



CHALLENGES AND STRATEGIES OF RURAL ELECTRIFICATION PROGRAM FOR ELECTRIC COOPERATIVES IN CENTRAL LUZON, PHILIPPINES

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ABSTRACT

The Philippine government strongly advocates the Rural Electrification Program for over 50 years, purposely to generate better opportunities that would propel socio-economic development. Various rural electrification initiatives were then established to attain universal electricity access but actual accomplishments continue to lag behind the targets. This study delved on the Rural Electrification Program of four (4) Electric Cooperatives in Central Luzon, Philippines and assessed its impacts on poverty, health and well-being, quality of education, economic growth and development, industry and infrastructure and climate change. A descriptive research design was applied and used qualitative and quantitative methods of research in collecting, investigating and explaining the data. Quantitative method involving numerical data were gathered from the respondents through survey questionnaire powered by Google forms while in the qualitative aspect, interview with the respondents along with appropriate observation was conducted. Determination of different problems confronting the said program and the application of aggressive and more advanced strategies were conducted. Findings revealed that the biggest electrification challenge being experienced by Electric Cooperatives (ECs) was rural inaccessibility and remoteness of areas along with difficult or rugged terrain. Thus, the best recommended solution for non-viable areas after trying all the possible options would be off-grid electrification. In conclusion, implication of the findings of the study of Public Administration was deliberated to comprehensively assess the opportunities to attain enhanced quality of life, better access to basic services on areas of health, education, water as well as resilient infrastructure towards rural development, for the best interest of Filipino people.

Keywords: Rural electrification program, Electric services, Universal electricity access, Central Luzon, Philippines

INTRODUCTION

The Rural Electrification Program of the Philippines brought about the lighting up of the countryside from few households to over 14 million connections within the franchise areas of 121 ECs.

Energy is indispensable for progress and viable energy is essential for viable progress

according to Wirth (n.d.). The way energy services are produced in power plants, transported through transmission lines, distributed to homes, businesses and industries and used by people affects the social, economic and environmental aspects of any development. Energy itself is not a fundamental human need but it is definitely indispensable for the satisfaction of all needs as

stated in the work of Galapon (2021). Energy is an important factor in people's daily lives particularly in the improvement of the quality of life and for the economic development of a country (Korkua and Thinsurat, 2013). The inaccessibility of electricity is certainly a major barrier to progress for a huge proportion of the world's population and has great impacts on a variety of development indicators such as health, education, food security, gender equality, livelihoods, and poverty. Put another way, while rural electrification programs appear to be essential in improving living conditions and promoting development, thoroughly evaluating such programs' impacts, to determine whether interventions are appropriate and cost effective, is a primary concern (Galapon and Mallari, 2021).

The turn of the century has witnessed remarkable improvements in the access of electricity. Record shows that 9 out of 10 people have access to electricity but serving the unserved and underserved areas still need intensive and collaborative efforts from the concerned government agencies and the distribution utilities (DUs) or electric cooperatives (ECs). It is apparent from the global perspective that electrification of rural areas progressed rapidly from year 2015 and 2017. Electricity access in developing countries has begun to spur up, energy efficiency is improving and renewable energy sources is making remarkable profits in the electric industry but a large gap still exists. In 2017, rural coverage was only 78 % as compared to 97% in urban areas. In the SDGS Report (2019) record further shows that 87% of the people currently without access to electricity reside in rural areas. As of 2018, there was a slight drop of people around the world without electricity access from about one billion in the previous year to 860 million. Out of this number, about 600 million lives in African countries and the rest are found in South Asia. SDG 7 which is "Affordable and Clean Energy" aims to provide reasonable, dependable, maintainable and advanced energy for everyone (IEA, 2020).

