

PART ONE: WHAT IS RENEWABLE ENERGY? A CASE OF CONCEPTUAL CONSENSUS

Part One of the thesis, set out in the following Chapters 3 and 4, sought to discover whether a common understanding of the concept of ‘renewable energy’ has developed in the laws of countries seeking to accelerate its deployment. In order to do this, the subject matter of national renewable energy laws was examined to assess:

- the form and approach to content of the legislative definitions of renewable energy (Chapter 3); and
- the nature of and levels of support for, the various energy sources and renewable energy technologies identified within the legislative definitions of renewable energy (Chapter 4).

This process highlighted the extent and scope of conceptual distance between some of the national laws that govern the accelerated deployment of renewable energy.

The analysis in Chapter 3 showed that a range of approaches had been adopted to the form and content of legislative definitions of renewable energy, with five different approaches to the form and seven different approaches to the content of the definitions identified. In many instances, the definition of renewable energy adopted or advocated for by different jurisdictions tended to be reflective of their indigenous energy sources (both renewable and non-renewable). This was suggestive of conceptual divergence between the legislative definitions of renewable energy. Despite this, Chapter 4 highlighted a significant degree of consensus around the energy sources that were identified as ‘renewable’ within the legislative definitions of the different countries. In particular, at least 80 of the 95 countries with national renewable energy laws accepted each of the following energy sources as renewable: wind energy, solar energy (both photovoltaic and concentrated solar thermal), biomass, landfill gas, sewage treatment gas and biomass, small-scale hydropower and geothermal energy.

Not every potential renewable energy source has this degree of acceptance within the legislation. Most notably, large-scale hydropower was only accepted as a renewable energy source in 65 countries, as compared to the 84 countries that accept small-scale hydropower. Ocean and riverine energy sources such as tidal, wave, hydrothermal (maremotermica), osmotic (salt gradient) energy had lower acceptance levels, which generally mirrored their level of commercialisation. The energy sources that were least likely to be accepted as renewable energy were those which arguably would not be accepted within the scientific meaning of renewable energy (i.e., energy which is depleted at an equal or slower rate than its replacement rate). These energy sources included hydrogen fuel cells, coal mine methane, other liquefied or gasified fossil fuels and peat, which had even lower levels of acceptance, with four or fewer countries including them within their legislative definition. Further, nuclear energy, another energy source whose status as a renewable or non-renewable energy source is commonly debated, was not accepted within the legislative definition of a single country. The debates associated with nuclear energy highlighted that many countries are impliedly conflating notions of sustainability into their definitions even though it is often not explicitly stated. The inclusion of energy sources that are arguably not renewable within a legislative definition, and the unwritten implied imposition of sustainability requirements can produce illogical results outside the ordinary person's understanding of renewable energy.

These findings suggest that the observed differences in the form and approach to the content of the legislative definition of renewable energy do not have a significant impact on the energy sources accepted as renewable within that definition. There are two implications for this finding. First, it suggests that there is a degree of international consensus about what energy sources are renewable for the purposes of electricity generation. This conceptual consensus as to the subject matter of the laws may provide the basis for later international harmonisation or legislative convergence in years to come. Second, it suggests that the form and the approach to the content of the legislative definition of renewable energy often do not make a material difference other than to impose

additional transaction costs. This suggests that there is an opportunity for greater efficiencies to be achieved within the renewable energy sector through the movement to a standard approach to the form and content of the legislative definition of renewable energy internationally.

CHAPTER 3: DEFINING 'RENEWABLE ENERGY'?

Before examining the fundamental question of 'How do we define renewable energy in law?', it is first necessary to consider why the legislative definition of 'renewable energy' matters. Section 3.1 of the chapter will begin by analysing the nature of definitions and, in particular, legislative definitions. This will lead into a discussion of the role of legislative definitions and how they are interpreted within different legal systems. In this section, it will be argued that legislative definitions play a critical role in clarifying the subject matter of legislation, as well as providing consistency, reducing complexity and uncertainty and minimising the need for repetition.

Section 3.2 will focus on the challenges associated with defining 'renewable energy'. This section will review the problems associated with trying to create a clear definition that will incorporate emerging renewable energy technologies, without that definition being either over- or under-inclusive. It will also discuss the significant economic benefits associated with being a qualifying renewable energy source and the resulting political pressure and lobbying that result.

Sections 3.3 to 3.5 consider the form and conceptual approaches to content used in different legislative definitions of 'renewable energy' from around the world. This research identifies five different approaches to the form of the definition of 'renewable energy' and seven different approaches to the content of the definition, which will each be discussed in turn. Commonly, these approaches are used in combination. The vast array of combinations of form and approach to content in the legislative definitions, even those using identical terms, highlights some significant inconsistencies that exist between countries legislating to promote or govern renewable energy. These differences have the potential to harm international trade by creating market barriers and hamper the prospect of legal harmonisation in the sector.

The attention shifts in Section 3.6 to addressing the question of ‘How should we define renewable energy in law?’ In this section, the best practices from the legislative definitions of renewable energy, and the international consensus on renewable energy sources are used to formulate the definition of renewable energy adopted in this thesis. The chapter concludes in Section 3.7.

3.1 UNDERSTANDING DEFINITIONS

What is a definition? A definition is a statement that seeks to attribute or clarify the meaning of a word or phrase. Definitions are made up of two essential parts: the concept being defined is called the *definiendum*, while the clarifying statement or substantive content of the definition is called the *definiens*.¹ As will be shown later in this chapter, it is possible for a *definiendum* such as ‘renewable energy’ to have a number of *definiens* with different distinguishing characteristics used in different jurisdictions, all of which are still functional.

Copi and Cohen have stated that there are five kinds of definitions:

1. *Stipulative or nominal definitions*: where a new meaning is arbitrarily assigned to the word or phrase being defined;
2. *Lexical definitions*: where a meaning that is already in established use to describe the word or phrase being defined is adopted. The purpose of these definitions is to explain that use or eliminate ambiguities in usage;
3. *Précising definitions*: where the meaning is clearly delimited to eliminate ambiguity or vagueness in interpretation;
4. *Theoretical definitions*: where the meaning encapsulates an understanding of the theory in which the word or phrase to be defined is a key element; and

¹ See generally, Irving M Copi, Carl Cohen and Kenneth D McMahon, *Introduction to Logic* (Prentice Hall, 14th ed, 2011) 79; Adrian Sgarbi, ‘What Is a Good Legislative Definition?’ (2013) 4 *Beijing Law Review* 28.

5. *Persuasive definitions*: where the meaning is designed to influence attitudes or stir emotions.²

Reed identified a further type of definition that he believed was useful for lawyers: the '*denotative definition*'. This type of definition lists either all or some of the things to which the term refers.³ Depending on whether it is the former or the latter, a denotative definition may either be exhaustive or merely inclusive.

3.1.1 THE ROLE OF LEGISLATIVE DEFINITIONS

Legislative definitions are definitions that are found in Acts of Parliament that seek to provide clarity and consistency to the subject matter covered by legislative provisions. There are primarily three reasons why legislative definitions are adopted:

1. to reduce or eliminate the ambiguities associated with interpreting a word or phrase (precising/lexical/denotative);
2. to explain a new concept, innovation or phenomenon (stipulative or theoretical); and/or
3. to influence attitudes as to the meaning to be attached to a word or phrase by either including or excluding meanings ordinarily attached to the definition (persuasive).⁴

A further benefit occurs where a concept is used repeatedly in a piece of legislation. In these circumstances, it will often be appropriate for the concept to be defined within the legislation in order to save the repetition of the explanatory or clarifying statements with each usage.⁵ In this way, legislative definitions shorten the length of legislation and make it easier for the reader to understand.

² Irving, Cohen and McMahon, above n 1, 79-86.

³ Reed Dickerson, *The Fundamentals of Legal Drafting* (Little, Brown and Co, 1965) 100.

⁴ See generally, Sgarbi, above n 1, 29; Parliamentary Counsel's Office of Western Australia, *How to read legislation, a beginner's guide* (Department of the Attorney General, State of Western Australia, 2011) 24-5.

⁵ Dickerson, above n 3, 98-9.

Sgarbi has stated that ‘condemnations of legislative definitions are common ... the most frequent arguments are that legislative definitions impede the “progress” of the legal institutions and that to legislatively define causes politics to endanger the process.’⁶ He does not support this argument though, noting that legislative definitions can always be amended and that vague and indefinite expressions may potentially cause more harm than a legislative definition.⁷

While the sentiment expressed in Sgarbi’s statement is admirable, his statement does however assume that legislative definitions do not themselves suffer from vagueness or ambiguity. Unfortunately, and as will be shown below, some of the definitions of ‘renewable energy’ adopted by various jurisdictions are not clear in their meaning, with confusion arising as to whether renewable energy sources or technologies are supported by the legislation. This reduces their usefulness, with Gifford and Salter stating: ‘[o]f course the definition set out in the Act of Parliament will only avoid argument about the meaning of the words they define if those definitions are themselves clear definitions.’⁸

3.1.2 STATUTORY INTERPRETATION OF LEGISLATIVE DEFINITIONS

Once a country has elected to include a definition in their legislative framework, the next issue becomes how that definition is to be legally interpreted. This is an important exercise as legislative definitions often adopt meanings that are far broader than a dictionary definition of the term. The approach taken to statutory interpretation differs between legal systems. Where the legislative definition is exhaustive, clear in its meaning and fits with the substantive enactment it is embedded within, the differing approaches are likely to make little difference to the practical outcome. However, if a definition is ill-defined or inclusive, the differing approaches taken by the different legal systems become a critical concern. As detailed in Appendix 1, the majority of the countries adopting renewable energy laws operate either within the common law or civil

⁶ Sgarbi, above n 1, 32.

⁷ Sgarbi, above n 1, 32.

⁸ Donald J Gifford and John Salter, *How to Understand an Act of Parliament* (Cavendish Publishing, 1996) 49.

law traditions, with a few countries having mixed legal systems. The different processes of statutory interpretation of legislative definitions in these legal systems will be briefly considered below.

3.1.2.1 COMMON LAW JURISDICTIONS

There is a well-established series of rules guiding the statutory interpretation of legislative definitions in the common law tradition. The most fundamental rule to interpreting legislative definitions is that ‘the function of a definition is not to enact substantive law. It is to provide aid in construing the statute.’⁹ As such, the meaning of a defined term is a matter of fact not a matter of law,¹⁰ and must be determined in each case.

The common law approach to using legislative definitions to construe statute is as follows:

1. Is there a legislative definition to be applied?
2. If yes, is the definition either expressly excluded or impliedly excluded by the presence of a contrary intention¹¹ from applying to the substantive enactment?
3. If not, the words of the definition should be read into the substantive enactment.
4. The substantive enactment should then be construed in the broader context of the statute, ‘bearing in mind the purpose and the mischief that it was designed to overcome.’¹²

If the legislative definition does not fit neatly within the text of the substantive enactment, it cannot be ignored but must still be taken into account in construing the text.¹³

⁹ *Kelly v The Queen* (2004) 218 CLR 216, 245 (McHugh J); see also *Gibb v Federal Commissioner of Taxation* (1966) 118 CLR 628, 635 (Barwick CJ, McTiernan and Taylor JJ).

¹⁰ *Brutus v Cozens* [1973] AC 854, 861 (Reid LJ).

¹¹ See e.g. *Gidaro v Secretary, Department of Social Security* (1998) 83 FCR 139, 150-1 (Burchett J); *Repatriation Commission v Vietnam Veterans' Association of Australia NSW Branch Inc* (2000) 154 FLR 345, 374 (Spigelman CJ).

¹² *Kelly v The Queen* (2004) 218 CLR 216, 245 (McHugh J).

In interpreting the meaning of a definition in the context of a substantive enactment, the words of the definition are to be assigned their plain and ordinary meaning. Depending upon the jurisdiction¹⁴ and the drafting of the legislation,¹⁵ the meaning ascribed to the words will either be the meaning the words bore at the date of enactment or ‘the Act will be deemed to be always speaking’, and their current meaning will be used.

A legislative definition will frequently apply to the whole of a piece of legislation but may on occasion only apply to a specified Part or Section of it. Where a definition only applies to a specified Part or Section, and the defined word or phrase is used outside of that Part or Section, the definition will not apply. In these circumstances, the word or phrase will be interpreted either using the alternative definition supplied, or where no definition is supplied, by using its plain, ordinary and everyday meaning.

3.1.2.2 CIVIL LAW JURISDICTIONS

It was historically thought that civil law jurisdictions were reluctant to adopt legislative definitions because in the words of Priscus, ‘every definition in civil law is dangerous; for it is rare for the possibility not to exist on its being overthrown.’¹⁶ Despite this, the vast majority of civil law jurisdictions with a legislative framework governing or promoting renewable energy do have a legislative definition.

¹³ *Kelly v The Queen* (2004) 218 CLR 216, 245 (McHugh J); see also Dennis Charles Pearce and Robert S Geddes, *Statutory Interpretation in Australia* (LexisNexis Butterworths, 2006) 238 for further discussion of this point.

¹⁴ Some jurisdictions such as Canada, South Australia and Western Australia have explicitly included the ‘Act always speaking’ rule into their Acts Interpretation Acts.

¹⁵ *R v Gee* (2003) 212 CLR 230, 241 (Gleeson CJ); *Deputy Commissioner of Taxation v Clark* (2003) 57 NSWLR 113, 145 (Spigelman CJ).

¹⁶ D.50.17.202 (Javolenus, Letters 11).

Unlike the common law tradition, in the civil law tradition 'statutory interpretation is very flexible, and there are no strict canons of interpretation.'¹⁷ Where a definition is clear in its meaning, fits the substantive enactment and is applicable to the issue at hand, civil law judges will ordinarily apply a literal approach. However, if this is not the case, there are primarily two different approaches to the statutory interpretation that may be applied:¹⁸

1. The exegetic approach: this approach uses legislative history such as *travaux préparatoires* to discern the legislative intention and the meaning of ill-defined provisions.¹⁹ This approach is focused on the application of the text, so if difficulties arise in logical reasoning methods, such as reasoning by analogy, reasoning by deduction and reasoning *a contrario* are adopted.
2. The teleological or progressive or extensive approach: this approach interprets the words of the definition in light of the purpose, values, legal, social and economic goals the legislation aims to achieve.²⁰ This approach interprets the words of the definition in a manner similar to the 'Act always speaking' approach in the common law tradition. In this approach, neither the historical context nor the original intention of the legislative drafters is considered but rather the law is adapted to reflect the current societal conditions.

Most civil law jurisdictions now apply a combination of these three methods to determine the meaning of a legislative definition. For example, the French method of interpreting a legislative definition would be as follows:

¹⁷ Claire M Germain, 'Approaches to Statutory Interpretation and Legislative History in France' (2003) 13 *Duke Journal of Comparative & International Law* 194.

