Joint Research Project:

Research on Improving Social Acceptance and Conflict over Renewable Energy Generation Facilities

FINAL REPORT

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Table of Contents

Chapter 1 Introduction

Section 1 Necessity and Purpose of Research

With the global recognition on the severity of the climate crisis the world is pursuing energy transition for carbon neutrality. In the IPCC Special Report, it is stated to limit global warming to 1.5 degrees, global emissions need to decline by 45% from 2010 levels by 2030 and reach carbon neutrality by 2050[1].

Korea is the world's ninth-largest CO2 emitter, and can only achieve the IPCC's recommendations by reducing emissions by 313.28 million tons by 2030[2]. As of 2018, 37% of domestic greenhouse gas emissions come from the energy generation and heat sectors[3]. Of these, coal-fired power plants account for about 30% of the total emissions. A phase-out of coal from power generation is the most urgent task in reducing greenhouse gas emissions, and it is essential to expand renewable energy facilities to accomplish the phase-out.

The need for energy transition is not just due to the climate crisis. Nuclear power, which has served as a base power source along with coal power generation, has been operating under insecure conditions, exposed to constant dangers from natural disasters, fraudulent construction, and safety accidents. Radioactive waste, which emits toxic substance for more than 100,000 years, will be discharged for decades under current energy policy. Even when nuclear power ceases to operate, the problem of waste disposal continues from generation to generation. Discontinuation of nuclear power usage does not equate of perfect closure of nuclear plant issues. At present there are still 24 nuclear power plants in operation in Korea.

The Korean government began to discuss energy transition as a policy agenda in earnest from 2017 onwards to solve the problems of air pollution, climate crisis, and denuclearization. Although various energy transition policies such as the 'Renewable Energy 3020 Plan' and the 'Energy Transition Roadmap' were announced, the renewable energy generation rate was 5.05%[4] of the total generation, of which solar and wind power accounted for only 2.66%[5]. There is an analysis that concludes that 100% of the electric power demand can be met with the potential domestic renewable energy sites, excluding the forest land[6]. However, the problem does not lie in the availability of power generation sites, but how and who operates the renewable energy power generation facility in a specific location. According to a study by the Audit Research Institute, 37.5% of solar and wind power projects whose permits were rejected or canceled were

[1] ‘’GLOBAL WARMING OF 1.5 °C’’, IPCC, 2018.
[2] ‘’2019 CO2 Emissions’’, Global Carbon Project, http://www.globalcarbonatlas.org/en/CO2-emissions.

[3] "2018 Greenhouse Gas Emissions', Ministry of Environment, 2020.09.25.

[4] "2019 New and Renewable Energy Supply Statistics (excluding non-renewable waste)”, Korea Energy Agency, November 2020.

[5] "2018 New and Renewable Energy White Paper”, Korea Energy Agency, January 29, 2019.

[6] "2018 New and Renewable Energy White Paper”, Korea Energy Agency, January 29, 2019.

due to opposition from local residents [7]. This is the result of power generation projects led unilaterally by business operators and the government that did not consider resident participation and ecological acceptance.

Energy transition centered on renewable energy must be urgently promoted in order to escape from the dangers of nuclear power generation and air pollution in the era of climate crisis. However, this should not be a simple quantitative expansion, but a process of resolving the inequalities between regions that had been premised on centralized power generation and transmission. In addition, environmental damage must be minimized during the development process of these safe energy facilities that will function as mitigators of climate crisis. As long as there are plans and tasks for expanding renewable energy in the future, solutions for mediating, revising and resolving conflicts are needed.

Based on the above awareness of the problem, this study aims to analyze the conflict in renewable energy sites in Korea through literature and field researches, and to prepare solutions for mediating the conflict of renewable energy by referring to European cases.

Section 2 Research Methods

1. Literature search

This study analyzes plans and previous studies on energy transition and examines issues and directions for improving the system to enhance eco-acceptance and resident acceptance. To understand Korea's energy transition policy, three government plans were reviewed. The "3rd Basic Energy Plan" that presents the basic principles and directions of power supply, and the "9th Basic Plan for Electricity Supply and Demand" that establishes specific power facility plans based on this, and the "Renewable Energy 3020 Implementation Plan" which includes the goals for the proliferation of renewable energy and specific strategies are reviewed. In addition, the research on the government's energy plan and legal basis of the Korea Legislation Research Institute[8] and the Board of Audit and Inspection of Korea[9] was referred.

As renewable energy began to proliferate in earnest in 2017, research on the facilities of power generation facility and methods of securing residents' acceptance were conducted. The Korea Maritime Institute[10]

[7] "Analysis of the Current Status of Renewable Energy Policy Promotion and Management", Audit Research Institute, Audit and Inspection Service. 2019. 8.

[8] [8] "A Study on Reorganization of Legislation in Local Industry-related Fields to Realize the Energy Conversion Roadmap", Junseo Lee, Korea Legislative Research Institute, Oct. 2019.

[9] "Analysis of the Current Status of Renewable Energy Policy Promotion and Management", Audit Research Institute, Audit and Inspection Service. 2019. 8

[10] "A Study on the Preparation of Countermeasures to Minimize the Impact of Offshore Wind Power Projects in the Marine and Fisheries Field", Korea Institute of Maritime Affairs and Fisheries, December 2019.

and the Ministry of Trade, Industry and Energy[11] identified the issue regarding residents' acceptability in the process of spreading offshore wind power and suggested subsidy support and measures to revitalize the fishing industry. In addition, the research of Hyun Woo Kim and Hawsun Sohn[12] shows problems with dolphin habitat damage caused by offshore wind power. To confirm the discussion on the environmental impact assessment policy plan, KEI's review materials[13] were referred to, and the European ESTEEM methodology reviewed by the Ministry of Trade, Industry and Energy for managing renewable energy conflicts[14] were also referred.

2. On-site investigation

In this study, 10 field research visits were conducted to understand the detailed aspects of the conflict over the location of renewable energy. The research area was selected by dividing the renewable energy power generation facility projects in Korea into those that have been postponed due to location conflicts and those that managed to reach smooth agreements with the residents or had the residents directly participate in the project to ensure acceptance. To check the environmental and landscape impact of renewable energy power generation facilities, the environment around the power generation facilities was investigated and interviews were conducted with stakeholders such as business operators, government officials, and local residents. As shown in Table 1 below, three onshore solar power plants, one floating solar power plant, two onshore wind power plants, and four offshore wind power plants were investigated according to the type of power generation.

Table 1: Field Research Timetable

Date	Activity	Classification	Number of Participants
15-16.07.2020	Taean offshore wind power complex, and Saemangeum field research	Resident conflict and local environment damage case	4
10-11.09.2020	Daegwallyeong, Daegi-ri onshore wind power complex field research	Onshore wind farm Damage site development case	4

[11] [11] "A plan to develop offshore wind power with the residents and coexist with the fisheries", Ministry of Trade, Industry and Energy, 2020.07.

[12] "The Current Status and Changes of the Emergence and of the pacific bottlenose dolphis in Jeju", Kim Hyun-woo and Son Ho-seon, Proceedings of the Korean Society for Marine Environment and Energy Conference, 2018.

[13] "Opinion on reviewing the policy plan (complementary) of the strategic environmental impact assessment report (the 9th basic plan for power supply and demand)", KEI, November 2020.

[14] "Development of Citizen Participation Program to Secure Regional Acceptance of Renewable Energy Development Projects-Focusing on the Application of European ESTEEM Methodology", Ministry of Trade, Industry and Energy, 2018.8.

13.10.2020	Yokjido offshore wind power complex resident interview	Offshore wind farm	2
14.10.2020	Hapcheon dam floating solar power complex K-water interview	Floating solar photovoltaic system Resident participation case	2
11-12.11.2020	Jeju Tamna, Daejeong-ri offshore wind power complex field research and discussion participation	Offshore wind farm	1
02.02.2021	Cheorwon Durumi solar power plant resident interview	Onshore solar photovoltaic system Resident participation case	3
17.02.2021	West-South Sea offshore wind power field research	Offshore wind farm	3
18.02.2021	Wolpyeong Village solar plant cooperative society interview	Onshore solar photovoltaic system Resident participation case	3
19.02.2021	Haenam Solaseado solar power plant field research	Onshore solar photovoltaic system	3
17-19.03.2021	Uljin Hyeonjongsan Wind Power Complex field research	Onshore wind farm Damage site development case	2

3. Advanced Case Study

This study compares and reviews overseas cases of renewable energy acceptance management in order to understand the implications and improvement directions related to renewable energy acceptance. Germany is the target country for comparison and review in this study. Through national discussions on energy conversion, Germany has been implementing renewable energy expansion policies along with nuclear power phase-out and coal phase-out ahead of Korea. The German government established KNE, an organization dedicated to conflict resolution, in 2016 after conflicts arose due to renewable energy projects. KNE has established conflict management strategies and manuals while coordinating over 100 conflict situations. To refer to KNE's conflict management strategy, two online workshops were held for 3 hours each on November 19 and 20, 2020. In the first workshop, under the theme of Renewable Energy Status and Resident Acceptance Management Plan, the status of renewable energy in Korea and Germany and strategies for improving resident acceptance were shared. In the second workshop, under the theme of Ecological Conservation Issues in the Energy Transition Process, problems and solutions for

environmental damage caused by renewable energy power generation facilities in Korea and Germany were shared.

Include short paragraph here to make reference to the Activity Report which is providing some additional and more detailed information about the research methods which were applied by Green Korea United.

Following the introduction in Chapter 1, Chapter 2 reviews the current status of renewable energy in Korea. The government plans and supply statistics related to energy conversion, which have been discussed since 2017, are identified and the scope of renewable energy is reviewed.

Chapter 3 examines conflicts related to renewable energy in Korea. Through field investigations, patterns of conflict are identified. Analysis is conducted based on the following classifications: environmental damage, distribution of power generation profits, and participation in the decision-making process.

Chapter 4 reviews renewable energy policies and conflict management systems in Germany and Europe based on a workshop with KNE in Germany. Through the European cases, the implications for the Korean cases are identified and improvement are reviewed.

The final Chapter 5 summarizes the implications found through the project and presents solutions for conflict management that will arise in the process of expanding renewable energy generation facilities in the future.

The project, supported by the EU-Korea Climate Action Project, aims to contribute to the process of creating an energy transition and carbon-neutral society by preparing solutions for mediating the location conflict of renewable energy.

Chapter 2 Current Status of Renewable Energy in Korea

Section 1 Korea's Renewable Energy Policy

I. Concept and Scope of Renewable Energy

The International Energy Agency (IEA) defines renewable energy as 'energy generated from natural phenomena that can be continuously supplemented'[15]. Includes solid biofuels, liquid biofuels, and renewable municipal waste along with wind, solar, geothermal, marine, hydro, and biogas.[16]

The European Union defines renewable energy as a “renewable non-fossil energy source”[17]. The difference from the IEA regulations is that renewable energy includes energy sources generated by natural

[15] ‘’Energy Statistics Manual’’, IEA, OECD, EUROSTAT, 2005.

[16] ‘’RENEWABLES IN GLOBAL ENERGY SUPPLY’’, IEA, OECD, 2007.

[17] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources.

temperature differences, including air heat and hydrothermal energy, and selective accreditation criteria are used to minimize adverse side effects such as 'carbon emissions and biodiversity damage' that can be caused by bioenergy[18]. 'Sustainability standards' are set based on the amount of carbon generated in the production process and the land where raw materials are cultivated, and only bioenergy that meets the criteria is computed in the statistics of renewable energy supply targets for each member country, and policy support is provided[19].

On the other hand, in Korea, 3 types of new energy and 8 types of renewable energy are combined to be defined as new and renewable energy. New energy is energy that converts and uses existing fossil fuels or uses electricity or heat through chemical reactions such as hydrogen and oxygen and includes 'energy obtained by liquefying and gasifying hydrogen, fuel cells, and coal'[20]. Renewable energy is 'energy that converts and uses renewable energy' and includes 'solar, wind, hydro, marine, bio, and waste'[21][22].

'Hydrogen, fuel cell, coal liquefied energy', currently classified as new energy, is closer to the concept of using energy generation facilities, technologies, and existing fossil fuels more efficiently than a form of energy. Therefore, including the expansion of new energy supply in the statistics of renewable energy supply is somewhat less related to the international trend to replace fossil fuels through clean natural energy[23]. As in the case of the EU discussed above, standards that include carbon emissions and biodiversity damage that may occur in the process of power generation are needed, just as bioenergy is classified by preparing sustainability standards.

Table 2: Classification of New and Renewable Energy in Korea

Classification	Energy Source	Content
Renewable Energy	Solar Energy	sunlight, heat
	Wind Power	
	Hydropower	
	Marine Energy	
	Geothermal Energy	
	Bio Energy	biogas, landfill gas, biodiesel, wood chips, coal briquettes, forest fuel, wood pellets, waste wood, black liquor, sewage sludge solid fuel, Boi-SFR, bio heavy oil

[18] Biofuels, bioliquids and biomass fuels.

[19] "The Current Status and Improvement Tasks of the New and Renewable Energy Classification System", Yeon-Soo Park, National Assembly Legislative Research Office, Feb. 2019.

[20] New and Renewable Energy Act Article 2, Subparagraph 1.

[21] Non-recyclable waste is excluded from October 2019.

[22] New and Renewable Energy Act Article 2, Subparagraph 2.

[23] "Statistics and Industry Classification System Maintenance Plan for Fostering New and Renewable Energy Industries", Korea Energy Economics Institute, 2011.6.

