How to Expand Rural Area's Power Supply in 1966–1978 through Rural Electrification Project

PROJECT DATA

PARTNER ORGANIZATION:
KDI School of Public Policy & Management

ORGANIZATION TYPE:
Academic

DELIVERY CHALLENGES:
Rural Electrification

DEVELOPMENT CHALLENGE:
Beneficiary Targeting, Financing Mechanism

SECTOR:
Rural and Urban Resilience

COUNTRY:
South Korea

REGION:
East Asia

PROJECT DURATION:
1966–1978

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TABLE OF CONTENTS

Abstract

This case study examines the Republic of Korea's Rural Electrification Project, which was carried out by the Korean government and Korea Electricity Power Corporation (KEPCO) between 1970 and 1987. The main purpose of this project was to achieve the nationwide electrification by offering long-term, low-interest loans. These loans were to be used for the construction of distribution facilities to rural residents who were regionally and financially disadvantaged, and not on large-scale transmission facilities, which would diminish return on investments. The Rural Electrification Project was a pioneering project intended to upgrade the education, culture, health, and hygiene in these areas, and was designed to develop the economy by increasing the productivity of these rural residents. As was originally planned, the electrification project made incredible progress in Korea within 10 years. Although there were still approximately 50,000 households without electricity on the island and in remote regions, the project was galvanized again in 1983, leading to an electrification rate of 99.8 percent by 1987. This was deemed an impressive success.

The Rural Electrification Project greatly improved rural incomes with special crop cultivation and livestock businesses, which proved to be commercially successful. The achievements of Rural Electrification Project can be summarized as economic effects that contributed to an increase in rural residents' incomes, in addition to social effects that improved their quality of life and mental

well-being. The economic effects refer to the economic benefits generated using electric power, such as the improvement of agricultural technologies that led to an increase in labor productivity, and income increases through rural factory operations. Improvements in agricultural productivity achieved using electricity were also noteworthy.

Introduction

Commercial electricity was first introduced to Korea in 1897, and was first supplied to major cities and industrial regions for lighting and industrial power. Many rural communities, however, were still without electricity in the 1960s.

In late 1950s, the Korean government, knowing U.S. aid would not last indefinitely, drafted their first five year economic development plan, primarily focused on expansions of infrastructures for future growth. This included aspects such as coal and electricity, as well as revenue increases in rural areas through the scaling up of farm produce, among other things.

At that time, rural electrification received attention from the administration of then-president Park Chung-Hee. Park had long believed in the importance of rural development, and was said to be inspired by the quality of life in rural villages of West Germany during a visit to that country in December 1964.[1] As such, he ordered ministers to begin the Rural Electrification Project as soon as he returned to Korea. With laws enacted in December 1965 regulating the governmental financing of electrical facility construction projects, the Rural Electrification Project was accelerated.

During the 1960s, large scale investments in major cities led to a widening rural-urban divide, characterized by a concentration of wealth in a small number of people around the city area and serious income inequality between urban and rural households. This was due to a population concentration in urban areas to meet the increased demand for labor, and a rural exodus where citizens moved to the cities for new opportunities. Therefore, rural electrification, as a part of social overhead capital, became another challenge to be addressed as soon as possible for a balanced development of Korea.

The electrification project changed not only the labor environment and way of life, but also the economic scale of rural communities. Yet even as electrification proceeded successfully, additional measures were required to adjust policy to meet the goals of the project. Electricity use required tremendous costs for external distribution, as well as indoor distribution and expansion construction. Thus, total construction costs were quite burdensome for rural individuals.

[1] http://pub.chosun.com/client/news/viw.asp?cate=C06&mcate=M1016&nNewsNumb=20140314468&nidx=14469 http://www.presidentparkchunghee.org/ (In Korean).

Table 1: The Number of Households and Electrification (as of the end of 1964)

(*Unit: 1,000 households*)

	Households	Served Households	Un-served Households	Electrification Rate (%)
Total	4,035	1,027	3,008	25.5
Rural Area	2,653	318	2,335	12.0
Urban Area	1,382	709	673	51.3

Table 2: Korean Economic Indicators After the Civil War, 1953

	1953	1962	1971
Per Capita GNP (USD)	67	87	288
GNP (mil-USD)	1,356	2,304	9,459
US-Aid (mil-USD)	194	232	1,068
Saving Rate (%)	8.8	3.2	14.6

Development Challenge

The government was able to supply electricity without interruption by 1964 under the Power Resources Development Project. Prior to the Electrification Project, 88 percent of rural residents did not have electric lighting. Therefore, the Rural Electrification Project aimed to build basic electrical facilities to supply power to rural areas. However, the remote countryside villages were at a disadvantage, with higher investment costs for supply facilities, low profitability, and technical problems with distribution. At the time, developing the rural communities, which accounted for over 60 percent of the total population, was essential for the country's balanced development and economic growth.

In May 1964, as part of rural electrification, KEPCO considered implementing the Rural Electrification Project to increase its revenue. Meanwhile, the company relaxed its controversial facility construction criteria for external wiring, and took measures to save construction costs. The new criteria were approved by government authorities and incorporated.

On April 23, 1965, the Korean government announced the Rural Electrification Project scheme. National efforts were made with combined loans of 100 million KRW—300 million KRW from government and 200 million KRW from the Industrial Bank of Korea, on the basis that KEPCO prepared details of the project such as: target area selection criteria, construction codes, and guidelines for loan repayment.

The government announced its long-term Rural Electrification Plan, scheduled to be completed by 1979. At the end of 1969, there were about four million households in South Korea, with approximately two million of those without electricity, indicating an un-electrification rate of 50 percent. It was clear that, despite having made significant progress, further efforts would need to be made.