¹⁸ Rupert Granville Glover, 'Statutory Interpretation in French and English Law' (1982) 1 *Canterbury Law Review* 385.

¹⁹ Germain, above n 17, 198.

²⁰ Mirzoyan Ashken Anna Meuthen and Konstantinos Flegas, *Teleological Interpretation* (17 July 2014) Wikis Der Freien Universität Berlin <<http://wikis.fu-berlin.de/display/oncomment/Teleological+Interpretation>>.

1. If the text is clear, it should be applied literally unless an absurd outcome would result.
2. If the text is ambiguous, the court will review the whole text of the legislation, the context of the provision and may also consider commentaries written about the text.
3. If the ambiguity is still not resolved, the court may then adopt the historical method of interpretation by analysing the *travaux préparatoires* to discern the legislative intention as at the date of enactment.
4. If a study of the text and historical interpretation do not resolve the ambiguity, the court may then engage in reasoning by analogy, deduction or *a contrario* using the text of the definition.
5. Finally, if the law is old and no longer fits the present circumstances, or the legislative history is confused, the court may then adopt a teleological approach and consider the purpose of the legislation in light of the current societal conditions.²¹

3.1.2.3 MIXED JURISDICTIONS

Most of the other jurisdictions with legislative definitions of ‘renewable energy’ which do not fit into either the pure common law or civil law legal traditions have mixed legal systems which may contain elements of two or more of Islamic law, customary law, religious law, socialist law, common law and civil law. For these jurisdictions, the rules of statutory interpretation of legislative definitions may vary considerably and need to be carefully considered when trying to discern the meaning of an ambiguous legislative definition.

3.2 THE CHALLENGE OF DEFINING RENEWABLE ENERGY

Formulating a legislative definition of ‘renewable energy’ is important in countries that have a primary legislative framework governing or promoting

²¹ Germain, above n 17, 201-2.

renewable energy law. The presence of a legislative definition delimits the core subject matter of such laws and provides greater certainty to the sector about which energy sources and technologies should be supported. At a time when there is increasing commercialisation of renewable energy technologies, it is notable that significant differences still exist in both legislative form and conceptual approach to the content of definitions. This section of the chapter considers why it is so challenging to define renewable energy, focusing on four key areas of difficulty:

1. the lack of a universally accepted definition of what constitutes renewable energy;
2. the challenge of creating a definition that will incorporate emerging renewable energy technologies, without that definition being either over- or under-inclusive;
3. the significant economic benefits associated with a technology being included in the definition of 'renewable energy'; and
4. the resulting inherently political nature of a technology being included within the definition of 'renewable energy', which makes the process of defining renewable energy the subject of industry group lobbying and potentially, regulatory capture.

3.2.1 THE LACK OF A UNIVERSAL DEFINITION OF RENEWABLE ENERGY

Unlike other sources of energy, renewable energy does not have a universally accepted definition, in part because it comes from so many different sources and is provided by so many different technologies that it cannot be reduced to a simple equation. While this is a novel problem within energy law, it is in fact no different from many other areas where the law has had to grapple with technological development. As Bennett Moses has noted, '[l]anguage cannot be completely technology-neutral; it is impossible to draft legislation with sufficient precision and clarity that addresses every possible future technical variation.'²²

²² Lyria Bennett Moses, 'Understanding Legal Responses to Technological Change: The Example of *In Vitro* Fertilization' (2005) 6 *Minnesota Journal of Law, Science and Technology* 505, 578.

3.2.2 THE PERVASIVE NATURE OF UNCERTAINTY AND OVER INCLUSIVENESS IN LEGISLATIVE DEFINITIONS

One of the biggest risks in devising a legislative definition of ‘renewable energy’ is that given there is no agreement about how to legally define renewable energy, the definition will either be ambiguous and uncertain or that a ‘stretched definition’ may be created.

Ambiguity and uncertainty arise when concepts are left ill-defined in legislation.²³ This can occur in two ways. First, a legislative drafter may not consider all of the consequences of using the definition in the context of where it is used in the broader text of the legislation. This may result in two or more meanings of the same term evolving, creating complexity and confusion. Second, in the context of an emerging sector such as the renewable energy sector, the definition may have clearly represented the concept as it stood but due to the rapid changes in the sector or new technologies, the definition no longer properly represents the concept. This may create a disjuncture between real world understandings and practices and the text of the legislation. If this results, it is likely to create interpretative issues and may result in the law having to be amended or regulations being introduced.²⁴ This problem is largely a product of the law in this field being reactive to technological change and thus always playing ‘catch-up’,²⁵ at the same time as lawmakers wanting to support emerging technologies. An alternative approach might be to encourage lawmakers to work much more closely with the industry and the scientists engaged in research and development (an area also the beneficiary of significant support from governments)²⁶ so that they can be proactive and much more tailored in developing appropriate regulation. Eligibility conditions should also be placed

²³ Office of Parliamentary Counsel of the Australian Government, *Reducing complexity in legislation* (Commonwealth Government of Australia, 2011) 11.

²⁴ *Ibid.*

²⁵ See Bennett Moses, above n 22, 528-9 for a general discussion of how the law is responsive to technological change.

²⁶ REN21 Secretariat, ‘Renewables 2012 Global Status Report’ (Report, REN21, 2012) 71.

on projects using qualified renewable energy sources such that commercially viable technologies and projects that have been long established do not benefit from the regulatory support mechanisms contained in the legislation.

When discussing ambiguity and uncertainty, it is important to distinguish inconclusiveness that is intentionally drafted into the definition to provide flexibility and discretion. Intentionally inconclusive definitions provide an opportunity for the government to exercise discretion in deciding whether they will provide regulatory support mechanisms to newly developed technologies. For example, Chapter 1, Article 2 of The Renewable Energy Law of the People's Republic of China states:

Renewable energy in this Law refers to non-fossil energy of wind energy, solar energy, water energy, biomass energy, geothermal energy, and ocean energy, **etc.** [...] This Law does not apply to the direct burning of straw, firewood and dejecta, **etc.** on low-efficiency stove[s]. [emphasis added]²⁷

It is the inclusion of the 'etceteras' within the definition of renewable energy which provide the energy authorities supervised by the National Energy Commission with discretion in their interpretation and implementation of the definition of renewable energy, providing greater flexibility in deciding which technologies they might support. However, the presence of these same 'etceteras' also adds uncertainty for project developers and instils a lack of public transparency in the decision-making process of which technologies the government will support under The Renewable Energy Law.

Another problem for legislative definitions of 'renewable energy' is what Butt and Castle have termed 'stretched definitions.'²⁸ By this, they mean definitions that are inclusive beyond their plain English meaning and therefore likely to create uncertainty in the reader. In the context of laws designed to encourage the acceleration of the deployment of renewable energy, there are two key ways a stretched definition of 'renewable energy' may eventuate. First, the legislative

²⁷ «中华人民共和国可再生能源法» [Renewable Energy Law of the People's Republic of China] (People's Republic of China) National People's Congress, 28 February 2005, Art 2 [Ministry of Commerce of the People's Republic of China translation from Mandarin] (emphasis added).

²⁸ Peter Butt and Richard W Castle, *Modern Legal Drafting: A Guide to Using Clearer Language* (Cambridge University Press, 2001) 118.

definition may inappropriately include long-established energy sources and technologies that do not require assistance in their development or commercialisation. Second, the legislative definition may be enlarged outside of its plain and ordinary meaning by including non-renewable energy sources. Both of these causes of 'stretched definitions' may seriously distort the market. In some jurisdictions, long-established projects utilising renewable generation technologies that are already commercially viable without government assistance, and indeed in some cases, that have been fully operational for decades, are benefiting from subsidies and other commercial support leading to super-profits for those generators. For example, during debates before the US Senate Committee on Energy in 2009, concerns were raised that the Grand Coulee Dam, a hydropower project with an installed capacity of 6,809 megawatts (MW) and originally constructed between 1933 and 1942, would be able to benefit from subsidies targeting renewable energy.²⁹ Meanwhile, the Russian definition of 'renewable energy' includes coal seam gas,³⁰ and the Swedish definition of 'renewable electricity' includes electricity generated from peat.³¹

These problems highlight the challenge that legislative drafters face in trying to capture the essence of 'renewable energy' in the context of a rapidly changing market. If the definition of 'renewable energy' is ill-defined, ambiguity or a 'stretched definition' may pervade the legislation creating unnecessary complexity. This places the legislative drafter in the difficult position of trying to instil sufficient flexibility into the legislative definition to allow it to encompass emerging renewable energy sources and technologies as they evolve.

²⁹ Felicity Barringer, 'With Billions at Stake, Trying to Expand the Meaning of 'Renewable Energy'', *New York Times* (New York), 25 May 2009.

³⁰ «ФЕДЕРАЛЬНЫЙ ЗАКОН N 35-ФЗ ОБ ЭЛЕКТРОЭНЕРГЕТИКЕ» [Russian Federation Federal Law on the Electric Power Industry] (Russian Federation) 26 March 2003, No 35-FZ, Art 3 [RAO Russian Power and Electrification translation from Russian].

³¹ *Lag om elcertifikat* [Electricity Certificates Act] (Sweden) No 2011:1200, s 2[1-2].

3.2.3 THE CONSEQUENCES OF DEFINING AN ENERGY SOURCE AS 'RENEWABLE'

One challenge of defining renewable energy sources and eligible renewable energy technologies in legislation is that the policy objective is to try to pick 'winners', i.e. those new or emerging technologies that with appropriate support in the development and early commercialisation stages will become competitive with existing fossil fuel generation.³² Unlike most other legislation involving new technologies, in this context, legislators are not trying to authorise, prohibit or otherwise place conditions on the use of these new technologies. However, the failure to support one emerging renewable technology, while giving preference to another, will almost inevitably have a 'chilling' effect on the research and development of the disfavoured technology and any subsequent commercialisation of that technology. This highlights the risk of bright-line exhaustive definitions of 'renewable energy' within the sector.

The benefits of falling within the definition of renewable energy are considerable, as evidenced by the over \$US 121bn globally that was allocated in 2013 for direct spending on regulatory support mechanisms to encourage greater deployment of renewable energy.³³ A further reflection of the value of a technology being recognised as renewable is shown by the efforts that some industry groups will go to in an attempt to have their technology included in the definition of renewable energy. A recent article in the *New York Times* stated that:

with billions of dollars at stake, legislators have been besieged by lobbyists eager to share in the wealth ... the lure of the renewable label is understandable.³⁴

This is because once a project has been recognised as being 'renewable' for the purposes of the relevant legislation, it will often be eligible to produce renewable energy credits which can be used either to offset the producer's own liability or

³² Catherine Mitchell, *Energy, Climate and Environment Series: The Political Economy of Sustainable Energy* (Palgrave Macmillan, 2010) 39-40.

³³ International Energy Agency, 'Renewable energy outlook' in International Energy Agency (ed), *World Energy Outlook* (2014) 239, 275.

³⁴ Barringer, above n 29.

be on-sold into the secondary credit market for financial gain. This secondary source of income (over and above the revenue from selling electricity into the market) can be a valuable additional income stream. Where the level of the benefits provided under a regulatory support mechanism are not 'banded' (or calibrated to the stage of technological development and commercialisation), this will encourage the expansion of the most highly commercialised technologies which can currently compete with fossil fuel based electricity at least cost, arguably leading to an 'all eggs in one basket' outcome. For example, in most jurisdictions, this would lead to the mass development of onshore wind-farms, an established technology. On-shore wind is currently one of the cheapest types of non-hydro renewable energy to produce and thus it would lead to super profits for its generators, at the expense of the development and commercialisation of emerging technologies.³⁵ The high financial costs associated with this undifferentiated support have increasingly meant that the decision whether a technology should receive such support has political, economic and legal dimensions.³⁶

3.2.4 THE POLITICS INVOLVED IN DEFINING 'RENEWABLE ENERGY' AND THE INCREASED LIKELIHOOD OF REGULATORY CAPTURE

It is not merely the significant financial benefits attached to a project being deemed 'renewable' that make it valuable for a project developer or industry group to lobby for the expansion of the definition of renewable energy, or its accommodation within an existing but elastic form of words. There are also often significant social, economic and employment opportunities for the local communities around these projects. Due to the land required to build new large-scale renewable energy generation facilities, these projects tend to be located in rural areas. For example, China's best wind and solar resources are located in

³⁵ Christoph Kost et al, *Levelized Cost of Electricity Renewable Energy Technologies* (Fraunhofer Institute, 2013).

³⁶ Wolfram Krewitt et al, *Renewable Energy Deployment Potentials in Large Economies* (German Aerospace Center (DLR), 2008) 111; RenewableUK, *The Zero-Carbon Switch: Joint Manifesto for Renewables* (RenewableUK, 2010) 3.

less populated and developed areas of western China.³⁷ This means that if these wind and solar resources are to be optimally utilised, new infrastructure and both skilled and unskilled jobs will be moved into rural or remote communities that would otherwise suffer from marginal or declining employment opportunities. This makes the process of defining renewable energy an inherently political process, with decisions about whether a project should receive the benefit of a regulatory support mechanism by virtue of being 'renewable' having far reaching consequences beyond those intended by the legislative purpose. These pressures strengthen the public policy arguments for bright line and 'robust' definitions.

The political nature of this process has been the subject of complaints in the United States to the Congress House Energy and Commerce Committee, with groups such as the Union of Concerned Scientists, Environment America and the Natural Resources Defense Council (NRDC) complaining about the stretching of the definition of 'renewable energy'. For example, the NRDC's Director of Renewable Energy Policy, Nathan Greene expressed his frustration at the 'increasing elasticity of the word "renewable" in the legislators' hands'³⁸ when he stated:

Usually this is a very political process, and not driven in any way, shape or form by any strict scientific or ecological definition of renewables.

Meanwhile, Leon Lowery, a Democratic staff member of the Committee, said that 'both environmentalists and industry had tinkered with the common-sense understanding of renewable sources to make definitions fit policy goals.'³⁹ This is a common problem within the energy sector and arguably a product of the central role that energy, including renewable energy, plays within the modern economy.⁴⁰ The depth of this problem is reflected in the comments of Graham Matthews, a lobbyist representing Covanta Energy, a waste-to-energy company:

³⁷ Kat Cheung and International Energy Agency, 'Integration of Renewables - Status and Challenges in China' (Working Paper, Organisation for Economic Co-Operation and Development, 2011).

³⁸ Barringer, above n 29.

³⁹ Ibid.

⁴⁰ This is discussed in more detail in Chapters 5 and 6.

