

Study on Developing a Benefit-Sharing Scheme to Increase Community Acceptance of Renewable Energy

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I. Background and purpose

- Increasing the penetration of renewable energy lies at the core of the government's energy transition policy.
- The third Energy Basic Plan, the central plan of the energy sector, presented the expansion of a distributed and participatory energy system as one of its five key tasks, under the vision of "sustainable growth and improvement of the quality of living through energy transition."
- The plan also has "transition to a clean and safe energy mix" as one of its five key implementation tasks, aiming to increase the share of renewables to 30 to 35 percent of total energy consumption by 2040.
- Low community acceptance of renewable energy power plants is one of the biggest factors limiting the penetration of renewable energy.
- With frequent earthquakes and air pollution emerging as social issues, community acceptance of renewable energy power plants has increased.
- However, the acceptance of residents living in close proximity to renewable energy power plants remains very low.
- "Benefit sharing" is an effective policy tool for promoting the voluntary participation of residents and increasing their acceptance of renewable energy power plants.
- Community engagement and benefit-sharing schemes have been proposed by many studies as effective ways of increasing the acceptance of renewable energy power plants.
- Such schemes are widely used for renewable energy projects in leading economies, such as Germany, Denmark, and Australia.
- On January 1, 2017, Korea also introduced an incentive to encourage community participation by offering additional renewable energy certificate (REC) weightings of 0.1 and 0.2 for renewable energy plants that meet certain requirements, depending on the level of resident participation.
- However, as of the end of 2018, two years after the introduction of the incentive system, only one application had been submitted, suggesting the need for effective measures for improving the system.
- A viable benefit-sharing system applicable to Korea is needed to achieve the 2030 targets and implement the energy transition policy effectively.
- As of the end of 2018, two years after the introduction of the incentive system, only one application had been submitted.
- Despite the existence of various types of benefit-sharing schemes, the incentive system is currently focused on the ownership interest of residents, suggesting that the incentive system needs to be modified.
- This study aims to present a benefit-sharing model that is sustainable and provides an effective means of identifying and addressing the causes of low community acceptance as an obstacle to the deployment of renewable energy.
- Existing research on promoting the acceptance of renewable energy and mitigating conflicts with local residents have largely taken two approaches.

- One presents a benefit-sharing mechanism that focuses on the distribution of benefits from an economic perspective.
- The other seeks to mitigate conflicts with communities by focusing more on procedures and the environment from a sociological perspective.
- This study differs from others in that in order to find a more comprehensive solution that includes distributive, procedural, and environmental factors, it treats “benefit sharing” in terms of “value sharing” by defining all tangible and intangible values generated by a renewable energy project as a “broad” benefit.

II. Results of investigation and analysis

- While renewables are being rapidly distributed thanks to the current government’s energy transition policy, the growing conflicts between developers and local residents have emerged as a serious social issue.
- While the general public’s overall approval of renewable energy is relatively high, acceptance of residents living in close proximity to renewable energy power plants is remarkably low.
- From 2010 to 2016, an annual average of 386 articles opposing solar energy were published in the media, and that number more than doubled to 652 articles in 2017 and 809 articles in 2018 (as of November 25).
- From 2010 to 2016, the annual average number of articles published in opposition to wind power was 293, and that number rose sharply to 505 in 2017 and 422 in 2018.¹
- The causes of opposition to renewables can be divided into environmental, procedural, and distributive factors.
- (Environmental factor) Solar PV and wind power generation inevitably cause various types of environmental impacts, such as blade glint, electromagnetic interferences, low-frequency noise, soil and water pollution, shadow flicker, damages to migratory birds and landscape amenity, and destruction of forests and ecosystems during plant construction.
- (Procedural factors) Local residents, as a substantial stakeholder, feel alienated as they are not involved in the decision-making process regarding construction and operation, leading to their opposition to renewable energy. Furthermore, the perfunctory administrative procedure, which is a result of the insufficient manpower of local governments, engenders distrust among residents.
- (Distributive factors) Outsiders benefit from development gains exclusively, while residents, who are directly exposed to damages, are not receiving sufficient compensation, showing a lack of distributive justice. This is the most significant factor undermining community acceptance.
- The government is implementing the following policies to address the factors hindering local acceptance.