Delivery Challenges

Shortly before the government-driven Rural Electrification Project, for which the President ordered immediate legislation, KEPCO had rural electrification planning to be implemented as an initiative to increase revenue. While neither a large-scale nor a countrywide project, details of project implementation were still prepared. Without any precedence to refer to, this preparation allowed government officials who were going to draft the nationwide Rural Electrification Project plan to study KEPCO cases closely. Through this, they found some challenges:

1. **How to draft long term development plans of electric power industry.**
   Korea did not have the resources for industrial development that are essential for national economic growth until the mid-1960s. This included technical expertise, experienced manpower, and a long-term development plan for any industry, including the electric power industry. This became the primary challenge before launching the rural electrification project.
2. **How to fund rural electrification and ease the customers' repayment burden.**
   This is one of the main concerns among other delivery challenges, considering the financial difficulties of Korea, such as limited government finances, national capital shortage, and a dismal outlook on private investment. The government tried to build a strategy to gauge the potential of a customer to pay back a loan. However, rural society had a high unemployment rate, especially in wintertime, due to a lack of production facilities. Further, the per capita GDP is estimated to have been around US$50–70 in the early 1960s.
3. **How to increase the number of households served with a limited budget.**
   With a limited budget, doubling or tripling the number of customers to be served in a short period time under existing KEPCO regulations and business practices was not likely to be attained. Therefore, a new approach to rural electrification, in terms of construction management, was necessary.
4. **How to prioritize the target area and/or villages.**
   Before the start of the Rural Electrification Project commencement in 1964, which area and/or villages should obtain electricity first was a great concern among the whole population, as this was a time when only a quarter of the population enjoyed the benefits of modern conveniences. National consensus was important to the success of the Rural Electrification Project, especially in regard to remaining within the specified budget. Thus, preparing optimal and reasonable area and/or village selection criteria was very important.

Tracing the Implementation Process

Legislation and Procedure of Rural Electrification Project

On April 23, 1965, the Ministry of Commerce established the Rural Electrification Project scheme, announcing its intentions to bring electricity to isolated rural areas. The project would be implemented using loans totaling 300 million Won (KRW), with 100 million KRW from the government and 200 million KRW from the Industrial Bank of Korea. The industrial Bank of Korea was established in 1961, with a focus on special financial loans to small and medium enterprises (SMEs). KEPCO assigned facility criteria for external wiring plans, to fit the situation of each rural community, and it also established the Guidelines for Rural Electrification Project Loan Recovery to prepare for the project. KEPCO enacted these guidelines on November 6, 1965.

Having prepared the annual plan for project implementation, including securing a budget, the central government allotted money to local governments based on the number of un-served customers, with guidelines reflecting comments from interested parties for better and efficient project implementation. With area selection criteria delivered by government, local governments then selected target villages. High priority was usually given to villages with factories for export or areas where people had been working hard to increase their income as a part

Figure 1: Implementation Procedure of Rural Electrification Project

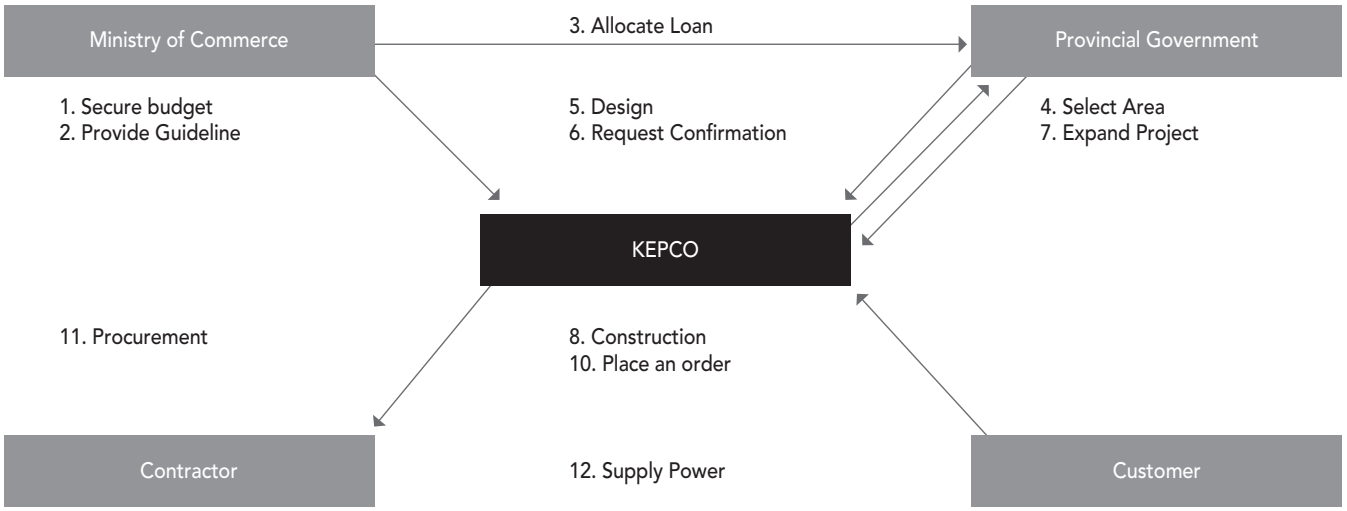


Table 3: Implementation Procedure of Electrification Project

Procedure	Management	Responsibilities
Establishment and implementation of electrification scheme guidelines	Ministry of Commerce	Secures budgets, allocates funds to local governments, and delivers guidelines
Area selection	Local governments	Selects electrification target areas, based on the criteria
Survey & Design	KEPCO	Surveys and designs the selected areas
Confirmation of project	Local governments	Secures a project scheme for the selected areas and reports it to KEPCO
Acquires materials	KEPCO	Acquires necessary materials
	KEPCO	Selects a contractor, and proceeds to construction
Power supply		Power supply

of the Saemaul Movement.[2] Some areas, which would be relatively more expensive, were given low priority, such as small communities of less than 30 households, villages that cost over 40,000 KRW per household, or villages that need additional facility reinforcement construction for technical challenges. Villages selected by the government were informed about electricity utility and local governments paid the construction cost after receiving the bill. The electricity utility prepared project implementation, including design, procurement, and ordering construction, while the customers selected internal wiring contractors for their home. Customers were served after the project completion and repaid the loan through collectively guaranteed agreements.