Energy policy is balkanized by region, and that dictates the debate. The politics become incredibly complicated.⁴¹

This poses the question of whether the use of a legislative definition to control the *scope* of the impact of the primary legislation on the renewable energy sector is the best way of deciding which technologies should receive support from regulatory mechanisms and subsidies. Does the inherently political nature of negotiating the content and breadth of a definition of renewable energy provide the best predictor of which emerging technologies currently outside the scope of the definition can be *best* commercialised in an economically viable way? Or will this lead to over-inclusive definitions that provide access to scarce resources for technologies that are inefficient or offer marginal returns in the long run?

Legislation also adds valuable democratic legitimacy to the process of giving regulatory support to emerging technologies. Bennett-Moses has argued that this is a balancing process.⁴² On the one hand, there are benefits to be gained by waiting until legislators:

...have a good understanding of the technology and its risks and benefits. On the other hand, there may be advantages to intervening at a stage when a technology is still developing so that lawmakers can influence that development. Delay may also allow the choices made by professionals to become fixed as a result of material equipment, economic investment, and habits.⁴³

One way of avoiding delays is to give the relevant energy authority in each jurisdiction areas of discretionary power, including perhaps interpretive discretion within the confines of a delegated authority to resolve any uncertainties in the interpretation of the definition.⁴⁴ This provides the added benefit that, in contrast to legislators, the public servants working within energy authorities often have considerable technical and practical expertise within the energy sector so may be better positioned to make choices that will achieve the legislated purposes. Further, Bennett-Moses has argued that by focusing on a

⁴¹ Barringer, above n 29.

⁴² Bennett Moses, above n 22, 579-80.

⁴³ Ibid.

⁴⁴ This is discussed further under inclusive definitions below.

narrower range of issues than the legislature, these 'agencies are more able to keep abreast of new developments'.⁴⁵

The potential problem with relying on agencies to make decisions about the most appropriate definition of renewable energy is that their very expertise in the area makes them more susceptible to regulatory capture.⁴⁶ This often arises because the government administrators who work in these energy authorities often develop their expertise in-house with energy companies as they tend to employ more people. Further, there is also a well-trodden path back into the private sector. This means that bureaucrats have few incentives to criticise or choose not to support emerging technologies, particularly those that have the backing of the large energy companies. Another issue here is the financial and status gains that may be made via empire building if the bureaucrats agree to expand the definition of renewable energy. Furthermore, with the rapid pace of technological development within the sector, energy companies that have invested in research and development often know considerably more about the latest developments than do the bureaucrats.⁴⁷ This places the energy companies in a position where they can call upon their corporate/industry reputations and build on their previous industry connections with the bureaucrats almost to dictate regulatory positions to government. Thus it is a delicate balancing act; on the one hand, the role of defining renewable energy may be vested in legislators who will provide democratic legitimacy to the process but have limited technical expertise while on the other hand, if too much authority is delegated to the bureaucrats, there will be technical expertise but limited democratic legitimacy. Thus one of the central questions that needs to be answered before deciding the approach that a country should adopt to defining renewable energy is whether technical expertise and flexibility will be valued more highly than democratic legitimacy. The following section of this chapter

⁴⁵ Bennett Moses, above n 22, 580.

⁴⁶ Ibibia Lucky Worika, 'Rural Applications of Energy Efficiency and Renewable Energy' in Richard L Ottinger and Adrian J Bradbrook (eds), *UNEP Handbook for Drafting Laws on Energy Efficiency and Renewable Energy Resources* (UNEP/Earth Print, 2007) 216, 223.

⁴⁷ McLennan Magasanik Associates, 'Final Report to the Garnaut Climate Change Review: NEM Market Failures and Governance Barriers for New Technologies' (Report, Garnaut Climate Change Review, 1 July 2008) 15-16.

considers how countries have addressed these issues in their legislative definitions.

3.3 THE APPROACHES TO DEFINING RENEWABLE ENERGY ADOPTED BY VARIOUS JURISDICTIONS

The definitions used in legislation often reflect the historical origins of the regulatory support for renewable energy in each jurisdiction, and the outcomes of political debate about the strategic direction of sub-sectors of the energy industry. Thus each jurisdiction's definition is the product of their unique social context. No comparative study of renewable energy laws would therefore be complete without considering the differences that emerge in their legislative definitions of 'renewable energy'.

A number of different terms (*definiendum*) have been used to define the core subject matter of the legislation including: 'renewable energy', 'renewable energy sources', 'renewable electricity', 'renewable energy resources', 'energy from renewable sources', 'new and renewable energy', 'renewable and sustainable energy sources', 'alternative energy', 'green power', 'non-conventional energy', 'non-traditional renewable energy sources' and 'non-fossil energy'. The term used by each country is contained in Appendix 3: **Renewable Energy Sources included in the Legislative Definitions of Renewable Energy by Country**.

The differences in the terms used can largely be attributed to semantics, with it being rare that a difference in term actually indicates a deviation from the plain and ordinary understanding of renewable energy. One notable exception to this statement is the use of the term 'new and renewable energy' in s 2(1) of the South Korean Act on the Promotion of the Development, Use and Diffusion of New and Renewable Energy 2004, which adopts a definition

that is much broader than the plain and ordinary meaning of those words.⁴⁸ This definition encompasses ‘energy converted from existing fossil fuels or renewable energy’ and expressly includes in s 2(1)(f) ‘energy from liquefied or gasified coal, and from gasified heavy residual oil which falls within the criteria and scope prescribed by the Presidential Decree.’

Rather, very real substantive differences do exist within the content of definitions using the same term. For example, while Brazil uses ‘alternative energy’ to refer to small-scale hydropower,⁴⁹ the Ukraine uses the same term much more broadly, incorporating in solar, wind, hydropower, ocean energy, biomass and biogas, and ‘secondary energy resources, which include blast and coke gas, and the degassing of methane gas from coal deposits.’⁵⁰ Equally, Russia adopts one of the most commonly used terms, ‘renewable energy’, to include ‘gas formed at coal sites’⁵¹ and Thailand uses the same term to include ‘energy obtained from wood, firewood, [and paddy] husk’.⁵² Finally, Sweden adopts a conventional definition for renewable energy sources’ but also includes a further definition within their legislation for ‘renewable electricity’ which it defines as ‘electricity produced from renewable energy sources or peat.’⁵³ This is clearly outside the plain and ordinary meaning that a reader might ascribe to the term ‘renewable electricity’, particularly in light of the definition of ‘renewable energy

⁴⁸ «개발의 승진 주문, 사용 및 확산 새로운 신 재생 에너지의» [Act on the Promotion of the Development, Use and Diffusion of New and Renewable Energy] (Republic of Korea), 31 December 2004, Art 2 [Korean Legislative Research Institute translation from Korean].

⁴⁹ *Law No 10,438* (Brazil) 26 April 2002, Art 3 [Linguistico Translations translation from Portuguese]: ‘Provides for the expansion of emergency electrical power, extraordinary rate adjustment, creates the Program of Incentives for Alternative Electricity Sources (Proinfra), the Energy Development Account (CDE), provides for the universalisation of the public electricity service.’

⁵⁰ *Law on Alternative Energy Sources* (Ukraine) 20 February 2003, no 555-IV, Art 1 [Linguistico Translations translation from Ukrainian].

⁵¹ «ФЕДЕРАЛЬНЫЙ ЗАКОН N 35-ФЗ ОБ ЭЛЕКТРОЭНЕРГЕТИКЕ» [Russian Federation Federal Law on the Electric Power Industry] (Russian Federation) 26 March 2003, No 35-FZ, Art 3 [RAO Russian Power and Electrification translation from Russian].

⁵² *Energy Industry Act, B E 2550* (Kingdom of Thailand) 10 December 2007, s 5 [Thai Law Forum trans]; *National Energy Policy Council Act B E 2535* (Kingdom of Thailand) 3 February 1992, s 4 [Thai Law Forum translation from Thai].

⁵³ *Lag om elcertifikat* [Electricity Certificates Act] (Sweden) No 2011:1200, s 2 [1-2].

sources' contained in the legislation. For this reason, a study of the form and content of the definitions is helpful to decipher the different coverage of the laws.

In the next section of the chapter, each different approach to form and to content will be analysed in turn, exemplified by references to the legislative definitions used in different jurisdictions. This section draws largely upon primary analysis of the legislative definition adopted by each country with a legislative framework governing or promoting renewable energy. Where the language of the authoritative version was not English, these definitions have been legally translated into English and are contained in Appendix 1. This section also draws upon the work conducted in Appendix 2, in which the legislative definition of 'renewable energy' (or the equivalent term used in the legislation) for each country with a renewable energy law has been classified according to its form and conceptual approach using the schema outlined below.

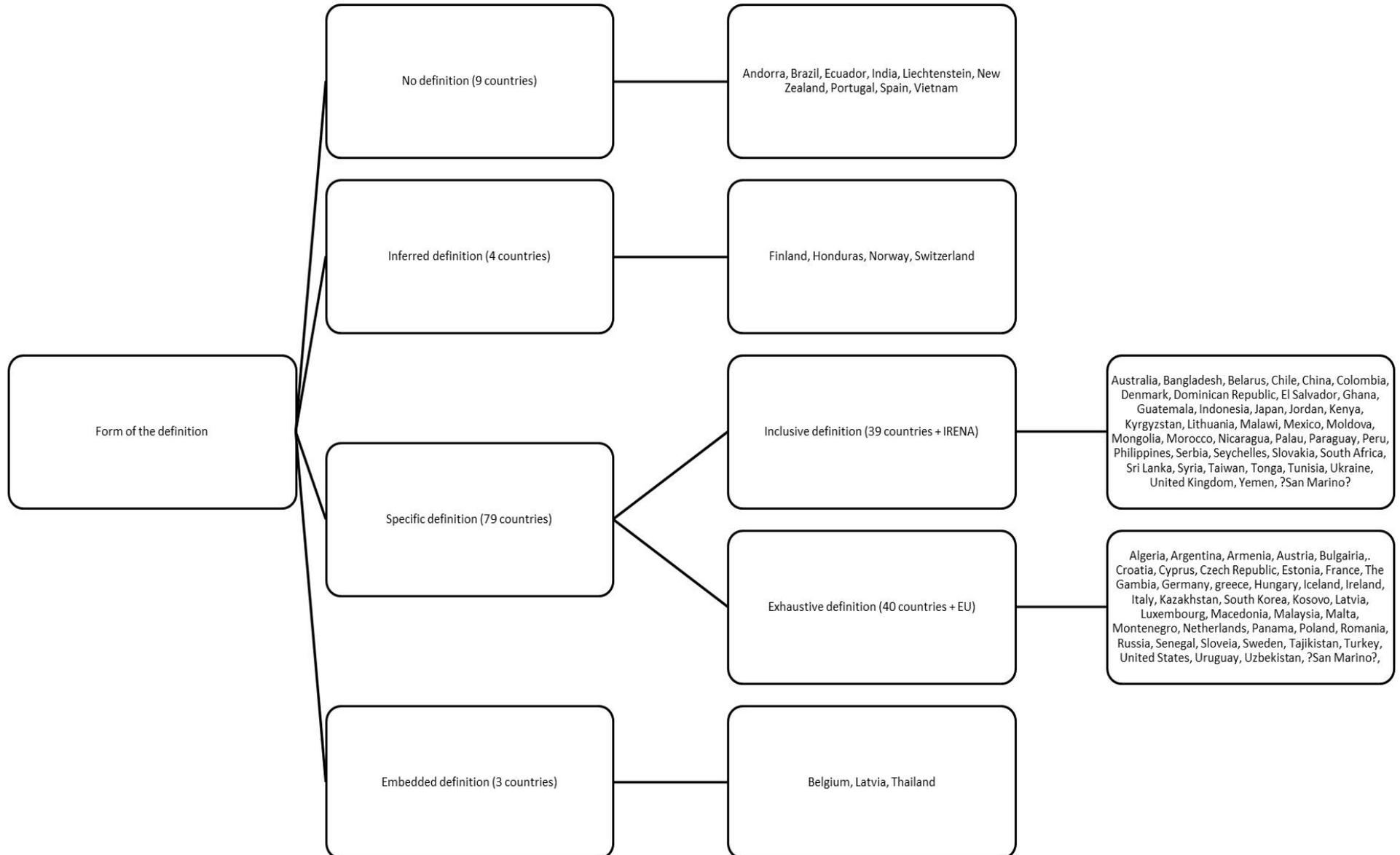
3.4 FORM OF THE DEFINITION

In classifying the various definitions of renewable energy used in different jurisdictions, it is helpful to distinguish between differences in the form of the definition and differences in the conceptual approach. This research has identified five different approaches taken to the form of the legislative definition of 'renewable energy':

1. No definition;
2. An exhaustive definition;
3. An inclusive definition;
4. An embedded definition from another piece of legislation; or
5. An inferred definition that is derived from the use of the principles of statutory interpretation.

The categorisation of the form of the different countries' definitions of 'renewable energy' is found in Figure 3.1 (below).

FIGURE 3.1: THE FORM OF DIFFERENT COUNTRIES DEFINITIONS OF 'RENEWABLE ENERGY'



3.4.1 NO DEFINITION

The first approach, adopted by nine countries out of the 95 countries with a primary legislative framework governing or promoting renewable energy law, is to not define 'renewable energy' or 'renewable electricity'. The countries that have adopted the 'no definition' approach are Andorra, Brazil, Ecuador, India, Liechtenstein, New Zealand, Portugal, Spain and Vietnam.

3.4.1.1 POSSIBLE EXPLANATIONS FOR THE DECISION NOT TO DEFINE

Unfortunately, when the decision is made to not define 'renewable energy' or 'renewable electricity' there is often little indication provided as to the reasons why. Despite this, it is argued that there may be three possible explanations drawn from the decision not to define.

First, the terms 'renewable energy' or 'renewable electricity' may be so clearly and widely understood within a country that the legislative drafters believe that the term does not need to be defined. However, given the differences that exist between different countries or in some cases, even between different states or provinces within the same country, it may be argued that in the vast majority of countries this is unlikely to provide a plausible justification for a decision not to define. That said, for countries such as Andorra, which has much of its domestic electricity generation coming from hydropower,⁵⁴ this may provide an explanation for their 'no definition' approach. This may also explain the lack of a definition in Spain and Portugal, as both countries are obligated to transpose and implement the EU definition into their domestic law.

The second possible explanation is that the terms 'renewable energy' and 'renewable electricity' are ascribed meaning through the existence of judicial interpretations of the phrases in case law. This is a reactive method of defining

⁵⁴ Forces Elèctriques d'Andorra, *Commitment to the environment* (2008) <<https://www.feda.ad/ang/sostenibilitat/contents/mediambient.aspx>>.

renewable energy, contingent on legal challenges being launched to provide clarity. Again, this is unlikely to provide a plausible explanation of the decision not to provide a legislative definition, especially given the paucity of case law that exists on renewable energy relative to other sources of energy.