Universal electricity access is still a big challenge and those without electric service are found in remote areas or poor, or both. In urban areas, those that remain unserved are usually poor communities. These areas may be easy to reach but it is quite hard to put up a permanent

infrastructure because many residents are informal settlers. Hence, there is a big tendency that these people may move out to other areas at any time. Extending the electric distribution lines in far-flung areas can be expensive. Even utilizing off-grid systems to deliver electric service to these dispersed populations can be financially difficult (World Bank, 2018).

Rural electrification in the Philippines began in 1890 and has progressed slowly until significant improvements patterned after the United States' rural electric cooperative system was introduced by the United States Agency for International Development (USAID). Feasibility studies for pilot projects was pioneered and a contract was executed in 1966 between President Ferdinand E. Marcos and the National Rural Electric Cooperative Association (NRECA) of the United States. This was immediately followed by the creation of the National Electrification Administration (NEA) by virtue of Republic Act 6038 otherwise known as "National Electrification Administration Act". The United States of America granted a \$3.5 Million loan to invest in the said electrification projects. During that period, only 22.9% of Filipino households had electricity and about 62.8% were located in urban areas while only 5.8% were found in rural areas. The birth of ECs shortly followed which became the implementing arm of NEA in extending power to remote and far-flung communities without electricity access (NEA, n.d.).

According to World Development Indicators (2018), 94.857% Filipino households already have electricity. About 97.509% households in urban areas have electricity while only 92.515% households in rural areas have electricity. In 2019, NEA Administrator Edgardo R. Masongsong stated that Filipino households without access to electricity stands at 2,319,660 million (Peralta, 2019). However, according to the DOE, Filipino households without electricity access have been reduced to just 1.62 million with the continuous implementation and fast-tracking of rural electrification projects under NEA's supervision (Domingo, 2021). In the report of PSA (2020), a total of 1,558,357 new service connections were accomplished by ECs in Central Luzon, Philippines in 2019 which is equivalent to 111.5 % of the



potential households based on 2015 National Census.

Rural Electrification Program now faces numerous and bigger challenges with more complexities than previous years. This is mainly because of frail and overburdened distribution grid and unserved population, including those who live in barangays that are mostly far-flung, disperse, hard-to-reach and more difficult to electrify (DOE, 2020).

Economic development through the enhancement of people’s living conditions were achieved through the provision of electricity. Nevertheless, it is still imperative to evaluate the appropriateness and cost-effectiveness of such programs to identify necessary strategies for its improvement (Torero, 2015).

OBJECTIVES OF THE STUDY

The study was undertaken to determine and evaluate the 1) accomplished consumer connection of Central Luzon ECs for year 2016 to 2020; 2) contribution of Rural Electrification Program in Central Luzon, Philippines on poverty, health and well-being, education, economic growth and development, industry and infrastructure and climate change; 3) problems encountered by Central Luzon ECs in the implementation of Rural Electrification Program; 4) strategies that can be undertaken by Central Luzon ECs to address the problems and improve the Rural Electrification Program.

METHODOLOGY

This study used various tools in data gathering which were needed to answer the research problems. The initial tool was documentary analysis which involves the retrieval of existing laws, memoranda, advisories, directives, rules or guidelines related to Rural Electrification Program in Central Luzon, Philippines. The information from these documents were analyzed to give more substance to the study. Secondly, survey questionnaire was created through google forms. Subsequently, these were sent through online platforms like messenger and email to the respondents comprised of officers and

employees and member-consumer-owners (MCOs). This helped in evaluating all programs related to rural electrification, determine the problems encountered during its implementation and recommend strategies by which said programs can be improved and successfully implemented. The last tool used was a semi-structured interview with the above-mentioned respondents and with some high officials of the Philippine Rural Electric Cooperatives Association, Inc. (PHILRECA) which enabled the researcher to gather a more comprehensive and essential data.

