

Philippine Electricity Development:
Emancipation through Decentralized
Renewable Energy

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Abstract

The passing of RA 9513 or better known as the Renewable Energy Act of 2008 was the institutionalization of the adoption of renewable energy resources in the Philippines. This made the country attain a diverse mix of power sources, but, due to the cost of sustaining renewable power plants like hydro-electric dams and geothermal facilities, the government is often attracted to the cost-efficiency of coal based power generation systems. Fortunately RA 9513 has made it possible to pursue the development of new renewable systems like Solar, Wind, and Biomass energy that are in its early technological maturity. The steady shift to these types of systems is revolutionary due to its decentralized nature. Unlike the traditional energy, solar, wind, and biomass can be harnessed in a community level. This is very important in securing the supply and access of electricity of the country. Greater accessibility is transformative because it can localize generation and can increase resiliency and stability of power consumption in the local level. This paper discusses the emancipation potential of renewable energy. The research starts with an exploratory discussion of the history of electricity generation in the Philippines and the adoption of renewable sources of energy by the country. This paper then proceeds with the

presentation of the importance of the adoption of new renewable energy sources that allow better accessibility and higher level sustainability. The research accounts the effects of the example new renewable energy plants that are already in use in the country. A few of them are located in Metro Manila like the Valenzuela Solar Farm and the increasing use of Rooftop Solar Panels. These solar electricity systems provide huge advantages for the consumers and the communities they cater. These new renewable systems provide greater flexibility in terms of production and consumption by democratizing the access of electricity. More people and more communities are given the capacity to diversify their sources of power. They become possible partners in the power sector rather than mere captured market of the traditional system. For a nation that struggles to maintain accessibility of electricity the adoption of community level power production is a huge opportunity for improving the lives of Filipinos.

Keywords: Renewable Energy, Decentralized Framework, Localize Power, Rooftop Solar

Introduction

Renewable energy (RE) has been part of the energy story of the Philippines. The nation started with the development of hydro-energy in its quest to energize major areas in the country. But it was through the passing of RA 9513 or the Renewable Energy Act of 2008 that the term renewable energy become a major tag line for the electricity industry. What was essential in the development of RE in the energy mix of the nation was the adoption of new power systems in the power generating mix of the country. Decentralized

electricity thru solar, wind, and biomass technology became an important part of the future green electricity in the country. However, the adoption of RE is more than just the Philippines attempt to lessen its reliance on fossil -based fuel. But it also represents the nation's attempt to develop a more diversified electricity mix to lessen its dependence on imported energy sources. However, what makes RE significant to the Philippine's electricity future is that it allows the country to pursue a more sustainable and greener energy development. In addition, the adoption of decentralized renewable electricity also gives more localized participation in terms of the electricity process; improving communities to become more autonomous and proactive in community development that is very important in the age Climate Change. This paper explores how the development of RE systems in the Philippines is hinged on the shift in the governance model in the power industry. The research discusses how socio-economic and political factors define the acceptability of adopting new energy technologies that not only increases the supply of electricity but also its sustainability. Likewise the paper discusses the key cases that will present new opportunities and challenges in the continuation of the development of green power.

Philippine Electrification

The Philippine electricity industry traces its roots from the establishment of the La Electricitas power company in 1892 (Patalinghug, 2003). The concessionaire was given the license to produce and provide electricity to light Manila's streets replacing

the old gas lamps. By 1903 Manila Electric Railroad Company (MERALCO) was established to operate city tram system but by 1904 the company acquired La Electricitas and its assets to formalize the establishment of a power generating and distributing company serving Metro Manila and nearby province (Cabrera 1992). Although founded by American businessmen and was initially a transportation company, MERALCO became synonymous to the development of the Philippine electric industry. After the Second World War the company ditched its tram assets and focused on power generation and distribution. Filipinization occurred by 1961 when the Lopezes bought out the American Owners (Patalinghug, 2003). Presently according to its corporate profile MERALCO is now the largest Filipino privately owned electric distribution company.

