

Legal Imperatives and Regulatory Mechanisms for Sustainable Energy Development: A Comparative Analysis of Renewable Energy Policies in Australia and China

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Abstract: This thesis conducts a critical examination of the legal frameworks and regulatory mechanisms governing the renewable energy sector, focusing on the alignment of policies and incentives with sustainable industry development internationally. It compares Australia's and China's approaches to renewable energy legislation, highlighting Australia's heavy reliance on fossil fuels and China's pioneering legal measures. Australia's Renewable Energy Target (RET), Small-scale Renewable Energy Scheme (SRES), and the Clean Energy Finance Corporation (CEFC) are evaluated, along with state-level initiatives. China's Renewable Energy Law (REL), Wind Power Concession Program, and the Mid-and Long-term Development Plan for Renewable Energy (MLDP) reflect its strategic legal positioning. The comparative analysis elucidates fiscal strategies, investment mechanisms, and grid integration issues, revealing differing approaches to government intervention and market-driven solutions. The thesis proposes enhancements to Australia's policy framework, emphasizing the need for grid modernization, intergovernmental coordination, investment in domestic manufacturing, and legal reform to ensure a robust, sustainable, and self-sufficient renewable energy sector.

Keywords: renewable energy policy, legal frameworks, Australia, China, sustainable development

1. Introduction

The nexus between energy policy and legal frameworks is critical in the context of global economic growth and societal progression. Contemporary society's escalating energy demands underscore the exigency of legal and regulatory responses to the dual crises of environmental degradation and resource depletion. The 2012 State of the Climate report articulates a legal and environmental imperative, revealing that anthropogenic carbon dioxide emissions from fossil fuel combustion have precipitated unprecedented global temperature alterations, overshadowing natural climate variability [1]. In Australia, electricity generation—a sector accountable for 38% of national carbon emissions—is predominantly fossil-fuel-based, with a staggering 90% dependency ratio, reflective of Australia's coal wealth [2]. The advent of renewable energy as a legal and policy solution emerges from this crucible of urgency. The legal ramifications of renewable energy encompass energy security, employment, economic opportunity, and global warming mitigation [3]. There are differences

worldwide in terms of social and economic development, population growth, and energy consumption. Countries around the globe have been formulating corresponding policies and incentive measures to promote and support the growth of the renewable energy industry. Legal scholars and policymakers globally acknowledge the underutilization of renewable energy and advocate for enhanced juridical engagement through the enactment of comprehensive regulations, legislation, incentives, and carbon taxation frameworks [3].

This thesis critically examines the legal instruments and regulatory mechanisms that underpin the renewable energy sector. It endeavors to unpack the alignment of incentive structures and support measures within renewable energy legislative policies, with a particular focus on the sustainable development of the industry at the international level. Through a comparative legal analysis of the policy frameworks of Australia and China, this work identifies the lacunae in current legislation and regulatory practices, seeking pathways for legal refinement and optimization of Australia's renewable energy governance. This examination culminates in a set of specific legal recommendations aimed at propelling Australia toward more robust renewable energy legislation, thereby advancing sustainable energy development while fortifying environmental stewardship.

2. Current Renewable Energy Landscape in Australia

2.1. The Renewable Energy Target (RET)

The Renewable Energy Target (RET) represents a cornerstone legislative framework within Australia's climate policy architecture. Enacted with the intent to furnish over four-fifths of Australia's electricity from renewable resources by 2030, the RET underscores the legislative commitment to transition from fossil fuel dependency to a sustainable, low-carbon energy system [4]. This legislative framework embodies the dual objectives of emissions abatement and the promotion of renewable energy, thereby serving as a statutory tool for environmental management and economic transition [5].

The RET is bifurcated into the Large-scale Renewable Energy Target (LRET) and the Small-scale Renewable Energy Scheme (SRES), both of which are predicated on a market mechanism that issues tradable certificates to energy producers corresponding to the quantity of clean energy generated [5]. These certificates, functioning as regulatory financial instruments, are mandated for purchase by electricity retailers, integrating a market-driven incentive within the statutory regime to stimulate renewable energy production [5].

2.2. Small-scale Renewable Energy Scheme

The Small-scale Renewable Energy Scheme (SRES) is a statutory program designed to incentivize the deployment of small-scale renewable energy systems via economic inducements. The issuance of Small-scale Technology Certificates (STCs) operates as a statutory incentive, correlating with the size, output, and overall contribution to renewable energy generation of these systems [5]. The legal framework encourages the uptake of technologies like rooftop solar through these STCs, facilitating a broader statutory engagement with renewable energy on a residential and small business level [6]. Furthermore, the SRES, through its legal mechanisms, advances not only environmental objectives but also economic efficiencies by mitigating the necessity for large-scale power generation investments and exerting downward pressure on retail electricity prices [6].

