Why is South Korea's renewable energy policy failing? A qualitative evaluation

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HIGHLIGHTS
- We identify factors for successful renewable energy deployment policies.
- We construct an evaluation framework based on the established literature.
- We analyze data collected from focused interviews and secondary materials.
- There exists an overall weakness throughout all renewable energy policy phases.
- We recommend some policy prescriptions based on the evaluation results.

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ABSTRACT
This study explores the causes of the South Korean government's failure to successfully deploy its renewable energy policy. Despite the South Korean government's ongoing efforts since 2002 to promote the deployment of renewable energy, the established deployment target has not been met and the share of renewable energy supply in total primary energy supply is poor compared to peer countries with a similar level of economic development. Therefore, we attempt to find the causes of this policy failure using qualitative evaluation methods. Through the analyses, conducted using focused interviews and secondary data, we found that the domination of the fossil fuel and nuclear power industry's interests, inconsistent policy shifts, policy design that lacks sufficient support schemes, poorly coordinated government activities, and unsystemic and untimely monitoring and feedback have led to the failure of renewable energy deployment policies in South Korea. To overcome these problems, we suggest that the South Korean government should set more ambitious policy goals, establish a new independent organization that focuses on energy policy issues, use a varied policy mix, and secure political support from diverse policy actors.

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1. Introduction

1.1. Background

This study aims to evaluate South Korea's renewable energy policy by inspecting what the South Korean government has achieved and what has been deficient in the implementation of the policy. The use of renewable energy has been promoted worldwide to cope with global climate change, environmental degradation, and uncertainty of fossil fuel supply. South Korea, which has grown into the world's thirteenth-largest economy and eighth-largest energy consumer, is still an energy-dependent country that imports 97% of the total amount of energy needed. Thus, securing a stable energy supply has been a primary national energy policy goal (Hong and Jeong, 2012).

In an effort to cope with the problem of occasional energy shortages and the international pressure to reduce greenhouse gases, the South Korean government has promoted the deployment of renewable energies since the declaration of the first year of renewable energy and the adoption of the feed-in-tariff (FIT) program in 2002 (IEA, 2012; Kim, 2012). In 2008, the South Korean government issued "low carbon, green growth" as a major national policy direction and pursued economic growth by means of developing green technology and deploying clean energy, including renewable energy (Moon, 2010; IEA, 2012: 21–22). As a result, the
energy production from renewable sources has increased constantly from 1.4% of total primary energy supply (TPES) in 2002 to 2.75% of TPES in 2011 (Korea Statistical Information Service, 2014).

In spite of the increase in total energy production from renewable resources and the investment of 8360 billion Korean won from the government between 2004 and 2011 (KNREC, 2012; MOTIE, 2014), South Korea’s renewable energy policies can hardly be considered successful. This view is based on the following reasons. First, the annual renewable energy production and deployment fall short of the yearly goal. According to its First New and Renewable Energy Development and Deployment Basic Plan (2002–2011, hereinafter, Basic Plan), South Korea targeted to provide 3% of TPES from new and renewable energy sources by 2006 (KEMCO, 2002), but the actual achievement was only 2.24% (Korea Statistical Information Service, 2014). The Second Basic Plan (2003–2012) set the target at 5% of TPES by 2011 (MOCIE, 2003), but the achievement again fell short of this goal, supplying only 2.75% of TPES from new and renewable sources (Korea Statistical Information Service, 2014). Recently, the Third Basic Plan (2009–2030) set the new target of gaining 11% of TPES from renewable resources by 2030 (MKE, 2009). However, given the deviation of South Korea’s renewable energy policy targets from the actual achievements, shown in Fig. 1, it is uncertain that the government will meet the goals.

Second, when comparing South Korea’s renewable energy deployment record with that of other industrialized countries, South Korea’s performance is very poor. In 2012, the share of renewable energy contribution to TPES was the lowest among OECD countries: South Korea’s new and renewable energy contributed 1.3% of TPES, while the International Energy Agency (IEA) average is 9% (IEA, 2014; Kim, 2012). Fig. 2 shows how South Korea’s renewable energy contribution compares to those of other IEA countries.

In short, based on data on policy performance measured against targets and the relative comparison to other industrialized countries, we contend that South Korea’s renewable energy policy has been failing. Through a qualitative evaluation, therefore, this study seeks to identify both institutional and non-institutional causes of South Korea’s renewable energy policy failure and attempts to provide alternative policy suggestions to overcome the defects of and obstacles to a successful renewable energy policy. Thus, the major research questions are as follows: What are the factors, flaws, or hindrances that have caused South Korea’s renewable energy deployment policy to fail? What policy suggestions can be made to overcome the barriers of a successful renewable energy deployment policy?

To answer these questions, this study first reviews the literature presenting the factors or elements of a successful renewable energy policy. We then briefly outline the status of South Korea’s renewable energy policies. Based on the review of theoretical discussion and policy practice, we develop an evaluation framework to single out the causes of policy failure of South Korea’s renewable energy policy. We explain the data collection methods we use such as the review of documents and archival records, as well as focused interviews. We then present the results of the evaluation. Finally, based on the result, we outline some challenges to be faced and suggest policy alternatives.