The final possible explanation is that the legislative drafters may have believed that it would be too difficult to pass the legislation if a definition of renewable energy was given, or that it would be inappropriate to include a definition in the relevant piece of legislation. This may explain the failure to define what was meant by ‘renewable energy’ in the Ecuadorian Constitution, as constitutions rarely contain definitions.

3.4.1.2 WHAT HAPPENS WHEN A TERM IS LEFT UNDEFINED IN LEGISLATION?

Where a term is not defined in the applicable legislation, the principles of statutory interpretation within both the common law and civil law systems require that the word be given its plain and ordinary meaning. In this event, the court may turn to dictionaries in the relevant language of high repute to assist with identifying the meaning of ‘renewable energy’. For example, the *Oxford English Dictionary* defines ‘renewable’ as:

- A. *adj*
 - 1. Capable of being renewed.
 - 2. *spec.* Of a natural resource of source of energy: capable of being replenished, not depleted by its utilization. Freq. in **renewable energy**.
- B. *n.*
 - Usu. in *pl.* A renewable natural resource or source of energy, such as water, wind or solar power.⁵⁵

However, given the considerable variance in the understanding of what renewable energy is, this exercise may not be as straightforward as it might otherwise appear. How, for example, is a court to determine whether woody biomass is renewable? Or what percentage of fossil fuels will be permitted to be used in eligible co-fired power plants? Given the lack of guidance provided by

⁵⁵ Oxford English Dictionary, *renewable, adj. and n.* (2014) <<http://www.oed.com/view/Entry/162427?redirectedFrom=renewable+energy>>.

the legislation, it is also difficult for the industry to predict with certainty which technologies should be commercialised, or even possibly where future research and development should be focused.

3.4.2 EXHAUSTIVE DEFINITION

The vast majority of countries, a total of 79 out of the 95 countries that have a primary legislative framework governing or promoting renewable energy, had a specific definition of the relevant term in their legislation. The analysis shows that it is fairly evenly split between countries who have opted for an exhaustive definition (40 countries) and those who have opted for an inclusive definition (39 countries), with it being unclear whether San Marino's definition is inclusive or exhaustive. In addition, the definition in the EU Directive is an exhaustive definition.

3.4.2.1 WHAT ARE THE FEATURES OF AN EXHAUSTIVE DEFINITION?

Exhaustive definitions seek explicitly and definitively to stipulate how the definition should be applied. The rationale for this approach is that the definition will be consistently applied, it removes ambiguity and it also removes discretion on the part of decision-makers. Exhaustive definitions are often signalled through the presence of the words 'means' or 'shall mean'. The use of the word 'means' in the drafting of legislative definitions signals that, to the extent that the plain and ordinary meaning of the term differs from the meaning in the exhaustive definition of 'renewable energy', the plain and ordinary meaning will be rejected for the purposes of the Act.⁵⁶ An example of an exhaustive definition is found in the German law:⁵⁷

3. "renewable energy sources" shall mean hydropower, including wave power, tidal power, salt gradient and flow energy, wind energy, solar radiation, geothermal energy,

⁵⁶ See e.g. Gifford and Salter, above n 8, 239.

⁵⁷ *Gesetz für den Vorrang Erneuerbarer Energien* [Act on granting priority to renewable energy sources] (Germany) 25 February 2000, BGBl, 2009, s 3 [German Federal Ministry for the Environment translation from German].

energy from biomass, including biogas, biomethane, landfill gas and sewage treatment gas, as well as the biodegradable fraction of municipal waste and industrial waste.

However, not all exhaustive definitions use the word 'means'; sometimes they are indicated by the presence of a bright line list, with no possibility for enlargement or interpretation.

3.4.2.2 WHAT ARE THE IMPLICATIONS OF USING AN EXHAUSTIVE DEFINITION?

In the case of defining 'renewable energy', a common problem seems to be whether the definition contained in the legislation is designed to be exhaustive or merely inclusive of the renewable energy sources listed in it. This problem is not limited to 'renewable energy', but reflects the difficulties of drafting legislative definitions for new and emerging technologies. Definitions play an important role in the legislative support for new technologies, particularly if the projects require access to both subsidies and private funding streams in order to be commercialised or developed. In these circumstances, private lenders will want to ensure with certainty that a project fits within the legislative definition and so can benefit from the legislative support from the subsidies prior to lending approval being granted for the privately funded loan.

Arguably, exhaustive definitions provide certainty and predictability about whether an energy source will fit within the definition of 'renewable', which may make it easier for projects to get financing. A downside of this, though, is that if an energy source is not currently deemed to be renewable due to the narrow drafting of the definition, and there is a later change of heart, the law will either require amendment or another law will need to be drafted. However, this problem only afflicts narrowly construed definitions and the majority of exhaustive definitions are broadly defined and include all of the scientifically accepted sources of renewable energy.

3.4.3 INCLUSIVE DEFINITION

In contrast to the exhaustive definition, inclusive definitions are more flexible and often enlarge the meaning of a term.⁵⁸ The other advantage of inclusive definitions is that in a sector with emerging energy sources and technologies, they do not require amendment or new laws to be passed when new eligible sources or technologies are developed. Specific inclusion definitions of ‘renewable energy’ are found in the laws of 39 countries.

Inclusive definitions are often signalled by the *definiens* being left open through the use of techniques such as ‘includes’, ‘etc.’ or ‘other sources of renewable energy prescribed in the regulations’. For example, the Chinese renewable energy law has an inclusive definition and a delegation of power to the ‘administrative department of energy of the State Council’:

Article 2 For the purpose of this Law, “renewable energy” refers to non-fossil energies, such as wind energy, solar energy, hydroenergy, bioenergy, geothermal energy and ocean energy, etc.

The application of this Law relating to hydropower shall be set forth by the administrative department of energy of the State Council and be submitted to the State Council for approval.

This Law shall not apply to the utilization of straws or stalks, firewood or dung in the form of direct burning through an inefficient cooking range.⁵⁹

One of the challenges of adopting an inclusive definition is in determining who should decide whether a definition should be enlarged to encompass a new energy source of technology as a qualifying renewable energy source.

⁵⁸ See e.g. Gifford and Salter, above n 8, 239; Dennis Charles Pearce and Robert S Geddes, *Statutory Interpretation in Australia* (LexisNexis Butterworths, 2006) 239.

⁵⁹ «中华人民共和国可再生能源法» [Renewable Energy Law of the People's Republic of China] (People's Republic of China) National People's Congress Standing Committee, 28 February 2005, Art 2 [Ministry of Commerce of the People's Republic of China translation from Mandarin].

3.4.3.1 DELEGATED POWER TO DEFINE

Thirteen countries have addressed this problem by formally delegating within the definition some of their powers relating to the definition of ‘renewable energy’ or ‘electricity generated from renewable energy sources’.

3.4.3.1.1 WHY USE A DELEGATION OF POWERS?

Countries will delegate their law-making powers for a wide range of reasons. Delegated powers are beneficial when the subject matter is highly complex and technical, as well as providing flexibility and an ability to experiment, especially when unforeseen circumstances arise. This makes them ideal for use in dynamic and rapidly changing markets. Delegated legislation also offers benefits by reducing pressure on parliamentary time. This means that it is often appropriate for some of the technical detail and implementation measures to be delegated.⁶⁰

3.4.3.1.2 HOW IS THE POWER TO DEFINE DELEGATED?

There are a number of ways in which the power to define ‘renewable energy’ has been delegated:

- a delegation to regulations (Australia, Denmark, Tonga, and the Seychelles);
- a delegation to the Government for a declaration (Bangladesh, Palau and Taiwan);
- a delegation to the relevant Minister (Denmark and Ireland); and
- a delegation to the Ministry or other administrative body (Chile, China, Mexico and Palau).

It should be noted that these delegations are not for the whole of the definition of renewable energy but normally relate to the power to decide whether the

⁶⁰ See Legislation Advisory Committee, *Chapter 10: Delegated legislation in ‘Guidelines on Process and Content of Legislation’* (May 2001) Parliamentary Counsel Office, Government of New Zealand <<http://www.pco.parliament.govt.nz/lac-chapter-10>> 821 [date accessed 2 June 2014]; Dennis Charles Pearce and Stephen Argument, *Delegated Legislation in Australia* (LexisNexis Butterworths, 2nd ed, 1999) 5; Parliament of Australia Senate Research and Education, *Parliamentary control of delegated legislation* (2014). <http://www.aph.gov.au/About_Parliament/Senate/Research_and_Education/hamer/chap09>.

definition of 'renewable energy' should be enlarged to include new energy sources. This is not the only safeguard in place. Parliaments commonly adopt processes to review delegated legislation, such as affirmative resolution and negative resolution. In addition, the courts have the power under administrative law to ensure that the delegation contained in the primary legislation is *intra vires* and may also be able to undertake a judicial review of decision-making.⁶¹

An example of two delegations of power to define is contained in the Palau *Net Metering Act*:

(g) "Renewable energy source" is specifically defined within this Act to include energy derived from solar power, water power, or wind power. Any other forms of renewable energy may be permitted by the P.P.V.c. on a case by case basis upon application by a customer, through Executive Order, or through amendment of this Act.⁶²

These delegations provide a potential project developer with three different ways in which the existing definition can be modified. This provides great flexibility but in adopting this structure of multiple delegations, it may also be used to play the different decision-makers off against one another. That is, if the P.P.U.C.⁶³ does not consent to including a technology, the project developer may then try to put pressure on the Minister to issue an Executive Order or, alternatively, lobby parliamentarians to have the Act amended. These issues need to be carefully considered before delegating authority.

3.4.3.1.3 WHY DELEGATE THE POWER TO DEFINE IN RENEWABLE ENERGY LAWS?

This approach provides flexibility, which is valuable in a dynamic and rapidly changing sector such as the energy sector. It also does not 'lock-in' particular renewable energy sources or technologies to receive support. This means that when the market drivers shift, such as through the removal of fossil fuel subsidies or the greater commercialisation of a technology, so that the renewable energy source or technology becomes cost-competitive with other types of

⁶¹ See Pearce and Argument, above n 58, 17; Parliament of Australia Senate Research and Education, above n 58.

⁶² *Net Metering Act 2009* (Palau) RRPL No 8-39, s 4.

⁶³ Note: The acronym P.P.V.c. used in this definition seems to be an error. It appears to be referring to the P.P.U.C. or the Palau Public Utilities Corporation.

energy, there is little or no time-lag in cancelling support. This thereby avoids the grant of super profits to projects that are already commercially viable without regulatory support. However, leaving these decisions to delegated decision-makers is not without its problems. To adopt this approach arguably lessens predictability in the outcome of decisions and diminishes certainty in the market. This in turn makes it more difficult to decide whether it is worth putting together the initial technical feasibility report for a new project. It can also make financing new projects and emerging technologies harder.

3.4.4 EMBEDDED DEFINITION FROM OTHER LEGISLATION

Three countries have definitions embedded in their legislation that are fully derived from another piece of legislation: Belgium, Latvia and Thailand. The definition in the *Mexican Law on the Development of Renewable Energy and Energy Transition Funding 2008* is partially derived from another piece of legislation.

3.4.1 HOW ARE LEGISLATIVE DEFINITIONS EMBEDDED FROM OTHER LEGISLATION?

Embedded definitions occur where the definition from one piece of legislation (the ‘primary legislation’) is embedded into another piece of legislation (the ‘secondary legislation’). An example of an embedded definition of ‘renewable energy’ is found in the Thai *Energy Industry Act (2007)*. This Act refers the reader to the definition contained in the earlier *National Energy Policy Council Act (1992)*:

SECONDARY ACT: ENERGY INDUSTRY ACT B.E. 2550 (2007)

Section 5: In this Act,

“Energy” means electricity or natural gas.

“Renewable energy” means renewable energy under the law on the National Energy Policy Council.

PRIMARY ACT: NATIONAL ENERGY POLICY COUNCIL B.E. 2535 (1992)

Section 4. In this Act:

"energy" means an ability to perform the work inherent in the sources capable of generating powers, which are renewable energy and non-renewable energy, and shall include the sources which may generate powers such as fuel, heat, and electricity;

"renewable energy" includes energy obtained from wood, firewood, paddy husk, bagasse, biomass, hydropower, solar power, geothermal power, wind power, and waves and tides...⁶⁴

3.4.4.2 THE IMPLICATIONS OF USING AN EMBEDDED LEGISLATIVE DEFINITION

There are several advantages to using embedded definitions. If every law or regulation on renewable energy has the same embedded definition, this ensures sector-wide consistency. This provides clarity about which renewable energy sources and technologies are going to be supported within a country and it also makes it harder for loopholes to develop. Another advantage of embedded definitions is that each legislative amendment to the definition of 'renewable energy' in the primary legislation does not create a knock-on need to amend all of the definition of 'renewable energy' contained in the secondary legislation. However, these benefits have to be weighed against the disadvantages of using embedded definitions. The prime disadvantage of embedded definitions is that they require a higher level of legal literacy and legal research skills than other types of definitions. This makes it more difficult for non-lawyers to discern the meaning from them than other styles of definitions. This is especially the case in circumstances where the person engaged in the statutory interpretation of the definition of 'renewable energy' is referred to embedded definitions within embedded definitions, i.e., tertiary legislation refers to a definition in a piece of secondary legislation, which in turn refers to a definition in primary legislation.

Another issue with embedded definitions is that there is often nothing in the primary legislation to indicate that it is the source of the definition of 'renewable

⁶⁴ *Energy Industry Act, B E 2550* (Kingdom of Thailand) 10 December 2007 [Thai Law Forum trans from Thai]; *National Energy Policy Council Act B E 2535* (Kingdom of Thailand) 3 February 1992 [Thai Law Forum translation from Thai].

energy' in the secondary legislation. This can create problems, particularly in countries with emerging legal systems, as occasionally the primary legislation may not contain a definition of 'renewable energy,' the legislation may have been amended or repealed and not replaced. In these circumstances, the applicable principles of statutory interpretation stipulate that 'unless the amending or repealing Act contains an indication to the contrary, the amendment or repeal does not affect the legal meaning of the referential definition.'⁶⁵ This problem is less easily solved in situations where the primary legislation was never passed at all, leaving the secondary legislation without a definition. In these circumstances, the Court will be obligated to use the plain and ordinary meaning of the defined term.⁶⁶

A further issue with embedded legislative definitions relates to their interpretation in the event of ambiguity. Ordinarily, the text of the legislative definition would be considered in the context of the Act, with consideration given to the purpose it is trying to address. However, where secondary legislation incorporates an embedded definition from primary legislation, and the definition in the primary legislation in turn incorporates another definition, this makes interpretation difficult. For example, if we again consider the embedded definitions used in the sector in Thailand, the definition of renewable energy contained in s 5 of the *Energy Industry Act B E 2550* (2007) (secondary legislation) is an embedded definition from s 4 of the law on the *National Energy Policy Council B E 2535* (1992) (primary legislation). These two laws contain two very different definitions of 'energy'. This then creates a situation where the definition of 'energy' in the *National Energy Policy Council Act* is incorporated into the definition of 'renewable energy', which in turn is incorporated into the *Energy Industry Act*. However, this secondary legislation contains a different and narrower definition of 'energy'. This creates confusion and makes interpreting the meaning of the definition of 'renewable energy' in the secondary legislation difficult.