	Waste Energy	waste gas, industrial waste, household waste, cement kiln auxiliary fuel, SRF, refined fuel oil
	Other Energy	
New Energy	Hydrogen Energy	
	Fuel Cell	
	Liquefied and Gasified Coal Energy and Heavy Residue Gasified Energy	IGCC (Integrated Gasification Combined Cycle)

Table 3: European renewable energy classification

Classification	Energy Source	Content
Renewable Energy	Solar Energy	Solar Power, Solar Heat
	Wind Power	
	Hydropower	
	Marine Energy	Tidal Power
	Geothermal Energy	Power Generation, Direct Heat Utilization
	Bio Energy	Biofuels, bioliquids and biomass fuels. Set according to sustainability standards
	Recycled Pottery Waste	Municipal waste with biodegradability
	Landfill Gas	
	Heat Energy	Use of energy related to cooling and heating using natural temperature difference such as air heat and water heat
	Sewage Treatment Power Generation Gas	

II. Supply Target and Plan

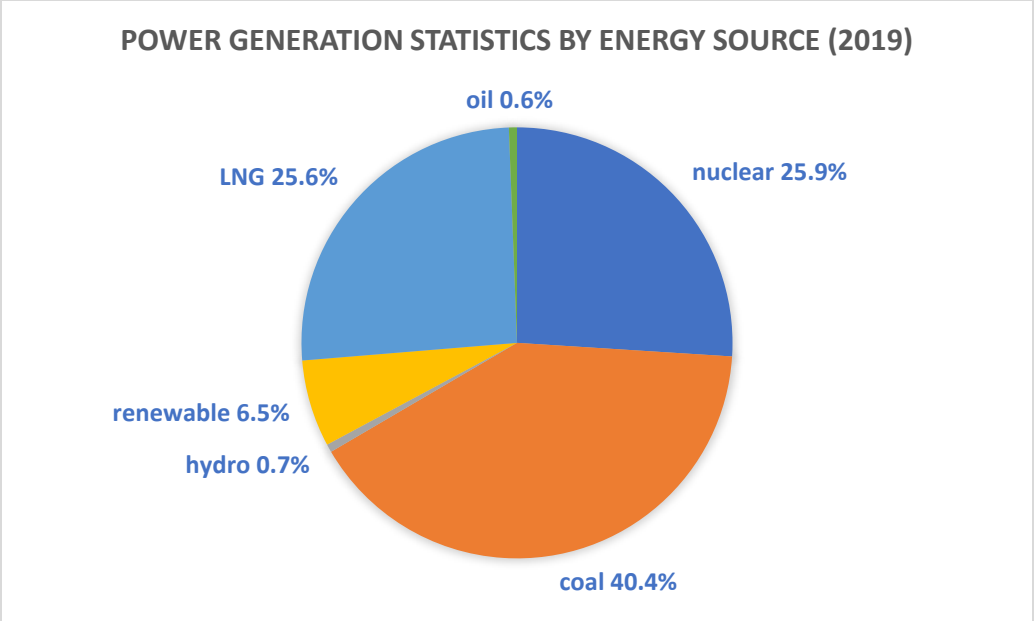
As of 2019, coal power is the largest at 40.4%, nuclear power at 25.9%, and LNG at 25.6%[24]. Renewable energy accounts for 6.5%[25], and hydro power and oil each account for only 0.6%.

1) Generation Status

Graph1: Power Generation Statistics by Energy Source (2019)

[24] "2019 Statistics of Power Generation by Energy Source", Korea Statistical Office, <https://kosis.kr/statHtml/statHtml.do?orgId=388&tblId=TX_38803_A016A&conn_path=I2>.

[25] According to the new and renewable energy supply statistics published by the Korea Energy Agency, the proportion of new and renewable energy generation in 2019 was 8.69% of the total amount, excluding the power generated by private vehicles.



Source: Power generation statistics by energy source in 2019. Korea Statistical Office.

It was in 2017 that energy transition began to be discussed as a policy agenda in Korea. The government revised the Electricity Business Act in March 2017, setting up a legal basis for energy conversion that considers economic feasibility as well as environment and safety[26]. To examine the main issues of Korea's energy transition policy three government plans will be reviewed. The first is the 3rd Basic Energy Plan, and the second is the 9th Basic Electricity Supply and Demand Plan. The third is the Renewable Energy 3020 Implementation Plan.

2) The 3rd Basic Energy Plan

The Basic Energy Plan is the overall plan of the national energy policy and is the top-level plan that affects a number of energy plans, such as the ´Basic Plan for Power Supply and Demand´ and the ´Basic Plan for New and Renewable Energy´[27]. 'The 3rd Basic Energy Plan', announced in June 2019, disclosed that while reducing nuclear power plants and coal-fired power plants, the share of renewable energy generation will be increased to 30-35% by 2040. It is to convert the main energy source of power generation energy from the existing nuclear and coal center to renewable energy. In contrast to the proposed expansion of the proportion of nuclear power plants as the main task in the "2nd Basic Energy Plan", the direction of the policy has changed to energy transition in the 3rd Basic Energy Plan.

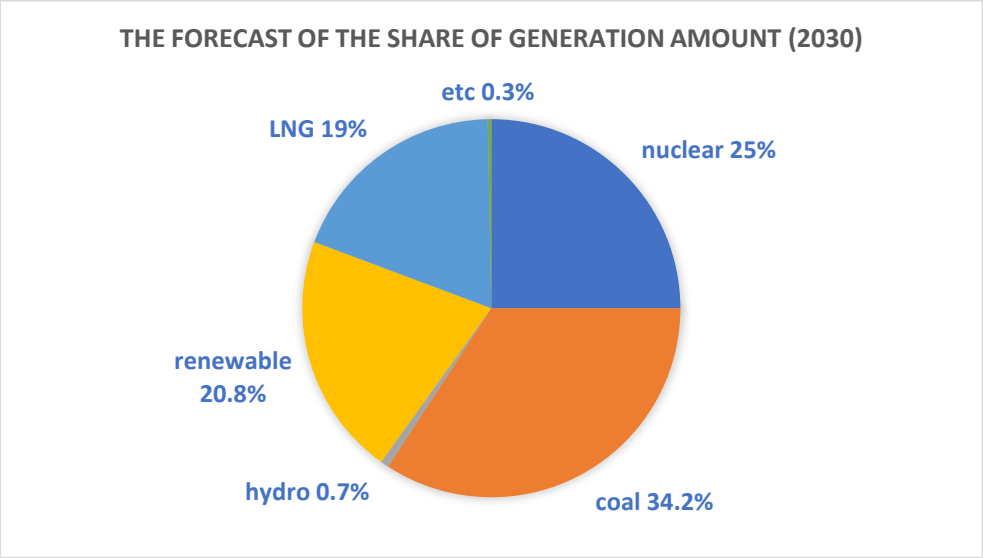
3) The 9th Basic Plan for Electricity Supply and Demand

The ´Basic Plan for Electricity Supply and Demand´ is a plan that is established every two years in order to forecast mid- to long-term power demand and expand power facilities accordingly based on the basic energy plan. The forecast of the share of generation amount according to the ´9th Basic Electric Power Supply and Demand Plan´ announced in December 2020 is as follows.

[26] "When establishing the basic plan for power supply and demand, comprehensive consideration should be given to the economic feasibility of electric facilities, the impact on the environment and public safety, etc." Article 3, Paragraph 2 of the Electricity Business Act.

[27] "A Study on Reorganization of Legislation in Local Industry-related Fields to Realize the Energy Conversion Roadmap", Junseo Lee, Korea Legislative Research Institute, Oct. 2019.

Graph 2: Forecast – Share of Generation Amount (2030)



Source: The 9th Basic Electric Power Supply and Demand Plan.

4) Renewable Energy 3020 Implementation Plan

The ´Renewable Energy 3020 Implementation Plan´ was announced by the Ministry of Trade, Industry and Energy in December 2017 and contains the contents of expanding the share of renewable energy generation to 20% by 2030. It proposes a goal of supplying a total of 48.7GW of new power generation facilities including 36.5GW of solar power and 17.7GW of wind power by 2030.

Graph 3: Renewable Energy 3020 Implementation Plan[28]

28 ''A Study on Optimal Power System Reinforcement Measures Following Renewable Energy Expansion'', Hyuk-Il Kwon, *Energies* 2020.

Ⅲ. Renewable Energy Expansion Policy

The Renewable Energy 3020 Plan discussed above contains measures on expanding renewable energy by creating an environment in which citizens can easily participate in solar power projects, introducing a planned location system, promoting large-scale project plans that take into account resident acceptance and environmental characteristics, and laying a foundation for expanding renewable energy through strengthening local government capabilities.

Table 4: Details of Renewable Energy 3020 Implementation Plan

Expansion of urban self-generated solar power	- Utilization of surplus power after offset processing; Carry over + Cash settlement - Mandatory zero energy building certification; Applied to all buildings by 2030 (new and rebuilt)
Business support for small cooperatives	- Temporary introduction of Korean FIT; Stable profit generation for 20 years, omit REC issuance and bidding process - Target: Cooperatives and farmers – less than 100kW, private businesses-less than 30kW - Incentives for social economy enterprises and citizen fund-type projects (provide REC weight, etc)
Activation of rural area solar power	- Abolition of age limit of buildings that can be installed in the agricultural promotion area and promote temporary use of salt reclaimed land - Activation of solar power installations in farmland and other agricultural promotion area
Introduction of local government led & planned site system	- Find sites from local governments → supply to private businesses → private businesses establish district development implementation plans - Introduction of village competition method, focus evaluation on residents' acceptance during planning review - Environmental review: basic district development/ Strategy before deliberation of implementation plan/ Mandatory implementation of environmental impact assessment - Sharing of development profits
Promotion of large-scale projects	- Focus on projects proposed by private and public organizations - Approval of the implementation plan for power generation development project and preemptive review of grid connection - Mandatory renewable energy supply for large power generation companies also raises the supply certificate weight - Onshore solar power, solar power using large-scale reclaimed land and onshore wind power, offshore wind power using planned locations - Develop a resident participation type business model (bond investment type, fund investment type, etc.)

Improvement of public property rental standards	Rent reduction 5% of property value → 1% or more Initial rental period 10 years → 20 years

The FIT (Feed in Tariffs) system, which was operated from 2002 and abolished in 2011 through the Renewable Energy 3020 Implementation Plan, has resumed under the name of "Korean FIT". In the Korean FIT, power generation companies, not the government, purchase electricity at a fixed price. For individual businesses with less than 30 kW, and farmers, fisheries, livestock, or cooperatives with less than 100 kW of small-scale solar power generators, support is given to guarantee stable income. In addition, for businesses with power generation facilities of 500MW or more there are plans to increase the RPS (Renewable Energy Portfolio Standard) ratio, the obligation of supplying more than a center percentage of total power generation using renewable energy, within the upper limit of 10%.

REC (Renewable Energy Certificate) support standards are revised every three years in consideration of technology development level, new and renewable energy supply goals, and operational performance. The supply certificate issuance amount is calculated by multiplying the power supply amount (MWh) by the weight of each facility. In the case of resident-participating projects, loans are supported at low interest through policy funds up to 90% of the project cost, and a REC weight of 0.1~0.2 is additionally paid. In addition, there is mandatory installation of new and renewable energy in new buildings, support for installation of new renewable energy through pilot projects, and operation of solar and wind power support centers.

Table 5: REC Grant Standard

Classification	Supply Certificate Weight	Target Energy and Standards	
		Installation Type	Detailed Standards
Solar Energy	1.2	Installation in general site	below 100kW
	1.0		from 100kW
	0.7		exceeding 3,000kW
	0.7	Installing in the forest	-
	1.5	Using existing facilities such as buildings	less than or equal to 3,000kW
	1.0		exceeding 3,000kW
	1.5	Installation floating on the water surface, such as oil and fat	
	1.0	Trading electricity through private power generation facilities	
	5.0	ESS facility (related to solar power facility)	2018, 2019
	4.0		2020
Other New Renewable Energy	0.25	IGCC, by-product gas, waste energy, Bio-SRF	
	0.5	Landfill gas, wood pellets, wood chips	
	1.0	Hydropower, onshore wind power, tidal power (with seawall), other bioenergy (bio heavy oil, biogas, etc.), trading electricity through private power generation facilities	
	1.0-2.5	Geothermal, tidal power (no seawall)	Fixed Type
			Variable Type

	1.5	Hydrothermal, unused forest biomass mixing facility	
	2.0	Fuel cell, algae, unused forest biomass (only applies to bioenergy power plant)	
	2.0	offshore wind power	Linkage distance less than 5km
	2.5		Linkage distance between 5-10km
	3.0		Linkage distance between 10-15km
	3.5		Linkage distance exceeding 15km
	4.5	ESS facility (related to wind power facility)	2018, 2019
	4.0		2020

Source: Management and operation guidelines for the mandatory supply of new and renewable energy and the mandatory mixing of fuels.

Chapter 3 Conflicts on Renewable Energy in Korea

Section 1: Problems of damage to settlement space and environment

Concerns about the reckless development of renewable energy facilities are increasing as the renewable energy power industry follows the practices of the existing power generation industry that has been driven with a focus on economics rather than considering ecological sensitivity. If the renewable energy facility does not have an eco-friendly aspect during the construction phase, environmental conflict rises inevitably. There is a need to improve social acceptance of renewable energy through transparency and clarity in the site evaluation and selection process. In this section, the problems of settlement space and environmental damage are examined in accordance with the type of power source.

I. Offshore wind

After the government announced its new and renewable energy expansion policy, large-scale offshore wind farms are being pushed ahead nationwide. Offshore wind power is expected to be relatively easy to secure the site and have high utilization rate when compared to the onshore wind power generation projects regarding deforestation and distance from residential areas. However, data on environmental impacts caused by offshore wind power are not well established, and guidelines for environmental evaluation have not yet been established[29]. In addition, there are conflicts with local fishermen over the scope of compensation. In the case of the Southwest Sea Power Complex, construction was delayed for

[29] Offshore wind power environmental assessment guidelines are being prepared by the Ministry of Environment's wind power environmental assessment team. Scheduled to be announced in the second half of 2021.

five years due to conflicts with local residents. In the case of the Yokjido Wind Farm, large-scale protests are taking place led by nearby fishermen[30].

