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Getting theRE

Getting through the humps and red lights that hinder the advance of green energy

Wilson Fortaleza Maitet Diokno Ted Aldwin Ong Job Bordamonte

- The years 2011, 2012, and 2013 can be considered both as milestones and missed opportunities for renewable energy (RE). The milestones include the 2011 launching of the National Renewable Energy Program (NREP) which provides for a detailed roadmap on how the Philippines will transition towards sustainable energy. The program aims to triple the amount of RE (15,304MW) in the energy mix by 2030 from the 2010 capacity level of 5,396 MW. Also in 2012, the United Nations launched its Sustainable Energy for All (UNSE4AII) Framework which seeks to provide the world's people universal access to modern energy services and renewable energy by 2030.
- The 2011 Fukushima nuclear disaster has driven many countries, particularly Germany and other nuclear countries in Europe, to re-think and re-work their future energy policies with prime importance given to a decisive shift towards renewable energy. This tragedy was a missed opportunity for the Philippines to definitively declare a non-nuclear energy policy given its abundance in RE alternative resources. In 2013, the Philippines was also hit by history's most powerful typhoon, Haiyan (Yolanda) which killed thousands of people and destroyed hundreds of billions worth of infrastructure and vital sources of livelihood.
- These were compelling reasons which could have been considered by our policymakers in reinventing the country's energy policies in favour of RE. Unfortunately the NREP remained at a business-as-usual mode, pursuing a less ambitious target of getting 35 per cent of RE share into the energy mix. In other words, fossil fuel led by coal and gas will continue to dominate our power system now and beyond 2030.

During the series of conferences co-organized by the Center for Power Issues and Initiatives (CPII) and the Friedrich Ebert Stiftung (FES), it was recognised that humps and red lights continue to slow down the country's shift to renewable energy and energy democracy due to gaps in policies and program implementation. One major gap is financing, where access to financial windows caters to big players and enterprising companies rather than to power systems collectively owned and managed by the people in their respective communities.

This policy paper identifies the old and new problems hounding the power sector and tries to come up with policy alternatives to address specific concerns raised during the conferences. Supplemental stories were also included here to show how actual projects and initiatives were made possible despite the humps and red lights slowing down the RE march.





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Getting theRE

Getting through the humps and red lights that hinder the advance of green energy

Wilson M. Fortaleza

Center for Power Issues and Initiatives (CPII)

Introduction

The Philippines is blessed with enormous indigenous renewable energy (RE) resources that can power its present and future energy needs. With an estimated 250,000MW¹ of potential RE capacity, the country is in the best position to ensure its energy security by embarking on a shift to green power.

But why has this privileged nation, for so many years, depended on and suffered the high cost and hazards of imported fossil fuel? Why continue build new coal fired power plants whose costs are expected to rise at a time that renewable energy is becoming more affordable? And why aren't the country's leaders taking more aggressive action towards developing and utilizing our vast RE resources? Evidently there are gaps in policies – these are disabling and powerful forces which continue to slow down the country's shift to renewable energy. The National Renewable Energy Program (NREP)² that was launched in 2011 pointed to the "fragmented and halting RE initiatives" to describe the downside of previous RE programs.

In this regard, the NREP tries to be more comprehensive and decisive in pursuing the country's shift to renewable energy. The program contains action plans for accelerating the development of the country's RE resources, including advancement in RE technologies. In actual terms, the NREP seeks to increase RE-based capacity to an estimated 15,304MW by year 2030, almost triple to the 2010 level of 5,369MW.³

¹ Department of Energy estimates, excluding solar potentials

² From the "The National Renewable Energy Program: The Road Starts Here" presentation of DoE

Undersecretary Jose Layug, Jr. to the European Union-Philippines Meeting on Energy, February 7, 2012. ³ Ibid

The year 2030 is also the target for the United Nation's Sustainable Energy for All (SE4All) Framework which seeks to provide the world's people universal access to modern energy services and renewable energy.⁴

The numbers may look so ambitious but remember the 2030 indicative target is merely a fraction of our untapped RE potential. Definitely an additional 10,000MW capacity of RE into the system for the next 20 years is faster than the 5,000MW renewable energy produced during the last seven decades.⁵

This is not to say, however, that the NREP faces no obstacles in pursuing its objectives. Ms. Grace Yeneza of Preferred Energy, Inc. (PEI)⁶ described as a "marathon with hurdles" today's run for RE, with red lights and humps forestalling the country's ultimate transition to renewable energy. Bureaucratic red tape, rules biased for big players, financing problems and regulatory issues are the main roadblocks that hamper the rapid development of RE projects in the Philippines.

The RE development framework, in the past, was considered crucial in addressing the country's dependence on imported fuel and in achieving the national objective of total electrification. Such considerations remain compellingly valid until today. In addition to this, the imperative imposed by climate crisis requires stronger and solid commitments from all governments to run on low carbon economies, which, in one way or another, can be done through a power shift. But whether new global commitments are carried out or not, the national imperative for RE had long been considered, with previous policies and programs put into motion by pioneering RE projects such as hydro and geothermal powers. The Philippines, in other words, was already into RE several decades back. And perhaps the "fragmented and halting RE initiatives" that held back RE's full development in this country can always be traced to governance problem, which probably is the same obstacle the NREP strategy is facing today.

The NREP, based on its defined strategy, will try to overcome established and emerging hurdles to achieve its 2030 RE targets. Key components of the strategy include providing market, fiscal and nonfiscal incentives to private sector investors, manufacturers, fabricators and suppliers.⁷

"The road starts here," declared the DoE in 2011. In short, a faster and comprehensive development of renewable energy in the Philippines begins with NREP. Truly, that can well be possible especially if humps and red lights do not suppress its full speed.

This paper will try to trace policy gaps in our country's RE history and from there come up with recommendations on how the obstacles that block the way towards our desired transition to sustainable energy should be addressed.

Rich in policies

Not only is the Philippines abundant in indigenous energy resources. It is also rich in policies on how to develop renewable energy.

⁴ A Vision Statement by Ban Ki-moon, Secretary-General of the United Nations, November 2011. The SE4All hopes to double the share of RE in global energy mix by 2030.

⁵ The first RE project in the country, the Caliraya HEP, was commissioned in 1942.

⁶ Ms. Grace Yeneza, "The Era of RE: Can RE power the Philippines to sustainability?" April 18, 2015.

⁷ Incentives under the Renewable Energy Act of 2008

Since the 1930s up to the 80's pursuing energy self-reliance based on indigenous energy sources has already been a part of the national program. It shaped into actual policy acts, beginning with the establishments of the National Power Corporation (NPC), the Philippine National Oil Corporation – Energy Development Corporation (PNOC-EDC), and the Department of Energy (DoE) which were mandated to implement the country's program for renewable energy.

The table below shows how the previous governments embarked on major programs for developing the country's indigenous renewable energy resources prior to the enactment of the Renewable Energy Act of 2008.

Policy Act	Period	Policy Objectives
Commonwealth Act No. 120	1936	Created the National Power Corporation (NPC) which function is the development of hydro power in any part of the country. The first hydropower plant built by NPC is the Caliraya Dam built in 1939 and commissioned in 1942.
Republic Act No. 2717	1960	Created the Electrification Administration to furnish the rural areas with cheap and dependable electric power facilities.
Republic Act No. 5092	1967	Promote and regulate the exploration, development, exploitation and utilization of energy, natural gas, and methane gas.
Republic Act No. 6038	1969	Declared the policy of total electrification, organization of National Electrification Administration (NEA) to pursue objective of total electrification. Repealed RA 2717.
Republic Act No. 6395	1971	Revised the NPC charter to include geothermal exploration and operating transmission lines nationwide.
Presidential Decree No. 40	1972	Defined the energy policy of the Marcos administration. These include total electrification, establishing electric cooperatives with the rights to build generating capacity and building the transmission system for the national grid.

Table 1. Previous and existing policies on renewable energy

Policy Act	Period	Policy Objectives
Presidential Decree No. 269	1973	Created the NEA to supervise the establishment and operations of electric cooperatives (ECs). ECs have the power to operate a generation and distribution system.
Presidential Decree No. 334	1973	Created the PNOC for oil exploration. Amended by PD 927 in 1976, expanding its functions to include exploration of non-oil energy resources (geothermal). Created the PNOC-EDC.
Presidential Decree No. 1068	1977	Acceleration of research, development and utilization of non-conventional energy resources.
Presidential Decree No. 1206	1977	Created DoE with mandate of ensuring energy self-reliance of the country by exploring indigenous resources.
Presidential Decree No. 1645	1979	Increased capitalization of NEA. Mandated ECs to explore operations of dendro-thermal and mini-hydros.
Republic Act No. 6957	1990	Authorizing the financing, construction, operation and maintenance of infrastructure projects by the private sector. Also known as the BOT law. Amended later by RA 7718.
Republic Act No. 7156	1991	Granted incentives to mini-hydro power developers.
Republic Act 7638	1992	Re-established and mandated the DoE to formulate and implement a program for the accelerated development of nonconventional energy systems and the promotion and commercialization of its application.
Executive Order No. 462	1997	Enabled private sector participation in the exploration, development, utilization and commercialization of OSW resources.
Executive Order No. 232	2000	Amended EO 462. Gave more incentives to OSW developers and made RE as priority source in electrifying off-grid barangays.

Policy Act	Period	Policy Objectives
Republic Act No. 9136 EPIRA	2001	Among its major policy objectives is to assure socially and environmentally compatible energy sources and infrastructure; promote the utilization of indigenous and new and renewable energy resources in power generation in order to reduce dependence on imported energy; and encourage the efficient use of energy and other modalities of demand side management.
Republic Act No. 9367	2006	Also known as the Bio-fuels Act of 2006. Provided fiscal incentives for the use of blended bio-fuels gasoline and diesel.

Source: DoE's Compendium of Energy Laws; specific PDs, RAs and EOs

Now what does this timeline show us? It tells us the story of a country that was in fact a pioneer in exploring and utilizing its renewable energy resources as shown by these successive policy acts. These acts likewise present the historical context from which specific policies were crafted such as the expected oil crisis of the 70s and the understood need to spur growth in the countryside by utilizing indigenous energy resources.