⁶⁵ Francis Alan Roscoe Bennion, *Understanding Common Law Legislation: Drafting and Interpretation* (Oxford University Press, 2001) 65.

⁶⁶ See e.g. *Lamont v Kennan* [2003] WASCA 82.

3.4.5 INFERRED DEFINITION

An inferred definition is found in situations where there is not a specific definition of ‘renewable energy’ or ‘electricity generated from renewable energy sources’ but using the principles of statutory interpretation, the meaning of the term used in the legislation can be inferred through a study of the text, context and purpose of the legislation. Four countries use the inferred approach in their legislation: Finland, Honduras, Norway and Switzerland. For example, the definition in the *Honduran Law for the Promotion of Electricity Generation with Renewable Resources* (2007) is inferred from the preamble to the legislation, which states that it relates to:

generation of electricity from renewable and sustainable natural sources, coming from sources of water and geothermal, solar, biomass, wind, tidal and solid waste sources.⁶⁷

Inferred definitions are given the same status as other types of legislative definitions in terms of statutory interpretation. The downside with their use is that they make identifying the core subject matter of the legislation more difficult to discern for the reader, as the reader has to search widely throughout the legislation to identify where the relevant definition is located.

⁶⁷ *Ley de Promocion a la Generacion de Energia Electrica con Recursos Renovables 2007* [Law for the Promotion of Electricity Generation with Renewable Resources 2007] (Honduras) 70/2007, Preamble [Linguistico Translations translation from Spanish].

3.5 APPROACH TO THE CONTENT OF THE DEFINITION

One of the features of the legislative definitions of ‘renewable energy’ is that different countries and legal cultures have different ways of identifying the essence or substance of renewable energy. In addition to the differences in form, there are also marked differences to the conceptual approaches taken in the *definiens*, with seven different approaches identified:

1. The definition identifies specific energy sources that are deemed to be ‘renewable’;
2. The definition adopts an exclusionary approach;
3. The definition refers to depletion and replacement rates;
4. The definition refers to environmentally sustainable development;
5. The definition limits the level of commercialisation of qualifying energy sources;
6. The definition refers to the ‘scientific or physical properties’ of the energy; and
7. The definition refers to specific renewable energy technologies.

These will each be analysed below. It should be noted that the vast majority of countries use a combination of approaches to clarify the meaning of their definition.

3.5.1 THE DEFINITION IDENTIFIES SPECIFIC ENERGY SOURCES THAT ARE ‘RENEWABLE’

Nearly all countries with a legislative definition (80 out of a total 95 countries) identify specific energy sources that are deemed to be ‘renewable’. By listing qualifying renewable energy sources, this approach is an example of Reed’s denotative definition category, but definitions in this category also often fulfil either a stipulative or lexical function. Countries such as Australia, China, Germany, Russia and South Korea have all adopted this approach, as have the EU and the IRENA in their definitions of ‘renewable energy’.

3.5.1.1 HOW DOES THE DENOTATIVE APPROACH OPERATE?

There are two ways in which this approach is commonly used in respect of the definition of ‘renewable energy’. First, countries may list energy sources that they deem to be renewable without providing any justification or rationale for their selection. This was the approach taken by Russia in *The Russian Federal Law on the Electric Power Industry 2003*:

RENEWABLE ENERGY means solar energy, wind energy, hydro energy (including waste water energy), except when such energy is used by pumped-storage power plants; tidal energy, wave energy of water bodies, including water basins, rivers, seas, oceans, geothermal energy using natural underground transfer fluids, low-potential thermal energy of earth, air, water using special transfer fluids, biomass, including plants grown specially for power generation, including trees, as well as production and consumption waste, with the exception of waste received during the use of hydrocarbon feedstock and fuel, biogas, gas released from production and consumption waste at the sites for the disposal of such waste; gas formed at coal sites.⁶⁸

One of the features of this definition is that it enlarges the meaning of ‘renewable energy’ beyond the plain and ordinary meaning of the phrase by encompassing energy sources derived from fossil fuels such as coal seam gas. This seems to be a real risk for definitions falling within this first category of denotative definitions that simply deem energy sources to be renewable. A similar problem can be found in the South Korean legislation, which in Article 2(1)(f) includes

(f) Energy from liquefied or gasified coal, and from gasified heavy residual oil which falls within the criteria and scope prescribed by Presidential Decree⁶⁹

within its definition of ‘new and renewable energy’. Enlarging definitions increase the complexity for a reader attempting to comprehend the meaning of legislation by creating confusion and potentially being misleading.⁷⁰ For example, the average person would not normally understand that the phrase

⁶⁸ «ФЕДЕРАЛЬНЫЙ ЗАКОН N 35-ФЗ ОБ ЭЛЕКТРОЭНЕРГЕТИКЕ» [Russian Federation Federal Law on the Electric Power Industry] (Russian Federation) 26 March 2003, No 35-FZ, Art 3 [RAO Russian Power and Electrification translation from Russian].

⁶⁹ «개발의 승진 주문, 사용 및 확산 새로운 신 재생 에너지의» [Act on the Promotion of the Development, Use and Diffusion of New and Renewable Energy] (Republic of Korea), 31 December 2004, Art 2 [Korean Legislative Research Institute translation from Korean].

⁷⁰ Bennion, above n 65, 65-6.

'renewable energy' might encompass coal seam gas, a form of energy which is not replaceable at an equal or faster rate than its depletion rate.

Second, countries may use the denotative approach in combination with another approach to identify the content of a definition, most commonly the exclusionary approach. In this way, the list of the energy sources acts as an example of how the other approach is being applied. For example, in s 17 of the *Australian Renewable Energy (Electricity) Act 2000* (Cth), the denotative approach detailed in s 17(1)(a)-(t) is combined with an exclusionary approach contained in s 17(2)(a)-(b):

17 What is an eligible renewable energy source?

(1) The following energy sources are eligible renewable energy sources:

- (a) hydro;
- (b) wave;
- (c) tide;
- (d) ocean;
- (e) wind;
- (f) solar;
- (g) geothermal-aquifer;
- (h) hot dry rock;
- (i) energy crops;
- (j) wood waste;
- (k) agricultural waste;
- (l) waste from processing of agricultural products;
- (m) food waste;
- (n) food processing waste;
- (o) bagasse;
- (p) black liquor;
- (q) biomass-based components of municipal solid waste;
- (r) landfill gas;
- (s) sewage gas and biomass-based components of sewage;
- (t) any other energy source prescribed by the regulations.

(2) Despite subsection (1), the following energy sources are not eligible renewable energy sources:

- (a) fossil fuels;
- (b) materials or waste products derived from fossil fuels.

The definition in Article 2 of the *Renewable Energy Law of the People's Republic of China 2005* adopts a similar approach:

Article 2 For the purpose of this Law, “renewable energy” refers to non-fossil energies, such as wind energy, solar energy, hydroenergy, bioenergy, geothermal energy and ocean energy, etc.⁷¹

3.5.1.2 THE IMPLICATIONS OF USING A DENOTATIVE APPROACH

While there are obvious disadvantages to using this approach in isolation to enlarge the scope of the definition of ‘renewable energy’ without further justification, this approach does also have some advantages. These are particularly evident when this approach is used in combination with another approach, such as the exclusionary approach. When combined in this way, the definition can clarify what renewable energy is by listing some or all of the qualifying sources of renewable energy (the denotative approach), as well as providing clarity about the sources of energy which are excluded from the definition (the exclusionary approach). In this way, potential project developers and investors seeking to benefit from the regulatory support mechanisms contained in the legislation are provided with increased certainty and insight into the decision-making process where the definition is an inclusive definition.

One risk of this approach is that legislative drafters in the renewable energy sector are often criticised for ‘picking winners’ by stipulating in an exhaustive manner the qualifying energy sources. Critics such as Frondel et al have argued that this process is often unnecessary and that deciding which renewable energy sources and technologies should be supported through regulatory support mechanisms may be better left for the market to decide.⁷²

3.5.2 THE DEFINITION ADOPTS AN EXCLUSIONARY APPROACH

⁷¹ «中华人民共和国可再生能源法» [Renewable Energy Law of the People's Republic of China] (People's Republic of China) National People's Congress, 28 February 2005, Art 2 [Ministry of Commerce of the People's Republic of China translation from Mandarin].

⁷² Manuel Frondel et al, 'Economic impacts from the promotion of renewable energy technologies: The German experience' (2010) 38 *Energy Policy* 4048, 4055.

Over a third of all countries with a primary legislative framework governing or promoting renewable energy have adopted an exclusionary approach to their legislative definition of 'renewable energy'. This approach is commonly used in combination with the previous approach of identifying specific renewable energy sources that are then deemed to be renewable, with only six countries out of a possible 34 countries not adopting this combined approach. The EU also uses the combined approach of identifying renewable energy sources and excluding fossil fuels in its definition of 'energy from renewable sources'.

One of the remarkable features of the exclusionary approach is how popular it is in civil law jurisdictions. Twenty-five of the countries using this approach are pure civil law jurisdictions, with another three countries using a mixed legal system with civil law elements. It is hypothesised that the reason for the high levels of popularity of this approach among civil law countries is because of the fear of judges engaging in 'gap-filling' or the use of analogical reasoning in the context of uncertain denotative legislative definitions. For this reason, it is much more important within these jurisdictions to explicitly exclude sources of energy that the country does not want to recognise as renewable.

3.5.2.1 HOW DOES THE EXCLUSIONARY APPROACH OPERATE?

There are three ways in which exclusionary definitions are formulated within legislation:

1. a direct exclusion can be made within the definition of 'renewable energy' to the qualifying renewable energy sources;
2. an exclusion may be established through the presence of another definition defining 'non-renewable energy sources'; or
3. an exclusion may be based upon the reading of the Act as a whole, taking into account the text, context and purpose of the Act. In these circumstances, the contents of the definition of 'renewable energy' may be read down or different meanings may be found to exist for the term in different sections of the legislation.

3.5.2.1.1 DIRECT EXCLUSION WITHIN THE DEFINITION

The first of these formulations, direct exclusion within the definition, is the one most commonly used by countries with legislative definitions of ‘renewable energy’. The exclusion process in these definitions works by countries identifying fossil fuel sources (and also often additionally identifying nuclear energy) and then defining any energy source that does not fit within the fossil fuel or nuclear category to be a renewable energy source. An example of this approach is found in the Hungarian law:

Renewable energy sources shall mean renewable non-fossil and non-nuclear energy sources (solar, wind, geothermal, wave, tidal, hydropower, biomass, and energy sources produced directly or indirectly from biomass, as well as landfill gas, sewage treatment plant gas and biogases)⁷³

Japan takes this approach one step further, even using the term ‘non-fossil energy’ rather than ‘renewable energy’, in its *Act on the Promotion of Development and Introduction of Non-Fossil Energy 1980*.⁷⁴

3.5.2.1.2 EXCLUSION BY VIRTUE OF ANOTHER DEFINITION

The second approach of constraining the interpretation of the definition of ‘renewable energy’ through the use of another definition, such as ‘non-renewable energy’, is also reasonably common. The definitions found in s2 of the Kenyan *Energy Act 2006* highlight how this operates:

“fossil fuels” means combustible or explosive hydrocarbons formed from the remains of prehistoric animals or plants and includes petroleum, coal, schist, shale, peat, natural gas or any other bituminous substance;

“renewable energy” means all non-fossil sources including, but not limited to biomass, geothermal, small hydropower, solar, wind, sewage treatment and plant gas;

In this definition, it is clear how the two definitions interact to exclude ‘fossil fuels’ from the definition of ‘renewable energy’. It also provides an advantage

⁷³ 2007. évi LXXXVI. törvény a villamos energiáról [Act No. LXXXVI of 2007 on Electric Energy] (Hungary), s 3(45) [Linguistic Translations translation from Hungarian].

⁷⁴ «石油代替エネルギーの開発及び導入の促進に関する法律, 昭和五十五年法律第七十一号» [Act on the Promotion of Development and Introduction of Non-Fossil Energy 1980] (Japan), Art 2(1) [Melanie Trezise, Australian Network for Japanese Law, translation from Japanese].

over the first exclusionary approach because it is not only clear about what is meant by 'renewable energy', but it is also clear about the definition of the excluded term, 'fossil fuels', providing greater certainty and predictability about the application of the law.

However, not every country that uses this approach is as explicit about the interaction between the two definitions; see for example, the Bangladeshi law:

(1) "Non-renewable energy" means energy derived from natural gas, coal, peat, mineral oil, other fossil fuel and energy derived from electricity and nuclear power and any other energy and power derived from any other sources as may be declared by the Government from time to time as non-renewable energy, by notification in the Official Gazette;

(14) "Renewable energy" means biomass (firewood, paddy husk, sugar cane bagasse, waste etc.), biofuel, biogas, hydropower, solar energy, wind energy, hydrogen cell, geothermal, low and high tide energy and energy derived from any other source as may be declared by the Government from time to time by notification in the Official Gazette...⁷⁵

In the Bangladeshi definitions, the interaction is implied through the application of the principles of statutory interpretation. Despite this, in absence of any other discriminant within their definition of 'renewable energy', which is otherwise simply denotative, the use of the second exclusionary approach does increase the clarity of the Bangladeshi law.

3.5.2.1.3 EXCLUSION RESULTING FROM STATUTORY INTERPRETATION OF THE WHOLE ACT

The third approach is arguably the most problematic of the three exclusionary approaches. This approach works well when the exclusionary provisions contained outside of the definitions section establish a consistent meaning of renewable energy through the Act. However, this approach is often used to give the term 'renewable energy' different meanings in different sections of the legislation.

⁷⁵ *Sustainable and Renewable Energy Development Authority Act* (Bangladesh) Act 48 of Law No 01, ch 1 s 2 [Linguistico Translations translation from Bengali].

