Approval Procedures for Large-Scale Renewable Energy Installations:

Comparison of National Legal Frameworks in Japan, New Zealand, the EU and the US

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Abstract

This paper analyses the commonalities and variances of environmental approval procedures in four OECD territories, Japan, New Zealand (NZ), the European Union (EU), and the United States (US). In order to streamline regulatory approval frameworks for large-scale renewable energy (LS-RE) installations, outlining the strengths, as well as the weaknesses of the current systems in place, is crucial in determining what components to alter in line with national and regional particularities. The jurisdictional juxtaposition facilitates the identification of administrative burdens, which could increase environmental review-related costs for developers and prolong the entire approval process. Environmental impact assessment (EIA) frameworks, a major component of the LS-RE approval process, suffer from administrative fracturing between the local, regional, and national levels as well as between various government agencies. In combination with strong reservations from local civil society stakeholders, the results revealed some of the flaws of the current LS-RE project approval systems in place. The EIA frameworks and reform efforts in all four jurisdictions illustrate the importance of consolidated and comprehensive frameworks to reduce the amount of planning uncertainties for developers. Utilising regulatory tools such as mandatory timeframes, scoping, clear screening thresholds and priority assessment categories for LS-RE projects, could result in robust EIA processes based on unified regulatory procedures for climate change mitigating energy projects, inside as well as outside of OECD jurisdictions.

Highlights

- Review of large-scale renewable energy project approval procedures.
- Analysis of frameworks in Japan, New Zealand, the EU, and the US.
- Approval procedures can act as strong barriers to renewable energy development.
- Streamlining efforts in New Zealand and the EU facilitate procedures.
- Procedural reforms provide an additional balance between stakeholder interests.

Keywords

renewable energy; environmental impact assessment; environmental law; energy law; OECD countries

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1. Introduction

Considering the cataclysmic effects that intensifying anthropogenic climate change and global warming have on the world's ecosystems and given the fact that fossil-fuel related greenhouse gases (GHG) represent the main drivers, finding ways how to reduce said negative externalities has become one of the major challenges for humanity. The Organisation for Economic Cooperation and Development (OECD) member states still constitute the main per capita generators of GHG emissions, therefore looking at the internal RE policies and how the structure their regulatory frameworks to accommodate higher RE capacities is crucial to any comprehensive global GHG mitigation strategy (IEA, 2017). Four OECD territories were selected for this comparative analysis research, Japan, NZ, the EU and the US. Table 1 illustrates the overwhelming reliance on fossil-fuel-based energy generation to meet domestic energy demand. In combination with the ambitious GHG emission reduction targets under the Paris Climate Agreement, expanding the share of RE represents a crucial component in each territory's GHG mitigation strategy.

Table 1

List of Total Primary Energy Supply (TPES) and RE Statistics

Country/Region	TPES (2016)	TPES (2016; Share fossil fuels)	NDC GHG Reductions	RE Target Share	RE Share Current
Japan	424Mtoe[1]	93.6%	26% by 2030 (base year 2013)	22-24% by 2030	4.8%
New Zealand	21Mtoe	59.3%	30% by 2030 (base year 2005)	100% by 2035	40.5%
EU	1717Mtoe	71.9	40% by 2030 (base year 1990)	27% by 2030	14.2%
US	2159Mtoe	82.3	26-28% by 2025	Currently no fixed	7.1%

	(base year 2005) political target.[1]
[1]Megatonnes of oil equivalent	(Sources: UNFCCC, 2017a, 2017b; NZWEA, 2018) IEA, 2017; Reuters, 2017)

LS-RE development is considered one of the most efficient methods to address climate change and mitigate anthropogenic GHG emissions. However, LS-RE projects have faced numerous obstacles caused either by stakeholder resistance, financial constraints or administrative as well as regulatory barriers (Larsen, 2018). Renewable energy law has been introduced as a branch of energy law to address issues revolving around the expansion and administration of RE infrastructure and the management of RE resources (Peters and Schomerus, 2014; Heffron and Talus, 2016a). This article presents a compelling argument that environmental approval procedures constitute an integral part of renewable energy law by building a direct link between local socio-environmental aspects of LS-RE project development and GHG strategies.

The paper focuses on the role of EIA review procedures, mandatory for many LS-RE projects, which bear significant project development stifling potential (Smart et al., 2014). Therefore, this paper aims at filling an important literature gap by investigating and informing decision-making about the energy-environment-society nexus established by EIA procedures (Loomis and Dziedzic, 2018). This issue is at the core of the broader energy justice and just transition debates and how we decarbonise our energy generation while assuring a fair distribution of the positive and negative externalities while doing so (Heffron and McCauley, 2017; McCauley and Heffron, 2018). The question of finding the right balance between ecological conservation, economic viability and social equity renders RE project-related EIA frameworks

[1] California (CA) has a RE target of 50% by 2026 (Mead, 2016); Washington State's (WA) 100% clean energy goal will require completely phasing out coal-fired generation by 2025 and eliminating all fossil fuels by 2045 (Gentzler, 2018)

one of the most potent tools to not only identify but to efficiently address local stakeholder concerns early on (Tolli et al, 2016; Pereira et al., 2018; Larsen et al, 2018). Hence, LS-RE project-related EIAs build the foundation for societal justice and fair and equal distribution of the expected impacts.

In order to analyse the regional variances between environmental approval procedures, this research focuses on various aspects of environmental regulations to investigate the influence of EIA and environmental rules on RE project development. The political ecology of participatory governance in addition to the determinants of wind energy growth provides an integrated and comprehensive image on the role of EIA in national RE and climate change policies in the context of LS-RE installations. Promoting LS-RE development has gained traction in the wake of the adoption of the Paris Climate Change agreement and the Sustainable Development Goals (SDGs) in 2015 (Villavicencio Calzadilla and Mauger, 2017). Despite numerous regulatory and financial incentives as well as rapidly falling production costs for RE installations, the low-carbon energy transition is still stalling in many countries (Villavicencio Calzadilla and Mauger, 2017). Regulatory stipulations contained in siting and permitting rules can act as barriers and lead to significant delays in the project planning stages. These might compromise the economic viability of RE projects, especially LS-RE installations, due to potentially evolving market conditions. The latter include reduced subsidy rates, shifts in public perceptions again resulting, among others, in stronger local stakeholder opposition or lower market demand caused by conventional thermal energy capacity additions (Kelsey and Meckling, 2018). In some jurisdictions, streamlining project approval frameworks has been considered as an efficient method to facilitate LS-RE project development such as for the construction of wind farms or geothermal power stations (Liljenfeldt, 2015; Shortall and Kharrazi, 2017). Altering environmental stipulations,

including EIA frameworks, has been a preferred method of eliminating regulatory red tape. However, this trend has faced numerous criticisms from environmental groups and civil society stakeholders and is often described as a "green vs. green" dilemma (Smart et al., 2014).

In order to provide a comprehensive picture of the unique challenges of the LS-RE approval, siting and permitting procedures, this paper will outline the strengths as well as the weaknesses of the current legal and regulatory frameworks mostly in relation to the siting and planning of large-scale wind power installations and geothermal power stations. These LS-RE project types have historically been experiencing the most virulent public opposition. As aforementioned, the four observed OECD territories each approach approval of LS-RE installations differently. The primary criteria for inclusion were the availability of comprehensive data, the implementation or announcement of EIA streamlining measures affecting LS-RE projects, and plans to expand the share of RE in the TPES. New Zealand and the EU have been selected as best practice frameworks to contrast their approaches towards often-controversial LS-RE projects with less progressive countries such as Japan and the US (Macintosh, 2010; Schumacher, 2015; Joseph et al., 2015). The EU is included as one single jurisdiction considering that the EU Directives in question provide a high level of mandatory guidance. These minimum goals assure a basic degree of harmonisation between member states. Therefore this paper opted for the inclusion of the overarching EU-level frameworks instead of a particular member state transposition.

Hence, juxtaposing these four systems enables the identification of the comparative elements within the LS-RE regulatory approval process that act as barriers or drivers to project development. In addition, this paper will look at how regulators and lawmakers address the

structural and procedural shortcomings within these approval procedures and the corresponding legal frameworks. Those tend to suffer from administrative fracturing between the local and national levels as well as divided competences between various government agencies. In combination with the strong reservations from local civil society stakeholders, these can stall LS-RE project development in a significant manner (Nadaï, 2007; Schumacher, 2017). Available remedies such as mandatory timeframes, scoping, clear screening thresholds and priority assessment categories for RE projects, could serve as tools for more robust LS-RE approval processes that introduce uniform regulatory procedures for climate change mitigating energy projects (Larsen, 2018).

In light of these circumstances, this interdisciplinary comparative analysis is situated at the frontier of environmental law and energy law. It will indicate administrative burdens that could increase approval-related costs and obligations for developers and potentially prolong approval procedures besides indicating potential remedies such as streamlining. By highlighting the strengths and weaknesses of each jurisdiction, decision-makers and regulators will be able to implement modifications into their frameworks to render approval procedures more efficient concerning time and costs. This will help mitigate GHG emissions by facilitating LS-RE project development while simultaneously reducing the negative environmental externalities of the latter.