Governing the Electricity Sector

The government's participation in the electricity industry started with the establishment of the National Power Corporation (NPC) in 1936 (Velasco, 2006). The agency was established to develop the hydro-electric assets of the country. In 1960 the Electrification Administration (EA) was established to pursue the electrification of the country. It was succeeded by the National Electricity Administration in 1969. But it was not until the 1970's where the government became a more prominent player by becoming the sole major power generator. This, however, resulted to the sequestering of generating assets of private entities like MERALCO. Because of the increasing reliance of the Philippine electricity industry from oil-based fuels NEA started to the push

for diversification of the electricity generation mix (Velasco, 2006). There was relative success in developing other potential energy sources. The government's investments in geothermal and hydro energy resulted to the expansion of renewable energy in the electricity generation matrix. But the state-centric approach in developing the country's electricity generation resource has led to the accumulation of massive debt to state owned enterprises (Poquiz, 2015). With the eventual fall of the Marcos Regime the power industry experienced further problems particularly due to the generation deficits that resulted to black outs in Luzon including Metro Manila (Baylon, 2010).

Decentralization and Privatization

The 90's brought the Power Industry in the crossroads. The Philippine government was facing a major crisis in finding a remedy to the power supply issue. The government was too hard-pressed that the Ramos administration had to look for a short-term solution by allow independent power producers (IPP) to enter the generation industry via RA 7468 or better known as the Power Crisis Act (Baylon, 2010). Via the immediate operation of diesel barges the power deficit was resolved by the middle part of Ramos' term. However, the government was also finding ways to look for ways that will be effective on the long term. This resulted to the eventual overhaul of the power industry. The passing of RA 9136 or better known as the Electric Power Industry Reform Act of 2001 (EPIRA) led to the unbundling of the country electricity industry (Danao, 2009). The EPIRA followed the text-book approach in reforming the power industry by de-coupling of the major parts of the electricity sector. Power Generation,

Transmission, and Distribution was separated resulting to the establishment of these areas as separate industries. But the highlight of EPIRA was to eventually make the Philippine Government less active and less immersed in the power sector (see Figure 1). According to Baylon (2010), the highlight of the electricity sector reform was the privatization of the key sub-sectors the industry. The official entry of new players allowed the Philippine government regress in running the show. By becoming a mere regulator, the Philippine government gives up most of the operational responsibility to the new investors. At the same time the entry of private players is presumed to make the energy industry more efficient and competitive. EPIRA also brought with it the opening the possibility for the "right to choose" concept by the opening of the Wholesale Electricity Spot Market (WESM) (Poquiz, 2015). The opening of the WESM allows the bulk procurement of electricity making the trading of power more flexible and cheaper. However, there are major issues that plague the spot market system of the country. For one there were issues of collusion among major players and regulators that led to pricing issues on traded electricity (Chavez, 2012). Another major problem is that the energy mix is not that diverse where certain energy sources dominates the electricity supply side limiting price flexibility in the trading floor (Dela Paz, 2014).

other is the new RE systems that are now being promoted since the passing of RE act. The old system is represented by two (2) types of generation plants. The first is the Big and Medium Hydro Electric plants while the second is the Geothermal Plants. Whilst the new system is represented by solar, wind, and biomass systems.

Old Renewable Energy

Hydro-electricity has been part of the electricity story of the Philippines. As state in the early pages of this paper the initial attempt of the Philippines to develop her electricity industry was anchored on the development and exploitation of Hydro-energy. In the post-war period the NPC heavily invested in the development of Hydro-Electric facilities in the country. This paved the way for the development of major water resources found in all corners of the country. Most of these plants were Big and Medium sized plants thus making the endeavor of developing these facilities capital intensive (Velasco, 2006). But besides the capital cost, the development of these power plants often leads to high social displacement. The development the Pantabangan Dam in Nueva Ecija left the town of Pantabangan and seven (7) outlying villages submerged in water displacing around thirteen thousand people (Tamondong-Helin, 1996). Another major problem of the Philippine's hydro experience is the increasing risk faced by this generating facilities with climate change (CC). CC has heavily altered the consistency of water supply needed to produce electricity. This was evident in the rotational black outs Mindanao experienced in 2014 because of the

low water levels of the Pulangi River in Bukidnon and Lake Lanao in Marawi City. These two serve as the main sources of water for the operation of Hydro-electric plants in Mindanao (Regalado, 2015).

