings. The immense scale of the buildings, and population housed within them, reflect the mechanistic thinking prevalent at the time that saw man as separate from nature, romanticising technology and industrialisation.

Lewis Mumford was a principal critic of this approach, arguing that it was hazardous to human wellbeing and that the space between buildings, being distant from homes, was not used as intended and effectively became a wasteland. Mumford (1961) advocated for a more organic approach to planning and for human-scale buildings no more than one or two storeys. For Mumford the city was more than a collection of buildings; it is a living unity (1922, p. 34) and its inhabitants "have a familiarity with their local environment and its resources" (1922, p. 186). John Nolen, who was influenced by Mumford, promoted the development of regional cities that reconciled "the struggle between men and machines, between natural and artificial tendencies, between biology and technology" (as cited in Stephenson, 2018, p. 285). In his 1927 book *New Towns for Old*, Nolen argued for regional cities to reflect the topographical and climatic conditions of their locality. Stephenson (2018) identifies Lewis Mumford, John Nolen and "Scottish polymath" Patrick Geddes (Mumford's mentor) as the key proponents of the city as a living organism—and critics of the dominant orthodoxy of the city as a machine. Stephenson (2018, p. 282) argues that the notion of sustainability took root in the work of Nolen and Mumford as their arguments for limiting the

growth of cities evolved into the 'limits to growth' generally as it applies to sustainability. The strategy to be developed in this thesis will follow this line of thinking—that human settlements should be limited in scale, with “urban, rural and natural landscapes ... meshed in synergistic fashion” (Stephenson, 2018, p. 284). Population growth should therefore be managed by replicating organic settlements rather than growing the size of the settlement.

5.2.2. Detached dwellings on the city edge

As some argue for increased density and the restructuring of urban centres, others seek to escape to the periphery. Frank Lloyd Wright also protested against the machine city as it “promoted dehumanising values, robbed people of their individuality and jeopardised their democratic lifestyle. He felt people would reap the full benefits of the Machine Age only by returning to their natural home, the land” (cited in Nelson, 1995, p. 339).

Wright's vision for Broadacre City, presented as a model at an Industrial Arts Exposition at the Rockefeller Centre in 1935, offered a decentralised pattern of settlements as the solution to the many physical, economic and political problems of the urban centre. The brief description of the model read:

A conception of the ideal modern decentralized community. Scale of the model: 4 square miles. This area includes 2200 one-acre plots. Protesting against the exaggerated and inhuman concentration in American cities, Broadacre City is designed for the direct contact of man with nature and the countryside. His birthright is re-established; the wide, open spaces are appropriately built upon. Thus the 'urbanized countryside' is born as a new type of city—one adapted to individual living. (Wright, 1935)

In accord with historical materialism, Wright suggested that new technologies—in particular, the motor car and “electrical inter-communication”—were already transforming cities “whether the powers that overbuilt the old cities otherwise like it or not” (Wright, 1935, p. 345).

Wright's vision was as much a proposal to reorganise the political economy of America as it was a city plan. He was influenced by Henry George and proposed that the state be responsible for the redistribution of land with each family to be given a minimum of one acre (Wright, 1935, p. 346). The 2,200 one-acre plots would house about 5,000 people. Communities would be **self-governed and self-sufficient**, based on small-scale farming and manufacturing. The political system would be restructured, eliminating “the present curse of petty and minor officialdom [and] government has been reduced to one minor government for each county” (Wright, 1935, p. 346). The economy would also be transformed, especially by eliminating complex distribution systems. “Methods of distribution are simple and direct. From the maker to the consumer by the most direct route” (Wright, 1935, p. 346).

The Broadacre City advanced an idea of decentralisation that eventually became the automobile-dependent suburban sprawl that characterises cities today. Rather than the proposed one acre that included local farming, the lot size was reduced to the standard quarter acre and so self-sufficiency became car dependency.

It is doubtful whether Broadacre City could have been economically self-sufficient, but it does pose an important question for the design of a political economy. Whereas our

economy attends closely to productive efficiency, can the same be said for distributive efficiency given our complex global supply chains?

Similar to Mumford and Nolen, Wright's settlements were limited in scale and population growth managed by replicating rather than growing the size of the settlement, while topographical and climatic conditions of the locality predetermine all features.

There are attempts to rectify the absence of food systems and to increase food self-sufficiency in the suburbs as an important sustainability and resilience strategy. The permaculture movement has offered practical strategies for decades and David Holmgren's *Retrosuburbia: The Downshifter's Guide to a Resilient Future* (2018) is a recent contribution. Complementing this, Alexander and Gleeson's *Degrowth in the Suburbs: A Radical Urban Imaginary* (2019) provides a political economic framework for *Retrosuburbia*, arguing for

a great resettlement of the human species, based on a new post-capitalist dispensation. To put our idea in its simplest form, this resettlement begins in a profoundly important human heart-land: the suburbs of our carbon civilisation (Alexander & Gleeson, 2019, p. 2)

While the retrofitting of the existing built environment is critical, it is equally, or arguably more important to re-imagine the form and function of new settlements. Building new towns allows for everything to be re-imagined, including ownership structures, organisation of buildings, design of infrastructure systems, extent of open space and so on. The lessons learnt from these new towns can then inform the approaches adopted in reconfiguring existing suburbs. Building new towns also provides an alternative approach to managing growth that does not exacerbate existing urban problems, while potentially extracting people from urban areas and supporting regional areas. Generating demand for new settlements might also harness the growth-mania to create decentralised living options and a more evenly distributed political economic system.

5.2.3. Building new towns

When proposing decentralisation—moving out of the centre—it is necessary to distinguish between moving to the periphery or creating a new centre beyond the periphery. The difficulty with fully extricating a new settlement from the orbit of an existing city lies in the development of a new political economy. If a new settlement remains dependent on the city centre for its economic needs and political governance, then it is not a new town. Much of suburbia has been constructed as dormitory housing, entirely dependent on the city for services and for work, whereas the plots in Broadacre City were intended to be self-sufficient in order to liberate people from government control.

More than three decades before Le Corbusier and Frank Lloyd Wright, Ebenezer Howard offered another approach to the development of new towns or an urbanised countryside. In 'Garden Cities of Tomorrow' (1902) Howard noted that the urban problems were created by the influx of people into urban centres, suggesting that "it is deeply to be deplored that the people should continue to stream into the already over-crowded cities, and should thus deplete the country districts" (Howard, 1902).

For Howard, this flow of people into cities reflected the various attractions of city life and so he proposed the development of Garden Cities—a blending of the best aspects of town and

country life—which would act as an alternative attractor outside the existing towns. These would draw people out and reverse the flow:

Each city may be regarded as a magnet, each person as a needle; and so viewed, it is at once seen that nothing short of the discovery of a method for constructing magnets of yet greater power than our cities possess can be effective for redistributing the population in a spontaneous and healthy manner. (Howard, 1902)

It is on this principle that the success of strategies for the development of a network of Circular Economy Villages rests. That is, to discover a method for redistributing populations in a spontaneous and healthy manner. The proposed strategy would not simply be a temporary financial support program or the relocation of government departments, but a political economic design of new towns that are attractive to potential residents.

Figure 8 Ebenezer Howard's Three Magnets

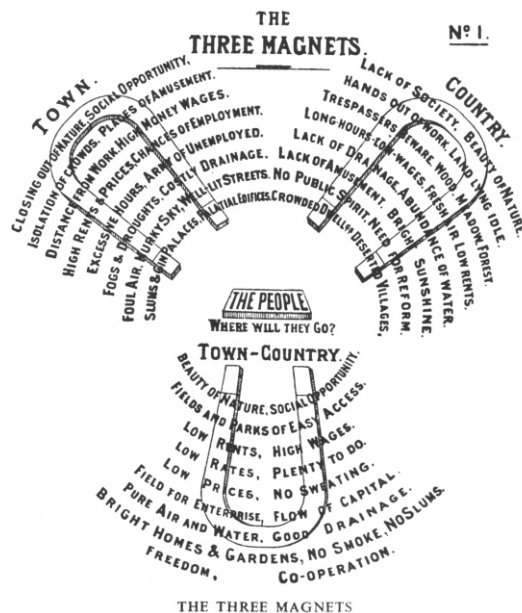
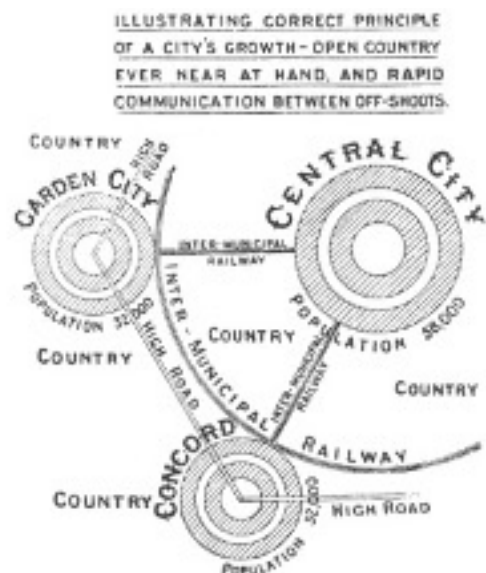


Figure 9 Ebenezer Howard's correct principle for a city's growth



On the bottom magnet of figure 8, Howard identifies the factors that he considers would draw people out of the cities and these are considered useful for the development of aspects of our own strategy. Table 2 lists these factors in the left column and restates them as potential design principles for CEVs.

Table 2 Attractors to Garden Cities restated as design principles for CEVs

Howard's attractors of people to Garden Cities (1902)	Equivalent design principles for Circular Economy Villages (2021)
bright homes and gardens, no slums, fields and parks of easy access	high-quality, passively designed housing, no more than two storeys to ensure easy access to substantial open space
beauty of nature, pure air and water, good drainage	located in attractive natural landscape integrated with well-managed water systems
no smoke	energy generated by clean renewable energy sources

Howard's attractors of people to Garden Cities (1902)	Equivalent design principles for Circular Economy Villages (2021)
low rents, low rates, low prices	affordable housing and low cost of living
plenty to do, no sweating, cooperation	sufficient collaborative work opportunities
freedom, fields of enterprise, social opportunity	innovation and entrepreneurship supported and encouraged
high wages	integration of work opportunities and support for innovation creates a local economy that generates an income flow for the village community
flow of capital	The development financing structures should be based on a consistent flow of moderate return to investors rather than on speculative, sporadic and high-risk returns

With the addition of a diverse, regenerative agricultural system, rather than unproductive gardens, Garden Cities would accord with Mumford's principle of urban, rural and natural landscapes meshed in synergistic fashion.

As in the previous chapter, the conclusion is reached that settlements should be developed with precinct-scale infrastructure, including a renewable energy micro-grid, integrated with a water micro-grid to irrigate a diverse, regenerative agricultural system. To develop efficient local energy, water and food systems the new settlement should align with the local geographic and climatic conditions as proposed by Nolen and Wright. It would therefore be more like an organic system grown out of the landscape, enhancing the capacity of the land to sustain a given population of people.

The development financing structures with a flow of capital would result in the development of a pipeline of village-scale projects. This also aligns with Howard's "correct principle of a city's growth", as illustrated in figure 9. That is, to create a network of settlements rather than sprawling a single settlement.

5.3. Inefficiency of food distribution

A planning strategy that results in a transformation of our food system from the current industrial scale to small scale regenerative agriculture will likely attract the criticism that this would be highly inefficient. After all, the industrialisation of agriculture reduced the proportion of the population involved in agriculture from around 75 percent to as low as 2 percent!

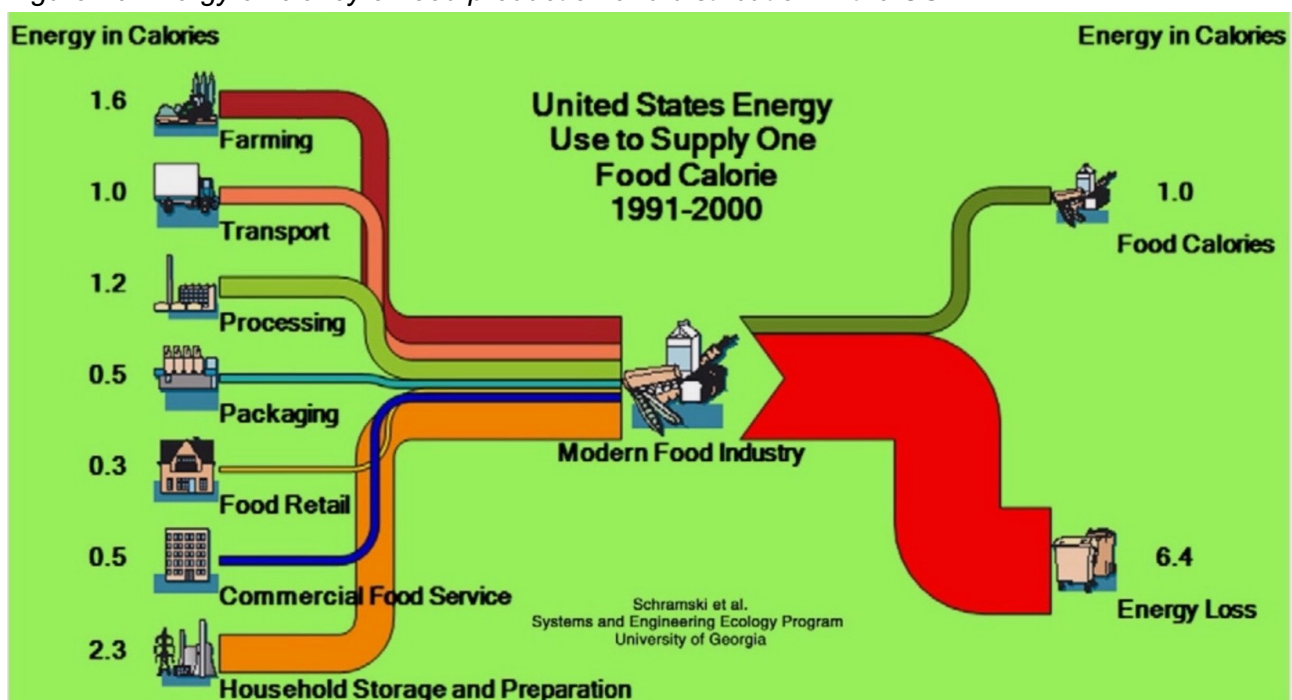
Such an argument fails to acknowledge that when 75 percent of the population was involved in agriculture, most people produced their own food and when it was harvested it went straight to the kitchen. As agriculture was mechanised our direct involvement decreased but the indirect participation substantially increased. Without this indirect economic support system to process, package, transport, warehouse and sell food, the industrial agricultural system could not function. Also, before any food production can occur, factories must make tractors and a range of other farm equipment, farm sheds must be built, fencing constructed and on it goes. Then there are the production inputs, including seeds, chemical fertilisers and diesel. All the fossil fuel inputs to the farming process also require, and therefore

embody, the energy needed for research, exploration, mining, refinement and distribution. For all this to function we also need a transport network, including roads, air and seaports, trucks, ships and airplanes. The economic system is a complex web, and it is entirely subjective as to which parts are—and which are not—categorised as part of the food system. Nevertheless, it is clear that substantially more than 2 percent of the population contribute to agricultural production and distribution.

Any conversation about efficiency, therefore, ought to acknowledge the trade-off between productive efficiency and distributive efficiency. As a general trend throughout the industrial era, increases in productive efficiency have resulted in decreased efficiency of distribution. Prior to the Industrial Revolution all the energy input needed to produce food came from humans and animals and a significant proportion of food was consumed in the general locality in which it was produced. Since the introduction of fossil fuels, the human and animal labour has indeed reduced to a negligible amount because all the energy input is now from fossil fuels and food supply chains are global.

A more holistic approach to any discussion about efficiency should incorporate both the efficiency of production and the efficiency of distribution.

Figure 10 Energy efficiency of food production and distribution in the US



Source: Schramski et al. (2011)

Schramski et al. (2011) have considered an economy without fossil fuels and its impact on food systems. Figure 10 is an illustration produced by Schramski et al. that summarises a comprehensive study conducted by Heller and Keoleian (2000), which assessed the total life-cycle energy demand of the food system in the US. The study found that 7.4 calories of energy are required to produce one calorie of food. They note (2011, p. 89) that other studies have produced widely varying results and the most cited study found that each calorie of food in the US required 15 calories of energy input. This variation results from the varying assumptions with respect to what should be included in the food production and distribution system.

Even acknowledging the subjective nature of delineating any boundaries of the food system, there is no doubting its current dependence on fossil fuels. After comparing the energy input to output relationship for various agricultural systems, Schramski et al. conclude that agricultural systems must become material and energy neutral, with the local community in balance with and directly connected to, their local ecosystem:

As natural resources continue to be depleted locally, sustainable agricultural systems will eventually move towards *material- and energy-neutral balances with regard to their adjacent ecosystems* (e.g., carbon, nitrogen, water, biota, energy, etc.). The luxury of distal supplies or deposits to accommodate unbalanced local environmental relationships is diminishing. *System approaches* such as low-input agriculture (House and Brust, 1989; Pimentel et al., 1989) or *traditional ecological knowledge* (TEK) approaches (Martin et al., 2010; Stinner et al., 1989) will become mainstream practices rather than soft science concepts pursued only by a few. They will comprise the systems tools to comprehensively support a better understood input–output, balanced relationship with local environments to *sustain a large-scale food supply network that may be much less centralised*.

One challenge attributed to this era of *agroecology* (Gliessman, 1990, 2006; Jackson, 1980) will be to determine the boundaries of these input–output calculations such that *future communities will reconnect with their local habitat in ways not currently envisioned*. Essentially, a systems oriented ecologically balanced agriculture is inevitable (Francis and Madden, 1993), although the timeline of implementation is unknown. (Schramski et al., 2011, p. 93, *emphasis added*)

Agroecology is the study of ecological processes applied to agricultural production systems and is sometimes used interchangeably with regenerative agriculture.

5.4. Inefficiency of industrial agglomeration in cities

The industrialisation of the food system resulted in the agglomeration of industries in cities. In a parallel with the argument that large-scale industrial food production is more efficient than small, local production, the pervasive view is that large scale cities are more efficient than smaller ones.

In October 2008, Paul Krugman was awarded The Sveriges Riksbank Prize in Economic Sciences for demonstrating mathematically why industries and people will naturally agglomerate in larger centres. “Economies of scale combined with reduced transport costs also help to explain why an increasingly larger share of the world population lives in cities” (TRSAS, 2008).

Essentially, Krugman described for mainstream economists what most people would consider rather obvious: that economies are not abstract but exist in the real world and have real world implications. In a presentation to the Association of American Geographers in 2010, Krugman reflected on this:

What you have to understand is that in the late 1980s mainstream economists were almost literally oblivious to the fact that economies aren’t dimensionless points in space – and to what the spatial dimension of the economy had to say about the nature of economic forces. (Krugman, 2010, p. 1)

Outside mainstream economics the study of unequal regional development and geographical transfer of value had been the subject of analysis for decades. In reviewing

this research, Friedman (1988, p. 94) notes that regional theory relies to a large extent on the core–periphery model originally formulated by François Perroux (1950), Gunnar Myrdal (1957) and Albert O. Hirschman (1958). Krugman (1991) adopts this core–periphery model to compare two regions with similar populations to explain why industries and economic activities agglomerate in larger cities. In this model each region contained two kinds of production: manufacturing in the core and agriculture in the periphery.

Krugman identifies two equilibrium conditions: (a) populations remain equally distributed and (b) populations agglomerate in one of the two regions. The mathematics demonstrate that if the system tips only slightly away from the initial equilibrium condition where populations are evenly distributed, it will move inexorably to the agglomerating equilibrium.

Krugman's modelling illustrated that agglomeration, the clustering of manufacturing businesses together, yields pecuniary externality benefits for all the businesses in the cluster. The two-region model suggests that if the production and costs in the regions are the same, then nothing much happens but if there is a slight difference "population will start to concentrate ... once started, this process will feed on itself." (Krugman, 1991, p. 487). Populations and businesses will both be drawn to one of the two cities, because, for businesses, the greater population represents a larger market for goods and a larger pool of workers. For people there are more opportunities for work and a greater availability of manufactured goods.

This all sounds very reasonable and is also consistent with the reality of our experiences as described by Ebenezer Howard, of a stream of people flowing into cities. Yet the model makes some crucial assumptions that need to be tested. The first is that:

Peasants produce agricultural goods... [and the] peasant population is assumed completely immobile between regions, with a given peasant supply ... in each region. [Manufacturing workers] may move between the regions. (Krugman, 1991, p. 488)

The basis of this assumption is that there will always be some 'peasant' farmers producing food to support the manufacturing in the cities. It takes both farmers and agricultural production processes entirely for granted and effectively assumes that farmers will continue to produce food for urban dwellers, irrespective of how little their produce is valued by the broader economic system. This criticism is underlined by a second assumption: that agriculture is a "constant returns sector tied to the land" while manufacturing is "an increasing-returns sector that can be located in either region" (Krugman, 1991, p. 487). Constant returns in agriculture assumes no degradation of the land over time, no droughts or bushfires or floods, even when these have been caused by industrial processes.

Food production is a primary input to the manufacturing process as no manufacturing can continue without both capitalists and workers being fed. Agricultural production must therefore be supported and managed in a manner that ensures its continuing economic viability. By focusing on pecuniary interests for manufacturers only, Krugman's mathematical model simply describes current economic thinking, which ignores environmental impacts and takes certain segments of the population for granted.

Despite these criticisms, Krugman's model has significant value. The starting condition of the model is one in which the two regions are of the same scale. In this condition there is no flow of people from one region to the other and no agglomeration of industries. Krugman develops mathematical formulae to express the relationships between, amongst other

things, the number of workers, pricing behaviour, relative wages, relative demand and transportation costs. He concludes that when transport costs are high the system stays in this balanced equilibrium and the two regions remain the same size, while when transport costs are low the system tips out of equilibrium and people flow from one city to the other. This conclusion is consistent with the argument in the previous section that productive efficiency must be balanced against distributive efficiency.

Krugman (1991, p. 494) then tests “whether a situation in which all workers are concentrated in one region is an equilibrium”. Manipulating another set of mathematical formulae, Krugman reaches the following conclusion:

With lower transportation costs, a higher manufacturing share, or stronger economies of scale, circular causation sets in, and manufacturing will concentrate in whichever region gets a head start. (Krugman, 1991, p. 497)

This concluding comment does not answer the question he intended to test. Circular causation and increasing concentration do not necessarily conclude in equilibrium. If, when the smaller centre is completely depleted, the larger one stops growing, then this could, perhaps, be described as an equilibrium. The reality, though, is quite different. The process of agglomeration would not suddenly stop when the surrounding villages are depleted. Once commenced, the growth trajectory becomes insatiable, and the major centre would look for other growth opportunities. The continued growth within this major centre would generate increasing demand for goods, requiring constant recalibration of production and distribution systems and therefore capital outlay. This, in turn requires more labour and resources resulting in a spiralling interplay between supply and demand. It is not unreasonable to argue that agglomeration of populations in one centre is not an equilibrium condition as it is dependent on continued growth and activity. A scheme that depends on a continuous inflow of people, generating returns for earlier (property) investors with money from later (property) investors, is defined as a Ponzi Scheme or Pyramid Scheme.

At the crux of this thesis is the proposition that the desired settlement pattern—our vision—is of a network of similar sized townships rather than the current assumption that cities and urban populations will continually grow, depleting rural townships. This is because falling production costs due to mass production can be outweighed by rising distribution costs as the distance between producer and consumer increases. A clear conclusion drawn from Krugman’s paper is that transportation costs are the only variable that can independently determine the final equilibrium condition. It is further noted that while manufacturers benefit from transportation infrastructure, its cost is externalised and it is for this reason that Krugman can conclude (1991, p. 485) that the pecuniary interests of the manufacturers resulted in pecuniary externality benefits for surrounding manufacturers, thus leading to the agglomeration of industries in cities.

An economic system is defined as a system of production, resource allocation, *and distribution* of goods and services within a given geographic area. Yet transport infrastructure is provided by governments, who also tend to subsidise the fossil fuels that power the vehicles that use that infrastructure. Instead of focusing only on productive efficiency and subsidising fossil fuels for distribution, a dialectical analysis would optimise efficiency of production against efficiency of distribution.

5.5. Efficiency as a measure of economic success

In physics, efficiency is simply the ratio of energy outputs produced from the energy inputs:

$$Efficiency = \frac{Energy_{outputs}}{Energy_{inputs}}$$

A system that requires more energy input than the output it delivers is unsustainable. There are two ways of maximising efficiency. They are to maximise production outputs from available inputs or to minimise energy inputs to produce the desired outputs. Energy inputs include fossil fuel energy and human labour. Minimising energy inputs is a crucial consideration when considering transport and distribution costs, particularly given their significance in determining the desired equilibrium condition.

To minimise the distribution costs, it is necessary to minimise the energy used to transport resources, goods and people around the system. The factors involved in determining transport energy costs can be interpreted from the concept of 'work', which in physics represents the energy required to displace an object with mass (m) by a distance (s):

$$Work(W) = Force(F) \cdot displacement(s)$$

and

$$Force(F) = mass(m) \cdot acceleration(a)$$

therefore,

$$Work(W) = mass(a) \cdot acceleration(a) \cdot displacement(s)$$

Therefore, to minimise the input work expended in the economic system it is necessary to minimise the displacement (s), that is, the distance travelled by the materials and people in the system, and where possible, also minimise the mass (m) being transported.

This can be more clearly understood by reference to the emerging concept of a circular economy. To avoid dumping waste in landfill, some plastic waste streams were collected and shipped to China and other Asian countries where the material was burnt to generate energy. Whilst this fulfils the intention of 'closing the loop' by converting waste to a resource, the size of the circular economy spans continents. Goods produced in China were shipped to Australia and when they were no longer needed were shipped back to China. When considering distributive efficiency, a localised circular economy is therefore clearly more efficient than one that spans continents, as significantly less energy is wasted in transport.

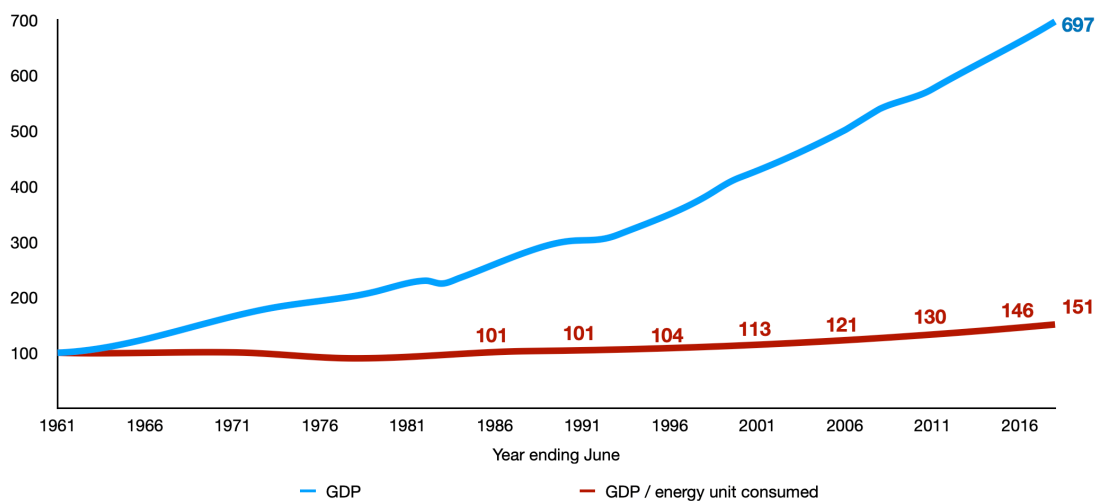
In the previous chapter we have already outlined some ways to significantly reduce the mass (m) being transported when distributing manufactured goods through the use of 3D printers and print-on-demand. Substantially less energy is expended in transporting information—the 'blue-prints' for a product—than is required to transport physical resources and goods. A global network of 3D printers available for access to various producers is a business opportunity waiting to be exploited. Minimising the distance travelled by the materials and people in an economic system requires localisation, or local production for local consumption. Localisation includes providing work opportunities close to housing to minimise commuting distances, preferably so they are walkable. Localising the food, water and energy systems would make a very significant contribution to the overall efficiency of a political economy.

To measure the efficiency of a political economy it is proposed that rather than just adding up the total production output, this should be divided by the total energy needed to deliver that output. Gross Domestic Efficiency (GDE) would be calculated by dividing gross domestic production (GDP) by the gross domestic consumption (GDC) of fossil fuel energy as follows:

$$GDE = \frac{GDP}{GDC_{fossilfuelenergy}}$$

This accounts for not just the production of goods but also all the movement of people, resources and goods around the system. One important aspect of this formula is that it accounts for waste energy because of the poor organisation of the political economy and pattern of human settlements. For example, energy is wasted as cars with a single occupant sit in traffic congestion or when food is transported from a farm to a central market then back to the same rural area. Figure 11 graphs data from the Australian Government Department of Industry, Science, Energy and Resources. It compares the change in GDP in Australia from 1961 to 2018 with the change in GDE over the same period when energy usage increased by a factor of 4.6, from 1,337 petajoules to 6,172 petajoules.

Figure 11 Australian GDP and GDE (GDP divided by energy consumption).

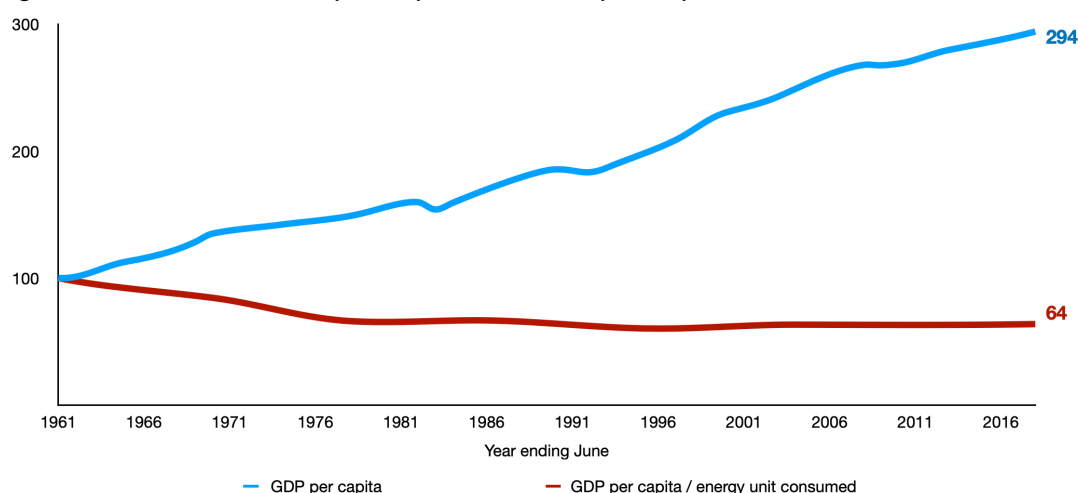


Base year 1961=100.

Source: Energy.gov.au, table B1 Australia - population, GDP and energy consumption

Taking population growth into account—wherein Australia's population increased from about 10.5 million in 1961 to 25 million in 2018—figure 12 shows that per capita output today is produced at less than two-thirds of the efficiency of the per capita output produced in 1961.

Figure 12 Australian GDP per capita and GDE per capita.



Base year 1961=100.