RESULTS AND DISCUSSION

1. Accomplished Consumer Connections of Central Luzon ECs for year 2016 to 2020

Table 1
Total Consumer Connection of Four ECs in Central Luzon, Philippines for 2016 to 2020

Year	Cooper ative A	Cooper ative B	Cooper ative C	Cooper ative D
2016	4,806	3,907	6,014	4,060
2017	4,788	4,200	6,101	4,245
2018	5,924	11,779	5,997	4,031
2019	6,077	4,324	6,999	4,089
2020	5,855	4,231	6,739	3,623
Total	27,450	28,441	31,850	20,048

Source : www.nea.gov.ph; <http://rso03.psa.gov.ph>; cooperative A, B, C & D

The Rural Electrification Program is the real key to the electrification of the countryside and NEA is the state-run corporation instrumental and responsible in the program implementation. NEA focuses on strengthening the ECs as its valued partners through provision of technical, institutional and financial assistance while ensuring that they serve with utmost quality, efficiency, reliability and global competitiveness (NEA, n. d.). The ECs were organized as private, non-stock, non-profit and non-political entities which is owned and operated by the consumers. The ECs are classified into five categories such as A+, B, C, D and E in accordance with their overall annual operational performance rating based on several parameters like system loss, collection efficiency and payment



to power suppliers, among others. The ECs are further classified as mega large, extra-large, large, medium and small depending upon the number of consumers they serve, their sales and the kilometers of line that they have constructed in their coverage area (NEA, n. d.).

Since its first inception, Rural Electrification Program became a national policy as embodied under Section 2 of P. D. 269 otherwise known as “National Electrification Administration Decree of 1973” and amended under Section 2 of the Republic Act 10531 otherwise known as the “National Electrification Act of 2013” with an ultimate aim of fostering sustainable development in the remote areas through rural electrification.

Meanwhile, the NEA in collaboration with the 121 ECs had already surpassed the 14-million mark in household connections, a very significant achievement in the government’s rural electrification program despite the limitations related to the COVID-19 pandemic. NEA reported that the ECs have energized 522,905 new household connections for the year 2020, exceeding the 14% target which was only 460,000. Hence, the total consumer connections have already reached 14.253 million while the number of unenergized consumers was reduced to 1,550,510 as per the 2015 census (NEA, 2021.) Since 1969, the ECs served as the agency’s implementing arm in the government’s mandated mission of reaching even the remotest and hard-to-reach areas as they continue to execute the latest electrification project called Sitio Electrification Program (SEP). In Central Luzon, Philippines, various ECs altogether have already accomplished 1,558,357 service connections through the SEP at the end of 2019 (PSA, 2019). The four ECs being the subject of this study have accomplished a total of 107,789 consumer connections for the year 2016 to 2020, as shown in Table 1.

The difference in the accomplishment of the four ECs is primarily due to the number of potential and target household connections in their coverage areas and the availability of funds needed for the implementation of electrification projects.

Rural Electrification Program which is mainly made through expansion or installation of

distribution of lines in remote areas provide a sustainable energy source for rural folks.

2. Contributions of Rural Electrification Program in Central Luzon, Philippines

Table 2

2019 and 2013 Functional Literacy, Education and Mass Media

Region and Age Group	2019 Functional Literacy Rate			2013 Functional Literacy Rate		
	Central Luzon					
	10 to 64 y/o (in percent)					
Gender	Both Sexes	Male	Female	Both Sexes	Male	Female
	94.4	93.5	95.4	92.3	91	93.6

Source: Philippine Statistics Authority

Economic activities apparently started to flourish after electrification as it resulted to the establishment of various micro, small and medium businesses which in turn created jobs and other income-generating opportunities for rural folks including women. Some of which are new stores, groceries, shops, cafes and restaurants. These manifest that electrification has indeed improved various types of businesses and people’s productivity in rural areas thereby providing efficient source of lighting, cooking, and accurate performance of tasks with lesser amount of time. Jobs common in rural areas like fishing and agriculture were enhanced and income also increased as new technologies surfaced. Electricity paved the way for cold storage thus enabled fishermen to preserve their catch for some days. Unlike before without electricity, they only have it as food or salted dried fish.