The development of Geothermal Energy in the country was a product of the oil price shocks experienced in the 1970's. The government, spearheaded by the Philippine National Oil Corporation (PNOC), invested in geothermal energy because of the attempt to diversify the nation's energy mix. The PNOC was able to develop the nation's geothermal potential making the country the second largest user of geothermal power in the world (Velasco, 2006). The success of this energy system has also resulted to the economic development of provinces where geothermal plants are located. It has also lessened our dependence on imported fossil-based fuel thus saving the country millions of dollars. But like the major hydro-electric plants, geothermal energy is also a capital-intensive project. This is the reason why the initial start of this undertaking has cost the government and country around Php. 1.8 billion (Velasco, 2006). The proximity of the potential sites is also a major issue. Almost all the geothermal wells are found near volcanically active areas that are often far from the main consumer bases. Similar to the hydro-electric dams, geothermal energy requires a complex infrastructure that increases the cost of operation. This reflects the framework issue that plagues the old RE systems that has exemplified the major problem of the centralized framework where traditional power systems work on.

Traditional energy systems often require a centralized framework for it to operate. This entails the formation of a

process driven structure that often requires centralization in the process of generation, transmission, and distribution of electricity (Rifkin, 2011). This system fits the procedures of energy development and consumption of the second industrial revolution. However, the framework does not promote efficiency and sustainability. One major problem is that the traditional framework requires for the energy system to heavily rely on a complex grid system. An entropic process emanates from this condition because the progression of generation and transmission already results to system losses (Hoffman & Hoffman, 2008)

New Renewable Energy

With passing of RA 9513 or the Renewable Energy Act, new renewable energy was integrated in the policy outline of the Philippine Government. The recognition of solar, wind, and biomass systems made the RE energy mix more diverse. But what made the landscape of Philippine electricity more dynamic is the lower capital cost that is required to develop and operate new RE plants. Unlike geothermal and big hydro, new renewables tend to cost less both economically and socially. This avoids the heavy displacement that often occurs in the development of dams and geothermal wells (Rifkin, 2011). For a developing country like the Philippines this is significant because it does not carry the heavy burden of social and economic dislocation. With the deregulation of the electricity industry the lure for private investments in RE became more alluring. This indirectly lessens the reliance of massive state participation in the formation and expansion of green energy. The government

will not be burdened by direct subsidy requirements. In addition to the economic and social advantages, new renewables are often community centered. This is because the technology now available to harness the sun, wind, and waste can be met by the local resource available in the host community. This limits the operational cost in terms of building complex infrastructure that are often required in traditional systems. Decentralization becomes the rule of the game in building new renewables (Hoffman & Hoffman, 2008).

Solar energy is perhaps the most effective new RE system for the Philippines because according Greenpeace (2014) the Philippines has potential to produce around 4.5 to 5.5 kWh/sqm/day in solar electricity. The good thing about solar power is that the available technology has increasingly matured. The price of solar panels has consistently decreased in last few years. In fact the projection is that the cost will continue to go by 50% in following decade (De Guzman, 2018). In terms of placement solar power is more adaptable to the terrain compared to wind and biomass. The best about solar is that it can even be developed in the urban setting. The increasing use of rooftop solar system is an indication of the immense potential of solar power (Verzola, 2016). The possibility for household-level generation and consumption is a huge step forward to energy empowerment. Investing in this type of RE is not a close door event. Local Government Units (LGUs), community organizations, and ordinary folks can also participate in the solar bandwagon.