Source: Energy.gov.au, table B1 Australia - population, GDP and energy consumption

5.6. Corroborating analysis

Corroborating this analysis, Webb et al. (2017) reviewed Australian capital city metropolitan plans and strategies and identified certain consistent planning and design principles (table 3). Except for 'increased public transport', to be replaced by 'increased walkability', these offer a good summary of the guiding principles for Circular Economy Villages.

Table 3 Sustainable urban planning & design principles from Australian metro strategies

Box 1 Consistent sustainable urban development planning and design principles (synthesised from current Australian metropolitan strategies/plans and validated through co-design process with stakeholders) indicating a growing consensus - More compact form rather than continuing urban sprawl - Productive agricultural land and connected landscapes protected - Polycentric city with distributed activity and job growth centres - Reduced car dependency, increased public transport, '30 min city' - Place-based mixed-use development allied with transport corridors and hubs - Mixed-use and more self-contained communities - More distributed infrastructure (e.g. water, energy, food) - More self-sufficiency in food, water, energy through, for example, urban agriculture, water sensitive urban design, rooftop solar/renewables - Water sensitive urban design (WSUD) - Increased focus on blue and green (living) infrastructure - Physical and social infrastructure that facilitates diverse social interaction, supporting creative innovation - Neighbourhoods and entire metropolitan areas that are walkable and cyclable - Greater housing choice, more compact and affordable housing, more quality shared spaces (public and utility spaces) - Circular economy with reduced resources usage/waste/emissions and ecological footprint - Low carbon, climate resilient strategies with emphasis on coherent strategies so that decarbonisation and resilience achieved concurrently
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Source: Webb et al. (2017)

5.7. Conclusions

This chapter has argued that the process of industrialisation over the past few centuries reorganised political economic systems and the pattern of human settlements. Industrial era technologies required and caused centralisation, resulting in a flow of people into urban centres and the creation of mega-cities. To create a network of settlements it is necessary to develop a method for constructing new settlements that attract people out of the cities.

The principles for the design for such settlements can be synthesised from the work of Howard, Nolen, Mumford and Frank Lloyd Wright.

While the articulation of such design principles is important, this chapter criticised the prevailing narrative that both industrial agriculture and agglomerated industrial manufacturing are necessarily more efficient than these same activities at a smaller scale. It has also emphasised the need to account for the increased inefficiency in distribution as production efficiency increases due to economies of scale. As shown in subsequent sections, the inefficiency of the industrial food system, and the inefficiency of industrial agglomeration in cities, are also problematic features when distributive inefficiencies are accounted for. The evaluation of changes in gross domestic product, population and domestic energy consumption between 1961 and 2018, which show that per capita output today is produced at less than two-thirds of the efficiency of the per capita output produced in 1961.

Contesting economic orthodoxy is important as it is influential in guiding town planning practice. It was noted that there are three possible strategies for managing population growth—increasing the density of a city, increasing its area, or building new towns. Yet urban planners focus primarily on the first two as these align with economic orthodoxy. The next chapter explores the various ways in which governments, corporations and communities have sought to develop new towns and villages to see how lessons from past experiences may inform this project.

6. New towns and settlements research

In the United Kingdom, Ebenezer Howard founded the Town and Country Planning Association in 1899 to promote the idea of the Garden City, thus creating the Garden Cities Movement, which eventually became the New Town Movement. Howard also formed the New Townsmen, a group who advocated for the development of 100 new towns to support the rebuilding effort after the First World War. It was not until 1946, though, that the *New Towns Act* was enacted in the UK, leading to the construction of 28 new towns in subsequent decades.

Following Howard, this thesis seeks to translate the theory of building new settlements into practical strategies and implementation processes. Whilst the proposed network of Circular Economy Villages (CEVs) has many differences from Howard's New Towns, the commonality of building new settlements means that lessons learnt from the development of the latter could inform the CEV development strategy. The approach in this chapter is to identify lessons from a diverse range of strategies for the building of new towns and villages—whether led by governments, corporations, or community groups—to inform the development of a pattern language.

One of the reasons why Australian government-led initiatives have not been advanced to date is that the focus of Australian urban planning is heavily weighted towards urban planning of the major centres rather than town and country planning, which would consider broader settlement patterns and the building of new towns. Population growth is managed through new 'infill' development that increases density or 'greenfield' development on the edge of existing cities and towns. The option of building new settlements is rarely considered and it's nearly a century since the last significant city development of Canberra.

In 2017, it appeared that Australia may move to develop new settlements. The federal government announced an inquiry into the 'Australian Government's role in the development of Cities' (Australian government, 2017). As a result of numerous submissions, the first recommendation of that inquiry reads:

The Committee recommends that the Australian Government, in conjunction with State and Territory governments, and in combination with the governance arrangements set out in Recommendation 28, develop a national plan of settlement, providing a national vision for our cities and regions across the next fifty years, providing for:

- growth and change in population
- growth and change in employment
- the economically, socially and environmentally sustainable development of cities and regions
- the relationship between cities and regions on a national, regional and local scale
- connectivity within and between regions, and between residence and employment
- resources for the implementation of the plan.

The media release advising of the tabling of the report in September 2018 similarly highlighted the need for a national plan of settlement.

At the time of writing, in early 2021, nothing has come of this. Given that most planners are only focused on the major cities, the settlement pattern remains centralised with rural and regional towns regarded as satellites of the major cities. It is also unlikely that a settlement planning process would result in a significant redistribution of populations. There is too much interest in maintaining high levels of demand—and therefore high prices—for properties in the major centres. A deliberate redistribution of populations would inevitably result in lower property prices in the capital cities, and this is probably the single most significant obstacle to the implementation of proposed vision. As a result of the emphasis on continued centralisation of populations, there is negligible consideration of the opportunities that new settlements may offer in addressing social and environmental issues or facilitating technological transitions. Indeed, the question of how the internet, the energy transition, or climate change might reshape settlement patterns and therefore town planning processes has essentially been unexplored territory until the lockdown due to COVID-19 (Barns, 2020).

Acknowledging the likelihood of obstruction and obfuscation, or even the simple inability to consider this broader perspective of settlement planning, an alternative to a national settlement plan is proposed. There is no reason why local councils couldn't undertake a settlement planning process to identify locations for new small-scale settlements. This could be undertaken within the framework of current strategic planning processes, particularly housing strategies and growth management strategies that already involve significant community engagement. This settlement planning process would be the first step of a 'bottom up' strategy. A town planning process, incorporating a relatively standardised approach for the planning and design of new settlements, would allow the development model to be efficiently replicated.

The strategy, therefore, is to construct a clear planning approval pathway for village-scale developments so they may be readily financed and built; much like 'detached dwelling' and 'apartment building' are separately characterised development types that each have clear approval pathways in planning policies. This would allow CEVs to be recognised by financial institutions and funded through existing or slightly modified financial structures. A formal process within the statutory planning framework would provide certainty for investors that development approval can be achieved. Investors would, of course, also require a financial model and business case that would provide a financial return. The development of this planning policy framework and principles for business plans is therefore an integral concern in this thesis.

Villages would be designed in accordance with best practice technical principles and using the best available technology so that they have broad appeal beyond the innovators and early adopters. The efficiencies of localisation and integration of infrastructure would substantially lower housing costs as well as lower ongoing living costs, further mobilising people to adopt, implement and further refine the development model.

A replicable model does not mean that all the villages will be the same, any more than detached dwellings or apartment buildings are all the same. Also, the design of each village project is necessarily dependent on the geography and climate of its locality and influenced by the built infrastructure and assets that already exist. This would generate a wide variety of designs for buildings as well as for water, food, and energy systems. The variations need not be so significant as to prohibit the preparation of development principles and associated implementation processes applicable to each bioregion within a local government area.

In contrast to the anarchist strategy that avoids engagement with the state, the focus is on being selective about which level of government can enable the desired outcomes at each relevant stage of the process. The preferred approach aligns with Saul Alinsky's 'Rules for Radicals', that is, to work within the system in order to change it, not to drop out of society.

Implementing the strategy through the local town planning policy framework maximises the likelihood of success. The challenge for strategy development is to align the efforts of communities with the enabling government policy framework. The previous chapter developed theoretical principles for the development of new settlements and also provided theoretical justification for a distributed network rather than centralised cities. This chapter will explore actual projects and settlements that have been developed in order to extract lessons that they may offer.

Three types of settlement will be examined. The first describes government and corporate-led initiatives for maximising profit. The second are community initiatives such as ecovillages and intentional communities. The third is an example of a traditional pre-industrial village. The aim is to identify lessons that can be learnt from each of these that may be of assistance in developing a pattern language and an effective implementation strategy.

6.1. Danwei, Quakers, Google and creating the good life

Studying Chinese Environmental Law in Shanghai in 2005, I learnt about the Maoist-era Chinese work unit, the Danwei, which was not just an economic unit but also a political and social unit expressed in urban form:

The Chinese system in the 1950s planned for each enterprise to provide for housing as well as social and cultural facilities of its employees making these units self-sufficient entities. Regardless of their size, any enterprise was obliged to supply a full set of facilities including housing, schools, a canteen, medical care, etc. For this reason very often smaller neighboring enterprises shared 'a common set of facilities'. (Lue, Rowe & Zhang, 2001, p. 117)

This approach runs exactly contra to town planning in the Anglosphere, the guiding principle of which is the separation of different land uses through the zoning of land. Yet the Danwei urban form was remarkably similar to the experimental villages built by the Quakers and wealthy industrialists in England that inspired Ebenezer Howard's Garden City model. For example, Bournville village, near Birmingham, was built by chocolate-maker George Cadbury. It was designed to provide affordable housing for his factory workers and included significant open space, a social and cultural centre, a Quaker meeting house and a school.

These contrasting approaches to town planning—separation of different land uses versus integrating a variety of uses to serve all the basic needs of the residents—appears to be an important starting point in the development of new settlements. For all the good intentions of separating polluting factories from housing, few workplaces in Australia now need to be separated in this way. Damaging health effects are more likely to be caused by the separation of land uses as traffic congestion leads to excessive air pollution and stress. The lockdown due to the COVID-19 pandemic has also illustrated that work and home can be co-located. The pandemic has also highlighted the risks associated with mass transit and the fragility of global supply chains, both pointing to the importance of local access to basic necessities.

As one begins to appreciate the potential advantages of diverse, compact and integrated settlements, examples start to appear more readily. Google's Googleplex in Mountain View, California, was one of the first purpose-built IT campuses, essentially a new settlement outside a major city. It provides a range of free services and facilities for its workers including 18 restaurants that serve breakfast, lunch and dinner, four gymnasias, swimming pools, volleyball courts, laundry facilities, a doctor and a pool of shared electric vehicles. It appears that the internet actually encourages re-localisation as the rarer skills and more complex needs can be accessed or purchased online.

Facebook and Apple have recently built similar campuses for their headquarters but all these examples, including Bournville village and the Chinese Danwei, are the products of concentrated power and wealth used to reinforce that wealth concentration. Nevertheless, they all illustrate the dialectical relationship between the conditions of workers and the profits of the industrialists. The provision of a range of services and facilities in a workplace also shows how China may have built its economic advantage over the West by separating minimum wage costs from marginal production costs. Significantly lower wages may be understood differently if these are compensated by the provision of free housing, canteen or restaurant food, education, and recreation facilities. Of course, nothing is free here as the capital costs of starting a business in China would be much higher but capital costs can more readily be subsidised by the government. Also, other operational costs like food would be bought in bulk at a wholesale price, while also reducing the need for workers to shop and cook.

Separating minimum wage costs from marginal production costs is good for the capitalist, while workers also have their living costs and domestic labour reduced. This seems like a win-win scenario. Yet although these top-down strategies represent a proven method of building an economic foundation for a successful business, this does not necessarily translate into a social foundation on which workers can build a good life.

The philosophical question of what it means to live a 'good life' arose separately as I tried to understand my own Greek origins and asked myself the question: What was so special about the city-states of Athens during its golden age in the 5th century BCE and Florence during the Renaissance that resulted in such a concentrated flourishing of creativity? Is the flourishing of creativity an outcome of a collaborative community all living the good life? What creates this outcome? Is it the compact, walkable urban form, the self-sufficient and self-governed political economy, or the common project—such as conquering other city-states, making chocolate, or designing google products—that creates social cohesion? In other words, is it the internal design or the external focus—or a combination of these? It was through this thought process that this thesis emerged as an exploration not just of individual settlements but a network of settlements, wherein both the internal design and the external focus were equally important. In economic terms, the internal design aims to minimise costs, while the external focus brings income to the community. In social terms the internal design provides the social foundation while the external focus provides social cohesion as residents have a common project. The internal design is a platform from which connections with the broader society can be developed while also providing a haven in difficult times.

The internal design of New Towns, Danwei and IT campuses were all developed to reduce the costs for the community, but this does not necessarily translate into a net benefit for the community. In line with all top-down strategies, those at the top harvest a disproportionate

share of the benefits. As a result, it was necessary to explore integrated settlements that were designed with the intention of providing a solid social foundation for the residents of the settlement while also creating an egalitarian rather than hierarchical political economy. These corporate initiatives were also not concerned with harmonising the development with natural ecosystems, which is considered a primary concern and integral to the development of a social foundation.

6.2. Ecovillages and intentional communities

The first stage of this research project, undertaken during the period at Griffith University, was primarily focused on understanding existing community-driven settlement projects such as ecovillages. Initially, the intention was to help advance the development of ecovillages by contributing town planning expertise to such projects. Whilst this was highly informative and essential, it very quickly became evident that the strategy of offering town planning advice to ecovillage developments was not sufficiently impactful. One reason for this was that the slow and difficult process of building individual settlements undermined efforts to build momentum for social change.

It was also notable that the timeframe for the planning and approval process is invariably significantly longer than other development projects of a similar scale. The principal causes of these delays often related to the lack of a clear planning approval pathway in the planning provisions of local authorities, together with difficulties in financing such projects.

As these were common problems across many projects, they presented a clear gap that this project could address. The vision ecovillagers wanted to realise was being obstructed by mainstream town planning processes. The emphasis of this thesis shifted to the development of replicable strategies for implementing the vision, identifying ways in which mainstream policies and processes could be adapted to facilitate implementation.

This fundamental shift in the focus of the project led to it being transferred to the Department of Political Economy at the University of Sydney. Yet the reframing and relocation of the project did not suggest the abandonment of ideas learnt about ecovillage developments in the Griffith University stage, particularly those learnt at a conference of the International Communal Studies Association (ICSA) at Findhorn, in June 2013. Findhorn is a large ecovillage and intentional community near Inverness in the north of Scotland. The Findhorn Foundation has been instrumental in encouraging further research into ecovillages, creating ecovillage development programs and supporting the development of new ecovillages, all through the Global Ecovillage Network (GEN, ecovillage.org).

The purpose of the conference—called ‘Communal Pathways to Sustainable Living’—was to synthesise the lessons learnt by intentional communities around the world and build a knowledge base to facilitate the further development of ecovillages. The inter-dependence of social sustainability—the focus of intentional communities—and ecological sustainability—the focus of ecovillage projects—had already been established within the network. The common problems and the contrast between different approaches to ecovillage development presented at the conference, provided the seeds for the identification of patterns and processes developed further in this thesis. One stark contrast was between ecovillages developed according to what may be described as the Findhorn/Global Ecovillage Network approach and that of the Camphill communities.

Findhorn conference participants were invited on a tour to Aberdeen, on Scotland's east coast, where we visited three Camphill communities. The network of over 100 Camphill communities around the world was initiated by a group of Austrian refugees who established the first Camphill community in Aberdeen in 1939. Camphill communities are residential communities that provide a range of educational, agricultural, craft and food services on site. They provide support, education, training and employment for adults and children with special needs. The Camphill movement is a social change initiative based on the principles of anthroposophy, a philosophy founded by Rudolf Steiner in the early 20th century.

Some of the key lessons from this conference are summarised in the following subsections. Many of these emerged through the contrast between the philosophies of the Findhorn Foundation and the Camphill communities. These lessons, discussed below, provided a starting point for considering various issues that are discussed more fully elsewhere in this thesis.

6.2.1. Community self-regulation

Most of the subject intentional communities aim to create an egalitarian governance structure, usually with a council of elders (e.g. Camphill) but often also with management groups (referred to as circles) that are responsible for various services, activities or the maintenance or management of facilities and assets (e.g. Findhorn, Narara (NSW)). There appears to be a strong, almost universal desire to shift away from centralised, authoritarian governance systems, although there appears to be an equally strong tendency towards founder worship (e.g. Findhorn, Damanhur (Italy), Auroville (India)).

The question of how such communities ought to be governed has been regularly raised whenever this research has been discussed. My background in civil infrastructure and spatial planning meant that my initial concerns related to the physical organisation and arrangement of village settlements, rather than social and political concerns. Yet, a comment in the presentation from the Newton Dee Camphill community, somewhat along the following lines, struck a chord:

When your job is to produce food that you, yourself, will later eat, it is likely that the standards you adopt will be much higher than when you are only concerned about maximising profit or avoiding penalties for non-compliance with imposed government regulations. (senior Newton Dee resident, 2013)

This immediate proximity to the agricultural systems that produce the food that will be consumed by the producers themselves means that the community is incentivised to self-regulate. They will also likely carefully manage their water and sewerage systems to ensure the highest quality, again without need for regulation. This approach led to an exploration of commoning and commons governance systems, which will be explored in more detail in Chapter 10. It is also the reason for re-orienting the project away from spatial planning alone, to allow for the examination of how political economic systems inform the spatial arrangement and scale of cities.

6.2.2. Social cohesion and aesthetics

Having heard high praise of Findhorn prior to the conference, first impressions of the physical aesthetics of the 'The Park', left me rather underwhelmed. The informal

organisation of the site seemed random and there did not appear to be any theme—colour, material or design—that tied the various structures and infrastructure together. Buildings seemed to have been constructed as owner-builder projects according to the interests and capabilities of the owners. Perhaps this first impression is an unfair assessment given that the community has transformed a dusty, disused air-force base into a village and food forest that houses hundreds and hosts thousands. It is also important to recognise that the community offers people very substantial freedom to express their individuality and their approach to sustainable building design and construction. This has resulted in incredible variety of housing types including retention of the original caravans, enormous repurposed Scotch whisky barrels, many buildings constructed of local timber with green roofs as well as a new precinct of townhouses developed by the community.

The Findhorn experience was contrasted with the first impressions of Camphill Newton Dee, which appeared like a master-planned estate. Food production is designed as a system with diverse activities based on biodynamic principles, a bakery produces bread for everyone in the village; workshops, shops, cafe, church and school all serve the whole community and act to bind the community together. A single philosophy—Rudolph Steiner’s anthroposophy—underpins everything in the Camphill village, including biodynamic farming practices, the Waldorf education system, religious celebrations, and social attitudes.

This contrast is not intended to suggest that one approach is right and the other wrong. Rather it is intended to illustrate that whereas Findhorn embraces a plurality of philosophies, Camphill is based on a single philosophy that is embraced by anyone who wishes to be part of the community. These different attitudes are inevitably expressed in the built environment.

This implies a tension between social cohesion and plurality. In this thesis it is argued that this tension can be reconciled by striving for diversity between settlements but uniformity within each settlement. A common attitude and common purpose within each settlement provides greater social cohesion, a more consistent aesthetic and common spaces that affirm commonality. The plurality and diversity of philosophies between settlements allows individuals, through freedom of movement, to find the philosophy and aesthetic that most aligns with their own.

6.2.3. The weight of tradition

One immediate problem with the aim of designing according to a common philosophy was identified in one of the most insightful presentations at the ICOSA 2013 conference, delivered by Olive M. Jones from New Zealand. The title, ‘Painting over other peoples’ paintings’, expressed the challenge of generational change that many utopian communities of the sixties and seventies had struggled with. Jones’ research into intentional communities in NZ highlighted an issue that was likely far more widespread. Visionaries who imagine an ideal and then create it are usually unwilling to let younger or newer residents tamper with any aspect of their utopia. These founders also often hold significant political power and so are more able to obstruct the desired change.

This need not be the case. Allowing the next generation to create their own utopia requires some humility and the willingness to accept that others may obliterate some of your own work. This is succession planning, something that is familiar in the business world but perhaps less so in social, cultural, political, and religious spheres. The tension between

conservatism—conserving the status quo—and a progressive attitude that desires change is one of the core areas of political dispute. In this thesis it has been argued that significant technological change is already causing social change, while there is also a necessity to enact even more changes to address ecological, social and economic crises. Whilst in the previous section it was suggested that each settlement should be characterised by a common philosophy and common attitude to life, this should not preclude change over time. Whilst this may be easier said than done, the acknowledgment that change is constant should help to let go of some traditions that are no longer useful or even detrimental in the current context. One way in which this attitude may be encouraged is through the system of land tenure. Whereas ownership tends to engender a sense of permanence and stability, lease arrangements are explicitly impermanent and subject to change. The collective ownership arrangements will be discussed more fully in Chapter 8.

6.2.4. The social womb

In the presentation at Camphill Newton Dee, the expression ‘social womb’ was used to describe the safe environment provided for children and adults with special needs. The separation of the village from the broader community and the familiarity between all the residents within the village ensured that everyone could walk freely throughout the site. This concept of a village as a ‘social womb’ acknowledges the importance of security and familiarity as essential basic needs that should be part of any social foundation. This informed the discussion in chapter 7, whereby it was proposed that the village, rather than the household, should be the basic unit of society and the “haven from a heartless world” (Wright, 2016, p. 14).

6.2.5. The public purpose

The concept of a common purpose or common cause as a means of binding a community together was previously mentioned by reference to the Google campus and the Cadbury chocolate village at Bournville. This idea was first experienced at the Camphill community tour, where providing care for people with special needs very clearly served to unite the community around this common purpose.

The grounding of a community in a common philosophy creates the social cohesion necessary for collaboration and teamwork. For the purposes of this discussion a distinction is made between a common purpose—something a community of people share in common or do together—from a public purpose, which extends this common purpose beyond the bounds of the community to provide a service or good to the broader society. This public good or service may be provided in exchange for income to the community (e.g. chocolate or google services) or, as in the case of Camphill, the community recognises a need that must be addressed and simply provides it.

In aiming to create a network of settlements it is highly unlikely that each will be able to provide all their needs. Each will therefore be, to some degree, dependent on the broader society. If each settlement provides a public good or service, then the capacity and resilience of the whole will be greater than that of any individual settlement. This interdependence-by-design provides a glue between village communities and begins to create the desired network pattern.

6.2.6. Local currencies and local economies

In a presentation at the ICSA 2013 conference, Jonathan Warner, Professor of Economics at Quest University, Canada, described some of the various currency and credit systems in operation at intentional and other local communities. He starts by defining the word 'credit', from the Latin 'credo', which means trust. Provided there is trust within a community, Warner argues, the range of trading systems and their mechanics is limited only by our imagination.

Warner proposes two basic reasons for establishing a local currency or credit system. One reason is economic, to reduce dependency on the outside world and "build resilience in the face of economic shocks". This occurs because local residents support local businesses who then recirculate the same money within the community. The second reason is social in that it "builds social capital within the community—binding the community together in a web of community relationships and activities".

While there is no reason to disagree with these social and economic benefits, trust between people in a community is highest when there is no need for currency at all. As outlined in Chapter 7, a local gift economy aims to ensure that everyone has access to their basic necessities. It is additionally argued in Chapter 9 that where infrastructure is designed to ensure an oversupply of basic necessities relative to the local demand, then the price of these tends towards zero. A gift economy is also a desirable as it eliminates all the work and cost involved in accounting, recording and reconciling transactions.

Finally, to what end should a community build trust? In a gift economy, trust is itself the end rather than a means to increasing material wealth.

6.2.7. Crises, migration and the search for a new world

In 2013, the economic crisis in Greece was already impacting many citizens, leading to "the emergence of a communitarian movement in the form of initiatives, collectives and eco-communities, a re-population of the countryside". Nicholas Anastasopoulos, architect and lecturer at the National Technical University of Athens, offered this insight in his presentation titled 'The Crisis and the Emergence of Communal Experiments in Greece'.

Centuries ago, with the collapse of small-scale farming due to industrialisation, people relocated to the cities. Today, when there are no work opportunities in the cities, as is the case for Athens, people return to the villages to at least have access to food and lower cost housing. The flow of people out of cities could be a choice but more often, as suggested by Anastasopoulos, people are forced due to circumstances beyond their control.

The situation in Athens is apparently even more complex than this, as we discovered in 2017 when visiting Athens at the invitation of Anastasopoulos. The outflow of young people from Athens is not just to the countryside but also to other parts of Europe because of the open borders in the European Union. The vacuum in Athens has been filled by refugees from war-torn countries in Africa, the Middle East and as far as Pakistan and Afghanistan. Athens is an extreme example, but it illustrates the dynamic character of human settlement patterns.

When economic systems fail, people relocate in search of opportunities. These people are all looking for a place to call home, where they can be settled, secure and work in exchange for shelter, food, and clean water. This search for a new world is the foundational story of Australia and all the 'New World' countries established through colonisation. This dynamic

flow of people in search of a new world became an important thread in this thesis. The question posed by this thesis is whether we are collectively capable of planning—as suggested by Ebenezer Howard—for the spontaneous and healthy redistribution of populations. Enabling the free movement of people should therefore be incorporated into the land tenure arrangements of new settlements. The alternative is that redistribution will be forced by sudden and extreme events, leading to displacement and conflict.

This dynamic quality of settlements, due to the perpetual movement of peoples, challenges the construct of a settlement with a defined community. It emphasises the need to plan equally for mobility as for stability, for nomads as much as for settlers. Accordingly, the human habitat should be appreciated as a network of settlements with people constantly moving through them.

6.2.8. Revitalising rural villages

Travelling through Europe for several months after the ICSA 2013 conference, we visited numerous ecovillages and intentional communities. On a number of occasions, we were alerted to the issue of the numerous abandoned villages throughout Europe that first experienced dwindling populations due to industrialisation and then fully vacated after World War 2.

We visited Torri Superiore (figure 13), a tiny village north of Ventimiglia in Italy that had been abandoned but was recently brought back to life by a group of committed people who established it as an ecovillage. Slowly purchasing all the property rights over a number of years, the community used the original construction techniques in the restoration process so as to retain its charm and authenticity.

Figure 13 Torri Superiore. Revitalised rural village



This experience highlighted an important issue. Proposals to relocate to the country are often countered with the suggestion that this would be wasteful of the assets and infrastructure already constructed in the major cities. The first response to this is that there are many disused assets and infrastructure in rural areas for which similar concerns are rarely expressed. The second response is that the major cities are congested. This thesis does not propose vacating the cities but to decongest them so that city infrastructure can be function more efficiently.

6.2.9. Community supported agriculture (CSA)

All the ecovillages we visited in 2013 had some form of food system and the narrative that many were expounding was that of a return to an agrarian lifestyle for all. This was not appealing to us, but our concern was laid to rest as we discovered a concept called community supported agriculture (CSA) that a number of communities were practising. As the name suggests, the entire community would assume the responsibility and financial risks of agricultural activities, but specialist farmers would undertake the actual work of farming. This has a number of advantages beyond the immediate issue of adequately valuing farmers and food production and acknowledging our dependence on them. Firstly, it takes advantage of the benefits of expertise and specialisation. Secondly, as consumers buy directly from the farmer, there are no middlemen, reducing the overall costs of distribution. Thirdly, as indicated previously in the section on community self-regulation, there is an incentive to produce the highest possible quality of food, using regenerative farming practices.

There are several variations of CSA, including outside the context of ecovillages where numerous online platforms offer food direct from the farm to the customer. The broader term, 'alternative food networks' is sometimes used (Nelson & Edwards, 2021). One approach is for consumers to enter a contract with the farmer, committing to purchase a proportionate share of the produce, irrespective of the quantity produced in the harvest. With these contract arrangements, the consumer provides upfront funding to the farmer. Ecovillages offer farmers free or subsidised land in exchange for food, with the farmer entitled to sell excess produce in the market.

Another approach is to simply re-invent the supply chain like, for example, Food Connect (foodconnect.com.au), which we visited in Brisbane in 2017. They have a warehouse in Brisbane that sources all its produce from farms between Bundaberg and Byron Bay to serve their mainly Brisbane-based customers. From their website Food Connect's impacts include:

- (a) Farmers are paid true cost of production - average 4x more than conventional markets
- (b) Short supply chain = 95% food system carbon emissions saved
- (c) Fresher produce means increased nutrient density and less visits to the doctor
- (d) Social isolation reduced through closer connections between growers, eaters and local community
- (e) Food Connect Shed 100% powered by renewable energy
- (f) GMO Free, Ecological and Regenerative Farming Methods, No Hydroponics, Increased Carbon Sequestration through healthy soils.
- (g) 2:1 Wage Ratio [top salaries to bottom salaries] for all staff including the owners

As previously indicated (Nelson & Edwards, 2021), the restructuring of food supply chains and the ways in which food is produced will play a significant role in reshaping the political economy. This has already been discussed in section 5.3 with respect to the inefficiency of fossil fuel dependent food distribution systems. This experience identified the imperative of integrating food systems into the planning of human settlements rather than maintaining the present urban-rural divide.

6.2.10. Utopian visions and environmental sustainability

As we travelled through Europe after the ICOSA 2013 conference, visiting various intentional communities, we realised that the impetus for starting these communities varied widely but broadly related to cultural, spiritual, environmental, and economic themes. The following are four emblematic examples:

- (a) Torri Superiore, mentioned above, was developed by a group of people who wished to contribute to the maintenance of traditional Italian village culture, which they described as simple, peaceful, and low cost within a beautiful rural environment. The impetus for this project was a combination of cultural and economic reasons.
- (b) Damanhur, also in Italy, was built by a community that sought spiritual enlightenment. Their first project was to build a great underground temple that embraced all the world's religions, thus uniting all humanity. Their impetus was entirely spiritual.
- (c) ZEGG is a German acronym for Centre for Experimental Cultural Design. ZEGG was established in a former army training camp for German youth, at Bad Belzig south-west of Berlin. One of its founding aims was to experiment and research issues of love and sexuality. Inspired by the ideas of sociologist Dieter Duhm, the community sought more open relationships as a way of overcoming the fear and possessiveness that they felt characterised many relationships.
- (d) Ecovillage Sieben Linden, located west of Berlin, was the only one of these four that was established explicitly for reasons related to environmental sustainability. One of the earliest communities to use the term 'ecovillage', it was founded on the principles of self-sufficiency and self-determination. From their website: "It has the aim to realise collaborative and holistic sustainable lifestyles, that connect a small ecological footprint with a high quality of life."

Despite these widely varying reasons for establishing communities, all produce much of their own food and energy, strive for self-sufficiency as a platform for self-determination and all are part of the Global Ecovillage Network (GEN).

Although this may be interpreted as a survey with a very small sample size, these examples do reinforce a number of themes presented in this thesis, including:

- (a) That, whatever the objective, to create a new political economy one useful approach is to design it within a new settlement
- (b) That any new political system must be constructed on an economic system that strives towards self-sufficiency and is relatively independent from the dominant system
- (c) That principal and foundational aspects of an economic system are housing, water, food, and energy
- (d) That food is more efficiently distributed to the community if it is produced close to where the consuming community is housed
- (e) That the production of sufficient food and energy is dependent on a cohesive social structure and organisation
- (f) That food and energy production are dependent on local geographic and climatic conditions.

6.3. Optimal size and scaling of communities

Size is an important question in the planning of new settlements because in economic terms, bigger is better due to economies of scale and the availability of a wider range of skills. Yet, in political governance terms, smaller is better because the voice of the individual diminishes as the collective increases in size.