However, the abolition of the DoE (Ministry of Energy) after the EDSA people power created a policy interregnum on power development. And in the face of a crippling power crisis that hit the country in the late 80s, political leaders messed up with their quick-fix solution which included massive power contracting with merchant and mainly oil and coal-based power plants of independent power producers (IPPs).

The DoE was reconstituted in 1992 under a

renewed mandate of accelerating the development of nonconventional energy systems and the promotion and commercialization of its application. However, the enactment of EPIRA in 2001 facilitated further the diminution of government role in power generation and RE development. The Renewable Energy Act of 2008 was enacted under this reigning regime of privatization hence the function of RE development was likewise entrusted to the private sector through governmentsanctioned market mechanisms.

The Renewable Energy Act

The Renewable Energy Act of 2008 (RA9513)⁸ is the country's most comprehensive legislation on sustainable energy. It provides the framework for the accelerated development of all kinds of renewable energy resources available in the country such as biomass, solar, wind, hydro, geothermal, ocean and hybrid systems. It also aims to develop national

⁸ RA 9513, <u>www.doe.gov.ph/issuances/republic-act/627-ra-9513</u>

and local capabilities in the use of renewable energy systems, and promote its efficient and cost-effective commercial application by providing fiscal and nonfiscal incentives.

To accelerate RE development, a wide array of incentives are offered for RE projects and activities. These include:

Production Incentives

- Seven year income tax holiday;
- Duty free importation of RE machinery, equipment and materials within the first 10 years;
- 1.5% realty tax cap on original cost of equipment and facilities to produce RE;
- Net operating loss carryover (to be carried for the next 7 consecutive years);
- 10% corporate tax rate (instead of the regular 35%);
- Tax exemption on carbon credits; and
- Tax credit on domestic capital equipment and services.

Incentives for Feedstock Producer

• Duty free importation and VAT exemption on all types of agricultural inputs, equipment and machinery.

Incentives for RE Commercialization

- Tax and duty-free importation of components, parts and materials;
- Tax credit on domestic capital components, parts and materials;
- Income tax holiday for 7 years;
- VAT zero-rated for all RE equipment transactions; and

• 50% tax rebate for purchase of RE equipment.

Aside from these, the law also provides for a system of feed-in-tariffs (FIT), establishes the Renewable Energy Market (REM), the Green Energy Options, as well as the system of Net Metering. To further enhance the investment climate for RE, the government share on RE development projects were waived and financing options were made available from government banks, particularly the Development Bank of the Philippines and Land Bank of the Philippines.

From here to where?

The 2011 National Renewable Energy Program (NREP), as mentioned in the introduction, gave flesh to the vision and goals of the Renewable Energy Act. It contains detailed sectoral targets and mechanisms on how those numbers may be achieved.

By 2030, the share of RE in Philippine energy mix is expected to reach 15,304MW or triple the 5,438MW capacity in 2010. A consolidated NREP roadmap is shown in this figure:

Figure 1: NREP Consolidated Roadmap



⁹ NREP Book, <u>www.doe.gov.ph/microsites/nrep/index.php?opt=nrepbook</u>

In summary and on per technology basis the NREP intends to:

- Increase geothermal capacity by 75%;
- Increase hydro power capacity by 160%;
- Deliver additional 277 MW biomass power capacities;
- Attain wind power grid parity with the commissioning of 2,345MW additional capacities;
- Mainstream an additional 284MW solar power capacities and pursue the achievement of the 1,528MW aspirational target; and
- Develop the first ocean energy facility for the country.

The NREP roadmap looks daring and ambitious. When compared with projections made in the Power Development Plan (2009-2030 and 2012-2030 revised)¹⁰ the RE triumph will translate to at least 30 percent share in total energy mix. Under the 2012-2030 Philippine Energy Plan (PEP),¹¹ the share of RE under

the business-as-usual scenario $(BAU)^{12}$ will be 32.6% and 37% under the low carbon scenario (LCS).¹³

Now, can the NREP and PEP targets be considered a major leap from its current level? Based on DoE data, the share of RE in total gross generation mix in 2013 and 2014 is already at 26.44% and 25.64% respectively (see Table 2), which obviously by now is very close to the 2030 projected share.

Today, the RE run has supposed to have reached halfway of its 15,300MW journey, with 7,500MW of RE target committed for 2015. Then if we look at the list of RE projects in the pipeline, the likelihood of hitting the 2030 target is quite positive. But why is the growth of RE's share in the total energy mix seems to be moving in a very slow pace?

One reason is that the country's energy pie is also getting bigger, with estimated annual growth of at least 4%. And with

PHILIPPINES							
	2014		2013	3	Difference		
PEANT TIPE	GWh	% Share	GWh	% Share	MWh	%	
Coal	33,054	42.78	32,081	42.62	973	3.03	
Oil-based	5,708	7.39	4,491	5.97	1,217	27.10	
Natural Gas	18,690	24.19	18,791	24.97	(101)	(0.54)	
Geothermal	10,308	13.34	9,605	12.76	704	7.32	
Hydro	9,137	11.83	10,019	13.31	(882)	(8.80)	
Wind	152	0.20	66	0.09	86	131.59	
Biomass	196	0.25	212	0.28	(16)	(7.68)	
Solar	17	0.02	1	0.00	15	1068.03	
Total Generation	77,261		75,266		1,995	2.65	

Table 2: 2014 and 2013 Comparative Gross Generation, Philippines

Source: DOE Power Statistics 2014

¹⁰ PDP 2009-2030, <u>https://www.doe.gov.ph/power-and-electrification/development-plans/321-power-development-plan</u>

¹¹ Philippine Energy Plan 2012-2030, DoE, <u>https://www.doe.gov.ph/doe_files/pdf/01_Energy_Situationer/</u> 2012-2030-PEP.pdf

¹² The BAU scenario simulates the future energy supply based on market forces interaction.

¹³ The LCS scenario considers the policy interventions and aggressive implementations of plans and programs for clean and environment-friendly energy fuels and technologies.

thinning supply threatening the country's energy security, the rush for additional capacity has favored fossil fuel. Consequently the faster the growth in the share of fossil fuel in the mix, the smaller the share for renewable.

In 2010, coal is only about 25% of the mix. It slightly moved to 28% in 2011, but in 2014, the share increased to 42%, outpacing geothermal.

shares. Sustainable energy, in the first place, was already in the country's agenda for over 80 years.

Nevertheless, even granting we sustain this positive outlook and everything works perfectly well, by 2030 we remain confronted with the grim reality that fossil fuel led by coal, gas and oil will continue to rule the power sector, and perhaps in the next15 years and beyond.



Figure 2: Generation mix by fuel type

Source: DoE, Philippine Energy Plan (PEP) 2012-2030

Furthermore, the NREP projection is based on existing RE Service/Operating Contracts and under the assumptions that market mechanisms and promising growth in electricity demand will stimulate massive private investments in the RE sector. The rate it is going now, though, indicates that RE is way behind the ideal scenario considering its potential for growth especially on new RE like solar and wind.

The government, however, is confident that with policy-incentive mechanisms already in place, the only way for our RE capacity is to grow and be able to power the country's overall need for a clean and sustainable energy. Well that is a dream that everyone The figure below shows the perspective of Philippine energy mix by fuel type from 2010-2030.





Source: DoE PEP 2012-2030

How do we get the RE?

The ultimate goal should be a shift to 100% renewable and the country has the policies and RE resources to power that shift. But why are we not getting there?

Apparently there are humps and red lights which prevent the full transition to green energy. In fact the government has already conceded to the reality that renewable energy is not yet in the position to displace fossil fuel in the near future, both under the BAU and LCS scenarios. By 2030, 60% of total energy supply will remain dominated by coal and oil. That should not be the case if the country really wants to pursue a serious transition to green power.

The country has long been running on RE deficit since it declared, in many policy acts, its intention to a chieve energy independence by relying more on its abundant supply of indigenous RE resources. Recent measures should have been able to address this gap by aiming for a more ambitious target and taking bolder steps in closing down such deficit. Humps and red lights, however, will continue to slow down the NREP advance so long as it remains at the confines of business-as-usual schemes in RE development.

Lost green decades for electric cooperatives

A glaring example of red lighting green energy in the Philippines is the story of electric cooperatives' inability to develop their capacity in running imbedded generating capacities despite the mandate provided under the old national electrification program that we have shown in the RE policy timeline. Had there been serious efforts and programs to develop their RE generating capacity, the country's 119 ECs, now servicing more than nine (9) million households nationwide, could have been powered by mini-hydros, dendro-thermals, biomass, wind and solar farms.

The government is also aware of the fact that all those RE sites/potentials are located within ECs franchise areas. Incentives should have been given to them to develop these resources. And had members been organizationally prepared for democratic ownership and leadership of their coops, the Green Energy Option¹⁴ could have readily been put into motion in local communities.

So why didn't the government pursue this thrust decisively? The National Electrification Administration (NEA) was supervising the conduct of ECs since the 1970s, and recently under RA 10531 or the NEA Reform Law, ensuring the 'sustainable development of rural areas' through total electrification was reemphasized. Both the old and new mandate of NEA included the development of mini-hydro systems. But it was only in 2014 that a comprehensive manual, The NEA + EC Handbook for the Development of Mini Hydro Projects in the Philippines¹⁵ which covers all aspects (technical, financial, regulatory) of minihydro development was published. Likewise it was only in 2013 that NEA created the Office of the Renewable Energy Development (O-RED) to facilitate the development of renewable energy-based power generation with the electric cooperatives.

Clearly what NEA had taught coops during the last 40 years was primarily purchased power contracting and not the expertise for generating own power. As a bank NEA had essentially financed the coops' DSM¹⁶ capex

 $^{^{14}\}mathrm{A}$ mechanism to empower end-users to choose renewable energy in meeting their energy requirements.