Additionally, dressmaking and tailoring businesses increased their production through electric sewing machines with extended working hours because of sufficient lighting. Small rice mills were also built for easy access of farmers and water refilling stations. Telecommunication facilities/towers and internet cafes were constructed. People also felt more safe and secure with the installation of street lights which illuminated the roads and streets as well as Close Circuit Television (CCTVs) which deterred crime occurrence. Electricity alone may not be able to improve the economic status but it is absolutely

essential for basic human needs and economic activity (Torero, 2015).

In the latest Macro Poverty Outlook for East Asia and the Pacific Report published by World Bank, the estimated poverty rate in the Philippines has been continuously reduced from 24.5% in 2016 to 23.1 % in 2017 and 21.9 % in 2018. It is also expected to be down further to 20.8% in 2019. In the same report, the World Bank expects the poverty rate to be declining further to 19.8% in 2020 and even lower in 2021 at 18.7% (Carlos, 2019).

In the Philippine Statistics Authority's (PSA's) comparative report regarding Poverty Among the Basic Sectors of the Philippines, those with higher poverty incidence compared to other basic sectors are farmers, fisherfolks, and individuals residing in rural areas at 40.8 % and 31.6% for 2015 and 2018, respectively. Nevertheless, it also displays that there was decline in poverty rate among these sectors of 9.2% during the period in review. This attests that electrification plays a vital role in the upliftment of the lives of rural folks and improvement of delivery of basic social and economic services.

Electricity access made possible the use of Electronic Medical Record (EMR) Systems by the Department of Health (DOH) for real-time access to medical information and monitoring of patient cases in Rural Health Units (DOH, 2019). Electricity also facilitated the use cold storage for Barangay Health Stations which maintains the stability of vaccines for the prevention of common communicable diseases like measles, chickenpox, hepatitis and many others. Medical equipment like dialysis machines, x-ray machines, ventilators and others also need electricity to function.

Electricity access resulted to a remarkable improvement as substantiated by Table 2 where the values for functional literacy rate of population 10 to 64 years old by sex and age group in Central Luzon, Philippines are significantly higher in 2019 than their corresponding values in 2013 at 5% significance level.

The functional literacy rate includes reading, writing skills and numerical skills. It enables the individual to completely and effectively respond in common life situations requiring a reasoning capability through written

communication. The increase in functional literacy rate may be most likely attributed through easy and fast access to significant information including international sources or references. This was made possible with the ownership and usage of Information Communication Technologies (ICT) devices like computers, cellular phones, television, cable, radio, broadband internet or fiber internet/DSL for learning which stands at 67.9% in Central Luzon, Philippines (PSA, 2019).

Inclusive growth and economic development are two important keys to poverty alleviation and improvement of living standards especially those belonging to the marginalized sectors. Electrification as earlier mentioned initiate all sorts of economic activities including employment or income-generating jobs. It offers better opportunities to parents to invest in their children's education. Hence, human development progresses thereby promoting economic growth which in turn reduces poverty.

One of the foundations for economic growth which help improve people's living standards is the development of resilient infrastructure. Energy and public works are probably the best partners we could ever have to propel the Philippines into becoming a Giant Economy in Asia. If energy and infrastructure reach the far-flung areas, it will uplift the lives of Filipino people as it will set the pace for a more robust economy thereby promoting international trade and efficient use of available resources.

At present, the impact of Rural Electrification Program on climate change can only be speculated. In more dense areas where the effect of increased energy consumption is clearly felt, there is really a need to be mindful of the effect of changes in temperature, which may eventually lead to climate change. However, the impact is probably less or minimal and tolerable in the countryside. We cannot deny the scientific fact that high electricity demand can put significant stress to our nature. Hence, addressing the effects of climate change should be a top priority. To do this, we should support research and innovation that will make fossil energy technologies cleaner and less harmful to the people and the environment. We also have to cut down on carbon pollution and work

dramatically to increase the efficiency of our appliances and vehicles.