This suggests there may be an optimal size for human communities, which also seemed to be the implication illustrated by the creativity of Athens and Florence during their golden years. There are other reasons for seeking to identify an optimal population size. Ecological economists argue that the population should not exceed the capacity of natural ecosystems to sustain it and so population is necessarily limited by local environmental conditions (s7.5.2). Also, with a fixed population it is possible to plan for supply to exceed demand and so create an abundance of basic necessities (chapter 9).

What then may the optimal population be? Christie Walk, a small community of 27 homes in the heart of Adelaide, offered some clues. We visited Christie Walk on a number of occasions, sharing ideas with residents and guests, and discovering the work of Paul Downton in the process. Christie Walk emerged from Downton's research, published in *Ecopolis: Architecture and Cities for a Changing Climate* (2009). He identified the concept of urban fractals. Downton refers to Richard Register in defining an urban fractal as "a fraction of the whole city with all essential components present and arranged for good interrelationship with one another and with the natural world and its biology and resources for human activity" (Downton, 2009, p. 28).

Fractals are natural patterns, expressing self-similarity at different scales. Extending Downton's definition, there is likely no single optimal scale, but perhaps different optimal scales depending on the number of people involved in a given activity. There are different scales at which humans interact, as is evidenced by various words adopted in our language, such as the *family* or *household* at the smallest scale, an *extended family* group or *clan*, perhaps living in a *hamlet*. At a larger scale again, a number of clans may form a *community* and live in a *village*. This scaling by clustering of smaller similar groups to form a larger group is an organic growth pattern.

Anthropologist Robin Dunbar theorised (1992, 1993) that:

there is a cognitive limit to the number of individuals with whom one person can maintain stable relationships, that this limit is a direct function of relative neocortical size, and that this in turn limits group size. The predicted group size for humans is relatively large (compared to those for nonhuman primates) and is close to the observed sizes of certain rather distinctive groups found in contemporary and historical human societies. (Dunbar, 1993, p. 691)

By comparing the size of the neocortex relative to the rest of the brain for different primates, Dunbar determined that the predicted group size for humans is 147.8. The number 150 is generally referred to as Dunbar's number. Dunbar's proposition is that beyond this size, communities must form organisational structures in order to function, whereas up to that limiting scale, relationships are flexible and internal groups form organically.

Dunbar also compared this with actual group sizes and notes (1993, p. 686) that Neolithic villages were of the same magnitude (150–200), while a comparison of the smallest

independent unit in various armies were generally in the range of 100–200. Also, the mean size of the 51 Hutterite communities who live and farm communally in South Dakota and Manitoba is 106.9 individuals. Apparently, the Hutterites regard 150 as the limiting size for their communities and, when this is reached, steps are taken to split into two daughter communities.

In line with the fractal patterns mentioned above, Dunbar (1993) also found that for modern hunter-gatherer societies:

group sizes fall into three quite distinct size classes: small living groups of 30–50 individuals... a large population unit (the tribe...) that typically numbers between 500 and 2,500 individuals and an intermediate level of grouping (either a permanent village or a culturally defined clan or lineage group) that typically contains 100–200 people. (Dunbar 1993, p. 684)

Dunbar (1993, p. 685) notes that there is no overlap between these groupings and that humans group at any of these scales in different contexts.

Whilst there are critics of Dunbar's number, the purpose here is to identify patterns to inform the size and scaling of human settlements. The current approach is to design the household scale, with no structure or pattern for the clustering of households into larger groups to form hamlets or villages. The urban fractal proposed by Register and Downton, like Perry's (2013) neighbourhood unit, suggests the need to consciously design at the precinct or village scale for communities. From a human perspective, this scale is important as a social womb for security, for a sense of belonging or as a collaborative unit for a public purpose.

As with all patterns, it is important to start with our current best guess. The numbers developed from Dunbar's research—household (5), clan (30) and village (150)—represent our current best guess. The scale refers to the capacity of the buildings and supporting infrastructure; the actual population at any time may be less to ensure there is an abundance of food, water and energy as well as ecosystem capacity to manage waste.

Indeed, it may be appropriate to plan villages to house a maximum of 200 individuals, with supporting food, water and energy infrastructure designed for this level of demand. This would allow the community to regulate its size based on food supply, through spare capacity available for short stay visitors and guests that bring income into the community. The design layout could also be such that there are separate hamlets housing up to 30 people, thus acknowledging the smaller group size. The proposed networking of villages in a bioregion also allows for the larger groupings to form.

6.4. Satoyama: traditional villages in harmony with nature

The exploration of ecovillages does not seek a return to an idealised, agrarian past but rather to ask what can be learnt from the past about living more in harmony with natural ecosystems and in more harmonious human relationships. Whilst many ecovillages had integrated food systems such as permaculture, it was not until our discovery of Satoyama villages in Japan that an example of comprehensive integration of social systems with the landscape was found. The landscape informed the choice of location for the village, also guiding the holistic management of water, energy and food systems and positioning of housing. The following description of Satoyama villages (Brown & Yokohari, 2003) illustrates the effectiveness of designing human settlements to work in harmony with natural systems:

The heavy rains of Japan collect quickly in steep mountain streams and make a short, violent dash to the sea. Flooding and property damage are inevitable without careful planning and management. The water management system that was devised and used successfully throughout Japan to mitigate the effects of storms was the basis for a prototypical settlement pattern... The hillsides were covered with managed woodlands and carefully terraced paddy fields.

Human settlements were arranged linearly along the base of the hills. Immediately in front of the settlements were the vegetable gardens, and beyond that were the lowland paddy fields. Rainfall was buffered by the trees, so caused little erosion.

The water was slowly but methodically passed from the woodlands and terraced paddies, through the villages to the vegetable gardens, then through paddy after paddy until it gently entered the local stream or river. All along the way, water provided an abundant habitat for wildlife and slowly percolated into the groundwater.

Materials were also cycled within the system. Leaves from the trees were composted and added to vegetable plots and paddy fields. Branches were used for fuel either directly or as charcoal. After trees reached a desired size they were harvested and the stumps were left to sprout. This coppice woodland was managed carefully so there was a constant supply of wood and the woodland always had an open canopy, allowing sunlight to penetrate and maximize the biomass production. Inputs to the system were limited to those provided by nature: precipitation and solar radiation. Outputs included sales of agricultural products and fuel to downstream urban settlements. It was a simple but very effective system that persisted for many generations. (Brown & Yokohari, 2003, p. 2)

The Japanese Government's Ministry of the Environment is now advocating for the development of rural societies in harmony with nature. They established the 'International Partnership for the Satoyama Initiative' (IPSI) in 2010 during the Conference of the Parties to the Convention on Biological Diversity. IPSI is based at the United Nations University in Tokyo and in 2020 had 258 member organisations, including research institutes, non-government organisations, local authorities and private sector organisations such as our consulting company, PolisPlan.

6.5. Conclusions

This chapter has argued that, despite mainstream planning processes focusing primarily on increasing the populations of existing cities, there is much interest in the project of building new settlements. It also appears that the COVID-19 pandemic may encourage greater interest in new settlements as people seek to escape the cities for various reasons.

In the absence of a broader state or national settlement plans encouraging decentralisation, it was suggested that local authorities may consider planning for a network of new villages within their local areas. In doing so, it is always useful to learn from past attempts at building new towns. Some initiatives, like the Chinese Danwei, Quaker villages of the 19th century and modern examples like Googleplex, illustrate the economic benefits of integrating a variety of different land uses within a compact built environment. A more problematic aspect of such developments was that the economic benefits generally do not accrue to the residents. Housing and services are offered to resident-workers to minimise labour costs and maximise profits.

This latter issue led to a deeper exploration of ecovillages and intentional communities, generic terms for community-led initiatives to finance and build new settlements. By visiting many ecovillages and attending conferences, numerous lessons were learnt. For example, it was suggested that a common aesthetic for the built environment and a common philosophy amongst the members of the community could support the social cohesion necessary for collaboration and teamwork. A distinction was also made between a common purpose—something a community of people share or do together—from a public purpose, which extends this common purpose beyond the bounds of the community to provide a service or good to the broader society.

The importance of creating a social womb, a safe environment in which people felt that they belonged was mentioned, while the problem of tradition leading to authoritarianism can cause people to feel trapped or drive them to leave. The search for a new world, that has historically been an important driver behind many waves of migration, reflects the continual desire within people to find a better place to live. This search for utopia illustrates the increasingly dynamic character of cities. Enabling the free movement of people should be incorporated into the land tenure arrangements of new settlements. The movement of people in the past has led to many traditional villages being vacated. The rehabilitation of unused buildings and infrastructure could offer an affordable opportunity to re-establish a settlement.

This chapter also affirmed the value of integrating food, water, and energy infrastructure close to the consuming community, with village infrastructure designed for a recommended maximum capacity of 200 people. A system for sizing and scaling was also identified with households clustered into hamlets, hamlets grouped to form a village, and villages networked with other villages for larger human groupings.

A description of traditional Japanese Satoyama villages provided some guidance for building villages in harmony with nature.

This chapter has identified a range of concepts that inform the development of individual settlements and settlement patterns, the next chapter begins our exploration of how these settlements can coalesce to form a social network.

7. A social foundation for aspiration

This chapter develops the dialectical relationship between individual settlements and the broader network of settlements that form a society, using the analogy of the village as a cell within a larger social organism. This emphasises the dialectical relationship between a settlement and the broader pattern of settlements that form the human habitat, while also highlighting the organic character of this relationship.

It builds on the analysis from previous chapters. Chapter 4 demonstrated the potential for the emergence of precinct-scale or village settlements with integrated infrastructure. Chapter 5 showed why a distributed network of such settlements would be economically efficient, also identifying key design characteristics. Chapter 6 then offered lessons from past attempts to build new settlements that could inform, amongst other things, the scale, form and governance arrangements.

The conception of the village as a cell within a larger social organism draws on the household–city relationship. The distinction between the household (oikos, economy) and the city (polis, polity) arose from as early as the 8th century BCE in the Greek Archaic period. Whereas the household is now understood as the basic unit of society, it is proposed that the basic unit should be expanded in scale to the size of a small community. When the village, precinct or local community is recognised as the basic unit of society, it is possible to build the relationships, integrated systems and infrastructure necessary to provide for the basic natural needs of that community—food, water, energy and shelter. Therefore, the basic unit of society satisfies the basic needs of the individuals, while the broader social network enables greater complexity, the satisfaction of other needs and desires or the sharing of rarer skills. The village–city relationship also emphasises that communities within individual settlements are not separate from society but rather remain within it, contributing to the reconstitution of social systems.

The household–city relationship—reconstructed as a village–city relationship—also broadens the dialectical unit of abstraction, expanding the system under consideration from a singular human settlement to a network. This emphasises the importance of connections geographically but also other relationships such as between local and global, between private and public and between monetary and non-monetary values.

This chapter also seeks to identify similarities and complementarities between feminist and ecological economic critiques. Feminist economic critiques compare non-monetary household care with the broader money economy. Similarly, ecological economics compares the money economy with ecological services that are difficult or impossible to value in monetary terms. Rather than viewing these separately, the two critiques are recognised as symptoms of a systemic failure, as also suggested by Raworth's doughnut economics. The doughnut integrates the social foundation and ecological ceiling into a single image illustrating how these are parts of a single system. Environmental degradation and social inequality are therefore not separate issues but two symptoms of a systemic problem.

Ecofeminist critiques similarly seek to connect ecological and social issues. The implication of these critiques, as suggested by Merchant (2006, p. 514) and Salleh (2017), is the need

for a shift from a hierarchical relationship of domination—humanity over nature and men over women—to a more egalitarian and dialectical relationship.

Beyond identifying the implications of various critiques, this chapter seeks to contribute to the more general objective of this thesis, connecting critique to vision through to a strategy for change. Adopting the notion of a household as the social foundation of an economic system, the articulated vision is reframed such that individual settlements are the social and economic foundation for the broader network of regenerative settlements. The proposed model can then be contrasted with other approaches to the provision of a social foundation, including in literature related to the gift economy, Jobs Guarantee (JG), Universal Basic Services (UBS) and Universal Basic Income (UBI).

Critiques from ecological economics are then reframed such that ecological systems are also appreciated as a social foundation. This introduces proposals for a steady state economy and a circular economy as strategies for incorporating ecological systems and values into an expanded political economy.

7.1. Political–economy and household–city relationships

This section examines how the concepts of politics and economics influence the structure and organisation of the built environment. In particular, how the relationship between politics and economics co-evolved with the relationship between the city and the household.

According to Hall (2013, p. 69), the polis probably emerged as early as the 8th century BCE at the beginning of the Archaic period in Greece. Hall (2013, p. 69,70) notes the variety of meanings and characteristics ascribed to the ‘polis’ both geographically throughout the Greek territories and across time. Hall is particularly careful not to automatically assume that Aristotle’s *Athenian Constitution, Politics and Economics*, written c. 350BCE, are necessarily accurate in their depiction of city-states four centuries earlier, when the scale of the polis was much smaller and before the introduction of coinage to Athens (c. 500BCE).

The term ‘polis’ could refer to an ‘urban centre’ and ‘a territory’ but most commonly ‘a community of citizens’ (Hall, 2013, p. 70). According to Hannah Arendt, in the original Archaic Greek context, the polis was explicitly and deliberately a community of free citizens. Arendt examines the relationship between ‘the polis and the household’ (1958, p. 28) in *The Human Condition*:

What all Greek philosophers, no matter how opposed to polis life, took for granted is that freedom is exclusively located in the political realm, that necessity is primarily a prepolitical phenomenon, characteristic of private household organization, and that force and violence are justified in this sphere because they are the only means to master necessity—for instance, by ruling over slaves—and to become free. (p. 31)

Household management, that is, ‘eco-nomia’, was the rules-based hierarchy imposed by the head of the household aimed at liberating him from necessity, so that he—and only he—could participate in sports, arts, philosophical debate and political discourse with other ‘free’ citizens. The domination of man over his natural condition, expressed as his domination over slaves and women, was justified as the means by which he was elevated above his animal nature. The polis was literally the domain of the super-natural and the super-man.

The Archaic Greeks created the political domain as the realm of freedom from household responsibilities and biological life processes. The polis could only be accessed by mastering the domain of necessity, where life was maintained and sustained. This meant that there was an enormous gulf between the economic and political domains, in sharp contrast to the blending and interconnection of these today. Aristotle's opening paragraph in *Economics* illustrates the gulf vividly:

The sciences of politics and economics differ not only as widely as a household and a city (the subject-matter with which they severally deal), but also in the fact that the science of politics involves a number of rulers, whereas the sphere of economics is a monarchy. (Aristotle, 1920)

Yet, by the third paragraph, Aristotle appears to confuse this separation between the household and the city, making the household a subset of the city, while also incorporating a geographic dimension to the definition:

Now a city is an aggregate made up of households and land and property, possessing in itself the means to a happy life. This is clear from the fact that, if men cannot attain this end, the community is dissolved. For it is for this end that they associate together. (Aristotle, 1920)

Figures 14 and 15 below show these two very different formulations of the household–city relationship. Even from the time of Aristotle, the city was conceived in geographic terms—as a territory or an urban centre—shifting the emphasis away from people and community and towards property as the central concern. This remains our principal concern today, yet the Archaic construct of the city as a community of free citizens implied the need to determine who was included and who was excluded. To be ‘free’ was to be free from the economy—the work involved in managing the household.

Figure 14 City as a domain of freedom from household responsibilities

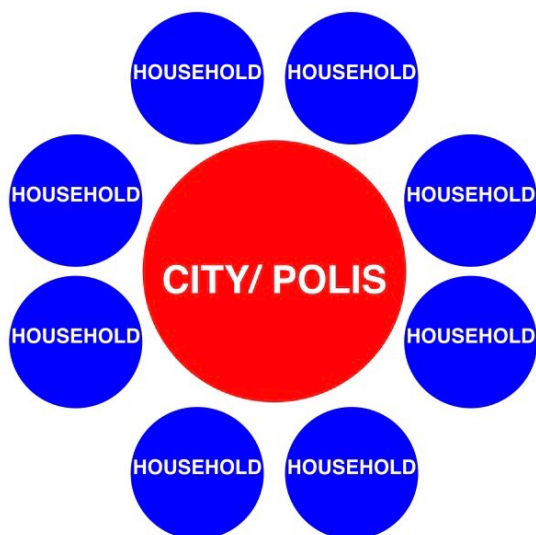
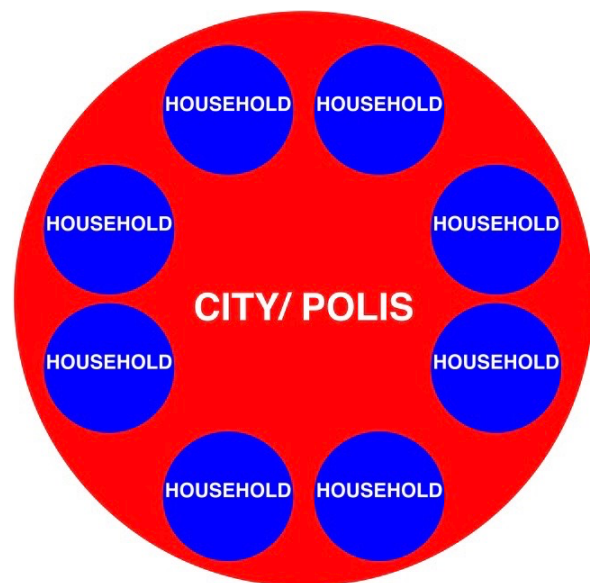


Figure 15 City as an aggregate of households



Arendt acknowledged the “profound difference between the modern and ancient understanding of politics” (Arendt, 1958, p. 33), and argued that Marx’s contention that politics is “primarily superstructures upon social interest ... makes it impossible to perceive any serious gulf between the two realms” (Arendt, 1958, p. 33). Whilst it is agreed that in the modern context this gulf is difficult to perceive, Marx’s descriptor still applies in that the political domain in the Archaic conception is still very much a superstructure built upon the work of women and slaves in the households.

Also, despite Arendt’s suggestion that these models represent “the modern and ancient understanding of politics” (1958, p. 33), the Archaic conception of the polis as a community of free citizens who gain that freedom through some form of domination—of both people and nature—is certainly a modern issue, as is evident in the following ecofeminist critique:

The capitalist patriarchal system has traditionally positioned and silenced women as ‘closer to nature’ - mere caregivers and food growers, outside of exchange value. Yet these reproductive labours – ‘natural and social’ are foundational to any society.
(Salleh, 2017)

This separation is also evident today in the way in which cities are organised. The city, when conceived as a territory, identifies the city limits or current ‘growth boundaries’, beyond which are the rural land zones where food is produced. Nature and ‘the environment’ are also beyond the city limits. The city is perceived as a clean, ordered, man-made and mechanical system of buildings and infrastructure. Resources and food are extracted from rural areas and drawn into the city, while the city’s waste is also discarded outside the city limits. When the city is understood as an ‘urban centre’ then even the sub-urban areas where households are agglomerated are outside city life.

There are other ways in which the household is viewed as separate from the city, for example, through the notional separation of the private domain from the public domain. Yet the private domain no longer refers to the household but to the corporation. In the public discourse therefore, such as in relation to debt levels, the public debt refers to government debt and private debt refers to that of corporations, while the household ‘sector’ is somewhat invisible. This was particularly evident at the time of the 2014 Australian Federal Budget debate, when the then Prime Minister Tony Abbott and Treasurer Joe Hockey declared a budget emergency. In June 2014 government debt was \$319 billion, while at the end of 2013 household debt was \$1.84 trillion¹. The proposal to increase taxes on households and reduce welfare in order to reduce government debt would only shift the debt to households and further increase housing stress. Yet this perspective was not, to the authors knowledge, explicitly expressed by the many opponents to the proposal.

The corporate domain has not only replaced households as representative of the private sphere but also consumed the political domain of freedom from work and economic activity:

we see the body of peoples and political communities in the image of a family whose everyday affairs have to be taken care of by a gigantic, nationwide administration of housekeeping...a kind of collective housekeeping; the collective of families economically organised into the facsimile of one super-family is what we call ‘society’ and its political form of organisation is called ‘nation’ (Arendt, 1958, p. 28).

¹ Sourced from Australian Bureau of Statistics
<https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/4102.0main+features202014> on 7 May 2020

The purpose of this discussion is to illustrate that the modern perception of the public sphere as the aggregate of households reflects a kind of delusion of democratic inclusivity and egalitarianism. Perhaps this can be interpreted as an evolution from a society that deliberately excluded the vast majority of its population from political processes, justifying slavery and oppressing women in the household as the expressions of the natural order of the world. Yet there are problems with both of these ‘ancient and modern’ formulations of the household–city relationship. In the earlier model, there is the problem of inequality that leads to the shifting of work responsibilities from one group to another through domination and violence. With the latter, there is a failure to adequately demarcate the boundaries of economic activity in order to create time and space that is free from economic conditioning and activity, making that time available for cultural, artistic, creative and recreational pursuits.

Any attempt to reconfigure the relationship between the household and the city must address both of these issues—separation, exclusion and inequality on the one hand and absorption of both the public domain and private domains into the corporate domain on the other. The following sections offer a discussion that reframes the household–city relationship, such that the basic unit of society—currently considered the household—is expanded in scale to the size of a small community.

7.2. Feminist critiques and two operating systems

Where Aristotle (1920) writes that “the science of politics involves a number of rulers, whereas the sphere of economics is a monarchy” he acknowledges two different governance systems within the broader social construct. When Eric Olin Wright (2016, p. 14) describes the household as a “haven from a heartless world”, that is, a place to which it is possible to escape from capitalism, he too acknowledges two different governance systems, whereby the household is already a care economy, a gift economy or a sharing economy². This aligns with feminist economics critiques that describe care and reproductive labour as foundational to any society despite not being valued within the exchange economy.

Power sets out five methodological starting points for feminist economists. The first is that “caring labor and domestic labor are vital parts of any economic system and should be incorporated into the analysis from the beginning, not shoehorned in as an afterthought” (Power, 2004, p. 4). This raises the question of how the two systems should be merged together. ‘Shoehorning’ care and domestic labour into the money economy may imply that the former must inevitably be incorporated into the money economy and valued in money terms. Is it possible to maintain discrete and separate operating systems for two complementary and inter-dependent arenas?

The proposal in this thesis is to increase the basic unit of society—the cell in the social organism—from the household scale to that of a village community. The village would operate as a system of social provisioning where residents collaborate to ensure that basic necessities such as food, water, energy and shelter are made available to all residents. The

² Note: The term ‘sharing economy’ has, in recent years, been applied to online platforms such as Uber and Airbnb. The term is used here in its literal sense.

broader network outside the village would continue to operate as a transactional money economy to satisfy more complex needs and desires and access rarer skills.

In *Social Provisioning as a Starting Point for Feminist Economics* (2004), Power describes the concept of social provisioning:

This is why I suggest 'social provisioning' as a term that emphasizes the analysis of economic activities as interdependent social processes. To define economics as the study of social provisioning is to emphasize that at its root, economic activity involves the ways people organize themselves collectively to get a living.

'Social provisioning' is a phrase that draws attention away from images of pecuniary pursuits and individual competition, and toward notions of sustenance, cooperation, and support. (p. 6)

For Power, the starting point in any analysis matters. The proposed 'starting place' proposed, therefore, is to acknowledge that the currently operating political economy consists of two arenas: the arena of monetary transactions and exchanges and the arena of non-monetary exchanges and relationships. From this starting point, the transition simply involves expanding the range of activities offered and accepted freely between family, friends and neighbours. By expanding the basic unit of society from the scale of the household to the scale of a community, fences between neighbours can be removed and it becomes possible to be more deliberate about designing for spaces where people can connect as well as infrastructure and assets that people can share.

As the non-competitive domain of reciprocity and caring is expanded, the transactional monetary domain necessarily diminishes. This also expands Wright's "haven from a heartless world" (2016, p. 14) as an escape from capitalism, whilst the social provisioning approach implies that economics should start by providing the "social foundation" that Raworth describes in *Doughnut Economics*. Formalising the unpaid household and local community voluntary labour allows the basic unit of society to be designed so that unpaid labour is reciprocated with an abundance of water, food, energy and shelter.

It was previously stated by reference to Arendt that in the ancient context "force and violence are justified in [the household] sphere because they are the only means to master necessity". Force, domination and violence are used to transfer the work needed to sustain life from those in power to the rest. Arendt (1958, p. 121) argues that:

Man cannot be free if he does not know that he is subject to necessity, because his freedom is always won in his never wholly successful attempts to liberate himself from necessity.

Rather than domination and violence to obtain freedom from necessity by transferring work onto others, that freedom may be enjoyed by all, some of the time, if the community collaborates to provide these necessities efficiently for all. This efficiency is achieved by aligning the economic systems with cyclical ecological systems and utilising the best available technology to efficiently provide these basic necessities for all in the community.

7.3. The village as a gift economy

Establishing two operating systems allows for the basic unit of society to be viewed as a gift economy, while outside these basic units the transactional money economy operates. To be

clear, this conception of the gift economy is quite distinct from the unstructured utopian ideal envisaged by Leahy (2011):

Mostly, people would operate according to an ethic of maximising pleasure and giving useful services and products to others. All production would be voluntary and organised to satisfy the immediate needs of producers or would be given away to meet others' needs, like a vast extension of voluntary forms of organisation that already exist. Conduct could not be regulated by denying livelihood to any section of society, since all people would be supplied by gifts from a multiplicity of independent collectives of producers. (Leahy, 2011, p. 113)

The challenge is always to define the boundary between “maximising pleasure and giving useful services and products to others” or between production satisfying “the immediate needs of producers or ... given away to meet others' needs”. This boundary—between the individual and the collective, as well as between the proximate or immediate and the distant—must be explicitly designed into the political economic organisation.

A gift economy operates best in the proximate context, such as a village-scale community, in which giving—or its absence—is visible and so contributions can be valued and reciprocated. In larger environments, individual actions are less visible, while at the household scale there may be less capacity, opportunity or capability to reciprocate. David Cheal's *The Gift Economy* (1988) describes this web of reciprocating contributions as “a system of redundant transactions within a moral economy, which makes possible the extended reproduction of social relations” (1988, p. 19). Cheal accords with the feminist perspective that two economies already exist in our society—the large-scale market economy of short-term profits and the small-scale moral or gift economy of long-term interests. Swedberg (1989) clarifies that Cheal's use of the word ‘redundant’ implies ‘economically redundant’ but by no means ‘socially redundant’ and then summarises Cheal's thesis succinctly: “gifts help to cement social relationships and to increase social solidarity in the everyday, small world” (Swedberg, 1989, p. 306).

The critical challenge in reshaping the broader market economy lies in the reorganisation of the small-scale moral or gift economy. If the web of giving and receiving, of time, effort and material things, has the effect of cementing hierarchical social relationships, then that will be the character of the broader political economy. It is not possible for the monarch of the household, having established dominion through force or even through an unconscious assertion of a pre-existing hierarchy, to then enter the public sphere as an egalitarian.

An egalitarian system of reciprocity and caring, where individuals are nurtured and encouraged to contribute according to their abilities—and also given time and space away from endless responsibilities and obligations—must first be established within the local community.

The development of a local political economy for community collaboration and mutual support implies that the village is a polis in the original Greek sense of a politically organised community of citizens. Local governance systems are discussed in more detail in Chapter 9, where Elinor Ostrom's research into commons governance systems provides useful insights.

7.4. Designing the social foundation

In addition to our proposed reconstruction of the community-scale gift economy several other approaches to the provision of a social foundation have emerged in recent years. They include Universal Basic Services (UBS), Universal Basic Income (UBI) and a jobs guarantee (JG). To analyse and compare these options fully would require substantially more space than is available here but it would be useful to touch on these in order to make some useful observations about the process of building a social foundation.

The first comment to be made in respect of these three—UBS, UBI or JG—is that they are proposed to be provided by governments. They would variously guarantee access to certain services—healthcare, education, legal services, shelter, food, transport and information—or provide money to access these services or else provide a job that pays money to access these services. The challenging aspect of a strategy that depends on governments is that it takes for granted a functioning and healthy political and economic superstructure that will deliver the infrastructure upon which that superstructure itself is built. These approaches hope that the people who benefit from a system that keeps many people indebted and insecure, will introduce systems that relieve this insecurity. The provision of money, services or jobs by governments also ensures that anyone who benefits from these remains dependent on the political economic superstructure that funds and delivers them.

Only a hierarchically organised political economy that employs systems of domination and disempowerment could assume as a starting point that communities are invariably incapable of self-organising locally to take care of each other. These options therefore stand in sharp contrast to an empowered and politically organised community that manages its land to ensure that the basic natural necessities required to sustain people are available to all. With the security that this provides, workers can say ‘no’ to inadequate work conditions and refuse directions to undertake work that is damaging to people and the planet. This is a more solid social foundation from which citizens can engage in the broader economy.

A second criticism is that the principal driver of such strategies is to address socio-economic inequality in the distribution of income and wealth. How that wealth is created, often through extractive and environmentally damaging processes, is generally secondary or incorporated as an afterthought. This issue will be discussed in more detail in the next section that examines an ecological perspective of the household–city relationship.

Despite these criticisms, such debates highlight some important issues that are useful for the development of our strategy for change. In particular, they highlight the escalating inequality in recent decades as well as the impact of technology on work opportunities. In doing so, they contextualise the debate about the future of work in historical terms, whereby disintegrating conditions reach a crisis point that is then reframed as an opportunity to create a better future. An example of this strategy for creating a new normal is unfolding at the time of writing in May 2020. As the COVID-19 crisis became a pandemic, the Australian Government introduced a temporary JobKeeper payment. The Australian Greens then promoted their recovery plan, which includes a jobs and income guarantee, as ‘A cleaner, fairer Australia: Beyond COVID-19, towards a Green New Deal’. Crises offer an opportunity to enact change.

Somewhat of a cross between a jobs guarantee and a basic income, the JobKeeper payment is also intended to act as an economic stimulus package during an economic

downturn. Both the JG and UBI concepts are intended as mechanisms to stabilise the economy, although the JG is a safety net that expands in difficult times, whereas a UBI is promoted as a platform that remains in place permanently.

In a presentation to a conference on the Future of Work, Yanis Varoufakis (2016) also places the necessity for a UBI within a historical context, arguing that the social democratic systems established in the 20th century were ruptured by the Global Financial Crisis of 2008 and cannot now be fixed. These systems, he argues, consisted of two key components. The first was redistribution of wealth within the working class, such that the working class was insuring itself and this took the form of, for example, the payment of income tax to fund healthcare and welfare. The second component of the New Deal compact was the redistribution of wealth from capital to labour. This took the form of minimum wages and working conditions as well as taxation.

For Varoufakis, the social democratic compact has been ruptured for two reasons. The first relates to the financialisation of capital, whereby investment capacity and savings have been extracted by the finance sector from both productive capital and the working class. Due to the resulting deflationary forces, wages have stagnated, and interest rates are low or negative. The working class is therefore not able to insure itself, and employers also do not have the capacity to contribute to the necessary wealth redistribution.

The second reason that Varoufakis presents for the rupture of the social democratic compact is automation. Throughout the period of industrialisation human labour has continually been replaced by machines but new job creation has broadly replaced jobs lost to mechanisation. According to Varoufakis, “the rise of the robots” means that the balance will shift, and many more jobs will be lost than the number created.