¹⁵ http://www.nea.gov.ph/nea-and-ec-handbook-for-the-development-of-mini-hydro-projects

¹⁶Distribution, Supply, and Metering

and not the development of their G&T¹⁷ capacity. Furthermore, under EPIRA, NEA was directed to guide coops enter the regime of Retail Competition and Open-Access (RC-OA)¹⁸ and to introduce private sector participation (PSP) into their system. Under this condition, the compulsion to generate own power is lost.

The same is lost under NREP/PEP. The program remains blind to coops' revolutionary potential for RE as it is primarily anchored on private-led market intervention. In fact, the rights (RE Service Contracts)¹⁹over rivers, steam fields, wind and solar sites have already been awarded to big private companies. As a public utility owned by consumers themselves, electric cooperatives should have been given priority and support by the State in developing their embedded RE resources. Lamentably, big players have already captured the best sites and there are even cases where a single developer holds multiple sites.

Again as a matter of policy it should be argued that in order to recover their lost green decades and expedite the process of greening our energy systems, electric cooperatives must be given a compellingly fresh mandate to pursue RE developments within their respective franchise areas. To do these, they have to be provided with necessary technical and financial assistance coming from the State as well as from other private institutions and multilateral agencies. The proposed mini-hydro projects of Benguet Electric Cooperative (Beneco)²⁰ and the existing Catingas hydro power of the Romblon Electric Cooperatives (Romelco)²¹ are good examples to replicate.

Role of LGUs

Another missing component for RE development, in fact a very important one, is the role of local government units (LGUs). Concretely, LGUs and other government agencies can lead the shift to RE by utilizing green power for a portion of their energy needs like powering their office buildings, hospitals, sports centers, justice halls, public markets, among others.

Unfortunately, except for a few, most LGUs are not into comprehensive power development planning as far as their local development plans are concerned. Much of the role they play is on approving or rejecting applications for power projects and not as project developers or initiators themselves. As autonomous political units, LGUs have the mandate of ensuring the general welfare of their people, including their health and environmental well-being. They also have the life and power of a corporation that they can utilize in pursuing their development agenda. LGUs therefore can mobilize all their powers and resources for green development hand in hand with other government agencies and private entities, including electric cooperatives.

 $^{^{17}}$ Generation & Transmission model of electric cooperatives in the US.

¹⁸ Open-Access refers to the provision of allowing any qualified user the use of transmission, and/or distribution system and associated facilities subject to the payment of transmission and/or distribution retail wheeling rates duly approved by the ERC.

¹⁹ Overview and Executive Summary PEP 2012-2030, DOE awarded 101 RE service contracts with total installed capacity of 2,565.94 MW.

²⁰ http://news.pia.gov.ph/article/view/41439536869/beneco-presents-hydro-project-proposal-in-kabayan

²¹ http://www.worldbank.org/en/news/feature/2011/03/18/philippines-hydro-power-injects-diversity-sibuyan-islands-economy

Go small but smart

Another imposing red light that slows down RE development in the country is the system of centralized grid. The Philippine Grid is a complex system of interconnecting major islands so that a megawatt produced in Luzon can be utilized in Visayas and Mindanao, and vice-versa.

But our grid system is inherently costly and inefficient given the country's archipelagic and mountainous layout, notwithstanding the huge imbalance between the base and peak loads. Consumers pay the National Grid Corporation (transmission charge and ancillary services) the high cost of managing this big system.

The NREP did not depart from this central grid model because it is perfectly under this same system where market mechanisms for incentivizing RE investments will work. The national grid constitutes the single biggest market for RE, hence, the logical response from power producers is also to go big. The more megawatt fed into the system, either through bilateral contracts or the spot market (WESM), will mean higher returns for investors.

The system of **Feed-in-Tariff**,²² as a matter of fact, is subsidy to RE developers in the form of market incentive borne by on-grid metered consumers. While FIT is innovative in nature, its current application fits more for big players. There is no equivalent incentive that covers small and off-grid systems.

The RE law also mandates priority dispatch for RE projects and for the transmission

company to ensure connections for them. However, the National Grid Corporation of the Philippines (NGCP) requires impact studies before doing the connection and Meralco requires this even for rooftop solar at own cost for the applicant.²³

What are the other downsides of a centralized grid for RE development?

First, while a centralized grid provides the cost benefit of economy of scale, the system also satisfies the craving of big players for a big market. This is the main reason why big companies who are into coal and gas are the same companies that are now into RE. The big companies may find the RE incentives attractive yet they have little to do with their decision to pursue big coal projects. Why? Because it will be much easier and more profitable for a company to build a 1,200MW coal plant to supply the national grid than embark on small RE projects to benefit small communities. In other words the policy provides incentives for RE development but unmindful of the fact that the national grid will continue to provide the biggest incentive to pursuing fossil fuelbased projects.

Second, a centralized grid requires big RE projects. This means building large dams, extensive steam fields and hectares of wind and solar farms that may intrude into the rights of host communities. A hybrid system seems more workable in the Philippine setup, thus, the policy should provide for the establishment of smart grids and more support for small, hybrid-type RE projects.

²² "Feed-in-Tariff" is economic policy created to promote active investment in the production of renewable energy sources. The goal is to offer cost-based compensation to renewable energy producers, providing price certainty and long-term contracts that help finance renewable energy investments. The FIT-ALL rates approved by the ERC is only for emerging RE like solar and wind.

²³Grace Yeneza, "The Era of RE: Can RE power the Philippines to sustainability?" presentation, April 18, 2015.

New IPPs

The ultimate shift to green power is best realized when every household, industrial and commercial establishments become energy producers themselves. With solar and wind expected to meet grid parity²⁴ within the next five years, this vision is no longer a fiction but a shining reality.

In Germany the shift to RE is no longer powered by few big players but by thousands of individual power producers (IPPs) or what is known as *distributed generation.*²⁵ As of 2014, output of total installed solar PV in Germany have reached 38GW, 35MW for wind, 8GW for biomass, and 5GW for hydro. Half of all renewables are locally-owned.²⁶ According to Germany's Chamber of Commerce and Industry, every sixth company in Europe's largest economy now generate their own electricity. They range from rural familyowned companies to the vast <u>Dow</u> <u>Chemical</u> Co. plant that consumes 1% of the country's electricity.²⁷

In the Philippines we can consider as new IPPs the residential, commercial and industrial end-users as well as energy cooperatives which are getting into selfgeneration of power. Encouraging and enabling them to produce electricity for own-use and eventually for grid dispatch will be the most desirable outcome of RE development in the country.

Just imagine this: In terms of electricity sales, the residential, commercial and industrial users take up 82% of its total (see table and figure below). Eventually if they can produce their own or just 30 percent²⁸ of their power requirements, that would mean a reduction of 63,345GWh or 19,000GWh (30%) of grid-based power and accordingly, a new source of transmittable power for the grid.

			PHIL	IPPINE S			
Sector	20	14	20	13	Difference		
Jector	GWh	% Share	GWh	% Share	GWh	% Growth Rate	
Residential	20,969	27.14%	20,614	27.39%	355.15	1.72%	
Commercial	18,761	24.28%	18,304	24.32%	457.04	2.50%	
Industrial	21,429	27.74%	20,677	27.47%	752.18	3.64%	
Others	2,186	2.83%	1,971	2.62%	215.11	10.91%	
Total Sales	63,345	81.99%	61,566	81.80%	1,779.48	2.89%	
Own-Use	6,646	8.60%	5,959	7.92%	686	11.52%	
System Loss	7,271	9.41%	7,741	10.28%	-470	-6.08%	
Total Consumption	77,261		75,266		1,995.62	2.65%	

Table 3 [.]	2014	and 2013	Comparative	Electricity	/ Sales a	nd Consum	ntion	Philinni	ines
Table U.	2014		oomparative	LIGGUIIGIU	i baics a	nu oonsum	puon,	, i iiiiiph	11169

Source: DOE

²⁴ "Grid Parity" is meant to describe the point in time, at which a developing technology will produce electricity for the same cost to rate payers as traditional technologies, or when the new technology can produce electricity for the same cost as the electricity available on a utility's transmission and distribution grid. <u>http://www.renewable-energy-advisors.com/learn-more-2/what-is-grid-parity/</u>

²⁵ "Distributed generation" (DG) refers to power generation at the point of consumption. Generating power on-site, rather than centrally, eliminates the cost, complexity, interdependencies, and inefficiencies associated with transmission and distribution. <u>http://www.bloomenergy.com/fuel-cell/distributed-generation/</u>

²⁶ http://www.greentechmedia.com/articles/read/germanys-energy-transition-explained-in-6-charts

²⁷ "As Electricity Costs Soar, Energy-Hungry Firms Have a Growing Incentive to Go Off the Grid," <u>http://www.wsj.com/articles/SB10001424052702304899704579390871434033460</u>

²⁸ Solar provides SM-North Edsa 30-40% of its total power needs, <u>http://www.abs-cbnnews.com/business/</u><u>11/24/14/sm-north-edsa-now-worlds-biggest-solar-powered-mall</u>



Figure 4: 2014 Electricity Sales & Consumption by Sector, Philippines

There is no doubt that in the near future, a solar-powered household, industry and commercial establishments will dominate the energy landscape of the Philippines. Not only that avoided costs of transmission and distribution will further bring down the cost of solar, its use is also becoming more popular among consumers.

In July 2013, the DoE has issued the Household Electrification Development Plan (HEDP 2013-2017)²⁹ that laid down different strategies and programs for fast-tracking household electrification both in urban and rural areas of the country. One major strategy identified was giving preference to renewable energy sources and technologies. The Circular likewise directed the Government to provide sufficient funds (through grants and assistance) to meet the investment requirement for this program.

However, it is only in September this year that the National Economic Development Authority (NEDA) approved DoE's P4.89 billion Access to Sustainable Energy Program,³⁰ which will provide at least 100,000 Filipino households electricity and energy services through a grant assistance for solar home systems and rural power generation facilities. Obviously the coverage is still very limited, but it is a move leading to the right direction.