Rural Electrification in Economic Five-Year Development Plan

Phase 1: Rural Electrification Project (1966–1970)

At the beginning stage of the project in 1964, the electrification rate in the suburbs of major cities was no better than that of rural areas, and so the highest priority was given to collective villages around the cities, as this was seen as cost-effective. Priority was also given to areas seen as needing electrification urgently, for various reasons; for example, Kyungki and Kangwon provinces focused on areas that had been recently won back after the end of the civil war in 1953.

Shortly before the completion of the first phase of the government's Rural Electrification Project in 1970, KEPCO created a special team to focus on rural electrification. This team's objective was, under government mandate, to streamline processes for country-wide rural electrification, implementing lessons learned and avoiding prior mistakes, during the subsequent decade.

KEPCO merged the Rural Electrification Department and the National Electrification Survey Committee (a temporary organization supposed to survey details of rural electrification completion) into the 'Rural Electrification Headquarters, a new name for the task force team in 1970. The goal was to better implement the project within the allotted limited budget before the scheduled time frame, under close cooperation with the government. Its responsibilities were as follows:

- To have a close cooperation with the government for target area selection;
- To survey and design aspects associated with electrification project, including electrification status;
- To secure and manage resources, such as: personnel, budget, etc.;
- To establish and implement measures for logistics, timely completion, and quality warranty;
- To implement measures to simplify procedures for effective and swift construction; and
- To encourage measures for timely completion.

KEPCO exercised extensive due diligence (some 12,000 working days over seven months from May 1970 to 1979) to in such areas as how to prioritize target villages, how to accurately estimate costs, and how to set technical thresholds to optimize power supply.

Phase 2: Rural Electrification Project (1971–1979)

The Long-term Rural Electrification Project scheme was announced by the central government on December 5, 1970. This scheme was based on KEPCO due diligence and aimed to complete electrification by 1979 through clear and strong political determinations that created numeric goals that should be achieved for every three years. Its ultimate goal was to reach 1.8 million households without electricity (not counting an additional 300,000 unserved households on islands and in deep valley areas) by 1979 (see Table 4 for the progressive schedule).

The first phase of this project, mainly financed by Government financial fund and KEPCO's budget, achieved notable increases in the number of households served, without requiring loans from abroad. This was helped by the fact that KEPCO had already prepared for rural electrification challenges, such as supply and transmission capacities shortages, before launching the project.

The Rural Electrification Project, which was originally conceived as only providing electric lights, was modified when more than half of the rural communities were served with electricity in 1973, and the government shifted policy direction to increase rural income through agriculture

2 The Saemaul Undong (translation: "New Village Movement") program in the 1970's was an initiative of the government of South Korea to partner with local villages in an effort to hasten economic development.

Table 4: Electrification Schedule (Unit: Households)				
Year	1971–73	1974–76	1977–79	Total
Served Households	400,000	600,000	800,000	1,800,000

automation with electricity (like developed countries). The project was no longer about improving the quality of life of rural residents by providing electric lights, but also focused on promoting rural modernization by increasing rural productivity and incomes with various power utilizations for agricultural management. In addition, rural labor shortages caused by urban industrialization urgently called for mechanization of agriculture.

Offshore islands were not prioritized for electrification because of the high costs and technical difficulties presented by these areas. However, by the late 1970s, these areas began to be prioritized. The ShinAn Island area, consisting of 23 small and medium-sized islands and heavily populated with 16,000 households, was a natural choice as the first offshore island electrification. This electrification was completed in May 1979, with the electricity from mainland channeled through a marine cable since there was no capacity for generation in the island area.

Phase 3: Rural Electrification of Deep Valley Area and Offshore Islands

On September 26, 1978, the government announced rural electrification of deep valley areas and offshore islands, and its target households were as follows:

Almost all medium-sized villages were already served before middle of the 1980s, and small-sized villages of more than four households in mountainside and remote villages were supposed to be served next. A total of 19,600 households were served by 1991, since the scheme's beginning in 1984, marking an electrification rate of 99.9 percent. Some offshore islands installed medium-sized generators when undersea cable connections proved impractical.

Tackling Delivery Challenges During Project

A. Long Term Development Plan of Electricity Industry Including Rural Electrification

Before developing its plan for generation and power delivery capacities expansion, KEPCO contracted some consulting services in the early 1960s, as a condition of receiving financial aid from USAID. Two assessments were performed, the first one by EBASCO Services Incorporated in 1964 and the other one by Burns & Roe in 1966. The recommendations, especially those related to transmission and distribution, became the foundation of Korea's electricity industry and provided key suggestions increasing the size of voltage system capacities, and the establishment flexibility, procurement, and construction standard to secure quality insurance and constriction warranties. They recommended the introduction of a newly developed voltage system unifying five different voltage systems to a single system in order to increase the efficiency of power system construction and operation with less cost. This was in addition to a recommendation to establish a construction standard for every voltage system to secure quality insurance and construction warranties, and an extensive rural electrification project.