Wind and Biomass have huge potentials in the Philippines also. Although it may not be as adaptive as solar energy, wind

and biomass plants can also maximize the benefit obtained from decentralized electricity. The Philippines have already started to develop wind farms and biomass facilities. But these projects are still limited to the farm type system. Rooftop wind turbines are also available, but it is not as accessible to consumers compared to solar energy packs (Verzola, 2016). Urban application is also limited because of the special requirements to operate wind turbines and biomass generators. None the less the application of RE is based on localization. Hence wind and biomass systems can be placed to areas where available resources like sustained wind speed and biomass fuel is available

New Renewable Energy is hinged on the framework of decentralization and democratization of access on production and consumption (Sison, et. al, 2015). This is the reason why new RE systems like solar, wind, and biomass often work better in a localized and community level process. The localization is advantageous because it does not sustain a linear process of energy development. Instead decentralized RE allows a circular process of electricity production. By relying on the local natural resources solar, wind, and biomass facilities avoid the instability of oil and coal prices. It reduces the reliance of imported sources saving money and also limiting carbon footprint. Unlike traditional RE, localized solar, wind, and biomass plants also require fewer capital investments and has a next to nil social displacement impact. But this does not connote that new RE will replace traditional RE and even fossil based generating facilities. So far, the level of maturity in the new RE is still in its early stages. In case of

the Philippine experience the new RE has experienced roadblocks coming from different fronts as cited earlier.

Policy and Technological Issue

One major problem faced by RE industry in the Philippines is the incongruence of certain policy and the potential of the technology. It is cited above that new RE works well in a decentralized manner but in the case of the Philippines the policy orientation in the RE landscape still reflects the systemic character of a centralized framework. The government lacks an incentive mechanism for people and communities to adopt new RE. All the incentives that are implemented are often favoring big and major players that is trying to crack into the RE landscape. The FIT for example is exclusive only for players who was able to avail of the limited slots of the program (Verzola 2016). With the absence of a more downstream incentive mechanism the potential of developing RE is limited to big and medium players. This results to local communities and household consumers to hold out on the adoption of the said system. The cause of this policy and technological conflict can be traced to the perspective of the regulatory institution. The government still views the industry using the same lens used in the traditional power framework (Sison, et al., 2015). But there are already attempts done to pass policies that will widen the access to decentralized RE system. One of the them is the proposed Solar Rooftop Adoption Act. It is intended to expand the access of solar panels by seeking grants and loan financing that will target regular consumers (Lackovic, M. & Ruiz-Cabrero, 2021). The

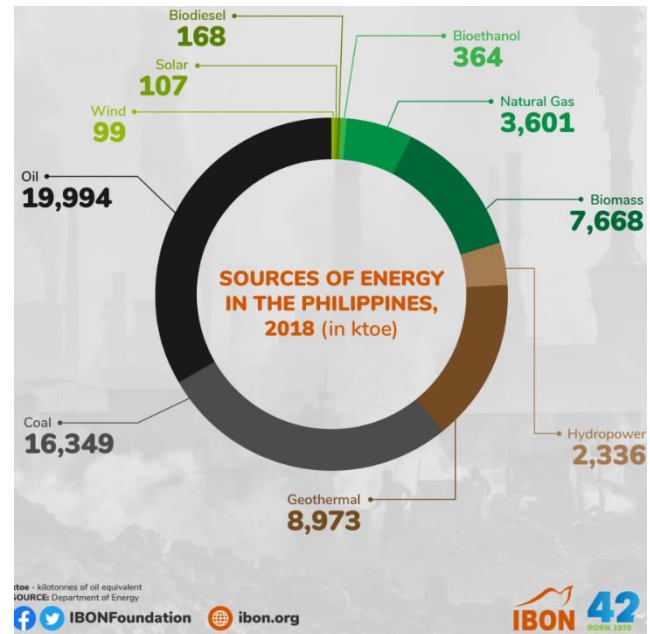
bill could have resolved the gap in the access for RE systems. But this bill has not yet transformed into law.

certain levels of market distortion, which is the source of criticism against the RE industry (De Guzman, 2018).