1.2. Literature review

Scholars have suggested factors that might contribute to the success of a renewable energy deployment policy, both through analyses on individual countries that have been successful in deploying renewable energies and through cross-national comparisons. While there are some commonalities in the factors explored, there has been no scholarly agreement on a dominant factor that may determine the success of a nation’s renewable energy policy. Finon (2006) and Carley (2009) emphasize that the policy environment such as the role of political institutions and interest groups need to be examined in the study of effectiveness of renewable energy policy. Delmas and Montes-Sancho (2011), in their study on U.S. state policies for renewable energy, also argue that the policy environment, which includes political and social factors other than the policy itself, like the presence of environmental group membership and green consumers, causes the success of renewable policies. Similarly, Yi and Feiock (2014) find that political factors, such as the role of regulatory institutions and entrepreneurial politics, influence the deployment of renewable energy. Wiser et al. (2005, 2007) and Wiser (2010), in their analyses of the U.S. experience of renewable portfolio standards policies that focused on policy design and implementation, find that overly aggressive targets, uncertainty of policy duration, inadequate efforts to enforce policies, and too many exemptions led to the failure of renewable energy policies. Komor (2004) also points out that the details of implementation as well as clarifying policy goals and setting goals based on a consensus through a political process are critical for the success of the renewable portfolio standard (RPS) program in Texas, U.S.

The success of Germany’s renewable energy policy is attributed to factors of the political environment and policy design. Lipp (2007) argues that political factors such as the presence of the Green Party and the rise of an advocacy coalition that could affect the institutional framework for renewable energy policy were critical for Germany’s success. Oshima (2013) points out that policy design factors such as the adoption of a feed-in tariffs (FIT) program, the high level of policy goals, and the principle of priority connection of renewable energy to the grid led to Germany’s success.

According to Komor (2004), the Netherlands’ success in deploying renewable energy resulted from several factors of policy
design and implementation. First, levying heavy taxes on electricity generated from fossil fuels made electricity from renewable resources competitive in the market, leading to the expansion of renewable energy deployment. Second, using creative marketing techniques helped promoting the use of renewable energy. Third, aggressive government policies such as tax exemption for people investing in green funds, tax credits for renewable energy technology investments, and direct support payments to renewable energy generators were effective policy tools.

Oshima (2013) contends that the keys to the Japanese success of renewable energy deployment policies were a consistent and continuous policy design and effective implementation such as the proper combination of technology development, facility installation, and the increase of renewable energy use.

Comparing renewable energy policies between Denmark, Germany, and the United Kingdom, Lipp (2007) finds that political commitment, policy choice or design, and citizen engagement are important factors for the success of renewable energy policies.

Comparing cases of EU countries, Haas et al. (2011) argue that a specific policy design such as technology-specific financial support is more critical for the success of renewable energy policies than the choice of support models between FIT and RPS. They also point out that the credibility of the renewable energy support system is important because it can reduce the uncertainty of the investment environment for potential investors. In addition, Ringel (2006) finds that the performance of renewable energy policies of EU countries, regardless of the choice of models such as FIT or RPS, depends on the political and economic context and the details of policy design.

Kim (2011), through cross-national time-series analyses, finds that the increase of renewable energy deployment could be affected by several factors of the policy environment, such as the dominant structure of the energy policy (i.e., the share of nuclear energy in the total energy production), the existence of an environmental party, environmental awareness of citizens, factors in the business environment such as deregulation that facilitate investment in renewable energies, and international pressure to reduce greenhouse gases.

Oshima (2013) identifies two types of hindrances, material and social, to success of renewable energy policies and contends that such impediments could be alleviated and subjugated if proper government policies were designed and implemented. According to his findings, material hindrances that indicate that the use of certain renewable energies is limited depending on the geographical conditions of a region such as weak and inconsistent wind blows could be overcome by developing a proper design of renewable energy use that fits into regional conditions. Social hindrances that refer to the uncompetitive nature of renewable energies in the market could be overcome through government provision of direct or indirect financial support to renewable energy producers.

As we have shown above, factors that are critical for the success of renewable energy policies vary country. Rather than one dominant factor, a wide range of success factors—from the policy environment to all policy-making stages such as policy design, implementation, and feedback—have been identified.

### 1.3. Current system and practice of renewable energy deployment policy in South Korea

Renewable energy deployment policies are designed and implemented by a centralized executive, the Ministry of Trade, Industry and Energy of Korea (MOTIE) in collaboration with local governments. The Korea New and Renewable Energy Center (KNREC), part of the Korea Energy Management Corporation (KEMCO), a government-affiliated organization, is responsible for supporting and managing specific renewable energy policy programs.

Under the Framework Act on Low Carbon Green Growth (hereinafter Framework Act), the South Korean government set a long-term broad plan, called the National Basic Plan for Energy (hereinafter National Plan), every five years with an implementation schedule of 20 years (Korea Ministry of Government Legislation (MOLEG), 2010b). The National Plan offers national guidelines for major energy policies and programs including renewable energies.1

The policymaking process of the National Plan is as follows: The MOTIE drafts the plan and submits it to the Energy Committee. The plan is then reviewed by the Presidential Committee on Green Growth, established under the Framework Act, and the cabinet council finally confirms it.

Based on the National Plan, the MOTIE shapes another refined plan—the New and Renewable Energy Development and Deployment Basic Plan (hereafter Basic Plan)—every five years with the duration of at least 10 years for the promotion of technological development, use and distribution of new and renewable energy, and the activation of the new energy industry. To achieve the policy objectives of the Basic Plan, an implementation plan is developed by the MOTIE and carried out by the KNREC and local governments (IEA, 2012; KNREC, 2012).

Under these legal and institutional frameworks, South Korea’s renewable energy policies have been mainly composed of three elements: deployment support, market creation, and institution design.

First, the South Korean government has been expanding deployment support programs including the General Deployment Program to facilitate technological development and market expansion, the Regional Deployment Programs carried out by local governments, the 1 Million Green Homes Program to support the installation of renewable energy facilities in residential sites, the Low-Carbon Green Village Program, and the Promotion Program for Renewable Energy Use in Public Buildings, as well as financial support programs, tax support program, and certifications for buildings that use renewable energies (IEA, 2012; Kim, 2012).