KEPCO's Capacity Improvement

One of the most difficult challenges faced by the project was the development of a voltage system that was suggested by USAID. There were few world-wide precedents that would guarantee the performance of the system, and KEPCO had a different voltage system

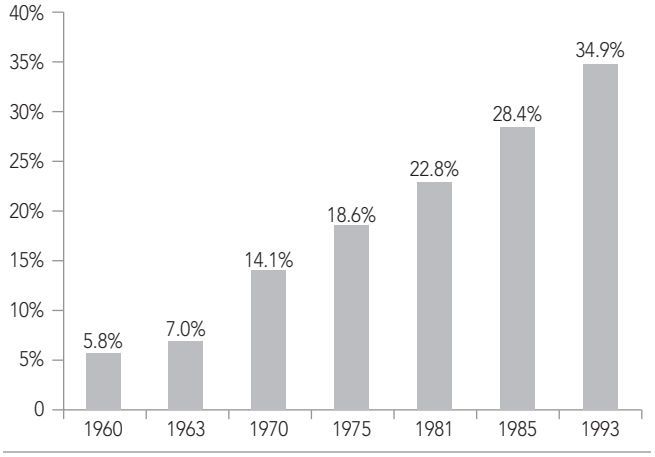
Table 5: The Targeted Households in 1978		
Deep Valley Area	Villages of not less than 10 households and construction expense no more than 500,000KRW/households	9,500 Households
Offshore Islands	42 Islands, connectable KEPCO network within technical threshold and construction expense no more than one mil-KRW/households	13,000 Households

already in place. Ultimately, after a thorough review, KEPCO adopted the new system, resulting in many benefits, including lower cost for the construction of new electricity facilities, considerable reduction in losses, and increased quality and stability of electricity.

Another benefit of the new system was reduced logistics cost. With the introduction of the newly developed voltage system, KEPCO ended up having only one type of voltage system rather than the five it had previously, so that both manufacturers and electricity utilities did not need to make and reserve five types of facilities. Furthermore, this decreased manufacturing costs and operation costs.

These changes marked considerable progress for KEPCO and enabled the company to provide customers with reliable electricity at a reasonable cost.

Figure 2: National Saving Rate



B. Funding for the Rural Electrification

From 1966 through 1970, Phase 1 of the Rural Electrification Project was mainly financed by both the Korean Government financial fund and KEPCO's budget. With the help of both increased savings and money remitted from abroad, there was a marked increase in the number of served households without loans from abroad. However, things changed due to the government policy change to complete rural electrification, including offshore islands and deep valley areas, before 1979. Customers demand for electrification increased as a result of the surprising changes of living convenience in served households.

Raising Funding Resources: Remittances and Domestic Savings

Korea, like many developing countries in the mid-1960s, suffered from shortfalls in investment funding at the incipient stage of economic development. Korean government policy attempted to capitalize on the resources of its population, encouraging workers to work abroad and send back remittances. Korean immigrants worked as miners and nurses in West Germany, as soldiers in Vietnam, and construction workers in the Middle East, sending remittances home that in some cases, reached around US$50 million. This accounted for about two percent of Korea's GNP in the 1960s. Remittances, together with foreign aid and loans from multi-lateral development banks, became major sources of funding for development initiatives in Korea, including rural electrification.

Korea's national savings rate increased very rapidly beginning in 1963, due to a national income increase, along with economic development and government-driven saving encouragement initiatives, to secure investment fund independently, under the long-term goal of creating a self-supporting economy. Due to blitz rate increase of September 1965 among economists and officials, the Korean government controversially[3] decided to double the interest rate from 15 percent to 30 percent to encourage savings. This was enough to keep real interest rates around to 20–22 percent, while repressing adverse effect of inflation. Furthermore, in 1966, the government encouraged everybody involved in economic activity to increase savings, shortly after doubling its national savings target figure from 8.3 billion KRW in 1965 to 20 billion KRW in 1966, which showed that the government had a strong determination to increase savings. Some of details are as follows:

- Encourage financial institutions, including commercial banks, to achieve a target figure, which was already set by government;
- Recommend that high ranking officials, including staff of state-owned companies, deposit 10 percent of pay in the bank;

[3] http://nlcollection.nl.go.kr/front/detail/detail.do?category_id=CA0000000032&rec_key=CO0000002155 (In Korean).

- Allow contractors and/or suppliers to deposit some portion of their pay in the bank as a contractual obligation;
- Allow parties and/or persons to deposit some amount in the bank before issuing license, permission, approval, etc.; and
- Encourage every school to achieve its target figure, as already set by government.

These efforts to fund rural electrification were not limited to public funds. Some villages were eager to get electricity service earlier than others. To achieve this, they tapped into their own credit unions, such as the New Community Savings Account, and reduced project costs by paying part of this in advance with their own funds. This meant that they scored higher on the selection criteria and received electricity earlier, while lessoning the burden on public coffers.

The project was also funded through loans from MDBs and foreign countries. In September 1971, the first loan of US$10.6 million was received from Asian Development Bank (ADB), earmarked for a transmission and substation capacities expansion. Two additional loans were received from Japan's Overseas Economic Cooperation Fund (OECF) in 1975 and from the International Bank for Reconstruction and Development (IBRD) of the World Bank Group in 1976. While the first loan filled a critical gap in savings, the latter loans allowed for diversification and lowering interest rates.

C. Lessening Customers' Burden in Terms of Loan Repayment

To lower the customers' loan repayment burden, the generation and transmission construction costs not directly related to rural electrification were paid by the electricity utility. Wiring the houses themselves, however, was the customers' responsibility, while the costs for distribution line construction (the main driver of cost) was shared by the utility and its customers. The utility paid around 5000 KRW (as of 1973) for every household, and the rest of the project costs were paid by customers through collectively guaranteed loan agreements.

Power was supplied to the village collectively, not per house. In order to prevent the nonpayment of the construction cost, a collectively guaranteed loan system was introduced so that all the residents have to pay the construction cost.

At the time of rural electrification legislation, customers were designated to repay equally divided monthly installment for 20 years with a year grace period, according to their collectively guaranteed repayment agreements.

The construction costs of distribution facilities, which were paid by the customers, varied depending on the distances between the power resources and the consumer regions, as well as the number of customers and circumstances of electrification regions. The average annual construction costs from 1965 to 1972 are shown in Table 6.