As a result of both these factors—financialisation of capital and automation—attempts to reconstitute the social democratic structures of the 20th century will be in vain. For Varoufakis, a UBI is therefore “essential to stabilise society and to civilise it” but the challenge to be overcome in implementing it is an ethical one—our discomfort with giving and receiving something for nothing. To make this leap, Varoufakis argues that the current dominant political economic paradigm must be overturned. The current paradigm is that wealth is created privately and then appropriated by the state for social purposes but “in reality, our wealth production is collective, it is social, it is only then privately appropriated”. (Varoufakis, 2016, 10:00). This justifies Varoufakis’ approach of funding the UBI not from taxation revenue but from dividends—a Universal Basic Dividend—sourced directly from corporations:

So, if we want to ameliorate for the ill-effects of capitalism undermining itself... then we need to create a system whereby society stakes a claim to the returns to aggregate capital and this claim becomes an income stream that goes to everyone. (Varoufakis, 2016, 20:33)

This analysis is consistent with the assertion in this thesis that the current political economy is in the process of a great transition, driven by new information and energy technologies. Yet whilst our diagnoses are consistent, prescriptions for addressing the problems differ substantially.

Instead of offering a UBI or a Universal Basic Dividend (UBD) as a response to the crisis of capitalism, a network of village-scale regenerative settlements would be the places in which

wealth is created collectively. At the local community scale, contributions can be valued in non-monetary terms and reciprocated appropriately, so no-one is receiving something for nothing. Work is valued but not in monetary terms. Certainly, there will be differences in the amount and type of work people contribute, but at this scale it is feasible to realise the Marxist credo of “from each according to his ability, to each according to his needs”.

Varoufakis also seeks to describe his proposed UBD as a “foundation, not a [safety] net, a floor on which to stand, solidly, and to be able to reach for the sky” (Varoufakis, 2016, 18:36). Yet, political superstructures do not reconstruct the infrastructure upon which they stand, the social foundation must be rebuilt, literally from the ground up, and a new and appropriate superstructure re-created.

7.5. Circular economy and ecology as social foundation

Whilst the feminist critique highlights that the social foundation of voluntary and care work within the household and local community is not appropriately valued in mainstream economics, the ecological critique is that the ecosystems used as resource inputs and waste sinks are not properly valued.

One misinterpretation of Kate Raworth’s doughnut is that mainstream economics has already been designed so that we are living in a blinkered doughnut—ignoring the social foundation and also ignoring the ecological ceiling.

Raworth’s approach is useful as an illustration of the interdependence of social, economic and ecological issues but it unfortunately reaffirms the notion that the environment is ‘out there’, beyond the city limits rather than immanent and integral to daily economic activity. An indigenous perspective of Raworth’s doughnut would show that ecological systems are the ultimate social foundation. Just as a household based on domination shapes the values and character of the broader political economy, so our collective relationship to the land upon which we live will shape our relationship to ecological systems as a whole.

Having established the ecological foundation as a starting point, the following discussion seeks to connect the literature in ecological economics with the vision for a network of village-scale settlements. In Chapters 4, 5 and 6 certain design principles for such settlements were developed and will be shown to align with the concept of a steady state economy, which has emerged out of ecological economics critiques of mainstream economics.

7.5.1. From mechanics to thermodynamics

Nicholas Georgescu-Roegen (1971 & 1975, p. 351) suggested that the mechanistic approaches were no longer a sound basis for economic thinking and that instead thermodynamic systems were more appropriate. This would align with a shift from the mechanical city to the organic city as suggested earlier in Mumford’s critique of Le Corbusier’s Radiant City.

The shift from mechanical to organic cities, requires a similar shift in thinking from linear, one-directional, logic, to a dialectical analysis of the relationship between economic activity and the natural world where that activity occurs. For our purposes a regenerative village can be described as a discrete system and the subject of thermodynamic analysis. The

integration of food, water, energy and built systems, tailored to local conditions, and designed to provide both work and the produce from that work for the residents, essentially creates a thermodynamic system, with energy flowing around that system.

Georgescu-Roegen (1975, p. 351) notes that the first law of thermodynamics—the law of conservation of energy—is consistent with mechanical thinking. On its own it does not preclude perpetual motion or infinite economic growth. In contrast, the second law—the entropy law—speaks to the availability or unavailability of energy for human use. Available energy, contained for example in fossil fuels, may be converted into work and heat at which point it is no longer available. Georgescu-Roegen acknowledges that this is a human construct but for this reason it is of central importance to the design of a human economy. In the context of human induced climate change due to global warming, his following expression of the entropy law is very useful:

All kinds of energy are gradually transformed into heat and heat becomes so dissipated in the end that man can no longer use it. (Georgescu-Roegen, 1975, p. 352)

Economic activity includes the extraction of useful fossil fuel energy from the earth's crust, which is then converted into heat that is dissipated in the earth's atmosphere and is no longer available for human use. The more economic activity, the faster will be the transfer of energy from the earth's crust to the atmosphere. Therefore, rather than maximising economic activity, the aim, as Herman Daly suggests (1973, p. 19), should be to minimise physical flows of production and consumption. Consistent with our discussion on efficiency, the sensible strategy for building a durable political economy is to minimise the energy input needed to achieve the necessary outcomes.

7.5.2. The steady state economy

Herman Daly builds upon this paradigm shift from mechanics to thermodynamics in the development of the concept of a steady state economy. Daly indicates that the necessity for a paradigm shift arises from the conflict between the biophysical constraints of the planet and the current political economic demand for infinite economic growth and unconstrained use of materials and energy. This argument aligns with the general limits to growth thesis outlined in the modelling of Meadows et al. (1972).

Daly's concept of a steady state economy also builds on the work of Kenneth Boulding who, in 1966, colourfully described the transition in *The Economics of the Coming Spaceship*:

For the sake of picturesqueness, I am tempted to call the open economy the "cowboy economy," the cowboy being symbolic of the illimitable plains and also associated with reckless, exploitative, romantic, and violent behavior...The closed economy of the future might similarly be called the "spaceman" economy, in which the earth has become a single spaceship, without unlimited reservoirs of anything, either for extraction or for pollution and in which, therefore, man must find his place in a cyclical ecological system which is capable of continuous reproduction of material form even though it cannot escape having inputs of energy. (Boulding, 1992)

Daly provides a succinct statement of the goal of a steady state economy as one that is able "to sustain a constant, sufficient stock of real wealth and people for a long time" (Daly, 2010, p. 21). Unfortunately, this raises at least two significant issues: (a) the population problem—

how to stop population growth and maintain a constant population; and (b) how much is sufficient?

Both of these issues are almost impossible to address at the global or national scales of current economic thinking. Ecological limits—the upper limit of ‘sufficient’—are dependent on the geographic and climatic conditions of a locality. To apply this approach in a vast continent like Australia, with its dramatic ecological variations, would be near impossible. One approach might be to divide the continent into its many bioregions (see figure 3) and then determine the ecological carrying capacity of each.

The task could be dramatically simplified if the problem was reversed. Rather than building a different economy from the top down, or from the grand scale to determine local implications, the economy should be built from its ecological foundations. Rather than asking how settlements would be structured in a different economic system, the question should be reversed. How might a disruptive and replicable model for building regenerative settlements enable the development of a new economic paradigm? If the building blocks of the political economy are regenerative and designed as systems, then that will be the character of the larger economy. As the goal of a steady state economy is to sustain a constant, sufficient stock of real wealth and people for a long time, the goal of our land development process would therefore be to create places that sustain a discrete population in their local environment for a long time.

To plan and design a village for a discrete population requires the accompanying development of supporting infrastructure that enhances the capacity of the land to support that population. The land enhancement would, of course, take the form of a renewable energy micro-grid that cycles water through the site, up to a reservoir, through the food system and the buildings and down to a wetland where it is cleaned before being cycled back to the top. As food is grown and waste is composted, soil depth and health increases, thus improving biodiversity and storing and slowing the flow of water. Over time, the stock of real wealth—natural capital—is increasing, while the population remains constant, ensuring that there is an abundance—more than sufficient—food, water, energy and shelter for that population.

It cannot be emphasised enough that further development involves replicating rather than growing the size of the village. Historically, as villages grew into towns and eventually to megacities the population exceeded the capacity of the land and supporting infrastructure. A land development strategy that replicates similar sized villages creates a distributed network of complementary city-states. Replicating villages with discrete populations also ensures that the population problem is addressed and managed at each place in accordance with local conditions.

7.5.3. The narrative of a circular economy

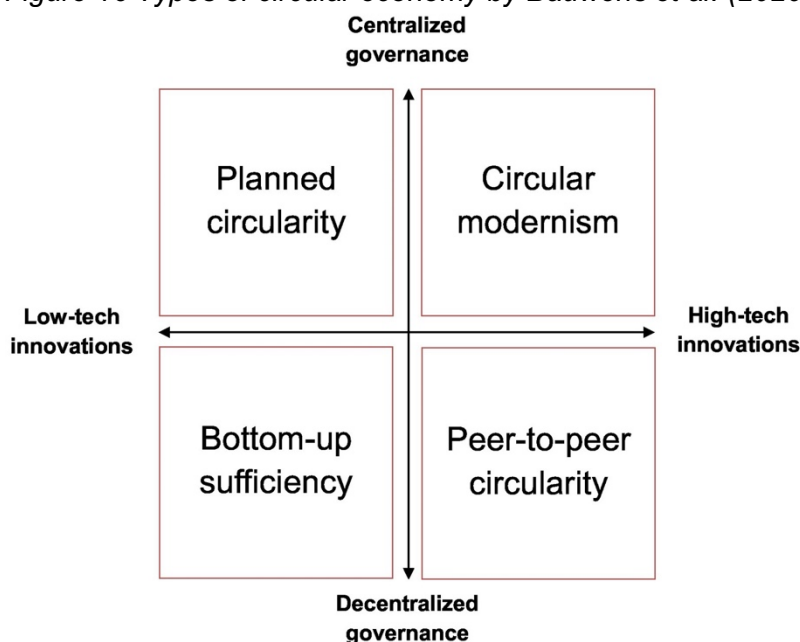
A steady state economy refers to a balanced system that does not depend on economic growth, a thermodynamically stable economy. This stable, steady, zero-growth economy can give the unfortunate implication of a flat-lining society where nothing is happening. For many, the concept of growth implies improvement, personal development and aspiration. Whilst the vision of a steady state economy is the desired objective, the narrative it offers may be counterproductive when developing a strategy for change.

The literature does include suggestions that a steady state economic system would be dynamic. For example, Kershner (2010, p. 549) describes ‘growth’ and ‘degrowth’ as phases within a ‘dynamic equilibrium’. Ecological systems are also clearly dynamic, yet the term itself—steady state—appears to lack appeal as evidenced by the fact that it has not entered mainstream political debate in the 50 years since it was first proposed.

In contrast, the ‘circular economy’ has captured the popular imagination. It more immediately expresses the dynamic character of the economy proposed by steady state economists, while also embodying the concepts of holistic systems, planning for life cycles and aligning with ecological cycles. The cyclical language also better aligns with the necessary dialectical methodology relating to dynamism and change. The circular terminology is useful for strategy development because there is growing momentum amongst business groups and various mainstream institutions around a suggested transition ‘from a linear to a circular economy’, also providing a clear and concise narrative for the transition.

Although there is significant emphasis on growth amongst many who promote the circular economy, it remains, as Korhonen et al. (2018) suggest, a contested concept. Kirchherr et al. (2017) analyse 114 definitions to illustrate the diversity of views, while Bauwens et al. (2020) in *Circular Futures: What will they look like?* synthesise the varying interpretations into four types. Figure 16 (Bauwens et al., 2020, p. 6) places these types by reference to two axes—centralised to decentralised governance on the Y-axis, high-tech to low tech on the X-axis.

Figure 16 Types of circular economy by Bauwens et al. (2020)



Planned circularity is “centrally piloted by the government via strong coercive measures...for example, by introducing taxes on raw material consumption, emissions and waste” (Bauwens et al., 2020, p. 6). This approach has been most enthusiastically implemented in China in the development of eco-industrial parks. Zhang et al. (2010) describe eco-industrial parks as practical examples illustrating the environmental and economic advantages that can be achieved through the process of industrial symbiosis.

Industrial symbiosis is the cooperative management of the resource flows of geographically clustered firms. As such it has a place-based focus.

Circular modernism is also centrally piloted but focuses on technological progress and business model innovation. Most keenly implemented in Europe, most mainstream discussion about the circular economy is limited to this construct. It is driven mainly by large corporations who work with government to set incentives and fund research and

development. The focus is on new business models, and conversion of waste into a resource as a means to maximise corporate profit.

Unlike planned circularity there is no focus on place, although both of these first two types strive for economic growth. This framework also provides clarity as to why circular economy concepts are more advanced in China and the European Union than in Australia. Both are highly dependent economically on manufacturing industries. Circular economy models increase the profits from manufacturing by converting waste into resource inputs, thus reducing both waste and raw material imports.

In contrast to China and the EU, Australia has negligible manufacturing and is highly dependent on resource exports. There is therefore less of a mainstream economic incentive to advance the circular economy and it is consequently perceived primarily as a waste management and emissions reduction strategy. Of course, in a globally interdependent economy, Australia will eventually be affected as our trading partners transition to a circular economy and the demand for our resources declines.

To ameliorate the impacts of reduced National income from resource extraction and sale, the Australian economy and people must become more locally self-reliant. The global pandemic of 2020 also highlights the fragility of global supply chains and the consequent necessity to be more locally self-reliant. Self-reliance and local resilience must, of course, be addressed at the National scale but local resilience at the community scale should not be neglected and would be far more effective and efficient—taking productive and distributive efficiency collectively—as described in Chapter 4.

The two decentralised circular economy types (Bauwens et al., 2020), bottom-up sufficiency and peer-to-peer circularity, reflect the two dimensions of the vision described in this thesis. Both seek to minimise demand rather than increase the supply of goods and services. As described in the discussion on efficiency, strategies to increase supply and encourage economic growth focus only on increasing production outputs but demand-side strategies increase efficiency by reducing production inputs needed to achieve sufficient outputs.

Bottom-up sufficiency focuses on the circular economy of organic materials, particularly integrating agricultural processes to minimise waste and reduce costs. This is the principal focus for the design of each Circular Economy Village, while peer-to-peer circularity would be used to access spaces, assets and produce both within and between Circular Economy Villages. Peer-to-peer circularity relates to the shift from ownership to access in the sharing economy. Online platforms provide temporary access to goods and assets, such as cars, accommodation, gardens and storage, reducing the need to purchase them.

7.6. Conclusions

Through the arguments provided in this chapter, the proposed regenerative settlements—the nodes of the envisioned network of settlements—can now be described as Circular Economy Villages. Whilst these would be localised, thermodynamically stable, steady state economies, it is considered that the circular economy terminology is not inconsistent with the steady state literature while also being substantially more effective, strategically, in conveying the vision and bringing it into reality.

A Circular Economy Village (CEV) would offer small-scale production of basic necessities within a self-sufficient local community. The village infrastructure would be designed as a thermodynamic system that provides for the needs of the citizens while minimising energy losses. By circulating materials and energy within the system it would “sustain a constant, sufficient stock of real wealth and people for a long time”.

CEVs are explicitly not isolated and independent but represent the social foundation of the broader society, in much the same way as the household is currently perceived as the social foundation in feminist economics. Just as care work and voluntary local community work are offered freely—outside the transactional money economy—so the activities within the CEV operate as a gift economy. Despite this work having no monetary value, it would be valued by the immediate community and reciprocated with access to basic necessities including food, water, energy and shelter. The production of these basic needs through the management of the land on which the community is located implies that local ecological systems are the ultimate social foundation. The enhancement of natural systems to provide an abundance of these basic necessities—more than is sufficient for the discrete community—ensures that supply exceeds demand, driving the price towards zero, thus justifying the gift economy. As a gift economy, the CEV would operate as a “haven from the heartless world of capitalism” allowing workers to say ‘no’ to unfair work conditions, and to socially or environmentally damaging work.

The CEV, constructed by a collaborative community working consciously with the ecological systems with which it is co-located, would form a solid social foundation upon which the broader social, economic and political fabric can be constructed. This was contrasted with proposals such as a Jobs Guarantee, Universal Basic Services and Universal Basic Income, which require the existing political economic superstructure to rebuild its own foundations.

Two issues were also identified as key considerations when re-imagining the relationship between the social foundation and the broader society—the household–city relationship. The first was the problem of inequality that arises through domination and violence, as one groups shifts their work and responsibilities onto another group. The second was the failure to adequately demarcate the boundaries of economic activity to create time and space that is free from economic conditioning and activity, and available for cultural, artistic, creative and recreational pursuits.

In the politically organised CEV, both issues would be addressed. Freedom would not be achieved by some shifting work onto others but by all working together. Through this collaboration—between individuals, and between the community and their land—basic necessities would be provided for all, efficiently and in abundance. The efficient delivery of basic necessities, both in terms of time and energy, maximises the opportunity and freedom for all to pursue creative and recreational activities.

8. Commoning for thriving individuals

The Circular Economy Village (CEV) is a system for the collective management of private land for the satisfaction of the private interests of all within that collective. The collectively owned and managed urban commons is a private domain for a specific community in the sense that they have the authority to exclude or invite others. Yet it is a 'commons' in that it requires the collective management of shared water and energy infrastructure, common spaces, food systems and shared bushland.

This chapter examines the development of systems for the collective management of common pool resources by communities, applying commons research to the urban commons and the shared infrastructure within a settlement. It also explores this micro-social dimension of change by reference to this literature.

In *The Tragedy of the Commons*, Garrett Hardin generated a great deal of debate when he argued that:

Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited. Ruin is the destination toward which all men rush, each pursuing his own best interest in a society that believes in the freedom of the commons. (Hardin, 1968, p. 1244)

Hardin's quote identifies a critical contradiction: the belief that a *free* society is *locked* into a system that compels individuals to act in a particular manner. The compulsion takes at least two interdependent forms. Firstly, there is the suggestion that all are compelled to participate in the mainstream economic system because, apparently, 'there is no alternative'. Secondly, once within the system, all 'free citizens' are compelled to continually increase economic activity. By keeping each other busy, we are denied the opportunity to pause and reflect on whether there is an alternative. Perhaps the state-imposed lockdowns in 2020 due to COVID-19 have offered this opportunity to re-evaluate and restructure our lives, both individually and collectively.

A central theme in this thesis is to assert that members of a free society should be free to reconstruct the systems by which they live. This does not only include advocacy for change but also direct change within the daily practices of a small community group. Rather than being locked into a system that compels individuals to increase their assets without limit, the circular relationship with the land compels them to care for the land and infrastructure and to manage it efficiently so that it provides their basic necessities with as little effort and energy as possible. The distinction between such bottom-up strategies for change compared with government and corporate-led initiatives is evident in the responses to Hardin's paper.

In a review of commons literature, Adhikari (2001, p. 3) identifies three broad schools of thought, each offering different strategies to avert the tragedy of the commons. The property rights school advocates for privatisation of the commons, the creation and enforcement of private property rights over public assets. A second school of thought advocates for strong state institutions to govern the commons. The process of corporatisation reflects a blending of these first two schools, whereby a state institution is charged with managing the commons but is required to behave like a corporation, particularly with respect to financial management. The third school of thought suggests that as individuals repeatedly confront

similar choices that depend on the actions of others, they are incentivised to establish and maintain systems that coordinate expectations.

It is this third school that argues that individuals are not only capable of working collaboratively but that this is what people invariably do if external interests and authorities do not interfere. Elinor Ostrom's research provides a strikingly different view to Hardin's. Ostrom (1990) carried out significant field research over many decades to develop a systematic methodology for governing the commons. She posits that:

Instead of presuming that the individuals sharing a commons are inevitably caught in a trap from which they cannot escape, I argue that the capacity of individuals to extricate themselves from various types of dilemma situations varies from situation to situation. (p. 14)

A yet stronger proposition is that presented by David Harvey for the "absorption of private property rights into a comprehensive project for the collective management of the commons" (Harvey, 2014, p. 50). This can be interpreted as a strategy for commoning in the private domain. This ensures that with defined private property rights, the commons are protected by the state to allow individuals to satisfy their private interests. Individuals will then not need to encroach on other commons as anticipated by Hardin.

This chapter is structured such that it builds on the work of Ostrom and Harvey's proposition to absorb private property rights into a system for the effective, collective governance and economic management of the urban commons. Ostrom's research compared numerous successful and failed examples of commons management, and yielded a set of eight principles, which, if implemented, would increase the chances of establishing an effective commons governance regime.

The eight principles are as follows:

- (1) Defining the boundaries of the [common pool resources] and specifying those authorized to use it can be thought of as a first step in organizing for collective action (Ostrom, 1990, p. 91)
- (2) Appropriation rules restricting time, place, technology, and/or quantity of resource units are related to local conditions and to provision rules requiring labor, materials, and/or money (p. 92)
- (3) Most individuals affected by the operational rules can participate in modifying the operational rules (p. 93)
- (4) Monitors, who actively audit [common pool resources] conditions and appropriator behavior, are accountable to the appropriators or are the appropriators (p. 94)
- (5) Appropriators who violate operational rules are likely to be assessed graduated sanctions (depending on the seriousness and context of the offense) by other appropriators, by officials accountable to these appropriators, or by both (p. 94)
- (6) Appropriators and their officials have rapid access to low-cost local arenas to resolve conflicts among appropriators or between appropriators and officials (p. 100)
- (7) The rights of appropriators to devise their own institutions are not challenged by external governmental authorities (p. 101)

- (8) Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises (p. 101).

The next three sections examine these eight principles. The first explores the issue of defining the boundary of the commons. This is followed by sections on rules and responsibilities, addressing principles 2–6 by Ostrom and then limiting the coercive role of the state responds to the final two principles.

Ostrom's focus was on governance arrangements, but these arrangements may be influenced or compromised by the structure of economic systems. Three sections then respectively address the circulation of money, the political economy of land and the political economy of labour.

The final two sections apply an Indigenous lens, exploring how commoning can form community and then also allow individuality to emerge.

8.1. Commons must have clearly defined boundaries

According to Ostrom's first principle, the first step in the effective management of the commons is to define the boundaries, including the resources to be managed and also the discrete identifiable community that manages and benefits from them. As such, it is necessary to determine a population size, land area and the resources to be managed by the community.

Two significant influences in town planning practice seek to define the boundaries of a planning area. Ebenezer Howard's Garden Cities proposed a population of 32,000 people and an area of 9,000 acres (3,642 hectares). A more relevant example, though, is Clarence Perry's neighbourhood unit described in the Regional Plan of New York and Environs in 1929:

Our investigations showed that residential communities, when they meet the universal needs of family life, have similar parts performing similar functions. In the neighborhood unit system those parts have been put together as an organic whole. The scheme is put forward as the frame-work of a model community and not as a detailed plan. Its actual realization in an individual real-estate development requires the embodiment and garniture which can be given to it only by the planner, the architect, and the builder. The underlying principle of the scheme is that an urban neighborhood should be regarded both as a unit of a larger whole and as a distinct entity in itself. (Perry, 2013)

The Circular Economy Village (CEV) is similarly proposed as a definable unit capable of being developed as an individual real-estate development; one that is a distinct entity as well as being a unit in a larger whole.

In Perry's neighbourhood unit, the universal needs of family life include a school, parks and playgrounds, local shops and housing. In the CEV, the universal needs of life are food, water, energy, shelter and transport and it is these that have been integrated together as an organic whole.

Perry defined the population size at 6,125 people in 1,241 homes on 160 acres (65 hectares). Whereas Perry proposed 94 people per hectare, Howard proposes just 8.8 people per hectare in his Garden Cities, illustrating the difference between a dense urban

precinct and an environment that intentionally offers a rural landscape character. This is consistent with the intent of Circular Economy Villages so, for a population of 200 people, an area of 23 hectares would be required at the Garden City density. Given that many rural farms in Australia were created at the scale of 100 acres (40 hectares), this may be an appropriate land size to be included in a planning policy for the development of CEV projects.

A compact urban zone would create a neighbourhood character, retaining most of the land zoned for rural and environmental purposes. Only about 5 hectares would be required to house 200 people at a suburban residential density, leaving 35 hectares for food production, water cycle management and for non-human priority ecosystems. (The gross residential density for a suburban neighbourhood is approximately 15 dwellings/hectare (Landcom, 2011, p.12). Average number of occupants per household was 2.6 (ABS, 2016). Therefore, $15 \times 2.6 = 39$ persons per hectare).

As always, this reflects our current best guess for the creation of a development model that can be further refined through the development process and subsequently as more CEVs are constructed.

8.2. Rights, benefits and responsibilities

Ostrom's second principle is that rules must suit local conditions. In order to appreciate what she refers to as 'appropriation rules', it is useful to start with the language of rights and benefits used in the establishment of common law property rights.

According to Bromley (1992), few concepts are more misunderstood than that of 'the commons':

There can be no more important aspect of scholarship than that of concepts and language. If scholars use the same words or terms to describe fundamentally different fact situations, ideas, or phenomena, then progress in understanding is impeded rather than advanced. In the literature on natural resources and environmental policy, it would be difficult to find an idea (a concept) that is as misunderstood as that of the commons and common property. (Bromley, 1992, p. 1)

Bromley then suggests that the confusion arises due to the imprecise definitions, arguing "that there is no such thing as a common property resource". Instead, "there are only resources controlled and managed as common property, or as state property, or as private property... [or resources] over which no property rights have been recognized" (Bromley, 1992, p. 2).

In accord with Bromley, the concept of 'property regimes' is preferred to 'property', as the former includes right holders, beneficiaries and stewards. Rights are claims to benefits and responsibilities that are recognised and protected against adverse claims (Bromley, 1992, p. 3) by the state or other external authority.

Property is therefore not just an object or a resource but also the social relations, connecting the resource to beneficiaries and stewards to the exclusion of others. By broadening the abstraction from 'the thing', to 'the thing with its relations', an ongoing dialectical relationship has been identified between the resource and people operating a political economic system to manage and benefit from that resource.

There are many examples of successful common property regimes (Bromley, 1992; Ostrom, 1990, 2002). Indeed “common property regimes exist and function very much like private property regimes and state property regimes. That is, some are not working very well, while others work very well indeed.” (Bromley, 1992, p. 2).

One cause of the tragedy of the commons occurs when a property regime is not established at all over certain resources or territories (Bromley, 1992; Gibson-Graham et al., 2016). In 1998, Garrett Hardin acknowledged this inaccuracy in his 1968 article:

To judge from the critical literature, the weightiest mistake in my synthesizing paper was the omission of the modifying adjective “unmanaged.” (Hardin, 1998, p. 683)

Such a failure is not inevitable. Recall the quote from Gammage in Chapter 2, relating to Australian First Nations land management:

There was no wilderness. The Law—an ecological philosophy enforced by religious sanction—compelled people to care for all their country. (Gammage, 2011, p. 2)

The indicative map of pre-European nations in Australia created by David Horton (1996) accordingly shows that every part of the continent was occupied and had land stewards. The property regime of indigenous cultures was one in which a discrete and identifiable community held all ownership rights, all stewardship responsibilities and benefited from the use of all resources within a territory. This is the simplest way to manage the complex array of ecosystem resources in a geographic area. Importantly, territorial boundaries were fluid, not rigid borders and also permeable. That is, outsiders were always welcome but a ‘Welcome to Country’ provided visitors with an introduction into appropriate behaviours within the territory. Also, as outlined in the discussion on the introduction of coins in Chapter 3, there was trade between territories across the Australian continent.

A much more complicated way of managing resources is to have numerous types of rights and therefore numerous different and often competing beneficiaries. The protection of rights then necessitates an external coercive authority. To make matters even more challenging in the Australian common law system there are rarely any explicit stewardship responsibilities or consequences for not caring for Country. This absence of stewardship responsibilities partly explains how an extractive mindset is created and reinforced. The comparison between an extractive and a regenerative attitude to land and ecosystems is discussed in the next chapter.

The complicated and problematic character of the layers of rights in the common law system became evident to the author when, in 2017, PolisPlan were invited to assist a community representing three Indigenous nations in North Queensland. After some years in the Federal Court, the community had won Native Title rights over some of their traditional lands pursuant to the Commonwealth Native Title Act (1993). Despite this federal determination (Congoo v Queensland, 2001), the land is still registered as ‘Unallocated State Land’, owned by the state of Queensland. The Native Title Determination is listed as an encumbrance on the land title. The determination itself identifies the extent of the native title rights and interests, which include to:

- (a) live on the area;
- (b) conserve the natural resources of the area for the benefit of the common law holders;

(c) maintain, use, manage and enjoy the area for the benefit of the common law holders...

The rights therefore include the benefit of living on the land, including conducting any social, religious, cultural and economic activities. Yet the rights of the local council to exercise its statutory powers continue, so if any buildings or infrastructure are proposed, they would still be subject to the ordinary development approval processes. Prior to making an application for development it is necessary to obtain the consent of the landowner, in this case the state of Queensland. The likely outcome of such a request would be that the state would require an entity with legal personhood to enter into a lease agreement or other common law rights regime. The Native Title rights would effectively become irrelevant.

In addition to the rights of the local council, the statutory rights and interests of electricity and telecommunication providers also still apply as do the common law rights of mining companies, farmers or any person who holds an occupational licence, a lease or tenement. Finally, as owners of the land, the state maintains its “‘absolute property’ for the purposes of the *Forestry Act 1959* in forest products and quarry materials” (*Congoo v Queensland*, 2001).

Note here that all the existing common law holders of rights and benefits now have an added benefit in that the holders of Native Title rights will maintain and manage the land for the benefit of all common law holders. They may conserve the natural resources of the area but have no authority over extractive industries. Native Title rights are effectively subservient to all other rights and indeed the Indigenous desire to ‘Care for Country’ is put in service of other common law rights holders. Whether this is just or unjust may perhaps be a matter of opinion but that it is complicated and highly likely to generate conflict between the various right holders should be obvious.

Three important messages emerge from the analysis in this section:

- (1) The social origins of environmental resources depletion do not arise because the resource is held in common, rather than owned privately or by the state, but because the property regime is poorly constructed or does not exist at all.
- (2) A property regime includes rights, benefits and responsibilities. To ensure the long-term sustainability of the subject resource, any property regime must include an appropriate balance between extraction of benefits and the duty of stewardship.
- (3) Ecosystems in any location or territory include a complex array of inter-related resources. There is one very simple way of managing this complexity or any number of very complicated ways.

The design of a Circular Economy Village adopts the simple way of managing complexity. That is, a discrete and identifiable community would collectively obtain ownership rights and undertake all stewardship responsibilities in order to benefit from the use of all resources within a territory. This would include not only obtaining Torrens title but also any other rights to resources (e.g., water, minerals, forestry products) in order to minimise extraction and impacts from external parties. The title and rights would not be held in the name of any person but rather a legal entity (e.g., company, trust) that represents the community of citizens that live on the subject land at any time.

This is consistent with principles 3 to 6 in that the community is self-governing; (a) making and modifying its own rules, (b) monitoring behaviours, (c) applying graduated sanctions for

violations of operational rules and (d) establishing low-cost local arenas for conflict resolution.

8.3. Limiting the coercive role of the state

The right of communities to establish their own rules and for these rules to not be challenged by external authorities is Ostrom's seventh principle.

Where there are numerous parties holding rights to use, access or extract benefits from any particular territory, an external 'unit of coercion' (Bromley, 1992, p. 3) must protect those rights from adverse claims. Usually this is the state authority that has established the system of rights and also granted the rights in the first instance. The state is usually represented by a bureaucratic administration of a central government, most often located externally to the subject territory or resource.