Second, market creation policies include the RPS (Kim, 2009, 2011), the mandatory use of new and renewable energy in public buildings, and the new and renewable energy test bed building program. In particular, to reduce the burden of increasing cost of renewable energy promotion under the FIT program (Haas et al., 2011; Lee and Park, 2008, Mitchell et al., 2006; Park, 2012; Rickerson et al., 2007; Woodward and Mitchell, 2011), the South Korean government decided to replace the FIT scheme with the RPS in 2012, with the expectation to promote the deployment of renewable energy in a more cost-effective manner (IEA, 2012). 2

From 2002 to 2011, the FIT guaranteed a fixed price for electricity generated from renewable sources.3 Meanwhile, the RPS has required electricity producers to generate a certain ratio of their output from renewable energy sources since 2012. Under the RPS, the South Korean government also offers the option for electricity producers. That is, electricity producers can either generate electricity from renewable sources or buy tradable green certificates.4

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1 South Korea established its First National Plan in 2008, spanning the period until 2030, and its Second National Plan in 2013, outlining policies (until 2035).
2 While the FIT program has contributed to the increase of the deployment rate of renewable energies since its adoption in 2002, it also led to a dramatic increment of costs in South Korea. Since the beginning of support for renewable energy, the cost of support has increased from 33.11 million won in 2002 to 2.392 billion won in 2008 (Kim, 2009).
3 In general, the prices under the FIT program are fixed tariffs set above market price to cover the cost disadvantage of green power production (Ringel, 2006).
4 The price of tradable green certificates is generally set based on demand and supply of the certificates (Haas et al., 2011).
An evaluation framework for renewable energy policy in South Korea.

Table 1
An evaluation framework for renewable energy policy in South Korea.

<table>
<thead>
<tr>
<th>Evaluation areas</th>
<th>Evaluation targets</th>
<th>Measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy environment</td>
<td>Awareness of renewable energy policies and related problems</td>
<td>-The extent to which politicians, bureaucrats, scholars, and citizens recognize the importance of renewable energy policies</td>
</tr>
<tr>
<td></td>
<td>Political support and stakeholder participation</td>
<td>-The extent to which the executive and the national assembly are willing to support renewable energy policies</td>
</tr>
<tr>
<td></td>
<td>Dominant structure of national energy policy</td>
<td>-The extent to which stakeholders participate in renewable energy policymaking and support the promotion of renewable energy policies</td>
</tr>
<tr>
<td></td>
<td>Potential of domestic renewable energy resources</td>
<td>-The extent to which the share of nuclear energy in the total energy production affects the increase or decrease of renewable energy deployment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-The extent to which the geographical conditions of South Korea are favorable to the production and use of renewable energies</td>
</tr>
<tr>
<td>Policy design</td>
<td>Systematization of renewable energy policy</td>
<td>-The extent to which renewable energy programs are systematically designed and planned</td>
</tr>
<tr>
<td></td>
<td>Establishment of relevant laws and regulations</td>
<td>-The extent to which laws and regulations regarding renewable energy production and use are established, if any, without legal deficiencies such as overlaps and contradictions</td>
</tr>
<tr>
<td></td>
<td>Establishment of a control tower and/or principal agents</td>
<td>-The extent to which a control tower and/or principal agents are institutionally entitled and designated to effectively plan and manage renewable energy programs</td>
</tr>
<tr>
<td></td>
<td>Feasibility and responsiveness of policy goals and strategies</td>
<td>-The extent to which renewable energy policy goals and strategies are set to be politically, administratively, or socioeconomically feasible</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-The extent to which renewable energy policy goals and strategies reflect changes in the policy environment</td>
</tr>
<tr>
<td>Policy implementation</td>
<td>Consistency and continuity</td>
<td>-The extent to which renewable energy programs have been implemented in consistent and continuous ways</td>
</tr>
<tr>
<td></td>
<td>Provision of financial and non-financial support</td>
<td>-The extent to which sufficient budgets are secured and allocated to implement renewable energy programs</td>
</tr>
<tr>
<td></td>
<td>Cooperation between government agencies and/or private actors</td>
<td>-The extent to which effective public relations systems and/or marketing systems are implemented to promote renewable energy programs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-The extent to which central government agencies, local agencies, and private sector actors cooperate and collaborate effectively</td>
</tr>
<tr>
<td>Policy evaluation and feedback</td>
<td>Accuracy and accessibility of program information</td>
<td>-The extent to which policy information on renewable energy programs are valid and reliable</td>
</tr>
<tr>
<td></td>
<td>Adequacy of monitoring</td>
<td>-The extent to which policy information on renewable energy programs are available to the public</td>
</tr>
<tr>
<td></td>
<td>Adequacy of ex post facto performance evaluation and audit</td>
<td>-The extent to which evaluations and audits of the performance of renewable energy programs are conducted in a systematic and timely manner</td>
</tr>
<tr>
<td></td>
<td>Adequacy of feedback</td>
<td>-The extent to which the results from monitoring, preliminary review, evaluation, and audit are reflected or considered in the subsequent year’s plan and budget decisions</td>
</tr>
</tbody>
</table>

Third, the South Korean government’s institutional design policy includes the authentication and standardization of new and renewable energy equipment, the cultivation of corporations specialized in new and renewable energy production, and the commercialization of new and renewable energy technologies (Kim, 2012).

2. Method

Based on the abovementioned theoretical elements and the current institutional setting of South Korea, we construct an evaluation framework by synthesizing those factors from the literature in a systematic way along a public policy cycle. The evaluation framework consists of four major evaluation areas: policy environment, policy design, policy implementation, and monitoring and feedback. Each evaluation area includes several evaluation targets. The description of the 15 evaluation targets and their associated measurements are shown in Table 1.