2. Methodology

In order to assess the strengths and weaknesses of each EIA framework, a multi-step mixed-methodology approach was applied. The first step consisted of in-depth literary and legal reviews of the current rules in place, enabling a gradual identification of the regulatory elements that acted as development barriers to RE projects. The overall analysis was

structured in two separate steps, the first being individual jurisdictional outlines of the respective EIA procedures. Each country-level analysis concluded by outlining the planned or already enacted reforms and streamlining measures. The next step consisted of the preliminary collection of relevant legal and procedural frameworks presented in Tables 2 and 3 that allowed for an objective assessment of the fundamental requirements set by EIA procedural steps for developers. Finally, these criteria were then applied in the comparative qualitative data analysis of the jurisdictional strengths and weaknesses, presented in Tables 4 and 5, which highlights the likely impact of each procedural component. Based on prior studies by Galás et al. (2015), Jiricka-Pürrer et al. (2018), and Kraal (2019), the two-step jurisdictional case study approach provides first comprehensive data at the individual country level. The illustration of the core procedural steps underpins the screening and review criteria applied in each jurisdiction. The subsequent comparative legal evaluations of each of the national frameworks (Tables 4 and 5) can be assessed on a side-by-side basis that facilitates the identification of best practices and the corresponding benchmarks.

3. Large-Scale Renewable Energy-relevant Environmental Legislation

3.1. Environmental Approval Regulations in Japan

Legislation that covers environmental impacts on a general scale has existed for almost 50 years in Japan and is divided into two branches, primary and secondary environmental laws (Fig. 1). The fundamental aspects of environmental principles are defined in two major pieces environmental legislation, the 1967 “Basic Law for Environmental Pollution Control" (BLEPC) and the 1972 "Nature Conservation Law" (NCL). These laws were drafted to combat serious industrial pollution and to preserve the natural environment. Under the BLEPC, secondary laws, dealing respectively with air, water, or other forms of pollution, were drafted. The 1957 National Parks Law has been understood as a secondary law of the

NCL (Milhaupt et al., 2012; MOEJ, 2016). A general, comprehensive and integrated environmental law, covering a large range of environmental subjects, was then passed in 1993 as the “Basic Environmental Law” (BEL), succeeding the BLEPC and complementing it with additional stipulations to account for changes in the socio-environmental and economic transformations in Japan over the past decades (MOEJ, 2012b). Under the BEL, the NCL currently works as well for the natural-environment preservation.

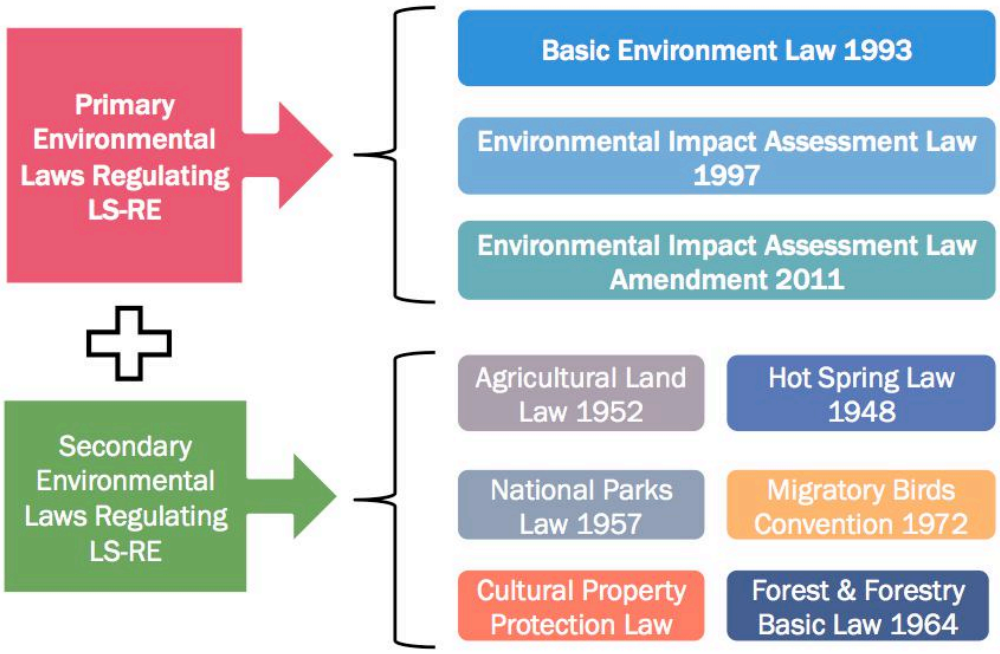

Fig. 1 Major Japanese Environmental Laws affecting LS-RE (Source: MOEJ, 2012a)

The initial system for EIA in Japan was a standardised rule of "Implementation of Environmental Impact Assessment ", set up through a Cabinet Decision in 1984. This was developed from 1972 guidelines, for public works, and 1980 guidelines, for port and harbour planning, reclamation activities, power plants, the Shinkansen (high-speed railway trains) and the 1981 EIA bill that failed to pass through the National Diet in 1983 (MOEJ, 2016).

In Japan, the environmental approval process illustrated in Fig. 2 for LS-RE projects is

currently enshrined mainly in two different pieces of legislation, as shown in Fig. 1, the first being the BEL, and the Environmental Impact Assessment Law 1997 (hereafter EIAL), including the substantial 2011 amendment to the latter (MOEJ, 2012a; Schumacher, 2017). The EIAL was enacted based on experiences under the 1984 Cabinet-Decision EIA guidelines, under the promotion of the BEL. The BEL, which contains a set of rules pertaining to the respect and protection of the environment, explicitly provided the state's obligation to make the EIA law in art. 20. Under this provision, the EIAL was enacted and imposed a set of environmental and legal requirements for potential future construction projects (MOEJ, 2012a). The EIAL was amended in 2011 to take account of several criticisms, such as the demands for continued monitoring, increased accountability, previously unaddressed environmental factors and more active public participation, into consideration. These changes did enter into force in 2013 (MOE, 2012a).

Fig.2 illustrates that the management of the Japanese EIA system is assumed by several entities, depending on the nature of the application. In principle, each project that requires approval as well as licensing or is funded respectively co-funded by the government is subject to the EIA law. The national government manages the EIA applications through the MOEJ and various other ministries. Depending on the field into which a project of a proponent falls, the ministry in charge of overseeing the EIA procedure will change. For power plants, including RE installations, the Ministry of Economy, Trade and Industry (METI) is in charge, although each EIA has to be screened eventually by the MOEJ for final approval (MOEJ, 2012b).

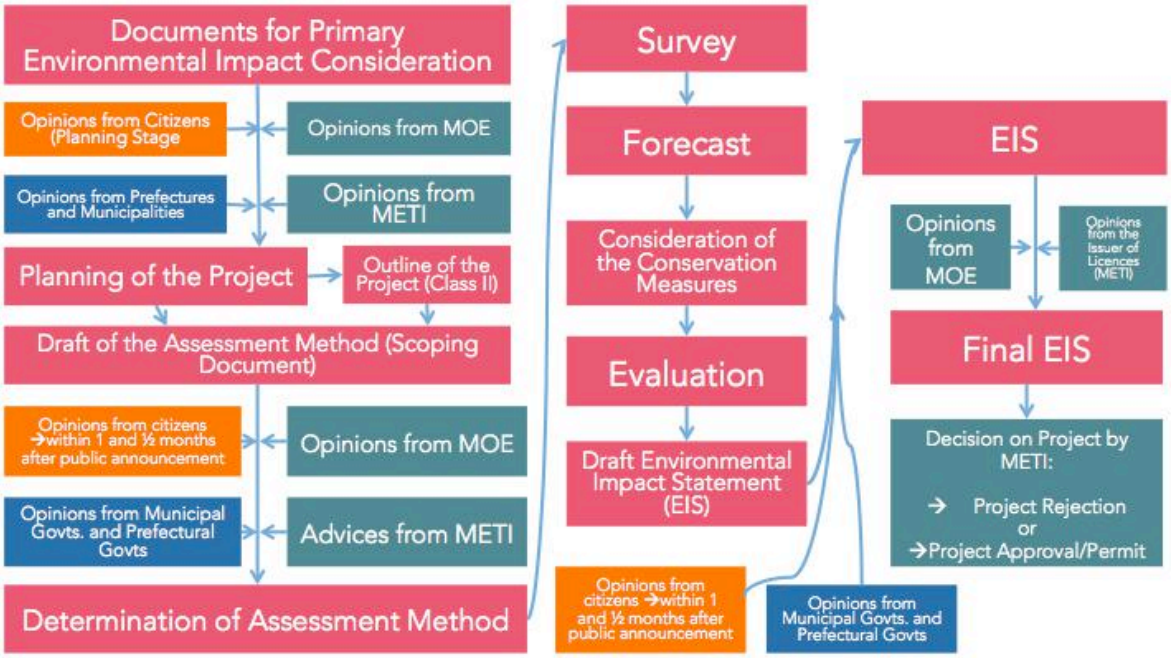

Fig. 2 Basic EIA procedural steps for LS-RE projects (Source: MOEJ, 2012a)

A power plant project is subject to the EIAL when the electricity output is larger than the one provided in the EIAL and regulations, as can be seen in Fig. 3. Projects are divided into two categories; Class-1 projects are defined as the ones requiring mandatory EIA due to great potential impact, while Class-2 projects are defined those with less potential impact than Class-1 and for which the government will decide whether or not an EIA will be required on a case-by-case basis after a thorough screening process evaluating socio-environmental, economic and other external factors (MOEJ, 2012b).