Getting past the humps and red lights

The RE law, NREP and PEP have given boost to the country's RE development. As a new and comprehensive program, NREP tries to address the "fragmented and halting RE initiatives" in the country over the past several decades. Yet humps and red lights persist in the system that operates under an overarching policy of free market and privatization.

Getting past these obstacles therefore is as important as giving incentives to RE developers. However, the main weakness of NREP is the fact that while it provides windows of opportunities for RE developers so that the share of green energy to the mix is enhanced, it failed to explicitly declare a timeline for a decisive phase out of fossil energy, the way Germany did to its nuclear power.³¹ Because of NREP's conservative outlook, the scenario in the Philippines tilts more to the business as usual side rather than to revolutionizing RE development. Experts consider as 'moderate outlook' renewable energy shares of 30-45% by 2050 and 'high renewable' when share reaches 50-95%, and ultimately 100%.³²

²⁹ From DoE Department Circular No. DC 2014-09-0018, Prescribing the Policies for the Implementation of the Household Electrification Program and Creating the Household Unified Strategic Electrification (HOUSE) Team for the purpose of achieving the country's total electrification goals.

³⁰ <u>http://www.gov.ph/2015/09/14/five-new-infrastructure-projects-approved/</u>

³¹ After the Fukushima tragedy in 2011, Germany declared a phase out of all its nuclear plants by 2020.

³² REN21: Renewable Energy Policy Network for the 21st Century, The First Decade: 2004-2014, <u>http://www.ren21.net/Portals/0/documents/activities/Topical%20Reports/REN21_10yr.pdf</u>

Gaps have clearly been identified. To be more effective, RE policies and incentives must favor the small players and existing forms of community-based public power such as electric cooperatives. Enabling new IPPs or distributed generation should likewise be made as top priority since in them resides the full potential for the needed power shift. They should be given equal access to incentives and subsidies provided for big players and to likewise enjoy the privileges of being power producers themselves. The net metering system needs to be aligned with the need for incentivizing new IPPs and household systems rather than serve as barrier to their entry to the RE territory.

The role of LGUs in RE development must be institutionalized, with power development becoming part of their local development plans. Some LGUs have already embarked on this process with the guidance of experts from the academe. The Joint Energy Development Advisory Group (JEDAG) is a concept that has already gained grounds in off-grid areas of Palawan, Bohol and Mindoro. JEDAG is a multi-stakeholders advisory council composed of LGU officials, DoE, other concerned government agencies, electric cooperatives, and representatives from the academe, business sectors and civil society organizations. Its main function is to serve as policy and technical advisor to the longterm power development plan, including the development of renewable energy in a particular LGU. However, the role of CSOs in this process must be strengthened as JEDAG is more concerned about ensuring reliability and least cost supply of power based on economies of scale or balancing

the optimum mix to achieve least cost power. By invoking the green energy options, consumers can pursue their right of choice for RE in the power development plans of LGUs.

Financing, which will be dealt with in a separate paper, is a major element in powering this shift. Bureaucratic gridlocks -- a process that requires over a hundred signatures for RE projects -- should be rationalized.

Climate jobs

An equally important social dimension that makes the shift to RE a desirable option is the creation of climate jobs. Job losses are expected once the shift is made. Coal mining and coal plants employ several hundred workers in the country. A framework for a *just transition*³³ should be considered to address this issue. But interestingly, countries that have embarked on power shifts have also seen a dramatic rise in climate jobs, with advances in RE technologies and the growing demand for them creating new value chains in the downstream sectors of the industry.

The European Commission made a prediction that for every job lost in the nuclear sector, two are created in renewables. The Climate Action Network estimates that with current INDC (Intended Nationally Determined Contributions) commitments, 1.04 million jobs will be created in the renewable energy sector - in wind, solar and hydro; 70,000 in the EU, 470,000 in the U.S. and 500,000 in China.³⁴ In Germany, the government projected that as many as 400,000 people will be employed

³³ Just Transition is a framework for a fair and sustainable shift to a low carbon economy, proposed by trade unions, <u>http://www.ituc-csi.org/IMG/pdf/01-Depliant-Transition5.pdf</u>

³⁴ http://europe.newsweek.com/report-1-million-jobs-created-if-climate-goals-reached-318280

by RE industry by 2020.³⁵ Meanwhile, a 2013 report from the Bureau of Labor Statistics (BLS) found 3.4 million green jobs in the United States at the end of 2011.³⁶ Other studies all arrived at the same conclusion that the co-benefits of green jobs far outweigh the costly shift to renewable energy.

The Philippines has not yet come up with a system for calculating or estimating green jobs. Nevertheless, the labor department's Institute for Labor Studies, in coordination with the International Labor Organization (ILO), has started conducting fora and establishing a research program and database to determine workforce trends resulting from energy-related initiatives. But definitely new jobs will be created with the rise in manufacture, fabrication, module-making, installation and repair of RE technology as well as the regular planting and gathering of feedstocks for biomass plants, among others. Of course, construction of climate resilient infrastructures like eco-buildings and new housing projects will entail new employment opportunities.

A job for everyone

In conclusion, the *tuwid na daan* (straight path) in getting theRE is to consider the needed power shift a job for everyone. Running the old power system in the country is like watching a typical power play – 'a swinging pendulum' once described by the country's most powerful

player in the industry. For the past several decades, that pendulum swayed from private to public and then from public to private. In both instances, policies and programs were decided at corporate boardrooms, so was production and distribution of power drawn from the top. Under both setups, consumers were merely regarded as 'captive market' in a typical 'buyer-seller' trading arrangements.

This has to change. The shift to renewable energy should likewise result in the creation of new, independent, and community-based producers of green power. Sustainable energy, in other words, should also mean society's advancement towards *energy democracy*.³⁷

The government's RE program walks on a market-led platform as provided under the framework of Renewable Energy Act. Yet while the strategy does not propose a swing to another direction, it encourages greater participation of all possible players, including end-users in developing the country's renewable energy future. Implementing programs, therefore, should be aligned to the purpose of empowering consumers who ultimately can be transformed into producers and workers that can be considered as a new common – the green power.

There is no doubt the Philippines is getting theRE. Humps and red lights remain, but the green light has been switched on.

³⁵ http://www.renewableenergyworld.com/articles/2008/04/renewable-energy-jobs-soar-in-germany-52089.html

³⁶ http://www.eesi.org/papers/view/fact-sheet-jobs-in-renewable-energy-and-energy-efficiency-2014

³⁷ Energy Democracy, as a trade union concept, means a transfer of resources, capital and infrastructure from private hands to a democratically controlled public sector, <u>http://energydemocracyinitiative.org/wp-content/</u><u>uploads/2014/05/resistreclaimrestructure_2013_english.pdf</u>

Financing Renewable Energy in the Philippines

by **Maitet Diokno**¹ Center for Power Issues and Initiatives (CPII)

With the passage of time and in almost every setting throughout the world, the evidence increasingly shows that the cost of renewable energy (RE) today is becoming cheaper than most conventional sources of energy like coal and diesel-fired power plants—in general, plants that rely on fossil fuel to generate electricity. What's more, the option of producing renewable energy is open to everyone-not just the suppliers of electricity, but to consumers as well. Greenpeace, along with the Global Wind Energy Council and Solar Power Europe, use the term "prosumer" to refer to consumers who generate their own electricity. This trend is occurring more intensively in the developed countries.

Philippine electricity rates are the highest in Asia and are among the highest in the world. Filipino consumers who can afford the RE option are wisely placing their money in an investment that, while heavy at the time of purchase, could yield savings in monthly electricity bills for decades to come. We know of a UP professor whose monthly MERALCO bill has been kept down to PhP500 because he invested in solar power. In a recent publication entitled *Crossing Over*, Roberto Verzola gives us more examples and stories of such Filipino prosumers.

If only the RE option were accessible to all Filipinos; how much cheaper and how much more broadly based would electricity then be in this country. (In 2006 official statistics show that there were 15 million Filipinos or 18 percent of the population without access to electricity.) Yet the harsh reality today is that those who can afford to have solar panels on their roofs are the better off in our society. If financing for RE were broadened in the Philippines then maybe those who are less privileged could turn their lights on at night.

¹ The author wishes to thank Ms. Melba Tutor for her invaluable research assistance in the preparation of this paper.

It can be argued that affordable and accessible financing for RE would quicken the pace of RE development in the Philippines. It would also enable prosumers and would-be prosumers to afford the upfront costs of installing RE in their homes. The effect of all of these would be to bring down electricity rates in the Philippines. Furthermore, it would broaden the ownership base of power generation in the Philippines—a structure which at present is controlled and dominated by a few big business groups.

But first a reality check is needed. Are we really getting theRE—with emphasis on RE? Data from the Philippines Department of Energy indicate a *declining* share of renewable energy in power generation, from 45 percent in 1990—25 years ago—to 26 percent in 2013—five years after the RE Act was signed into law. Traditionally in the Philippines, RE has come from hydropower, geothermal power, and much less significantly, biomass. Only recently have wind and solar power begun to be installed in the Philippines. But in terms of capacity and generation, these are still relatively insignificant today.

The decreasing share of RE in electricity generation in the Philippines has meant that coal has been in the ascendancy in power generation. From a meager share of seven percent in 1990, coal-fired electricity generation accounted for 43 percent of all electricity generated in 2013. The dramatic increase in coal generation by itself lays bare the bias of the government for fossil fuels, despite the enactment of the RE Law. The Philippines appears to be swimming against the current, and defying global trends. With renewable energy becoming cheaper; with fossil fuel use resulting in global warming that renders our people more and more vulnerable to disasters; with the Philippines rich in renewable energy resources and relatively poorer in oil and good quality coal, the Philippine government under Benigno S. Aquino II pushed coal and has raised our dependency on it.