Transitioning to cleaner energy resources has been a real struggle for developing countries like the Philippines. However, there is really a need to reduce reliance on fossil fuels as this causes air pollution, climate change and financial uncertainty. Accordingly, the Philippine government approved several laws namely: R. A. No. 9136 otherwise known as the Electric Power Industry Reform Act of 2001, R. A. 9367 otherwise known as the Biofuels Act of 2006, R. A. 9513 otherwise known as the Renewable Energy Act of 2008 and R. A. 9729 otherwise known as the Climate Change Act of 2009, which all provides legal bases for addressing climate change through sustainable development.

Relatively, there are three key pillars to mitigate climate change and address the sustainability gaps namely: increase use of renewable energy sources, reduction of global energy demands through efficient use of energy and increase in the electrification pathway for end-users (IRENA, 2017).

3. Problems encountered by Central Luzon ECs in the implementation of Rural Electrification Program

As with any type of program, problems have also been encountered in the implementation of Rural Electrification Program. Emerging as the topmost problem was the rural inaccessibility and remoteness of areas. Some barangays are inaccessible by road and reachable by means of walking through hilly areas or near a cliff. Others require crossing the river with boats or passing by a hanging bridge which makes transport of electrical materials harder. According to the DOE, the biggest challenges are mainly the frail and overburdened distribution grid and unserved population, especially those residing in barangays that are mostly far-flung, disperse, hard-to-reach and difficult to electrify which requires intensive resources, time and great efforts.

Another problem which expansively affects Rural Electrification Program is the occurrence of natural calamities like typhoon, flood and

earthquake and man-made calamities like arson, explosion and other destructive activities which disrupts the construction works or damage materials and equipment. Low population densities and dispersed households is also one of the problems in the electrification of Barangays or Sitios. Most of the Sitios have only less than ten households and though there is a government subsidy for the house wiring cost, expansion of lines in these areas would result to high capital and operating cost and slow return of investment. Among the biggest problems in extending electric distribution lines are insufficient power generation capacity, weak transmission and distribution facilities, expensive supply to remote areas, or merely unaffordability of electric service. On the contrary, the major concerns for those not connected to the grid or served by any DU or EC are inadequate policies and regulations, deficient planning and administrative support, lack of financing schemes or available loans for off-grid contractors and again, affordability of service for underprivileged households. (World Bank, 2018).

Another life-threatening concern is the political interference where politicians insist on favoring constituents. The ECs are encountering problems on uncollected power accounts from LGUs, military camps and other government agencies as well as residential consumers. While the ECs can impose its right to disconnect or restrict provision of services to the delinquent consumers, it is a sad reality that political interventions during collection and disconnection activities happen resulting to low collection efficiency.

User unaffordability likewise surfaced as one of the problems. Poor households cannot afford the charges for new connection. Sometimes poor consumers are not able to pay their electricity bills on time which tends to accumulate resulting to high account receivables. The government provide subsidies like the National Intensification for Household Electrification (NIHE) from year 2015 to 2017 for poor households covered by the “*Pantawid Pamilyang Pilipino Program*” (4Ps). The 4Ps is a human development measure of the Philippine government that provides conditional cash grants to the poorest of the poor to lift them out from poverty. In addition, the government has

been continuously implementing lifeline subsidy rates since 2001 which is a socialized pricing mechanism for qualified marginalized end-users or poor households with low electricity consumption as set by the Energy Regulatory Commission (ERC). On May 27, 2021, President Rodrigo R. Duterte signed Republic Act No. 11552, amending Section 73 of the Electric Power Industry Reform Act of 2001 (EPIRA) law as amended by Republic Act No. 10150 exempting from the cross-subsidy phase-out the qualified marginalized end-users under this Act and extending it for a period of 50 years or until 2071 unless otherwise extended by law (Galapon, 2021).