It is best practice in legislative drafting that when a word is used, it should, if possible, be assigned a consistent meaning throughout the Act.⁷⁶ This makes reading and interpreting the legislation less complex for the reader and minimises opportunities for confusion. The assignment of alternative meanings to a defined term is particularly problematic where this is not indicated at the first use with a specific cross-reference to the alternative meanings. For this reason, the Office of the Legislative Counsel of the U.S. House of Representatives states in its manual on Drafting Style that where there are a small number of alternative meanings that must be used, a cross-reference rather than a blanket statement such as ‘unless the context requires otherwise’ is preferable ‘to warn[ing] the reader of the different usage.’⁷⁷

This best practice is not always adopted in other countries. The Tongan *Renewable Energy Act 2008* highlights some of the problems with this approach:

2. Definitions

In this Act, unless the context otherwise requires –

“renewable energy” means any form of energy that is not derived from fossil fuels and specifically excludes energy from petroleum products and energy from coal products;

4. Renewable energy to which this Act applies

(1) Subject to subsection (3), this Act shall apply to the production, storage or distribution of any form of energy derived from a renewable source specified under subsection (2), where –

- (a) the production, storage or distribution of renewable energy is made on a commercial basis;
- (b) the production, storage or distribution of renewable energy is for the use in a commercial enterprise; or
- (c) the renewable energy is intended for a third party.

(2) Renewable energy sources include the following, and any other source specified by regulations made under this Act -

- (a) Biofuel;
- (b) Biogas;
- (c) Biomass;
- (d) Fuel Cells;
- (e) Geothermal;
- (f) Hydrogen;
- (g) Hydropower;
- (h) Ocean Thermal Energy Conversion (OTEC);
- (i) Plant, animal or marine resources;

⁷⁶ Gifford and Salter, above n 8, 3.

⁷⁷ The US House of Representatives Office of the Legislative Counsel, *House Legislative Counsel's Manual on Drafting Style* (104th Congress, 1995) <http://www.llsdc.org/assets/sourcebook/manual_on_drafting_style.pdf> 29.

- (j) Solar;
- (k) Tidal;
- (l) Wave;
- (m) Wind.

(3) This Act shall not apply to electricity that has been converted from direct current to alternate current, although originally derived from a renewable energy source.

This Act provides two completely different approaches to defining ‘renewable energy’: one in the definitions section (s 2) and another in the section ‘Renewable energy to which this Act applies’ (s 4), with no justification provided as to why this is the case. The first definition in s 2 is a straightforward, broad exclusionary definition. The second definition contained in s 4 is much narrower, limiting the ‘Renewable energy to which this Act applies’ to commercial production, storage or distribution (i.e. excluding small scale household generation for personal use). In s 4(3) the Act also excludes all generation that has been converted from DC to AC. This is a particularly unusual exclusion, as power plants generally prefer the use of alternating current (AC) for distribution purposes, given that it is easier to alter the voltage of the electricity using a transformer (and often safer for the end consumer).

The two meanings of ‘renewable energy’ in the Tongan *Renewable Energy Act* increase the complexity of the task of interpreting the legislation, especially for non-lawyers. This is a particular problem as it is not clear why the legislative drafters felt the need to include two different meanings at all. Tonga is not the only country to have adopted this approach of assigning multiple meanings to the term ‘renewable energy’. Tajikistan has two different definitions within their law: ‘renewable source of energy’ in the definitions section (Article 1), and a more limited definition of the ‘renewable energy sources’ to which the Act applies in the section on the ‘organizational legal frameworks for the use of renewable energy sources’ (Article 4).⁷⁸ This is also a feature of the Romanian legislation with a broad definition of ‘renewable energy sources’ in the definitions section (Article 2(ac)) and a narrower definition in Article 3(1),

⁷⁸ *The Law of the Republic of Tajikistan on the use of Renewable Energy Sources* (Tajikistan) 12 January 2010, No 587 [UNDP in Tajikistan translation from Russian].

which places limitations on which renewable energy sources that can benefit from the promotion system established by the law.⁷⁹

3.5.2.2 IMPLICATIONS OF ADOPTING THE EXCLUSIONARY APPROACH

The exclusionary approach plays an important role in clarifying the scope of the definition of ‘renewable energy’, particularly if one meaning is assigned to the term and is used consistently throughout the legislation. It is a well-established approach to defining terms in law, with Cook stating:

A definition does not have to set forth everything which is included and everything which is excluded by the use of a particular word. Frequently it may be desirable to exclude certain things without stating what is included by the use of a word.⁸⁰

The use of the exclusionary approach to exclude fossil fuels from the definition of ‘renewable energy’ does, however, create problems for co-fired hybrid power plants, which use conventional fossil fuels alongside either biomass, landfill gas, sewage treatment plant gas or biogas. Unless the issue of these co-fired hybrid power plants is specifically carved out, the broad exclusion on the use of fossil fuels may preclude these power plants from benefiting from the regulatory support mechanisms available to renewable energy sources. There are a number of different ways in which countries address this issue: some countries, such as Austria, only provide support for co-fired generators on the condition that the fossil fuel component may not exceed that which is technically required for the operation,⁸¹ while others, such as Bulgaria, specify that at least 20 per cent of the feedstock must be derived from renewable sources.⁸² However, the majority of countries seem to address this issue in a similar manner to the United Kingdom,

⁷⁹ *Legea 220/2008 pentru stabilirea sistemului de promovare a producerii energiei din surse regenerabile de energie, republicata 2010* [Law 220/2008 on establishing the promotion system of energy production from renewable energy sources] (Romania) [Linguistico Translations translation from Romanian]; including amendments made through Law 139/2010 and Law 134/2012; for approval dell’OGU No 88/2011 to amend and supplement Law 220/2008 on establishing the promotion system for the production of electricity from renewable energy sources.

⁸⁰ Robert N Cook, *Legal Drafting, University Casebook Series* (Foundation Press, 1951) 37.

⁸¹ Bundesgesetz über die Förderung der Elektrizitätserzeugung aus erneuerbaren Energieträgern [Federal Act on the promotion of electricity generation from renewable energy sources] (Republic of Austria) 2012, s 5(1)(18) [Mitchell Cleaver translation from German].

⁸² «Закон за енергията от възобновяеми източници» [Energy from Renewable Sources Act] (Republic of Bulgaria) 3 May 2011, State Gazette 35, 2011, s 1(11).

which provides the authority for this issue to be addressed in secondary legislation in s 32M(2):

For the purposes of the definition of “renewable sources”, a renewables obligation order may make provision—

- (a) about what constitutes “waste”;
- (b) about how the proportion of waste which is, or is derived from, fossil fuel is to be determined;
- (c) about what, subject to such exceptions as may be specified, constitutes sufficient evidence of that proportion in any particular case;
- (d) authorising the Authority, in specified circumstances, to require an operator of a generating station to arrange—
 - (i) for samples of any fuel used (or to be used) in the generating station, or of any gas or other substance produced as a result of the use of such fuel, to be taken by a person, and analysed in a manner, approved by the Authority, and
 - (ii) for the results of that analysis to be made available to the Authority.⁸³

3.5.3 THE DEFINITION REFERS TO THE DEPLETION AND REPLACEMENT RATES

This next approach recognises that once the earth’s supply of fossil fuel sources have been exhausted, it will take millions of years and the right environmental conditions for them to be replaced. Indeed, with the rapid urbanisation that has occurred since the industrial revolution, many of the environments where these non-renewable fuel sources historically developed, such as peat bogs, have been destroyed. By referring to the depletion and replacement rates in the definition of ‘renewable energy’, this approach reflects closely the plain and ordinary meaning ascribed to the phrase.

This approach is less popular than the denotative or exclusionary approaches, with 22 countries adopting this approach in their definitions. This approach is also implied in the IRENA definition, which refers to ‘all forms of energy produced from renewable sources in a sustainable manner’.⁸⁴ Almost all of the countries that have adopted this approach are developing countries.

⁸³ *Electricity Act 1989* (UK) s 32M(2).

⁸⁴ International Renewable Energy Agency (IRENA), ‘Statute of the International Renewable Energy Agency’ (Paper presented at Conference on the Establishment of the International Renewable Energy Agency, Bonn, 26 January 2009).

3.5.3.1 HOW DO COUNTRIES REFER TO DEPLETION AND REPLACEMENT RATES IN THEIR DEFINITIONS?

A number of different phrases are used to refer to the depletion and replacement rates within the definitions:

- Guatemala: ‘... resources whose common characteristic is that, by their nature, they do not end or are renewed...’⁸⁵
- Jordan: ‘Energy produced from inexhaustible natural resources’.⁸⁶
- Kyrgyzstan: ‘...sources of energy that continuously regenerate...’⁸⁷
- Mexico: ‘...whose source is natural phenomena, processes or materials that can be transformed into energy for human use and that regenerate naturally, making them available either continuously or periodically...’⁸⁸
- Morocco: ‘...all sources of energy which are renewed naturally or by human action...’⁸⁹
- Philippines: ‘...energy resources that do not have an upper limit on the total quantity to be used. Such resources are renewable on a regular basis, and whose renewal rate is relatively rapid to consider availability over an indefinite period of time...’⁹⁰
- San Marino: ‘...all forms of energy generated from resources which from their intrinsic nature, regenerate or are not exhaustible on a human timescale...’⁹¹

⁸⁵ *DECRETO NÚMERO 52-2003 LEY DE INCENTIVOS PARA EL DESARROLLO DE PROYECTOS DE ENERGIA RENOVABLE 2003* [Renewable Energy Project Incentives Act 2003] (Republic of Guatemala) Art 4 [Linguistico Translations translation from Spanish].

⁸⁶ *The Renewable Energy and Energy Efficiency Law 2010* (Kingdom of Jordan), Art 2(a)

⁸⁷ «ЗАКОН КЫРГЫЗСКОЙ РЕСПУБЛИКИ ‘О ВОЗОБНОВЛЯЕМЫХ ИСТОЧНИКАХ ЭНЕРГИИ» [Law of Kyrgyz Republic ‘On Renewable Energy’] (Kyrgyzstan) 2008 No 283, Art 3 [Levi Romanov translation from Russian].

⁸⁸ *LEY PARA EL APROVECHAMIENTO DE ENERGÍAS RENOVABLES Y EL FINANCIAMIENTO DE LA TRANSICIÓN ENERGÉTICA 2008* [Law on the Development of Renewable Energy and Energy Transition Funding 2008] (Mexico), ch 1 Art 3.

⁸⁹ *Loi n 13-09 relative aux énergies renouvelables* [Renewable Energy Law] (Kingdom of Morocco) 2010 [Tallulah Bur translation from French].

⁹⁰ *Renewable Energy Act of 2008* (Republic of the Philippines), Art 4(uu).

⁹¹ *LEGGE 7 MAGGIO 2008 N.72 PROMOZIONE ED INCENTIVAZIONE DELL’EFFICIENZA ENERGETICA DEGLI EDIFICI E DELL’IMPIEGO DI ENERGIE RINNOVABILI IN AMBITO CIVILE E INDUSTRIALE* [Law No 72 on the Promotion and Incentives for Energy Efficiency in Buildings and the Use of Renewable Energy in the Civil and Industrial Fields] (San Marino) 7 May 2008, Art 3(2) [Linguistico Translations translation from Italian].

- Senegal: ‘...a source of energy that is renewable fairly quickly after utilisation/consumption which is considered inexhaustible on the timescale...’⁹²
- Slovakia: ‘...a non-fossil energy source, the energy potential of which is constantly replenished by natural processes or activities of people...’⁹³

These definitions seem to have several common characteristics. First, the energy must either deplete over such a long period of time that the energy source can be considered ‘inexhaustible’ or it must be renewable. Second, it is not clear what precise timescale is necessary for an energy source to be considered inexhaustible. The Philippines refers to ‘an indefinite period of time’; San Marino states it must be ‘not exhaustible on a human timescale’, but does not clarify what is meant by this statement; Senegal states it must be ‘considered inexhaustible on the timescale’; and Jordan simply states it must be ‘inexhaustible’. Third, where the energy source is renewable, the replacement rate must be fairly rapid, normally at a faster or equal rate to the depletion of the energy source.

Sri Lanka takes the notion of depletion and replacement rates one step further by relating the concept to intergenerational equity. Section 70 of the Sri Lanka *Sustainable Energy Authority Act* defines ‘renewable energy resource’ as follows:

“renewable energy resource” means the sources of kinetic or thermal energy stemming from either solar or geothermal activity, *which can be harnessed* within the territory of the Republic of Sri Lanka, *without affecting the ability of the future generations to harness it for their use*, and includes biomass energy, hydro energy, solar energy and wind energy.⁹⁴

⁹² *Loi n° 2010-21 du 20 Décembre 2010 relative à l’orientation sur le droit de l’énergie renouvelable* [Act No 2010-21 of 20 December 2010 concerning guidance on renewable energy law] (Senegal), ch 1 [Ashley Richards translation from French].

⁹³ *Zákon 309/2009 Z.z. o podpore obnoviteľných zdrojov energie* [Act 309 on the promotion of renewable energy sources and high-efficiency cogeneration and on amendments to certain acts] (Slovakia) 19 June 2009, s 2(1)(a).

⁹⁴ *Sustainable Energy Authority Act 2007* (Sri Lanka) No 35 of 2007 (emphasis added)

Intergenerational equity was a central precept of the definition of ‘sustainable development’ adopted by the *Our Common Future Report* of the Brundtland Commission:

Sustainable development is the kind of development that meets the needs of the present without compromising the ability of future generations to meet their own need.⁹⁵

However by incorporating the concept of intergenerational equity into the definition of ‘renewable energy resource,’ this again adds potential uncertainty with it being unclear what measures will be used to test whether an energy source can be harnessed ‘without affecting the ability of the future generations to harness it for their use.’⁹⁶

3.5.4 THE DEFINITION REFERS TO ENVIRONMENTALLY SUSTAINABLE DEVELOPMENT

The fifth approach conflates the concepts of renewable energy with environmentally sustainable development by referencing it in the definition. This approach is used in eight of the 95 countries with a primary legislative framework governing or promoting renewable energy law: Chile, Colombia, Dominican Republic, Honduras, Indonesia, Ireland, Nicaragua, and Uruguay. A reference to sustainability is also found in the IRENA definition.

Interestingly, there is little correlation between the countries that reference environmentally sustainable development in their definition and those that rank environmental protection and sustainable protection highly in the legislative objectives section of their law. Colombia represents the only exception to this rule, ranking sustainable development as their second legislative objective and environmental protection as their third legislative objective. Colombia’s first legislative objective is energy security. Despite this, there is a correlation to the countries showing a long-term commitment to international environmental issues more generally with all of the countries using this approach being early

⁹⁵ World Commission on Environment and Development, *Our Common Future* (Oxford University Press Oxford, 1987).