Electricity Generation by Source of Power, 1990, 2000 and 2013

Source of basic data: Department of Energy, Republic of the Philippines

This paper is an initial attempt to examine the financing of renewable energy in the Philippines. As of this writing the information is limited. For example, data is not readily available on the amount of loans extended by Philippine banks and other government institutions for renewable energy. Instead the paper focuses on existing credit facilities available in the Philippines for investing in renewable energy. A newly approved World Bank guarantee for rural electric cooperatives' (RECs) commercial loans for RE, is also discussed. Furthermore, it discusses a tool developed by a Swiss reinsurance firm, made popular by Greenpeace, to assess the different financing aspects involving renewable energy. How attractive the Philippines' RE sector would be to banks and finance companies is then assessed based on this tool and on the RE policies and implementing rules that the government has established. Finally, the paper looks at financing schemes in other countries and localities-Iloilo City in particular-where incentives to promote renewable energy have been put in place.

Who could benefit from RE financing

A broadened provision of financing for renewable energy could benefit a wide range of Filipinos. One group would of course be those consumers who are already connected to the grid and who would like a cheaper option, a green option, a smarter option, or all of the above. They range from the low income to high income households, with varying degrees of knowledge and awareness about renewable energy and how it could change their lives and their way of life.

Another group consists of disenfranchised consumers who do not have electricity in their homes. Mainly because they live in isolated areas far away from the grid, and cannot pay for the additional wires needed to connect them (beyond the utilityprovided 30 meters); these families, while a minority in the Philippines, are still a significant number. They belong mainly to the poorer segments of our society, left behind because they are literally powerless and unconnected. They are also little, if at all aware of the possibility of off-grid renewable energy powering their homes. This is primarily because the traditional response of the power planners and the distribution utilities is to provide dieselfueled power barges (for island communities) or simply to leave them in the dark, so to speak. With the United Nations calling for "sustainable energy for all" by the year 2030, a concerted effort to make available RE financing at highly concessional rates to these fellow citizens must be a necessary element of the country's development effort.

The state of RE financing in the Philippines

The Philippine government has thus far not issued any bond to finance the development of renewable energy. Nevertheless foreign funds have been made available to the national government and to the banking system (both public and private) for the latter. The European Union and the Japanese government are among the major donors/lenders, along with the World Bank and its sister company, the International Finance Corporation (IFC). The latter often manage or oversee the funds of the former. The World Bank recently approved a \$44-million guarantee to cover REC loans from commercial banks for renewable energy investments. This is discussed in a later section.

The EU has a program called ASEP—Access to Sustainable Energy Programme—consisting of a €60-million grant (equivalent to PhP2.8 billion). It is intended to provide 100,000 Filipino households with access to electricity through the Department of Energy (DOE). The program calls for at least 20 MW of clean, grid-tied Solar Photovoltaic Plants with no tariff impacts (six to 10 plants of 2-3 MW capacity each). ASEP supports the Bangsamoro electric cooperatives and the provision of livelihood to ensure sustainability of projects in Mindanao areas. It is also intended to create permanent highly skilled jobs employing at least 60 engineers and 70 technicians at the local project areas.

The main conduit of ASEP is the Department of Energy, while other foreign funds are lent through two major government banks—Land Bank, and the Development Bank of the Philippines—and two private commercial banks. Funds for the latter—Banco de Oro (BDO), Bank of the Philippine Islands (BPI) and its affiliate BPI Globe BanKO—come from the IFC.

On the domestic front, the Pag-IBIG Fund can lend its members up to PhP130,000 for a solar rooftop installation (maximum capacity of 1kw) as part of its housing loan services. This may be for new housing or as home improvement. The loan is payable in 20 to 25 years. The provision of RE financing for Pag-IBIG members is a welcome development and renders solar energy affordable to employees who contribute to the fund, since Pag-IBIG will shoulder the upfront costs.

Jaccqueline Constantino, corporate expert officer belonging to the Institutional Housing department of the Pag-IBIG Fund, said at a seminar on energy democracy jointly organized by the Center for Power Issues and Initiatives (CPII) and the Friedrich Ebert Stiftung (FES), that Pag-IBIG is now adopting a points system for its members who adopt "green" designs in their homes. This, according to her, is done in support of the country's advocacy to protect the environment.

Examples of "green" designs are houses that have water catchments, solar panels, among others. She said this earns a point in the appraisal process which would give the member a premium. Pag-IBIG Fund will add two per cent (2%) to the member's loanable amount. This was done so members will be encouraged to install green designs to their homes. She added that this is in line with the Philippine Green Building Code. Ms. Constantino expressed that the availment of green designs (the actual device and its installation) can now be included in the costing of the total housing loan. She said that although this is a new concept, some members in the province of Batangas have already availed of this facility.

Some housing developers have also embarked on the construction of housing enclaves with 500-watt solar panels on the roofs. One company, Solar Philippines, a supplier and installer of solar power, offers a "Switch-Save-Own" scheme to its customers. The latter can choose from among three different capacities of solar power (1.5 kw, 3 kw and 5kw) which Solar Philippines will then install. The new prosumer pays the solar energy company from its electricity savings until (s)he eventually owns the installation. The cost of the schemes ranges from about PhP190,000 to half a million pesos.

The Land Bank of the Philippines has several lending windows for different RE users. It has a carbon finance support facility intended for the borrower's improvement in energy efficiency and climate change protection. It has a credit program for rural electrification open to electric cooperatives and wholesale electricity suppliers, for a wide range of purposes and not just renewable energy. But it also launched REWARD—Renewable Energy for Wiser and Accelerated Resources Development—which gives financial assistance (ten years maximum) to entities that will engage in renewable energy projects in support of the national government's call to develop alternative energy sources.

Eligible borrowers include sole proprietorships, partnerships, corporations (at least 60 percent Filipinoowned), cooperatives, local government units, as well as non-government organizations with legal personality to borrow. REWARD is available to support a wide range of RE projects such as biofuel, biomass, hydropower, wind projects, geothermal, solar photovoltaic (PV), solar water heaters, and co-generation. REWARD funds may be used to purchase fixed assets as well as for working capital.

The Development Bank of the Philippines (DBP) has an Environmental Development Project (EDP) which is financed by the Japanese government. EDP supports RE initiatives of private corporations/ enterprises, renewable energy service companies, qualified third parties for energy projects, private utility operators, LGUs, NGOs, rural electric cooperatives (RECs), and participating financial institutions. The term loan can have a maximum maturity of 15 years. The equity requirement (share in total project cost) for private companies is at least 20 percent, while for LGUs, RECs and NGOs, a minimum equity of 10% of total project cost is required.

In addition, the DBP has a lending facility for power generation (non-RE also eligible), power transmission and power distribution. The facility also supports energy efficiency projects and alternative fuel projects. Eligible borrowers are private corporations and financial institutions, rural electric cooperatives, local government units, and government owned and controlled corporations.

At the same seminar jointly organized by the CPII and FES, Rustico Noli Cruz, assistant Vice President of the Development Bank of the Philippines (DBP), shared the Bank's contribution to RE development as having reached a total capacity of 790.04 MW both on-grid and offgrid. Luzon has 578.03 MW which consists mostly of hydro power projects followed by solar and biomass. For the Visayas region, DBP has 179.66 MW installed and operational which consists of wind power projects. For Mindanao, the 32.35 MW consists of hydro power projects.

DBP funded RE projects in Tarlac, Romblon, and Negros Occidental are estimated to have avoided 1,252,630 tons of carbon dioxide emissions, as well as the annual importation of 1.947 million barrels of fuel. These projects have saved on government subsidy of P350.81 million per annum, and provided employment to 6,600 workers.

Two of the financing programs of the DBP are the Financing Utilities for Sustainable Energy Development (FUSED) Program and the Green Financing Program. Eligible borrowers include private corporations, local government units, electric cooperatives, private financial institutions, government-owned and controlled corporations, and NGOs. The term for the loan is 15 years maximum inclusive of up to 5 years grace period of principal.

Some challenges cited by Mr. Cruz are the Bank's mandate which is limited to

enterprises and excludes households; the low business appetite of rural banks and NGOs to cater to renewable energy projects; and the technical and financial capacity of proponents. Nevertheless the DBP, he emphasized, is looking for viable energy projects that it can finance.

Who will most likely get financed

The broadest group of Filipino individuals who could obtain financing for solar panels consists of the employed Filipinos who contribute to the Pag-IBIG Fund. As of April 2015 there were 39 million employed Filipinos. According to a press statement of the Fund, there are 15 million Pag-IBIG members.

Because the major conduits of the funds available for RE development are being coursed through two big commercial banks and two government banks, it is reasonable to expect that the probability is slim for ordinary Filipino consumers to qualify for these loans. According to a survey commissioned by the Bangko Sentral ng Pilipinas (BSP), only two percent of Filipinos borrow from a bank. (Most of them—74 percent—borrow from family, relatives and friends; another 10 percent borrow from informal lenders.)

So who will most likely get RE financing? More likely it will be the individuals and families with higher incomes and who are considered more bankable or creditworthy, established businesses and the already big power players in the country.

Guaranteeing Rural Electric Cooperatives' Loans for RE

This is in fact what the World Bank observes in its Project Appraisal Document² on a US\$44-million guarantee for a "Renewable Energy Development Project" for the Philippines, in particular, rural electric cooperatives. To quote from Annex 2 of said document:

"To date, Philippine commercial banks (mostly the larger ones) have mainly worked with either Large IPP developers with strong balance sheets (mostly in geothermal or large hydropower generation projects) or with self/co-generation sponsors that can offer their production facilities as collateral (mostly biomass projects). These market segments may continue to have good access to financing. Overall though there is limited experience in financing renewable energy projects in the banking sector as a whole, particularly related to projects that would supply ECs [electric cooperatives] directly." (paragraph 31, Annex 2)

After scanning the RE projects of local governments, electric cooperatives, small independent power producers (IPPs), large IPPs, self/co-generation sponsors, the World Bank identified a financing gap among electric cooperatives and small IPPs amounting to 356 megawatts (MW). More than half of these projects are RECsponsored, and all are of less than 10 MW capacity.