Likewise, armed conflict was also identified as one of the problems. Some mountainous and far-flung areas within the cooperatives' coverage are conflict-affected because of the presence of leftist groups who do not favor electrification for security reasons. In December 2018, President Duterte signed Executive Order No. 70 "Institutionalizing the Whole-of-Nation Approach in Attaining Inclusive and Sustainable Peace, Creating a National Task Force to End Local Communist Armed Conflict, and Directing the Adoption of a National Peace Framework." This is in response to the goal of winning the battle against insurgencies, internal disturbances and tensions, and other armed conflicts and threat.

The least problem identified by the four ECs was fiscal deficit. For the past four years, NEA has been receiving lower budget allocations. The ECs being at times dependent on government subsidies then fails to implement the electrification projects as they are not capable of allocating enough resources from their internally generated funds.

4. Strategies that can be undertaken by Central Luzon ECs to address the problems and improve the Rural Electrification Program

The United Nations 2030 Agenda for Sustainable Development with the goal of having universal electricity access and improved quality, reliability, safety and affordability of electricity services poses formidable challenges for DUs and ECs. The effectiveness and sufficiency of strategies for Rural Electrification Program therefore is one significant step towards the

achievement of that goal. The recommended strategies for the problems earlier identified are as follows:

For rural inaccessibility and remoteness of areas, the ECs may opt to issue waiver in favor of Qualified Third Party (QTP) under the QTP Program to energize it through off-grid solutions like wind, hydro or solar energy sources. Due to global policy and fear of environmental issues, renewable energy sources awareness was enhanced and turned out to be one of the most appealing and ecological-friendly technical solutions (Agarwal, Kumar and Goel, 2013).

For natural and man-made calamities, it is very important for the ECs to craft a Contingency Plan to address the untoward effects.

For political interference, proper networking and coordination with the LGU officials must be done to explain the real objectives of Rural Electrification Program to gain their support and cooperation.

For user unaffordability, the ECs should devise some ways to cater to marginalized sectors through a SPA of new connection charges allowing them to pay the installation cost on a staggered basis with a minimal interest.

For concerns of armed conflict, government assistance must be sought in areas with peace and order concerns to ensure security of EC infrastructures, transmission and distribution lines.

For the past years, fiscal deficit has also been a concern. The government to achieve its mandate of total electrification must guarantee the availability of funds in the form of grants and subsidies.

The ECs aside from the implementation of the above-mentioned strategies must sustain excellent overall operational performance and continue to adopt technological innovations to help fast-track and further enhance the Rural Electrification Program.

CONCLUSIONS

Rural Electrification Program which is mainly made through expansion or installation of distribution of lines in remote areas provide a sustainable energy source for rural folks. In order to comply with the government's mandate of

achieving total electrification, the four ECs in Central Luzon, Philippines should devise new and useful strategies. This includes adoption of new technologies, allocation of sufficient funds or sourcing of funds through financing schemes for line expansions, preparation of attainable Workplan, institutional strengthening through capacity building and awareness program for its employees and stakeholders, and effective policy formulation and implementation.

RECOMMENDATIONS

For remote areas having highly dispersed households, difficult terrain, less viable or non-viable which require high investment cost, the ECs may opt to waive it to qualified private investors or may propose for off-grid electrification alternatives such as micro-grids using diesel generators or renewable energy sources like Solar Home System, wind or hydro. Careful assessment and planning must also be done by ECs in order not to compromise their system loss, collection efficiency and the quality of service that they provide to their MCOs.

The Philippine government must guarantee the availability of funds for sustainability of electrification projects. Looking for alternative steps like sourcing out of foreign grants and donations may contribute in gathering enough resources. Further, government subsidies for house wiring installation must be carefully administered to ensure that they only go to the qualified beneficiaries.

The ECs must also coordinate with LGU officials regarding proper integration of electrification projects with other developmental or social services like education, healthcare services, income generation, availability of jobs and infrastructure projects to ensure successful implementation.