The unit of analysis is the renewable energy deployment policy of South Korea at the national level. We chose a qualitative approach to conduct the evaluation because the research question focuses on finding causes of renewable energy policy failure. Thus, evidence and data on South Korea’s renewable energy policies and programs were collected through a combination of focused interviews and secondary data sources. For the focused interviews, we sampled experts from five key stakeholder groups using the snowballing method: government agencies, national research institutes, universities, renewable energy businesses, and civic groups in South Korea.

We asked 13 experts who were selected from five different groups, as shown in Table 2, 15 questions based on the evaluation framework. The focused interviews were conducted between June 1, 2014 and August 30, 2014. Respondents were asked to assess 15 evaluation targets qualitatively. We analyzed the collected data by identifying shared opinions and dividing the information into four

(footnote continued)

6 Yin (2009) suggests that using a qualitative approach such as a case study is appropriate when the research question requires an explanation of how or why a treatment such as a public policy works or does not work.

7 The focused interview refers to a type of individual interview that follows focused questions on certain topic (Merton et al., 1990).
evaluation categories. As it turned out, most respondents showed a high level of agreement on problems and challenges facing the South Korean government’s renewable energy deployment policy. Nevertheless, we acknowledge that such a qualitative evaluation method may have some limitations in robustness because it depends on the respondents’ subjective experiences and views. Thus, we support the findings by providing secondary data that could be considered more objective. The secondary data were collected from documentations such as government reports, archival records including statistical data, and academic studies of renewable energy programs.

### 3. Results

Through the qualitative evaluation employing focused interviews and the examination of the status of South Korea’s renewable energy deployment policy, we identified some causes for the policy failure or difficulties that may hinder the success of the policy in the four evaluation areas.

#### 3.1. Policy environment

3.1.1. Lopsided political and industrial interests in the promotion of nuclear power generation

South Korea’s renewable energy policy has been strongly damaged by political and industrial interests that favor a lopsided energy policy backing the promotion of nuclear power generation.

In the process of industrialization in the 1980s, South Korea introduced nuclear and thermal power generation to provide cheap and stable electricity to industries and, as a consequence, the structure of nuclear power domination has been established in the South Korean economy through the connection between government agencies, such as MOTIE and KEMCO, and nuclear power industries. The priority given to nuclear power generation over renewable energy has been reflected in energy policy goals. The Second National Plan (2013–2035) aimed to increase the share of nuclear power in total energy generation up to 29% by 2035 (MOTIE, 2013). On the other hand, the policy target for new and renewable energies is to increase the share to just 6% by 2020 and 11% by 2035, which is a much lower target than that for nuclear power generation. This level of policy targets is not much different from the preceding First National Plan (2008–2030), which already set the ratio of renewable energy at 11% and planned to construct 10 more nuclear power plants by 2030 in addition to the existing 23 nuclear power plants (MKE, 2008).

Regarding this lopsidedness, some interviewees point out that the South Korean government has overestimated energy demand and insists on the supply-centered plan that entails a considerable expansion of the share of nuclear power. Thus, this preference for nuclear power generation over renewable energy generation has become an obstacle for the development and deployment of renewable energies while industries and end users of electricity might benefit from the nuclear and thermal oriented policies.

3.1.2. Lack of willingness to provide institutional support for renewable energy deployment

While the South Korean government and the national assembly appear to be willing to support renewable energy policies, actual support for institutionalizing renewable energy policy programs are weak. Most respondents point out that political and administrative unwillingness has become the most serious obstacle to the expansion of renewable energy programs and the enhancement of South Korea’s renewable energy capacity. They also mention that three major laws, namely the Framework Act (MOLEG, 2010b), the Energy Basic Law (MOLEG, 2006), and the Act in the Promotion of the Development, Use, and Deployment of New and Renewable Energy (hereinafter New and Renewable Energy Act) (MOLEG, 2004), show inconsistent and weak support for institutionalizing renewable energy policy programs.

3.1.3. Physically and technologically good, but financially bad potentials for renewable energy developments

South Korea’s physical potentials for renewable energies such as photovoltaic, solar thermal, wind, and geothermal power are limitless. The usable physical potential, which considers the geographic conditions, is about 163.800 billion TOE (ton of oil equivalent). Technological potential, which refers to the amount of energy that can be generated with the current level of technology, is estimated at 1.800 billion TOE. This technical potential is over six times larger than the primary energy demand was in 2012, which stood at 280 million TOE. These estimations show that it is possible to replace all fossil fuels using renewable energy in South Korea (KNREC, 2012; Lee, 2013).

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### Table 2

Interviewees and their affiliations.

<table>
<thead>
<tr>
<th>Type of group</th>
<th>Stakeholders</th>
<th>Number of interviewees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government agency</td>
<td>Ministry of Trade, Industry and Energy of Korea (MOTIE)</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Korea Energy Management Corporation (KEMCO)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Korea New and Renewable Energy Center (KNREC)</td>
<td></td>
</tr>
<tr>
<td>Research institute</td>
<td>Korea Environment Institute</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Green Energy Strategy Institute</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Institute for Climate Change Action</td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>Seoul National University (Dept. of Energy Resources Engineering)</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Korea University (Dept. of Environmental Systems Engineering)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hanbat National University (Dept. of Civil and Environmental Engineering)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Kyungpook National University (School of Public Administration)</td>
<td></td>
</tr>
<tr>
<td>Renewable energy business</td>
<td>Korea Photovoltaic Industry Association</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Korea Wind Energy Industry Association</td>
<td></td>
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<tr>
<td></td>
<td>Chung-buk New &amp; Renewable Energy Association</td>
<td></td>
</tr>
<tr>
<td>Civic group</td>
<td>Green Korea United</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Korean Federation for Environmental Movement</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Korea NGO’s Energy Network</td>
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</tr>
</tbody>
</table>
Nonetheless, as most respondents point out, investments in renewable energy technologies and facilities by the government and even by the private sector to extract and secure renewable energy sources in South Korea are still very low and progress sluggishly. By contrast, Germany for example has a relatively lower level of sunshine but secures around 20 percent of renewable energy generation from solar power sources and generates 35 gigawatt (GW) of energy from photovoltaic sources. Japan, which has similar weather conditions as South Korea, secures 89 GW from solar power, while South Korea is estimated to extract only 1 GW of energy from that source (KNREC, 2012). The South Korean government has invested 162.8 billion Korean won annually on average—1790.6 billion Korean won in all—on research and development for renewable energy from 2003 to 2013. This is two times less than the investment on research for nuclear power generation, which stands at 281.6 billion Korean won annually on average, a total of 3098 billion Korean won, from 2003 to 2013 (KNREC, 2014; MSIP, 2014a, 2014b).