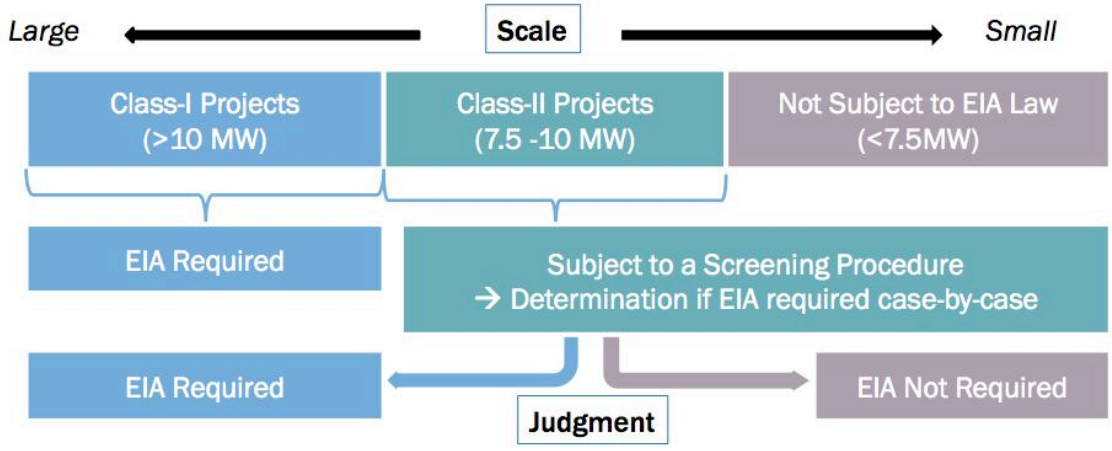

Fig. 3 Classification categories for National EIA Screening (Source: MOEJ, 2012a)

The current output thresholds for wind power and geothermal power plants are respectively “10,000kw or over” for Class-1 projects, “7,500kw-10,000kw” for Class-2 projects. This does not mean however that projects with a lower electricity output are exempt from EIAs. Local governments e.g. prefectures, municipalities and ordinance-designated cities can edict their own ordinances, which either impose local EIAs or they can add items not specified by the EIA law to national EIAs, for projects under 7,500kw (MOEJ, 2012b).

The EIAL then creates an approval procedure for development projects that are likely to have a significant impact on the environment in order to conform these activities with the most common sustainability principles and minimum environmental protection standards. The EIA procedure is started by launching an application with the Ministry of Environment (MOEJ) and will include input by the public, local authorities (prefectures and municipalities), the project proponents and the national government, represented by the MOEJ and, in the case of power plants, by the Ministry of Economy, Trade and Industry (METI). Before final approval is given, MOEJ has to issue a final consultative and non-binding opinion. Afterwards, METI will issue the final decision on whether to approve a development license or not (MOEJ, 2012a). Furthermore, local governments such as prefectures and municipalities can create their own supplementary local EIA ordinances for all areas or elements not explicitly covered by the national EIAL, thus generating a large catalogue of differing EIA rules (MOEJ, 2012a; METI, 2016a).

In 2011, the EIAL was amended, adding several procedural steps at the beginning and at the end of the EIA process. By integrating a pre-assessment primary environmental impact consideration (PEIC) and impact mitigation report (IMR) post-monitoring stages, which entered into full force in 2013, the government wanted to create additional possibilities for public input and overall planning consideration, in line with more broad strategic

environmental assessment (SEA) principles, without having to create a specific entirely separate SEA law (MOEJ, 2012a).

The vast majority of RE power plant projects are subject to the EIAL and the environmental approval procedures stipulated therein. Solar PV is currently a notable exception as projects falling within this category, irrespective of size and production capacity, are not subject to the EIAL (Watanabe and Stapczynski, 2016). Wind power has initially been exempt as well, however, with the 2011 EIAL amendment, it was added to list of projects subject to an EIA, primarily out of environmental concerns, mostly linked to low-frequency sounds, noise and the elevated risk of bird collisions (MOEJ, 2012a).

Besides these two main pieces of environmental legislation, several other laws have to be consulted as well during the various project development stages and the subsequent approval process, such as the “Hot Spring Law 1948” and “Natural Parks Law 1957”, the “Migratory Birds Convention 1972”, the “Noise Regulation Law 1968” or the “Agricultural Land Law 1952”. The approval procedures outlined within these laws are sometimes concurrent or separate from the main EIA process and require separate approval from different authorities (Schumacher, 2015; MOEJ, 2012a; JFS, 2014a; JFS, 2014c; MOEJ, 2015).

3.2. Environmental Approval Regulations in New Zealand

Similar to Japan, New Zealand had a number of laws regulating various air, water and soil or other pollutants separately. This also meant that in New Zealand applications for resource consents by investors regarding the construction projects or the exploitation of natural resources had to undergo a “set of procedures for environmental assessment”, that was sometimes discouraging investors or slowing down ongoing projects (Montz, 1993).

The “Resource Management Act 1991” (RMA) was a landmark piece of legislation that altered the EIA process in New Zealand radically. First of all, it regrouped all previous environmental laws into one single act, thus making the environmental law framework more coherent and comprehensive. Secondly, it reformed the EIA process to speed up accreditation procedures and facilitate project planning as well as render eventual execution more cost-effective (Montz, 1993).

In New Zealand EIAs are called “Assessment of Environmental Effects” (AEE) but other than the differing denomination; they are essentially the same procedural tool and serve the same function as EIAs in other countries. They are part of the so-called “resource consent” (RC) requirement, which obliges companies or individuals, who wish engage in activities that might adversely or disproportionally affect the environment, to obtain prior consent from government authorities, either on a national or local level (NZMOE, 2009a).

In 2009, 2011 and 2013, the New Zealand government progressively amended the RMA to create a new government agency, the “Environmental Protection Authority” (NZ-EPA), which is charged with overseeing resource consents of “national significance” (RCNS) (IEA, 2011; Kelly, 2011; NZEPA, 2013), which underlie different procedural timeframes and administrative rules than normal AEEs. This new procedure, presented in Fig. 4 was introduced to streamline the whole AEE process for LS-RE projects with significant environmental impact potential, like wind parks or geothermal power plants, and shorten the previously often lengthy and cumbersome treatment of these under the normal AEE system (IEA, 2011). This system was further incorporated into the New Zealand national legal framework with the passage of the "Environmental Protection Authority Act 2011 (EPAA), which contained some clarification in terms of competences between the NZMOE, the

NZEPA and local authorities, notably regional councils (NZMOE, 2014).

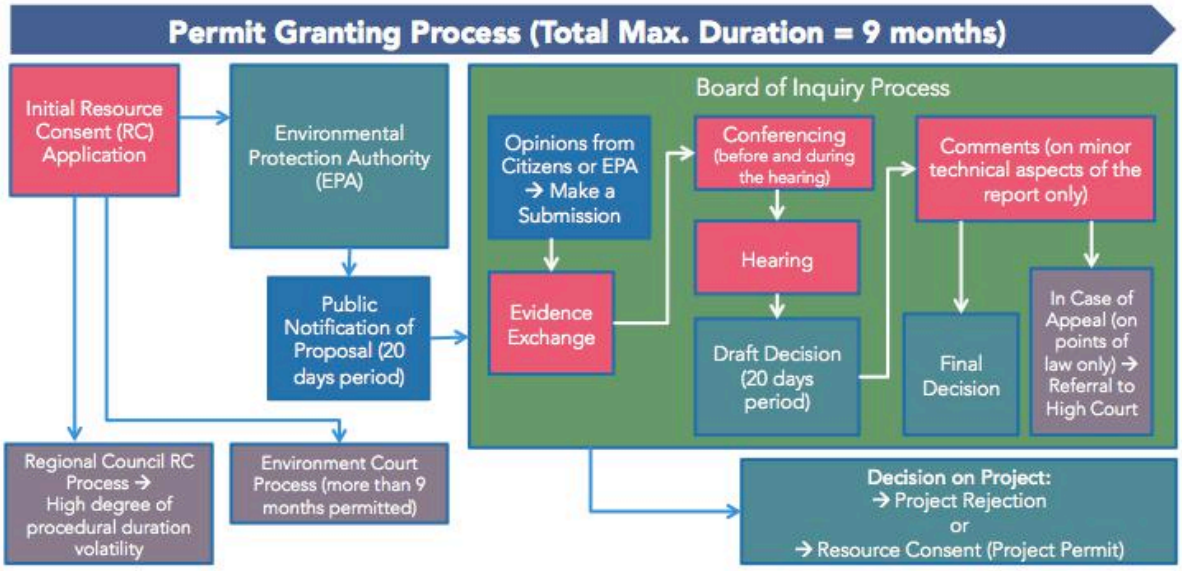

Fig. 5 New Zealand Board of Inquiry Process (Source: NZEPA, 2013)

On the one hand, the RCNS system is managed by the New Zealand national government through the NZEPA. The amended RMA establishes an independent application system, evaluation procedure and method to appeal NZEPA decisions (Cheyne, 2013). On the other hand, management of the ordinary AEE system continues to be handled by the respective competent local councils, which are regional political and regulatory sub-divisions comparable to the Japanese prefectures.