Bromley uses the term 'unit of coercion' in order to indicate that the "authority system can either be a central government, or it can be a local village council. The important issue here is that individuals feel compelled to comply with the institutions in effect" (Bromley, 1992, p. 3). The unit of coercion must operate on two levels—to exclude those who don't have rights and to manage relationships between those who do.

Returning to the quote from Bill Gammage for an Indigenous perspective, the unit of coercion can be an accepted cultural norm rather than a central government administration:

The Law—an ecological philosophy enforced by religious sanction—compelled people to care for all their country... an uncertain climate and nature's restless cycles demanded myriad practices shaped and varied by local conditions. Management was active not passive, alert to season and circumstance, committed to a balance of life.

The chief ally was fire. [this was] a planned, precise, fine-grained local caring. ...Means were local, ends were universal. Successfully managing such diverse material was an impressive achievement; making from it a single estate was a breathtaking leap of imagination. (Gammage, 2011, p. 2)

There was no need for a central state authority or continent-wide government. The community in each bioregion accepted responsibility for managing the resources in their territory. All the communities also agreed to a common ecological philosophy. In other words, the internal functioning of a property regime within a territory is dependent on that regime being respected by communities outside the territory. This is consistent with the last of Elinor Ostrom's eight principles for a well-managed commons. Commons work best when "organised in multiple layers of nested enterprises" (Ostrom 1990, p. 101). "Establishing rules at one level, without rules at the other levels, will produce an incomplete system that may not endure over the long run" (Ostrom, 1990, p. 102).

8.4. Avoiding the tragedy of the commodity

Poorly managed resources—whether by the state, privately or in common—could be defined as those for which extraction exceeds regeneration. The excessive extraction of benefits and under-emphasis of stewardship in property regimes is a more significant issue for resource depletion than lack of management altogether. Indeed, when benefits are not extracted, no recognition of property rights or establishment of a property regime is

necessary. The absence of a property regime, per se, does generate any issues. Rather, environmental issues are caused by the imbalance between extraction and regeneration.

Longo and Clausen's *The Tragedy of the Commodity* (2011), in a critique of Hardin's original article from a Marxist perspective, describes how excessive, unlimited extraction is a central characteristic of the capitalist system. Briefly, they argue that this arises because quantitative exchange values are divorced from qualitative use values. Marx distinguishes between an economy that circulates commodities, mediated by money (C-M-C), from an economy that circulates money mediated by commodities (M-C-M). The goal of the former is to deliver useful commodities and when the relevant needs are satisfied the circulation is complete. The goal of the latter system is to deliver surplus monetary value. Commodities are only produced if money is available to begin the process and money will only be made available if it can be demonstrated that surplus money value will be realised at the end of the process. The realisation of surplus value does not end the process but rather provides an impetus for further reinvestment—setting the system on a growth trajectory. Referencing Marx, Longo and Clausen (2011, p. 317) note that the “result of one cycle is the beginning of the next and the movement of capital is therefore limitless”. Accordingly, the usefulness of the commodities is irrelevant to the capitalist who is only concerned with the continual extraction of surplus value.

Marx also observes that this process necessarily results in the commodification of labour and nature, which come together to produce surplus exchange values. That is, surplus value represents the extent to which extraction of benefits exceeds contribution to care and maintenance. When the motive, rationale and goal of an economic process is simply to realise surplus value, then the participants become oblivious to all the consequences, which are considered as externalities or secondary concerns.

This financial imperative is reinforced by a legal system that is designed only to protect rights rather than placing equal weight on rights and responsibilities.

The financial feasibility of a Circular Economy Village development project should therefore not be assessed according to its capacity to deliver surplus money value. Rather, the costs of planning, designing and building a useful product should be distributed amongst the users of that product.

8.5. The political economy of land

The development of a Circular Economy Village should also aim to eliminate the extraction of surplus value at every step of the development process, from the extraction of land value uplift due to the rezoning of land, through the construction of capital works and ongoing operation.

When rural land is rezoned to permit urban uses, the state increases the value of the land simply by changing the colour on the land use zoning map. No actual improvements to the land have occurred either by the public authority or the private owner of the land. Yet the land-owner benefits from the land value uplift. This brings us to the ideas of Henry George.

Henry George (1879) sought to rebalance and remedy the unequal distribution of wealth. Eliminating six alternative strategies, including government interference and a more even distribution of land, George's final remedy was simple “We must make land common

property” (George, 1879, p. 328). To implement this plan, George resists dramatic actions and argues, consistent with the approach here, “that great changes can best be brought about under old forms...When nature would make a higher type, she takes a lower one and develops it” (George, 1879, p. 405).

Specifically, then, George proposes to simply adjust the existing system of taxation: “To abolish all taxation save that upon land values” (1879, p. 406). This would have the effect of ensuring that landowners holding the most valuable land portfolios would pay the most in taxation, while those with no land pay no tax.

There are two issues with this approach. The first is that while this may have been an appropriate strategy in the Industrial Age—“all other monopolies are trivial in extent as compared with the monopoly of land” (1879, p. 412)—it is becoming increasingly less useful as a strategy in the Information Age. ‘Big Tech’, companies like Alphabet (Google), Facebook, Apple, Amazon and Microsoft, no longer generate wealth through ownership and control of land but through the control of information.

The second issue is that this is a macro-political strategy; to make land common to all within a nation effectively gives control to none but the central government. When the majority have no meaningful control, they also do not take responsibility for managing the land. The inevitable consequence would be a centrally controlled authoritarian state.

Yet, George’s proposal would be far more effective if implemented as a micro-social strategy, whereby land is held in common by each community, who have collective control and responsibility for the land upon which they are located.

A strategy for the development of a Circular Economy Village would seek to avoid the unearned private appropriation of public wealth due to land rezoning. The rezoning of land is a lengthy and staged process beginning with the designation of rural land in a strategy identifying it for future rezoning (land release) and ending with the actual amendment of the planning instrument that changes the zones, from rural to permitting urban land uses.

Rather than separate public policy processes, entirely divorced from the financial processes that must follow, a more integrated strategy is proposed as follows:

STEP 1. A strategic locality planning process is necessarily the first step and involves identifying the appropriate locations for settlements. This process of land release must necessarily be a public process involving the community living in the subject bioregion. This occurs prior to the formal rezoning process.

STEP 2. The land where each future settlement is to be located is transferred at market value to the ownership of a Community Land Trust while it is still zoned for rural purposes. Any subsequent change in zoning or capital improvements would therefore be retained in the ownership of the trust. The cost of the improvements, including provision of infrastructure, would also be incurred by the trust. Land improvements, in a Circular Economy Village, are not just any capital works (that return surplus value) but only those that enhance the capacity of the land to support a population. Community Land Trusts are described by Crabtree et al. in their 2019 publication *Enabling Community Land Trusts in Australia*:

Community land trusts (CLTs) are private, non-profit entities that hold title to property for the dual purposes of perpetually affordable housing and community benefit. This broad definition allows each CLT to determine how to meet those objectives according to its context. (Crabtree et al., 2019, p. 5)

By retaining ownership of the land in a CLT, in perpetuity, housing and supporting infrastructure are no longer tradable commodities. This also ensures that land enhancements precede any extraction of benefits or corresponding stewardship responsibilities.

STEP 3. Future residents would purchase units in the trust (or shares if a company structure is preferred for the CLT). This is a common approach for commercial real estate development, where managed investment trusts (MIT) or real estate investment trusts (REIT) are the usual financial vehicles. This is now feasible for smaller developments through online platforms such as domacom.com.au, which is regulated by the Australian Securities and Investment Commission (ASIC) and enables fractional real estate investment.

Members of the community will therefore not own land or the improvements but rather they will own a share—together with the rest of their community—of the entity that owns the land and capital improvements. Occupants would then occupy the village by way of a rental agreement. This would have two components: a payment towards the capital cost that can be offset by purchasing shares or units in the trust, and a payment towards the operational costs, which will be discussed in the next section.

Occupation by rental agreement avoids the presumption of domination and control that comes from individual ownership and instead reinforces the requirement to maintain a relation between the individual and the collective. It also reinforces the fact that our relationship with the land is temporary and our responsibility is to manage it for those who follow, just as we might expect those who precede us to maintain it in good condition for our enjoyment.

Emerging build-to-rent and co-living development models are therefore most appropriate development strategies. Like retirement villages and student housing, build-to-rent and co-living are usually precinct-scale (more than one building) that integrate some form of housing with shared facilities, spaces and services. All of these forms of development are held in single ownership, one operator manages the entire precinct and usually there is a host on-site. Build-to-rent and co-living make precinct-scale developments with shared assets available for all age groups. The collective term Housing as a Service (HaaS) could be adopted as a parallel to the emerging concept of Mobility as a Service (MaaS).

As indicated in section 4.2.5, this represents a significant disruption to the development industry, as holding, operating and maintaining assets post-construction requires a different attitude to design and construction. It is more likely that financing strategies will use life-cycle costing, seeking to maximise durability and quality in order to minimise ongoing maintenance issues.

The Circular Economy Village development model includes the precinct-scale development form with shared assets but also includes a system of shared ownership by the residents. This ensures that the benefits from capital improvements accrue to the residents rather than an external developer or shareholder. The circular economy perspective is that money,

wealth or benefits should circulate locally as much as possible with extraction from the community minimised.

The collective ownership, together with individual rental agreements setting out management responsibilities, provides a better balance between access and ownership, upending the common assumption that care of land is a natural consequence of ownership while renters are necessarily unlikely to care for the land. Managing the commons is the same as land stewardship, which is more likely through this form of collective ownership and renting than through private ownership that generates attitudes of control, exclusion and competition.

8.6. The political economy of labour

A systems approach cannot consider capital and labour without reference to land or land without reference to capital and labour. Labour is involved throughout the development process and afterwards in its management and maintenance. In this way, all three—land, capital and labour—are integrated.

The economic design of Circular Economy Villages must therefore include collective land ownership, collective funding of capital improvements and collective subsequent operation and management of the land and capital. This avoids the extraction of surplus value from each of the three factors of production: land, capital and labour.

After the capital construction works and ownership structures are established, the ongoing operation of the CEV must also avoid the circulation of money so as to focus on use values rather than exchange values. Accordingly, necessary commodities such as food, water and energy should all be regarded as priceless and circulated around the site in a gift economy. The circulation of goods includes production, distribution to consumers and the use of waste, post-consumption, to regenerate the land. In a virtuous cycle the land is constantly improved to more efficiently provide basic necessities. The resulting abundance of these necessities—excessive supply relative to demand—ensures that the exchange value would tend towards zero anyway.

Of course, the sale of surplus produce to people outside the village community would bring income to the community and reduce the operational component of the lease for individuals. Conversely, any purchases of goods or services such as vehicles or washing machines represents outgoings for the village community and so increases operational costs. This formula is no different to that of any household or corporation: balance the budget or ensure that income exceeds outgoings.

The difference when compared to a household is the scale and the supporting infrastructure. With a population of up to 200 people there would be a wide range of skills and services. Basic care services for children, the aged and the sick should not cost money. Often someone will be able to help you with a software problem, or to fix a tap, paint a wall or do some gardening. The supporting infrastructure will ensure that food, water and energy will be available at no cost. Residents are incentivised to minimise outgoing expenses by developing a wide range of skills and services within the resident community. This would result in better education, training and succession planning.

8.7. Commoning to form community

The collective ownership of private property through a Community Land Trust also reconciles the tension between the collective and individuals. The individual is part of the collective, not isolated from it. Individuals are tenants-in-common or equal shareholders of the land, which is now a commons. Yet we have already indicated that a commons is not property but a property regime. A regime includes the actions by various parties who are managing the commons.

Gibson-Graham et al. (2016) suggest the verb ‘commoning’ rather than the noun ‘commons’ as this expresses active relationships between people and also between a community and the land. In this formulation, commoning is characterised as a relational process of negotiating various benefits and stewardship responsibilities. “Commoning thus involves establishing rules or protocols for access and use, taking caring of and accepting responsibility for a resource, and distributing the benefits in ways that take into account the well-being of others” (2016, p. 195).

An interesting implication of this approach is that it emphasises the role of, and empowers communities:

communities are constituted through the process of commoning. As the geographer Amanda Huron puts it, ‘there appears to be a dialectical relationship between commons formation and community formations: one does not necessarily precede the other’. (Gibson-Graham et al., 2016, p. 196)

Although the dialectical relationship between the commons property regime and the community is accepted, it should also be acknowledged that the land preceded the community living on it. Consequently, the property regime must be developed by the community through a deep understanding of the local geography, climatic conditions and the patterns of behaviour of the various components of the ecosystem (including the humans). The property regime and community character must therefore be a product of the land. This is consistent with the Indigenous systems of law and culture as articulated by Graham and Maloney, who affirm that the land is the source of the law:

In Aboriginal law, the two most important kinds of relationship in life are, first, those between land and people and, second, those amongst people themselves, the second always being contingent upon the first. The land, and how we treat it, is what determines our human-ness. (Graham & Maloney, 2019, p. 389)

This perspective is also consistent with Friedrich Hayek’s (1973) distinction between ‘taxis’ and ‘cosmos’, the former being an exogenous social order, an artificial construction imposed on a system from the outside. By contrast ‘cosmos’ represents an endogenous, self-generating, spontaneous or natural order developed within a system. The commoning of the land by a discrete community within a Circular Economy Village must be of this latter form, emerging from a deep understanding of the land.

8.8. Individuality emerges from community

The opportunity for self-determination is already lost in the context of an exogenous, imposed social order. This form of social order inevitably results, as Garrett Hardin suggested, in the compulsion of individuals to increase their herd without limit. It is hardly

possible to develop an individual identity if one is compelled to continually behave in a particular way.

Yet, is individuality any more likely to develop within a community that is collaboratively commoning its shared infrastructure? The individual is still compelled by the group! According to Graham and Maloney (2019), individuality is more likely to develop to its fullest potential in this context:

In Aboriginal law and culture, we believe that a person finds their individuality within the group. To behave as if you are a discrete entity or a conscious isolate is to limit yourself to being an observer in an observed world. (Graham & Maloney, 2019, p. 390).

From this perspective, individuality emerges from an understanding of one's relationships—both with others within the community and within a multi-species ecosystem. These relationships with others and with the land define our humanity and individuality by contextualising ourselves within the world. The separation of the individual from the world only creates isolation and loneliness, not individuality.

“There are four essential attributes to the relationist ethos—a custodial ethic, locality, autonomy and balance” (Graham & Maloney, 2019, p. 390). The custodial ethic refers to an attitude of responsibility for the people, other species and land within one's locality. The lifelong learning required to fully appreciate the complex array of relationships within a local ecosystem, and one's part within it, anchors people to their locality. The embeddedness of a community within its local ecosystem ensures their autonomy from other communities as each community is constrained by the patterns of activity within their ecosystem. The custodial ethic could perhaps be defined by reference to the other three attributes: as the autonomous responsibility for managing the ecosystems in a locality, aiming to ensure these ecosystems remain in balance.

Whilst the autonomy of each community keeps external impacts on this balance at bay, there are also internal impacts, that is, individuals acting inappropriately:

In Aboriginal law, ego is considered a volatile substance; one that should be respected and acknowledged (not suppressed as such), but which needs active management and containment. To allow an individual's ego to override the well-being of the family, clan or community is to allow volatility, instability and unfairness. (Graham & Maloney, 2019, p. 392)

There is much to learn from the Australian Aboriginal ethos and system of commons governance. What it may not be able to address fully in our current context are the external impacts on local ecosystems within a globally interconnected world. The level of local autonomy possible in the pre-European settlement context may not be possible due to the permeability of individual communities to the outside world. A more relevant relationship between local and global must be developed.

The description of the economy in the previous chapter, as consisting of two operating systems—one as a social foundation, the other for aspiration—is therefore relevant. The commoning activity within a community relates to the custodial ethic that provides a social foundation for all in the community.

8.9. Conclusions

Some of the literature related to the Commons—and Commoning as an activity—promotes the benefits of collaboration as an antidote to the excessive individualism of modern society. Rather than casting this as a binary choice, the Circular Economy Village would promote the pursuit of individuality through collaboration. That is, by collaborating to efficiently provide all members of a community access to their basic natural necessities, everyone will have the time and space to pursue their individual passions and interests. Liberty for the pursuit of happiness can be achieved by maximising the efficiency with which necessities are produced and distributed.

A potentially problematic issue with this perspective may arise where certain individuals may aspire to travel more often than being anchored to one particular place. Settlers may argue that their longer-term contribution is more valuable than temporary or brief contributions of nomads. This serves as another reason for ensuring that the local commons is a gift economy where use values are not measured in exchange terms. Some aspire to contribute to a superbly efficient local ecosystem, others aspire to explore different places, people and ideas. The former improves an individual node, the latter improves the network as a whole. Both are valuable in their own way.

Finding a balance between settlers and nomads requires an acknowledgement that the city is a dynamic system. Change is therefore continuous. Commoning to provide a social foundation therefore requires continuing commitment of a community to the management of its commons, even as both the members of the community and the mix of common assets change over time. We are all ultimately only temporary residents, while the settlements will remain for future generations. The flexible, collective ownership structures and rental arrangements are therefore crucial to the liberation of individual aspirations as they remove the burdens of being anchored to a place, a mortgage debt, a job or a set of obligations.

The relationship between the city and its citizens is dialectical, requiring constant dialogue. Individuals can find their identity only by identifying their particular contribution to the broader system and therefore their relationship with other parts of the system. Such contributions can be local, global or any scale in between and that contribution may change through the different stages of our life cycle.

It is only through the development of a collaborative attitude in our daily lives that our skills and capabilities can impact the management of the global commons such as the oceans and atmosphere that stabilise the climate. Just as global action is dependent on local attitudes and actions, community empowerment depends on empowered individuals. By establishing a social foundation that efficiently provides necessities for all individuals the community liberates and empowers individuals. As individuals contribute freely to the establishment of a social foundation for everyone in the collective, the empowerment of the local community increases and government responsibilities, power and authority diminish. This dialectical relationship between the individual and the collective provides an efficient and effective system of commons governance for Circular Economy Villages.

9. From extractive scarcity to regenerative abundance

In advocating for a simpler way of living, Ted Trainer (2014, p.1) suggests “that we are entering an era of intense and irremediable scarcity, which rules out notions of emancipation in terms of centralised, industrialised, technically sophisticated or globalised systems, growth economies or affluent lifestyles”. The implication is that the current surplus, or abundance, of goods and services is due to the centralised, industrialised and globalised system. This assumes that abundance and scarcity are concerned with supply from industrial production, ignoring whether that supply actually satisfies demand. The concern only with productive capacity excuses production of unnecessary goods and justifies failures in distribution including excessive waste and unequal distribution. It does not follow that because mechanised or automated industrial processes produce a lot of goods relative to pre-industrial processes, therefore there is now an abundance relative to the past. Whether there is abundance or scarcity of any good or service should reflect the experience of consumers not producers. Productive abundance is irrelevant to a consumer experiencing insufficient access to food, whether it is unavailable or too expensive. It is the experience of the consumer that reflects the efficiency of the economic system as a whole, which is defined, in addition to production, by processes of resource allocation, capital allocation and distribution of goods and services in any specified geographical area.

While economists and politicians speak enthusiastically about the abundance created by industrial production processes, markets depend on scarcity. Scarcity, which occurs when demand exceeds supply, is often contrived through marketing that inflates demand, or by deliberately constraining supply to inflate prices. True abundance occurs when supply is permitted to consistently exceed demand, in which circumstance the price would tend toward zero. Paul Mason (2015, p. 146) writes that the “advance from scarcity to abundance is a significant development in the history of humanity...but it’s a major challenge for economic theory. Capitalism made us see the price mechanism as the organic, spontaneous, granular thing in economic life. Now we need a theory for its disappearance.”

This chapter will review the simple living ideas advocated by Trainer, Samuel Alexander and others, identifying many similarities with the proposal in this thesis as well as some important differences. The critical difference is between the narrative of a simple, frugal lifestyle and one of abundance. To create abundance requires systems for calculating production in relation to consumption to ensure there is an oversupply. The socialist calculation debate of the early 20th century is discussed, raising questions related to the efficient allocation of capital, approaches for eliminating the price mechanism and encouraging innovation. The contrast between abundance and scarcity will also highlight the distinction between extractive and regenerative production processes that have a negative and positive impact on the land respectively.

The aim throughout is to encourage a shift from linear logic—growth is good, or growth is bad—to a dialectical, relational or circular approach that examines the relationship between production and consumption and the relationship between production processes and their impact on the land. This implies a shift from binary thinking—we can support the economy or the environment but not both—to an appreciation of dualities, in which the relationship between these constructs is understood.

This underpins the development of the post-capitalist project that Paul Mason (2015, p. 266) refers to as Project Zero “because its aims are a zero-carbon energy system; the production of machines, products and services with zero marginal costs; and the reduction of necessary labour time as close as possible to zero”. Extending Mason’s idea, this chapter compares the current pursuit of infinite economic growth—Project Infinity—with Project Zero.

9.1. Simplicity, frugality and the sufficiency economy

Advocates of voluntary simplicity (e.g., Trainer, Alexander), like many degrowth advocates (Schneider et al., 2010), in expressing their concern for the present social and ecological crises, argue that the principal political economic issues are excessive consumption and the collective pursuit of limitless economic growth. Their response, therefore, is to voluntarily consume less while seeking a higher quality of life. Trainer (2014) describes it as follows in *A Limits to Growth Critique of the Radical Left: The Need to Embrace a Simpler Way*:

The core element in the limits case is that we are entering an era of intense and irremediable scarcity, which rules out notions of emancipation in terms of centralised, industrialised, technically sophisticated or globalised systems, growth economies or affluent lifestyles. There must be a dramatic reduction in rich-world levels of production and consumption and ‘living standards’. The Simpler Way vision is of an alternative which achieves this goal while liberating us to enjoy a higher quality of life. (p. 1):

There are a number of similarities between this approach and the vision and strategy proposed in this thesis but also some fundamental differences. Similarities include that the transition must be a bottom-up, micro-social strategy and that this will only be possible if there is a collective rise in consciousness and voluntary actions by individuals. The voluntary aspect should specifically be emphasised, as the creation of a network of local gift economies requires many individuals to volunteer their services for non-monetary compensation during the planning and development stages also.

Another similarity is in the definition of progress as a process of liberation from economic activity. This is described eloquently by Alexander (2015):

Rather than progress being seen as a movement toward ever-increasing material affluence, the sufficiency economy aims for a world in which everyone’s basic needs are modestly but sufficiently met, ... human beings would [then] realise that they were free from the demands of continuous economic activity and could therefore dedicate more of their energies to non-materialistic pursuits, such as enjoying social relationships, connecting with nature, exploring the mysteries of the universe, or engaging in peaceful, creative activity of various sorts. (p. 66)

There is a clear shift in emphasis towards the privileging of use values for non-materialistic pursuits over exchange values for material goods, thus decoupling economic growth from human prosperity.

Both simple living and the related term ‘frugal abundance’ (Liegey and Nelson, 2020) suggest that change can be achieved merely by reducing consumer demand. Reducing demand is important but without critical mass it does not significantly influence the remainder of the economic system—resource extraction, production, and distribution. Paul Mason’s Project Zero, mentioned above, describes the ultimate consequences of increasing efficiency, minimising both material and energy demand throughout the entire

economic system. It therefore can complement a frugal, or minimalist mindset of consumers.

Both simple living and Project Zero minimise exchange values. Frugal abundance adds that the purpose of simple living is to maximise use values. This thesis seeks to similarly complement Project Zero by arguing that the purpose of an efficient economic system is to maximise the time and energy available for non-materialistic pursuits—maximising use values.

The term 'simple' also indicates that present mainstream political economic systems are unnecessarily complicated and could be, or rather should be, substantially simplified.

Yet another similarity is that voluntary simplicity also decouples monetary income from access to basic material necessities. For example, voluntary simplicity advocates encourage collaboration within a local community for the provision of food for all. Therefore, food systems are incorporated in and around settlements. In *Remaking Settlements: The Potential Cost Reductions Enabled by the Simpler Way* (2015), Trainer writes:

Most and possibly almost all food could come from within settlements, that is from home gardens, community gardens, neighbourhood commons, and very small farms, even in the dense suburbs of large cities, at a very low dollar cost and at almost no energy cost. However, it is likely that some grain, dairy, oils, fruit and nuts would need to be brought in, ideally in bulk from nearby farms. (p. 3)

The vision of a distributed network of settlements, each with its own integrated food system, is well aligned with the vision proposed here, as is the suggestion that this would be far more cost efficient than the current industrialised monocultural food system (refer to section 5.3).

Despite these areas of agreement in terms of a general vision, the challenge for the voluntary simplicity movement is in mobilising populations for the realisation of that vision. It has consistently been argued throughout this thesis that the strategy and vision must be developed together in a coherent and integrated manner. An unrealisable vision will always remain no more than a vision. The practical issues of implementation can be divided into the following:

- (a) The economic problem of calculating what is a sufficient level of production and consumption.
- (b) The political problem of who decides what is a sufficient level of production and consumption.

In the construction of any political economy these two issues are, of course, highly interdependent, so the resolution of these should be harmonised. This chapter is concerned with the economic problem of calculation. The political problem has already been discussed in Chapter 8. The optimal approach for the effective governance of the commons is for this to be carried out by the community living on the commons in question, generally using some formulation of the eight rules developed by Elinor Ostrom.

In Chapter 5 it was argued that, for maximum efficiency, production and consumption should be co-located, where possible within the same village or the same bioregion, before extending supply chains beyond this. In Chapter 7 it was argued that the local community should act as a social foundation, providing residents with their basic necessities such as food, water, energy, shelter and work opportunities.

Therefore, to align political and economic considerations it would be useful to consider how the calculation problem could be resolved at the level of the local community.

The problem of economic calculation is to determine how much of the various goods and services are sufficient and what resources, land and labour are required to produce and distribute these. As illustrated in the quote above by Trainer (2015), the need to calculate how much is sufficient becomes a key settlement-planning consideration. This has been debated at length in literature promoting a socialist alternative to capitalism ever since Marx famously wrote “from each according to his ability, to each according to his needs”. Much of the literature assumes that economic calculation must necessarily be carried out at a national or state level by a centralised bureaucracy. The discussion on the so-called calculation debate provided below will offer a fundamentally different and far more efficient approach that only requires the calculation of certain basic economic necessities at a local community level.

9.2. The calculation debate

According to Mason (2015, p. 224), in the early 20th century mainstream economists seriously contemplated the possibility of socialism. The central concern was whether it was possible for a state authority to calculate the various needs and wants of citizens and produce these as needed. If this were possible, supply and demand would be calculated by the state rather than resulting from market price fluctuations. According to Mason (2015), it was Ludwig von Mises who identified three weaknesses of central planning in his book *Economic Calculation in the Socialist Commonwealth* (1920):

Mises targeted three critical weaknesses of planning in reality: a state can't calculate as fast as a market can; a state can't reward innovation; and ...without a finance system [the distribution of capital] becomes unwieldy and haphazard...Because his predictions were proved right, by both the life and death of the Soviet economy, his book has become a hallowed text of the free market right. (p. 225)

It is interesting that there are no claims of the failure of capitalism when capitalist states fail, while the rise of China, led by the Chinese Communist Party, is claimed as evidence of the success of capitalism. Such ‘capitalist versus socialist’ debates are considered fruitless, particularly given the absolutist connotations and emotive responses the terms evoke. Instead, the important questions are those raised by Mises:

- (a) Is it possible to develop an alternative system that introduces some form of calculation of supply and demand that results in the disappearance of the price mechanism?
- (b) Would this alternative system be effective and efficient in allocating capital?
- (c) Would this alternative system encourage or stifle innovation?

Mason notes that Mises’ pupil and free market advocate Friedrich Hayek and his collaborator Harold Robbins considered that state calculation is possible but would involve millions of equations and an enormous amount of data. While such calculations would have been cumbersome in the 20th century, this would not be a problem for the powerful computers and machine learning of the 21st century.

Despite this newfound calculating power, there is still a question as to whether calculation is necessary in a post-capitalist economy experiencing abundance rather than scarcity. The price of a good or service is a reflection of its relative scarcity: greater scarcity, the greater the price, less scarce, the lower the price. Mason (2015) argues that for both sides of the calculation debate:

...the idea of transition—in which a system based on scarcity gives way to one based on abundance—is unexplored territory. If capitalism and state socialism are just two ways of allocating goods rationally until you reach equilibrium, the transition between them is just a technical challenge, not a revolution. (Mason, 2015, p. 227)

Neither side considered what would happen when equilibrium is achieved. As argued in section 5.4, equilibrium can only be achieved when populations are evenly distributed in the landscape—a network of Circular Economy Villages. In Chapter 7 it was argued that this required the formalisation of a political economy with two operating systems. Within each village a gift economy is established, thus eliminating the price mechanism. The political economy outside each village, including trade between villages, would remain a capitalist system with markets setting the price of goods and services and governments regulating the market as necessary. The extent to which these markets are transformed depends on the extent to which the political economy within each village community reduces its dependence on that system.

While it has already been argued that there are numerous social, health and environmental benefits of establishing local gift economies, these reasons are not of direct concern to the calculation problem.

From the simple perspective of the supply–demand relationship, where a community can produce more of any product than they need, that is, where supply consistently exceeds demand, the price tends toward zero. A gift economy can emerge for these purely economic reasons. This, of course, does not mean that work is eliminated, nor does it resolve the political problem of negotiating who does the work. It does, though, establish an economic logic and an objective for the political negotiation—if everyone could contribute in some way to the production, harvesting, cooking and organic waste management of food, then everyone could have access to free food. This then also provides a framework for the governance of the community commons—if the land is healthy and water is clean, then it will produce more food with less effort.

The price mechanism disappears for food when no-one in a community needs to go to a market to buy food. A similar logic can apply to water, energy, housing as well as transport and communication infrastructure.

The approach to the calculation problem is no longer about setting up massive computing power at a national scale to constantly evaluate levels of supply and demand for all the different goods and services, recalibrate the logistics of production and distribution, and then begin the evaluation process again in an endless cycle.

Instead, supply and demand would only need to be calculated once—or at most for a few iterations—until the equilibrium condition is determined. The political economy would be designed to tend towards an equilibrium condition in which supply consistently exceeds demand. This would be achieved through the design of capital infrastructure for each

community. Tailoring the design to the local geographic and climatic condition would ensure that technologies enhance and work in alignment with local natural systems.

Despite indicating above that the market economy outside and between villages is not a primary concern, the reality is that as the social relations of production for basic necessities are transformed, the entire centralised political and economic system is affected. The central tenet of historical materialism is that transforming the foundation of the political economy will inevitably transform the superstructures built upon it (Marx, 1977).

To illustrate how substantial an impact can be achieved by focusing on these few basic necessities, table 4 below shows three household expenditure surveys conducted between 1984 and 2016 by the Australian Bureau of Statics. These surveys indicate that the basic necessities adopted in this thesis consistently account for over 60 percent of consumer spending.