Market Competition

The entry of new RE in the Philippine power industry is a representation of the opening up of the sector to new stakeholders. But this does not entail that solar, wind, and biomass got the largest investments. According to Baylon (2010) the EPIRA was primarily a privatization reform which mainly benefited major companies. The expansion of new RE is eclipsed by the development of more entrenched and mature power system. This is particularly evident in the generation side of the electricity sector. Coal and Natural Gas have benefited the greatest in the privatization of the Philippine Power Sector. Coal has become king in the Philippines in the last two decades (see Figure 2). While other traditional energy sources have decreased like oil or remained flat like old RE, it is clear that solar, wind, and biomass is facing gargantuan competitors coming from king coal and natural gas, which are both non-renewable and climate change inducing resources. Even with the passing of the Renewable Energy Act of 2008, renewables have not expanded in the same scale as that of other traditional energy in terms of the percentage in the energy mix of the Philippines. This leaves a major issue of price competition of electricity. The only way renewables to be competitive against the 'others' incentives have to be given. The FIT mechanism became a major part of the competitiveness of green electricity. But the adoption of this incentive process requires

Figure 2- Share of Electricity Sources



Source: Ibon Foundation

Social Acceptance

Social acceptance is still a major problem in growing green energy. One major reason for this is the limited incentives for regular folks to shift towards RE. Even if there is an increasing awareness of climate change in the global scale this is not enough to convince people, particularly Filipinos to invest in new energy systems. This situation can be explained by the material and institutional condition of the Philippines. Most Filipinos cannot afford to avail themselves of a simple solar power pack

because there is not much downstream facility for people to avail the said system (Verzola, 2016). The lack of fiscal and loan mechanism available makes the shift prohibitive even if the actual cost of solar panels has decreased by half since 2011 (De Guzman, 2018). One way to address this is to expand the incentive system given to the RE industry. But rather than focusing more on the major players there should an incentive facility that will also cover the regular consumers. Policies that reflects the same spirit as SB 2456 may help in addressing this problem. But what is perhaps more effective is to have more localized adoption of renewable energy systems. This can be spearheaded by the LGUs in a city or municipality. However, LGUs cannot solely shoulder the whole expense of the operations. Therefore, it is imperative that the local approach should also consider a partnership driven framework. Other stakeholders should come in the equation.

Valenzuela Solar Energy Incorporated Inc. (VALSOL)

The Valenzuela Solar Farm has been operating for the past three years. It is a 12-hectare facility that was once an abandoned bangus fish farm in Barangay Isla, Valenzuela City (Canete, 2015). It was one the first solar farms that was established in an urban setting in the Philippines. The 8.5 megawatt (MW) facility provides 11,379 MW hours to MERALCO. Using SUNTECH's solar panels, it can provide 17,614 households in Valenzuela of clean and renewable electricity thus offsetting around 3,473 tons of carbon per year (Business Mirror, 2016). The establishment of a facility like this in the Philippines is an important step towards the maturity of new RE. VALSOL represents the potential for RE investments in the country. It also promotes

green jobs to local residents particularly those living in Barangay Isla (Canete, 2015). But VALSOL also exhibits the systemic problem that is faced by the RE industry. For one the facility is mainly a private endeavor, it does not fully accommodate what the decentralized framework is all about. Instead of promoting a shared market structure, VALSOL is tied to the centralized set up of selling their entire electricity to MERALCO. Instead of focusing on equitable access to energy the electricity produced by the solar facility is turned into a traditional commodity that has to be distributed by a centralized entity like MERALCO. This situation is typically happening to most sizable RE developments in the country. But because of the increasing investments in new RE projects it's important to take note that renewables are now increasingly becoming an important piece of the Philippines' energy future.