⁹⁶ *Sustainable Energy Authority Act 2007* (Sri Lanka) No 35 of 2007, s 70.

adopters of the Kyoto Protocol – Chile (2002), Colombia (2001), Dominican Republic (2002), Honduras (2000), Indonesia (2004), Ireland (2002), Nicaragua (1999), and Uruguay (2001).⁹⁷

3.5.4.1 WHAT IS MEANT BY REFERENCES IN THE DEFINITIONS TO SUSTAINABILITY?

The definitions in this category often incorporate the concept of sustainability by stating:

- Indonesia: ‘Renewable energy sources are energy sources produced from sustainable energy resources if managed properly...’⁹⁸
- Nicaragua: ‘Renewable sources: Are those sources or renewable resources that exist in nature, and can be extracted in a sustainable way...’⁹⁹
- IRENA: ‘In this Statute the term “renewable energy” means all forms of energy produced from renewable sources in a sustainable manner...’¹⁰⁰

This then begs the question of what is meant by the references to sustainability within these definitions.

Most of the countries that choose to define in this way leave this as an open question in their legislative definitions. This means that the relevant words will be subject to the principles of statutory interpretation to glean a meaning. However, Colombia does define sustainable development in Article 3(3) of their law:

Sustainable development means development leading to economic growth and an increased quality of life and social wellbeing, without exhausting the basis of renewable

⁹⁷ UNFCCC, *Status of Ratification of the Kyoto Protocol* (2014) <http://unfccc.int/kyoto_protocol/status_of_ratification/items/2613.php>.

⁹⁸ *UNDANG-UNDANG REPUBLIK INDONESIA NOMOR 30 TAHUN 2007 TENTANG ENERGI* [Law of the Republic of Indonesia Number 30 of 2007 About Energy] (Republic of Indonesia), ch 1 Art 1(6) [Ellen Marie O’Brien translation from Indonesian].

⁹⁹ *LEY PARA LA PROMOCIÓN DE GENERACIÓN ELÉCTRICA CON FUENTES RENOVABLES* [Law for the Promotion of Renewable Energy Generation] (Nicaragua) Act No 532, 2005, Art 2.

¹⁰⁰ IRENA, above n 84, Art 3.

energy resources which sustain it or adversely affecting the environment or the right of future generations to use it to satisfy their own needs.¹⁰¹

Regrettably, this is not the phrase that Colombia uses in its definition of ‘Non-conventional energy sources’.¹⁰² Rather, their definition refers to ‘energy sources available worldwide that are environmentally sustainable’,¹⁰³ which suggests that the meaning may be slightly different to that of ‘sustainable development’. Environmental sustainability is not defined in the Colombian legislation, though a definition may be inferred from the definition of ‘sustainable development’.

A different approach has been adopted by Chile, with its definition describing features of environmentally sustainable development rather than explicitly using the phrase in their definition:

Non-conventional energy sources: ... 7) Other means of generation duly determined by the Committee which use renewable energy to generate electricity, contribute to the diversification of energy supply sources in electrical systems and have low environmental impact, in accordance with the procedures established by the regulation.¹⁰⁴

The Dominican Republic has also adopted a similar approach with its definition, specifying that the energy sources must be able to be continually used without ‘appreciable alteration to the environment’.

¹⁰¹ *LEY 697 DE 2001 (Octubre 3) Diario Oficial No. 44.573, de 05 de octubre de 2001 mediante la cual se fomenta el uso racional y eficiente de la energía, se promueve la utilización de energías alternativas y se dictan otras disposiciones* [Law 697 on the promotion of the efficient and rational use of energy and alternative energies] (Colombia) 5 October 2001, Official Gazette No 44,573, Art 3(3) [Linguistico Translations translation from Spanish].

¹⁰² *Ibid* Art 3(9).

¹⁰³ *Ibid*.

¹⁰⁴ *LEY NÚM. 20.257 INTRODUCE MODIFICACIONES A LA LEY GENERAL DE SERVICIOS ELÉCTRICOS RESPECTO DE LA GENERACIÓN DE ENERGÍA ELÉCTRICA CON FUENTES DE ENERGÍAS RENOVABLES NO CONVENCIONALES* [The Law No 20,257 better known as Non-Conventional Renewable Energy Law] (Chile) 1 April 2008, s 4(aa) [Linguistico Translations translation from Spanish].

3.5.4.2 IMPLICATIONS OF A DEFINITION REFERENCING ENVIRONMENTALLY SUSTAINABLE DEVELOPMENT

A definition referencing environmentally sustainable development may have implications for decisions of what renewable energy sources and technologies are to be within the scope of the definition. For example, as will be shown in the next chapter, there has been significant debate about whether large-scale hydropower should be considered a source of renewable energy due to serious concerns about its environmental sustainability. Four of the countries with a definition referencing environmentally sustainable development (Chile, Colombia, Dominican Republic and Uruguay) already explicitly exclude large-scale hydropower power projects from their definition. However, the remaining four countries (Honduras, Indonesia, Ireland and Nicaragua) have not addressed this issue in their legislation. This means that it will ultimately be up to the courts to decide whether energy can be produced from large-scale hydropower in a sustainable way such that their definitions are satisfied and the projects can utilise the regulatory support mechanisms contained in the law. This is potentially a serious issue for these jurisdictions, with hydropower making up 30.9 per cent of the domestic electricity generation in Honduras,¹⁰⁵ 9.9 per cent in Indonesia,¹⁰⁶ 3.04 per cent in Ireland¹⁰⁷ and 8.3 per cent in Nicaragua.¹⁰⁸ This issue may have to be addressed sooner rather than later, with sixteen new large-

¹⁰⁵ 2010 data from Central Intelligence Agency, *The World Factbook: Honduras* (2014) <<https://www.cia.gov/library/publications/the-world-factbook/geos/ho.html>>.

¹⁰⁶ 2011 data from Central Intelligence Agency, *The World Factbook: Indonesia* (2014) <<https://www.cia.gov/library/publications/the-world-factbook/geos/id.html>>.

¹⁰⁷ Raw data for this calculation based on 2012 figures derived from the US Energy Information Administration, *International Energy Statistics* (2014) <<http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=2&pid=2&aid=12&cid=regions&syid=2008&eyid=2012&unit=BKWH>>.

¹⁰⁸ 2013 data from Central Intelligence Agency, *The World Factbook: Nicaragua* (2014) <<https://www.cia.gov/library/publications/the-world-factbook/geos/nu.html>>.

scale hydropower plants in Honduras,¹⁰⁹ five in Indonesia,¹¹⁰ and one in Nicaragua¹¹¹ currently in advanced stages of development.

3.5.5 THE DEFINITION LIMITS THE LEVEL OF COMMERCIALISATION OF THE QUALIFYING ENERGY SOURCES

Currently used by only two countries, Colombia and Paraguay, this fifth approach provides a much broader definition than the plain and ordinary meaning of ‘renewable energy’ or ‘renewable electricity’. The features of this approach are that:

- (1) the term ‘non-conventional energy sources’ is used in the legislation rather than ‘renewable energy’, emphasising that the term is broader than the standard definition; and
- (2) in order for energy to qualify under the definition of ‘non-conventional energy sources’ it must be only ‘marginally used’ and ‘not widely marketed’ within the country.

For example, Articles 3(8) and (9) of the Colombian law specify:

ARTICLE 3. DEFINITIONS. For the purpose of interpreting and applying this law, the following mean: [...]

8. Conventional energy sources: For the purpose of this law, conventional energy sources are those used intensively and widely marketed in this country.

9. Non-conventional energy sources: For the purpose of this law, non-conventional energy sources are energy sources available worldwide that are environmentally sustainable, but which are not utilised in this country or are marginally used and not widely marketed.¹¹²

¹⁰⁹ 3Power Energy Group, *Hydro Energy – Honduras: Market Overview* (2014) <<http://www.3powerenergy.com/generation/hydro/honduras>>.

¹¹⁰ Hydroworld Weekly, *Indonesian utility to construct three new hydropower plants* (23 March 2012) <<http://www.hydroworld.com/articles/2012/03/indonesian-utility.html>>.

¹¹¹ Republic of Nicaragua Ministry of Energy and Mines, *Expression of Interest to participate in SREP* (11 April 2014) <https://www.climateinvestmentfunds.org/cif/sites/climateinvestmentfunds.org/files/Nicaragua_EOI.pdf> 8.

¹¹² LEY 697 DE 2001 (Octubre 3) *Diario Oficial No. 44.573, de 05 de octubre de 2001 mediante la cual se fomenta el uso racional y eficiente de la energía, se promueve la utilización de energías alternativas y se dictan otras disposiciones* [Law 697 on the promotion of the efficient and rational use of energy and alternative energies] (Colombia) 5 October 2001, Official Gazette No 44,573, Art 3(3) [Linguistico Translations translation from Spanish].

3.5.5.1 THE IMPLICATIONS OF THE DEFINITION LIMITING THE LEVEL OF COMMERCIALISATION OF QUALIFYING ENERGY SOURCES

The features of this approach mean that renewable energy sources and technologies that have long been commercialised and are financially viable without government support are prevented from benefiting from the regulatory support mechanisms contained within the laws. This means that the provision of financial and other support under these laws goes only to emerging and less commercialised sources and technologies that may not be able to otherwise participate in the market.

Supporting less commercialised technologies may be a good long-term strategy for these countries. Both Colombia and Paraguay currently display very high levels of energy self-sufficiency, producing 311.4 per cent (2009) and 156.5 per cent (2009) respectively of their domestic energy demand.¹¹³ By encouraging the use of alternative sources of energy, these countries may be seeking to preserve increasing shares of their fossil fuel production for the export market, where there may be able to generate higher profits than if that energy had to be used domestically for electricity generation.

3.5.6 THE DEFINITION REFERS TO THE 'SCIENTIFIC' OR 'PHYSICAL PROPERTIES' OF THE ENERGY

The sixth approach to the question of 'How do we define renewable energy in law?' seeks to incorporate references to the scientific or physical properties of the renewable energy source. Seven of the 95 countries with primary framework legislation governing or promoting the accelerated deployment of renewable energy have adopted this approach: Algeria, Chile, Malawi, Sri Lanka, Tunisia, Ukraine and Yemen.

¹¹³ International Renewable Energy Agency, *Renewable Energy Country Profiles Latin America* (IRENA, 2012) 12, 32.

3.5.6.1 HOW DO COUNTRIES USE THE SCIENTIFIC OR PHYSICAL PROPERTIES OF ENERGY IN THEIR DEFINITIONS?

Countries that have incorporated this approach into their legislative definitions commonly identify both the source of the energy and the form of energy generated. For example, the Tunisian legislation specifies that ‘The promotion of renewable energies’ is defined as:

The set of actions aimed at the exploitation of all forms of electrical, mechanical or thermal energy obtained by the transformation of solar energy, wind, biomass, geothermal or other renewable natural resources.¹¹⁴

The Chilean definition provides a more detailed example of this approach:

(aa) Non-conventional renewable means of generation: those having any of the following characteristics:

- 1) Those whose primary source of energy is biomass, which is energy obtained from organic and biodegradable material, which can be used directly as a fuel or converted into other liquid, solid or gaseous biofuels. It shall be understood to include the biodegradable portion of domestic and non-domestic solid waste.
- 2) Those whose primary source of energy is hydropower and whose maximum power is less than 20,000 kilowatts.
- 3) Those whose primary source of energy is geothermal energy, understood as energy obtained from the natural heat inside the earth.
- 4) Those whose primary source of energy is solar energy, obtained from solar radiation.
- 5) Those whose primary source of energy is wind power, which is the kinetic energy of wind.
- 6) Those whose primary source of energy is tidal energy, which is any form of mechanical energy produced by the movement of the tides, waves or currents, as well as energy obtained from the thermal gradient of the sea.
- 7) Other means of generation duly determined by the Committee which use renewable energy to generate electricity contribute to the diversification of energy supply sources in electrical systems and have low environmental impact, in accordance with the procedures established by the regulation.¹¹⁵

¹¹⁴ *Loi n° 2004-72 du 2 août 2004, relative à la maîtrise de l'énergie* [Law No 2004-72 dated 2 August 2004 relating to the energy management] (Tunisia), ch 1 [Ashley Richards translation from French].

¹¹⁵ *LEY NÚM. 20.257 INTRODUCE MODIFICACIONES A LA LEY GENERAL DE SERVICIOS ELÉCTRICOS RESPECTO DE LA GENERACIÓN DE ENERGÍA ELÉCTRICA CON FUENTES DE ENERGÍAS RENOVABLES NO CONVENCIONALES* [The Law No 20,257 better known as Non-Conventional Renewable Energy Law] (Chile) 1 April 2008, s 4(aa) [Linguistico Translations translation from Spanish]

It is not clear what benefit is gained by specifying the form of energy produced by the relevant renewable energy source. It does not seem materially to alter the outcome whether the form of energy derived from a renewable energy source is, for example, kinetic or mechanical. There also does not appear to be any information available as to why this approach was adopted.

A different approach to the inclusion of ‘scientific or physical properties’ of the energy source in the definition is found in the *Energy Regulation Act* of Malawi, which states:

“renewable energy” means those sources of energy available to mankind arising from natural processes in the interaction between the sun and the earth’s surface and regularly replenished and these include the sun as the primary renewable energy resource and the secondary renewable energy resources that derive from the sun including wind energy, hydro, ocean thermal, ocean wave, ocean tidal and electricity from photovoltaic effects, biomass, geothermal, etc.¹¹⁶

As opposed to the approaches taken by Tunisia and Chile, which focus on the forms of energy derived, as well as whether the source of the energy is renewable, the Malawian approach focuses on whether the source of energy is either directly or indirectly derived from the sun. While the majority of this definition is scientifically correct, with renewable energy commonly understood either to be directly or indirectly derived from the interaction between the sun, the moon and the earth, this definition does contain one serious scientific error: that is, geothermal energy is not derived from the sun as a secondary renewable energy source. Geothermal energy is derived from the natural heat of the earth core, and as such, is a form of thermal and atomic energy. Indeed, as will be shown in the next chapter, this has prompted debate about whether it is in fact truly ‘renewable’, as it cannot be replaced at the same or a faster rate than it is depleted.

¹¹⁶ *Energy Regulation Act 20 of 2004* (Malawi) GN 37/2007, ch 73:02 pt 1 s 2.

The Dominican Republic gets around this issue in its relevant definitions:¹¹⁷

w) Primary energy sources: Are forms of non-technological energy which is natural or physical in origin, producing energy that can be exploited, transformed or generated.

Four origins exist:

- a) From the sun (which produces wind energy, rain and hydroelectric energy, photovoltaic energy, tidal energy from waves and sea currents, and energy from photosynthesis stored in hydrocarbons and in vegetable biomass);
- b) From lunar gravitational pull, which produces or generates tidal energy (the tides);
- c) Geological, producing volcanic and geothermal energy;
- d) Atomic, enabling the development of nuclear energy;
- e) Other.