So what the World Bank did was to expand an existing program of the Philippine government that guarantees loans of the rural electric cooperatives, to cover local bank lending to RECs for renewable energy. The existing program is called ECPCG or the Electric Cooperatives Partial Credit Guarantee Program. It originally offered partial credit guarantees to RECs

² Report No. 72689-PH, dated 18 April 2016. The chart and quotations presented in this section are all from this report.

borrowing from commercial banks to finance energy efficiency programs of the RECs that would bring down their system loss. By providing a \$44-million guarantee, the World Bank says this would lower the risk of commercial bank lending to the ECs and small IPPs, thereby enabling the latter to access commercial bank financing for RE. The RE projects that are expected to be supported by the WB guarantee would be mini-hydro and solar projects.

According to the WB document, the ECPCG program is owned by the government but it is managed by a private corporation called the LGU Guarantee Corporation. The latter is a joint venture of the Bankers Association of the Philippines and the Development Bank of the Philippines. The National Electrification Administration, through its Office of Renewable Energy Development (ORED), is seen to play a "key role" in the loan origination process. Annex 2 of the WB document presents the structure of the ECPCG in the diagram that follows.

This "RE Window" will address the difficulties of RECs and small IPPs in securing bank loans for distributed renewable energy development. Through this guarantee, small IPPs can enter into contracts with RECs to develop RE projects within the franchise area of the RECs. Because these facilities are embedded in the utility distribution area, they need not pass through high-voltage transmission lines which add to the cost of electricity. Again to quote from the WB document:



Figure 2-1: Structure of ECPCG

* Note that NEA's oversight & step-in rights would be limited to ECs, either as joint venture partners or off-takers, in cases where the borrower is an RE developer. "With typical blended costs of purchased power in the PhP5-8/kWh range for the ECs and generation costs levelized over a 25 year lifetime for an embedded project in the PhP3.5-4.5/kWh, one or two small projects of 1-10 MW can make a significant difference to blended costs of generation for an EC." (paragraph 27 of Annex 2)

Not only are commercial banks expected to become more willing to lend to RECs and small IPPs for RE. They are also expected to offer these loans at terms that match the needs of the small hydro or solar projects of the RECs, such as longer repayment periods (12 to 15 years), higher debt-toequity ratios (80/20), lower minimum debt service cover ratios, and more flexible collateral requirements.

Furthermore, the ECPCG program supposedly offers a "one-time rate fixing option"—in other words, the project sponsors can choose to convert variable rate loans from the banks into a long-term, fixed rate. This would enable the small IPPs to offer a steady long-term price for REgenerated electricity to the RECs.

The RE Window provided by the \$44million World Bank guarantee sets the following eligibility criteria (paragraph 36, Annex 2):Again to quote from the WB document:

- Renewable energy resource such as wind, mini hydro, biomass or solar
- The off-taker of the RE facility must be an electric cooperative with a Power
- Purchase Agreement approved by the Energy Regulatory Commission (ERC).
- Expected project size ranges from one to ten MW, but there is no specific limit.
- Risk rating of the electric cooperative is not set, as commercial banks are

expected to adjust their price (interest rate) depending on the risk rating of the cooperative in question.

- Tariff: From the perspective of the purchasing electric cooperative, the RE project should be least-cost, regardless of whether the project is FIT-eligible or not.
- Grid connection: on and off-grid projects are eligible "but preference will be given to embedded projects directly connected to the distribution system."

By 2021, the World Bank expects this program to have resulted in 71 MW of generation capacity of renewable energy. Also by 2021, 400,000 households—two million Filipinos—are expected to have directly benefited from this program by getting connected to the distribution system of the electric cooperatives.

Making attractive the financing of RE

An auditing firm in the US, Ernst & Young-its Philippine partner is SGV-compares 40 countries around the world and ranks them according to how attractive it is to invest in renewable energy in each country. The "renewable energy country attractiveness index" (RECAI) looks at macroeconomic stability, investment climate, prioritization and bankability of renewables, and project attractiveness. In May 2016 the latest RECAI ranking was released; the Philippines placed 22 out of 40 countries. Its ranking has been moving up in the last three years. (The US ranked first in 2016, followed by China, India, Chile and Germany fifth.)

Renewable Energy	Country	Attractiveness	Index:	May	201	6
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						Techno	logy-specif	c indices ra	inkings		
	Indicative										
Rank	on previous index ¹	Market	RECAI	Onshore wind	Offshore wind	Solar PV	Solar CSP	Biomass	Geothermal	Small hydro	Marine
1	=	US	77.0	1	4	1	1	2	2	6	8
2	=	China	76.9	2	1	3	7	1	16	1	6
3		India	71.6	4	21	2	4	3	15	2	23
4		Chile	70.4	6	20	7	3	18	6	4	20
5	-	Germany	69.0	8	2	19	22*	12	8	22	26
7		Maxico	67.0	5	24	6	12	26	50	11	16
8	-	France	66.7	9	9	9	19	10	17	21	5
9	-	Canada	64.6	7	14	14	22*	20	19	7	4
10		Australia	63.8	10	15	4	8	19	9	14	7
11		South Africa	63.0	15	25	10	2	29	30*	13	14
12	-	Japan	62.6	25	7	18	22*	4	10	8	10
13	-	UK	61.4	14	3	28	22*	5	28	24	1
14		Morocco	61.1	18	29	15	6	38	25	38	38
15		Denmark.	60.9	11	6	32	22*	6	30*	34	19
10	· · · · · · · · · · · · · · · · · · ·	Egypt	50.1	12	20	8	224	39	20	30	39
18	new	Argentina	57.9	21	22	11	13	24	14	10	25
19	-	Turkey	57.3	22	33	23	18	37	7	5	13
20	-	Belgium	56.8	23	8	35	22*	9	30*	28	31
21	-	Sweden	56.5	20	11	33	22*	13	30*	27	21
22		Philippines	56.1	30	35	17	22*	25	4	16	9
23	-	South Korea	55.7	35	16	37	22*	30	24	18	2
24		Peru	55.2	34	32	22	22*	28	11	9	32
25	-	Italy	54.3	26	28	30	16	16	13	17	24
20	ĉ	Destural	54.1	38	40	12	20	35	30*	29	17
28	÷	Spain	53.9	29	27	36	15	17	26	32	18
29	-	Taiwan	53.2	39	23	26	22*	27	21	20	30
30	-	Kenya	52.9	28	37	21	14	33	3	25	36
31	-	Ireland	52.5	13	13	39	22*	23	27	26	3
32	new	Jordan	52.2	33	38	13	9	40	22	40	40
33	new	Uruguay	52.0	32	30	24	22*	36	30*	39	35
34	-	Norway	51.8	16	12	38	22*	31	30*	12	15
35	-	Poland	51.5	27	17	29	22*	14	18	23	33
36	A 10	Finland	51.2	17	10	40	22*	1	30*	31	27
37		Dakistan	51.1	37	39	27	22"	21	29	33	28
30	Tiew	Indonesia	50.5	36	34	20	22*	22	1	15	11
40		Greece	50.2	40	31	31	17	34	23	37	37

*Joint ranking ¹ Due to the methodology refresh, the previous numeric ranking is not a comparable measurement, therefore an indication of the movement is provided only

Source: Ernst & Young, RECAI – Renewable energy country attractiveness index, Issue 47, May 2016; <u>http://www.ey.com/GL/en/Industries/Power---Utilities/Renewable-Energy-Country-Attractiveness-Index</u>

The Philippines' highest rankings are in geothermal and marine energy, placing 4th and 9th, respectively, out of the 40 countries compared. The improvement in 2015 in the RECAI ranking of the Philippines was due to planned additions of two GW of wind

power, and 500 MW to 700 MW of solar power. Another factor that contributed to the move up the ladder was the feed-intariff rates of the Philippines—considered among the highest in Asia. Priority grid connection, duty-free importation of equipment, exemption from value added taxes (VAT), accelerated depreciation, a seven-year income tax holiday followed by a 10 percent corporate income tax rate are all plus factors that would promote RE investments in the Philippines.

But Ernst & Young also identified several snags that have prevented the Philippines' rank from being higher. Among these are:

- Regulators have placed a cap on the cumulative capacity eligible for FITs: 200MW for wind, 50MW for solar and 250MW for biomass and hydro combined.
- FITs are available on a first come first served basis; oversubscribed RE projects will then have to rely on bilateral contracts with distribution utilities, or sell their generated power at the wholesale electricity spot market.
- FITs are subject to review every three years or when the cumulative capacity cap is reached.
- The RE investor can apply for FIT eligibility only when at least 80 percent of construction is complete.

In addition, the RECAI report on the Philippines states: "Despite increasingly attractive renewable energy prospects, efforts will also now need to focus on addressing the administrative bottlenecks and allegedly weak enforcement of antitrust laws that have slowed both market reform and the pace of deployment."

Overall, however, the auditing firm remains upbeat about the Philippines and expects its RECAI ranking to move up in the coming years. The country's ranking has in fact improved between 2015 and 2016.

Investment and financing risks and barriers

Three international organizations – Greenpeace International, the Global Wind

Energy Council, and Solar Power Europe—have been publishing an annual report entitled *Energy* [*R*]evolution, a highly respected report which looks at future renewable energy markets. One chapter of this report discusses the financing of the energy [r]evolution. This section draws largely from said chapter in the latest report, released in September 2015.

According to the Swiss RE Private Equity Partners, as cited in the abovementioned report, renewable energy projects have several features different from conventional energy projects. These features also influence positively the bankability and tend to lower the risks to creditors for lending to RE projects. Among these features are the following:

- Short construction and ramp-up periods from one to three years, compared with 10 years for conventional energy, with long useful lives of over 20 years.
- Guaranteed market through priority dispatch (where this is granted by law or policy)
- Particularly for onshore wind and solar PV projects, there is a good operational track record and the plants are characterized by low operational complexity.
- Except for biomass, most RE projects are not subject to fuel price volatility because their primary energy resource is free.
- Future cash flows of RE projects are in general predictable because feed-in tariffs are guaranteed—in some countries, these are also automatically adjusted for inflation. This makes for secure profit margins and predictable cash flows.
- In cases like these, the banks are open to non-recourse (no collateral) financing, whereby the future cash streams are intended to pay for the loan.