Each council produces a resource plan outlining how resources may or may not be used within its jurisdiction. A proponent who wants to construct a power plant in this area is subject to these local rules, and the AEE will thus be performed on the basis of the regional council resource plan (NZMOE, 2009b). This plan needs to be in conformity with the RMA provisions, but apart from this requirement, the local plan will set out individual rules whether an RC and AEE will be necessary or not.

The major improvement over the old system is, as illustrated in Fig. 5, that RC applicants have the choice to deposit their application either directly with the EPA, or the NZMOE that decides when a matter is of “National Significance”, or finally if the competent regional council refers a matter to the NZEPA (sections 142 and 145 of RMA). Section 142 of the RMA states that a project might qualify if it has “aroused widespread public concern or interest regarding its actual or likely effect on the environment, including the global environment”, “affects or is likely to affect or is relevant to New Zealand's international obligations to the global environment” or “results or is likely to result in or contribute to significant or irreversible changes to the environment, including the global environment” (NZMOE, 2014).

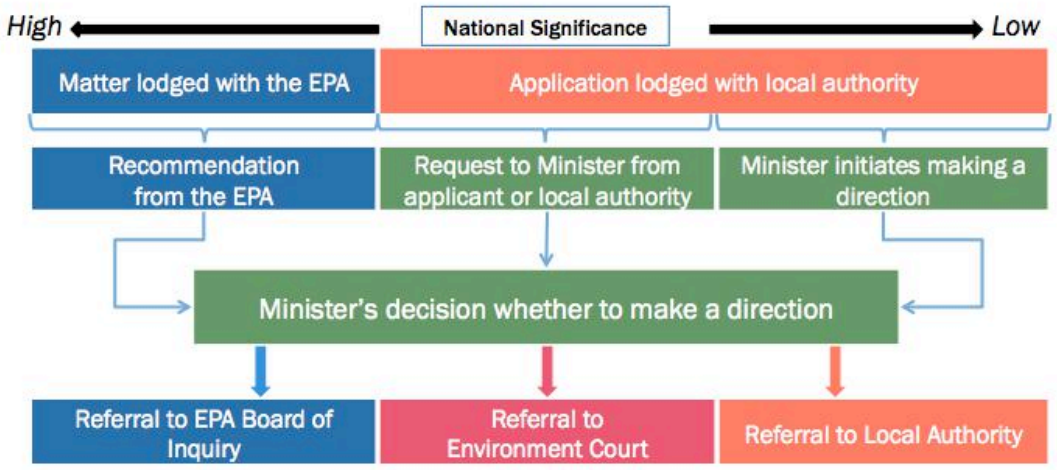

Fig. 5 LS-RE Project Subject to Preferential NZEPA Procedure (Source: NZEPA, 2013)

Although this plays only a minor role for RE projects, as large-scale wind power farms as well geothermal power installations are under usual circumstances considered to be of “National Significance” at most times given their GHG mitigation roles and thus will normally be notified and henceforth be subject to NZEPA evaluation (NZMOE, 2014).

If a project gains RCNS status, it will be subject to a streamlined evaluation by an NZEPA-

internal board of inquiry (see Fig. 4) that is independent of the NZMOE or any other government body and is able to disseminate information without prior bias or external influence. The procedure limits public input, containing strict rules in terms of evidence and deadlines (20 days after initial notification). In case of opposition from interested parties or local members of civil society, the board of inquiry will assess every piece of information and eventually take a definitive decision after said public notification period and the subsequent hearings. This decision can only be appealed exclusively on points of law (NZMOE, 2014).

3.3. Environmental Approval Regulations in the EU

EU EIA law was first introduced via Commission Directive 85/337/EEC in 1985, which set out the environmental approval process for public and private projects complying with the statutory assessment criteria defined in the directive such as project type, size or likely environmental impact (EC, 2009). Over the years, this directive got amended on three occasions: Directive 97/11/EC integrated the "UN ECE Espoo Convention on EIA in a Transboundary Context"; Directive 2003/35/EC aligned the main EIA Directive with the provisions on public participation contained in the "Aarhus Convention on Public Participation in Decision-making and Access to Justice in Environmental Matters"; and finally Directive 2009/31/EC amended the Annex I and II lists that contain the types of projects subject to the EIA Directive, extending the latter to include projects related to transport and carbon capture and storage (CCS). These three amendments were then codified into one single text by Directive 2011/92/EU (EC, 2011).

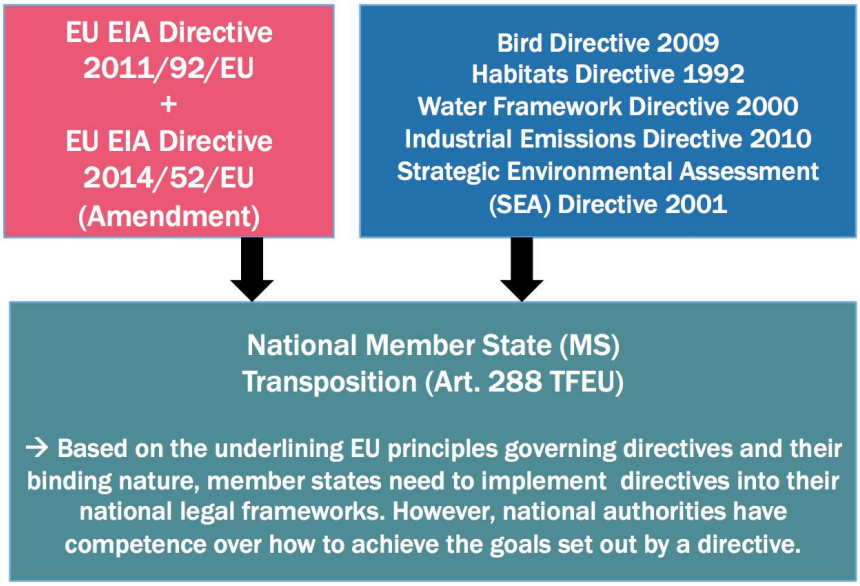

Fig. 6 EU Environmental Directives affecting LS-RE (Source: EC 2009, 2011, 2012a, 2013; TFEU)

Implementation of Directives is governed according to article 288 of the Treaty on the Functioning of the European Union (TFEU), presented in Fig. 6, which specifies that member states are in charge of implementing the directions and guidelines contained therein into their national legal frameworks within a prescribed time-frame. Depending on the respective directive's framing and wording, member states do possess more or less considerable leeway as to how they want to achieve the minimum policy goals set out by a directive (Van Zeben, 2014).

In 2014, the EU revised the 2011 EIA Directive with the amended Directive 2014/52/EU (hereafter the Directive), which was the result of a five-year consultation process between several major EU institutions (Commission, Parliament and Council), the public, environmental organisations and industry stakeholders (EC, 2012a). Its implementation pursued the goal of simplifying the entire EIA process as well as implementing recent

European Court of Justice (ECJ) jurisprudence regarding project screening procedures[2] and necessity of an EIA[3] (EC, 2017a). The amendment was meant to address three main shortcomings: 1) Insufficient operation of the screening process; 2) Insufficient quality and analysis of assessments; 3) Risks of inconsistencies, within the EIA process itself, regarding time-frames and in relation to other legislation (EC, 2012b). It aimed at increasing predictability with mandatory time-frames for the national authorities in charge of the EIA review steps (EC, 2012b). This would create more opportunities for public participation and achieve more overall transparency in the diffusion or dissemination of information with regards to the screening or final development consent decisions.

Moreover, through several guidance documents, the Commission sought to clarify ECJ jurisprudence[4] which states that although several directives cover the environmental approval process for LS-RE projects, including the Birds and Habitats, the EIA procedure is distinct in its features and fulfilling the approval conditions for one process does not automatically amount to compliance with the requirements established by other directives (EC, 2017a - 2017d).

Fig. 7 shows that Annex I projects are always subject to an EIA, however, the only LS-RE projects currently in this category are large hydroelectricity projects. Annex II of the Directive

[2] See *C-486/04, Commission v Italy* and *C-127/02 ("Waddenzee" case)*, where the ECJ construed a broad interpretation of what constitutes a project under the EIA Directive. It also found that projects need to be interpreted differently, even among similar directives, in this instance the *Habitats Directive*.

[3] See C-72/95, *Kraaijeveld and others* and *C-332/04, Commission v. Spain*, the ECJ found that the EIA Directive has a wide scope and broad purpose and that EIAs should therefore be the rule in case of probable environmental impacts

[4] The ECJ stated that "*The appropriate assessment carried out under Article 6(3) of the Habitats Directive, despite having many similarities, is distinct from the environment impact assessment required under the EIA and SEA Directives. Whilst these assessments are often carried out together, as part of an integrated or coordinated procedure, each assessment has a different purpose and assesses impacts on different aspects of the environment. The outcome of each assessment procedure is also different. In the case of the EIA or SEA assessments, the authorities have to take the impacts into account. For the appropriate assessment, however, the outcome is legally binding for the competent national authority and conditions its final decision." (ECJ, 2014)*

lists the projects that are not necessarily subject to EIAs. It includes wind power, geothermal power and large-scale solar PV projects. These projects will be subject to a screening procedure, which can prolong the overall EIA duration and uncertainty for developers considerably (Directive 2014/52/EU). The Directive contains stipulations, which recommend that competent authorities should take screening decisions within a non-binding 90-day time-frame. In addition, the Directive prescribes a mandatory minimum public consultation period of 30 days to address concerns over a lack of accountability and public consideration highlighted during the pre-adoption consultation period (EC, 2012b).