3.2. Policy design

3.2.1. Problematic conceptualization and classification of renewable energy

With regard to the definition and typology of renewable energy, South Korea uses a different term and definition than other countries. Instead of using the internationally recognized term “renewable energy,” South Korea adopted the term “new and renewable energy.” According to the New and Renewable Energy Act of Korea (MOLEG, 2004), “renewable energy” includes eight types of energy sources such as photovoltaic, solar thermal, wind, biomass, waste, hydro, ocean, and geothermal energies, while “new energy” refers to three types of energies—hydrogen, fuel cell, and residual oil gasification—which are converted from fossil fuels. This “new energy” is a term indigenous to South Korea. The International Energy Agency (IEA) and industrialized countries such as the US, the EU and Japan do not include these new energies, which are wastes from fossil fuels, in the category of renewable energy because they are industrial and urban wastes that cannot be biologically decomposed. In this regard, some Korean academic critics point out that new energy sources such as hydrogen energy saving systems for fuel batteries and integrated gasification combined cycles, which are identified as “new and renewable energy” sources in the 2004 New and Renewable Energy Act (MOLEG, 2004), are not by nature renewable energies and thus should be treated as non-renewable energies (Kim, 2012; Lee, 2013) 8

8 Given the criticism of South Korea’s special usage of the term “new and renewable energy,” this study focuses on renewable energy rather than new energy in evaluating the South Korean government’s renewable energy policies.

Therefore, some critical observers stress that including both new and renewable energies in a same law generates confusion in renewable energy statistics. That is, since new energies are included in the same category as renewable energies, the renewable energy production rate has been overstated, leading to the illusion that South Korea’s renewable energy production rate is higher than the actual performance (Hong and Jeong, 2012).

Furthermore, since the conceptualization and classification of renewable energy in South Korea are neither based on scientific or academic foundations nor correspond to international usages of the term, all the respondents emphasized that this causes unclear and inconsistent policymaking and implementation. Consequently, this conceptualization and classification problem results in poor control of overall renewable energy developments, improperly defined roles of relevant government agencies, and the absence of research institutes specialized in renewable energy research.

3.2.2. Disordered legal system and unsystematic national plans for renewable energy deployment

South Korea’s Framework Act is the supreme law providing the general guidelines and rules that all other regulations on renewable energy policies have to fall into. The Framework Act was enacted in 2010 to provide measures to counter the global climate change and to harmonize economic growth and environmental protection. Along with the enactment of the Framework Act, the earlier Energy Basic Law (MOLEG, 2006) was modified into the Energy Act (MOLEG, 2010a). However, some problems have been pointed out in regard to whether it is appropriate to regulate South Korea’s energy policy within the framework of green growth.

First, the concept of green growth is just one of various measures of energy use. The area of energy use has a wider scope than promoting the use of renewable energies. Therefore, it is not appropriate to regulate major elements of energy policy in the Framework Act (Chun, 2009; Kim, 2013).

Second, a basic energy plan needs to set energy policy goals and coordinate various energy programs in different areas within the political, economic, and environmental context. Therefore, regulating a basic energy plan in the Framework Act could reduce the scope of the plan. For instance, securing energy supply is not related to green growth (Kim, 2013; Ryu, 2012). Thus, the Ministry of Government Legislation, which is responsible for modifying the South Korean legal system, indicates that the Energy Act rather than the Framework Act is more appropriate for regulating energy policy (Lee, 2009).

In addition to these problems of legal systems, the national plan to promote renewable energy deployment is unsystematic as well. The South Korean government’s Third Basic Plan (2009–2030) (MOTIE, 2009) under the New and Renewable Energy Act (MOLEG, 2004) has forecasted that new and renewable energy resources will make up a share of 11% of TPES by 2030 because of relevant technological developments and lowered costs to generate new and renewable energies (KSIS, 2014). However, according to the interviewees, it looks like this national plan lacks initiative because forecasting mostly depends on changes of the policy environment, such as related technologies and costs. Neither specific plans for investments in renewable energy technology nor active policy alternatives to achieve these policy goals are included. In addition, the South Korean government has never designed more systematic energy plans that include and sustain a specific ratio of different types of energy sources and an effective procedure to manage electricity prices for a stable and consistent supply of renewable energies. Even worse, the South Korean government has not attempted to take poll of the public opinion to reach a consensus on controversial energy policy issues, such as the ratio of each type of electricity in the energy mix and the policy choice between FIT and RPS.

3.2.3. Insufficient consideration before making the policy shift from feed-in-tariff to renewable portfolio standards

One of the major hindrances to the successful implementation of South Korea’s renewable energy policy is that the government has changed its national energy policy option from FIT to RPS in 2012.