Figure 3: Project Cost Assignment

Table 6: Construction Cost Per Household by Funding Source (Average)

Year Funding Source	1965	1966	1967	1968	1969	1970	1971	1972
Financial funds	7,895	12,006	12,779	16,083	16,775	20,633	20,000	22,000
KEPCO	3,500	4,599	4,530	4,181	5,175	3,996	4,800	5,000
Customers	1,184	1,157	569	282	—	—	—	—
Total	**12,579**	**17,762**	**17,878**	**20,546**	**21,950**	**24,629**	**24,800**	**27,000**

Revision of Loan Terms and Conditions to Ease the Burden

The enactment of the Rural Electrification Promotion Act on December 30, 1965, allowed the government to finance electrical facility construction, and the Rural Electrification Project came to be. However, it soon became apparent that loan terms would need to be revised to relieve burdens on the customers.

The initial terms of the loans included 7.5 percent interest rate and a 20-year repayment period. While this included a year-long grace period, this was still difficult considering residents' income levels in rural areas. The government revised the law on March 3, 1967, extending repayment to 35 years, including a five-year grace period, to lessen the burden on low-income rural residents. This was further revised to a five-year grace period with 30 years of equal payments on May 22, 1968. During the five-year grace period, only the interest payments were required and after that, the principal and interest had to be paid in equal payments for 30 years. Payments were collectively levied in the monthly electric bills by KEPCO, under the Article 12 of the law. The repayment amounts varied, depending on the customer's loan amount and the number of electric lights.

D. Strategic Project Management

Every possible way to minimize the project cost was introduced as the project was implemented: KEPCO drafted and introduced a construction code for rural electrification that had a smaller safety margin as compared to the general construction code, in addition to taking responsibility over the whole process of the project without hiring consultants.

Phase 2 of the project decided which village should be first served. This selection was made not only by which areas were a priority, but also took into consideration the construction costs and reliable power supplies to customers, reflecting experience of the Phase 1. This helped to supply power, which helped to meet the technical threshold, and to reduce construction, operation, and management costs, after project completion.

Cost and Infrastructure Management

As is often the case in rural electrification projects, one of the most important aspects increasing the number of households served, doing it in a short period of time, and staying within a strict budget. KEPCO studied a variety of ways to reduce cost, drawing on consultations with EBASCO and Burns & Roe.

KEPCO played a dominant role in guiding the process from its early planning stages all the way through construction infrastructure. Thus, to ensure project success, KEPCO had to play a key role in coordinating stakeholders, including villagers, in target areas.

The electrical equipment manufacturing industry was not strong enough to deliver all types of equipment in the late 1960s, and so a portion of the equipment had to be imported from advanced countries until the mid 1970s, when it became possible to substitute domestic equipment in place of imported. To lower the price of equipment, KEPCO wielded a bulk-purchase approach to not only foreign but also domestic manufacturers. This later contributed to a growth of the domestic electrical equipment manufacturing industry through investment and technical cooperation with advanced foreign manufacturers, leading to the sole use of locally supplied equipment. There were several tools and accessories were newly developed for rural electrification, which also contributed to a lower project cost.

Further, the same approach was adopted in hiring construction companies to help lower the construction cost, while deploying more personnel in the project area for securing the construction performance warranty. This made some construction companies develop and/or import new construction methods to maximize their profit, while reducing construction cost. In some cases, villagers who were eager to receive electricity ahead of other villages contributed a portion of labor to the project in a sense of collaboration and support of one's own village.

E. How to Prioritize the Target Area and/or Villages

At the Phase 1 period, it was crucial that the criteria of target area selection be fair, and carried out without favoritism toward particular villages. The local governor selected target area at his discretion, based on the development plan within the allocated funds. At least one area of each city, county, and borough was to be included for a balanced project implementation. For areas with sufficient demands, exceeding the break-point of electricity utility should be considered. For the first phase of rural electrification, the criteria were as indicated in Table 7.

In Phase 2, while maintaining a fair and balanced approach, it was also crucial to serve as many households as possible with limited budget and time. The basic principle of area selection that local governors were to follow was a regional balance, with a return on investment and potential spread-effect of the project. The systematic criteria as as indicated in Table 8.

In September 26, 1978 Government announced rural electrification of deep valley area and offshore islands. These areas had their own specific criteria.

Almost all medium-sized villages were already served before middle of 1980s, and small sized villages of not less than five households in the deep valley area were supposed to be served next. Since the project's beginning in 1984, a total 19,600 households were served by 1991, marking an electrification rate of 99.9 percent. Medium-sized generators were installed in some offshore islands that were not served through marine cables from the mainland.

Lessons Learned

Rural electrification in Korea as a part of economic planning played a pivotal role in the economic development and balanced economic growth throughout Korea in the 1970s. Furthermore, it represents one of the most successful programs from that time period. This project, while poorly designed and organized at the beginning, was completed swiftly and successfully with strong government initiation and policy intervention.

Table 7: The Criteria of Target Area Selection: The First Phase

☐	Areas that electrification is possible without further installation of transmission and substation facilities.
☐	Areas that the length of the construction zone are over one kilometer and less than eight kilometers.
☐	Areas in which all villagers can afford the entire cost of internal wiring.
☐	Areas with sufficient demands, exceeding the break-even point of electricity utility.
☐	In accordance with development plan, local governors' opinions are considered. (Example: all-weather farming complex model village)
☐	Areas who electrical facilities were damaged during civil war.
☐	Areas with city and county offices.
☐	Exempted area: off-shore areas, deep valley areas, and downtown areas of big cities, such as Jongno-gu and Joong-gu of Seoul, and Joong-gu and Dong-gu of Pusan.