<Protest against the offshore wind power in Yokjido>[31]

For offshore wind power development, depending on the facility capacity a different environmental evaluation system is applied. When the capacity is over 100MW, it is subject to environmental impact assessment[32] and sea area use consultation[33]. Only sea area use consultation applies to facilities with capacity less than 100MW. From 2014 to 2019, there were a total of 16 evaluations for the purpose of installing wind turbines offshore, and 15 sea area use consultations and one environmental impact evaluation were conducted. Since the degree, expertise, and scope of the evaluation differ according to the power generation capacity, operators are configuring the power generation capacity to be less than 100MW, avoiding the environmental impact assessment.

The Korea Institute of Oceans and Fisheries pointed out the institutional limitations of the maritime use consultation through a study conducted in 2019[34]. The sea area use consultation does not evaluate the environmental impact assessment items such as tide, safety of ship navigation, noise, vibration, and radio interference. Of these, the effects of noise and vibration on living organisms are partially reflected, but the effects on humans are not investigated. There is also a limitation that the same range of evaluation is applied to marine plants that cannot move and birds that can move freely in space. In addition, the impact

[30] “Absolute opposition to Yokji offshore wind power plant construction!”. <Hansan Shinmun>. 2019.04.26, <http://www.hansannews.com/news/articleView.html?idxno=60986>

[31] "Wind farm on the offshore Yokjido Island will destroy the fishing grounds " <Yonhap News>. 2019.07.02, <https://www.yna.co.kr/view/AKR20190702117500052>.

[32] The process of comprehensively predicting, analyzing, and evaluating the environmental impact of an activity intended to be developed or used. Based on Article 5 of the Environmental Conservation Act.

[33] A system that requires prior consultation on the appropriateness of the use of the sea area and the impact on the marine environment for activities intended to develop or use the sea. Based on Articles 84-95 of the Marine Environment Management Act.

[34] "A Study on the Preparation of Countermeasures to Minimize the Impact of Offshore Wind Power Projects in the Marine and Fisheries Field", Korea Institute of Maritime Affairs and Fisheries, December 2019.

of social, economic, and environmental sectors is based on administrative boundaries. Strengthening follow-up monitoring for offshore wind power projects and improvement on the system is required[35].

Despite these institutional limitations, as of February 2020, there are a total of 21 offshore wind power projects that have been licensed for power generation, with a scale of about 2,984MW. In July 2020, the government announced that it will jointly work with relevant ministries to revitalize offshore wind power[36] through the government-led initiative to discover a location, simplify the licensing process, strengthen residents' acceptance and environment, and share power generation profits to coexist with the residents and the fishery industry. By establishing a location information map containing wind conditions, 17 types of regulatory information, fishing boat activity, and catch information, the offshore wind power consideration zone will be announced in the sea area with good business feasibility and less impact on fishing. There is a plan to investigate the basic feasibility of economics and environmental feasibility for two years in two regions by installing wind conditions measuring equipment and environmental monitoring facilities. The public water point usage fee was reduced by 50%, the weight of the renewable energy supply certificate (REC) was increased according to the distance connected to the coastline, and the support range around the power plant was also reset to enable more practical support[37].

Currently in Korea, there are two commercial operations at Tamna Offshore Wind Power (30MW) and Southwest Offshore Wind Power Demonstration Complex (60MW) in Jeju Island. The Southwest Sea Offshore Wind Power Project is a large-scale project completed in multiple steps of proof-demonstration-proliferation. However, as the area set forth a traffic ban of 14 million square meters to move large crane ships and other wind power generating units, there were objections from the fishermen that faced reduction of fishing grounds. Accordingly, Korea Offshore Wind Power, which is a business operator, designed a 'Fishery Coexistence Complex' allowing the passage and fishing activities of coastal fishing vessels of 10 tons or less in the wind farm upon maritime traffic safety examinations. It announced technology for coexistence in the fishery industry will be applied, such as building a farm in the complex and installing artificial fish reefs.

Since 2012, Jeju Island has been on a path to carbon-free, and has set goals for eco-friendly mobility, improved energy independence, and a 34% reduction in greenhouse gas emissions by 2030. In regards to the share of electric vehicle distribution and renewable energy generation, Jeju Island is showing leading performance in Korea. Through the concept of public-air, it has stipulated public management and profit sharing of wind power generation, and has led meaningful cases such as community energy and village power plant operation. However, due to excessive supply of power during the daytime, the number of orders for limiting output is increasing, centering on large-scale wind power generation where control facilities are obligated. It is expected that about 240 output restrictions will be implemented in 2022. Reverse transmission is not possible for HVDC 1,2 link lines connecting Jeju from Haenam and Jindo, Jeollanam-do to the seabed, and construction of a two-way three linkage line is being planned for this, but there are difficulties experienced. Meanwhile, additional offshore wind power is on the way. As shown in the status diagram below, Hanlim Offshore Wind Power, Handong Pyeongdae Offshore Wind Power,

[35] Projects subject to sea area use consultations are conducted only once semi-annually during project implementation.

[36] "A plan to develop offshore wind power with the residents and coexist with the fisheries", Ministry of Trade, Industry and Energy, 2020.07.

[37] Standard on areas adjacent to power plants belonging to the Eup, Myeon, and Dong have been re-regulated. The island area located within a radius of 5 km from the nearest coastal point of the generator within 2km vertically from the coastline and within the distance from the generator to the nearest coastal point is the reference area (2020. Enforcement Decree amended).

Daejeong Offshore Wind Power, Woljeong·Haengwon Offshore Wind Power, Pyoseon·Hacheon·Sehwa Offshore Wind Power are projects that are in the process of preparation and implementation.

<Status Map of Wind Power Resources in Jeju Island>[38]

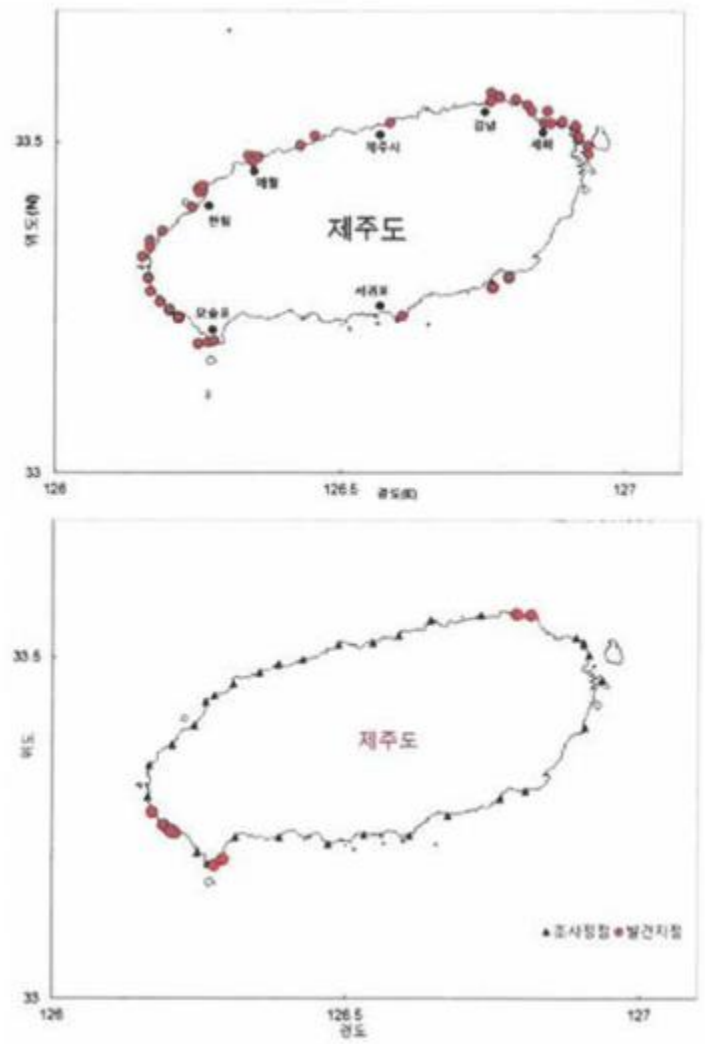
Jeju Island, which started offshore wind power earlier than the mainland, has detailed standards for the location of offshore wind power generation districts by its own ordinance. The contents include for a power generation facility capacity of 50MW or more, an average utilization rate of 30% or more, a distance of more than twice the diameter from the distance from the edge of the nearest generator blade to the boundary of the protected area's core area, and a distance of 1km from the shoreline. The separation distance from the coastline seems to have taken into account of the Jeju Island's deep-water characteristics, sericulture and direct conflict with the village fishing grounds. However, the location of offshore wind turbines at a distance of 1-2km from the coastline can be a problem in terms of landscape as well.

<Jeju Tamna Offshore Wind Power>

[38] ‘’Carbon Free Island, JEJU by 2030’’, Jeju Provincial Office Future Strategy Bureau, https://www.jeju.go.kr/group/part29/power/wind.htm;jsessionid=Xzy72d0cCE1SyDRuEvRRCm7mBuNU71EXndXmI6Rkm7U6BabAJ0Oz4S1sMwSs7teS.was_1_servlet_www6?.

In the case of Jeju Island, district designation has been promoted, with the exception of areas designated as protected areas with high conservation value. The Daejeong wind power generation project in the habitat of the pacific bottlenose dolphin, a marine protected creature in Korea, is becoming an issue. As the number of pacific bottlenose dolphin continues to decline, there are rising concerns about the construction of an offshore wind farm where the pacific bottlenose dolphin habitat is located. Jeju Island is the only coastal resident stock of the pacific bottlenose dolphin habitat. There is a need for preservation measures or measures for the sea area recognized as a habitat for protected organisms.

Graph 4: Distribution of pacific bottlenose dolphis in Jeju Island [39]



[39] "The Current Status and Changes of the Emergence and of the pacific bottlenose dolphis in Jeju", Kim Hyun-woo and Son Ho-seon, Proceedings of the Korean Society for Marine Environment and Energy Conference, 2018.

II. Onshore wind power

Power generators have considered mountain ranges such as Baekdu-daegan and vein as candidate areas for the project as they have good wind conditions[40]. However, as these locations have high ecological sensitivity, there were many controversies and conflicts in the process of attempting to locate onshore wind power. When a wind farm is installed in a mountain area, an access road, and a management road necessary for transporting materials that are required during construction. There were concerns that opening of a new road to transport large-scale blades or tower components that make up the wind turbine will result in vegetation damage during the process[41].

The Ministry of Environment has prepared guidelines for environmental evaluation of onshore wind power development projects and suggests the direction of consultation when evaluating environmental impact. Main content includes that in the case of areas adjacent[42] to protected areas[43], the environmental impact and reduction measures should be carefully reviewed, and the damaged area should be used first. The damage to the major habitats of legally protected species and grade 1 areas on the ecological zoning map should be suppressed if possible and otherwise necessary sufficient measures should be taken. In the case of a private house where there is a risk of noise impact, standard value[44] must be complied[45]. Nevertheless, there are controversies as location avoidance of ecologically sensitive vein areas, or grade 1 areas on the ecological zoning map has not been clarified specifically.

According to the location status of the Environmental Policy Evaluation Research Institute for a total of 70 onshore wind power projects registered in the Environmental Impact Assessment Information Support System from 2002 to May 2017, most of the projects correspond to projects of 100 MW or less. It is confirmed that most projects received only small-scale environmental impact assessments (43 cases). Of the 70 projects, 77% are in mountain areas, and the rest are located on the coast or farmland[46]. As the criticism of wind power installed in the main mountain ranges rises, onshore wind power generation complexes are established in areas that have already been damaged, or centered on coastal areas with relatively good wind resources. However, conflicts are still unresolved in areas power generation complexes are planned or are in progress in areas where there is high ecological sensitivity or in areas where there is already high concentration of wind power facilities.

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[40] About 40% of wind power generation projects located in mountainous areas appear to be located along the main ridge axis, such as ridges, veins, and branches. KEI. Strategic Environmental Impact Assessment and Policy Plan (Supplementary) Review Opinion (The 9th Basic Electric Power Supply and Demand Plan).

[41] "Press release `Strategy for the development of onshore wind power projects that coexist with the natural environment´, KEI, 2017.11.10.

[42] 1 km - 500m radius of the protected area.

[43] Upstream water collection area, Baekdu-daegan protected area, etc.

[44] Morning (05:00-07:00), Evening (18:00-22:00): 50db or lower. Daytime (07:00-18:00): Lower than 55db. Night (22:00-05:00): 45db or lower.

[45] "Guidelines for Environmental Evaluation of Onshore Wind Power Development Project", Ministry of Environment, January 7, 2020

[46] "Press release 'Strategy for the Development of Onshore Wind Power Projects Coexisting with the Natural Environment´, KEI, 2017.11.10

<Examples of development of damaged areas>

Uljin Hyeonjongsan Wind Power Complex[47]

Gangneung Daegi-ri Wind Power Complex[48]

III. Solar Power

The photovoltaic power generation facilities were thoughtlessly developed and installed mainly in mountain areas with low land prices without consideration of the surrounding environment, with anticipation of a rise in real estate prices from reclassification of land category. According to the Korea Environmental Policy Evaluation Institute, the total cumulative development area of 4,450 onshore solar power generation projects that completed environmental evaluation consultations as of August 2018 is 104 km^2. Among them, the ratio of forest lands had the highest ratio of 61%, and 38% account for damaged forests in good conditions[49].

[47] A large-scale forest fire damaged area with a range of 100,000 square meters in 2007.

[48] Highland crop cultivation area.

[49] "Opinion on reviewing the policy plan (complementary) of the strategic environmental impact assessment report (the 9th basic plan for power supply and demand)", KEI, November 2020.