Annex III of the Directive provides a catalogue of selection criteria for projects that fall within the scope of the Annex II screening procedure. Things that the national screening authorities need to consider are the characteristics (e.g. size, cumulation, natural resource use, etc.), the location and potential impact of the project in order determine if said project is either subject to or exempt from the EIA requirement (Directive 2014/52/EU).

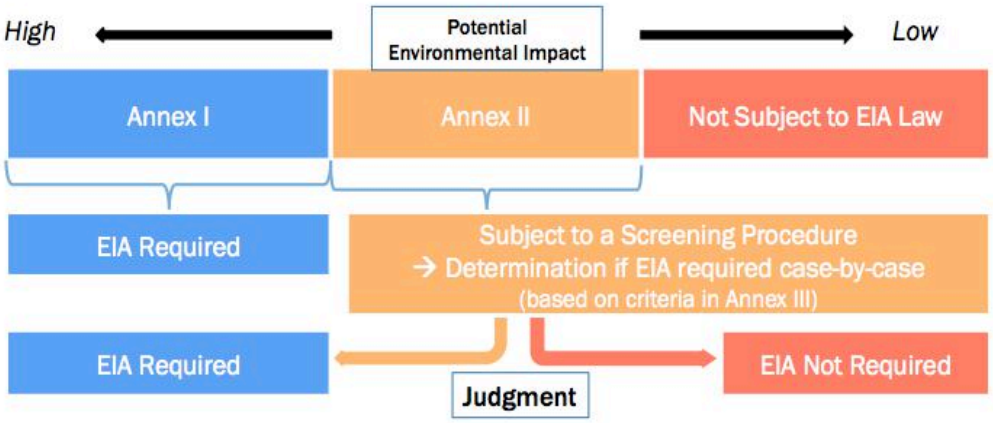

Fig. 7 Classification categories for EIA Screening (Source: adapted from Directive 2014/52/EU)

Fig. 8 illustrates the extent to which national member states can also fix their own thresholds or criteria as to when they require an EIA. Thereby, member states enjoy a fair degree of

regulatory flexibility in devising their own laws on how to reach the goals of the directive. Individual member state transpositions can vary significantly, for example for when an EIA is required for large-scale wind turbines. The German EIA act contains unique provisions that allocate siting responsibilities to both the federal level and the federated states. Federated entities, the Bundesländer, first need to designate priority areas in accordance with their internal land use regulations (TU Berlin, 2011). In these zones, developers are then permitted to site LS-RE installations in compliance with certain federal rules. For example, the German EIA process is mandatory for wind farms composed of at least 20 wind turbines exceeding 50 meters in height (UVPG). Wind farms consisting of 3 to 19 wind turbines exceeding 50 metres in height are subject to an EIA screening procedure (UVPG; Geißler et al., 2013). In the UK, large-scale onshore wind power projects exceeding a production output of 50MW or above are always subject to an obligatory EIA, whereas wind power installations composed of more than five turbines or exceeding a production output of 5 MW will be subject to an EIA screening procedure (Jones et al., 2011; Town and Country Planning (Environmental Impact Assessment) Regulations, 2017). In France, in an attempt to promote low-carbon energy technologies, a 2018 legislative reform has abolished separate EIAs for wind farms altogether as long as a local prefectural consent has been obtained (MEEM, 2017). This regulatory update introduces the integrated “environmental authorisation” process that foresees a final approval decision within 9 to 11 months (MEEM, 2017).

Despite the relatively high degree of flexibility offered by the Directive to each individual member state to adopt and implement the provisions set forth in the Directive into their EIA legal frameworks, the new amendment has also been met with criticism from many stakeholders. For example, member state officials, industry groups, politicians and environmentalists criticised the lack of public input requirements (EC, 2012b)

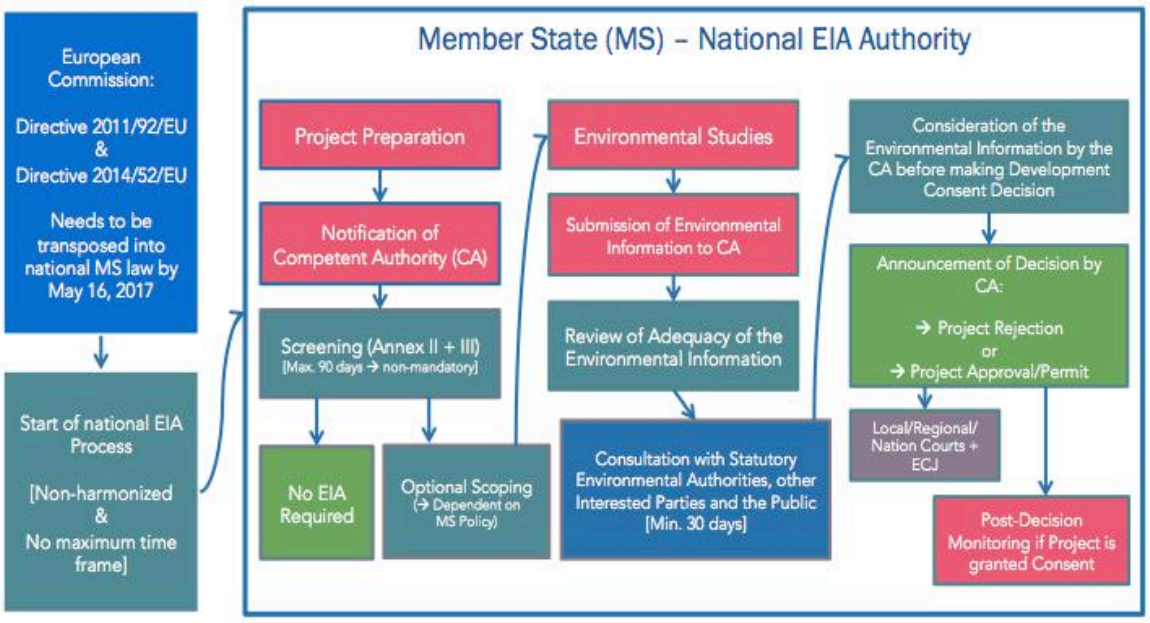

Fig. 8 Basic EIA procedural steps for LS-RE projects (Source: adapted from Directive 2014/52/EU)

3.4. Environmental Approval Regulations in the US

The US represents an interesting case study insofar that legal and procedural frameworks do differ sometimes significantly from state to state. Due to multiple procedural competence allocations between the federal, state, county, and municipal levels, the United States environmental approval frameworks are even more fractured than between EU member states, where Directive 2014/52/EU constitutes a legislative act that sets out the minimum goals that all EU countries must achieve (TFEU Art. 288; Schumacher, 2018). For the purpose of this paper, the example of the California Environmental Control Act (CEQA) is used to represent state-level environmental approval frameworks (see Fig. 10), California being a frontrunner in

terms of state-level environmental rules. Studies have documented that in-state environmental provisions in state-wide permitting and siting regulations affect LS-RE project development (Hitaj, 2013; Schumacher, 2018). Environmental impacts on bird and bat populations, low-frequency noise emissions impacts or landscape aesthetics do represent well-documented negative externalities. Wind energy installations are most frequently affected by adversities and controversies, albeit other RE types does also experience them (Dai et al., 2015). Henceforth, environmental legislation subjecting developers to take these incidentals into account, throughout all permitting and siting stages, bears the risk of adding significant administrative and financial burdens during the pre-construction planning phases, and generally renders overall investments more risky and expensive (Lüthi and Prässler, 2011; Petrova, 2013; Troxler, 2013).

In 1969, the United States was the first country in the world to create an integrated legal framework whose sole purpose was the protection of the natural environment. The National Environmental Protection Act (NEPA), which entered into force in 1970, mandated that government agencies would have to consider potential environmental impacts prior to the start of any such activities (see Fig. 9). This provision includes entities interacting with the government, for example, those executing government contracts or developing on federal lands. Even if the screening stage reveals no government involvement of any sorts, projects might still be subject to an EIA (see Fig. 9), for example under state-level CEQA rules, in case the LS-RE project is being proposed in California (CEQ, 2016). Developers first have to perform an EIA and produce a comprehensive Environmental Impact Statement (EIS) listing all of the potential socio-environmental hazards created during the project construction and operation phases (Sive and Chertok, 2005; CEQ, 2016). Numerous states emulated the federal NEPA procedural rules shortly after its conception by integrating identical or similar

provisions into their state-level environmental frameworks (see Fig. 10). These “State Environmental Protection Acts” (SEPA) are also known as “Little-NEPAs” (L-NEPA) (CEQ, 2016).