Advocates of RPS, including some government personnel interviewed for this study, argue that this policy shift, which is expected to promote technological developments and industrial activities, was the right decision because FIT in the past had put a heavy financial burden on the government. This assertion is based on the fact that the total government expenditure to support FIT was $1.5879 trillion Korean won between 2002 and 2012, while the
FIT budget in the electricity industry foundation fund in 2012 totaled 395 billion Korean won. It took up about 25% of the total expenditure. In addition, new power generation facilities for renewable energy that have been built since the implementation of RPS in 2012 account for almost 80% of the total production capacity built over the past 10 years (Lee, 2013).

However, this policy shift is criticized by many experts in the field because the government has made the change before the advantages and disadvantages of each policy option were fully examined and relevant stakeholders had reached consensus (Kim, 2009, 2011; Kim and Choi, 2012; Kwon, 2014; Lee, 2014; Lee and Ahn, 2012; Lee and Park, 2008; Lee and Yun, 2011; Park and Lee, 2013). Some respondents in this study point out that implementing RPS has revealed several shortcomings in deploying renewable energies in South Korea. First, energy producers that are responsible for renewable energy generation are in fact only large-scale producers. Because the government allocates the minimum quantity of total energy generation from renewable sources under the RPS system, large-scale producers can benefit from the wholesale electricity price and renewable energy certificate sales, whereas it is difficult for small-scale producers to even secure the sales of renewable energy certificates. Second, it became difficult for energy producers to receive funding from financial institutions because of the uncertainty of the profitability under RPS system. When the FIT system had been implemented in the past, energy producers could finance their facilities easily because profitability was guaranteed for 20 years. Because of this advantage, the current South Korean government still allows the photovoltaic generation sector to use the FIT system. This partial FIT, paradoxically, shows that it might have been a policy failure to replace FIT with RPS. In other words, using FIT to promote photovoltaic generation could be considered evidence that FIT is a better policy tool to promote renewable energy in the South Korean context. Third, RPS does not protect small-scale investors (i.e., producers of less than 100 W) because of the low bidding cost. When the bidding cost is low, large-scale investors can make more profits.

3.3. Policy implementation

3.3.1. Insufficient financial support, and weak public relations and marketing

South Korea’s renewable energy policy focuses on the demand management of electricity and the expected level of demand for energy from renewable sources was set at 6.7 million TOE in 2020, which is very low compared to other types of energy. This low level of expected demand for renewable energy causes insufficient budget allocation, lack of investment in renewable energy facilities, and sluggish technological development. For instance, the budget for new and renewable energy has decreased over the last three years from 1003.4 billion Korean won in 2011 to 802.7 billion Korean won in 2014, which accounts for a 20% reduction (MOTIE, 2014).^9^

All the respondents in the interviews agree that while there are some forms of subsidies provided to renewable energy businesses, the current Park administration has lowered the extent of those subsidies to a level that does not reflect the reality of the market. The Park administration also does not provide any tax benefits to the renewable energy industry, resulting in complaints from renewable energy businesses (Korea Energy Economics Institute, 2013a).

In addition, even though the previous Lee administration transferred 350 billion Korean won to RPS when shifting from FIT to RPS in 2012, a much higher amount of financial support is still required for the RPS system to work properly. However, the RPS system has not received an adequate level of financial support as the government lacks a specific plan to finance it systematically.

Some of the interviewed experts assert that the South Korean government’s non-financial support for the deployment of renewable energy, such as public relations and marketing efforts, is weak as well. While KEMCO assigned more than 200 million Korean won to public relations and marketing, the public relations and marketing system is not working effectively. As a consequence, many unqualified businesses have entered the renewable energy market without having sufficient knowledge about the market. By contrast, the South Korean government’s public relations and marketing efforts for nuclear power plants have been successful. They include establishing the Korea Nuclear Energy Promotion Agency (KONEPA) in 1992 and assigning 1 billion Korean won to the promotion of 23 commercial nuclear power reactors, which contributed the 40 percent share of nuclear energy in the total electricity consumption in South Korea (MKE, 2010).

3.3.2. Inadequate coordination and lack of cooperation between government agencies

Multiple government actors are involved in developing and implementing renewable energy policies in South Korea. As mentioned before, the presidential committee on green growth, established under the Framework Act in 2010, is in charge of overall green industrial policies including the renewable energy policy. However, the principal government agency, which is de facto responsible for developing renewable energy policies and securing the relevant budget, is MOTIE, while KNREC also implements various renewable energy programs under KEMCO. In addition, the Ministry of Environment of Korea (MOE), Korea Forestry Service (KFS), and local governments are involved in the implementation of renewable energy policies by taking charge of some policy projects such as the environment-friendly energy town project.

While the presidential committee on green growth is expected to coordinate overall renewable energy policies, almost all interviewed experts point out that it has suffered from a lack of coordination between government agencies, in particular when making the National Plan. The lack of proper coordination between government agencies resulted in the national energy basic plan, which is lopsided in its concern for electricity demand and the expansion of nuclear power plants to meet the demand. Consequently, the deployment plan for renewable energies for South Korea is neither ambitious nor specific.

In addition, experts from universities and research institutes contend that another instance of ill-coordination is the case of environmental impact assessment of nuclear power plants. The MOE demands to review the impact of large-scale construction projects on the environment before the project plan is completed. However, in practice, environmental impact assessments are conducted during and even after the construction of nuclear or thermal power plants, which means that environmental problems are not properly managed in a preventive manner in South Korea.

In addition, all the respondents agree that regulations from government agencies regarding environmental issues are another obstacle to deploying renewable energies. These environmental issues include noise from wind power facilities, degradation of ocean environment caused by tidal power generation, and damages to agricultural land. Disputes over these issues are often very difficult to solve because different government agencies,
which are involved in the same regulations, do not cooperate effectively in resolving them. The lack of cooperation between government agencies in deregulating restrictions makes it difficult for renewable energy businesses to effectively deploy renewable energies. For instance, the construction of 41 wind power facilities in South Korea had to be suspended in 2013 because of multiple regulations from the MOE, KFS, and local governments (Korea Energy Economics Institute, 2013b).

