

I.T. Roadmap for the Energy Sector in the Philippines

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Introduction

I.

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The Philippines has had a very strong history of successful independent power producers (IPPs) implementations. Since the early nineties, the country sought private sector participation in setting up IPPs to meet its power demand. The shift towards privatization in the Philippine power sector led to investments from both foreign and local companies and gave rise to radical reforms in the industry.

The National Power Corporation (NPC), which was established to construct, operate and maintain the production of electricity, has accumulated and wallowed in billions of debt in the past three decades. This led to a lack of financial capability to efficiently operate, maintain and build power generators. The government then resorted to creating several Republic Acts such as RA No. 6957, known as Build-Operate-and-Transfer (BOT) Law and RA No. 7468, known as The Power Crisis Act. The BOT Law permitted private contractors under a build-operate-transfer or build-and-transfer (BAT) scheme to construct and operate power generation facilities for what is stated as an assured reasonable return of its investment, operating and maintenance costs. This proved to be insufficient however and induced an amendment of the BOT Law wherein the addition of the build-own-and-operate (BOO), build-lease-and-transfer (BLT), rehabilitate-own-and-operate (ROO) and rehabilitate-operate-and-transfer (ROT) schemes were implemented. Besides strengthening the BOT Law, the government executed The Power Crisis Act which gave the President the power to enter into negotiated contracts for the construction, repair, rehabilitation, improvement or maintenance of power plants, projects and facilities and the ability to reorganize the NPC.

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Despite these efforts, the government has not been able to keep up with the impending energy crisis. Aside from the inefficiency of the NPC, other factors are said to hinder the solution to this ever-present crisis. One factor is the main response to power shortages known as the Interruptible Load Program (ILP). The ILP involves large establishments who have their own generators, such as shopping malls, factories, office buildings, to voluntarily interrupt their power from the main grid and start running their generators when a shortage is predicted. Although this is believed to be more socially and economically beneficial, some private sectors and even the Department of Energy do not believe that it is sufficient. Moreover, just last year, the administration of President Noynoy Aquino requested a joint congressional resolution granting him emergency powers for a limited time period to fast-track contracts for new power generation. This sparked controversy and has still not been resolved, at least on paper.

Another factor is what is known as the Red Tape or the excessive complexity of an official routine or procedure which leads to delay or inaction. The Department of Energy estimates that it takes 165 signatures and a minimum of three years to secure the necessary permits to address the crisis. This can then be challenged, and delayed in court by opposing local activists, say, coal power plants. Additionally, some investors are reluctant about contractual and pricing changes. In the last decade, contracts made during the energy crisis in the 1990s were renegotiated to try to get more favorable terms. And the Energy Regulatory Commission has often been slow to approve cost recovery, delaying rate changes in the face of increasing

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generation costs. This paper aims to discover alternative solutions to the energy crisis by analyzing the external and internal factors of the Energy Sector in the Philippines.

External Analysis of the Philippines

II.

A. Economic

The Philippines enjoyed one of the fastest growing economies in the past decade. Our Gross Domestic Product (GDP) peaked up to 8.9 percent growth in certain quarters. This growth increased the buying power of




people, thus increasing consumption and production not only in energy sector but in almost all other industries as well. The GDP is forecasted to grow by 6 percent in 2017, continuing the economic success and traction that is had already gained.

The industry, value-adding sector comprises 31.6 percent, or approximately Php 77,778,852,053.00, of the country's GDP. Within this sector is the electricity, water, and gas. The increased demand for this sector is largely caused by the increased overall economic activities in the country. More infrastructures are being developed. Local communities are improved and empowered. The micro, small, and medium enterprises (MSME) sector has bloomed to an all-time high. Foreign direct investments (FDI) are increasing. This in turn resulted to the strengthening of transmission and distribution line across the country to cope with the current development in the economy. Moreover, the worsening climates of the country is another factor for the increase in demand and expenditure, whether it is caused by El Nino or climate change, or both. Ultimately, it leads to higher usage of utilities such as water and electricity.


B. Social, Cultural, Demographic

Philippines just broke through the 100,000,000 mark a few years ago. Its current population is at 102,437,390 and has a growth rate of 1.9 percent in 2015. While our population density is at an average of 250 people per square kilometer, the seemingly centralized development of the country led



the people to go to regions like NCR, which has a population density of at least 16,000 people per square kilometer. This resulted into a bottleneck in logistics. Transportation going to and back has already been experiencing inefficiencies. An average person in the Metro spends at least six hours daily in transit. The average travel time for a 15-kilometer drive within the city is 45 minutes. In fact, Manila is labeled among the worst traffic condition in the world consistently over the past five years. A great consequence to this is that a lot of energy has unproductively been consumed and a lot of non-value adding activities because of the huge amount of time spent stuck in traffic.