Table 8: The Criteria of Target Area Selection: The Second Phase

☐	Paying off the budget shortfall of Phase 1.
☐	Coast guard posts and vulnerable regions against blitzkrieg.
☐	Fishing post of deep sea fishery for export.
☐	Mining area and cottage industries (i.e., clothing, food production, etc.)
☐	Areas with a county seat and/or ward office.
☐	Areas around railway station and on both sides of the expressway.
☐	Areas with government designated domestic industry villages for income increase.
☐	Areas with damaged electrical facilities during civil war, as well as the frontline area of the civil war.
☐	Areas with community-owned factories, to increase community income.
☐	Island areas.
☐	Areas with an average loan per capita lower than 40,000 KRW.
☐	Villages with at least 30 households.
☐	Areas without further reinforcement projects due to low voltage and/or capacity shortages of transmissions and/or substations.
☐	Areas chosen by authorities for commitment to the New Community Movement program.

Table 9: The Criteria of Target Area Selection: Deep Valley Area and Offshore Islands

Deep Valley Area	Villages of not less than 10 households and construction expense no more than 500,000KRW/households	9,500 Households
Offshore Islands	42 Islands, connectable KEPCO network within technical threshold and construction expense no more than 1 mil-KRW/households	13,000 Households

Table 10: Achievements of Rural Electrification Project by Year

	Served households (1,000 households)		Electrification Rate (%)	Construction Costs (mil-KRW)			
	Each year	Total		Loans	KEPCO	Customers	Total
1964	0	(317.9)	12.0				
1965	38.7	356.6	13.4	300	133	45	478
1966	64.8	421.4	15.9	778	320	74	1,172
1967	45.5	466.9	17.6	584	208	23	815
1968	53.8	520.7	19.6	854	222	11	1,087
1969	72.5	593.2	23.4	1,198	357	109	1,664
1970	90.6	683.8	27.0	1,890	468	28	2,386
1971	171.9	855.7	33.8	3,380	802	74	4,256
1972	177.0	1,032.7	40.8	3,600	803	74	4,477
1973	284.5	1,317.4	52.0	7,390	1,338	195	8,923
1974	177.1	1,494.3	59.0	6,473	909	589	7,971
1975	137.3	2,105.6	81.6	6,090	951	897	7,938
1976	235.0	2,576.0	93.5	15,250	2,275	2,256	19,781
1977	120.0	2,696.0	97.8	13,100	1,428	1,896	16,424
1978	58.6	2,754.6	100.0	12,953	921	1,327	15,201
Subtotal	1,727.3	2,754.6	100.0	73,840	11,135	7,598	92,573
1979	22.9	2,777		9,978	573	1,108	11,659
Total	1,750	2,777		83,818	11,708	8,706	104,232

A. Long Term Development Planning Before Project Launching

This project saw considerable delays and difficulties with coordination among all parties involved at the beginning. Better due diligence and long-term planning might have enabled more efficient and effective implementation of the project.

B. Encouraging Villagers' Voluntary Participation

Villagers' voluntary and active participation in the project, made possible by both incentive programs provided through officers and citizenship under the strong village-senior leadership over the whole process of the project, should be highly evaluated. Seamaul Movement, a full-fledged promotional effort, raised ownership of project and participation of villagers with a sense of collaboration and support. They did not spare their toil and efforts during project implementation, as they gave manpower freely and voluntarily for the construction of electrical equipment, such as transporting construction materials and erecting poles; additionally, they yielded their rights of way, paid construction bills under collectively guaranteed agreements, and more.

C. Strategic Planning in Selecting the Target Area Practice

Target areas were selected by Provincial Governors, taking into account provincial development plans. This was coupled with clear criteria stipulated in the Rural Electrification Law, with a particular focus on regional balance and prioritizing low-cost areas. This clear set of criteria was important in showing villagers the impartiality of the project.

D. Developing Electricity Industry and Nurturing Manufactures

The project benefitted by the fact that most equipment came from domestic manufacturers, and that these manufacturers were encouraged to develop equipment and accessories only for rural electrification. Through this, KEPCO also nurtured the electrical equipment manufacturing industry, learning and adopting from imported equipment from overseas, localizing the imported equipment through investment, and technical cooperation with advanced foreign manufacturers afterwards.

E. Strong Political Leadership

This economic plan driven by government was better supported by well-developed meritocracy of the government and strong political leadership of the President. Setting rural electrification as the priority agenda, Korean government could put national resources together strategically and concentrate its efforts on the project, minimizing conflict among departments. Reviewing the progress of the project quarterly by his own hand and encouraging involved parties' more efforts to place the project on schedule, the then-president Park Chung-Heeactually lead the project to success.

Annex 1. Rural Electrification Promotion Act

[Effectuated on May 22, 1968] [Law No. 2015 partially amended on May 22, 1968]

Article 1 (Purpose)

This Act is aimed at improving the agricultural productivity and quality of life for rural residents by promoting electrification.

Article 2 (Definitions)

In this Act, a "rural area" refers to a village with most residents engaging in agriculture, regardless of the administrative district. In this Act, "electrical facility construction" means distribution (excluding transmission and substation) and internal wiring facility construction. In this Act, "electricity provider" refers to "Korea Electric Power Corporation." In this Act, "unit construction" means electrical facility construction, recognized as collective construction by the electricity provider. In Article 6 Section 2, Article 7 Section 1 and 2, and Article 10 Section 2, "leader of local government" means Seoul Mayor, Pusan Mayor, and provincial governor. In Article 4 and 7 Section 3, and Article 11 Section 2, "leader of local government" means Seoul Mayor, Pusan Mayor, mayor, and county officer.

Article 3 (Construction Cost Payment)

The electrical facility construction funding shall be determined as the following: Distribution construction costs are covered by the electricity provider's payment (with amount approved by the commerce minister, in accordance with the Electric Business Law Article 19), combined with financial or other types of loans. Internal wiring costs shall be covered by customers.