Table 4 Proportion of weekly household spending on goods and services

Household expenditure category	1984 (%)	2009-10 (%)	2015-16 (%)
Current housing costs (selected dwelling)	12.8	18.0	19.6
Food and non-alcoholic beverages	19.7	16.5	16.6
Transport	16.3	15.6	14.5
Domestic fuel and power	2.9	2.6	2.9
Household services and operation	2.5	2.8	3.2
Household furnishings and equipment	7.7	4.6	4.1
Communication	1.8	3.4	3.3
SUBTOTAL	63.7	60	64.2
Recreation	11.9	12.5	12.1
Miscellaneous goods and services	6.3	7.0	6.8
Medical care and health expenses	3.9	5.3	5.8
Clothing and footwear	6.5	3.6	3.1
Education	0.9	2.5	3.1
Alcoholic beverages	3.4	2.6	2.2
Personal care	1.8	1.9	2.0
Tobacco products	1.6	1.0	0.9
SUBTOTAL	98	36.4	36

Source: Australian Bureau of Statistics, Household Expenditure Survey 2015-16, results released 13/09/2017 (note: figures consistent with source data even though totals do not add to 100%)

9.3. Efficient allocation of capital

The strategy for delivering a network of Circular Economy Villages includes the allocation of sufficient and appropriate capital to each village to create a local political economy that delivers an abundance of certain basic necessities—food, water, energy, shelter and transport. Whilst this does not provide all goods and services, it does provide a fundamentally different social foundation.

The construction of a CEV would therefore need to engage in the mainstream political economy to obtain the necessary development approvals and attract the necessary finance for construction. Finance will flow when there is a reliable pathway to approval that provides a sufficient level of certainty for investors. For politicians and advisers who are legitimately

concerned about the public interest, the central concern shifts from maximising production anywhere, to the establishment of a strategic town planning process for the allocation of capital to enable the construction of a network of zero marginal cost CEVs. The key elements of that process for the jurisdiction of New South Wales, Australia are outlined in Liaros (2019) and discussed further in the concluding chapter.

The counter-intuitive aspect of this approach is that capital will be allocated to minimise future economic activity. Not only would the price mechanism be eliminated but the allocation of capital would clearly have been efficient and effective without the need for a financial system. The appropriate geographic locations of capital infrastructure investments are determined through the strategic town planning process. Money is paid by the future residents to deliver that infrastructure and the process is complete. This is consistent with the emerging concept of regenerative finance (Fullerton, 2015), wherein money is the means (C-M-C) and not the ends (M-C-M) of economic activity. Fullerton draws on the work of Daly and Costanza in ecological economics and on that of Mang and Reed in regenerative development. He views wealth holistically in the context of a healthy society and healthy environment.

Rather than aiming to grow the economy, funds are allocated to create a local gift economies that empower people and regenerate local ecosystems. Empowerment grows with increasing reliance on local systems and community, thus reducing participation in mainstream extractive markets.

As such, the usual problem of capitalist capture, whereby alternative ideas are absorbed into the mainstream economy, is inverted. Funds are attracted from the mainstream political economy for the creation of havens from the heartless world of capitalism (Wright, 2016).

This is consistent with proposals by Daly (1973) and others to create a steady state economy but at a local scale. The “goal of a steady state [economy] is to sustain a constant, sufficient stock of real wealth [capital] and people [population] for a long time” (Daly, 2010, p. 21). By maximising local activity, dependence on broader systems diminishes:

The physical flows of production and consumption must be minimized not maximized...The central concept must be the stock of wealth, not as presently, the flow of income and consumption. Furthermore, the stock must not grow. For several reasons *the important issue of the steady state will be distribution, not production.* (Daly, 1973, p. 19 *emphasis added*)

In a CEV, materials and goods are cycled around and within the village as much as possible so as to minimise throughput (imports and exports). As described in Chapter 7, distribution is localised as much as possible.

In planning for the allocation of capital the aim is for ongoing operating costs to tend towards zero. A community would purchase, in the mainstream economy, the land and capital needed to build a settlement—housing and other buildings, vehicles, as well as energy, water management and agricultural infrastructure. These would be organised so that they deliver—in conjunction with the labour of the people in the community—all the food, water, energy, housing and mobility services that the community needs. By adopting zero marginal cost technologies for the capital and planning for a surplus, the marginal cost of these would tend towards zero.

9.4. Fixing the demand

Daly's assertion that "the stock must not grow" (Daly, 1973, p. 19) implies that both the capital assets and population of a CEV must remain fixed in scale. This is useful for the creation of a relatively standardised and replicable strategic town planning process. Designing for communities of a fixed scale simplifies infrastructure provision requirements for the village, while also making it easier to assess impacts on surrounding areas.

Yet the most crucial aspect of planning for a fixed population is that it dramatically simplifies the calculation problem and ensures that supply consistently exceeds demand. The focus on basic natural needs only, rather than on all goods and services, is also important. It is much easier to plan for the supply of goods if their demand is relatively inelastic. The demand for these basic needs does not vary significantly with price. This suggests that providing them through market mechanisms is perhaps not the most efficient approach anyway. Instead, planning the capital investment to maintain a price of zero may be more appropriate.

The total overall level of demand *by people* is equivalent to the total demands *on the environment*. Accordingly, it is useful to examine formulae that have been developed to assess environmental impact. Ehrlich and Holdren (1971) proposed one such formula:

The total negative impact ... on the environment can be expressed... by the relation

$$I = P * F$$

Where P is the population, and F is a function which measures the per capita impact. A great deal of complexity is subsumed in this simple relation, however. For example, F increases with per capita consumption if technology is held constant, but may decrease in some cases if more benign technologies are introduced in the provision of a constant level of consumption. (Ehrlich & Holdren, 1971, p. 1212)

The variability of F, due to varying consumption levels and the use of different technologies, has led to the reframing of the formula by ecological economists (Chertow, 2001; Washington, 2017) as follows:

$$I = P * A * T$$

In this formulation, A stands for affluence but relates to per capita consumption of resources, while T is for technology. For our purposes, (T) is the capital infrastructure that supports the people (P) and their consumption activity (A). Therefore, as an example, where the technology (T) for producing energy is a coal-fired power plant the overall impact (I) is greater than that where more benign technologies, such as solar photovoltaic panels or wind turbines, are used (for the same population consuming at the same level).

The proposed approach to strategic planning for a network of CEV therefore assumes a discrete and fixed population in each village to more easily and efficiently plan for the capital infrastructure needed to supply their basic needs. By planning for a discrete population, it is possible to estimate demand for water, food, energy, transport and built spaces and it is therefore possible to plan for an abundance of these. The over-supply drives their market price towards zero.

Planning for a discrete population at the local scale is also much simpler than dealing with population management at a national scale because the optimal population in a locality

depends on the capacity of ecosystems and available infrastructure in that locality. A larger population could be supported in an area with high rainfall and fertile soils than would be possible in an arid climate. Alternatively, communities of the same size located in more arid regions would require a larger land area than in a high rainfall area.

This is a unique approach to One Planet Living, a concept developed by Bioregional (<https://www.bioregional.com/one-planet-living>) as part of the development of the BedZED eco-village in the UK. Rather than a framework for calculating the ecological footprint of a community, and then planning to reduce that footprint, the aim is to match the demands of the population to the capacity of the supporting infrastructure and ecosystems.

Calculating demand and supply at a local scale is also more manageable. Planning for, say, 200 people is more straightforward than planning for millions. To plan for a bioregion or larger area, simply replicate the process and build more villages but tailor the design of each to their local conditions. As the process is replicated, and more villages are built, a network of settlements is created.

Whilst designing for a fixed population is a primary consideration, as is ensuring that the population does not exceed the carrying capacity of local ecosystems and infrastructure, there are also social considerations when determining the size of any village population. As discussed in section 6.3 the selection of sizes should also be based on apparently natural human group sizes—families, clans, village communities and so on.

Having established an approach to stabilising demand by focusing only on the supply of basic necessities, the calculation problem becomes relatively simple to solve. A fixed population size has a relatively stable demand that informs the design capacity of the infrastructure ecosystem.

9.5. Regenerative development and design

As noted in the quote above, the per capita impact “may decrease...if more benign technologies are introduced in the provision of a constant level of consumption” (Ehrlich & Holdren, 1971, p. 1212). Technologies that are used in production can be extractive (have a negative impact on the land), or could be benign (neutral impact), but could also be regenerative (positive impact). Capital and associated systems can indeed be designed to have a positive impact on the land and ecosystems. According to Mang and Reed (2020), this approach is referred to as regenerative development:

Advocates of a regenerative approach to the built environment believe that a much more comprehensive, deeply integrated, and whole-systems approach is needed. They propose that eco-efficient design technologies and strategies must be integrated within an ecologically based approach that reverses the degeneration of both the earth’s natural systems and the human systems that inhabit them. The regenerative methodology focuses on the development of human settlements that partner with natural systems and processes to actively regenerate the health of their place as a whole, and the spirit of the people who inhabit it. (p. 123)

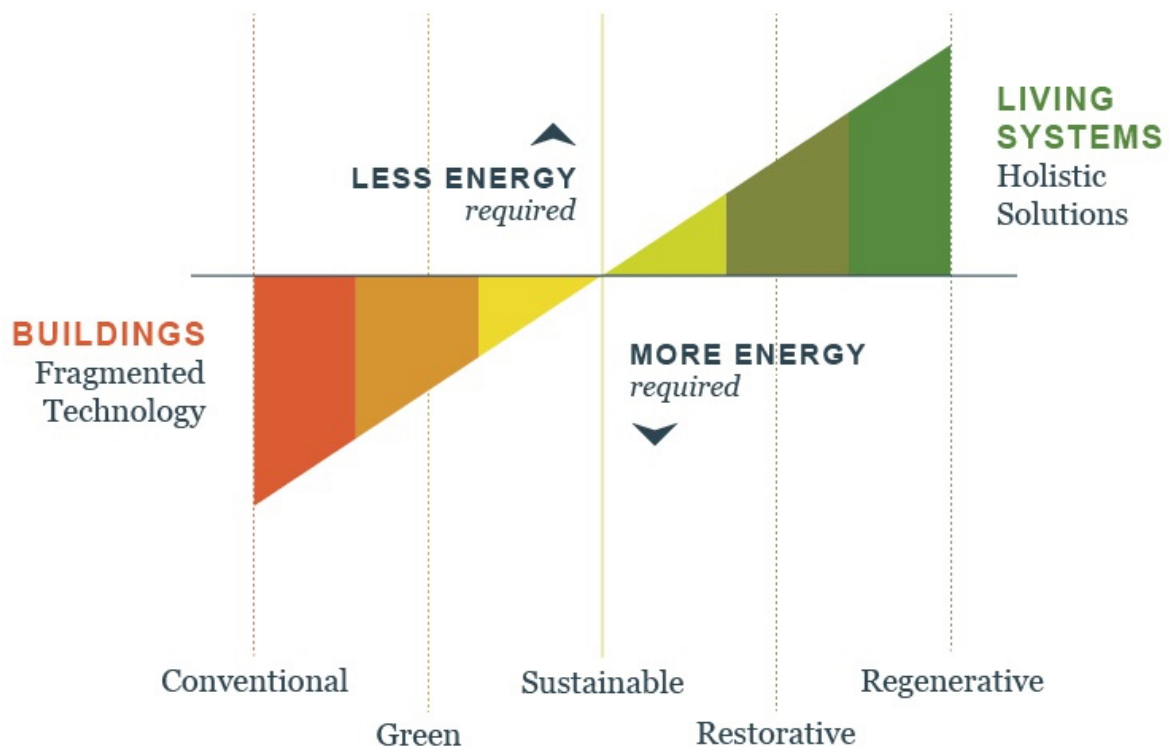
Mang and Reed argue for an advancement beyond ‘sustainability’—sustaining things as they are—to regeneration—actively improving the health of ecological systems and the people within them. Figure 17 illustrates this trajectory of ecological design. It suggests that

as the design of settlements is better aligned with all other living systems, less energy is required to maintain them.

In a CEV, the co-location and integration of food, water, energy, transport and building makes each of them, and the village system as a whole, more efficient. A renewable energy micro-grid makes it more feasible to manage the water cycle, both the quantity and quality of water cycling continuously through the site. The energy micro-grid could also be designed such that it has the capacity to power a small fleet of shared electric vehicles. The built environment can be passively designed to minimise demand, whilst the proximity of housing and food systems reduces transport costs. Food waste can be composted to improve soil health or converted into a biofuel for energy. Improved soils retain and clean water and also produce more food.

Regenerative development expands on the argument of ecological economists (Georgescu-Roegen, Boulding, Daly), that the level of production and consumption must not exceed the capacity of ecological systems to produce the necessary resources or manage waste. This maximum capacity clearly depends on the local ecological conditions where that production is occurring—an arid zone will have a different capacity compared to a high rainfall area. In addition, that capacity can be increased or reduced depending on whether human activity is extractive or regenerative.

Figure 17 Trajectory of Ecological Design by Mang and Reed (2020)



9.6. Encouraging innovation

Having dealt with the efficient allocation of capital and the disappearance of the price mechanism, the only remaining question is whether innovation is stifled or encouraged. This has already been addressed in previous chapters through the argument that efficient provision of a social foundation—satisfaction of basic natural needs for all—would liberate individuals to pursue their own aspirations. The necessary precondition for creativity and innovation is time outside of everyday economic concerns, such as earning money to pay the mortgage or to put food on the table.

Whereas voluntary simplicity and frugal living narratives also promote free time outside of economic concerns, they depict a future as a retrograde return to an agrarian past rather than one that encourages innovation. The incorporation of available modern technologies for the delivery of basic necessities can convey a narrative of learning from the past to build a better future. It supports continued innovation but is aimed at further liberation from unnecessary work.

The internet enables the global sharing of information and ideas and this relies on energy. To maintain modern communication and electricity systems the adoption of renewable energy technologies is imperative. To then mobilise populations to act, the transition narrative must communicate a vision of the next evolution of the human story, not a loss of our most important technologies. Rather than implying—in somewhat absolutist terms—that capitalism and industrialisation were a complete mistake, a more nuanced approach would adopt the positive, useful knowledge and technologies, while abandoning extractive and destructive technologies and practises.

Innovation can therefore be directed towards continually refining and improving the efficiency of daily human economic activity, reducing unnecessary human labour and increasing the net positive impact on the land. Innovation could find new ways of actively restoring, rehabilitating, and regenerating ecosystems to create still greater abundance.

9.7. From linear to circular (dialectic) logic

There is a substantial and consequential difference between less negative impact and net positive impact. For mainstream economists more production and consumption is always better. In contrast, for advocates of voluntary simplicity, less production and consumption is always better. A significant problem with this linear logic is well recognised by degrowth advocates, including Alexander (2015, p. xi), in their acknowledgement that production outputs are presently unequally distributed. This means that degrowth must apply to overdeveloped regions, while poorer nations should be allowed to continue to grow “to attain a dignified existence” (Alexander, 2015, p. xi). The vision consequently becomes unclear as some areas can continue to grow while others must engage in degrowth, all whilst there is no clear approach to determining what is a sufficient level of production and consumption.

There can be no limits imposed on economic growth at a societal level if individuals do not stop accumulating when they have reached a sufficient level of access to resources. Current high and growing inequality means that most people consider that they have insufficient resources relative to wealthy peers in their own immediate society. The growth imperative and competitive nature of the capitalist political economy emerges from inequality and then

reinforces and exacerbates the unequal distribution of resources. Consequently, “Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited” (Hardin, 1968, p. 1244).

A linear logic states that because current levels of production and consumption are too high, these must be dramatically reduced. Instead, a dialectical perspective sees consumption patterns as influenced by, and influencing, production. On the latter reasoning, it is therefore not sufficient to simply consume less: it is also necessary to reallocate capital from extractive to regenerative production processes, to design products to be durable or fully recyclable rather than disposable, and to dramatically reduce the length of supply chains. In essence, the transition must address the entire system holistically and have the capacity to bring all consumers and producers into the process of change.

In this context, expressions such as ‘frugal abundance’, ‘permacultural neopeasantry’ (Nelson & Edwards, 2021) and agrarian lifestyles are unlikely to garner the necessary mass appeal. The alternative narrative of minimalism is preferred as it is likely to have broader appeal and stands in direct contrast to present cultural narratives of maximising consumption and production. Minimalism is a choice to own or desire fewer possessions and exists in an environment of abundance. In contrast to the current dominant marketing strategy that seeks to increase the margin of discontent—the difference between what we have and what we desire—minimalists seek to minimise desires and be content with what we have.

Encouraging minimalism is a strategy for reducing demand for material goods, mitigating the harm of continued economic growth, while also offering individuals an adaptation strategy for the possible eventuality of a time of greater scarcity.

9.8. From Project Infinity to Project Zero

For the cultural narrative of minimalism to be effective it must address the entire system holistically and apply beyond the attitude of consumers to producers and distributors also. What processes are necessary to minimise resource extraction, minimise production output and minimise movement within and around the system?

Each of these have already been discussed and are available. The promotion of a circular economy would minimise *resource extraction* by keeping materials that have already been extracted circulating in the economy. Sometimes referred to as cradle-to-cradle design, products and business models are designed from the outset to manage the entire life cycle, including how materials can be recaptured and re-used after the useful life of a good.

Production-on-demand could be described as minimalist when contrasted with mass production that is usually accompanied by marketing processes to generate unnecessary demand. *Minimalist marketing* involves sharing information about a product without evoking a desire to own that product unnecessarily. *Minimalist distribution* has been discussed in Chapter 5 and includes co-location of production and consumption as well as, where possible, transporting information rather than resources, goods and people.

This striving for less economic activity rather than more, though, requires a collective about-face; a 180-degree transformation in our political economic agenda from the current Project Infinity—the endless pursuit of more economic growth—to Project Zero, the pursuit of less.

This is not just a technical issue involving the establishment of the minimalist processes outlined above. It is also a socio-cultural project that defines the collective values of a society. Furthermore, the counter-intuitive proposition of this chapter is that the pursuit of zero leads to abundance, whereas the pursuit of infinity leads to scarcity.

To demonstrate this, it is proposed to reframe Mason's conception of Project Zero, which aims for a zero-carbon energy system, zero marginal cost technologies and the reduction of necessary labour time as close as possible to zero.

Project Zero could be described instead to have two dimensions—economic and political—in dialectical relationship with each other. The economic dimension is concerned with the technologies and processes adopted for the production and distribution of necessary goods and services. It also relates to the striving towards zero energy input for abundant output of necessities. The political dimension is concerned with converting the current pervasive cultural narratives that value work to one that values freedom from work. Project Zero here relates to valuing free time and striving for zero work rather than boasting how many hours we work and how busy we are.

The economic dimension would include a zero-carbon energy system and zero marginal cost technologies, not as ends in themselves but rather as the means by which goods and services may be delivered to end-users at a market price of zero. This may, at first glance, appear absurd. Yet, in Australia—as in many other countries—in the late 1970s, education at all levels was essentially free as was healthcare. Driving on any road was free of charge as was street parking and access to national parks. The general principle was that taxes were collected so that governments could provide certain public goods freely to all. Those services that were valued as common or public goods were freely available to all. They were free because their value was regarded as not quantifiable in money terms. Goods and services that enhance quality of life for all should be regarded as priceless.

The advancement of the neoliberal agenda over the past few decades, particularly in respect of the privatisation or corporatisation of the commons, has expanded the scope of priced commodities and consequently diminished those that are priceless. Over the past 40 years we have re-educated ourselves to suggest that the absence of a price reflects an absence of value, neglecting the distinction between exchange values and use values.

The first step in the advancement of Project Zero is to identify the goods and services that should be available in abundance. Rather than starting with services like education and healthcare, the preference in this thesis is for the provision of basic necessities like food, water, energy and shelter within a Circular Economy Village. Such goods can conceivably be delivered for zero marginal cost and therefore the only calculation problem is to determine how capital costs will be paid and shared. The provision of these necessities, in exchange for work but not money, results in a number of derivative benefits, particularly in education and healthcare. Learning to manage land provides education in geography, biology and potentially other fields of learning. These would be learnt as life skills in the growing, harvesting, processing and preparation of food, as well as learning to collaborate to achieve these outcomes. This education provides a solid foundation for more complex skill development in various fields of engineering, architecture, landscape design and so on.

With respect to healthcare, there are substantial health benefits arising from affordable access to proximate fresh food. According to research by public health professionals, the

built environment has an important role to play in supporting human health. In a review of the literature in the field of Healthy Urban Design by Kent et al. (2011), three key interventions were identified that could support human health: getting people active, connecting and strengthening communities, and providing healthy food options. A walkable village environment with many accessible, shared facilities would encourage both exercise and community collaboration in the provision of fresh food and other basic necessities.

The development of a network of CEVs, within which communities collaborate to provide basic necessities freely for all, provides a conceptual economic framework for the development of a Project Zero political economy. Yet this technological foundation and potential reorganisation of the social relations of production remains a theoretical proposition unless populations are mobilised to translate theory into practice and ideals into reality.

The political dimension of Project Zero is the problem identified by John Maynard Keynes in *Economic possibilities for our grandchildren* (1930):

Thus for the first time since his creation man will be faced with his real, his permanent problem—how to use his freedom from pressing economic cares, how to occupy the leisure, which science and compound interest will have won for him, to live wisely and agreeably and well...

Yet there is no country and no people, I think, who can look forward to the age of leisure and of abundance without a dread... a fifteen-hour [work] week may put off the problem for a great while. (Keynes, 1930, p. 22, 23)

In addition to this problem of how to use freedom from pressing economic cares, there is also the problem of accepting that such freedom is possible—that economic abundance should lead to freedom from work and that the work ethic is the cause of, not the solution to, economic problems.

9.9. Conclusions

Whilst the present mainstream political economy produces abundance, it also systematically produces scarcity for a large proportion of the world's population. Indeed, the present system *requires* that scarcity be produced, and continually reproduced.

This paradox—that the present political economy systematically produces both abundance and scarcity, wealth, and poverty—reflects the uneven *distribution* of produce. This challenges proposals for simple living and frugality as the antidote for present social and economic woes as these focus on production and consumption, rather than on distribution. Whilst advocates for simplicity acknowledge this problem, it poses critical issues for implementation strategies. Who decides how much is sufficient and how is this calculated? To thrive, rather than just survive, humans must have their survival needs satisfied efficiently, allowing time and energy for thriving. Thus, the pursuit of abundance is essential.

Abundance may be defined as supply consistently exceeding demand, which implies that the price of the subject commodities would tend towards zero. This causes problems for an economic system that depends on the price mechanism to calculate production levels. The calculation debate of the early 20th century identified this problem as well as concerns about the efficient allocation of capital and whether such alternative systems stifle or encourage innovation.

The economic design of CEVs resolves the calculation problem by planning for a discrete population and planning only for their essential needs. Fixing the population stabilises the overall demand for basic necessities such as food, water, energy and shelter. With an estimate for overall demand, it is possible to efficiently allocate the capital resources needed to build the local infrastructure to supply that demand. Co-location of producers with consumers makes distribution highly efficient also. The allocation of capital is also planned through the strategic town planning processes that determine appropriate locations of CEVs and timing for their development.

By allocating capital to the development of CEVs that provide residents with their basic needs, the political economy is directing activity towards the simultaneous regeneration of natural ecosystems. Such new models of land development also encourage innovation as systems and technologies are constantly refined to minimise energy demand and improve efficiency. As the delivery of survival needs increases in efficiency, time, and energy available for thriving is maximised. The pursuit of zero waste, minimal labour, free commodities, and freely accessible public infrastructure can be described as Project Zero. This may be contrasted with the current Project Infinity, which encourages us to strive in the opposite direction.

10. The freedom to remake our cities

In *The Right to the City* (2008), David Harvey argues:

The right to the city is far more than the individual liberty to access urban resources: it is a right to change ourselves by changing the city. It is, moreover, a common rather than an individual right since this transformation inevitably depends upon the exercise of a collective power to reshape the processes of urbanization. The freedom to make and remake our cities and ourselves is, I want to argue, one of the most precious yet most neglected of our human rights. (p. 23)

This thesis seeks no less than to exercise this freedom to remake our cities and ourselves through a collective project. Yet the very notion of freedom is contested. To minimise the risk of becoming embroiled in concepts that are contested by liberals and libertarians alike, the following framework provided by Carter provides a more explicit and specific interpretation:

MacCallum defines the basic concept of freedom...as...a triadic relation—that is, a relation between three things: an agent, certain preventing conditions, and certain doings or becomings of the agent. Any statement about freedom or unfreedom can be translated into a statement of the above form by specifying *what is free or unfree*, *from what it is free or unfree*, and *what it is free or unfree to do or become*. (Carter, 2016)

The character of freedom explored in this thesis can therefore be described, using this triadic relation approach, as follows:

- What is free or unfree? Everyone. Every person within a political economic system. Not just everyone when they are retired after a lifetime of struggle. Not everyone who has proven themselves to be a hard worker. Everyone, irrespective of the assessment of others as to the adequacy of their contribution.
- From what is it free or unfree? From entrapment by economic necessity. That is, freedom from debt and the compulsion to earn money in order to satisfy basic natural needs—in particular, for food, water, energy and accommodation. Freedom also from a “system that compels [us] to increase [our] herd without limit—in a world that is limited” (Hardin, 1968, p. 1244).
- What is it free or unfree to do or become? To explore, create, innovate, relax, recreate, connect and do those things that each free person determines will make their life meaningful. Freedom also to collectively create a new political economic system.

The purpose for being very specific is to create a synthesis between the competing positions of the political left and right. To show that social justice, equality and compassion are not antithetical to aspiration but are complementary and inter-dependent.

Freedom is never absolute but in constant dialectical relationship with the work needed to sustain life. ‘Life and liberty’ or ‘necessity and freedom’ are therefore a duality, two opposing forces, each demanding our time and energy and requiring the active negotiation of the line between them. As Hannah Arendt states, “Man cannot be free if he does not know that he is subject to necessity” (1958, p. 121). The key is to actively negotiate this line between the time and energy allocated for necessity and that allocated for individual freedoms.

The dialectical relationship between freedom and necessity is the thread that ties all the chapters together. The proposed vision is of a global network of opportunities anchored at its local nodes to the earth and natural ecosystems for the provision of material necessities. This provides a social foundation for aspiration and a local environment for the participation in the management of the commons. The more efficiently the commons are managed to produce and distribute food, water, energy and housing, the more free time and energy is available for individuals.

The process of making and remaking our cities and ourselves is necessarily a historical process and so must be interpreted within the flow of the broad sweep of history. The nation-state should therefore be compared and contrasted with political economies that preceded it and possible political economic structures that may come after. In this way, it is possible to step outside the perception that the current model is permanent or already perfected rather than just another stage in the evolution of human societies. It becomes possible not just to try something new but to value earlier political economies that may have had more or different freedoms despite fewer technologies. In doing so and by identifying elements of these earlier systems that may be of value, it becomes possible to then formulate a possible political economy that takes the best elements of all past and present systems to create something new. It becomes possible to ask whether the idea of a trading network of self-determining and relatively self-sufficient city-states, which was the precursor of the nation state, might offer a framework for what comes after. What lessons could be learnt from indigenous thinking, particularly with respect to connection to and caring for Country?

This chapter offers various perspectives on the dialectical relationship between necessity and freedom, each designed to further reinforce arguments made in previous chapters. It will eventually lead to the appreciation that freedom implies freedom from unnecessary work, which spotlights a cultural imperative to fill our days with work and busyness. What Max Weber described as the protestant work ethic is complemented by a fear of emptiness and a dread of the age of leisure.

In the development of Project Zero, it is important to appreciate what zero means. In the previous chapter we discussed the disappearance of the price mechanism within CEVs and the contrast with Project Infinity—the pursuit of infinite economic growth. Project Zero includes the pursuit of zero waste (including waste heat), free (zero price) public infrastructure, all within the emerging zero marginal cost society.

The aspect of Project Zero described in this chapter relates to the distinction between zero as absence or emptiness, with zero as the cartesian origin, the centre or balancing point between positive and negative values. In contrast to the ‘sensible centre’ the place of compromise in which no-one is satisfied, this is an equilibrium condition that includes and balances competing values. From this perspective both work and leisure are valued and desirable, suggesting that political and economic systems should embrace and accommodate both.

10.1. The ideal of freedom shapes history

The debate between materialist and idealist conceptions of history is essentially a debate about whether necessity is more important than freedom or vice versa. The role of individual freedom as an organising principle for societies was proposed by Hegel and more recently

by Francis Fukuyama in *The End of History?* (1989). The role of necessity as the organising principle was articulated through Marx's concept of historical materialism.

The explicit position in this thesis is that both are equally important and inter-dependent aspects of the human condition and therefore of the construction of societies. Necessity is the mother of invention, which results in new technologies that are often, at some level, designed to increase convenience. That is, they are intended or marketed as labour-saving devices designed to liberate us from economic necessity. All aspirations are, at some level, seeking freedom from economic necessity. This section illustrates this from the idealist perspective and the next section reaches the same conclusion from the materialist perspective.

Francis Fukuyama proposes that societies have reached the end of history, "that is, the endpoint of mankind's ideological evolution and the universalization of Western liberal democracy as the final form of human government". All that now remains is economic activity and the expansion of markets. Fukuyama believed that the ideals of the French Revolution could not be improved upon (although it could be argued that 'fraternity' is somewhat sexist and ought to be replaced with 'compassion'). It is difficult, though, to accept an argument that these ideals have evolved over history given that liberty has been the call in every revolution in recorded history, at least since the exodus of the Hebrews from Egypt. Instead, it is proposed that the tension between necessity and freedom has always existed and every revolution arises when one segment of the population enjoys an excess of both freedom and access to necessities while a much larger segment experiences a lack of both.

It is also argued that while these ideals may need little improvement, the political actions and structures that flow from them and that create the current form of human government still do need considerable improvement. Calling something liberal and democratic does not make it so. Thirty years on from the writing of *The End of History?*, with rising inequality and diminishing freedoms, this essay now seems extraordinarily dated and few would argue that the homogenous nation state is the final and best form of political economy.

Despite all the evidence to the contrary, Fukuyama (1989) suggests that "the root causes of economic inequality do not have to do with the underlying legal and social structure of our society, which remains fundamentally egalitarian". All the evidence suggests the opposite. Inequality is extreme and rising while individuals are trapped by debt and even entire nations—such as Greece—have lost their democratic freedoms to creditor nations. The cause is the entrenched political and economic structures that depend on an ever-growing class of debtors to fund the lifestyle of the creditors. Indeed, in a more recent offering, *Identity: the demand for dignity and the politics of resentment*, Fukuyama (2018) acknowledges that the globalisation of the liberal world order did not benefit everyone, and that people are motivated by more than material self-interest.

The issue of increasing inequality and its consequences were brought to general public consciousness through youth uprisings such as the Arab Spring, Occupy Movement and Los Indignados in 2010 and 2011. These issues were then confirmed by economists in books such as *The Price of Inequality* (Stiglitz, 2012) and *Capital in the Twenty-First Century* (Picketty, 2013).

Nothing illustrates what has happened more vividly than the plight of today's twenty-year-olds. Instead of starting a new life, fresh with enthusiasm and hope, many of them confront a world of anxiety and fear. Burdened with student loans that they know they will struggle to repay and that would not be reduced even if they were bankrupt, they search for good jobs in a dismal market. If they are lucky enough to get a job, the wages will be a disappointment, often so low that they have to keep living with their parents. (Stiglitz, 2012, p. 332)

As with equality, Fukuyama provides no evidence that the nation-state, as currently structured, seeks to liberate its citizens. The above references to increasing inequality also demonstrate diminishing liberty as more people are trapped by debts. The parallel and contemporaneous diminution of freedom and equality reinforces the proposition by Balibar (2014), that equality and liberty are, in fact, the same thing. He coined the term 'equaliberty' and argued by reference to the intentions of the 1789 *Declaration of the Rights of Man and of the Citizen* that emerged from the French Revolution. Demands for equality are, in essence, demands for the same freedoms enjoyed by a few.