Rooftop Solar

Rooftop solar packs are now increasingly becoming popular. With the failure of the EPIRA to resolve electricity supply and pricing issues, the utilization of rooftop solar panels is becoming a viable alternative in sourcing for electricity (Verzola, 2016). The main advantage of rooftop solar is hinged on the level of independence that the system provides to its consumers. There are solar packs that can give full off grid freedom resulting to the elimination of electricity bills. But these types of solar packs are often very pricey. There are also other rooftop solar packages that allows users to be partly energy independent. This lessens the reliance on electricity sold by distributing utilities like MERALCO. Energy emancipation is made possible by this type of RE system. But the

potential of rooftop solar goes beyond the decrease in the power bill. Being in a decentralized structure, rooftop solar can also enhance the resilience of its users (Sison, et al., 2015). It makes energy access more democratic thru the transformation of the consumer as a producer. In times of calamity it makes the process of powering the household faster thus helping in lighting and heating needs of the household. Comparing this to the centralized solar field system, home-based energy system also makes electricity production and consumption more efficient because it eliminates systems-losses accumulated through the transmission of power (Rifkin, 2011). Thus, the overall benefit of decentralized energy is based on the empowerment of the consumers. But in order for its full potential to be realized there should be a change in the systemic incentive mechanisms.

Emancipation through Renewable Energy

The future of the Philippine energy sector is now heading towards a greener and sustainable one. Because of climate change and the increasing volatility of fossil-based resources the nation has to fully commit to the development of RE. But this does not mean that the thrust towards renewables will be a smooth path to take. There will always be challenges that will stem from different fronts. Institutional roadblocks will be one of the major impediments that renewable energy is facing. Now the government's take on green electricity is still stuck in the centralized lens. This has resulted to the non-maximization of the full potential of solar, wind, and biomass resources. The conservativeness of the policies implemented is reflective of the state of the 'business' of electricity. EPIRA's main effect to the Philippine RE story was still limited to the

value of privatization. The frenzy for the nation's energy industry is mainly fueled by the economic gains of investing into energy assets. Economics of scale works well in the current condition of the Philippine energy market. Private investment is driven by the main desire for profit. Even the government has carried this perspective. Having transformed into a regulatory player, the Philippine state becomes a mere facilitator for the processes of the deregulated market. The RE industry is subjected to this same condition. Many of the solar, wind, and biomass energy projects in the nation is mainly driven by the centralized framework. Valenzuela's VALSOL plant is the best representation of such situation. The production of the solar facility is mainly captured by MERALCO's distribution infrastructure, thus not maximizing the community developing potential of an urban solar plant. This arrangement is particular to ensure and sustain the income driven orientation of VALSOL. Earning, however, is part of the operation of any form business endeavor. But the potential of RE is best suited for a shared economy. Players are still driven to earn, but it does not follow Adam Smith's centralized economic process. Earning is driven by surplus after the product has enabled participants to be energy independent. A shared economy emphasizes the empowerment of consumers and the community. RE technology works well within this condition. The surplus of production is not the main motivator to produce, it is but an incentive to sell/share to others. But with the current state of government incentives, the in-congruence of policy and technology makes it difficult and economically prohibitive to adopt a decentralized approach in developing renewables. The tax and other forms of incentives the Philippine government is giving to the RE industry is commendable,

but it is incomplete. The FIT and other tax holidays may have allowed major RE players to compete against the other players representing well entrenched power systems, but it does not allow further adoption in the individual and community level. However, there are novel attempts to address this like Senate Bill 2456. Perhaps it will only need a bit of time for the demand to make decentralized RE systems to be accorded with the same policy incentives as that of the major players. With the increasing development of RE technology small scale power systems are becoming more economically viable. The increasing popularity of rooftop solar packs is a representation of this development. Nonetheless to fully make these kind of energy systems mainstream a state level incentive framework is needed. However, this needs a systemic shift in the energy and electricity sector. If this finally happens the door will finally open for the widespread adoption for renewables. A road to energy transformation and consumer emancipation will finally widen and perhaps the electricity story of the country will become real and not just fairy tale promises.

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