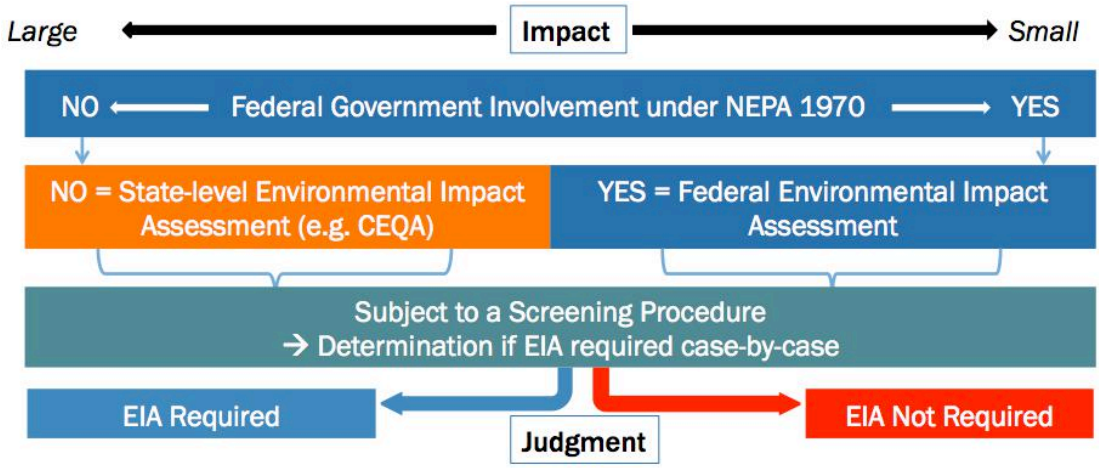

Fig. 9 Screening Procedure for Projects potentially subject to the NEPA EIA Procedure (Source: CEQ, 2016)

The NEPA provisions notwithstanding, government policies do affect state-level wind energy development only to a small degree; mainly through projects planned on federal lands. Government agencies such as the Bureau of Land Management (BLM), National Forest Service (NFS), Fish and Wildlife Service (US-FWS), National Park Service (NPS) and the Department of Defense (DOD) do collectively manage more than 608.9 million acres of land, on which at least 20.6 million acres do qualify for wind power development, mostly in Western Region states such as Nevada, Idaho, Utah or Wyoming (BLM, 2011; Spengler, 2011). As aforementioned, the basic requirements for developers that want to engage in construction activities on these lands is the performance of an EIA followed by the production of an EIS. In 2012, the total installed wind energy capacities on federal lands amounted to just over 800MW, a marginal figure if compared to the more than 60,000MW installed on privately owned lands (AWEA, 2013b). States with high ratios of federal land might still be

negatively impacted given that obtaining development consent for wind energy installations on these lands is much more cumbersome (Schumacher, 2018). This in return increases the pressure on privately owned lands to be developed first, potentially forgoing the most promising wind resources, or increasing potential conflicts on the remaining patches of in-state developable land (Hitaj, 2013).

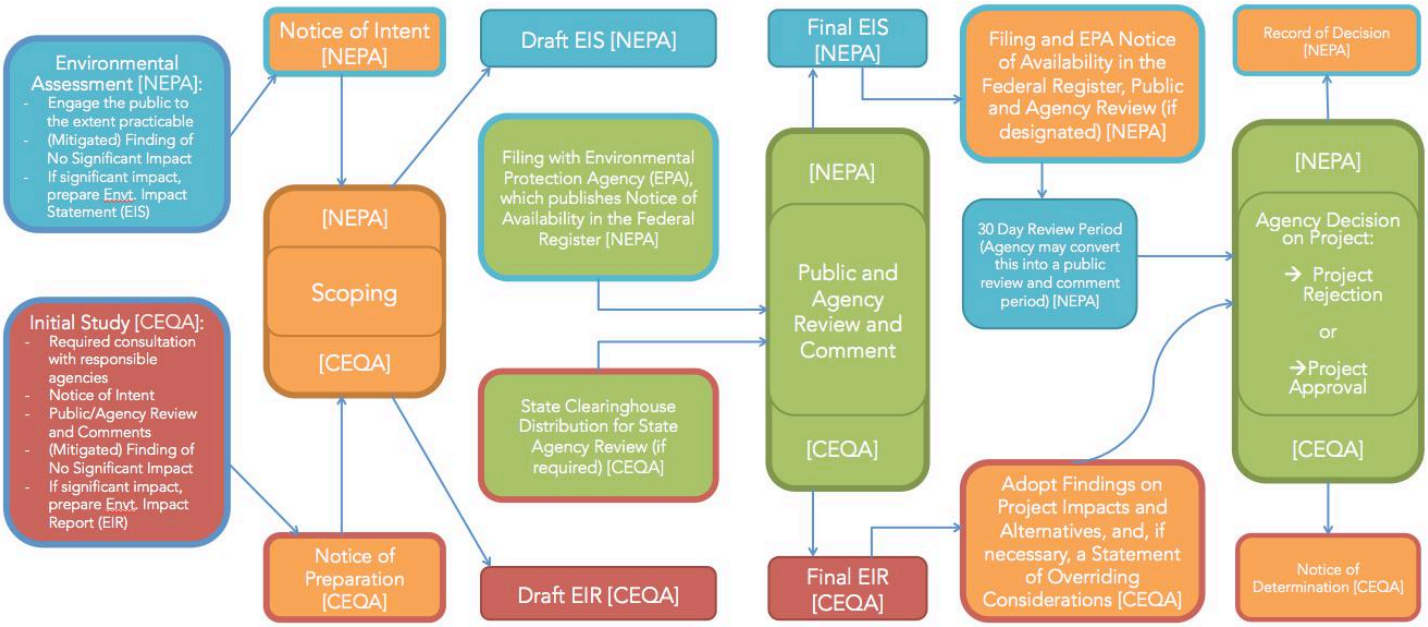

Fig. 10 Basic EIA procedural steps for LS-RE projects under NEPA and CEQA (Source: NEPA, 2014)

One notable exception of high-impact federal laws are the ones in relation to the protection of particularly rare or vulnerable species, in the case of wind power the most critical ones being the Bald and Golden Eagle Protection Act (BGEPA), the Migratory Bird Treaty Act (MBTA) and the Endangered Species Act (ESA) (AFWA and US-FWS, 2007). These statutory provisions apply nationwide, irrespective of activity, property rights or location (Panarella, 2014). Even though these are federal rules, and thus indiscriminate towards state regulatory contexts, they still represent a potential indicator of state-level variances on wind energy growth potential through SEPA, and in California CEQA, transposition (Schumacher, 2018).

Therefore, state-level regulatory frameworks and procedural approval requirements remain potential indicators of in-state wind energy development ratios (Bohn and Lant, 2009; Del Rio and Tarancón, 2012). Many states do not have any procedural requirements or central regulatory authorities at the state level and leave the decision-making to local authorities such as counties or municipalities (Ottinger, 2014; Geißler et al., 2013). On the other hand, as aforementioned, numerous states implemented the SEPA environmental rules modelled after NEPA. Numerous states also created their own non-NEPA environmental procedural frameworks applicable to LS-RE permitting or siting activities (Geißler et al., 2013).

Several states even created special-purpose regulatory procedures for LS-RE energy projects, including Iowa, Vermont, or West Virginia among others; or for energy projects that surpass specific power generating capacities, for example Oregon for wind generating facilities over 35MW or New York for facilities over 25MW (Geißler et al., 2013; NCSL, 2016; NARUC, 2013). Given that integrated state-level permitting and siting rules usually facilitate the process for large-scale projects, they can speed up the whole approval process for developers. Certain states such as Washington State, Hawaii, Colorado or Maine leave the choice up to the developers of large-scale projects whether they prefer local procedures or state procedures, or appeal to the state level if a permit was denied by local authorities (NCSL, 2016; NARUC, 2013). Washington State is of particular note as its Energy Facility Site Evaluation Council offers a streamlined general siting process for large-scale projects with generation capacities of 350MW and above (WEFSEC, 2014). This process opts to provide developers with a final approval decision within 14 months, thus providing an additional degree of planning certainty currently not offered in any other state or at the federal level (WEFSEC, 2014).

Numerous developers, industry groups and government agencies cite these environmental

provisions as the main regulatory barriers deterring wind energy development (Troxler, 2013). In the past, potential investors sometimes abandoned or avoided projects altogether due to the lengthy, expensive and cumbersome environmental impact statements and the risk of subsequent nuisance litigation (Petrova, 2013; Brown, 2013). Other points of contention are also the participatory governance components implemented into these regulations that require a mandatory public consultation phase that enables interested members of civil society and local community stakeholders to voice any potential concerns or objections (EPA, 2012). The public participation phases follow certain procedural steps, which if not conducted properly, could lead to potential litigation on procedural grounds, which is also decried as a nuisance by many developers and state representatives (EPA, 2012; Brown, 2013; Petrova, 2013).

4. Comparison of LS-RE EIA procedures in Japan, New Zealand, the EU, and the US

4. 1.1. Cross-jurisdictional barriers to EIA reform

The following comparative analysis will highlight the elements of each EIA system among those that, in the previous chapters, were identified as factors that can either act as potential drivers or potential barriers to LS-RE. This will permit the creation of streamlined EIA frameworks, which integrate those aspects that were considered the most efficient in balancing various stakeholder interests, including economic factors, socio-environmental concerns or participatory governance. Utilizing parts of comparative analysis methods previously applied by Galas et al. (2015), Geißler et al. (2013) and Suwanteep et al. (2016), allows for direct juxtaposition of each frameworks' procedural and structural particularities (see Table 3), and thus enables a holistic evaluation of the elements that can stifle the development of RE projects. Qualitative matrixes, comprising each the various strengths (see Table 4) and weaknesses (see Table 5) observed in each territory facilitates the subsequent development of a streamlined procedural framework that can potentially alleviate some of the

drawbacks as and inconsistencies in the current system's structures.