<Solar power development site in Jeonbuk Jangsu-gun, Jeollabuk-do>[50]

Accordingly, the Ministry of Environment regulates in the environmental assessment guidelines that ecological sensitive areas should be avoided as solar power generation facility location[51]. In addition, the Ministry of Trade, Industry and Energy introduced a temporary use permit system for mountain solar power in May 2018, reinforcing the slope standard from 25 degrees to 15 degrees and reducing the mountain solar power REC weight to 0.7. To prevent the increase in real estate prices and development activities through the reclassification of land type, after temporary use for 20 years the forest needs to be restored to its original state, and the cost of creating alternative forest resources is imposed.

In the case of floating photovoltaic power, there was a backlash from farmers and fishermen around the reservoir when the 10% limit on the reservoir solar power maximum surface water area promoted by the Rural Community Corporation was abolished. In the case of a large-scale facility plans, there is greater concern that the existing functions may be lost or changed along with landscape damage when energy facilities are built into reservoirs that have provided functions such as agricultural water supply, recreation, and tourism. In the midst of this, the unfounded heavy metal controversy over solar power and concerns over water quality and ecosystem pollution have not been resolved, leading to rise in conflict.

Data on the environmental impact of floating solar power, including the results of research showing that underwater structures act as spawning grounds, increasing the number of aquatic organisms, is less persuasive as the percentage of ratio water surface area of floating solar power is high and large-scale. The Environmental Policy Evaluation Institute stated that floating solar power generation facilities do not have a significant effect on the water quality in the water area, and green algae does not occur if the ratio of the installed area to the low water area is applied in accordance with the guidelines for environmental assessment consultation. The institute also confirmed that the domestic floating photovoltaic power

[50] " Mountains and fields covered with solar panels... Eco-friendly energy that destroys the environment", <Hankook Ilbo>. 2019.08.22, <https://www.hankookilbo.com/News/Read/201908211279061500>.

[51] Baekdu-daegan and vein protected areas, areas around the center of major mountain trunks, habitats and spawning sites of the legally protected species and grade 1 areas on the ecological zoning map, areas with a slope of 15degrees or more and Vegetation Preservation Class of IV or higher to prevent landslides and sediment spills, ecology· Areas in need of landscape conservation, such as landscape conservation areas and cultural property protection areas.

generation facilities do not contain heavy metals, and the dissolution test results of Hapcheon Lake facilities (buoyancy bodies, underwater cables and structures) have been found to be below the standard value[52].

The Hapcheon Dam floating solar power plant in 2012 installed 100kW Unit 1, and 500kW Unit 2 and in 2013 installed a tacking type of 100kW. Subsequently, a 40MW scale project is underway as a public participatory power generation project.

<Hapcheon Dam Tracker Floating Solar Power 100kw>

Section 2: Externalization of Power Generation Profits

External transfer of power generation profits is one of the main causes of conflict. In particular, subsidies arbitrarily applied by the development companies act as a major factor of conflict. Unlike legal grants, arbitrary subsidies do not have a principle on the target, standards, and scale of support. Therefore, the payment is only shared among few stakeholders that are favorable towards the project, causing division in the local community[53]. Such informal support needs to be legalized through a resident-participating benefit-sharing system or a local win-win fund. Once the residents experience how some of the power generation subsidies or power generation profits are transferred to the local common fund and used for the local community from the renewable energy power generation complex located in the region, they become more welcoming to additional facilities entering the region. This is a process where energy consumers transition to become energy producers.

In the case of large-scale projects, as measures to improve resident acceptance, the government compensates for damage according to the Act on Support for Areas Around Power Plants, or encourages residents to participate through a profit-sharing system.

There are incentives for resident participation promoted by the government for the profit-sharing system. In the resident participation incentive system, if local residents participate in new and renewable energy

[52] “Illusion and Realities of the Floating Solar Power Generation Business Issue-Fact Check”,' KEI, KEI Focus Vol. 7, No. 9. 2019.

[53] "A Study on the Preparation of Countermeasures to Minimize the Impact of Offshore Wind Power Projects in the Marine Fisheries Field", Korea Institute of Maritime Affairs and Fisheries. 2019.12.

development projects, additional REC weights are given according to the degree of participation[54]. This is an attempt to increase resident acceptance of development projects by sharing profits with local residents based on the financial resources secured through the system. In addition, there is an objective to revitalize cooperative and citizen fund-type projects.

Local residents formed a corporation and participated in the project in the Moon Hye-ri Durumi Photovoltaic power plant in Cheorwon. Of the 65 households in the village, 52 households participated in the project. Residents who have joined the union are paid an average of 150,000 won per month from 2019 when the power generation project started. Not only Moon Hye-ri residents, but also Cheorwon residents can participate in the project. Each person can invest up to 15 million won, and 100,000-150,000 won is the monthly return on investment paid for 20 years. Total of 3,460 households participated and a total of 27.1 billion won was collected. A project financing was formed to allow residents who have difficulty in investing directly in the equity to also participate. The village representative said that the project direction was established through more than 50 briefing sessions and residents' meetings from the project planning stage together with the power generation company. The main agenda established through the meeting are: 1) Do not sell power plants 2) Support long-term village development instead of short-term monetary compensation 3) Share profits from resident investment 4) Job creation from power plant construction and operation phase. This was to prevent the business that has received the permission for development activity from gaining profits by receiving investment from a bank and assigning the actual construction work through a subcontractor. In addition, through agreement with the business operator, 12 positions on power plant management jobs were delegated to village residents. There remain issues on how to distribute and use public funds when the village started generating public funds while participating in the renewable energy power generation project.

< Cheorwon Durumi photovoltaic power plant >

A bird's-eye view of the power generation complex plan[55]

Village cooperative office

[54] In the case of solar power (more than 1MW) and wind power (more than 3MW), additional REC weights of 10-20% are given depending on the degree of resident participation. Effective from January 2017.

[55] Plans to build a 200MW solar power generation complex by 2024. 30MW completed in 2019.

Section 3: Problems of Participation in the Development Process

In most projects so far, residents have not been able to obtain information about the project before the power plant permit was granted. After the project was in full swing, the local residents would belatedly encounter the information through formal public hearings, resulting in resident opposition. Approaching residents for consent was merely part of a formal procedure that was carried out after important matters such as location and size were already determined.

According to the current licensing procedure for renewable energy, a power generation business license is obtained first while the location is selected by the business operator. Review and opinion gathering on the feasibility of the location, the environment, and the acceptability of the region in accordance with the National Territory Planning Act is carried out afterwards in the process of obtaining permission for development activities. The power plant license grant is provided based on the location of the power plant that is decided under the leadership of the business operator. Therefore, when there are problems with the environment and resident acceptance in the subsequent procedures, it is difficult to discuss alternative locations and prepare fundamental alternatives[56]. Procedures for environmental impact assessment and resident opinion collection should be done prior to permitting the power generation project.

Even at the stage of permission for development activities, resident acceptance is not properly secured. In the case of offshore wind power, it is legally enforced to collect resident opinions for environmental impact assessment, but it is not mandated in the sea area use consultation. Even when residents obtain detailed information on the project and on environmental impacts, there is no institutional mechanism for submitting opinions on this. In September 2020, through the revision of the Enforcement Decree of the New and Renewable Energy Act and the Electricity Business Act, the government mandated that prior to applying for a business license, the main contents of the power generation project are posted in the local daily[57] for the residents. It is stated that opinions will be collected through prior notice and submitted to the license holder when applying for a power generation project, but there are limitations on lack of detailed guidance on effectiveness on spreading power through local newspaper and reflection of opinions.

In November 2020, the government enacted the “Guidelines on the Creation and Support of New and Renewable Energy Integrated Complexes” and introduced the Integrated Complex. Integrated Complex is a procedure where prior to providing power generation business license, the local government searches for the location and selects the site by collecting opinions from residents, and recruits for a development business entity renewable energy power generation facility of 40MW or larger. From the planning stage, a public-private council is formed to collect the opinions of local residents. Actual stakeholders, such as local residents and fishermen, participate in the public-private council. The private council will discuss matters related to profit sharing and environmental protection, location candidate areas and sales revenue utilization plans. In the project conducted as an integrated complex, additional REC is given to share the profits of power generation with the local community.

[56] "The Implications and Tasks of Introducing Renewable Energy Location Policy”, Ji-Hye Park. 2018.8.

[57] Projects subject to environmental impact assessment: 14 days before application for permission, projects subject to small-scale environmental impact assessment and sea area use evaluation: 7 days before application for permit.

However, there are questions regarding whether the public-private council is a suitable system for resident participation. In the case of the Yokjido wind power complex, a conflict management council was formed in Tongyeong city from 2019 to attempt discussions between the stakeholders, but the council came to a halt after two rounds of opposition from the local residents. After that, the Conflict Council held a debate session between fishermen and business operator, but it only lasted 20 minutes due to the backlash of the fishermen. The expert who served as the chairman of the council at the time talked about the issue of the representation of the people participating in the council. Everyone affected by the wind farm are actually stakeholders, and the chairman criticized the representative selection standard. If sufficient discussion before the council and public debate involving majority of the citizens prior to the council, opposition from the residents will not come to an end.

<Yokji Wind Power Resident Debate>[58]

Amid these limitations, there are attempts to introduce the EU's ESTEEM technique as a way to improve resident participation. The European Union supported a “Create Acceptance” study to develop a strategic tool for communication to improve acceptance among key actors of new technology projects for two years starting from 2006 to prevent the introduction of innovative energy technologies from failing in the face of social resistance. ESTEEM, one of the findings of research, is a methodological tool to promote social acceptance of technological innovations such as renewable energy. ESTEEM has two main purposes. First, it initiates or improves communication between the person in charge of the technology project and the relevant stakeholders (NGOs, policy makers, local civil society, etc.). Secondly, helps the project manager to develop a future action plan that can be taken to improve the social acceptance of the technology project[59]. In 2020, Dangjin City introduced ESTEEM in the process of promoting the Nanjido Energy Independent Island Plan and established the business plan with the local residents. Based on the basic business plan, two additional meetings were held with the residents to clarify the plan and vision of Nanjido Energy Independent Island. In the process of establishing a resident participation project plan,

[58] "Tongyeong Yokji Offshore Wind Power Resident Debate Aborted with Backlash of Fisherman”, <Hansan Newspaper>, October 25, 2019. <http://www.hansannews.com/news/articleView.html?idxno=62715>.

[59] "Development of Citizen Participation Program to Secure Regional Acceptance of Renewable Energy Development Projects-Focusing on the Application of European ESTEEM Methodology”, Ministry of Trade, Industry and Energy, 2018.8.

resident cooperatives were designed, prepared and launched so that residents can directly participate in the implementation phase of future business plans and share profits. The process of establishing a business plan and vision together with residents has the advantage of proactively collecting the diverse needs of residents and various stakeholders and preparing a joint promotion plan between the business operator and residents[60].

<Nanjido Energy Independent Island Plan>

Chapter 4 Renewable Energy Policy and Conflict Management in Germany

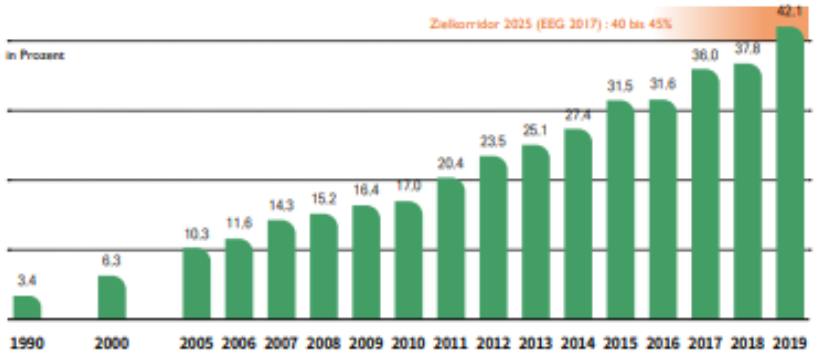
Section 1: Energy Policy in Germany

I. Renewable energy status in Germany

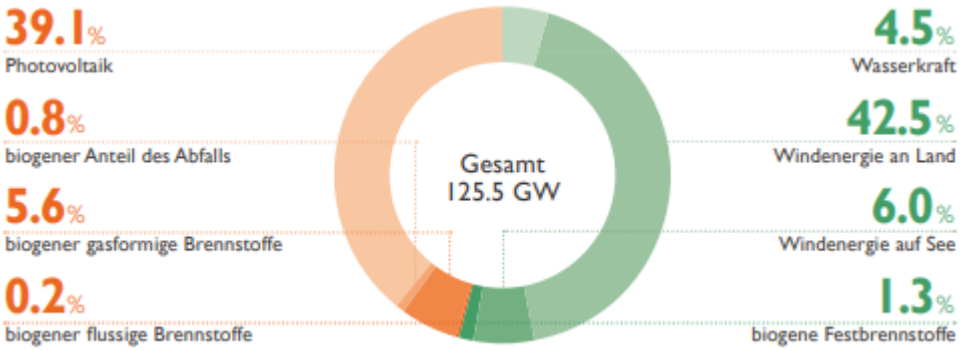
Germany is a leading country in the expansion of renewable energy. With the enactment of the Renewable Energy Act in 2000, the share of renewable energy electricity, which remained at 6.3%, reached 42.1% in 2019. It has already exceeded the target of reaching 35% by 2020.

[60] "Focusing on ESTEEM to seek ways to prevent and manage renewable energy conflicts", Jae-gak Han, Presentation in Environmental Sociology, December 2020. 04.