Article 3 Part 2 (Local Government's Partial Construction Payment)

Local government can pay for part of the electrical facility construction costs.

[Added on March 3, 1967]

Article 4 (Project Plan)

The head of local government should collect service application forms and draft the next year's electrification plan for unit construction; it should be submitted to the electricity provider via provincial governor by the end of February. However, Seoul and Pusan Mayors can directly submit the application forms to the electricity provider.

The electricity provider should draft a rural electrification project and funding plans for the next year, based on the plan of the previous clause, and submit them to the commerce minister by the end of April.

Article 5 (Funding Measures)

The government must deliberate on the rural electrification project and financing plans of the previous clause and appropriate the amount that requires financial funds in the next year's budget. However, the loans must be included in the estimated expenditures with amounts greater than the projected kerosene tax revenues among the petroleum tax of the year.

<Amended on May 22, 1968>

In the financing plan of the previous clause, if the electricity provider is not able to pay the allocated amount, the government should introduce loans in order to cover the amount that exceeds the electricity provider's ability to pay.

Article 6 (Construction Loan)

The loans of the Article 3 Section 1 shall be offered to the electricity provider. The loan debt of the previous clause is guaranteed by the head of local government. Electric customers subject to this Act have joint obligation for unit construction loan and interest payment to the electric provider. The loans must not be used for purposes other than the ones specified in this Act.

Article 7 (Notice and Funding Measures)

The commerce minister should notify the rural electrification and funding plans to the head of local governments when the budget is finalized, as set forth in Article 5 Section1. Upon notice of the previous clause, the head of local government should notify the electric customers to collectively deposit their unit construction

payments with the electricity provider by February. Upon notice of the previous clause, the electric customers should collectively deposit their unit construction payments by the deadline and submit the certificate and service application form for each construction to the head of local government and electricity provider.

Article 8 (Construction)

When the electricity provider receives loan payments and requests for electrical facility, it must execute the construction of the year without delay, in accordance with the project plan, as set forth in the previous Article Section 3.

Article 9 (Revision of Project Plan)

If the electricity provider is not able to complete the facility construction with finalized budget under Article 5 Section 1, the reason should be reported to the commerce minister. If the reason is deemed valid, the commerce minister can change the project plan and transfer the construction cost to another unit construction.

Article 10 (Funding Measures)

The commerce minister can take necessary measures and supervise the loan usage and construction status. The head of local government can order the electricity provider to report on the loan usage and construction status when necessary.

Article 11 (Repayment Period)

Loans are payable with a five-year grace period and 30 years of equal payments.

<Amended on March 3, 1967 and May 22, 1968>

The electricity provider must submit the loan repayment status of each customer to the head of local government each month.

Article 12 (Payment Collection)

Loan payment shall be collected by the electricity provider in the monthly electric bills. The electricity provider must repay the loan four times a year with customers' payments and should report it to the commerce minister.

Article 13 (Application of Other Laws)

This Act shall not preclude application of the Electricity Business Law.

Attachment <No. 2015, May 22. 1968>

This Act shall become effective from the day of announcement.

Enactment of Rural Electrification Promotion Act

Due to the shortage of power generation and profitability issues with excessive facility cost, the rural electrification project has been delayed. However, since the Five-Year Power Resources Development Plan was expected to expand power supply, the Rural Electrification Promotion Act (Law No. 1737) was established on December 30, 1965, as legal devices to implement the Rural Electrification Project. The estimated budget was 440 million KRW each year, and there had been important Act amendments three times. The key points of the initially established law are as follows: construction cost shall be covered by the electricity provider and the government's financial funds for electrical facility construction; the head of local government and electricity provider should submit the next year's Rural Electrification Plan to the state government by the end of February; the government loan shall be provided to the electricity provider through financial institutions, and local government must guarantee the payment by obligating the customers to pay the loan as a joint debtor; government loan repayment period is 20 years; and government loan repayment shall be managed by the electricity provider by collectively levying the amount in the monthly electric bills.

Amendment of March 3, 1967 (Law No. 1970)

Although this Act was established to modernize the underdeveloped rural communities, it posed excessive burden on the residents when it was enforced. As a result, the rural electrification plan was rarely implemented, even though the target areas were selected. It led to the amendment of the Act, extending the grace and repayment periods, and reducing the burden of rural residents to achieve early electrification. The key points are as follows: part of electrical facility construction can be funded by local government, and loan principal and interest shall be paid with a five-year grace period and 30 years of equal payments.

Amendment of December 31, 1984 (Law No. 3781)

In order to effectively implement the Island Electrification Project, the installation and operation of off-grid generation facility were supported. Also, remaining payments of the moved customers were covered by the government, reducing the additional burden on the customers. The key points of the amendment are as follows: installation, management, and operation of self-generation facility shall be conducted and supervised by the head of local government; and the construction costs shall be covered by financial funds, local government subsidies, and the customers. Local government can subsidize the operation costs of self-generation facilities, while KEPCO is responsible for designing, supervising, and providing technical support for off-grid generation facility construction. Further, regular maintenance and management, as well as the operators' education, are the responsibilities of KEPCO; KEPCO can take over off-grid generation facilities in regions, based on the criteria, and supply electricity; and moved customers' remaining loan payments shall be covered by the electricity provider, or local and state government.

Amendment of January 13, 1990 (Law No.4213)

This was to provide electricity to deep valley areas and off-shore customers who had no power or had unstable power supply with off-grid generation facilities. Construction costs for distribution facilities of off-grid generation facilities shall be covered as follows: customers shall pay basic construction cost of 25,000 KRW and financial funds of one million KRW; and 50% of the remaining amounts shall be funded by the state and local government, and the other 50% by KEPCO. Operation cost of Island regions of at least 50 households with off-grid generation facilities shall be partially supported by KEPCO.