In the past, numerous issues regarding the implementation of LS-RE procedures were identified by analysing and comparing streamlining approaches and reform attempts in a number of jurisdictions (Joseph et al., 2015; Galas et al., 2015; Suwanteep et al., 2016; Schumacher, 2017; Jiricka-Pürrer et al., 2018). These jurisdictional case studies in Chapter 3 the reform efforts already in place, thus revealing some of the positive (see Table 4) or negative (see Table 5) results of these attempted streamlining measures. Henceforth, the detailed juxtaposition of the main EIA policy markers leads to a more comprehensive comparative assessment, facilitating the ulterior creation of more efficient framework proposals.

4.1.2. Comparative criteria expansion attempts

Hayashi (2008) compared the Japanese system with those in England, Canada and South Korea; however, he focused almost exclusively on procedural details, practically entirely excluding the larger socio-environmental or context or specific sectorial impacts. In contrast, this paper's results reveal that in terms of liability and accountability, the 2011 EIA law has been amended to take account of post-Fukushima developments. The 2011 EIAL amendments need to be viewed as complements to other energy policy revisions such as the Feed-in-Tariff (FiT) or global RE promotion commitments in the wake of the COP meetings.

Studies by Suwanteep et al. (2016) and Chen et al. (2014) focus largely on EIA provisions or RE. Looking at the weaknesses presented in Table 5, we see the potential correlations between both and the potential implications that EIAs can have on RE development and vice versa. The most pertinent aspects of this comparative analysis underpin the so-called "green v.

green" conflicts that many LS-RE projects see themselves confronted with, in that they usually represent a desirable technology solution in order to mitigate GHG emissions (Slattery et al., 2012). On the other hand, due to the distributed nature and decentralised range patterns, they often enter into conflicts with local stakeholders because of zoning and land-use conflicts, or because of environmental concerns as was observed in all four observed territories (Morris et al., 2014). The fact that RE installations are geographically less flexible than other energy generation technologies given their geospatially fixed nature of available RE resources, they are more likely to enter into a higher number of conflicts with local stakeholders (Troxler, 2013; Smart et al., 2014). In many instances, concerns regarding LS-RE projects arise irrespective of used technology, although solar PV has been much less affected than wind or geothermal, mainly thanks to the absence of active moving parts or substantial geological activities (Hoffman, 2011).

Looking at the procedural steps within and the sequence of legislative steps leading up to the amendments of NZ's RMA in 2009, Japan's EIAL in 2011, and the EU's EIA Directive in 2014 (see Figs. 2, 5 and 8; and Tables 2 and 3), these can be understood as a logical consequence to some of the concerns described above. With the country's topography being overwhelmingly mountainous, it seems reasonable to implement certain safeguards or additional procedural requirements such as PEIC or IMR (see Fig. 2) in order to create a more balanced project approval system that offers a high degree of public involvement. However, other relevant factors such as fiscal incentives and market environment notwithstanding, the abundance of procedural steps and input requirements from various stakeholders in the Japanese EIA framework have negatively impacted LS-RE growth for projects involving wind and geothermal power (Azechi, 2012; Nishikizawa et al., 2013). This is mainly in relation to the fact that these projects do also fall with the scope of other laws such as the

Migratory Bird Convention, Agricultural Land Law, Natural Park Law or Hot Spring Law. Solar PV certainly benefitted from some of the aforementioned incentives such as being allocated the highest FiT rates, and several studies and stakeholder interviews did reveal that the fact that solar PV is not subject to the EIAL does facilitate certain planning measures significantly. The fact that project development proposals increased by 667% within a three-year period between 2013 and 2015, after the relaxation of certain procedural requirements, provides strong evidence between less stringent EIA procedural frameworks and LS-RE development growth (Schumacher, 2017).

4.1.3. Taxonomical and administrative inconsistencies of EIA rules

Therefore, one of the most important aspects is to determine whether a project is actually subject to an EIA, which will likely prolong the entire planning and eventual construction phases a few years. The most frequent issues in all of the four territories, with regards to screening, were the length of the screening, the vague selection criteria for borderline projects and the resulting uncertainty for developers. Out of all four jurisdictions, the Japanese screening process is the most straightforward in this regard in that categorises energy projects based on production output capacity in MW (see Fig. 3). As aforementioned, everything ranging below 7.5MW is exempt; everything above 10MW is subject to the EIAL and projects between 7.5MW and 10MW will be screened. However, the screening procedure will involve the opinions from at least four parties, the MOEJ, METI, the project proponent and the prefectural governor. These have to be theoretically delivered within 60 days, however, this timeframe is often exceeded due to procedural delays (Shibata and Irie, 2013). In New Zealand and the EU, although there are guidelines outlining specific factors to be considered, such as potential environmental impact, the situation is similar to Japan’s in that it is not always clear when a project will require an EIA, whereas in the US federal agency

involvement is the main criteria for a NEPA-rooted EIA, thus allowing most developers to fall back on state rules, which again are quite fractured and therefore offer no uniform screening picture. The results for the US did still show that states with designated wind permitting authorities (DPAW) and comprehensive procedural rules for LS-RE projects did enjoy higher wind energy growth (Hitaj, 2013; NCSL, 2016; Schumacher, 2018).

Table 2

Summary of Main Legal Acts Covering the Environmental Approval Process

Japan	New Zealand	EU	US
• Basic Environment Law 1993	• Resources Management Act 1993	• EIA Directive 2011/92/EU	• National Environmental Protection Act 1970
• Environmental Impact Assessment Law 1997	• Resources Management Amendment Act 2009	• EIA Directive 2014/52/EU	• Clean Air Protection Act 1970
• Environmental Impact Assessment Law Amendment 2011	• Environmental Protection Authority Act 2011	• TEN-E Regulation No. 347/2013	• Bald and Golden Eagle Protection Act 1940
		• Birds Directive 2009/147/EC	• Migratory Bird Treaty Act 1918
• Prefectural and municipal ordinances	• Resources Management Amendment Act 2013		
		• Habitats Directive 92/43/EEC	• Endangered Species Act 1973
			• State-level Environmental Protection Action Acts

Table 3

Results of Procedural Framework Comparison for LS-RE projects (MOEJ, 2012b; Uesako, 2013; METI, 2016b; Directive 2014/52/EU; Cena et al., 2015; NZEPA, 2013; NEPA, 2014)

EIA Procedure	Japan	New Zealand	EU	US
Pre-EIA	Yes	No	National Variations	State-level Variations
Screening	Yes	Yes	Yes	Yes
Scoping	Yes	Yes	Yes (Non-mandatory - National Variations)	Yes
Expert-validated Assessment	No (In theory, in practice MOEJ/METI reviews amount to expert assessment)	Yes	Yes	Yes
Public Participation Mandatory	Yes (45 days + 45 days = 90 days total)	Yes (20 days)	Yes (30 days min.)	Yes
Post-Monitoring	Yes	No	Yes	No
Overall Average Duration	ca. 36-48 months	90days	ca. 42 months (EU-27)	N/A[1]
Average Observed Procedural Steps	28	11	18 (EU-27)	11

[1] Data for US unavailable as of December 2018

The Japanese, EU, and US EIA procedural frameworks also suffer to some extent from a significant degree of fracturing at the local level. However, this is not the case for non-solar LS-RE projects as they are subject to the national EIA process. This is laudable and substantiated by the experiences in New Zealand with the NZEPA Board of Inquiry process, the TEN-E Regulation “Projects of Common Interest” measures and experiences with DPAWs in the United States (NZMOE, 2014; NCSL, 2016; Schumacher, 2017). Centralized, uniform approval procedures performed by one administrative entity reduce the amount of administrative backtracking and therefore render the collection, submission and evaluation of data more easy for both project proponents as well as the reviewers, who do not need to split

resources among several agencies. Henceforth, one-stop-shop approaches should be favoured to a multi-level, multi-agency system.

4.1.4. The case for public participation

The hardest and most contentious part in all territories has been the right level of public participation. Japan opted for increased public input outlets and local civil society accountability in the wake of Fukushima and simultaneously growing concerns concerning the adverse health impacts of large-scale wind turbines (see Table 4). However, as Table 5 illustrates, these measures also increase the risk of legal obstruction as examples for geothermal projects and wind have illustrated (Nishikizawa et al., 2013, Uechi et 2014). Therefore, some of the streamlining elements from other territories might prove useful for any future EIA amendments in Japan, if incorporated. New Zealand's approach with fixed and strictly contained public notification and participation periods, both for regular AEEs and PNSs, does appear the to be the most efficient, especially since most cases can only be challenged in court on procedural grounds. Yet, as critics have pointed out, these periods are insufficient in allowing for a fair and balanced debate over the potential impacts of projects, especially PNSs. In the EU, member states have to implement a public participation period of minimum 30 days. However, given the principle of subsidiarity, this will not necessarily lead to a uniform set of participatory governance rules in each member state. There is an elevated risk of individual member states deliberately setting extremely short periods of time to either promote or dissuade the development of certain technologies, rendering project planning within the EU more complex. The United States system of mostly individualised non-integrated rules within each state does lead to a situation that in some states without any approval process, or where counties are in charge, public participation is reduced to very short periods if any at all. In the absence of any comprehensive participatory governance

provisions, local opponents do need to seek remedies usually through land-use or private property based legal action (Treppa, 2016). The federal NEPA process is undoubtedly more unified and less fractured. However public participation can also stand here in the way of LS-RE development on public lands, and given the government's involvement, opponents can sue at the federal level, thus increasing the risk of prolonged and expensive legal obstruction (Badicheck, 2016).