Fukuyama argued that the real world is in a transition phase as it progressively aligns with the ideals of the French Revolution. Whilst this thesis fully concurs that the final and best form of human government would embrace the ideals of liberty, equality and compassion, the nation-state cannot realise those ideals. Indeed, so-called Western liberal democracy is failing for the same reason that Fukuyama suggests that communism and fascism failed. The authoritarian tendencies in communist countries and fascism's "belief in its right to rule other people" are, in substance, little different from the centralised power structures characteristic of capitalist nation-states. The similarity between the three models is in the centralisation of power. Only in a system where economic capacity is distributed can people everywhere be freed from the debt traps created by economic necessity.

Perhaps the countless economic disruptions in numerous industries suggests that capitalism is fundamentally changing into a new form of political economy; and perhaps it can be guided into a form that actually seeks to realise the ideals of liberty and equality.

10.2. Material conditions shape history

Whereas some argue that that the pursuit of ideals such as liberty and equality are the principal drivers of social change, an equally strong argument can be made that suggests that social change is driven by the means by which people satisfy their material necessities.

In Chapter 4 the process of economic disruption or creative destruction was described in theoretical terms and applied to a range of different industries including communication, energy and water management, housing and transport. Changes in one industry can be interpreted as a disruption, but, as many disruptions converge, the political structures that are intended to manage them are no longer fit for purpose.

Historical materialism, first developed by Karl Marx, makes precisely this same argument: that technological change, in the way material necessities are produced, will cause changes in the social and political superstructures.

In particular, and as shown in the historical overview provided in Chapter 3, communication technologies play a critical role in the organisation of human societies and settlement patterns. They also provide a unique focus for the debate as to whether history is shaped

by the conditions for the satisfaction of material economic necessities or political ideals like freedom and equality. The material, technological means of communication enable the sharing and fermentation of social ideals in the public consciousness. The shift from centrally controlled and mediated communication to unmediated communication certainly has a significant effect on social relations generally and the relations of production in particular. It is the unmediated communication enabled by the internet that liberates individuals and communities from the influence of centralised authorities. This opens the possibility for distributed social structures and settlement patterns unmediated by a capital city.

The same applies to energy technologies. In the centralised industrial system, access to electricity was entirely dependent on the prior construction of a power plant near a coal deposit and the connection of that plant to the end user through a series of transmission and distribution cables. Today it is possible to purchase solar photovoltaic panels and wind turbines and then generate electricity at close to zero marginal cost: free electricity and also freedom from dependence on capitalist power providers.

The liberation need not stop there. Whenever electricity supply exceeds local demand, the excess can be used to pump water from a lower reservoir to an upper one. The cycling of water through a site could allow for the generation of complementary hydroelectric power but more importantly can liberate a community from centralised water providers. With more water, more food can be produced, liberating the community from centralised and industrialised food producers. The provision of housing for farm workers liberates all of us from the industrial food system. In all cases, liberty and necessity are intimately connected.

As more and more local communities free themselves from dependence on centralised providers of their basic needs, the influence of capitalist organisations on politicians and systems of government diminishes. As more labour activity is no longer rewarded with money but with free (zero cost) access to basic necessities, the role and authority of central governments also diminish as their income tax revenue falls. Government costs will also reduce as their responsibility to provide a welfare safety net is replaced by the responsibility of communities to provide individuals with a social platform. The role and authority of central governments falls as communities become empowered and responsible for their own governance.

Technological change alters the social relations of production for the provision of necessities with the objective of liberating individuals and communities. Perhaps rather than prioritising freedom over necessity or vice versa, a more accurate perspective would acknowledge that both are equally relevant and important in driving social change and that they in a constant dialectical relationship.

10.3. Something for nothing

The technological transition described above—to a system where basic necessities are produced at zero marginal cost—is both technically feasible and desirable. It is technically feasible because solar panels, wind turbines, water reservoirs, food production landscapes, housing and electric vehicles are all zero marginal cost technologies. After the capital construction costs are paid, the ongoing production of electricity, water, food, shelter and transport services requires no fuel or other externally sourced inputs that need to be paid for with money. Labour is required to maintain and manage them, but money—sourced

through engagement with the mainstream economy—is no longer required. With a fixed population it is also possible to supply an abundance of these basic necessities as suggested in Chapter 9. With supply consistently exceeding demand the price mechanism disappears as the price becomes zero.

Striving for a system composed of zero marginal cost technologies is desirable because when the price of a good or service is zero then, from a financial perspective, everyone has equal access. The further the price moves above zero the more inequality is created as access is increasingly constrained by the ability to pay. The more free goods and services are available, the more equal the society becomes. Freedom and equality are co-located at the zero price-point. It is no coincidence that Western societies were most egalitarian when education and healthcare were free for a brief window through the 1970s and early 1980s.

Unfortunately, without the moving price mechanism to limit access to those with financial resources, an ethical dilemma arises. There is no compulsion to work and earn money if everything is free. In articulating the necessity for a universal basic income (or dividend) as “essential to stabilise society and to civilise it”, Yanis Varoufakis identified this dilemma as our discomfort with giving and receiving something for nothing.

Yet, as stated above, labour is still required to maintain and manage the capital infrastructure and local ecosystems in order to produce the basic necessities. The governance of this common infrastructure would require the contribution of all or most of the residents as outlined in Elinor Ostrom’s commons governance processes detailed in Chapter 8. Yet what are the assurances that everyone will contribute their fair share?

The first response to this is to counter with the same rhetorical question for the current system. Does the fact that someone has money indicate that they have contributed their fair share, or will do so in the future?

The second response is to ask what is the essential character of human nature? Are we more likely to collaborate, share and be generous or the opposite? This is the question that Rutger Bregman asks in *Humankind: A Hopeful History* (2020). Bregman writes that the prevailing narrative, not just in the West but in societies around the world, is the latter view, wherein we are all “selfish beasts that need to be reined in, restrained and regulated” (Bregman, 2020) by a powerful authority as espoused by Hobbes in *Leviathan* (1651).

Bregman presents the competing views of Hobbes and Jean-Jacques Rousseau, “the man who declared that in our heart of hearts we’re all good. Far from being our salvation, Rousseau believed ‘civilisation’ is what ruins us” (Bregman, 2020). The central thesis of Bregman’s book aligns with that of Hugh Mackay, who uses the following excerpt to market *The Kindness Revolution* (2021):

Revolutions never start at the top. If we dare to dream of a more loving country - kinder, more compassionate, more cooperative, more respectful, more inclusive, more egalitarian, more harmonious, less cynical - there's only one way to start turning that dream into a reality: each of us must live as if this is already that country.

This hopeful view of human nature underpins this entire thesis. The current political economic structures are based on the Hobbesian assumption that without a central authority to maintain order, chaos would reign. Both Bregman and Mackay recognise that revolutions

never start at the top because it is in the interests of central authorities to cultivate atomisation of, and competition between, people in a society.

It takes a leap of faith to trust that others will contribute their fair share and to trust also that the contributions we make will be recognised and valued by our community, not in monetary terms but through the gifts we receive. Although this faith and trust in neighbours may be tested at times, it is most likely that any failures would be aberrations confirming the norm that human nature is essentially good. If this were not so it would not be possible for Elinor Ostrom to present numerous examples of well-managed commons and then develop a set of rules for their collective management.

10.4. Natural order and freedom from authority

In *The Road to Serfdom* (1944) Friedrich Hayek offered the usual libertarian warnings against authoritarianism, specifically targeting centralised planning as the mechanism through which authoritarian control is implemented and achieved. His objection to central planning cast it as a binary choice that was fundamentally opposed to the free market. Central planning, according to Hayek, interfered with ‘natural’ market processes. Rather than this binary choice, central planning could create the mechanisms for the devolution of power from state to local authorities and ultimately to local communities. Also, rather than interfering with natural processes, central planning can plan for the development of regenerative village systems that enhance natural processes. Clearly, this is not what Hayek meant by the term ‘natural’, but neither is ‘homo economicus’—the self-interested, calculating robot that underpins market theory—a natural being.

By re-interpreting Hayek’s idea of natural processes, and adopting the proposed planning strategy, it is then reasonable to accept that taking responsibility for one’s basic necessities locally and collectively would reduce dependency on larger and more complicated systems, thus liberating individuals and communities from authoritarian control. This strategy is macro-political (Wright, 2016) in that it encourages state and federal governments to empower local communities by enabling and facilitating the development of CEVs. The policies are also micro-social and ‘bottom-up’ not just because communities demand the policy changes but also because CEVs will be collectively funded, owned and managed at the community scale. This provides the necessary bridge or alignment between government policy and community action.

Whether state and federal governments facilitate community action or cause unnecessary delays will determine whether the transition of society to a new normal can happen in a planned and relatively smooth manner or through constant disruptions leading to increased social disorder.

To be clear, the aim is to facilitate the abandonment of the mainstream economic objective of unlimited compound economic growth, while retaining the relevant and necessary legal and administrative infrastructure that supports orderly development of land.

10.5. Freedom from being settled

Another perspective on freedom from necessity is the freedom from being anchored to place, which is not just the freedom to travel but also to relocate in a seamless and fluid

manner. This freedom can be interpreted in a number of ways by reference to the different constraints to this freedom. Firstly, we can be anchored to place as a result of being tied to a responsibility to manage our excessive material possessions and secondly, we may be constrained by the excessive transaction costs in moving from one place to another.

10.5.1. Minimalism and becoming nomadic

The economic emphasis on consumption has led to the construction of larger and larger houses to contain all the acquired possessions. The responsibility of caring for and maintaining these possessions as well as the higher household debt of bigger houses is a weight or anchor to place. The anchor is not just to the house but also to a job for earning the income to purchase more goods and pay off the mortgage. Letting go of material possessions, choosing to live with less and also choosing a smaller house in order to minimise mortgage debt can liberate us from unnecessary work.

Advocates for minimalism, simple living and tiny homes describe the process of letting go of material possessions as a positive step to a bigger life. Moving from a larger to a smaller home is certainly liberating but a further step for some may be to move into a motorhome or caravan and become a nomad.

As part of the field research for this thesis the author and his partner lived and worked for five years from a motorhome. It is fascinating to discover the extent by which the internet is transforming work, particularly for the many professionals who work at a desk in an office. Prior to becoming nomads, we established a cloud-based file management system ensuring that we had access to all our information wherever we were. While available monthly data plans were limited when we started, by 2019 providers were offering unlimited data, so working online had become entirely feasible and simple. Over this time communication with clients and collaborators with online platforms like Skype and Zoom substantially increased. When suggesting that most work-related communication in the future will be on these platforms, we repeatedly heard that these will never replace the office and face-to-face communication. Once again, a dialectical perspective is useful. Virtual connectivity need not replace immediate human connection but can complement it with the aim of significantly reducing the need to travel. For many professionals, initial meetings may be face-to-face with all subsequent correspondence and communication being virtual. This approach also significantly increases potential opportunities to work on projects across the country.

Events like the lockdown due to the COVID-19 pandemic accelerate changes like these that were already happening. They also illustrate that even nomads occasionally need a place to stay and be settled. Once again, the dialectical perspective is most useful; both the settled and nomadic lifestyles represent meaningful human desires that ought to be accommodated in the planning of the human habitat. These desires may change as individuals pass through different life stages, so accommodating nomads is important from the perspective of life-cycle planning.

10.5.2. Transaction costs constraining movement

The process of moving may be constrained by unnecessarily high transaction costs involved in buying and selling a house. The most significant of these is state government stamp duty. In November 2020, the NSW state government released a consultation paper wherein it

proposed a transition from stamp duties at the point of sale to an annual property tax. The proposal document notes that stamp duty can add \$34,000 to the cost of the average home in NSW. It allows purchasers the option to pay an annual tax based on unimproved land value. Such a shift would be a positive step towards a more fluid property system. Notably, one of the reasons for the proposal is the government's recognition that times are changing:

Stamp duty served its purpose when house prices were lower relative to income and moving around regularly was rare. However, the way we live, work and move has changed. In the last 40 years alone, Australia has transitioned from an industrial workforce to a professional one. Today, young Australians are likely to navigate 17 job changes across five different careers over their working lives. (NSW Treasury, 2020, p. 3)

Such a policy change would make relocating easier and less expensive, while generating a more consistent income stream for government and thus reducing the need for it to encourage growth in property prices.

From the perspective of a Circular Economy Village, annual or monthly property taxes would be preferred to high transaction costs as these could be accommodated within the rental costs passed on to residents. Residents, whether they are staying for a short period or long, would pay the same monthly rent.

This can liberate people from being settled by also dramatically changing the economics of hotel accommodation. Over the last decade it has become increasingly difficult to differentiate housing from hotel accommodation. Airbnb has converted many houses into hotels and alternative housing forms such as build-to-rent and co-living are in many ways like hotels. Co-living in particular is designed to service digital nomads, while many hotels are providing work hubs and other facilities to service the same market of people who work mostly online and travel from place to place.

10.6. The freedom to do nothing

Perhaps the greatest obstacle to a society that values freedom—other than as an abstract ideal—is the interpretation that freedom from work, from responsibilities and from obligations is somehow incongruous with living a good life. What Max Weber described as the protestant work ethic was reinforced by cultural sayings such as that ‘idle hands are the devil’s playground’.

It has already been noted that advocates of degrowth and simple living (Nelson & Edwards; Alexander; Trainer) promote liberation from unnecessary labour so that all can enjoy a higher quality of life. Henry David Thoreau, a mid-19th century advocate of simple living, went into the woods by Walden Pond, in Concord Massachusetts, to simplify his life, working only as needed to sustain himself:

I went to the woods because I wished to live deliberately, to front only the essential facts of life, and see if I could not learn what it had to teach... (Thoreau, 1995, p. 172)

His critique of society was that most people, even in relatively free countries, are so occupied by superfluous matters that they do not enjoy the “finer fruits” of life. This endless work means that “the laboring man has not time to be anything but a machine” (Thoreau, 1995, p. 15).

Thoreau recognises that much time and energy is consumed on the superfluous and that to live deliberately is to question what is truly necessary and what is superfluous. In the log of the *Endeavour*, in August 1770, Captain James Cook appears to be questioning not just what is superfluous but also whether “necessary conveniences” are, in reality, superfluous:

the Natives of New Holland ... are far more happier than we Europeans, being wholly [sic] unacquainted not only with the Superfluous, but with the necessary Conveniences so much sought after in Europe; ... They live in a Tranquility which is not disturbed by the Inequality of Condition. The earth and Sea of their own accord furnishes them with all things necessary for Life. They covet not Magnificent [sic] Houses, Household-stuff, etc. (Wharton, 1893)

Working for life’s necessities has become an all-consuming imperative, leaving no time or energy for freedom from necessity. A life lived deliberately would seek to find a balance between the time and energy spent on necessary work and that allocated to freedom from work. The challenge is to continually question where we draw the line between the necessary and the superfluous.

A political economy developed by a people who lived deliberately would ensure that necessities were produced and distributed to all efficiently—with minimal collective input energy and time. This would ensure that everyone enjoys some freedom from work.

10.7. When nothing becomes something

To value and create time for leisure rather than filling our days with work and busyness involves making a distinction between doing nothing as emptiness compared with doing nothing as the time and space to recuperate, recalibrate and recreate. Indeed, these two descriptions of nothing are critical in the development of Project Zero. While zero may be a void, absence or emptiness, it is also a balancing point, the Cartesian origin between positive and negative values. Robert Kaplan’s *The Nothing That Is: A Natural History of Zero* (1999) examines the philosophical struggles as the concept of zero changed from nothing to something. This history is helpful for appreciating why the pursuit of zero is preferable to the pursuit of infinity.

Early numbering systems, such as Roman numerals, were mainly concerned with arithmetic counting and so they didn’t have a figure for zero. It wasn’t until the acceptance of abstract concepts such as negative numbers that zero became necessary as a point you might pass through when subtracting a large number from a smaller one. Numbers began to be understood as concepts rather than as real things. By the 9th century, Arab and Indian thinkers had developed the rules of algebra. Algebra enables the determination of unknown quantities by rebalancing an equation, that is, by subtracting terms from both sides so that the equation equals zero. Zero was now no longer imagined solely as the absence of things but as a balancing point between the positive and negative numbers.

Just as dialectics expands our perspective by looking at relationships, mathematics began to be imagined as being more about the relationship between things rather than the things themselves. The critical invention was double-entry book-keeping in the 14th century, which was crucial to the development of commerce and trade (Kaplan, 1999, p. 110). Trade, of course, is essentially about relationships and the flow of things.

With the acceptance of zero as a number and mathematics as flows, it became possible to show all numbers on a continuous line with zero at the centre, negatives to one side and positives on the other. Consequently, the focus shifted from absolute values to relative values. To the extent that mathematics represents the human attempt to describe the physical world, that world is best described not in terms of absolutes or of real and tangible things but rather in terms of flows, relativities and relationships.

In the 17th century, Rene Descartes developed the Cartesian axis system, with zero as the origin at the centre. Zero is now completely arbitrary, we can choose the origin or centre and then everything is measured relative to this centre. Scales of all types begin to be developed:

Man is the measurer of all things. ... Look at our midnights, our meridians, look at whatever scales you will, they are all made with invented boundaries we almost believe are out there but mark instead the personality of their inventors. (Kaplan, 1999, p. 187-188)

This arbitrary identification of centres had implications for the way in which human settlement patterns were understood. The concepts of a city centre and a remote community would have been entirely foreign to Indigenous communities. Each community was located at its own centre and there was no prioritisation of one place over another, which results in differential land values.

This shift in our perception of zero was crucial in developing a system for understanding the world. Kaplan calls this a paradigm shift as we were increasingly able to look beyond the physical reality and to the world of ideas and ideals. Numbers were used to point the way to an idea and not simply to count material things; or as Kaplan puts it, a shift “from matter to what matters” (Kaplan, 1999, p. 104). The paradigm shift continues to unfold today. Before double entry book-keeping, the world is just a collection of things, then we start to see the connection between things and can manage their flow. With Newton’s laws we start to predict their flow and movement, and the world is now understood not just as things but as things connected by forces or energy flows. With the articulation of the law of conservation of energy—the first law of thermodynamics—and Albert Einstein’s proof in 1905 that all mass is embodied energy, it is now possible to assert that everything is energy. No separate ‘thing’ exists in isolation, everything is part of a system of energy flows. Everything and everyone is part of one interconnected system.

Our economic system ought to be imagined in this way, as a dynamic system of flows and not as a collection of separate people competing with other separate people to harvest material possessions. Even material possessions just represent the transformation of energy into another form, whereby the process of transformation results in heat loss, increasing the disorder of the system as a whole (according to the second law of thermodynamics).

Harvey (2014, p. 75) observes that the tension between fixity and motion in the circulation of capital is framed by long-term investments in physical infrastructure and built environments. The built environment has been shaped by the flows of our economic system but then continues to enable and speed up those flows. We shape our cities, thereafter they shape us.

To reconcile the tension between fixity and motion, it is necessary to re-imagine the landscape such that each community is located at its own centre. When a capital city somewhere distant is identified as the centre, then we locate ourselves in some outer orbit. It is only when we prioritise the place in which we live and identify it as the centre—and encourage others to do likewise—that we can each find our own centre. Otherwise, we all find ourselves constantly torn between competing priorities—the demands of home and those of the centre.

The centring of economic activity in the place where we live, to diminish the tension between work and home, requires an understanding of zero as a centre or origin that we create. We imagine zero into existence as a way of measuring relative values. Everything is relative. How we imagine zero is crucial to our understanding of the world—is it simply the absence of things or is it a balancing point? If we understand the world only in relation to the things in it, then their absence is terrifying. In this worldview the making of things is positive and perceived as development, while the loss of things or the inability to create things is viewed in negative terms or as a retrograde step. The alternative worldview allows us to imagine zero as a balancing point or the way in which we rebalance or find our centre.

The perspective of zero as a balancing point can also redefine work and production, whereby the act of producing things is balanced by not producing. Our 'to do' list includes time and space to rest, relax and reflect on the things we have done. Such a pause for re-evaluation creates the space for innovation and creativity; setting a new course to create or do other things. Zero is a window into the ideal world; the time and space for reflection and re-evaluation of our ideals and to ask whether our actions in the real world are consistent with our ideals. One and zero can be imagined as action and reflection:

...0 and 1 are the only actual numbers. From them ...all the rest of the numbers in the world spring, and all their behavior is regulated by them. (Kaplan, 1999, p. 143)

Having boiled everything down to combinations of ones and zeros, it is then possible to appreciate how whole new virtual worlds can be constructed through our computing technology. Computers now allow us to model various ideas before implementing them in the real world. The virtual world that we have created through computers, the internet and social networking has transformed the way we socialise, share ideas, trade, influence and engage politically.

Zero therefore represents an idea that we imagine, while everything that we see as 'real' flows out of our imagined idea. To identify '1' on a Cartesian axis, we must firstly define our zero. We create our reality out of our created definition of the centre or origin or balancing point. That which is central to us is our core beliefs or ideals. They determine how we spend our energy, and what things we create. The world that we collectively create then, in turn, influences our vision of the ideal world.

Zero is a balancing point, not an absence or void. This means that striving towards zero is not something to be feared—that to *have* nothing is to *be* nothing—but a means of rebalancing, both of the individual and of the society as a whole. The natural inclination to strive towards infinity, the desire for endless growth and to always aspire for more, should be balanced with the opposing need to let go, of both people and possessions. Letting go—and saying no—is a liberation from endless work, responsibilities and obligations. In turn, this allows us to pause, re-evaluate and start over. The process of rebalancing ensures that

we are not striving aimlessly but consciously, deliberately, towards a clear vision of a positive and hopeful future.

This thesis has sought to illustrate how great transitions have occurred throughout history, mostly as somewhat accidental consequences of new communication technologies. The global connectivity of the internet allows for a conscious and deliberate transition—a rebalancing of the global human society.

Mythologist and philosopher Joseph Campbell, in his book *Myths to Live By* (1972), compared the myths, stories and religions of different cultures around the world. He believed that with space flight and the first photographs of the earth from space, we began to see the earth objectively and holistically. Campbell believed that humanity was becoming a single global community and was on the cusp of a great shift as significant as the Agricultural Revolution:

There were formerly horizons within which people lived and thought and mythologized—horizons of the tribe or religious sect. There are now no more horizons. And with the dissolution of horizons we have experienced and are experiencing collisions, terrific collisions, not only of people but of their mythologies...

I think it is improper to become hysterical about it, projecting hatred and blame. It is an inevitable, altogether natural thing that when energies that have never met before come into collision—each bearing its own pride—there should be turbulence. That is just what we are experiencing; and we are riding it: riding it to a new age, a new birth, a totally new condition of mankind. (p. 254, 255)

The globalization of the economy and consequent mixing of peoples is driving the need to create a global culture, which is simply a common understanding of each other. The vision of a global network of regenerative villages acknowledges this imperative of embracing our common humanity and our common responsibility for the planet on which we live. It also simultaneously acknowledges the importance of diversity and connection to place and community. This is, as Campbell suggests, a “totally new condition of mankind”.

10.8. Conclusions

This chapter has defined freedom as applying to everyone, allowing all to be free from debt, and free from the compulsion to work, earn money and collect assets in order to be free from necessity. This freedom would increase opportunities to explore, create, innovate, relax, recreate, connect.

Freedom, though, is never absolute as work will always be required to provide material necessities. The dialectical relationship between necessity and freedom was the key idea examined. Contrasting Hegelian and Marxist ideas were presented, wherein the former prioritised ideals such as freedom as the driver of change through history, whereas the latter argued that the means by which necessities were satisfied was pre-eminent. Rather than prioritising freedom over necessity or vice versa, a more accurate perspective would acknowledge that both are equally relevant and important in driving social change and that they in a constant dialectical relationship.

Freedom was also described in terms opportunities to receive something for nothing, and as freedom from authority. Freedom from being settled satisfies the aspirations of travellers

and nomads, while minimalism provides freedom from the maintenance responsibilities associated with ownership and possession.

In a society that values doing, working and being busy, we forget the value of just being—the freedom to do nothing, to stop, recuperate, reflect, recalibrate and recreate. It is through this process that we may realise the necessity and claim the freedom to make and remake ourselves and our cities.

11. Synthesis and implementation

By setting out a clear vision for the future from the outset, this thesis seeks to develop a strategy that would be coherent, integrated and directed towards a definable goal. Acknowledging a range of critiques of the present globally dominant, pro-growth, political economy, the vision of a network of Circular Economy Villages (CEVs) is intended to embody ideals of community interdependence, harmony with natural ecosystems and freedom from unnecessary work.

A circular economy is one that aligns with the natural ecological cycles of growth and decay, rather than seeking endless, compound economic growth. CEVs would be part of an inter-dependent network, connecting with neighbouring and other villages within their bioregion and beyond. Local solutions are preferred to more distant ones to minimise unnecessary transport and travel. Physical connections would be via a fleet of shared electric vehicles, with each village providing a charging station. Virtual connections can, of course, be global and need not be constrained by geography.

Bringing such a vision to practical reality remains a huge challenge, of course. This concluding chapter seeks to bring together the issues explored in the preceding chapters and consider what the next steps should be.

The project relates both to the design of the regenerative nodes in the network and also the design of a process to enable these nodes to be readily replicated to create a network. The following sections inform the work of planners, architects, urban designers, developers and other professionals regarding how to build a network of CEVs. The policy framework is designed to align with the financial objectives of developers, and social and financial objectives of future communities, all within the constraints of the local environment. All must work in harmony for the project to be realised.

11.1. Justification of the vision

The following is a summary of the principal justifications for the proposed vision as identified in this thesis:

- (a) The co-location of housing with work for producing food, water and energy is more energy efficient than the housing of populations distant from these basic necessities. This increased distributive efficiency can reduce both the capital cost of housing and the ongoing cost of living.
- (b) Large agglomerations of people in a settlement results in: (i) a complicated array of hierarchical social relations, (ii) much otherwise unnecessary work managing those relations, and (iii) excessive competition and inefficiencies in movement within the settlement. Based on anthropological and sociological evidence, the optimal scale for human communities is 100–200 people. The greater complexity needed to satisfy more complex needs or share rarer skills can be achieved through networking between communities.
- (c) Matching the population to the capacity of the supporting infrastructure is an approach to ‘One Planet Living’. This ensures that benefits extracted from natural systems are coupled with actions for regenerating ecosystems and absorbing waste, resulting in a net positive human impact on the supporting ecosystem.

- (d) The CEV adopts and implements the three key interventions for improving public health—getting people active, connecting and strengthening communities, and providing healthy food options. (Kent et al., 2011).
- (e) As advances in technology make many jobs obsolete, a new political economic system is required through which all people can access their basic natural needs. Rather than the provision of universal basic income, universal basic services or a jobs guarantee, the CEV is a place in which people can collaborate to directly produce and access these basic needs.
- (f) The integration of food, water and energy systems around the built environment creates work opportunities for the development of a local economy.
- (g) The proximity of food consumers to food producers supports the necessary shift to regenerative agriculture—a system of active land management for improving ecosystem health—as it provides the additional occasional workforce needed to produce and process food.

Visions for the future are often dismissed as utopian, impractical or idealistic, or that there is nothing new here, ecovillages have been tried and failed. Yet we are living in a time of dramatic technological change with the threat of the collapse of ecosystems due to climate change, land degradation and plastic pollution. In many countries, inequality is extreme with significant populations feeling politically disenfranchised and economically excluded. It is considered that business-as-usual in any field of human endeavour is not an option.

11.2. Overcoming obstacles in implementation

Beyond the theoretical justification of the proposed vision, there are some obstacles to implementation requiring careful consideration. The most significant would be resistance from state and capitalist interests who benefit most from the status quo. In navigating a pathway through these obstacles, it is important to recognise that neither the nation state nor capitalist vested interests are monolithic structures. Their power is concentrated in existing major cities and the extent of that power is often directly related to the property values therein.

Accordingly, it is strategically important to build early projects in rural areas. Local councils in rural areas already have a small level of autonomy and often regard cities, state authorities and corporations as antagonistic to local interests. When councils work closely with their local communities to develop town planning strategies for their local area it can be very difficult for the state to over-ride their wishes. Local autonomy and authority can be further amplified when the development of a new village offers a return for investors while being more affordable than traditional housing.

There are many other reasons for developing the early projects on greenfield sites in rural areas, including:

- (a) Minimising the number of competing and interested stakeholders.
- (b) Lower land costs should result in lower total overall cost of housing.
- (c) By developing rural land, it is possible to incorporate significant adjoining land for the management of ecosystems and for the integration of water and food systems within the built environment.

- (d) Large areas of land are needed to produce food and manage water in-situ for a community. Existing subdivision patterns make the development of CEVs far more feasible in rural areas.
- (e) A site that is a 'clean slate' and held in single ownership allows for the design of integrated and optimally located buildings and infrastructure without concern for lot sizes and property boundaries.
- (f) The development of low-cost rural land allows for the establishment of processes for capturing the land value uplift.
- (g) Development in rural areas supports the principle of "redistributing populations in a spontaneous and healthy manner" (Howard, 1902).
- (h) The strategy provides for capital investment in rural and regional areas.
- (i) The strategy does not require the demolition of existing buildings and infrastructure in urban areas.

With regard to this last point, the early objective should not be to transform existing spatial forms, big cities and existing large-scale infrastructure, but to demonstrate an alternative spatial form, ensuring that new, rather than existing, populations are housed in CEVs. If, or as, this becomes the preferred living environment, strategies for transforming existing urban areas can be implemented.

The strategy therefore is to develop the first CEVs outside existing cities on available rural land and with communities and councils that support this approach. The prototypes would demonstrate the viability of this development model and generate demand for more to be built.

11.3. Narratives for change

It was argued (chapter 3) that past great transitions occurred due to the introduction of new means of communication and that the internet will similarly cause another dramatic reorganisation of human settlement patterns (chapter 4). While the means of communication are important, the narratives being communicated are of equal importance as these can convey both the strategy and the vision for a new normal.

11.3.1. Transition narratives

Following are three principal transition narratives described in this thesis:

- (1) From centralised to distributed
- (2) From extractive to regenerative, and
- (3) From linear to circular.

The description below of the first two narratives illustrates that these reflect particular expressions of the transition from a linear to a circular economy.

Centralised settlement patterns concentrate production and governance systems in one settlement to serve all settlements in the region. By contrast, a distributed settlement pattern is one in which consumption and production are co-located as much as possible to minimise the energy required for the movement of people, goods and resources in the region.

This could be described as the spatial dimension of a circular economy. Proponents of a circular economy often argue for ‘closing the loop’ and converting waste into a resource. Yet the further resources, goods and people travel, the greater is the scale of transport and logistics infrastructure. The economic cycle, from resource extraction, through production, distribution to the consumer, and post-consumption waste management, should therefore be localised as much as possible. Smaller distances traversed in the product life cycle require less energy and therefore generate less waste heat.

The second narrative is the transition from extractive to regenerative systems. An extractive system benefits from the use of natural resources without rehabilitating or restoring those systems. A regenerative system is one that aligns with natural ecological cycles, giving and taking in a mutually beneficial relationship with nature. Regenerative development and regenerative agriculture are activities that have a net positive impact on the land and ecosystems. Extractive and regenerative attitudes can apply also to relationships between people. The narrative promoting a shift from extractive to regenerative attitudes and activities can also be described in circular terms—referring to reciprocity or relational circularity between people or between a community and the land on which they are located.