These sources can be divided into renewable (sun, wind, tides, waves, biomass, geothermal, hydraulic etc.) and non-renewable (such as oil, natural gas, coal and atomic energy).

x) Renewable energy sources: Includes all sources that are capable of being continually replenished after any use, without appreciable alteration to the environment, or which are so abundant that they can be used for millennia without significant erosion. They include urban, agricultural and industrial waste derived from biomass;

In these definitions, the legislative drafters acknowledge that geothermal energy is a product of thermal energy (though interestingly, they do not identify that some of this heat is due to the breakdown of radioactive particles in the earth's core). They also appear to acknowledge that the ability of sites of geothermal energy to continuously produce energy diminishes over long periods of use. However, due to the long depletion times, which are often in the range of several hundreds of years and the vast resource of geothermal energy that many countries have, even though geothermal energy is not 'capable of being continually replenished after any use', it is still deemed to be renewable energy in the Dominican Republic.

¹¹⁷ *Ley No. 5707 sobre Incentivo al Desarrollo de Fuentes Renovables de Energía y de sus Regímenes Especiales* [Renewable Energies Incentive Law 57-07] (Dominican Republic) 2007, ch 1 Art 1 [Linguistico Translations translation from Spanish].

3.5.6.2 THE IMPLICATIONS OF THE DEFINITION REFERRING TO THE 'SCIENTIFIC OR PHYSICAL PROPERTIES' OF THE RENEWABLE ENERGY SOURCE

The advantage of referring to the scientific or physical properties of the renewable energy source within the legislative definition is that it removes the more political aspects of the interpretative process. To the extent that it is not clear whether a renewable energy source is included within a definition, the reader is not required to make judgement calls about whether the renewable energy source is, for example, environmentally sustainable, but rather must apply the relevant scientific principles. This potentially makes this approach easy for a reader with a non-specialist legal background to interpret the definition.

Despite this, it is not clear that making a reference to the 'scientific or physical properties' of the renewable energy source provides any additional benefit to merely deeming particular energy sources to be renewable or, alternatively, using the depletion/replacement rate approach.

3.5.7 THE DEFINITION REFERS TO SPECIFIC RENEWABLE TECHNOLOGIES

The final approach to defining renewable energy is the least common, with only Algeria making a concerted effort to mention different technologies used to convert renewable energy sources into electricity in their legislative definition. In their definitions, Algeria primarily uses the 'scientific or physical properties approach', coupled with a denotative list of specific renewable technologies.¹¹⁸ For example, in Article 4 of the Algerian law, it states that both photovoltaic conversion and thermal and thermodynamic conversion may be used to convert energy from solar radiation from its primary state to electricity. It also specifies

¹¹⁸ *Loi n° 04-09 du 27 Jumada Ethania 1425 correspondant au 14 août 2004 relative à la promotion des énergies renouvelables dans le cadre du développement durable* [Law No 04-09 of 27 Jumada Ethania 1425 corresponding to 14 August 2004 on the promotion of renewable energies in the framework of sustainable development] (Algeria), Art 3, 4 [Stephanie Watson translation from French].

that both ‘wet’ channels of conversion, methane and alcohol fermentation, and ‘dry’ channels of conversion, combustion, carbonization and gasification, may be used to convert biomass from its primary state into its final form.¹¹⁹

Ordinarily, this approach of naming specific renewable technologies within the definition of ‘renewable energy’ could not be recommended, particularly if the government is seeking to encourage rapid deployment of renewable energy at least cost. By specifying technologies, this immediately dates the legislation. This may mean that more efficient, and in the long-term more cost-effective, emerging technologies are not given the support they need to commercialise. It also may lead to allegations that the government is seeking to ‘pick winners’ in a rapidly evolving sector with imperfect information available. These criticisms cannot be made in regard to the Algerian legislation. This is because the opening paragraph of Article 4 that lists the relevant technologies states:

Covered by the provisions of this Act and constituting its fields of application, all processes to convert renewable energy from their primary form to their final form, including the following channels of conversion.¹²⁰

However, this does prompt the question of why the Algerian legislative drafters bothered to list the specific renewable energy technologies at all? It is unclear what value this approach adds to the legislative definition of ‘renewable energy’, particularly as the list of technologies is preceded by the general catch all, and it does not seem to alter the outcome of the question of ‘What energy sources are renewable under Algerian law?’

3.5.8 COMBINED APPROACHES TO THE CONTENT OF DEFINITIONS

Over 80 per cent of countries with a legislative definition of renewable energy have adopted a combination of approaches to delimit the content of their definition. From this research, it appears that the vast majority of countries adopt one approach as a discriminant in order to distinguish the qualified renewable energy sources from other energy sources, and then use the

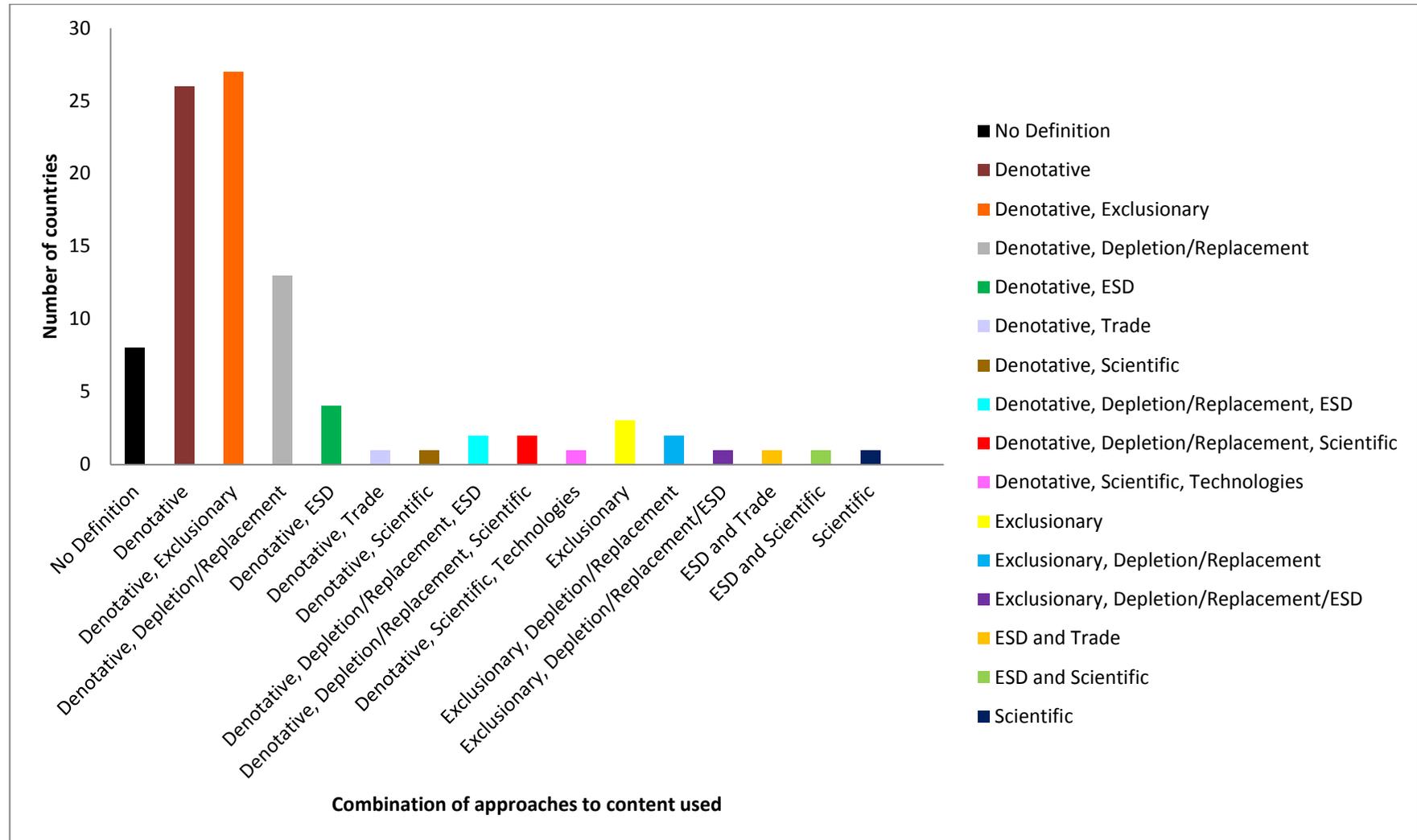
¹¹⁹ Ibid Art 4.

¹²⁰ Ibid.

denotative approach to exemplify how the application of the first discriminant operates. Most commonly, countries use a combination of the exclusionary approach and denotative approach (28 countries and the EU), with the second most popular combination a reference to the depletion/replacement rates and the denotative approach (nineteen countries). As shown in Graph 3.1 (below), other combinations exist, including those combining up to three different approaches, but these are significantly less popular.

This frequency of use of combined approaches suggests that most legislative drafters believe that the use of the denotative approach, or any other approach, in isolation will be insufficient to clarify the meaning of renewable energy. The exception to this rule is the fourteen countries that have adopted an exhaustive denotative definition. As these definitions exhaustively list the qualifying renewable energy sources, these countries do not need another discriminant to determine the content of the definition.

GRAPH 3.1: COMBINATION OF APPROACHES TO CONTENT TAKEN IN LEGISLATIVE DEFINITIONS OF 'RENEWABLE ENERGY'



3.6 HOW SHOULD RENEWABLE ENERGY BE LEGISLATIVELY DEFINED?

Some of the features of effective legislative definitions are that they provide clarity to the concept of ‘renewable energy’, endure without requiring frequent amendment and give effect to the government’s policies. In most circumstances, legislative definitions should also be able to be understood by a reader without resorting to a referral to the court for statutory interpretation.¹²¹

As shown above, different countries have adopted very different approaches to the form and content of their legislative definitions. In terms of the form of the definitions, it is obviously preferable that a specific definition be adopted covering ‘renewable energy’. This avoids the situation of not having a definition at all, or having to infer the content of the definition from another text. It also makes it easier for a non-lawyer to locate the definition than when it takes the form of an embedded definition. The question then becomes whether an inclusive or exhaustive definition is preferable. In the context of an emerging sector, a narrow exhaustive definition of ‘renewable energy’ may unduly limit the development of the sector and act in a manner that is contrary to the stated legislative objectives in terms of promoting or accelerating the deployment of renewable energy. Most countries with an exhaustive definition overcome this problem by having a broad exhaustive definition that includes all of the scientifically accepted sources of renewable energy plus geothermal energy. To this extent, these exhaustive definitions are effective in clarifying the meaning of ‘renewable energy’ and creating greater certainty in deciding which renewable energy sources and technologies to support. Properly drafted, inclusive definitions can also offer these benefits while providing more flexibility in dealing with rapidly changing markets. This is because an inclusive definition can provide clear guidelines on the content of the definition and provide examples of qualifying renewable energy sources, while still allowing for

¹²¹ See generally, Legislation Advisory Committee, *Chapter 2: Understandable and accessible legislation in ‘Guidelines on Process and Content of Legislation’* (May 2001) Parliamentary Counsel Office, Government of New Zealand, <<http://www.pco.parliament.govt.nz/lac-chapter-2>> [date accessed 2 June 2014].

discretion to be exercised if new energy sources or technologies are developed. If discretion is permitted in an inclusive definition, a formal delegation of powers should be made, clearly identifying the decision-maker and the scope of their authority.

In terms of the content of the definitions, these also vary widely, with some countries conflating the concept of 'renewable energy' with environmentally sustainable development or trade. It is argued that the legislative definition is not the appropriate place into which to incorporate these ideas as it isolates the definition from the commonly understood meaning of the term. These ideas may be better expressed in other areas of the legislation such as the objectives section. Equally, references to the applicable technologies are also unhelpful as they do not materially add anything to a definition designed to encapsulate qualifying renewable energy sources, but do date the definition, meaning it may require more frequent amendment. References to the depletion and replacement rate, references excluding fossil fuels and nuclear energy and illustrative lists of qualifying energy sources do all materially add to the legislative definition. These approaches make it clear what is being included in and excluded from, the definitions as well as assisting in the interpretive exercise for novel energy sources by identifying some of the types of qualifying renewable energy sources that met those criteria at the date of drafting.

To this end, it would appear that an inclusive definition that excludes fossil fuels and nuclear energy, refers to the depletion and replacement rate of the energy sources, and then provides a denotative list of examples of qualifying renewable energy sources might be the best approach. In addition, this definition should contain a clear delegation of powers enabling other energy sources that meet the criterion to be included in the legislative definition through insertion in delegated legislation.

For the purposes of this thesis, the following definition of ‘renewable energy’ has been adopted:

***Renewable energy** means non-fossil fuel and non-nuclear energy sources that are replaced at a rate equal to or faster than their depletion rate. Qualifying sources of renewable energy include solar energy, wind energy, hydropower, geothermal, tidal energy, current energy, wave energy, hydrothermal energy (maremotermica), osmotic energy, biomass, biogas, and any other source prescribed by the Minister for Energy in the regulations.*

Note that while geothermal energy from hot dry rock technology is arguably not renewable from a strictly scientific perspective (as discussed in the following chapter), geothermal energy has been accepted as renewable for the purposes of this thesis due to the international consensus that recognises it as such.

3.7 CONCLUSION

This study of the legislative definitions of ‘renewable energy’ highlights the very real differences that are evolving in both the form and approach to content. In many instances, the definition of renewable energy adopted or advocated by different jurisdictions tends to be reflective of their indigenous energy sources (both renewable and non-renewable). This is exemplified by the references to paddy husks in Thailand, coal seam gas in Russia and the Ukraine, peat in Sweden and wood products in Finland. This outcome leads to illogical results, removing the meaning of ‘renewable energy’ from the commonly held understanding of the term amongst the general population. It also has a distorting effect not just on the current renewable energy projects that can benefit from the regulatory support mechanisms contained in the legislation but sends signals that will affect future research and development, and commercialisation of renewable energy technologies.

As highlighted in the previous chapter, the lack of a universal definition is also hampering administration and information sharing internationally. If different

countries each have different legislative definitions of 'renewable energy', even in the face of the globalisation of renewable energy technologies, this imposes an additional market barrier for new market entrants and makes international trade in the sector more difficult.

Clearly here the Holy Grail would be the harmonisation of the legislative definitions and legal standards for 'renewable energy'. However, given that no country has transposed the IRENA definition into its domestic legislation, there currently does not seem to be the international will for this to occur. This may be because countries are more interested in protecting their own sovereign position than in facilitating international trade and commerce in the sector. As will be shown in Chapter 6, this is likely to be because of the close association in policy between energy security and national security more broadly.

If a harmonised international definition of 'renewable energy' is not going to be adopted, countries could still improve the form and approach to content of their legislative definitions. This could be done by ensuring that legislative definitions are well-tailored to the subject matter (being neither over- or under-inclusive), are not overly complex and do not contain material that is extraneous to the task of providing meaning to the question: 'How should we define renewable energy in law?'