¹ www.bigkinds.or.kr (accessed on Nov 27, 2018).

Table 1. Factors hindering renewable energy acceptance and policies

	Factors	Current systems
Environmental factors	<ul style="list-style-type: none"> o Blade glint, heavy metal contamination, electromagnetic interferences, noise, damage to landscape amenity and forests, landslides, damage to protected species, etc. 	<ul style="list-style-type: none"> o Guideline for solar PV generation sites (Ministry of Trade, Industry and Energy, 2017) o Guideline for the assessment of the environmental feasibility of onshore solar PV (Ministry of Environment, 2018) o Guideline for low-frequency noise control (Ministry of Environment, 2018)
Procedural factors	<ul style="list-style-type: none"> O Failure of projects to inform or consult with residents living near power plants in advance regarding location, implementation plan and environmental damage, leading to greater community conflict. This is difficult to address later on. O Due to the insufficient manpower of local governments, administrative procedures such as environmental impact assessments are not adequately carried out. 	<ul style="list-style-type: none"> O Revised notice of standards for the licensing of power generation projects (2018) Developers are required to notify local governments of project details before they apply for licenses, and heads of local governments must post such details on electronic government bulletin boards or other places where they will be seen by residents for at least seven days. O Secure local acceptance through the “Location Planning System”
Distributive factors	<ul style="list-style-type: none"> O Monopolization of benefits generated by development by outsiders and lack of a system for compensating residents exposed to damages 	<ul style="list-style-type: none"> O Benefit sharing through residents’ participation in investment Incentives for residents’ participation in renewable energy projects O Support for solar PV on farms Expanded policy loans (2017: KRW 32 billion → 2018: KRW 150 billion) Launched guaranteed, low-interest loan product O Sinan-gun created ordinance on sharing the benefits of renewable energy projects. Jeju-do implemented a system for sharing the benefits of wind power development.

Source: author

□ Summary of benefit-sharing schemes

○ To increase the social acceptance of renewable energy projects, a benefit-sharing scheme is needed.

- Benefit-sharing schemes take various forms, such as local ownership, community improvement funds, compensation, in-kind benefits, local employment/contracting, energy price reductions, indirect social benefits, and tax compensation.

- There is no benefit-sharing scheme that is suitable for all renewable energy projects, meaning

that such schemes need to be tailored to the characteristics of the local community and the nature of the given project.

Table 2. Types of benefit-sharing schemes

	Description	Countries
Local ownership	Developers offer ownership interest in or guarantees for a renewable energy development project to a local community.	Germany, Spain
Community funds	Developers provide funds for joint community projects or offer local tax reductions.	Sweden
Compensation	Developers provide compensation for expected damages (ecological damages, etc.).	France
In-kind benefits	Developers make contributions to community enhancement projects during power plant construction (social agenda, education, development projects, etc.).	Greece
Local employment/contracting	Jobs are created, and local companies are given priority in relation to contracts for the development, construction, and operation of power plants.	Canada
Energy price reductions	Residents are permitted to use the electricity generated by the given renewable energy power plant or purchase energy at a reduced price.	Netherlands
Indirect social benefits	Renewable energy projects provide indirect benefits, such as tourist attractions and ecotourism.	Denmark
Tax compensation	A certain percentage of income taxes is paid to residents living near renewable energy power plants.	Germany

Source: Cheolyong Lee (2014, p.33)

- Benefit-sharing schemes should consider both procedural and distributional justice.
- Benefit-sharing schemes should satisfy the following three tenets of energy justice.²
 - Energy justice includes: (i) distributive justice, concerning the fair distribution of benefits generated by a project; (ii) procedural justice, concerning the direct involvement of a community in the project implementation process; and (iii) recognition justice, concerning who is to represent the local community in arranging the distribution of benefits.
 - To increase community acceptance of renewable energy projects, community participation is essential in the early phase of projects, and discussions on the transparent sharing of benefits should be held.
 - A benefit-sharing scheme is a means of reaching an agreement on the type of a benefit sharing scheme and the method of implementing such scheme through the direct participation of local communities in the decision-making process of a renewable energy project.
 - A benefit-sharing scheme is created through an agreement with residents that is based on regionality, the wishes of residents, and the extent of damage that a community suffers.
- To increase local acceptance, a renewable energy project should not be implemented solely as a national energy policy, but in the context of a growth strategy for the given community.