3.4. Policy monitoring, assessment, and feedback

3.4.1. Lack of systematic monitoring, regular evaluation, and performance auditing

Most interviewees—except government personnel—point out that because the MOTIE monitors the progress of renewable energy programs only when officials judge the monitoring to be necessary, monitoring has never been conducted in a systematic manner, not even when many unqualified small-scale businesses entered the market during the previous Lee administration as well as during the current Park administration.

As a result, for instance, the unit price of renewable energy facility installation varies depending on which agencies take charge of the implementation. That is, the unit price of facility installation of regional deployment programs executed by local governments is 4–17% higher than that of general deployment programs implemented by the central government agencies (National Assembly Budget Office, 2010). This shows that there has been no systemic monitoring of the installation of renewable energy facilities at the national level.

In addition, the MOTIE has not regularly conducted systematic formal evaluations of the overall renewable energy policy programs and their effects even though the governmental agency is legally responsible for designing, implementing, and allocating budgets to renewable energy programs. It is partly because no specific law concerning the development and deployment of renewable energy enforces periodic evaluations and the adequate utilization of evaluation results.

With regard to auditing, the self-auditing entity of the MOTIE and even the board of audit and inspection of Korea (BAI) occasionally audit accounting aspects of renewable energy policy programs, but only when necessary. There is no regular and consistent auditing and inspection of the overall implementation and performance of renewable energy programs.

3.4.2. Lack of adequate feedback arrangements

Under the poor monitoring system, critical findings on implementation errors and ideas for potential improvements of renewable energy programs cannot systematically be reflected in subsequent policy changes. Ultimately, without proper policy feedback arrangements, it can hardly be expected that the South Korean government promotes various policy initiatives.

In addition, some respondents from research institutes point out that the validity and reliability of statistical data on renewable energy programs in recent years are questionable in part because of the absence of systematic monitoring and feedback. Moreover, those data are not properly reflected in the next year’s planning stage since they are not published until the end of the following year.10

Nevertheless, no sufficient efforts have been made at both the national level and the organizational level to introduce a regular monitoring system and to build up a systematic policy feedback arrangement to reflect findings from monitoring and evaluation.

4. Discussion and policy implications

The results of this study confirm most theoretical arguments of established literature on renewable energy deployment policies. This study in this regard contribute to the literature in that we explain a country’s policy failure using a comprehensive evaluation framework which is applicable to the analysis of a country’s renewable energy policies. Based on the results, we suggest the following policy alternatives.

4.1. Establishing an ambitious policy goal for the deployment of renewable energies through citizen participation

Above all, to cope with the international pressure of reducing greenhouse gases effectively and in an ecologically sustainable way, we recommend the South Korean government to establish more ambitious policy goals for the deployment of renewable energies. Increasing South Korean citizens’ awareness of the importance of renewable energies could be a driving force in overcoming the adverse policy environment that is biased in favor of nuclear power generation and in making more aggressive renewable energy policies. Therefore, actual citizen involvement in renewable energy policymaking and policy implementation needs to be expanded. Intensive efforts are required to translate increased citizen awareness of renewable energies into political mobilization so that the South Korean administration could adopt more drastic measures. Environmental groups as well as local governments also need to develop strategies to effectively increase the policy demand for the expansion of renewable energies. In addition, the South Korean Green Party’s success in securing seats in the national assembly and local councils in national and local elections would also contribute to affecting major political parties and the government to pursue more ambitious policy goals.11 Ultimately, as the public and political awareness of the importance of renewable energies increases, the performance of renewable energy deployment programs will be strengthened.

In addition, in order to improve the financial and technical feasibility of renewable energy deployment policies, both the South Korean government and industry need to make efforts to decrease the unit price of renewable energy generation and improve the technologies for generating renewable energies.

4.2. Redefining the definition of renewable energies

Since the current definition of renewable energy in the relevant laws in South Korea is mixed with the definition of new energies, which use fossil fuels, the term “renewable energy” needs to be redefined so that it fits international norms. We suggest categorizing waste gas as part of waste energy and deep geothermal and hot spring water as geothermal power, while dropping fuel oil from the category of waste energy because it uses fossil fuels. New statistics that separate renewable from new energies also need to be developed. As Hong and Jeong (2012) and Kim (2012) assert, new energies need to be defined separately in an independent law system given they are part of fossil fuels and have different characteristics than renewable energies.

10 Another problem is that South Korea’s renewable energy statistics are different from those following international norms such as the IEA’s because of South Korea’s different definition of renewable energies (Kim, 2012; Lee, 2013; MOLEG, 2004). For instance, South Korea’s renewable energy statistics do not include large-scale hydropower while including plastic combustion energy, which is usually not included in the category of renewable energy in other industrialized countries.

11 In the local election in 2012, the South Korean Green Party has secured two seats in local councils, but the support for green politics is currently very weak as the Green Party obtained just 0.48% of the total vote.
4.3. Resetting the goals and objectives of renewable energy deployment

South Korea needs to reset proper and feasible renewable energy deployment goals in conjunction with relevant policy goals of renewable energy investment and industrialization. Currently, renewable energy deployment policy goal (i.e., achieving 11% share of TPES by 2030) is not directly linked with renewable energy investment and industrialization goals that aim to be a new growth engine of the South Korean economy (Kim, 2012).