The description of great transitions through history (chapter 3) offers a temporal perspective of circularity, the longest economic *cycles* of the human story. Each great transition represents the death of one form of political economy and the birth of a new one through which process the pattern of human settlements is fundamentally altered. This is a critical narrative as the acceptance that pre-historic life was not “nasty, brutish and short” but rich, complex, and vibrant, allows for a fuller assessment of those social structures and worldviews. In turn, this opens the possibility for the development of a new political economy that is not just post-capitalist but post nation-state. Such a system would embrace the cyclical thinking of indigenous communities and the self-determination of city-states.

The discursive, diverse, and trans-disciplinary structure of this thesis is also circular—in the sense of being holistic—and therefore distinct from linear, rational arguments. The latter begin with assumptions and matters excluded from consideration, narrowing the focus to a singular matter. A line of reasoning is developed to reach a conclusion. The consequent externalities may or may not be identified but the implication is that they will be dealt with elsewhere by others. Rather than dividing research into different disciplines, this thesis seeks to embrace a range of ideas, each adding substance to the vision sketched out at the outset, to convey a fuller, more holistic narrative. There can be some difficulty conveying a holistic narrative in the linear form of a text. Connections are everywhere between different chapters. Jargon from different disciplines must be explained and synthesised. The ultimate construct must be taken as a whole; the parts cannot be viewed in isolation without recognising their role in the system as a whole. Chapters could be read in any order as each is self-contained although many form natural pairs—Chapters 3 and 4 on transitions and temporal circularity, 5 and 6 on building new towns and spatial circularity, 7 and 8 on the relationship between individuals and the collective, or holistic circularity, and 9 and 10 on Project Zero and the mathematical consequences of a circular economy.

The holistic perspective of circularity allows for the integration of food, water, energy and housing systems. The current separate development and management of these by experts in different fields has created built environments filled with competing stakeholders. The integration applies not just to the physical infrastructure but also to its ownership and

management. Owners and managers must be incorporated into the system, highlighting the importance of adopting collective ownership of land title—using some form of fractional real estate investment in a community land trust (section 8.4). A commons governance system based on the principles developed by Elinor Ostrom can guide ongoing management. A life-cycle planning and costing approach, designed to maximise affordability and minimise living costs, would connect planners, designers and builders with operators post-construction. This is consistent with emerging build-to-rent development models (section 4.2.5). When integrated systems are developed, numerous unexpected benefits emerge such as enabling the transition to shared electric vehicles (section 4.3), improvements in public health and opportunities for education (section 9.8).

The dialectical methodology—building relationships between opposing concepts—provides the relational perspective of circularity. To reconcile contradictions between opposing concepts, and tensions between competing stakeholders, it is necessary to build relationships ‘across the divide’. The relationist ethos of Indigenous communities (section 8.6) affirms that the relationship between people is secondary to the relationship between a community and the land upon which they live and depend. Therefore, debates relating to dialectical materialism or dialectical idealism must be framed by reference to human relationship to the land and ultimately to settlement patterns (sections 2.2, 10.1, 10.2). The needs of a population are most efficiently delivered by enhancing the capacity of the land through the provision of appropriate infrastructure. Social relations of production are then determined based on the requirements for the management and maintenance of this capital infrastructure (chapter 8).

Dialectics was used to embrace both growth and degrowth agendas within a circular economy framework (section 2.1), the political left and right (section 2.5), local and global (section 2.6) and government and individuals (section 2.7). Other dialectical comparisons included between centralised and distributed (chapter 5), theory and practice (chapters 4, 6 and 11), social foundation and aspiration (chapter 7), collaboration and individuality (chapter 8) and necessity and freedom (chapter 10).

11.3.2. Narratives describing the vision

The emphasis throughout has been on individual settlements designed as unique organisms, connected to other like settlements as nodes in a network. This arrangement can also be perceived in reverse whereby the network is the organism and individual settlements are cells within it (Chapter 7).

In the present political economy, households and local communities are the cells in the broader social organism. The free labour carried out in these environments underpins the economy and society but is not valued by it. The proposed Circular Economy Village can then be perceived as an expansion of the household to the scale of a local community. It also formalises the present reality wherein human societies consist of two complementary political economic operating systems, the local and global. Table 5 summarises the key characteristics of the two systems.

In addition to *a network of organic (regenerative) settlements*, and *cells in the social organism*, a third way of describing the proposed vision is the Australian Indigenous perspective of the landscape as *a network of waterholes connected by storylines*.

Table 5 Dual or parallel political economy operating systems

Local, community economy	Global economy
Familiarity between people and familiarity with the land on which they live	Non-familiarity
Enables reciprocal gift relationships between people and between people and the land	Requires contractual exchange relationships
Gift economy	Money economy
Commoning to produce and distribute use values	Collaborate based on exchange values

11.3.3. Narrative describing the objective: Project Zero

Paul Mason, (2015, p. 266) refers to the post-capitalist project as Project Zero—a zero-carbon energy system, zero marginal cost production system and zero unnecessary labour. This has been adopted as a concise narrative describing the objective of the political economy and differentiating it from the current striving for infinite economic growth.

As necessary labour time is reduced, several other social narratives and normative behaviours must be challenged. A choice must be made between maximising job creation and economic activity or maximising freedom from unnecessary work. Also, as basic necessities become abundant, making them available for free requires a change in mindset as does accepting that sometimes people will receive something for nothing, and that people should sometimes have the freedom to do nothing.

Such significant changes to culturally entrenched mindsets depend ultimately on the building of trust in, and between, communities, and the acceptance that humans, by nature, have a powerful preference to contribute, to share, to participate and to support each other. This hopeful view of human nature is contrary to the underlying assumption of current political economic structures, which are based on the Hobbesian view that without a central government to maintain order, chaos would reign.

11.4. Complementarity with alternative visions

11.4.1. Degrowth, simplicity and the Global Ecovillage Network

The vision proposed in this thesis is generally consistent with that offered by advocates of degrowth, simplicity and participants in the Global Ecovillage Network (GEN). All promote non-hierarchical social structures that encourage conviviality, through the fair distribution of abundant produce. All support the principle of “living within Earth’s regenerative limits in socially equitable and collectively supportive ways” (Liegey & Nelson, 2020, p. 3).

Whilst visions are broadly aligned, strategies and transition narratives vary. Degrowth is an intentionally “provocative slogan” (Liegey & Nelson, 2020, p. 2), deliberately striking at the heart of the issue—challenging the unquestioned promotion of economic growth without limits. Yet degrowth and simple living advocates (Alexander, 2015) recognise that a key issue is uneven distribution rather than the volume of production, and that poor regions need more growth while degrowth is only expected of the rich.

Rather than placing degrowth at odds with growth, the circular terminology seeks to synthesise growth and degrowth narratives as parts of a natural cycle. Economic cycles can then be described in natural terms, having stages of growth, decay, death and regeneration.

The spatial perspective of the circular economy augments and strengthens the degrowth argument, encouraging localisation of the economy to empower communities. Additionally, to advance beyond frugal agrarian lifestyles, village communities should collaborate with others in their bioregion. A loose collective of villages is not the same as an integrated network, which benefits from the network effect whereby more participants increase the diversity and resilience of the system as a whole.

11.4.2. Steady state economy

Herman Daly coined the term ‘steady state economy’, the goal of which “is to sustain a constant, sufficient stock of real wealth and people for a long time” (Daly, 2010, p. 21). This is consistent with the goal in this thesis of settlements that sustain a discrete population in their environment for a long time. To sustain a population means not just to house them but also to provide other natural needs such as food, water, and energy. The flow or circulation of materials, goods and services around the settlement should provide these essential needs while enhancing the capacity of natural systems to absorb waste and regenerate. The system is dynamic in that there is constant economic activity, but it is stable and does not grow in scale.

Beyond individual settlements, the broader network must also remain stable. Paul Krugman’s (1991) analysis of equilibrium conditions in regional geography provides the necessary insight. Exploring the relationship between the development of two centres, Krugman identifies two equilibrium conditions, that is, two steady states: (a) both centres remain the same size, and (b) people and economic activity agglomerate in one of the two centres, depleting the other. In Chapter 5 it was argued that the process of agglomeration would not suddenly stop when the surrounding villages are depleted. Once commenced, the growth trajectory becomes insatiable, and the major centre would look for other growth opportunities. It is not unreasonable to argue that agglomeration of populations in one centre is not an equilibrium condition as it is dependent on continued growth and activity. Consequently, the only remaining equilibrium condition—the only steady state—is for populations to be evenly distributed in the landscape.

11.5. Macro-political and micro-social strategies

In the introduction it was argued that micro-social strategies were preferable to macro-political ones for bringing the vision into reality. That is, rather than simply identifying certain policy changes for governments to implement, the aim was to mobilise people to act. This endogenously motivated action includes daily activities such as local food production but also mobilising to influence government strategies, policies or plans.

Accordingly, there need not be a binary choice between macro-political and micro-social strategies. Ultimately, it is considered essential that government policies are aligned with the will of the people, that they empower people, and facilitate the transition to an egalitarian and regenerative future. The most effective strategies are those that harmonise the dialectical relationship between governing bodies and the broader population.

The following section briefly outlines macro-political strategies that may be implemented by state and federal governments. These would support the activities of local councils, developers and communities. The local government strategies are also aligned with the design principles for CEVs.

11.5.1. Policies for a Green New Deal

In recent years there has been growing interest in numerous countries to develop a green new deal. As Stilwell (2021) notes, such policy packages seek to address climate change and economic inequality, adopting a pragmatic rather than a radical stance. Green New Deal policies are intentionally transformative, consistent with the approach in this thesis, but differing in their emphasis on macro-political strategies.

The policy proposals listed below could be implemented directly or through a Green New Deal policy package to facilitate the development of a network of Circular Economy Villages. They are relevant to the Australian context and the jurisdiction of New South Wales. As a federated system, property law and town planning legislation are state responsibilities, but the federal government has influence particularly through taxation settings and through the allocation of funds for projects.

The proposals for state and federal legislation and policy are relatively general in nature, reflecting, in a number of cases, that governments are already leaning in this direction. The approach for the local government level is quite different where strategies and policies are more specific in nature. The thesis focus has been on micro-social strategies that do not necessarily require the state and federal policies, although such policies would clearly facilitate the delivery of such projects.

1. Promotion of circular economy, precinct-scale infrastructure

Dominant capitalist vested interests are not homogenous. Property developers are not concerned if industrial agriculture or fossil fuel electricity providers are disrupted by incorporating food and energy systems within their developments. Indeed, these would contribute positively to their marketing strategies.

It would be relatively straight-forward to require, for example, that all new development precincts generate and store sufficient energy to service their site. This could include a community battery for storage connected to an electric vehicle charging station in each new development precinct of a certain scale.

On-site water management is more complex as it requires more land area. This increased area can be achieved through the proposed local strategies outlined below. The *Water Industry Competition Act 2006* (NSW) already aims to encourage private-sector investment in water and wastewater industries.

2. Activation Precincts as new towns

The NSW Government recently introduced the State Environmental Planning Policy (Activation Precincts) 2020 to, amongst other things, “facilitate the strategic and efficient development of land and infrastructure in those precincts”. Under the policy, the Regional Growth NSW Development Corporation was established, to develop masterplans and

delivery plans for certain identified regional precincts. In accord with the argument in this thesis, an increased focus on detail at the strategic planning phase improves infrastructure delivery and reduces conflict in the development approval process.

Development corporations were created in the UK, pursuant to the *New Towns Act 1946* (UK) to deliver the 28 new townships. Such authorities could be established to build a network of CEVs.

3. Mobility as a Service (MaaS)

While the idea and language of ‘mobility as a service’ (MaaS) is new, the term could apply to public transport. The more recent usage commonly refers to mobile phone platforms that allow individuals to access a range of transport options and so avoid the need to purchase a vehicle. As the cost decreases and the development of necessary infrastructure makes shared electric and autonomous vehicles more feasible, they are likely to make public mass transit less appealing. The tension between mass transit—where large numbers of people are travelling to the same place at the same time—and MaaS designed for individuals should be acknowledged, together with its implications for capital infrastructure investment. This issue can be generalised to question whether infrastructure investment should continue to focus on large-scale projects or many more small-scale projects, particularly in rural areas.

The CEV development model is more consistent with dispersed, small-scale transport movements rather than mass transit, which in any case is very limited in rural and regional areas. Similarly, investment in small, precinct-scale infrastructure in many small towns would be preferred to large-scale infrastructure investments often designed to benefit large cities.

4. Housing as a Service (HaaS)

As with mobility, virtual platforms are enabling a shift from ownership to access. The NSW state government appears to be supporting this transition in housing with its proposed State Environmental Planning Policy Housing Diversity (Housing Diversity SEPP), which includes changes to facilitate more social housing, build-to-rent housing, student housing and co-living. These can collectively be referred to as ‘Housing as a Service’ (HaaS).

AHURI (2019) cites the main obstacle to these housing models is that tax settings have been designed for build-to-sell models. At the state level, land taxes would become prohibitive as companies increased their holdings over time. In July 2020, as part of its response to COVID-19, the NSW state government halved the land tax rate for build-to-rent projects. At the federal level, GST provisions and income tax levels for overseas investors are impediments to uptake in Australia.

Changes in these tax settings would further support the development of CEVs. It is noted, though, that all these obstacles relate to issues for large corporations seeking overseas investment and seeking to retain ownership of development precincts. The CEV model aims to have collective ownership by the residents themselves. Ownership would therefore be broadly distributed and so the land tax is not an issue. Investment would be local and so the concerns relating to overseas investors are not relevant. Nevertheless, these proposed changes requested by the large development corporations would help build momentum for HaaS development models.

5. Land value capture through the rezoning process

The proposal here is to develop a consistent state-wide, or even nation-wide, approach to capturing the land value increases due to the rezoning of land. The present process by which land is rezoned results in unearned increases in land value benefitting private landholders. This occurs when rural land is identified to be converted to urban land. There are numerous steps before urban development can occur but at each step the value increases.

Henry George and his followers tend to argue that there should be a land tax imposed on this unearned land value increase. The requirement to pay a tax does not address the question of how that revenue will be used. The challenge is to ensure that taxes extracted from any land are used to provide public infrastructure on that same land. In administrative law this is referred to as the spatial nexus between revenue and expenditure.

The nexus principle is a requirement in all development contributions plans and provides for a direct connection between the funds paid by a developer and the public infrastructure provided. The intention is that the infrastructure respond directly to the impacts created by the development. Whilst this is an essential principle, the mechanics of the development contributions system are cumbersome, the delivery of infrastructure is rarely timely, and the amount of funds provided usually falls well short of the infrastructure costs.

The CEV development model assumes the direct delivery of both housing and supporting infrastructure by the same entity. Indeed, these are completely integrated both physically and in the cost structures. There is also no subdivision of land at which point responsibility for public infrastructure is handed over to the local authority or infrastructure provider. There is no point of sale at which time the developer passes responsibility to an infrastructure manager. All assets remain in the ownership, care and responsibility of the original purchaser of the rural land. As the land is never sold, remaining in the ownership of the community land trust in perpetuity, there is no land value uplift. Value uplift relates to exchange values, whereas in a CEV the increase is in use values. Infrastructure works carried out make the land habitable for a certain population. The costs and benefits of carrying out the works accrue to the entity that represents the community who lives on the land.

In the local government policy outlined below it is argued that specific requirements should be fulfilled at different stages of the land rezoning process. That is, certain planning, design or construction activities should be complete (a) prior to identification of land in a strategy, (b) prior to council resolving to refer to the Department of Planning, (c) prior to advertisement, (d) prior to final resolution and (e) prior to referral to the minister for signing and publication. Whilst these stepped requirements could be developed at a local level in a council policy, it would be more preferable to have a consistent, state-wide approach.

11.5.2. Local government strategies

Local councils play a significant role in land development through their responsibilities for strategic planning and development assessment processes. For numerous Circular Economy Villages to be financed, developed and built within a local government area, there must be a clear development approval pathway. Whilst all the mechanisms are available for any development to occur, certain modifications to the regulatory framework are needed to facilitate the development of CEVs.

Whilst the provisions apply to the jurisdiction of New South Wales, Australia, the principles are readily translatable to other jurisdictions.

Local communities can drive change in their local area by proposing and lobbying for the following changes to their local strategies and plans. The following builds on the approval pathway outlined in Liaros (2019).

1. Strategic plan and locality planning

All local policies flow from the high-level strategies that identify where new development will occur. Councils prepare housing strategies that articulate how much additional housing is proposed for the local area, in what locations and in what form and density.

The preparation of a housing strategy provides the opportunity for councils—in consultation with their community—to introduce Circular Economy Villages into their local planning framework. The housing strategy should explicitly refer to Circular Economy Villages (or regenerative villages) and include objectives that are consistent with the design principles set out in section 11.5.3 below. The LSPS should also:

- (a) identify the general localities (not the specific sites) where this development would be permitted; and
- (b) refer to a policy document or chapter in the Development Control Plan (DCP) for more information (discussed below).

With these provisions in the strategy documents, the mechanics of the process, including development controls, infrastructure planning and other policy provisions can then be prepared.

2. Development policy

A policy document or chapter in the Development Control Plan (DCP) should clearly describe the development form and the process through which this development outcome could be achieved. Given the substantial changes proposed, a useful approach would be to first identify one site for a pilot project, the development of which would inform the framing of development controls, infrastructure planning process and wording in the strategy. Lessons from building a pilot project would help refine the town planning processes needed to facilitate the development of a wider network of CEVs.

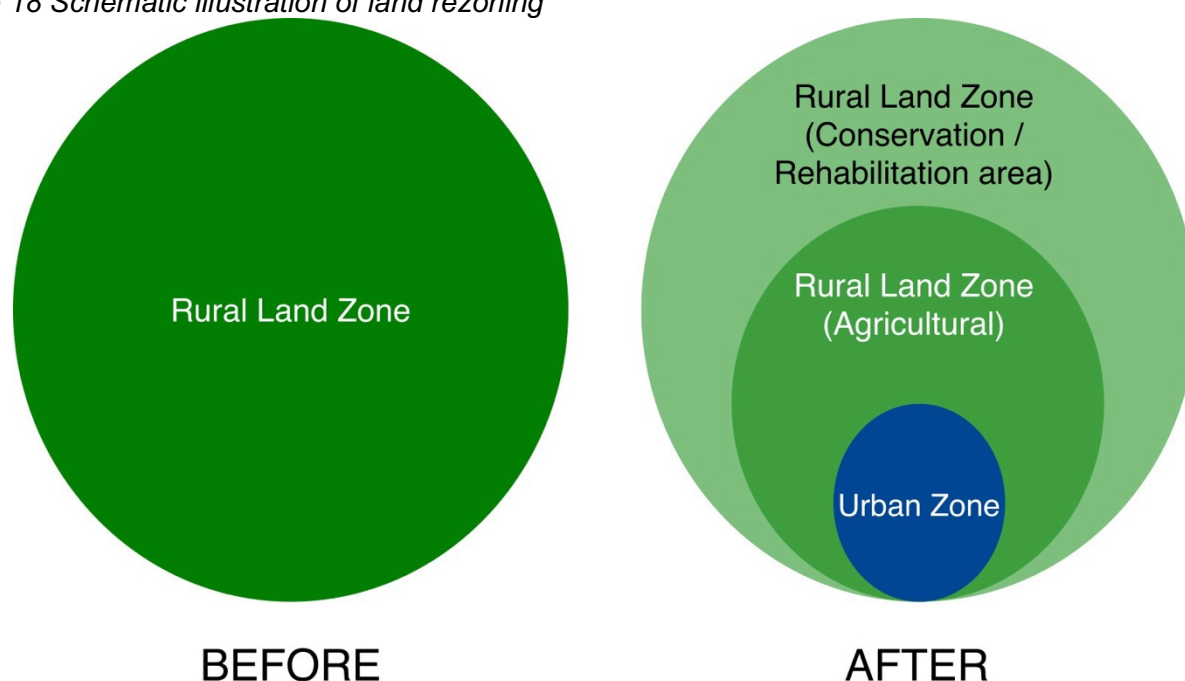
As a starting point, the following should be included in the policy document as requirements for the development of a pilot project:

- (a) **Prepare a site masterplan and provide justification for land rezoning.** This provision should require sufficient documentation to illustrate that the developer intends to develop the site in accordance with the design principles set out in section 11.5.3 below. In NSW this could take the form of a Concept Development Application in accordance with Division 4.4 of the EP & A Act together with a Planning Instrument Amendment in accordance with Division 3.5 of the EP & A Act.
- (b) **Outline the process for capturing the land value uplift.** When articulating the assessment processes for CEVs, councils should identify the specific activities required to be completed by the developer at different stages of the land rezoning and development assessment processes. This will ensure that the rezoning process proceeds in concert with improvements to the land and discourages the sale of

unimproved land that has been rezoned. The steps in the rezoning process include (a) identification of the land in the strategy, (b) council resolution to commence rezoning, (c) council resolution to begin community consultation, (d) council resolution to approve, (e) approval by the Minister and publication in the government gazette.

- (c) **Minimum site requirements and compact built environment.** The controls established in the council policy (or DCP) should state the minimum total land area required and the proportion of the site to be rezoned. It is estimated that approximately six hectares is required to house 200 people at a suburban residential density of 12–15 dwellings per hectare. The controls should therefore require, for example, that a maximum of six hectares of a minimum 40-hectare site, can be rezoned for urban purposes. The controls could also include stipulations for land rehabilitation and conservation, identifying minimum area requirements for different purposes as illustrated in figure 18. This approach will also ensure a compact urban form, which will minimise infrastructure life-cycle costs.

Figure 18 Schematic illustration of land rezoning



- (d) **A prohibition on subdivision of the land in perpetuity.** This should be required to be applied as an encumbrance on the land title. The purpose of land subdivision is to separate responsibilities and benefits for different parts of the site. By prohibiting subdivision, the housing and shared infrastructure will all be the responsibility of a single entity.
- (e) **Stipulated provision of energy, water and food systems.** Development controls should stipulate minimum requirements for harvesting, management, storage and distribution of water, food and energy. There is no reason why sites could not be required to provide at least 90 percent of their water and energy requirements. It may be more difficult to provide all food on site, but a 50 percent self-provision would not be unreasonable, and perhaps 80 percent in the bioregion.
- (f) **Stipulated design principles for buildings.** The design principles should be drawn from those outlined in section 11.5.3 below. Some could be prescriptive; for example, requiring a maximum of two storeys or 8 metre height limitation. They could also set

certain performance standards, for example, requiring that buildings be designed to maintain a constant internal temperature without air-conditioning.

- (g) **Requirement to prepare a transport plan.** The preparation of a transport plan for movement both within and beyond the site will focus attention on connectivity between activities. It should also ensure that the design of the energy system accommodates electric vehicles of various forms; including ebikes, golf carts and cars.

3. Voluntary Planning Agreement policy

In NSW, a Voluntary Planning Agreement (VPA) is an agreement between a developer and a planning authority, under which the developer agrees to provide material public benefits to be used for a public purpose. Given that the proposed development will include various facilities, assets, roads and open spaces, this is the most appropriate mechanism for their delivery. Some of these will service the population within the development site, others will, additionally, be available to communities outside the site.

As they are voluntary, councils cannot require that a developer enter into such an agreement. Nevertheless, without such an agreement, the developer will be required to contribute to the provision of local infrastructure or have the development refused due to the lack of access to utilities such as water supply and sewerage systems. Council can offer a more frictionless and less costly approval pathway that encourages the negotiation of a VPA. This can be facilitated through the preparation of a VPA policy that sets out the steps and requirements of such a process as they apply to Circular Economy Villages. This should include a standard template VPA to reduce legal costs and maintain a level of consistency in approach. In the policy council should address the following matters:

- (a) The effect on any development contributions required pursuant to sections 7.11 or 7.12 of the EP&A Act (NSW). That is, contributions may be reduced where the developer provides appropriate infrastructure that services the population within and outside the development.
- (b) The effect on any charges for water supply, sewerage and storm-water drainage facilities under section 64 of the *Local Government Act 1993* (NSW). That is, developers will not pay for water infrastructure where they provide and manage this on-site.
- (c) A requirement for the VPA to run with the land pursuant to section 7.6 of the EP&A Act (NSW). This will ensure that infrastructure delivery and ongoing management will remain the responsibility of the landowners in perpetuity.
- (d) The effect on waste levies. That is, where the development proposes to manage all waste on-site, council will not be required to collect and manage waste and so waste levies for this service should not be required. Alternatively, the agreement could provide for reduced waste levies in line with reduced amount of waste required to be collected, or it could provide that council makes payment to the site where it manages waste from surrounding areas, reducing council's costs.
- (e) The effect on ordinary rates or requirement for any special rates. In the absence of a state-wide approach, it is unclear whether the ordinary rates applicable to a CEV should be those that apply to farmland, residential properties, or businesses, or indeed a combination of these. Council should obtain advice and make a clear

determination in this respect, and then provide clear and consistent advice to proponents.

11.5.3. Financial plan and design principles for CEVs

The 20th-century town planning debate, between Le Corbusier's mechanical city and Lewis Mumford's organic city (Chapter 5), offered yet another perspective to justify the vision but also provided some guidance for the design of new settlements. The efficiency gains from integrating food systems reinforced the shift from the current urban strategies that exclude food systems to a more integrated, organic approach to settlement design. The ideas of Mumford, Ebenezer Howard and Frank Lloyd Wright have been synthesised into a set of design principles for the development of organic settlements. Together with lessons from ecovillages and other settlement research (Chapter 6), and ownership structures (Chapter 8), these have now been further refined into the following list of proposed design principles:

- (a) A minimum land area of 40 hectares (100 acres) should be consolidated into a single parcel. A Community Land Trust (CLT) should be established to purchase, develop, and manage the land, retaining ownership in perpetuity. The cost of the improvements, including provision of infrastructure, would also be incurred by the trust (section 8.4). Capital improvement works and any subsequent change in zoning would therefore benefit the trust.
- (b) Future residents would purchase units in the trust (or shares if a company structure is preferred for the CLT). A managed investment trust may be established for this purpose, or online platforms that enable fractional real estate investment may be used (section 8.4).
- (c) Buildings should be human scale, no more than two stories in height. This reduces construction costs for housing affordability and provides more direct connection to open space and natural systems.
- (d) A systems approach should be adopted with urban, rural and natural landscapes integrated with an ecosystem of infrastructure including, energy, water, food, buildings, transport and communication. The built environment should be compact and contained within a small portion of the site to minimise the costs of constructing and maintaining the infrastructure.
- (e) Match the population to the capacity of the infrastructure. Settlements should be planned for a fixed population so that the capacity of the supporting infrastructure exceeds the village population. A scale of approximately 200 people was determined based on the Dunbar number (section 6.2.11). The scale informs the capacity of the infrastructure ecosystem and maximum population. A lower population would ensure greater abundance but higher capital costs per person.
- (f) The design of each settlement should reflect the topographical and climatic conditions of its locality. Building and infrastructure should not be imposed on the landscape but should enhance local conditions.
- (g) The design should be located in an attractive natural landscape, seek to maximise biodiversity and be of high quality with plenty of open space. This recognises the importance of nature and aesthetics to human health and well-being. Biodiverse landscapes are healthy, resilient and so support human health.
- (h) Wherever possible, zero marginal cost technologies should be adopted to minimise life-cycle costs. Zero marginal cost technologies are those that require minimal

human labour to operate post-construction. Rather than working to generate income and then buy basic necessities, these are delivered by technology that enhances natural ecosystems in the locality.

- (i) Aim to maximise durability of capital infrastructure. This will minimise life cycle costs and consequently reduce the cost of living in the long term. Accordingly, use life-cycle planning and costing, with appropriate legal, financial and ownership structures. This would ensure housing prices and cost of living are more affordable than nearby mega-cities because these would be based on actual asset construction and maintenance costs rather than on speculative and artificial land values. When maintenance and management costs are included in project costing it is more likely that assets will be durable and low maintenance. Build-to-rent and other Housing-as-a-Service development models are most appropriate in this respect.
- (j) Local production, including of waste-to-resource micro-factories, should be powered by renewable energy to maintain a clean and healthy environment. The local economy should have some capacity to produce goods and manage waste as a circular economy of inorganic materials with zero emissions.
- (k) The food, water and energy systems should similarly provide their outputs and manage waste as a circular economy of organic materials with zero emissions.
- (l) Settlements should include a remote work hub and guest accommodation to access remote services and welcome visiting specialists. Settlements should be designed to accommodate a local economy for exporting and importing services. This could be described as a circular or relational service economy.
- (m) Population growth should be managed by building new settlements rather than growing the size of the settlement. Whilst this is necessary for consistency with the proposed vision, it also promotes the development of rural land, which is more affordable than already zoned urban land. With vastly increased land supply, this cost will also tend towards zero.
- (n) The business plan for the development of a network of settlements should assume a pipeline of these village-scale projects to attract low-cost rather than speculative capital. Further minimise costs by removing financial speculation from the process of land development. Financing for housing should be based on the costs of capital asset development and the return from this depreciating asset.

11.6. Principal research question: final response

The principal research question in the opening chapter of this thesis was stated as follows: How would human habitats be structured in a political economic paradigm wherein populations were mobilised to regenerate natural systems and, through this, to rehabilitate and regenerate the human condition? As also noted, asking the question in reverse is also relevant: Might a disruptive model for building human habitats enable the development of such a regenerative political economic paradigm?

In exploring these questions, this thesis has described how the human habitat would be structured in a political economic paradigm based on spatial, temporal, holistic and relational circularity. It also provides the justification, narratives, and implementation strategies for a development model that, if replicated, would bring this ideal into reality.

The question as to whether populations will be motivated and mobilised to achieve these changes, of course, remains open. There are environmental, social, economic, and political

forces working both for and against. It is hoped that, by providing the necessary financial and policy mechanisms, others involved in property development and related activities may contribute positively to the development of a global network of Circular Economy Villages.

Appendix: Transition Charter

Developed from the Transition Charter proposed in *Rethinking the City* (Liaros, 2014)

1. Transition, that is, continual and steady change, is our process for creating a Better World.
2. Our Better World will be arranged as networks of Circular Economy Villages.
3. The network will be forged through but bound only by the free sharing of all human knowledge.
4. Each community shall regard all other communities as their equals and is responsible for sharing knowledge to achieve and maintain that equality.
5. Each community shall strive towards self-sufficiency with respect to food, water, energy, and material resources, with this to be achieved by harvesting these from the community's own land and keeping them cycling locally.
6. Each community acknowledges that the right to use any part of the Earth is accompanied by a responsibility to maintain and enhance the health of the Earth so it may also be enjoyed by all future generations of all life species.
7. Each community shall maintain itself at a scale whereby all its members can meaningfully participate as equals in the development of agreements that bind the community together.
8. Each community shall allow and encourage the continual review of its agreements so that those social contracts are suitable to the present participants.
9. Each community shall allow and encourage the free movement of individuals between communities.
10. Each community acknowledges that all individuals are unique and therefore different but, nevertheless, all regard each other as equals.
11. Each community shall encourage all individuals in their pursuit of self-knowledge, which is the pursuit of happiness.
12. Through the pursuit of self-knowledge, achieved by enabling freedom from work, accepting change, and encouraging personal growth, we can each discover how we can contribute freely to the creation of a Better World.

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