² Rudolph et.al. (2018).

- A benefit-sharing scheme for renewable energy generation needs to be accompanied by a long-term local development strategy for revitalizing the community.
- To ensure that a renewable energy project revitalizes the local community, an energy strategy must be included in the overall community development strategy.
- Review of benefit-sharing schemes overseas
 - Community acceptance, which is one of the major issues of renewable energy distribution, is an important and universal factor of renewable energy projects in all countries.
- Many countries are adopting benefit-sharing schemes to promote renewable energy distribution and increase community acceptance.
- Benefit-sharing schemes for renewable energy projects take various forms, as there is no single benefit-sharing scheme that can address the various aspects of all projects.
- Therefore, the policies of some countries focus on how to devise such benefit-sharing schemes.
 - Recently, a few local and national governments have issued guidance on how to develop benefit-sharing schemes.³
- Regarding such guidance, local and national governments are focusing not on the types of benefit-sharing schemes, but on the procedures and methods through which benefits are shared.
- To increase local ownership of renewable energy projects, the Scottish government has published three “good practice principles”: Scottish Government Good Practice Principles for Community Benefits from Offshore Renewable Energy Development, Scottish Government Good Practice Principles for Community Benefits From Onshore Renewable Energy Development, and Scottish Government Good Practice Principles for Shared Ownership of Onshore Renewable Energy Development.
- The British government issued the “Community Benefits from Onshore Wind Developments: Best Practice Guidance for England” to help communities gain a better understanding of the benefits they can receive from wind farms and provide assistance to communities, developers, and local governments.
- Victoria state of Australia published “Community Engagement and Benefit Sharing in Renewable Energy Development: A Guide for Renewable Energy Developers” to provide guidance for renewable energy distribution.
- New South Wales state of Australia published “Strategic Options for Delivering Ownership and Benefit Sharing Models for Wind Farms in NSW” in order to increase the acceptance of wind power and ensure the equitable distribution of benefits to communities.
- The common characteristics and implications of the latest guidelines on benefit-sharing schemes are outlined below.
 - First, in establishing benefit-sharing plans, procedural justice is prioritized over distributive justice. As benefit-sharing schemes take various forms and the benefit-sharing method needs to reflect a diverse range of opinions in order to satisfy the desires of various stakeholders, the procedure for establishing a benefit-sharing system should be transparent and fair. The communication process should provide local residents with accurate information on the environmental, social, and economic impacts of renewable energy projects in a transparent

³ For details on such guidance, refer to Seongnam Jeong and Seungmun Lee (2018), *Study on Building a Benefit-Sharing System to Increase the Community Acceptance of Renewable Energy*.

manner.

- Second, the local residents eligible to participate in a project should be clearly defined. Otherwise, there will be an excessive number of stakeholders in the project as well as too many complaints and diverse problems.
 - Third, the benefits generated by a renewable energy project should be used to vitalize the local community through the creation of a “benefit-sharing package” based on the various opinions of community members. We use the term, “benefit sharing package” instead of “benefit sharing” because various types of benefit-sharing schemes are necessary to reflect the various opinions of local community members. The purpose of a benefit-sharing package is not to provide financial compensation to individuals, i.e. cash to each member of a local community, but to revitalize the community.
 - Fourth, although a benefit-sharing package is to be managed by the local community, assistance may be provided by specialists and outside organizations, and the management of the package should be fair, transparent, and consistent. To manage the benefit-sharing package, a local community may establish a separate organization or a committee in which local governments, local organizations, and community representatives can jointly participate.
 - Fifth, benefit-sharing packages are offered to local communities voluntarily by developers, but how much such package affects developers’ winning of the project right varies, depending on a specific system of each nation. Developers are not legally required to offer benefit-sharing packages to communities—it is a voluntary measure for increasing the acceptance and revitalization of communities. Whether the provision of such benefit sharing package influences developers’ acquisition of a right to business depends on specific system of a nation.
 - Sixth, local governments play an important role in establishing a benefit-sharing system. A renewable energy deployment strategy is not a national policy; rather, it begins with addressing matters of interest in a community. To ensure that a renewable energy project promotes the growth and development of a local community, it should be integrated with the community development plan and energy policy itself.
- Limitations of benefit-sharing schemes in Korea and directions for their improvement
- The participatory incentive system currently in place can be applied only when residents account for a certain portion of the total investment, as is the case with investments in shares, bonds, or funds.
 - Among the three factors undermining acceptance (environmental, procedural, and economic factors), only the economic factor is considered when developing a benefit-sharing scheme.
 - Although this incentive produces an economic effect sufficient to satisfy residents’ expected rate of return,⁴ only one application has been submitted for such resident participatory projects as of end of 2018, two years after the launch of the incentive system.
 - This is attributed to the fact that residents often find it difficult to understand the concept of the “REC weighting” incentive. Moreover, many residents lack the financial resources to make even the minimum amount of investment in solar PV or wind power projects.
 - Developers have difficulty implementing projects due to a lack of concrete implementation methods.
 - The transferability of ownership interest held by residents is not clearly defined.
 - Although the scope of investment was broadened to include investment funds in addition to