[Graph 5]: Renewable energy power share[61]



[Graph 3]: Energy share by power source[62]

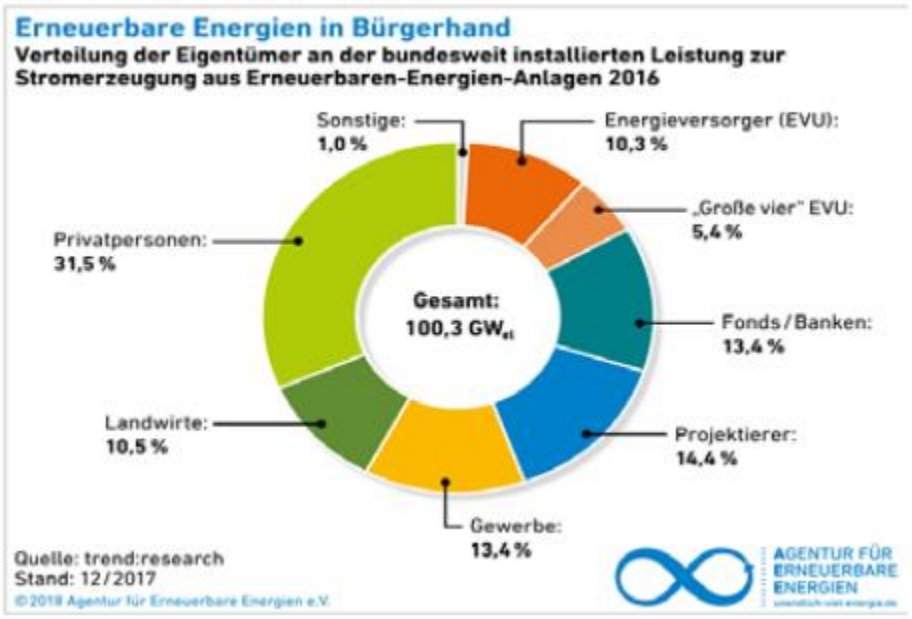


The figure below shows the share of ownership of renewable energy generation facilities in Germany. Civil-owned power plants accounted for 42%, with private (31.5%) and farmers (10.5%) owned, and the four energy giant corporations only account for 5.4% of the share. This reveals the aspect of citizen-led renewable energy where energy conversion is powered by the citizens.

[61] German Federal Ministry of Energy and Economy, 2020.

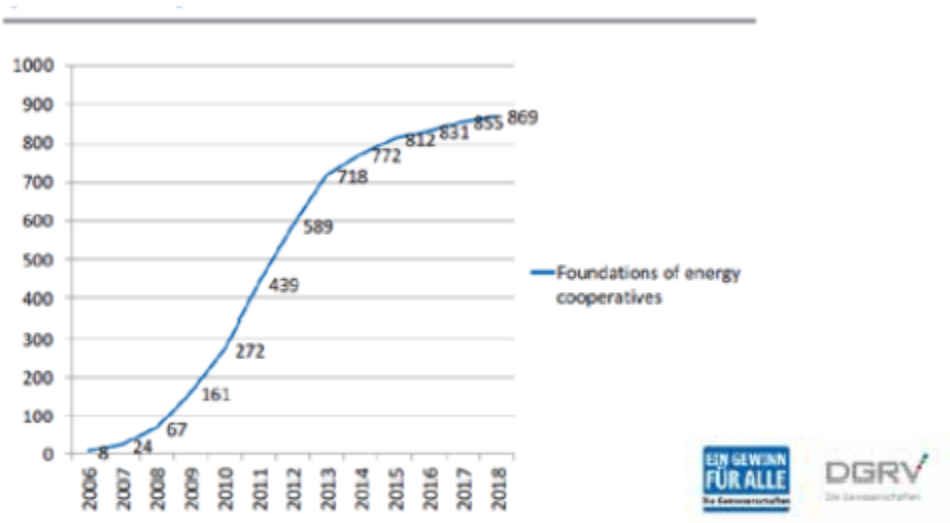
[62] Onshore wind power generation accounts for 42.5%, offshore wind power generation accounts for 6%, solar power generation accounts for 39.1%, and hydropower generation accounts for 4.5%. German Federal Ministry of Energy and Economy, 2020.

Graph 6: Citizen-led Renewable Energy



Energy cooperatives are also active. The number of union members is 183,000 (2018). From the table below, the number of energy cooperatives, which had been only eight since 2006, has increased tenfold in just ten years.

Graph 7: German Energy Cooperative Growth Graph (2006-2018)



II. Efforts to secure ecological diversity in the renewable energy business

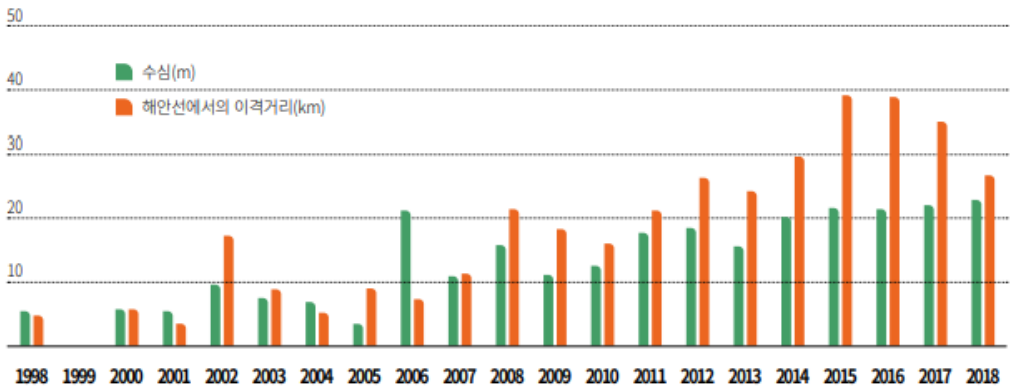
Germany decided to shut down all six nuclear power plants remaining by 2022, and to end coal power generation by 2038 at the latest. 84% of German citizens are in favor of energy conversion. Although Germany is rapidly expanding renewable energy, it is not without issues surrounding its location.

Regarding renewable energy facilities in Germany, protection of red kites on onshore wind power and harbour porpoise on offshore wind power is also an important issue. Solar power raises issue of scenery disturbance, so forests are sometimes planted to cover up the disturbance. Solar panels are a problem with landscape infringement, so shielded forests are sometimes planted. No power generation complex can be built within a 10km radius of an UNESCO cultural heritage site.

In Germany, wind is strong outside of highlands as well, so the onshore wind power project prefers flatland construction to mountain areas. If it is concluded that the wind power will affect the mortality rate of the protected species, the business cannot be proceeded. Among the wind power projects that are licensed, 3/4are sued, 2/3 of the complaints are said to be due to the impact on birds and bats. Therefore, it is necessary to determine in advance what birds and vulnerable species are affected, how the bird breeding period may be impacted, and how far away from the endangered species nest the wind generation plant needs to be. Distance of 1 to 1.5 kilometers apart for red kites, and for black storks, 3 to 6 kilometers are stipulated by federal states. Several devices to narrow the separation distance, for instance cameras, speakers, fences, etc., change the direction of movement of the current or stop the generator for a while. When wind power is shut down, it is for the breeding season, the harvest season for birds to fly, and for demand management.

The issue of offshore wind power is to regulate the noise level not to exceed 160 decibels when 750 meters away from the protected area to avoid the effect on the black storks inhabiting the North Sea. Environmental groups insist that the regulation should be applied not only to the North Sea (Nordsee), but also to the Baltic Sea (Ostsee). Graph X below is showing the average depth and separation distance by year. There is no separation distance from the coastline, but as the water level is low there is a trend of moving further away.

Graph 8: Separation distance and depth from the shoreline of the offshore wind farm (yearly average)



Regarding solar power, subsidies are provided for installations within 110 meters of the road. Since the area around the road has already been damaged, installation is recommended in areas that have already been damaged. Renewable energy facilities are mandated for new buildings to promote integrated building, farming, and floating solar power, and some federal states are also pushing for mandate the installation on industrial buildings. As solar power grows on a larger scale, competition between farmland and land is intensifying, and since large-scale complexes have low acceptability, there is emphasis on the importance of profit sharing. Forests are sometimes planted to cover up the scenery disturbance. What is important is that a habitat need to be created to maintain biodiversity and that the photovoltaic power generation facilities are made in harmony with the surroundings. Since biodiversity is a very important factor in the climate crisis response program, it is important to keep this in mind when constructing renewable energy generation facilities. Photovoltaic complexes within the habitat reserve are not permitted.

Section 2: Strategies of KNE Activities in Germany

I. Establishment and Operation of Center for Nature Conservation and Energy Conversion (KNE)

In Germany, as the renewable energy business expanded, location conflicts became frequent. Environmental organizations emphasized the need for a body in charge of conflict resolution, and in 2013 the agreement with the German coalition government (consisting the Christian Democratic Party, the Christian Social Democratic Party, and the Social Democratic Party) agreed to establish the necessary procedures and structures to promote energy conversion in an environmentally friendly manner. In order to resolve conflicts and objectify the debate at the renewable energy business site, the ‘Center for Nature Conservation and Energy Conversion Empowerment' (in German ´Kompetenzzentrum Naturschutz und Energiewende (KNE)´) was established. The following year, fundraising and organization was prepared, and KNE was established in 2016.

The Center for Nature Conservation and Energy Conversion Empowerment (KNE), a mediation organization, is made up of 25 staff members of the Ministry of Science and Information, Conflict Mediation and Management, Ministry of Communication, Communication, and Administration. 52 mediators unite to promote coordination work in the field. It operates with funds supported by the federal government, but has a status as an independent organization, not an affiliated organization, and provides conflict mediation services. It provides conflict adjustment and consulting for renewable energy development projects, coordination among regulatory agencies and organizations, and scientific analysis methods and reduction techniques for environmental damage investigations.

The crucial point in KNE operation as a neutral third party is to gain trust through fairness and professionalism. To this end, efforts are made to maintain a certain distance between the stakeholders. Most cases of conflict resolution are projects conducted in accordance with the government's policy to expand renewable energy. As KNE receives subsidies from the government, it must strive to not create an impression that the organization represents the position of the government. Some stakeholders try to get

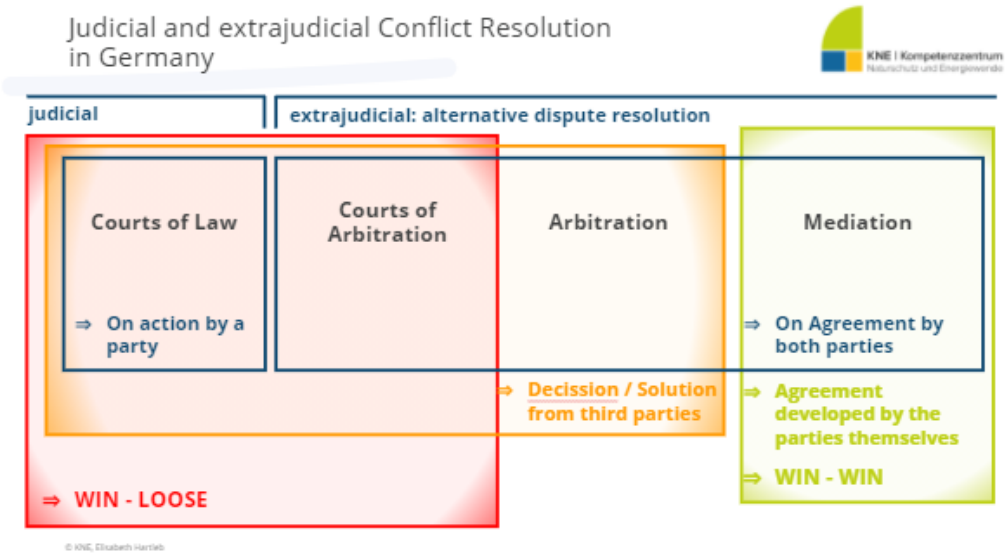
mediators on their side by approaching the mediators in different ways. Mediators are qualified upon completion of 80 hours of training. For each mediation, there is a cost of EUR 1,000 . Half of the cost is borne by KNE's own fund to secure independence from the power generation operators. Maintaining fiscal independence is an important factor in securing reliability in the mediation process. Therefore, KNE directly covers the costs incurred in determining the wages and stakeholders of mediators. The remaining costs incurred in the mediation process are shared by the stakeholders. Mainly, developers and local governments promoting policies to expand renewable energy request for conflict resolution.

II. Resident Acceptance Mediation Strategy

Win-Win Mediation

KNE explained that conflict needs to be 'mediated'. Conflict adjustment is different from a 'judgment' made by the court, or 'arbitration' that happens through a government agency. Existing conflicts between stakeholders were mainly managed through court judgments through litigation or arbitration by state agencies. In judgment and arbitration, a third party, not the interested party, provides a solution, and the stakeholders of the conflict get divided into winners are losers. KNE's conflict resolution is a process in which stakeholders directly seek solutions that is mutually agreed upon.