2.3. The Clean Energy Finance Corporation

Established through statutory action in 2012, the Clean Energy Finance Corporation (CEFC) is a legal entity charged with the advancement of clean energy investments and the commercialization of

sustainable technologies [2]. The CEFC operates through a framework of legal and fiscal instruments designed to leverage private sector engagement and foster collaborative ventures in the renewable sector. Its mandate is to provide financial support and investment for projects that can lead to a reduction in Australia's carbon footprint and facilitate an energy transition consistent with international climate commitments [2].

2.4. Emphasis on Supplementary State-Level Measures and Incentives

The legal infrastructure for renewable energy in Australia is complemented by state-level statutory measures, which are instrumental in tailoring policy to regional imperatives. This section scrutinizes these supplementary legal initiatives, with a focus on the statutory measures employed by Victoria and Queensland.

Victoria's Renewable Energy (Jobs and Investment) Act 2017 exemplifies subnational legislative action, setting ambitious statutory targets for renewable energy generation and providing a stable policy environment for renewable projects [7]. The Act facilitates large-scale renewable energy developments through legal mechanisms such as the auction process, which confers contractual certainty and economic impetus [7].

Queensland's legislative approach, as manifested in the Energy and Jobs Plan, delineates targets of 70% renewable energy by 2032 and 80% by 2035, integrating statutory instruments with fiscal strategies to galvanize industry growth [8]. The Queensland Renewable Energy Zones (QREZ) initiative is a legislative program earmarked with AUD 145 million in funding, aimed at establishing Queensland as a hub for renewable investment through legal and technological innovation [8]. The Queensland Renewable Energy and Hydrogen Jobs Fund, another statutory instrument, enables government-owned corporations to enter the renewable and hydrogen markets, providing a legal basis for fiscal support and resource allocation to facilitate project implementation and operation [8].

3. Current Renewable Energy Landscape in China

3.1. Renewable Energy Law

In China, the legislative cornerstone of renewable energy policy is the Renewable Energy Law (REL) enacted in 2006, a pioneering legal instrument conceived to promote renewable energy development within the nation's rapidly evolving energy sector [9]. The REL articulates a comprehensive legal mandate, aiming to "enhance the development and utilization of renewable energy, optimize the energy structure, secure energy supplies, mitigate environmental impact, and realize the sustainable development of the economy and society" [10]. It lays down binding legal obligations while offering policy support, effectively incentivizing various market actors to invest and participate in renewable energy projects.

3.2. Wind Power Concession Program

The Wind Power Concession Program, initiated in 2003, represents a strategic policy intervention aimed at bolstering wind energy adoption. It stipulates a competitive bidding process for projects exceeding 50 megawatts (MW) in capacity, creating a market-driven mechanism for cost reduction and efficiency [11]. Accompanied by an incremental tariff policy favoring domestic equipment, the program illustrates China's approach to nurturing and protecting its nascent wind energy manufacturing sector. The imposition of an 8 percent tariff on imported wind turbines and a 3 percent duty on components in 2004 exemplifies the use of fiscal legal tools to support domestic industries [11].

3.3. Mid-and Long-term Development Plan for Renewable Energy (MLDP)

The promulgation of the Mid-and Long-term Development Plan for Renewable Energy (MLDP) in 2007 was a strategic move to delineate the trajectory of China's renewable energy sector. The MLDP outlines ambitious targets and posits a suite of measures including financial subsidies, tax incentives, and support for technological innovation [9]. The plan is a testament to China's commitment to harnessing law and policy in steering the energy transition.

4. Comparative Analysis: Australia & China in the Renewable Energy Sector

4.1. Policy Objectives and Legal Frameworks

In the realm of renewable energy policy, Australia and China have delineated national renewable energy targets and promulgated comprehensive legal frameworks to bolster the proliferation of renewable energy technologies. Moreover, subnational jurisdictions within these countries have devised tailored renewable energy goals and regulatory instruments that take into account regional endowments of renewable resources.

Australia's legislative approach to renewable energy is encapsulated in statutes such as the Renewable Energy (Electricity) Act 2000, supplemented by specific provisions like those found in the Renewable Energy (Electricity) (Small-scale Technology Shortfall Charge) Act 2010 and Renewable Energy (Electricity) (Large-scale Generation Shortfall Charge) Act 2000. These statutes, underpinned by the Renewable Energy (Electricity) Regulations 2001, constitute a holistic framework designed to operationalize the Renewable Energy Target (RET).

China's legal foundation in renewable energy is anchored by the Renewable Energy Law (REL) of 2006. Pivotal Chinese bodies like the National Development and Reform Commission (NDRC) have formulated ancillary regulations, such as the Regulation on Administration of Power Generation from Renewable Energy (NDRC Energy [2006] No.13). The State Electricity Regulatory Commission (SERC) further supports the legislative architecture through directives like the Measures on Supervision and Administration of Grid Enterprises in the Purchase of Renewable Energy Power (SERC [2007] No. 25). These regulatory edicts create mandatory requirements fostering investment and large-scale deployment of renewable energy sources. In both China and Australia, these robust legal systems effectively incentivize the development and adoption of renewable energy technologies.