⁴ Seongsam Jeong, 2017, *Study on Increasing the Local Acceptance of Renewable Energy*.

ownership interest, such investment funds, whether made through private placement or public offering, also entail restrictions.

- The Location Planning System of the Ministry of Environment, which aims to secure community acceptance and environmental performance, also does not provide specific implementation methods.
- Concrete measures for securing community acceptance and environmental protection have not been presented.
- Although both “local government-lead method” and “community public subscription method” are allowed to operate simultaneously, the community public subscription method does not offer incentives, such as REC weighting, and thus fails to promote implementation. Also, there is no law that prohibits the implementation of projects that were not adopted through such subscription.
- Above all, the benefit-sharing schemes presented so far focus only on “financial benefits,” which is the root cause of their failure.
- As mentioned earlier, it is environmental and procedural factors, more so than economic factors, that undermine community acceptance.
- Moreover, numerous types of benefit-sharing schemes can be found in domestic and overseas literature and case studies.
- Accordingly, in terms of the broader context of energy transition, the definition of a benefit-sharing scheme needs to be expanded to include a “broad range of benefit-sharing or value-sharing schemes” that cover the environmental, procedural, and economic factors.
- Survey
 - This survey aimed to investigate residents’ preferences regarding benefit-sharing schemes for the establishment of renewable energy power plants and identify the major factors involved in fostering a transition from simple cash compensation to a community enhancement fund.
 - As a sample from the general public, a total of 735 adults nationwide aged 19 or older and listed in the resident registration record of the Ministry of the Interior were selected, in proportion to the distribution of sex and age by region, and the survey was conducted online.
 - As a sample from residents living near the renewable energy plants, a total of 505 participants across regions where renewables projects are underway were selected, and the survey was conducted through interviews.

Table 3. Survey categories and items

Category	Survey items
Part I Demographic characteristics	Residential area, sex, and age
Part II Awareness of energy transition	Level of recognition of energy transition policy and related pros and cons Level of renewable energy distribution Level of acceptance of electricity price increase
Part III Opinions on acceptance of renewable energy facilities	Pros and cons of the construction of renewable energy power plants Types of benefit-sharing schemes favored by residents and reasons for leading to a change

	of type of benefit-sharing scheme Level of satisfaction with renewable energy power plants currently in operation Level of satisfaction with the benefit-sharing scheme adopted and desire to change it
Part IV Preference by type of benefit-sharing scheme for renewable energy projects	Level of preference for benefit-sharing schemes by type, in terms of four properties (expected rate of return, investment risk, community support, and job creation) Selection of preferred scheme among three hypothetical benefit-sharing schemes
Part V Individual, social, and economic characteristics	Characteristics of household and area of residence Level of household income Political beliefs