Familial ties have always been so strong in the Philippines. Extended families ought to stay and live within close proximity with each other. Families tend to live within the same city or province, eating out together and bonding almost every week. However, it is already showing signs of weakening due to the emergence of a development that is more globally inclined and stratified. The number of OFWs are still increasing and as well as the number of families migrating abroad. Living alone is also likely to rise rapidly in the Philippines due to the emergence, adaptation and cultivation of a more global approach which favors functionality and practicality. This can be seen in the rise of condominiums across the different areas of the country. Extended families are starting to separate homes as well, with some families starting to move out to nearby provinces where they see a potential for



growth. Families also move out of the city so as to veer away from its busy and congested way of life.

C. Political, Legal, and Government

The political, legal, and administrative landscape is bound to change again this May. A new administration will step in and this certainly raises some uncertainties with regards to the state of the Philippines in its development. Corruption has already dropped in the Philippines, despite the low government trust, with the corruption index dropping to the 85th least corrupt country in the world in 2014, although rising again to 95th in rank in 2015. Nonetheless, this is still a big improvement from its ranking of 105 in 2012 and its peak at 141 in 2008.

Growth in the field of ICT is promising in the past years. In 2015, the Philippines is ranked 98th out of 167 countries in the ICT Development Index (IDI). This is an increase in rank from 105th in 2010. It is still uncertain however, as to whether or not the next administration is a strong supporter of ICT and this is crucial in terms of keeping the momentum of the certain sector's growth.

D. Technological

Robust market signals in the field of ICT are crucial for its continued capacity addition. The Philippines is a strong market for ICT. This can be seen with the emergence of several technologies in the country. The number of BPOs and technology companies in the country has increased and this has

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certainly brought in a lot of job opportunities for the people. In fact, the Philippines is ranked 88 out of 167 countries in terms of e-readiness or the conduciveness to sustain ICT growth. Moreover, there has also been an increase in the adaptation of these technologies. Smartphone penetration is expected to reach 70 percent in 2018. Smartphone vendors have increased exponentially over the past few years. This in turn can lead to the further growth and innovation of this sector in the country.

Because of the said development and transferring of technologies, the Philippines has strengthened transmission and distribution infrastructure. ICT services are now more available to the citizens. About 44,478,808 people regularly access the internet. Internet has already reached a handful of remote areas and are now being integrated in the development of the country. ICT accessibility is now also more available for the business sector. The number of IT parks and Technology Business Incubators (TBIs) have increased and encouraged people to conduct efficient and agile businesses through the driving growth of IT as a business tool. The startup environment has also become more friendly with kickstarters and crowdfunders being more available. But despite this, it can be said that the ICT infrastructure of the Philippines is still sub par and is far from being globally competitive. Internet penetration in 2016 is only at 43 percent. And less than 40 percent of startups remain after four years.


E. Ecological



Climate in the Philippines is diverse and somewhat unpredictable.

Typically, the Philippines has two seasons: wet and dry. Summer occurs from April up to May and the rainy season from June up to October. Typhoon seasons usually begin from August and end on October. However, ecological shifts and the worsening global warming had caused the climate in the country to prolong or shorten wet and dry seasons. Typhoons can now begin as early as July with typhoon Glenda in 2014, and as late as December with typhoon Yolanda in the same year. This poses a challenge in the country in terms of risk management with power, energy capacity and allocation.

The diverse climate in the country is brought by its geographic position. The Philippines is a tropical country and this calls for a lot of renewable resources. Solar energy potential can harness up to 1,203.46 megawatts (MW) of power. Moreover, the country is an archipelago and there is an abundant water resource wherever you go. There is a 145,990 Million Cubic Meter (MCM) water resource potential and 1,547.51 megawatts (MW) of potential wind power. Indeed, This is a great potential that the country can take advantage of to reduce its dependency on oil, indigenous and natural gas, and electricity. Unfortunately, this is a far cry from the amount of energy installed and harnessed as the country has a 29.3 percent energy efficiency. 17 percent, or 16,000,000 of the Filipino population does not have access to electricity and resources alike. In fact the consistently increasing dependence of the country to energy imports will diminish the



renewable energy contribution from 46 percent in 2010 to 14 percent in 2035, a time when gas and coal reserves are probably depleted.

F. The Energy Sector

The energy sector generates a small imbalance between fossil fuels and renewable energy sources. Of the Fossil Fuels, Coal is responsible for 43 percent of power generation, 12 percent come from Natural Gas while Oil provides the remaining 7 percent. Our renewable energy sources come from Hydro and Geothermal power. They are responsible for 24 percent and 13 percent, respectively, of our power generation. The remaining one percent is generated from other renewables such as Biomass, Wind and Solar.

Residential households are responsible for 27 percent of the Power Consumption. The Commercial Sector uses 24 percent while the Industrial Sector tops the other sectors with 28 percent share of the consumption. The Utilities sector also consume power, responsible for 9 percent of the consumption while the remaining 9 percent are power losses.