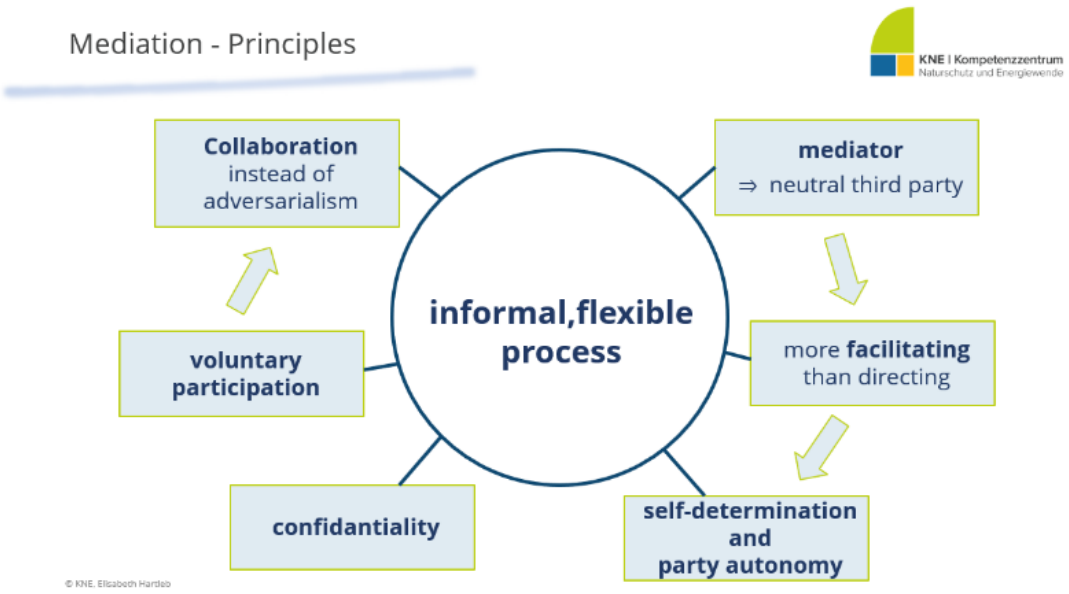
Graph 9: The differences between judgement, arbitration and mediation



Source: KNE Workshop Materials.

Mediation is based on six principles. In the mediation process, a neutral third-party drives and leads the process, and does not play a decision making role. Instead of suggesting solutions, the role of the third party is to facilitate conversation between the stakeholders. All conversations are guaranteed confidentiality and freedom of participation, therefore the participation of the stakeholders is voluntary. The process is based on cooperation, not hostility, and only those who agree to these principles can participate in the conversation. The conversation take part in a relaxed, informal atmosphere where the participants can change the process flexibility.

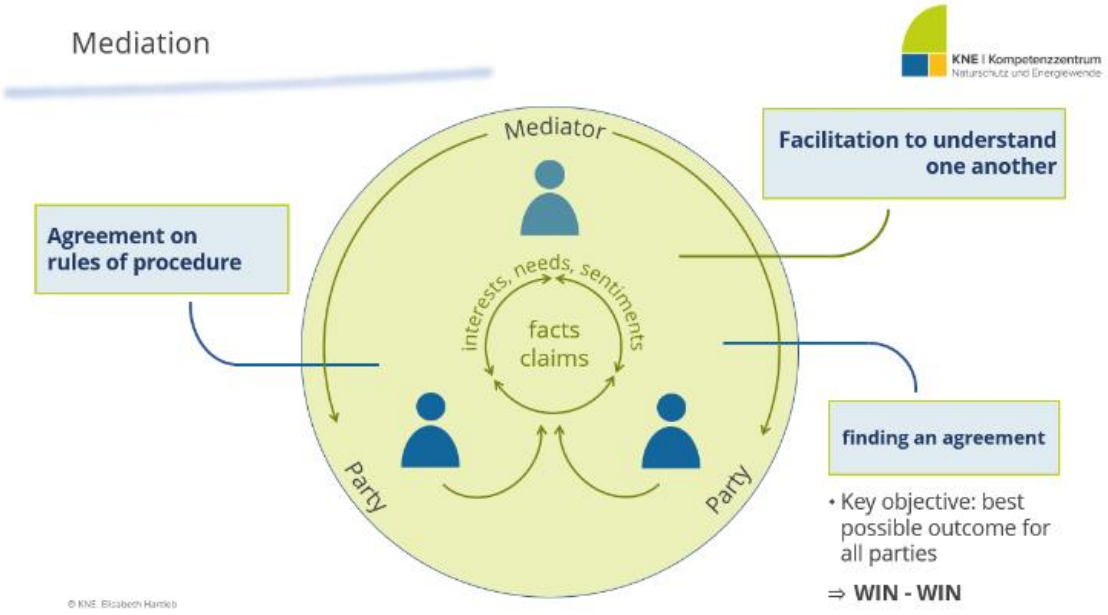
Graph 10: Principles of Mediation



Source: KNE Workshop Materials.

The goal of mediation is for the stakeholders to sympathize with each other's situation as much as possible and to reach a point of consensus. Those involved in the conversation share their interests, needs, and feelings. Instead of a set procedure, the process follows the rules and procedures agreed upon by everybody. In this process, KNE mediators are neutral facilitators and play a role in recording the conversations, conducting the meetings, creating an atmosphere, and adjusting the schedules.

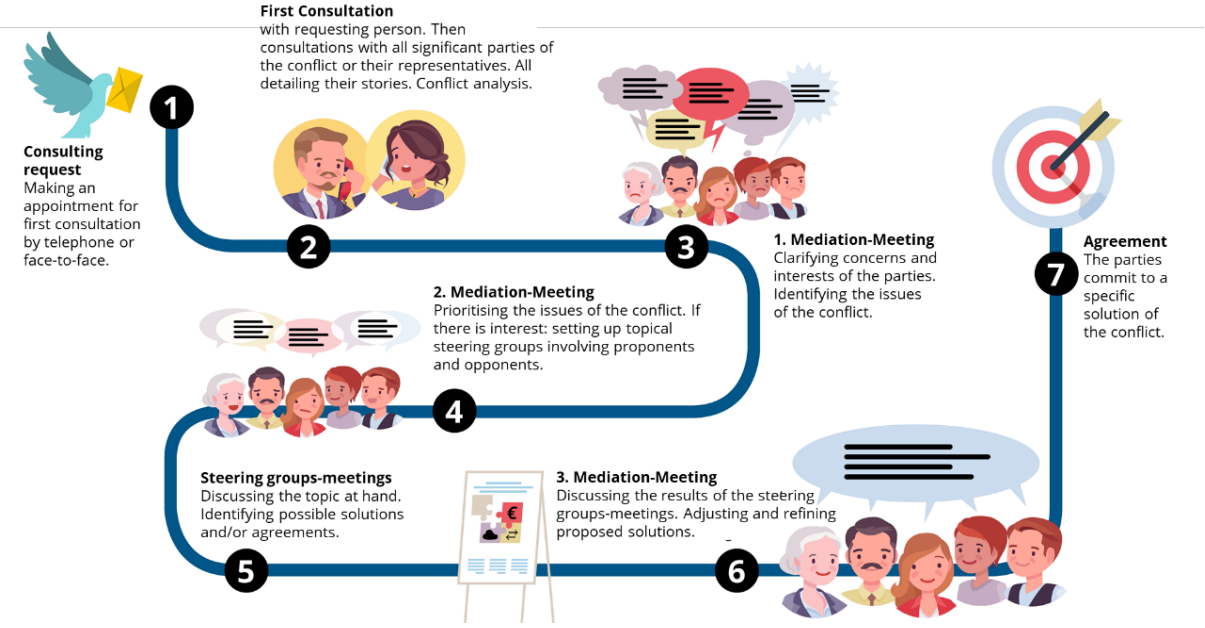
Graph 11: Mediation process



Source: KNE Workshop Material.

There are seven steps in the mediation process. Conflict mediators work as a pair and first identify the detailed information on the project and analyze who the stakeholders are and what the issues of conflict are. In this process, all stakeholders are contacted and are provided the schedule of conversation and confirm their intentions to participate. As emphasized earlier, to prevent external intervention, the cost incurred in selecting and informing the stakeholders are covered internally.

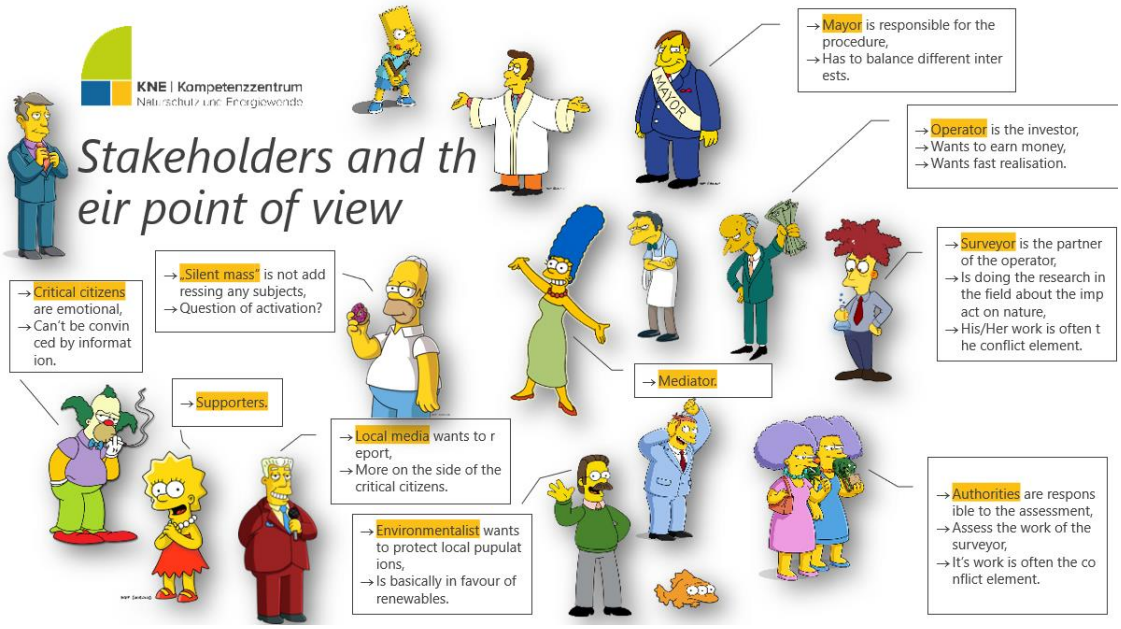
Graph 12: 7 Stages of adjustment



Sources: KNE Workshop Material.

KNE classifies the stakeholders into 10 different types: local residents who oppose development, local residents who support the development, silent residents, media, environmental activists, local governments, mayors, business operators, environmental appraisers, and local churches. Characteristics of each stakeholder are identified to facilitate cooperation and conversation engagement. Sometimes, media participation is limited as there are cases in which conflict situations are reported dramatically, producing unnecessary hostility to people.

Graph 13: Types of stakeholders



Source: KNE Workshop Material.

In the first meeting, stakeholders work together to create procedures and rules. Mainly, the management team is established and items to be discussed together are selected. The first meeting is the most important because there are many opinions. Through three rounds of meetings, the participants come up with the content of agreement. In the final stage, the contents set in the mediation meeting are presented to all stakeholders, and the revision process is carried out through a meeting in which all participants take part. If a matter that needs to be discussed again arises and the participants agree, it is possible to return to the previous stage. It takes an average of 3 months for each conflict resolution case, but it may take longer depending on the case.

The meeting is conducted in small groups in a form of debate. All debates must be done in a non-violent manner. Previously, public hearings were done in a speech-type discussion where everyone would gather in a large auditorium. This often resulted in emotional conflicts, and it was difficult to attract majority of the participants as there were often silent participants. KNE organizes various stakeholders into one group and through conversation techniques, induce more people to voice out their opinion during the discussion. The mediators facilitate the stakeholders to have an equal say and fully state their respective needs and positions and encourage participants to coordinate themselves and come up with an agreement that satisfies all. The mediators facilitate the process but ensure that the stakeholders take the lead. Emotionally intense discussions get managed by a professional mediator.

<KNE mediation. Small group debate. KNE Workshop Material>

KNE mediators clearly set their roles and the scope of conversations. In the case of a project that has already been approved, they inform the participants that the process of discussion and coordination is on how to proceed the project, not on reviewing whether the project is going to happen. In addition, the scope of the dialogue is clearly set and limited to discussing specific and detailed individual issues not on general discussion on renewable energy policy.

As a conflict coordinating body, KNE maintains a neutral attitude during the conflict mediation process, but this does not mean that KNE is neutral to energy conversion. KNE supports energy conversion and has a position that it should be promoted when following the principle of precaution. KNE self-evaluates that it has achieved satisfactory mediation results with over 100 mediation cases so far. It receives financial support from the federal government, but trusts are secured because the independence of its operations is not infringed. In Germany, in addition to KNEW, federal states have their own bodies for conflict resolution and there are also active climate managers.

Chapter 5 Conclusion

I. Renewable energy facilities that are compatible with ecological conservation and biodiversity

The renewable energy generation project for eco-friendly energy transition is also a development project. While meeting the location conditions sui for eco-friendly power generation facilities, it is necessary to minimize environmental damage in the process of development projects so as not to conflict with ecological conservation and biodiversity preservation. Even in Germany, where energy conversion is happening at a fast pace, a precautionary principle is applied to avoid environmental invasion caused by renewable energy projects. In order for the renewable energy development projects to go in line with the strategy for responding to climate crisis, there is careful consideration given to potential damages to biodiversity in proceeding the projects. This should be a focal point of renewable energy generation businesses that represent energy conservation.

In the case of the **photovoltaic power generation** projects, the problems were mainly reckless development of forestry (forest). As the regulation on forestry solar power strengthened, the problem of thoughtless development in mountainous land has been resolved to some extent. In addition, it is positively evaluated that 1) areas that should be avoided and 2) areas that need to be carefully reviewed have been specified to eliminate controversy. The local government, to respond to civil complaints about solar power, set a uniform separation distance from the road. This has resulted in adverse side effects and is considered an ineffective response due to lack of understanding of the source of the complaint and analysis[63]. It is merely a measure put in place for administrative convenience. If the local government by local government ordinance puts a non-permission regulation on floating solar power, this is a problematic response. Installation of solar power facilities in areas where biodiversity has already been damaged, such as roads and buildings should be promoted.

In the case of **onshore wind power**, as the government has revealed through the onshore wind power activation plan, it is necessary to provide a location map that comprehensively provides location information, such as wind conditions and environmental regulations, and to strengthen environmental evaluation reviews before permitting power generation projects. In addition, in consideration of the cumulative impact of the neighboring area development, the separation distance between power generation complexes should be established so that power generation complexes are not concentrated and accumulated in specific areas.