Given that South Korea’s renewable energy deployment goals are relatively low compared to other OECD countries such as Sweden and Germany, more ambitious policy goals than the current ones need to be set. To achieve the goals in a cost-effective manner, setting renewable energy deployment goals by sources (i.e., by wind power) needs to be considered. In the long-term, South Korea needs to develop an exit strategy to replace nuclear and thermal power generation with renewable ones given that South Korea does not have sustainable levels of natural resources for nuclear and thermal power generation such as coal and uranium.

4.4. Establishing a new organization that focuses on energy issues

Successfully achieving policy goals for renewable energy deployment requires an independent government agency that can focus on and professionally control national energy issues. When renewable energy issues are under the jurisdiction of the department that promotes industry and trade (i.e., the MOTIE), policy directions and contents are inevitably affected by the interests of industries and businesses—such as a stable and cheap supply of energy, thereby generating a bias toward nuclear power generation. In this case, other important energy concerns such as energy security, environmental degradation, and safety can be overlooked. Therefore, as suggested by many scholars and experts who participated in the Energy Alternative Forum (2012), South Korea needs to consider the establishment of a new independent agency as a kind of control tower. For instance, an organization called “Department of Energy” or “Department of Environment and Energy” can be considered. This independent energy agency may plan major renewable energy programs, provide national guidance for the production and deployment of renewable energies, coordinate and tune the roles and responsibilities across related agencies, foster and support research and development and a qualified workforce for renewable energies, conduct regular evaluations of renewable energy programs, build monitoring and feedback systems, create a renewable energy development fund, and even promote public policy culture for renewable energies.

In particular, as excessive and unreasonable regulations from different central and local government agencies impede renewable energy deployment as pointed out previously, this independent agency’s active role is expected to effectively resolve the regulatory issues in collaboration with relevant stakeholders.

4.5. Consistent and continuous policy goals, implementation, systematic monitoring, and proper feedback

The policy goals and major policy tools need to be consistent and implemented continuously so that renewable energy businesses could invest in facilities in a stable business environment. At present, one of the major challenges in terms of policy consistency and continuity is how to provide investment security to businesses and banks under the current RPS system. While the previous FIT provided investment security by guaranteeing fixed prices for renewable energy generation for a certain period of time, RPS does not contain similar measures for the newly growing renewable energy market. Therefore, the current RPS system needs to be reformed to provide a stable investment environment for renewable energy businesses and investors. Reintroducing FIT can be one of the choices.12 In this case, however, measures to maintain a sustainable level of cost of FIT need to be considered carefully.

In addition, consistent and continuous monitoring and systematic evaluations that can be reflected timely in next year’s renewable energy programs need to be conducted. Additionally, valid and reliable information and data on the progress of the deployment of renewable energies need to be systematically gathered and periodically provided to the public to provoke the involvement of political actors and citizens.

4.6. Establishing a new public fund or an appropriation for renewable energies

The current South Korean administration needs to develop a way to allocate a sufficient share of the national budget for the production, deployment, and research and development of renewable energies on a continuous basis. In order to ultimately enhance the renewable energy capacity, the South Korean government needs to create a new fund specifically designated for the production, deployment, and research and development of renewable energies, called the “Renewable Energy Development Fund (REDF).”

As a tentative solution, the budgeting standards of the Ministry of Strategy and Finance of Korea (MOSF) need to be revised so that the budgets for renewable energies could at least be appropriated in the government’s regular budgeting system, for instance, by installing a new item titled “Renewable Energy Expenses.”

4.7. Using a varied policy mix

Various and aggressive policy tools in terms of both financial and non-financial support need to be adopted by the South Korean government. Those policy tools may include tax incentives for a wide range of renewable energy generation, net metering, green prices and green electricity, mandatory use of renewable energy in all buildings, increased access to the electricity grid, increased electricity prices, reform of the electricity price system, and intensive investment in energy efficiency.

5. Conclusion

We recognize that South Korea may have reached a turning point: a chance for effective renewable energy deployment policies to replace ineffective ones. Although the South Korean government has strived to facilitate the deployment of renewable energies since 2002, its policy performance has been poor compared to its targets and to other industrialized countries. The major reason for this unsatisfactory performance of renewable energy policies may ultimately be attributed to the political environment that has been dominated by the fossil fuel and nuclear power industry’s interests. In addition, the problematic and inconsistent policy shifts between FIT and RPS and a design that lacks sufficient support schemes caused confusion in the market, resulting in the sluggish deployment of renewable energy. Furthermore, the South Korean government has encountered difficulties in implementing renewable energy programs since it could not properly coordinate activities of different government agencies.

12 The case of Japan, where policy failure eventually led to the replacement of RPS with FIT in 2012 is noteworthy in this context.
to both achieve renewable energy deployment goals and overcome obstacles such as excessive regulations of renewable energy businesses. Even the South Korean government’s monitoring and feedback system for renewable energy programs is neither systematic nor timely, thereby hindering the effective implementation of renewable energy programs.

Therefore, we identified some effective strategies to fix these problems and made policy suggestions to redesign the renewable energy policies of the South Korean government. Above all, the success of South Korea’s renewable energy policy depends on the development of institutions and political forces that can push forward and support the development and implementation of ambitious policies for the deployment of renewable energies. Building such forces requires continuous efforts by multiple actors, in particular the leadership of policymakers and political support from policy actors such as environmental groups, renewable energy businesses, and relevant political parties. Some of our policy suggestions might be challenging for the South Korean government, and might need to be made through the heated political discussion between relevant policy actors.

This study can contribute to the literature of renewable energy deployment policies theoretically, empirically, and practically. By developing an evaluation framework based on theoretical arguments and analyzing empirical data, this study support the validity of most elements that have been identified as causes of renewable energy deployment policy success or failure. In practice, the South Korean experience would provide some insights for policy actors who attempt to increase knowledge on renewable energy policies not only in South Korea but also in other countries with similar contexts and settings.

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