In summary, what makes RE projects highly bankable is the combination of no fuel price volatility, relatively secure revenues and generally limited market risk.

According to the Greenpeace et al. report, at the heart of any project finance would be the assessment and allocation of risks. The report identifies four kinds of risks that need to be evaluated when considering RE projects. These are *regulatory* risks, *construction* risks, *financing* risks and *operational* risks.

Regulatory risks refer to adverse changes in laws, implementing rules and regulations, feed-in tariffs and net metering rules, and changes in as well as breaches of contracts. In the Philippines the regulatory risk of RE may be considered high because of the restrictions and limits placed on both feedin tariffs and on net metering rules. Also, despite the existence of laws and their corresponding rules and regulations (not in relation to RE alone, but in general), successful challenges to these laws and contracts have been undertaken at the judicial level.

The very low cap of 50MW on solar power for FIT eligibility has in fact elicited a warning from the Philippine Solar Power Alliance (PSPA) that the Philippines could stand to lose \$650 million in investments in solar power. According to the alliance, planned investments are already estimated at \$800 million. But the 50MW cap set on solar power means only \$150 million of these investments would be eligible for the feed-in tariffs. (*Philippine Daily Inquirer*, 31 July 2011)

In a presentation to the Asian Development Bank, Tetchi Cruz-Capellan, current president of the PSPA, refers to a higher installation target of 500MW instead of the originally approved 50MW. The FIT was also lowered from PhP9.68 per kWh to PhP8.69. As of March 2015, there were 106 projects that had been awarded the FIT of PhP8.69; 118 projects under construction; and 215 projects with pending application.

Construction risks refer to unexpected delays and cost overruns in setting up an RE project. The Greenpeace et al. report considers this kind of risk to be low for RE projects, because the designs of these are relatively simple. Furthermore the construction risk can be mitigated by employing proven technologies and experienced project development partners, and by providing for construction guarantees in project development contracts.

In the Philippines, the government is requiring 80 percent completion of construction before one can apply for FIT eligibility. At the same time, the government will grant FIT eligibility on the basis of "first come, first served". The risk of meeting this requirement while still not being eligible for FIT is therefore high and may lower the attractiveness of RE in the Philippines.

Financing risks refer to the mismatching of the terms of the loan with the nature of the project. For example, some borrowers in the Philippines may obtain foreign currency loans to support projects that would generate peso revenues. The risk of a peso devaluation would therefore fall on the borrower; a devalued peso would render it more expensive in pesos to pay the same dollar-denominated debt. Another mismatch could be that the loan is payable in three years whereas the project would require a longer period to pay for itself. The design of the loan must be carefully considered in order to mitigate the financing risks.

Operational risks include equipment failure, and lower availability of the primary energy resource (wind, water, heat, insolation, biomass source). An overestimation of the RE project's future energy source could result in operational risk.

PSPA president Tetchi Capellan cites other regulatory and construction obstacles to commerciality of solar power. For one, the project holder must get permits from seven agencies and 11 offices. Furthermore, it takes from nine to 12 months to obtain an authorized conversion of land use from agricultural to industrial. There is also a problem with grid interconnection, especially outside Metro Manila. Lastly, the construction risks weigh heavily on equity funders and creditors, made worse by the opaque system of reporting on project development. Ms Capellan recommends improvements in permitting process to shorten the time period involved, as well as greater transparency for approved projects. Furthermore she proposes public-private partnership in setting installation targets and in smoother grid interconnections to benefit solar prosumers. (Tetchi Cruz-Capellan, "Finding our place in the Sun," ADB Clean Energy Forum, 17 June 2015. https://d335hnnegk3szv.cloudfront.net/w p-content/uploads/sites/837/2015/06 /Tetchi%20Capelan_ADB%20Presentation ______final%20version.pptx)

In general, for renewable energy projects, the risks and up-front costs are high at the initial development stage, and tend to fall at the operational stage. Still the Greenpeace et al. report cites barriers to finance that continue to exist in many countries around the world. These are enumerated in the following table.

TABLE 4.2 | CATEGORISATION OF BARRIERS TO RENEWABLE ENERGY INVESTMENT

CATEGORY	SUB-CATEGORY	EXAMPLE BARRIERS
BARRIERS TO FINANCE	COST BARRIERS.	COSTS OF RENEWABLE ENERGY TO GENERATE. MARKET FAILURES (NO CARBON PRICE, ETC.). ENERGY PRICES. TECHNICAL BARRIERS. COMPETING TECHNOLOGIES (GAS, NUCLEAR, CCS AND COAL).
	INSUFFICIENT INFORMATION AND EXPERIENCE.	OVERRATED RISKS. LACK OF EXPERIENCED INVESTORS. LACK OF EXPERIENCED PROJECT DEVELOPERS. WEAK FINANCE SECTORS IN SOME COUNTRIES.
	FINANCIAL STRUCTURE.	UP-FRONT INVESTMENT COST. COSTS OF DEBT AND EQUITY. LEVERAGE. RISK LEVELS AND FINANCE HORIZON. EQUITY/CREDIT/BOND OPTIONS. SECURITY FOR INVESTMENT.
	PROJECT AND INDUSTRY SCALE.	RELATIVE SMALL INDUSTRY SCALE. SMALLER PROJECT SCALE.
	INVESTOR CONFIDENCE.	CONFIDENCE IN LONG-TERM POLICY, CONFIDENCE IN SHORT-TERM POLICY, CONFIDENCE IN THE RENEWABLE ENERGY MARKET

Source: Greenpeace International, Global Wind Energy Council, and Solar Power Europe. Energy [*R*]*evolution*—*A Sustainable World Energy Outlook 2015, p. 52.*

One obstacle or barrier cited in the abovementioned report that is applicable to the Philippines is that posed by the incumbent power sector. To quote the Greenpeace et al. report: "In many regions, both state-owned and private utilities block renewable energy with their market and political power, specifically by maintaining the 'status quo' in the grid, protecting electricity markets for centralised coal and nuclear power, and lobbying against prorenewable and climate protection laws." (p. 53)

Although the energy planners and the national government can and will cite the existence of laws and programs promoting renewable energy, the barriers to the development of the latter nevertheless exist. The biggest resistance will come from the vested interests in the power sector who would not want to see electricity rates in the Philippines fall, thanks to the development of renewable energy.

Hopefully the recent creation and establishment of a Philippine Competition Commission would help to counter this trend. In 2015 Republic Act 10667 was finally signed into law (after a 24-year wait). It declares as national policy the prevention of economic concentration that would "control the production, distribution, trade, or industry that will unduly stifle competition, lessen, manipulate or constrict the discipline of free markets." The law also seeks to "penalize all forms of anticompetitive agreements, abuse of dominant position and anti-competitive mergers and acquisitions, with the objective of protecting consumer welfare." The Commission created by this law is currently headed by former NEDA chief Arsenio Balisacan.

In relation to the electricity sector, the Philippine Competition Act has repealed section 43(u) of the EPIRA or Electric Power Industry Reform Act. This section gives the Energy Regulatory Commission (ERC) "the original and exclusive jurisdiction over all cases contesting rates, fees, fines and penalties imposed by the ERC in the exercise of the above mentioned powers, functions and responsibilities and over all cases involving disputes between and among participants or players in the energy sector." It seems the Philippine Competition Commission can now intervene in such cases involving anticompetitive acts.

Experience in other countries of RE financing at local level

Filipinos must take heart from the positive RE developments in localities around the world. First of all, there already exist communities that depend on RE for 100 percent of their electricity needs. The key lesson from the local-based experiences is that smaller communities—those with less energy demand—are the first to achieve energy independence, usually as a result of the active involvement of local residents who themselves own the RE units (generally solar PV or wind).

Every year since 2005, an international report is published on local renewable energy policies by three organizations, namely: REN21 Renewable Energy Policy Network for the 21st Century, Institute for Sustainable Energy Policies (ISEP), and ICLEI-Local Governments for Sustainability. The 2011 report cites various local case studies in relation to the financing of RE. One city mentioned is our very own Iloilo City, in Western Visayas. Ted Ong of CPII briefly discusses Iloilo City's efforts to promote renewable energy in a boxed section. Efforts in other localities around the world are as follows:

Community of Dardesheim, Saxony Anhalt, Germany

- ✓ Wind park's turbines were financially structured in such a way that would induce citizens to become involved.
- ✓ For example, project participants enjoy a share in the rent revenues and hold shares that offer a minimum rate of return of eight percent.

Spanish region of Navarra

- Local government sought to induce local participation in the renewable project by offering financial incentives to buyers of solar panels.
- ✓ Each investor commits approximately €50,000 per panel, but a major business corporation, Acciona, helps arrange the financing, operates the site, and collects the feed-in tariffs.
- ✓ With a population of over 600,000, Navarra now generates almost 70 percent of all electricity from wind and solar power, including over 1,100 wind turbines.
- ✓ The government offered 10 percent tax credits for investments in wind energy, grid-connected solar PV, biomass, biodiesel, and geothermal power. (In 2006, Government of Navarra granted €195.74 million in tax credits for solar PV installations alone.)

Island of Samsø, Denmark

- No funding was obtained from outside the community; instead, local citizens invested in renewable energy projects by buying shares.
- Investments were marketed as business opportunities, secured by revenue guarantees based on the national feedin-tariff policy.
- Local project leader Søren Hermansen played an invaluable role in convincing local residents of the wind project's

benefits.

- Hermansen's team believed that a high degree of civic participation was needed to ensure the long-term viability of the project.
- •All onshore turbines and one offshore turbine are owned by locals, either through a cooperative or with private ownership schemes.
- Samsø is now completely powered by renewable electricity.

Town of Frederickshavn, Denmark (population 25,000)

- ✓ Fund has been established to finance renewables.
- ✓ To achieve the goal of becoming 100% renewable by 2015 (including the transport sector), the town estimated an investment requirement of KR1 billion (about USD170 million).
- In contrast to the Samsø citizen-finance model, Frederickshavn is also soliciting finance from outside investors.
- ✓ The city plans to adjust some taxes.