○ Survey results and implications

- First, residents living in close proximity to renewable energy power plants have a low awareness of energy transition. To address this issue, the government needs to hold conferences or engage in other forms of communication in order to provide residents with accurate and up-to-date information.
- Residents living near the sites or planned sites of renewable energy power plants are less aware of energy transition policy than the general public, and many of them have a negative perception of energy transition.
- The government should provide residents living near power plants with accurate information on renewable energy technology so that they have the knowledge they need to understand and approve of the increased penetration of renewable energy.
- Second, incentives related to electricity bills should be offered to residents living near power plants.
- Residents living near power plants are more opposed than the general public to an electricity price hike as a result of energy transition policy.
- Such residents may feel that it is unacceptable for them to have to pay a higher electricity price, even after they accept the renewable energy project.
- Therefore, the government needs to consider offering electricity bill discounts in cases where the electricity price is to be raised due to the distribution of renewables.
- Third, the government needs to provide residents living near power plants with information on the impacts of renewable energy distribution on the environment through a procedure that is transparent and ensures residents' involvement.
- While some residents living near power plants said they are opposed to renewable energy power plants mostly due to the landscape amenity damage and environmental pollution they cause, other residents living near renewable energy power plants said that they accept such power plants largely because the construction of the plants led to the improvement and/or restoration of damaged landscapes, destroyed ecosystems, and environmental pollution.
- To resolve these opposing views on the same environmental issue, the environmental impacts of renewable energy power plants need to be carefully analyzed, and the analysis results should be provided to residents through a transparent procedure.
- Fourth, ways of discouraging cash compensation as an economic benefit for residents needs to

be put in place.

- Most residents favor compensation in cash. In Korea, however, there are no laws supporting the provision of cash compensation for power plant construction, and the sustained practice of providing cash compensation may lead people to take such compensation for granted.
- When developers provide a certain economic benefit to local communities, the government needs to offer an incentive for the management of such benefits through community funds or devise an alternative mechanism whereby funds are managed transparently and consistently.
- This study, through discrete choice experiments (DCE), failed to elicit major factors that contribute to a shift from simple cash compensation to community funds.
- DCE failed to generate results with statistical significance because of the strong preference of residents living near renewable energy power plants for cash compensation and the large proportion of the elderly in the sample.
- Many respondents living near power plants said they would choose cash compensation as their preferred benefit-sharing scheme.
- The elderly participants of this survey, which was conducted via interviews, had a limited understanding of the DCE method.

III. Policy suggestions

- It is desirable for various types of incentives to be introduced to revitalize local communities.
- It is ideal for renewable energy distribution to be linked with community revitalization, and a benefit-sharing scheme aimed at increasing the local acceptance of renewable energy needs to be designed in such a way that promotes community revitalization.
- Balanced national land development through local community revitalization is a major policy goal of this government.
- Therefore, even in the absence of direct investment by residents, collaboration between developers and residents to launch community revitalization projects in tandem with renewable energy projects needs to be supported through incentives such as REC weighting.
- Besides tangible results from community projects, the process of residents' deliberation on the content and implementation method of a community development project can serve as an intangible asset for them, laying the groundwork for future community revitalization efforts.
- In most cases, developers build roads to transport equipment and material for the construction of renewable energy power plants, thus expanding the infrastructure in communities without requiring significant additional expenditures by developers.
- Therefore, compared with the provision of incentives to residents, developers are more actively engaged with local residents and motivated to build business infrastructure in an eco-friendlier way.
- As for the incentive system for renewable energy power plants with resident participation, only one application has been filed in the roughly two years since the launch of the system, indicating the need to improve the effectiveness of the system.