Annex 2. Rural Electrification History in Korea

August 28, 1964	Ten members of National Assembly ruling party proposed "The Rural Electrification Promotion Act (Draft)": Bill No.289
June 7, 1965	The Chairman of Commerce and Industry Committee asked for suggestions on the Act (Draft) by both the Finance Committee and the Home Affairs Committee
November 6, 1965	Draft Guidelines for Rural Electrification Project Loan payment (KEPCO)
December 9, 1965	The Chairman of Commerce and Industry Committee asked for examination of legality and wording of the Rural Electrification Promotion Act (draft) by the Legislation and the Judiciary Committee
December 30, 1965	Announcement of Rural Electrification Promotion Act (Law No.1737, with complete text of 13 articles)
March 1, 1966	Rural Electrification commencement with newly established executive bureau of KEPCO (Rural Electrification Department)
March 24, 1966	The Ministry of Commerce notified details on Rural Electrification: Overview of Rural Electrification Project, electricity supplying procedure from application to power supply, service application form, financial planning, and loan payment.
March 3, 1967	The first amendment of Rural Electrification Promotion Act (Law No. 1970, enactment of Article 3 Section 2, amendment of Article 11 Section 1)
May 22, 1968:	The second amendment of Rural Electrification Promotion Act (Law No. 2015)
January 14, 1969	The third amendment of Guideline for Loan payment
March 16, 1970	Committee for another round of Rural Electrification Initiative nationwide
Nov 2, 1970	Loan application for Asian Development Bank (ADB)
December 5, 1970	Announcement of Rural Electrification Completion scheme: 2.5 million households with electricity by 1979, with exception to the almost 210,000 households of offshore and deep valley areas
March 19, 1971	Presidential address for Rural Electrification: Rural Electrification Completion to 70 percent by 1976
June 16, 1971	New exclusive executive bureau in the Ministry of Commerce to complete Rural Electrification by 1979 after the Presidential address
August 26, 1971	ADB loan approval
September 13, 1971	Signing of ADB loan agreement
January 18, 1972	Effectuation of ADB loan agreement: Borrower-KEPCO, Lender-ADB, Loan amount USD$10,600,000, and 7.5 percent annual interest rate with three-year grace period and 17-year repayment
May 24, 1974	Presidential address for Rural Electrification: Rural Electrification Completion by 1977
October 25, 1974	Exchange of MOU for Overseas Economic Cooperation Fund (OECF) between two governments
December 26, 1974	OECF loan agreement
January 1, 1975	The fourth amendment of Guidelines for Loan payment
February 14, 1975	Effectuation of OECF Loan Agreement: Lender-OECF, Loan Amount-360 million Yen, and 3.25 percent annual interest rate with seven-year grace period and 18-year repayment, with fixed amount payments of principal twice a year

February 14, 1975	World Bank (IBRD) loan application
April 1975	IBRD due diligence
July 1975	IBRD appraisal for Korea loan application
November 1975	Congressional consent for IBRD loan
January 1, 1976	The fifth amendment of Guidelines for Loan payment
March 19, 1976	Signing of IBRD loan agreement
June 4, 1976	Announcement of IBRD Loan Agreement: Borrower-Korean Government, Lender-IBRD, Loan amount-USD$18.1 million, 8.5 percent annual interest rate for general interest loans, 4.5 percent annual interest rate with seven-year grace period and 18-year repayment
April 5, 1978	Furthering rural electrification areas to off-shore and deep valley areas, with relatively low budget
August 10, 1978	Commencement of the first off-shore area electrification: ShinAn Island, south east of Korean peninsular
September 26, 1978	Off-shore and deep valley area electrification scheme
June 30, 1979	Completion of ShinAn Island electrification
September 6, 1979	Rural Electrification Scheme after 1981
October 2, 1979	The second off-shore area electrification, five big islands of western part in Korean Peninsular
January 12, 1980	Increase interest rate by 73.3 percent: from 7.5 percent to 13 percent

References

Bank of Korea. 1970. "Rural Electrification Project Report."

Electrical Society Journal. 1974. "Present and Future of Rural Electrification Project."

Export and Investment Office, Department of Western Cooperation, Ministry of Industry and Energy. 2005. "Korea and Philippines Power Resources Cooperation Expansion."

KEPCO. 1989. "100-Year-History Album of Korean Electricity."

———. 1989. "100-Year-History of Korean Electricity."

———. 1995. *Encyclopedia of Power Distribution*.

———. 2008. *Encyclopedia of Power Distribution*.

———. 2011. "History and Effects of Philippines Electrification Project."

———. 1965. *Korea Electric Almanac*.

———. 2011. "Philippines Electrification Project Final Results."

———. "Power Demand And Sales Activities (Island and Remote Region Electrification Project)". http://www.kepco.co.kr.

———. "Power Demand and Sales Activities (Rural Electrification Activities)". *http://www.kepco.co.kr*.

Korea Architectural Association. 1976. "Natural Resources Development Plan in Accordance with New Community Project."

Korea Electric Association. 1992. "Island and Remote Region Electrification Project Implementation."

———. 1980. "Island Region Electrification Project with Steel Tower and Submarine Cable."

———. 1987. "Promotion Background and Achievements of Rural Electrification Project."

Lee, Eungho. 1980. "Modernization Plan for Rural Electrification Project."

Ministry of Health and Society. 1968. "Rural Society Reform Report."

Ministry of Industry and Energy. "Power Sector Statistics."

Ministry Of Legislation: Rural Electrification Promotion Act (Law No.2015). 2017.

National Assembly Secretariat. 1970. "Status of Rural Electrification Project and Its Expansion Strategies."

Oh, Changsuk. 1996. "Modernization of Power Distribution and Electrification Project."

Rural Agricultural Corporation. 1973. "Achievements and Outlook of Rural Electrification Project."

Rural Electrification Promotion Headquarter. 1971. "Status and Outlook of Rural Electrification Project."