Table 4

List of Strengths of Individual EIA Frameworks

Japan	New Zealand	EU	US
(+) High degree of public and local involvement	(+) Extremely short processing timeframes between application and final decision under the EPA approval process	(+) Increased public input (minimum public consultation period)	(+) Federal process only for projects with federal involvement (most RE projects excluded)
(+) Many stages for revisions and subsequent input	(+) Cost limits and fixed maximum timeframes for PNSs (9 months total) and medium-sized regular AEEs (6 months)	(+) Creation of harmonised guidelines and increased screening process clarifications	(+) Some states without any environmental approval regulations = Short duration and cost
(+) Implementation of restructuring plans for RE installations	(+) Cost support for surveys and pre-EIA steps in some instances	(+) More clarity through increased public accountability, monitoring and expert involvement	(+) High level of public involvement and mandatory timeframes (under NEPA)
(+) High degree of accountability, pre- and post-monitoring provisions	(+) Integrated one-stop shop approach	(+) Creation of one-stop shop requirement for EIA/Birds/Habitats (Natura2000) Directives	

(+) For national EIAs, high degree of shared expertise between MOE and METI	(+) Limited legal obstruction possibilities

Having highlighted some of the most defining strengths and weaknesses, it becomes apparent that an accessible EIA system benefits most from homogeneity and precise rules including mandatory timeframes, which provide each party involved with the necessary planning safety to act within a stable project development environment that does consider all the various perspectives and opinions of each stakeholder. Providing financial and administrative support for required surveys or studies to developers, which in the case of RE are often composed of new entrants, usually local cooperatives or small utilities that do not rely on established conventional power generation capacities and thus do not necessarily possess the capital reserves to withstand the monetary and regulatory uncertainties created through an overly complex EIA process (JFS, 2014b; JFS, 2015).

Table 5

List of Weaknesses of Individual EIA Frameworks

Japan	New Zealand	EU	US
(-) Vague screening process	(-) Very short duration limits for public involvement or opposition	(-) No mandatory scoping increases uncertainty and might lead to unnecessary procedural confusion	(-) Fractured approval landscape across state lines in the absence of a uniform legal body of EIA
(-) Numerous opportunities for litigation and legal obstruction	(-) Limited legal recourse facilities	(-) No mandatory timeframes in the Directive	(-) Screening rules to determine what projects fall under federal jurisdiction are not sufficiently clear = Uncertainty
(-) Solar PV not subject to the EIA Law	(-) Short project assessment timeframes for competent review authority	(-) No one-stop shop obligation	(-) Federal process length at times overly extended with elevated risk of legal opposition

(-) Absence of one-stop approach or dedicated authority	(-) Does not automatically apply to all LS-RE projects, although most of them do qualify	(-) Application of EIA guidelines merely voluntary	(-) Some state processes very lengthy in absence of uniform rules (devolved county competences)
(-) Manifold competence fracturing between ministries, national and local governments		(-) Opting for a Directive instead of a Regulation leads to legal fracturing	(-) Absence of one-stop shop approach in most states and on the federal level
(-) Long procedural timeframes, increasing cost and complexity		(-) TEN-E Regulation not applied to RE generation projects, only to transboundary transmission and storage	
		(-) Risk of increased costs (e.g. experts, monitoring, public distribution)	

4.2. Methodological Limitations and Future Jurisdictional Research Considerations

4.2.1. Japan

One of the main limitations for Japan was the generally difficult or restricted access to reliable data for RE project-related EIAs, due to fractured development procedures and a widespread reluctance of both developers and utilities to provide comprehensive datasets or case study information. Creating new inroads to more complete data sets or the creation of own empirical findings through fieldwork efforts will be crucial in the future. Potential collaborations with Japanese research institutes could partially offset these limitations.

With concrete proposals from the government side being sparse, this represents another area the will could be further assessed in the future, given recent policy changes after COP21

climate change summit and before upcoming full liberalisation of the electricity market with the complete unbundling of generation, transmission and distribution operations. The creation of additional empirical analyses integrating the policy and regulatory developments could provide a more comprehensive picture of the proportional influence of EIA in contrast to other factors. Especially the latter is of high interest, given the potential correlation between the liberalisation and pre-emptive RE development. This empirical analysis should take into account how local government EIAs differ from region to region and if observed variances in RE development levels can be partially attributed to differences in each regulatory framework.

4.2.2. New Zealand

As data for RE developments in New Zealand is in the public domain and easily accessible, the major limitation for this territory was the absence of any completed project consent applications after the full implementation of the streamlining amendments EPAA 2011 and RMAA 2013. According to the NZ EPA, no conclusive data is currently available since no RE projects are momentarily planned or eligible for expedited NZEPA approval process. Once new applications will be launched in the future, observing how the projects will fare under the new approval procedural framework will provide further data and evidence if these projects do get approved without major opposition or if such profound streamlining approach does compromise environmental protection by threatening or harming local ecosystems in proximity to RE project development sites.

4.2.3. European Union

In the case of the EU, large parts of the analysis were confined to a simple investigation on the main provisions contained within the reformed Directive. However, the impacts following

member state implementation past the May 2017 deadline will be an equally important research topic, given the fact that member states' EIA frameworks will likely diverge significantly from each other, thus an empirical analysis using updated data on RE barriers (latest available: July 2010) and RE capacity additions could provide a more clear picture of the potential interrelations between both variables. To complement this empirical study and RE project data being fractured between member states, the creation of novel EU project database with comparable indicators could serve as the foundation a subsequent series of empirical studies.

Next, using a few member states as representative territories for the entire EU EIA reform process will facilitate more efficient and comprehensive qualitative comparison with other non-federal national entities. Finally, a pronounced expert opinion balance integrating semi-structured interviews or additional stakeholder surveys could increase the level of accuracy in terms of reliable stakeholder data for qualitative data analysis purposes.

4.2.4. United States

The large sample size of 50 state-level regulatory frameworks did require a limitation of observed regulations for California, as a representation of SEPAs. Therefore, in the future using a mix of qualitative and quantitative datasets is of interest, in addition to more specific case-study analyses. The highly dynamic regulatory environment under the Trump administration necessitates more investigation, given that a large number of environmental rules pertaining to EIAs and LS-RE development have either been altered or have been dropped by the EPA or the Department of Energy. With individual states, most notably California, and municipalities committing to the targets set in the Paris Agreement, regulatory frameworks are likely to evolve in the near future to reflect these statements. Streamlining

efforts to provide additional regulatory easements to RE developers are one possible strategy. For the time being, LS-RE is mostly dependent on state-level rules, thus highly dependent on the presence or absence of SEPAs. However, monitoring and eventually mapping these future regulatory approval developments in an exclusive US context would provide additional insights.

5. Conclusion

In the context of subcategories within the discipline of energy law, the importance of RE-related literature has become apparent due to the gradual increase in topical discussions surrounding legal issues involving the expansion of renewables. Scholars such as Heffron et al. (2018) have highlighted how some of the defining principles found in the related areas of environmental and climate law have slowly percolated into energy law, ultimately facilitating defining the latter as a distinct sub-discipline of law. This article applies this core understanding of energy law by exploring and expanding on some of the legal questions regarding environmental permitting rules and approval procedures for RE installations. In the past, some of these issues had already been partially illustrated by several scholars such as Peters and Schomerus (2014). However, significant recent developments in the areas of EIA and RE technologies raised several new legal questions pertaining to the underlying issue of scaling renewables. Therefore, it is crucial to further analyse the role of environmental principles within the field of energy law, underpinned by Heffron and Talus (2016b), who advocated for paradigm shifts within the discipline towards more focus on socio-environmental accountability.

This article reveals strong interconnections between environmental and energy law via case studies from four OECD jurisdictions that illustrate how environmental regulations can act as

a barrier to LS-RE development in that they do prolong the overall approval process for development applications. In a two-step methodological approach, the article first examined each of the four jurisdictions individually before outlining the strengths and weaknesses via comparative tables. The paper's comparative analysis reveals that EIA frameworks for LS-RE projects need to be conceptualised and structured with a balance between environmental protection, economic viability and public concerns in mind to underpin the core aspects of energy justice. It can act as a powerful mediating tool between regulators, local stakeholders, and project developers to increase public acceptance, reduce the risk of legal obstruction. Overall, progressive RE laws represent a potent regulatory measure to promote a just energy transition towards a low-carbon energy society, in line with the seven principles of energy law, most notably the principles of energy justice and the protection of the environment, human health, and combatting climate change (Heffron et al, 2018). Streamlining EIA processes via one-stop shops, mandatory overall timeframes, and comprehensive screening stages would help to address stakeholder concerns and reinforce communication outlets and joint fact-finding in LS-RE planning and environmental disputes. Therefore, future energy policy research should determine if the conceptual approaches of these reforms lead to increased RE growth and stakeholder satisfaction. Further data needs to be gathered and additional case studies will provide more granular insights since only a few noticeable short-term impacts have materialised as of now, mainly due to the small lead-up times for the momentarily undertaken reforms.

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