Internal Analysis of the Energy Sector

III.

A. Strengths

Natural Resources

The main strength of the country right now is its natural resources. Its resources currently provide 40 percent of the power consumption. This

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helps ease coal mining, which although inexpensive in production is actually costly and harmful to the environment.

Low Oil Demand

It can also be noted in our power generation that the Philippines also has low demands for importing oil. This is a strength in a sense that we are less vulnerable to power shortage if oil prices rise.

Diverse Landscape

The diverse landscape is one of our key strengths, some areas can easily utilize wind energy while others can utilize the water. Vast areas of lands are also unoccupied and are underdeveloped. This poses a lot of potential to acquire several renewable resources of energy.


B. Weaknesses

Inefficient Power Generation

Power generation right now can definitely improve. The capacity for power generation totals to 18,000 megawatts. However, reports last year indicated that there will be power shortages given the 14,100 megawatt demand. The capacity of the energy sector is well above the demand but its efficiency that leads to waste in production is causing shortages.

Dependence on Fossil Fuel

In production of resources, 62 percent of the energy comes from non-renewable resources. While this is not as high compared to neighboring countries such as Indonesia at 65 percent, Thailand at 80 percent, and

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Singapore at 95 percent, it is worth noting that a country that is heavily dependent on ecological tourism and biodiversity, environmentally destructive energy sources are more costly than they seem.

C. Opportunities

High potential for renewable energy

The 62 percent of the fossil fuel dependence would not be such a weakness had there not be an untapped efficient alternative energy source from renewables. This is one of our key opportunities. For context, our current power grid can hold 500 megawatts of additional Wind Energy without a problem. Our current capacity for generation is at 437 megawatts combined from Wind, Solar, Biomass and other new Renewable energy. In here, we can see the potential of having more wind farms in certain areas.

Shoreline energy potential

Time and time again, the Philippines experiences surges that greet us from the Pacific. Normally feared, the country can take this circumstance finally to its advantage, given new technology. The US Bureau Of Ocean Energy Management reports that the island of Hawaii, having a land area of 4,000 square miles, can harvest up to 80 TWh/year. Over three times the yearly consumption of the Philippines. It can be estimated that with the vast shorelines of the Philippines, it can harvest at least around the same amount. Given that the technology is not yet here to fully utilize, research and development in this direction would greatly benefit the country.



D. Threats

Change of Administration

The biggest threat right now, although it might be an opportunity in different points of view, is the change of administration. Changing platforms has a high chance of making progress lag or cancel out because of the reallocation of resources and priorities. The plans of the previous administration might be shelved out depending on the new president. The economy will also be affected, as investor confidence normally take a dip during the first years of a new administration.

Dependence on Fossil Fuel

The dependence on oil and fossil fuels are also a threat as it is bound to run out and become expensive sooner or later. More than the environmental concern, this is a threat as indigenous energy resources might become too expensive to produce in its depleting state, and thus cripple the economy.


Recommendations

IV.

Three-Tier Plan

1. Improve Energy Efficiency, Usage, Safety, & Sustainability

It is imperative that the first facet of this grand scheme is geared towards primarily fixing what needs to be fixed, and making sure that the proposed solutions




would not only be SMART(Specific, Measurable, Attainable, Realistic, Time Bound), but also sustainable.

In devising the strategy, the deciding factor for the issue which the group wanted to tackle most, were the processes and devices which we use the most, because multiple inefficiencies a day multiplied by the population of the Philippines is definitely a major contributor to the problem. The following are thus proposed:

- a. Government-initiated & subsidized Trade-ins of old household appliances for newer, more energy-efficient devices.*

With the continual growth in the field of green technology, we are no longer cornered into having to use appliances in our home that are wasteful with its energy use, as well as detrimental to our electricity bills. The problem however, is that we lack encouragement because upgrading to these more efficient machines also entail us to accepting that our old ones go obsolete for nothing, and that we would have to shell out additional cash for something which we'll feel minimally albeit it extending over time. The proposed solution is a bill to be passed which allows the government to subsidize replacements/swapping of our old machines indirectly by partnering with leading appliance stores. This is foreseen to be achieved by partnering with the Department of Energy for recommendations of which specific appliances meet a good Energy Efficiency Ratio(EER) for every classification available.


- b. Less fuel consumption for Public Transportation Vehicles*

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In addition to our household appliances, machines in the transportation industry are also very widely used. We are so used to riding and driving vehicles that run on Petrol because they are marketed as a better fuel for your car, but the problem is that they're not essentially very environmental friendly and energy-efficient. By this, there is therefore a problem which we need to address because they contribute greatly to our usage of non-renewable energy.