- To address the limitations of ownership investment, investment funds were modified to offer incentives such as REC weighting.
- Investment funds are divided into private placement funds and public offering funds, depending on how investors are secured. However, as public offering investment funds do not allow the securing of specific investors, they are not a suitable method for attracting the participation of residents in a certain area.
- Private placement investment funds are intended only for investors able to make a certain minimum investment, in accordance with the Financial Investment Services and Capital Markets Act, meaning that such funds are not suitable for benefit-sharing schemes with resident participation.
- Therefore, resident participation through a cooperative is desirable and has the following advantages.
- Investment in renewable energy projects can be made in the form of ownership interest or investment funds.
- A cooperative that owns a certain ownership interest in a project (e.g., 10 or 20 percent) can maintain its investment despite the withdrawal of certain members who move out of the community, etc.
- As they are corporations, cooperatives are eligible for privately placed investment funds.
- It is wise to assign REC weightings in proportion to the ownership interest of residents.
- Currently, the ownership interest of residents is limited to only two levels: 10 percent and 20 percent.
- To relax this rule, it would be advisable to assign REC weightings in proportion to the actual ownership interest of residents. For example, an ownership interest of 15 percent should receive an REC weighting of 15 percent.
- For a Location Planning System that does not have any specific implementation method, a community public subscription project conducted through an auction system based on multi-attribute assessment is an option.
- A multi-attribute assessment-based auction prioritizes community projects with higher acceptance and better benefit-sharing (value-sharing) prospects, which helps with both conflict resolution and community revitalization.
- A common auction would select a community that makes a bid with the lowest compensation (subsidy).
- However, by considering both the scheme of benefit sharing such as community welfare, employment, collaborative projects, and profit sharing of power plants, and the process of consultation between community and developer to derive such benefit-sharing scheme are considered, we can select projects with higher benefit-sharing (value-sharing) attributes. That is, a multi-attribute assessment of the level of attainment of both distributive justice and procedural justice is desirable.
- An auction system based on multi-attribute assessment is also applied to the “RPS fixed-price contract competitive bidding system” that is currently being implemented by the Korea Energy Agency.
- However, the competitive bidding system is comprised of a price category (70%) and a non-price category (30%). The impact on community revitalization associated with community participation is merely one of the assessment items under the non-price category. Consequently,

its importance in assessment is relatively low.

Table 4. Assessment standards of fixed-price contract competitive bidding

	Assessment indicators	Details and assessment standards	Assigned score
Quantitative assessment	Bid price	[upper ceiling - bid price / upper ceiling] x 70 *rounded off to nearest hundredth	70
Assessment of project content	Prompt and continuous maintenance and repair system Stable power plant operation Impact of renewable energy power plants, with resident (farmers) participation, on the area and industrial development *Scores for each item range from 8.5 to 10 [below average (8.5-9.0), average (9.1-9.5), and excellent (9.6-10)]		30
Total			100

Source: Korea Energy Agency, 2018, Notice on fixed-price RPS contract competitive bidding for the second half of 2018.

- Victoria state introduced an auction system for renewable energy.
- Victoria state set the goal of expanding the share of renewable energy generation to 40 percent of total electricity consumption by 2025 and strived to promote community engagement.
- To achieve this goal, Victoria state government launched an auction system in October 2017, and bidding companies are required to submit their benefit-sharing plans.
- The advantages of integrating an auction system with the Location Planning System are outlined below.
- (Secure community acceptance in advance) By allowing communities to participate in bidding after first engaging in consultations with developers, communities with higher acceptance can be prioritized for project commencement.
- (Price discovery) Whereas the monopolization of profits by external developers is said to be a major reason for low community acceptance, some have argued that compensation for a community is excessive. Therefore, competitive bidding can allow for the discovery of appropriate levels of compensation, given the region, business, and project scale. This will affect the compensation levels for other renewable energy projects as well, enabling the efficient deployment of renewable energy.
- (Restriction of reckless development) By fixing an annual quantity for auction by local governments and reflecting such quantity in local energy plans, the reckless development of solar PV and wind farms, which has recently emerged as a problem, can be addressed.
- Necessity for governance between central and local governments
- It is recommended to curtail the scope of discretion granted to local governments. However, the authority provided within such limited discretion needs to be strengthened.
- Heads of local governments elected by popular vote are sensitive to the voices of residents.

Therefore, if matters related to renewable energy projects, such as licenses and compensation, are left to the discretion of local governments, most of such matters are likely to be dealt with in ways that minimize the numbers of complaints from residents.

- Accordingly, the central government needs to present detailed guidelines and guidance.
- The central government should provide personnel and renewable energy education to local governments to ensure that they are able to effectively implement renewable energy policies.

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Policy Issue Paper 19-06

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Acceptance of Renewable Energy**

Printed on: April 29, 2019

Issued on: April 30, 2019

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Published by: Yongseong Cho

Publishing company: Korea Energy Economic Institute (KEEI)

405-11, Jongga-ro, Ulsan, 44543

Tel: (052) 714-2114 (Main)/Fax: (052)-714-2028

Registration Issue: Issue No. 7/December 7, 1992

Printed by: Beomshin (042)254-8737