For ECs affected by armed conflicts, collaboration with appropriate government agencies may be done to ensure efficient and secured implementation of electrification projects. Security back-up for leaders must also be sent to areas with peace and order concerns to ensure safety of infrastructures, transmission and distribution lines.

Streamlining of procedures and requirements for new connection in consultation with the LGU officials and stakeholders must be done. This involves waiving of fees for building/electrical permit to ease the burden for applicants. SPA on connection charges is also one way of helping them avail of electricity services in an installment basis.

The journey leading to the achievement of total electrification of the Philippines through Rural Electrification Program may be tough, full of challenges and still far from over but the lifelong benefits is undeniably beyond measure: a comfortable and secured life for all Filipino families and the future generations.

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REFERENCES

- Agarwal, N., Kumar, A. and Goel, V. (2014). Unit sizing and cost analysis of renewable energy based hybrid power generation System-A case study. *Walailak Journal of Science and Technology (WJST)* 11(1), 19-32. 2013. <https://doi.org/10.14456/WJST.2014.24>
- Carlos, RA. (2019). *PH poverty projected to be at 18.7% in 2021: WB*. <https://www.pna.gov.ph>
- DOH (2019). Implementation of the national ehealth electronic medical record system validation for national health data reporting requirements. http://ehealth.doh.gov.ph/images/eHealthPDF/AOE_MRSValidationMaster05122016.pdf
- Domingo, R. (2021). *93% of Filipino homes now have access to electricity*. <https://business.inquirer.net>
- Expanded Rural Electrification Program Implementation Strategies* (n.d.). <https://doe.gov.ph>
- IEA (2020). *SDG7: Data and Projections*. <https://www.iea.org>

IRENA (2017). Accelerating renewable mini-grid deployment: A study on the Philippines. <https://www.irena.org>

Galapon, ML.(2021). Rural electrification program: a challenge to electric cooperatives in Central Luzon, Philippines (Doctoral dissertation). Tarlac State University, Romulo Blvd., Tarlac City, 2300 Tarlac, Philippines.

Galapon, ML. and Mallari, N. (2021). A review of rural electrification initiatives and their impact on socioeconomic development. *In: Proceedings of the 8th National and International Academic Conference on Research to Serve Society*, Huachiew Chalermprakiet University, Bangphli District, Samutprakan, Thailand. 2021, p. 37-43.

Korkua, SK. and Thinsurat, K. (2013). A load prioritization model for a smart demand responsive energy management system in the residential sector. *Walailak Journal of Science and Technology (WJST)*. 2013. <https://doi.org/10.14456/WJST.24.53>

NEA (n.d.). *Report on the initiatives and activities on rural electrification*. <https://www.nea.gov.ph>

NEA (n.d.).FAQs. <https://nea.gov.ph>

NEA (2021). *NEA: Electricity Connections Hit 14 Million Mark*. <https://nea.gov.ph>

NEA-ITSDD (n.d.).*About NEA*. <https://nea.gov.ph>

Peralta, J. (2019). *Over 2.3 million households remain without electricity – NEA*. <https://www.cnn.ph>

PSA (2019). Number of municipalities and barangays energized and service connections as of 31 December 2015 to 2018 by Province: Region III. <http://rso03.psa.gov.ph>

PSA (2019). Number of households reporting presence of household conveniences/devices at home by province/city/municipality. <http://rso03.psa.gov.ph>

PSA (2020). *Functional Literacy Rate*. <https://psa.gov.ph>

SDGS Report. 2019. <https://unstats.un.org>

Torero, M. (2015). The impact of rural electrification: Challenges and ways forward. 2015. <https://doi.org/10.13140/2.1.2543.2641>

Wirth, T. (n. d.). <https://www.wisefamousquotes.com>

World Bank (2018). *Access to energy is at the heart of development*. <https://www.worldbank.org>

World Development Indicators (2018). *Access to electricity (% of population)*. <https://databank.worldbank.org>

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