- i. Short Term: DOT encourages and incentivizes Taxi and Jeepney operators to convert to Diesel Engines either by restricting allowable number of non-diesel ratio of cars in their garage, or subsidizing engine replacements.

If it were not 2016 and the diesel available was still as detrimental to our vehicles as the diesel before, then it would not be a wise move to encourage shifting to this kind of fuel, but it is, and the diesel available in the market is now better for your engines, and more environment-friendly. The primary benefit to using diesel is the fact that it is more 'fuel dense' than your regular petrol, consisting of longer hydrocarbon chains and therefore consumed slower, which allows you to go further. If we encourage the switch to diesel, we are also encouraging more efficient use of an energy type that is non-renewable. By partnering with the Department of Transportation and the other agencies involved, we could begin this trend by encouraging




if not requiring our taxi operators/Bus administrators to switch to diesel engines.

ii. Medium Term: Transitioning from fuel to electricity-run vehicles.

That said, it must be understood that although this is better in the short run, it is not something that must be sustained given the fact that this form of fuel is non-renewable. The proposition is to divert step-by-step towards the use of electric cars. The government must incentivize foreign car manufactures given the lack of local ones, who offer vehicles of the appropriate specification to enter the Philippine market, as the same time making it more feasible to the community by being cheaper than the status quo. In addition to partnering with car manufacturers, we must also partner with local entities such as Meralco that would be able to eventually develop charging stations for our electromobiles in an efficient way.

iii. Long Term: Partnering with several automobile-companies and Standardizing Taxi, Bus, and Jeepney units to be more lightweight, energy-efficient, and environment-friendly.

Lastly, this act of efficiency could be taken even further by standardizing the units involved in the field of our public transportation, not only because it would ensure efficiency and security, but also because it is a good step towards the Philippines' economic progress.


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- c. *Improved Infrastructure: Eliminating overhanging, overcrowded, and exposed electrical lines by replacing them with underground power lines.*

In addition to the inefficient vehicles employed in our field of public transportation, another very obvious issue is the state of our current electrical connections. The cables through which energy flow, albeit being relatively strong, are prone to excessive external stress that could potentially be dangerous, but also discouraging for our tourism because it looks aesthetically ugly. The proposition is to partner with our current energy providers and help them transition into more advanced underground power lines that are safe from floods, easier to maintain, and more aesthetically appealing for our tourism.

2. Expand Production

The next facet of the strategy would be to expand our generation facilities in order to better provide for ourselves, making electricity cheaper for the filipinos, as well as possibly export for profitability. The way we wanted to go about this expansion, is to make use of what we currently have, and build on top of that in order to further leverage on our strengths.

- a. *Take advantage of the different mixes of the Philippine climate. Wind Energy can expand production by up to 500MW for example, “Despite wind’s variable nature, 500 megawatts can easily be integrated without the risk of blackouts or interruptions,” explains WWF-Philippines Climate Change Unit Head Gia Ibay.*




The Philippines already has the largest Wind Power Generation in Southeast Asia. Ibay, adds that our grids can fit 500MW more energy from Wind Energy. Right now our Wind energy generates around 400MW. The Philippines is planning to increase the installed wind energy capacity to 1,600 MW over the next 2-3 years. Additional research and development in this area will greatly benefit our power generation but also our environment. The 1600MW of clean energy offsets around 200,000 tonnes of carbon emission, thus also helping health and environment.

- b. Utilization of the Philippines' having the greatest shoreline area through implementation of new technology in Sea Mills.*

The Philippines being an archipelago, by extension means that we have a very vast shoreline. This should be utilized given the high potential of harvestable mechanical energy offered by the current. A new technology in the realm of hydropower allows this to be harvested and converted into electrical energy. By partnering with corporations that have an interest in the development of science such as Intel and the Department of Science and technology, a possible converter could be developed and utilized along our shorelines.

- c. Encourage Green-Corporations to make use of their wide solar-exposed building surface areas. Incentivisation for Corporations that could generate a percentage of their power consumption, such as tax-payable deductions.*



The business districts of the metropolitan areas nowadays boast of extremely high buildings which in turn equate to vast surface areas. This could be utilized as foundation for solar panels that could harvest solar energy and convert it into electrical energy for consumption of the building. To encourage this, the government could offer tax deductibles to the corporations who would be able to propagate at least 50% of their energy consumption, as not to add to the growing demand. In effect, there would be less strain in terms of energy demand for the country, and it could be exported for profitability purposes.


3. Share the Power(Export)

Lastly, looking forward and assuming that the aforementioned recommendations have been implemented and already exists at a sustainable level, the next viable step would be to share our generated power to the other countries to help alleviate their respective shortages in energy. This would be beneficial to the Philippines twofold, primarily for profitability given the energy crisis in Asia specially for our brothers in India and Pakistan, and secondly for global recognition in our quest to build ourselves as a rising sustainable economy.



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