In Korea, no guidelines have yet been prepared for environmental evaluation of **offshore wind power**. The environmental impact of offshore wind power generation during the installation of the generator structure is mainly due to noise and vibration generated, changes in benthic organisms, changes in the seabed topography, generation of suspended sands, and during operation changes in underwater noise and flow velocity, scouring, damage to the landscape, collision of birds, and the influence of fish by cable electromagnetic waves has been raised. Overseas, standards and measures have been taken to minimize the impact of noise during driving. As previously mentioned, the German Federal Maritime and Hydrographic Administration stipulates that the noise level in the protected area does not exceed 160dB when 750m away from the construction site. In Korea, vibration-free and driving-free construction method is applied to minimize the occurrence of noise, vibration, and suspended solids during construction, and for up to three years after the offshore wind power facility is built the impact of the marine environment is investigated, and if damage occurs measures to reduce the damage will be taken. There is a plan is to accumulate and analyze medium to long term data on the effect of offshore wind power on the marine environment.

It is necessary to take measures to prevent damage in advance, not afterwards. As introduced in the case of onshore wind power generation in Germany, it is necessary to take precautionary measures to change the direction of movement through various devices, or to stop the wind turbine during the bird breeding season or when birds are flying in places where a collision is predicted or separated from the nest of protected species.

[63] "Renewable energy separation distance restrictions and future tasks", Ministry of Environment. 2020.12.

In the case of offshore wind power in Korea, it is necessary to evaluate the migration path or habitat of migratory birds and other birds and take measures to reduce the disturbance of the movement of the birds. A guideline for the environmental assessment of offshore wind power, specifying a certain separation distance from the bird protection area, is required. Detector or radar device to prevent bird collisions, and coloring one of the wings to make them more recognizable can be considered as potential solutions. Measures on protected marine species habitat and conservation are also needed. For protected species designated as marine protected species, the government is obligated to provide habitats and protection measures. To diagnose the impact on protected areas and habitat of protected species, and to prevent and provide buffer for damage, environmental assessment guidelines containing the separation distance from the power generation complex are needed. Consideration of the marine landscape is also necessary. Most countries do not have separate rules for separation distance from the coastline, but there is a trend of increasing distance from the coastline in consideration of the impact of landscape and fishing activities. In Korea, in addition to the southwest coast, the East Sea and Jeju Island are also deep, therefore the wind farm must be built within several kilometers from the coastline, unless it is a floating type. Sufficient separation distance is necessary given that wind power has an impact on the landscape of the coast.

II. Resident participation/led renewable energy as a process of experiencing energy democracy

Renewable energy power generation facilities cover the entire national territory, such as forests, farmland, and public waters, so they must be compatible with the economic activities that have been conducted around these spaces. Contention and conflict can arise over the use, and it can accompany changes in the local community due to changes in settlement conditions. Sharp conflicts with residents can arise if residents who have operated the space and engaged in economic activities are blocked from opportunities to participate in the project plan, selection of the location, and reorganization of the project without being provided with information about the renewable energy project in advance. In situations where the opportunity to participate has been deprived, the only alternative for the residents is to participate in objections and hinder the projects. One-sided decisions inevitably lead to confrontation.

The structure of inequality, where local community was forced to sacrifice for energy consumption in large cities, is also a factor that made local residents have unfavorable image towards renewable energy facilities. Even more so, if renewable energy facilities do not improve the living conditions of residents in the region, but only to power the cities and benefit the profit of outside businesses.

It is necessary that the opinions of the residents are reflected starting from the way the location is selected, how to share profits and how the project will progress. The process of accepting renewable energy in one's residence should be a process of experiencing energy democracy. Breaking the energy monopoly includes not only the breakage monopoly of business and profits, but also breaking the monopoly of information and the exclusivity in the manner of propulsion and the stakeholders being the organizer. The plan for profit sharing needs to be carefully considered and designed so that resident participation, investment, and distribution are practically carried out, and best practices need to proliferate. For the residents to promote energy cooperatives, that will organize the renewable energy power generation projects, state-owned land lease and other institutional support should be given.

It is demonstrated in the German cases that cooperatives embody energy democracy and, with their power, become the main basis for social acceptance of renewable energy.

III. Establishment of an exclusive organization for conflict management of renewable energy

Renewable energy needs to grow steadily. As the renewable energy business expands, there will be more conflicts. There is an urgent need for a conflict mediation organization that mediates conflicts that arise in this process and provide support and facilitate the stakeholders to come to a settlement on their own. For large-scale projects, the government plans to strengthen the collection of opinions from local residents through the formation of a public-private council from the planning stage. The actual stakeholders will participate and decide whether to proceed with the project. If the public-private council is organized and operated under the leadership of the administration, it is likely that the council will operate under political spin and administrative convenience. This is the main reason the operation of public-private councils and conflict mediation councils has suffered so far. There was difficulty in settling who the stakeholders are, how to assign representativeness, and who will mediate before the mediation. An independent conflict mediation body that will prepare for and resolve conflicts needs to be established. An experienced mediator from this body should gather detailed information about the project, understand the issue of conflict, analyze the stakeholders, and facilitate the process where participants can mitigate conflicts and come to a joint agreement.

IV. Application of Research Results

Three implications were drawn through the project. First, the need for site selection and facility standards for renewable energy consistent with ecological conservation and biodiversity. Second, as a process of experiencing energy democracy, residents participate in expanding renewable energy. Third, there is a need for an independent organization in charge of conflict management and a structure in which all stakeholders participate from the start of the project.

Green Korea United shared the above content through holding a discussion on improving the acceptability of renewable energy. In the follow-up discussions and policy meetings, activities to establish a dedicated organization and to establish standards for renewable energy sites that preserve biodiversity will be continued.

Specifically, Green Korea United will edit the research in the form of an online report, post it on its website, and distribute it online to energy conversion activity groups, renewable energy operators and administrative authorities. Green Korea United will also produce online card news and promote the content through social media. Specific distribution agencies are shown in the Table 6 below.

Table 6: Distribution agencies

Name of Agency	Type of Agency
Ministry of Trade, Industry and Energy	Government Agency
Ministry of Environment	Government Agency
KOREA ENERGY AGENCY	Government Agency
Korea Environment Institute	Government Agency
Energy Justice Actions	NGO
Korean Federation For Environmental Movement	NGO
Korea Wind Energy Industry Association	Energy Company
KCRE Cooperation	Energy Cooperative
KOSEDA	Energy Company
Energy Transition Korea	NGO
Solution for Our Climate	NGO
Institute for Climate Change Action	Research Institute
Green Energy Strategy Institute	Research Institute

In addition, a follow-up debate will be held on the issue of location conflicts for renewable energy generation facilities. On December 10, 2020, Green Korea United has already invited journalists, researchers and government officials to hold an online discussion forum on the topic of improving the acceptability of renewable energy and shared the research details and solutions. Further discussion forums will continue on the topic of finding ways to become energy self-reliant through renewable energy in cities with high energy demand, with the awareness that the conflict over renewable energy location mainly occurs in mountainous, marine, and rural areas with low energy demand.

Green Korea United also plans to directly participate in Korea's renewable energy policy making process. Specifically, by attending a meeting of the Ministry of Environment and civic groups on April 20 under the theme of wind power environmental impact assessment, policy recommendations based on the research content will be made. The South Korean government plans to propose a one-stop special bill in April 2021 to simplify the environmental impact assessment of wind power generation. The issue of ecosystem damage caused by the simplification of environmental impact assessment will be raised and suggestion will be made for the need for the selection of wind farm locations and facility standards consistent with biodiversity. In addition, we plan to attend the Climate-Friendly Renewable Energy Public-Private Council hosted by the Ministry of Trade, Industry and Energy and report on the research. The Climate-Friendly Renewable Energy Public-Private Council plans to hold the first meeting on June 14th with the renewable energy location policy making department, business operators, and environmental protection groups to hold a total of five discussions. The Council aims to identify problems arising in the process of proliferation for each renewable energy generation and seek solutions. The Green Korea United plans to share the findings of this study and propose three solutions for systematic implementation.

ANNEX 1: Interview Questionnaire Design Checklist

Part	Contents
Conflict Management	Background of conflict
	Stakeholders
	Occupation of nearby residents
	Method of distributing profits
	Conversation process between stakeholders
	Communication strategies of stakeholders
	Demands of each stakeholder
	Government's role in conflict management
	Community business projects
Environmental Impact	Scale of power generation complex
	Estimated environmental damage
	Location of power generation complex
	Power generation output
	Countermeasures for wild animal
	Install process of power generation facilities
	Facility operation method
	Business attraction plan

ANNEX 2: KNE Online Workshop Materials

<Renewable Energy Policy in South Korea>

19.11.2020

Sunghee Lim Green Alliance Climate Energy Team Energy Conversion Team Leader

1. Concept and Scope of Renewable Energy

- In Korea, under the law governing **renewable energy, new energy** is treated as a similar concept to renewable energy

- Renewable energy is classified into solar energy, wind power, hydropower, marine energy, geothermal energy, bio energy, and waste energy (excluding non-renewable waste).

- New energy is classified into hydrogen energy, fuel cell and IGCC (Integrated Gasification Combined Cycle-coal gasification combined cycle power generation).

- Statistics on renewable energy are published as new and renewable energy, including waste energy, fuel cells and IGCC. In case of bioenergy, it includes the combustion of biomass and coal

<Scope of new and renewable energy under the New and Renewable Energy Act>

Classification	Energy Source	Content
Renewable Energy	Solar Energy	sunlight, heat
	Wind Power	
	Hydropower	
	Marine Energy	
	Geothermal Energy	
	Bio Energy	biogas, landfill gas, biodiesel, wood chips, coal briquettes, forest fuel, wood pellets, waste wood, black liquor, sewage sludge solid fuel, Boi-SFR, bio heavy oil
	Waste Energy	waste gas, industrial waste, household waste, cement kiln auxiliary fuel, SRF, refined fuel oil
	Other Energy	
New Energy	Hydrogen Energy	
	Fuel Cell	
	Liquefied and Gasified Cocal Energy and Heavy Residue Gasified Energy	IGCC (Integrated Gasification Combined Cycle)
	Other New Energy	

2. Current Status of Renewable Energy Generation

1) Power Configuration

- Electricity target demand for 2019: 88.5GW (Power facility size: 113.4GW)
- 2030 target demand (8th basic plan for electricity supply and demand)
  : 101.1GW (target size: 122.8GW)
- 2034 target demand (9th basic plan for electricity supply and demand)
  : 104.2GW (target size: 127.1GW)
- Power Source ratio (2018):
  Coal-fired power 41.9%, nuclear power 23.4%, LNG 26.8%, New ·Renewable 5.6%, hydropower 1.2%, petroleum (1.0%)

*Coal consumption of South Korea is 80.6Million toe, similar to Germanys 80.5Million Toe

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2. Current Status of Renewable Energy Generation

2) Share of Renewable Energy Generation

- Share of New ·Renewable energy generation in 2019 is 9.77% of total energy generation

- **The share of renewable energy generation is 4.97%.** Of these, solar and wind power account for 2.66% (2.2% and 0.46% respectively, increased by 42%, and 8.7% from last year)

3) Supply Potential

- Sufficient potential of solar and wind power

- According to research by Korea Environment Institute (KEI)
  - Wind power potential: 59.4W (15GW on onshore, and 44.4GW offshore)
  - Solar power potential: estimated at 102GW

- Analysis of potential energy amount by Korea Energy Economics Institute
  - Solar power 321GW, wind power 39GW (onshore 17GW, offshore 22GW)
  - 521TWh electricity generation is possible (90% of 579TWh-expected electricity consumption in 2030)

3) Supply Potential

1page

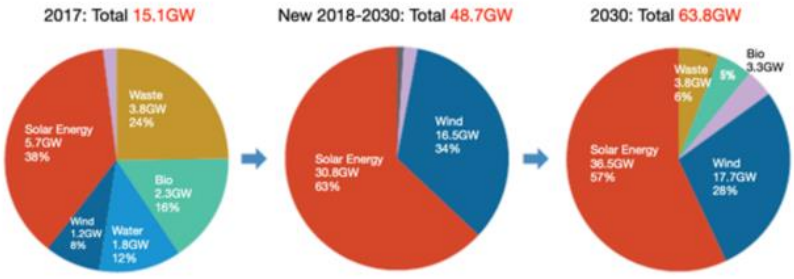
Classification	Detail		Facility Capacity (GW)			Annual Conversion Output (TWh/Year)			Final Energy			Primary Energy		
			Theoretical	Technical	Market	Theoretical	Technical	Market	Theoretical	Technical	Market	Theoretical	Technical	Market
Solar	Sunlight		106,831	1,807	321	137,347	2,338	411	11,811,842	201,068	35,346	28,980,217	493,318	86,721
	Heat		106,831	4,778	150	137,347	6,181	191	11,811,842	531,566	16,426	11,811,842	531,566	16,426
Wind	Onshore		499	352	17	942	756	39	81,012	65,016	3,353	198,762	159,516	8,229
	Offshore		462,	387	22	1,385	1,176	71	119,110	101,136	6,106	292,235	248,136	14,981
Water	-		28	12	3	246	41	9	21,156	3,526	774	51,906	8,651	1,899
Geothermal	Shallow		22,236	1,256	334	55,796	932	29	4,798,456	80,152	2,494	4,798,456	80,152	2,494
	Deep		350	3	0	3,066	19	0	263,676	1,634	0	646,926	4,009	0
Marine	Tide		430	109	0	3,766	957	0	323,876	82,302	0	794,626	201,927	0
	Tidal		13	11	1	112	46	2	9,632	3,956	203	23,632	9,706	497
	Wave		129	18	0	1,128	40	0	97,008	3,440	0	238,008	8,440	0
	Seawater temperature difference	Power Generation	64	0	0	557	4	0	47,902	344	0	117,527	844	0
		Heating and Cooling	15	9	0	85	51	0	7,310	4,386	0	7,310	4,386	0
Bio	-		12	10	0.4	89	72	3	7,677	6,190	248	18,836	15,188	609
Waste	-		6	4	4	45	32	32	3,845	2,739	9,433	6,721	6,721	
Total			237,906	8,756	852	341,911	12,645	7878	29,404,344	1,087,455	67,689	47,989,716	1,772,560	138,577