4.2. Fiscal Incentives and Investment Mechanisms

The fiscal strategies of China and Australia in advancing renewable energy sectors differ in design and execution despite both nations providing substantive monetary support. Australia's establishment of the Clean Energy Finance Corporation (CEFC) exemplifies its approach, providing financial backing for renewable energy, low-emission technologies, and energy efficiency projects. This complements rebate schemes designed to lower the financial barriers for renewable energy uptake amongst individuals and enterprises, thus propelling private sector investment [9].

In China, governmental economic incentive policies are highly targeted. Tax incentives are crafted to stimulate local production and utilization of wind power equipment, as well as support enterprises embarking on renewable energy endeavors. The nation has prioritized large-scale projects in solar and wind sectors, leveraging economies of scale for cost reduction. The implementation of a feed-in tariff policy guarantees that renewable energy producers can recoup expenses while securing a margin of profit.

China's centralized, top-down modality of renewable energy policy contrasts with the decentralized and heterogeneous approaches evident within Australian states. China accentuates the

strategic role of government in industrial expansion, while Australia's paradigm pivots on market mechanisms to foment financial support and collaboration within the renewable sector.

4.3. Grid-Connection and Infrastructure Integration

Both China and Australia grapple with the complexities of integrating burgeoning renewable energy outputs into existing power grids. The rapid expansion of renewable generation has precipitated a conspicuous misalignment with grid infrastructure, necessitating extensive system overhauls and enhancements [9]. Despite this shared challenge, Australia's Renewable Energy Certificate (REC) system exemplifies a more efficacious approach than China's current practices, legislating obligations for power utilities to procure renewable energy [9]. This mechanism ensures that the renewable energy sector remains tightly interwoven with national energy procurement strategies, fostering a more streamlined integration into the power grid.

5. Proposed Improvements to Australia's Renewable Energy Policies

In the quest to ameliorate the burgeoning requisites for renewable energy grid integration, it is incumbent upon the governments of Australia and China to ardently prioritize the augmentation and modernization of their electrical grids. This strategic imperative necessitates a concerted effort to enhance the infrastructural capacity, thus enabling a seamless and efficacious assimilation of renewable energy outputs into the extant power systems, concurrently reinforcing grid resilience and stability.

The exigency for improved intergovernmental coordination within the Australian federation is paramount. Presently, the heterogeneity of renewable energy policies across various Australian states engenders a degree of fragmentation within the national energy framework. An increased synergism between the Commonwealth and the state governments is imperative to streamline regulatory processes, harmonize policy implementation, and bolster the uniformity and potency of renewable energy initiatives across the nation [9].

Australia's approach towards reinforcing its renewable energy sector should encompass strategic investment in domestic manufacturing capabilities akin to the Chinese model. By nurturing and incentivizing the local production of renewable energy apparatuses and ancillary components, Australia can engender substantial domestic employment opportunities, thereby stimulating economic vivacity and mitigating reliance on foreign imports. Such a paradigm shift towards a more self-sufficient renewable energy sector would not only conduce to economic fortification but would also align with the global trend towards sustainable and locally generated energy solutions.

The legal scholarship in this context would advocate for a robust legislative framework that can support these strategic shifts. A review and potential reform of relevant energy laws and regulations may be required to provide the necessary legal underpinning for these initiatives. This would encompass examining existing incentives, tariffs, and regulations, ensuring they are conducive to fostering an environment of innovation and growth within the renewable energy sector, while also aligning with international best practices and fulfilling the countries' commitments to global climate change initiatives.

Thus, it is through these multifaceted efforts—grid modernization, intergovernmental collaboration, domestic manufacturing support, and legal framework enhancement—that Australia and China can achieve more efficacious renewable energy grid integration and a resilient, sustainable energy future.

6. Conclusion

In conclusion, the comparative study of renewable energy policy and legal frameworks in Australia and China provides valuable insights into the diverse approaches taken to foster sustainable energy transitions. While both countries have made significant legislative efforts to combat climate change and bolster renewable energy production, their methods reveal inherent contrasts in policy design and implementation. Australia's market-based incentives and decentralized governance contrast with China's centralized, directive approach, reflecting broader socio-political and economic orientations.

Both nations face significant challenges, particularly in upgrading grid infrastructure and ensuring the efficient integration of renewable energy. This necessitates ongoing legal and policy innovation, with Australia requiring improved intergovernmental coordination and China continuing its ambitious infrastructure development.

Moving forward, it is evident that both nations must continually adapt their legal and policy frameworks to meet the evolving demands of renewable energy technology and market dynamics. The experiences of Australia and China offer instructive lessons for other countries seeking to enhance their renewable energy sectors, highlighting the importance of a supportive legal environment and tailored policy mechanisms in achieving a greener future.

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