3. Renewable Energy Supply Target and Plan

1page

1) Renewable energy 3020 Implementation Plan (2017)

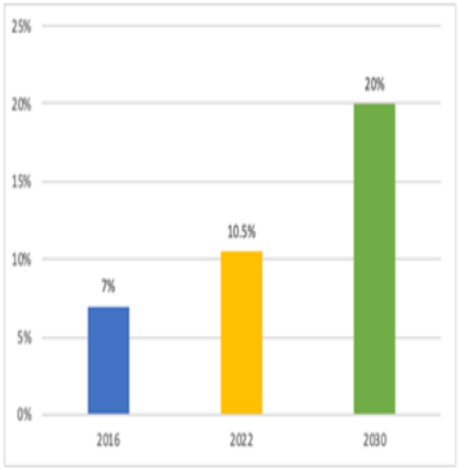
- Expand the share of renewable energy electricity to 20% by 2030
  - Move from waste to solar energy and wind power centered supply (over 95% of new facilities to solar and wind power)
  - Target: Solar energy 36.5GW, Wind power 17.7GW (12GW offshore)



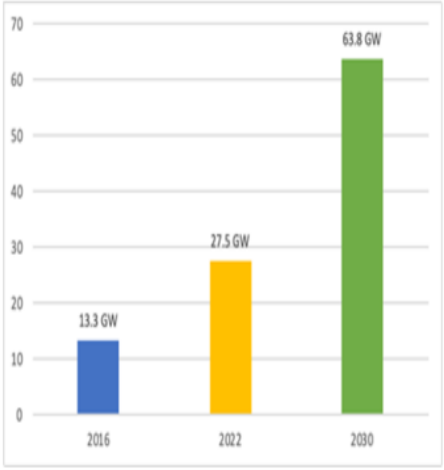
3. Renewable Energy Supply Target and Plan

1page

Share of Renewable Energy Generation



Renewable Energy Facility Capacity



o Details of Renewable Energy 3020 Implementation Plan

1page

Urban car Solar power expansion	- Utilization of surplus power after offset processing: Carry over + Cash settlement - Mandatory zero energy building certification: Applied to all buildings by 2030
Small business support Cooperatives activation	- Temporary introduction of Korean FIT: Stable profit generation for 20 years, omit REC issuance and bidding process - Target: Cooperatives and farmers : less than 100kW, private businesses-less than 30kW - Incentives for social economy enterprises and citizen fund-type projects (provide REC weight, etc)
Rural area Solar power activation	- Abolition of age limit of buildings that can be installed in the agricultural promotion area and promote temporary use of salt reclaimed land - Activation of solar power installations in farmland and other agricultural promotion area

o Details of Renewable Energy 3020 Implementation Plan

1page

Local government led Introduction of planned location system	- Find sites for large-area local governments→ supply to private businesses→ private businesses establish district development implementation plans - Introduction of village competition method, focus evaluation on residents' acceptance during planning review - Environmental review : basic district development/ Strategy before deliberation of implementation plan/ Mandatory implementation of environmental impact assessment - Sharing of development profits
Promotion of large-scale projects	- Focus on projects proposed by private and public organizations : Approval of the implementation plan for power generation development project and preemptive review of grid connection - Mandatory renewable energy supply for large power generation companies also raises the supply certificate weight RPS : Onshore solar power, solar power using large-scale reclaimed land and onshore wind power, offshore wind power using planned locations - Develop a resident participation type business model (bond investment type, fund investment type, etc.)
Public property Improvement of rental standards	- Rent reduction 5% of property value→ 1% or more - Initial rental period 10 years→ 20 years

o Measures to resolve the side effects caused by expansion of renewable energy

Prevention of environmental damage such as mountain areas	- Temporary use permit system for solar power production areas (Forest -) restore to forest without reclassification of land category of hybrid land) - Impose alternative forest resource creation costs - Reinforce slope permit standards to prevent soil leakage and damage to the landscape (25 degrees -) 15 degrees) - Reduction of REC weight for small-scale solar power generation businesses in forest - Reinforcement of environmental guidelines for onshore solar power
Resolving location conflict	- Provide prior notice of project details to residents prior to power generation project permission - Perform environmental impact assessment before permitting solar and wind power generation projects
Prevention of real estate speculation	- Introduced a temporary solar farmland use permit system - Restrict the transfer and acquisition of power generation business license before the completion of solar power plant - Reinforce the system to prevent discretionary division of solar power plants (expand the scope of the same business operator)

2) The 3rd Basic Energy Plan (2019-2040)

- 30-35% increase by year 2040

4. Renewable Energy Support Policy

1page

1) Applicable Law

o Applicable law for support
: New energy and renewable energy development, use and distribution promotion act

o Power generation business permit
: Electricity Business Act (Minister of Commerce, Industry and Energy for 3MW or more, governor for less (less than 1MW is re-delegated to the local government)

o Permission for development activities, etc
: In accordance with the relevant laws and regulations on mountains, oceans and the head of local government.

2) Support System

1page

o **FIT (Feed in Tariffs, 2002)**
: Purchased at a fixed price for 20 years. Abolished in 2012

o **RPS (Renewable Energy Portfolio Standard, 2012)**
: A system that mandates power generation business owners with power generation facilities of 500MW or more to supply more than a certain percentage of the total power generation using new·renewable energy

o **REC (Renewable Energy Certificate) issuance and support**
- Revised every three years in consideration of technology development level, new·renewable energy support target, and operation performance.
- Supply certificate issuance amount = electricity supply (MWh) * weight by facility (ie: 2REC=1MWh*2.0(weight)
- In case of resident-participating projects, policy funds are supported at low interest rates up to 90% of the project cost and in addition to 0.1-0.2 weights paid

2) Support System

* Promoting the introduction of mandatory hydrogen power generation in the electricity market (2022)

o **Power generation difference support system (small photovoltaic FIT)**: guarantee stable profit generation for small businesses

o Obligatory installation project of new·renewable energy for new buildings

o Support for installation costs by supplying and supporting pilot projects

o Support center operation for solar and wind power

<Issues Surrounding Renewable Energy>

20.11.2020

Sunghee Lim Green Alliance Climate Energy Team Energy Conversion Team Leader

1. Regulation on location of renewable energy

"Ease of environmental regulations for rapid energy conversion"

VS

"Should not have conflict with environment conservation"

1) Policy on Location

o Subject to environmental impact assessment
: Facility capacity greater than **100,000kW** (small-scale impact assessment varies by measure depending on the purpose)

o Guidelines for environmental evaluation when conducting environmental impact assessment (applied to offshore/onshore solar and onshore wind power. Offshore wind power is in the process of enactment)

- **Offshore solar power** : Installed on the water surface of a dam or reservoir that is being used as a living water supply, but is not designated as a water source protection area (10% of the reservoir full area ratio abolished)

1) Policy on Location

- **Onshore solar power**

* Areas to be avoided : Within 100 meters of major mountain range such as the Baekdu-daegan, legally protected area, habitats of protected species, ecologically sensitive areas such as grade 1 areas on the ecological zoning map, landscape conservation areas, landslide risk area, slopes of 15 degrees or more acute, etc

* Areas requiring careful review : Grade 2 areas on ecological zoning map, areas of concern for ecological cutoff, vegetation conservation of level 3-4, etc

* Reinforcement of the distance between roads and houses is being applied by local governments

- **Onshore wind power** : Not within 500m-1km of Baekdu-daegan protected area, protected area, Grade 1 on ecological zoning map, possible forest roads
Noise (45dB or less separated by 500meters), low frequency (12.5Hz_85dB, 16Hz_82dB or less recommended)

* Separation distance: Double the height of generator

1) Policy on Location

o Conversion of Forest Land

– Renewable energy power generation facilities were interpreted as public interest purposes under the Management of Mountainous Districts Act and could be converted. But, in order to prevent ruthless development, the system has been changed to permit for temporary use of mountain areas. Replacement charge for forest resource creation cost that was exempted has been raised, and the slope standard has been raised to prevent soil leakage and landscape damage.

– With the exception of absolute conservation farmland (wind power, building installation and solar power in areas affected by salt damage is possible) agricultural land conversion is permitted

1) Policy on Location

o Planned location system is to be introduced

– **"Development District"** development plan is to be approved by the central government after the metropolitan local government finds the site (in combination with the village competition, key assessment of residents' acceptance, and environmental impact assessment)

– Supply land to private business owners, the private business owner establishes and accepts the implementation plans > batch agenda processing of the license

o Offshore wind power activation plan

: Planned location excavation (Establish location information, Consideration Zone presentation, support for basic environment feasibility research), promote the establishment of an integrated licensing organization suitable for Korea and strengthen resident acceptance, etc.

2) Effect of Location Regulation

- With the intensified conflict with the increase in installation of solar power in the mountains and installation of wind power on the mountains with good conservation status, moving in the direction of some location regulations being strengthened

- Difficulty in development is reduced through lowering the weight of small-scale photovoltaic RECs in production areas and location regulations

3) Issue

- In conservation farmland (vast area with good amount of sunlight) solar energy farming should be permitted (Proposal of amendment to the law)

- Relaxation of the regulation regarding less than 15 degree angle slope for solar power on land. This is a stricter regulation than that for golf courses, which are environmentally harmful facilities.

- Excessive road separation distance regulation in accordance with the local government's ordinance for permission to conduct development activities (100m-1km apart)

- Need for cumulative effect and separation distance between power generation plants

- Need for tighter regulations on onshore wind power (vein, grade 1 areas on the ecological zoning map, restriction on woodland path to be stipulated)

2. Resident Acceptance

As renewable energy power generation facilities are developed around inexpensive mountains without consideration for the environment, they face opposition from local residents

The offshore wind power projects that are to be launched for development will also face conflicts with the fishermen

1) Negative Perception of solar power generation

1page

o Dissemination of false and exaggerated information on hazards of solar power generation_heavy metals > water/soil pollution, electromagnetic waves, light reflection, etc

<Banner Against Solar Power>

2) Conflict with fisheries due to wind power noise and low frequency concerns

o There is a recommended separation distance (twice the diameter of the blade tip of the wind turbine) and noise/low frequency, but residents are repelled by the accumulation of wind farm

<Jeju Island Offshore Wind Farm>

2) Conflict with fisheries due to wind power noise and low frequency concerns

o There are conflicts with the fishermen in the public waters for offshore wind powers: Consultation cases of coexistence model with fisheries

- Southwest Offshore Wind Power (2.5GW)
- Sinan Offshore Wind Power (8GW)

*Designed fisheries coexistence complex: navigation and fishing activities are permitted

*Created fish farm in offshore wind farm, and demonstrated fishery industry technology coexistence through installation of artificial fish reef, etc.

<Onshore Wind Farm Construction Site>

<Rally Against Offshore Wind Power>

3) Opposition to externalization of power generation profits and monopoly of business operations

o The profits from the renewable energy power generation projects were not shared with the local community, but rather monopolized and transferred to outside leading to opposition from local residents. This has resulted in increase of informal civil petition costs to persuade the residents.
o Rather than explaining, persuading and gathering opinions from the residents in the early stages of the project, among external providers, there were repetitive occurrences in which the residents were notified about the business promotion information with delay during the development activity permission stage, after having obtained the permission for power generation business. A procedure for submitting results of prior notice and opinion collection 14 days prior to power generation project permission has been established (Amendment of Electricity Business Act 2020.10.)
o After obtaining the power generation business permission, there was transfer and acquisition of the permission and division. There were also investments made with real estate profits in mind.

3) Opposition to externalization of power generation profits and monopoly of business operations

o To institutionalize resident participation and profit sharing, if the resident participation rate exceeds 10% (20%) of equity capital, and 2% (4%) of total project cost for solar power plants with a facility capacity of 500kW or more, and for wind power plants with a capacity of 3MW or more, 10% (20%) of REC weight is additionally assigned, and additional points are given for SMP+REC fixed priced bidding.
o In case of wind power generation, 10% of the capital and just 2% of the project cost total to several hundred million won, making it difficult for local residents to invest in (long-term low-interest loan support policy does exist)
o Cooperatives have not been actively organized. Consensus on ideal profit-sharing model has not been made.
o In case of Jeju Island, if the Jeju Energy Corporation designates a district as village specialized in new·renewable energy, the village can own a generator operation, and with the introduction of public concept of wind power, donate a certain percentage of power generation profits back to Jeju Island.

3. Questions regarding renewable energy license rights

o Local government heads are sensitive to civil complaints, and feel pressure in exercising their permission rights as they care about the next election

o There was a claim that central government should exercise the authority to permit development activities

o Responsibility avoidance and what energy decentralization is was raised as an opposing question.

4. Absence of conflict management organization

o Rise in civil complaints of local governments. Lack of manpower to handle civil complaints.

o The Korea Energy Agency operates wind power and solar power support projects by metropolitan city areas, but this is also insufficient

o In the case of large-scale projects, conflict mediation committees are being operated, but face conflicts and are unable to function properly

o The need for intermediate support organization for conflict management by region is raised.

5. Awareness of the problem of large-scale renewable energy development projects

o Questions on the principle of small-scale regional dispersion type

o Energy independence of urban areas through renewable energy

There are negative consequences when power generation projects are done at inexpensive sites to make profit, rather than keeping the principle of producing electricity where electricity is needed. Efforts need to be made to establish energy independence in cities and villages. Measure need to be taken to increase renewable energy facilities in idle areas in cities.