Kuzumaki, Japan

- ✓ In 2005, the town officially decided to produce 100% of energy needs through local RE.
- Subsidy of ¥30,000 yen per kW (max of 90,000 yen) available for solar PV installation with up to ¥50,000 available for the installation of solar heating systems.
- ✓ A subsidy of ¥50,000 was also provided for the purchase of hybrid/electric vehicles.
- ✓ One half of the installation cost (maximum of ¥100,000) is also available for the installation of wood biomass heating systems (wood chips, pellet stoves).
- ✓ Other subsidies of ¥100,000 were provided for small hydro and wind power.

Masdar City, United Arab Emirates

- Example of a planned city supported at the national level and designed from inception to be completely reliant on renewable energy.
- The national government of Abu Dhabi has allocated up to \$15 billion in seed capital and the city is still under construction.
- ✓ Credit Suisse invested \$100 million in the Masdar Clean-Tech Fund.

Iida City, Japan

✓ Plans to increase the share of households with solar PV from two percent in 2006 to 30 percent by 2010.

- ✓ Established solar PV subsidies of ¥70,000 per kW (limited to a maximum of 3 kW).
- ✓ Free installation of 3.5 kW Solar PV systems for a limited time.
- ✓ Subsidies of up to 20 percent of the cost (limited to ¥30,000) for residential solar hot water installations.
- ✓ Public-Private partnerships: collaboration with Chubu Electric to develop a mega-solar development that will consist of a 1,000kW plant that will come online in 2011.
- Community funding programs: Plan to install community-owned solar PV in over 210 locations.

Iloilo City Government institutionalized 20% incentive for household RE users

By: Ted Aldwin E. Ong

Fellow, Center for Power Issues and Initiatives (CPII)

In 2009, the City Council of the Local Government of Iloilo City passed an ordinance establishing a mechanism that provides 20-percent reduction in the annual real property tax for household power end-users.

Former City Councilor Eldrid C. Antiquera sponsored the ordinance. Antiquera finds the measure a necessary step for the city government for it will encourage household power end-users to use renewable energy sources for its electricity needs.

Antiquera was able to gather unanimous support from all 13 members of the legislative body and with only one absent in a regular session becoming the 20-percent incentive among household users of renewable energy institutionalized into a law.

The Regulation Ordinance No. 2009-358 "An Ordinance Encouraging All Household Entities to Utilize Natural Energy from Renewable Energy Sources and Providing Real Property Tax Incentive Thereof" was enacted on November 18, 2009, and was signed by former Iloilo City Mayor Jerry P. Trenas and Vice-Mayor Jed Patrick E. Mabilog.

Antiquera explained that the passage of the ordinance was an initiative of the city government in support of the national government's commitment to international agreements intended to enjoin citizens and gather public support in meeting global targets aimed at minimizing carbon dioxide emissions.

Moreover, the ordinance is a mechanism through which the city government recognizes the commitment of Iloilo City residents to clean and sustainable energy, thereby minimizing the impact of climate change.

How power end-users can apply

The ordinance states that the 20-percent real property tax incentive only covers residential units. An owner of the household in whole or in part including those who lease or rent can apply for the tax incentive by accomplishing a pro-forma application provided by the City Environment and Natural Resources Office (CENRO).

The CENRO is also the office that receives the application and does the coordination work with the Iloilo City Engineering Office who is tasked to make an ocular inspection of the applicant's household to determine if it complies with the requirement.

Once the City Engineering Office validates the existence of a renewable energy facility, whether stand alone or connected to the grid, the Engineering Office will provide an audit seal to the equipment or facility and then issue a Certification of Compliance to the applicant.

How the incentive is implemented

The Certificate of Compliance serves as the documentary evidence that the applicant is qualified to avail of the 20-percent incentive. This is supported by an endorsement from the CENRO and the applicant can now carry these support documents to the Office of the City Treasurer who shall authorize the reduction of 20-percent to real property tax to the applicant upon payment of real property tax.

Since the incentive is provided on a yearly basis, the beneficiary is required to process an annual renewal form and submit to the CENRO.

Gradual increase of beneficiary

The list of beneficiaries of the tax incentive obtained by the Center for Power Issues and Initiatives (CPII) from the Iloilo City Environment and Natural Resources Office revealed a slow take off of applications.

In fact, applications recorded by CENRO only started in 2014 or five years after the enactment of the ordinance. Since 2014 to the present, however, the list of applications contains a small number, but the trend illustrates gradual increase.

In 2014, CENRO only issued approval and endorsement for 12 applicants. It increased to 16 applicants in 2015 and to 23 applicants for 2016. So far no records have shown that there were applications that were disqualified.

Personnel from CENRO declined to cite reasons for the low turnout of applications from residential power end-users of Iloilo City for lack of document to show as basis of its assessment and because enforcement of the ordinance has yet to undergo evaluation.

Periodic Review

A periodic review is integrated in Section 12 of Ordinance No. 2009-358. The focus of the review, however, only covers implementation among beneficiaries that earned approval and who availed of the incentive.

The subject of the periodic review covers spot check of the beneficiary for violations of the approved requirements or commissions of fraud which can be used by the City Government to disqualify renewal of applications.

A periodic review to check on the status of implementation of the ordinance from the Iloilo City Council consistent with its oversight function, or, specifically; from its committee on environment where the ordinance emanated, was not integrated in the ordinance.

There are no reports available from CENRO or the Iloilo City Engineering Office related to performance of regulation functions in the last three years.

Legal foundation of the ordinance

According to Antiquera the enactment of the ordinance by the Iloilo City Government was consistent with the Local Government Code of 1991 which states that the "Local government units shall share with the national government the responsibility in the management and maintenance of ecological balance within their territorial jurisdiction, subject to the provisions of this Code and national policies:"

Former City Councilor Antiquera also underscored that the ordinance was a pro-active response after Republic Act 9513 or the "Renewable Energy Act of 2008" was enacted into law which aims for the country to optimize its renewable energy sources in order to become energy self-sufficient and mitigate the global problem of climate change.

Lawyer Eldrid C. Antiquera was the principal author of Regulation Ordinance No. 2009-358. Antiquera was an elected city councilor at that time and served as chairperson of the committee on environment of the Iloilo City Council.

Adelaide, Australia

✓ Offers \$1,000 subsidies for solar PV systems larger than 1-kilowatt (kW), and subsidies of \$1/watt up to \$3000 to install solar PV for lighting in common areas of apartment buildings

Austin, Texas, US

- ✓ Austin Energy, the energy department of the city government, has been purchasing private wind power since 2001, receives electricity from several solar installations in the city, and also purchases power from landfill gas in San Antonio.
- ✓ Austin Energy's GreenChoice Program allows residents and businesses to voluntarily purchase green power through 5-year and 10-year subscriptions; by 2009, subscriptions represented 750 GWh in green power sales.
- ✓ Austin Energy also provides rebates of \$3.75/watt for solar PV and \$1,500 to \$2,000 per system for solar hot water.

Edinburgh, UK

✓ Launched a Climate Change Fund totaling £18.8 million to develop local carbon-free communities

Freiburg (i. BR), Germany

- ✓ Sale of municipal land to developers with the requirement that housing built on the land incorporate RE and exceed national energy efficiency standards.
- ✓ This led to several renewablesintensive low-energy housing districts.

New York City, New York, US

- ✓ Property tax abatement program, which provides a rebate of 8.75% of installation costs each year for four years, up to \$62,500 per year, resulting in a total rebate of 35%.
- ✓ The net-metering capacity limit was also raised from 10kW to 2 MW in late 2008.

Oxford, UK

- Low Carbon Buildings Program (LCBP) launched in 2006 with 2 planned phases.
 - •During the first phase, the city provides subsidies for solar PV, solar hot water, and small-scale wind power in public, commercial, and residential buildings. Households can receive up to £2,500 per property.
 - The second phase provides grants to community groups and nongovernmental organizations for renewable energy in public buildings such as schools and churches, up to 50 percent of the total installation cost and maximum of £200,000.
 - By 2009, the city had allocated £45 million to LCBP including £10 million to phase one and £35 million to phase two.
- The city jointly operates the Community Sustainable Energy Program (CSEP) with a private research organization called the Building Research Establishment (BRE).
- ✓ Will provide community-based organizations with £8 million to install renewable energy systems and £1 million to develop renewable energy projects

Portland, Oregon, US

- ✓ Established a \$450,000 Biofuels Investment Fund that supports various biofuels production and distribution projects, including projects to install or convert fueling equipment.
- Launched a five-year \$2.5 million • Green Investment Fund with private
- partners that is investing in renewable energy projects, and the city facilitates business partnerships for renewable

energy investment and green power sales.

✓ Bureau of Planning and Sustainability oversees these efforts.

San Francisco, California, US

✓ \$100 million Solar Energy Bond in 2001 GoSolar program provides solar PV subsidies of \$2,000 to \$4,000 for residential installations (\$7,000 for low-income residents) and \$1,500/kW for installations by businesses and nonprofit entities (maximum of \$10,000).

Toronto, Canada

 Established a \$20 million Sustainable Energy Fund to provide low-interest financing for renewable energy projects

Wellington, New Zealand

✓ \$300 rebate of consent fees for solar hot water and other renewable energy technologies

Transformational Finance: the Real Challenge

The World Resources Institute (WRI) has analyzed the role of finance in enabling a fundamental shift in country systems towards a renewable energy regime accompanied by energy efficiency. After studying 20 countries, both developed and developing, the WRI arrived at the three main criteria of what it calls low-carbon energy transformation, as shown in its 2016 working paper entitled "Transformational Climate Finance: an Exploration of Low-Carbon Energy." These are as follows:

- The shift to renewable energy has a *significant impact* on the economy.
- While change may begin slowly, progress is *exponential or non-linear*.
- Low carbon energy transformation takes place over decades and there is no backsliding. It is *sustained and long-term*.

How can finance play a role in this kind of transformation? In a few of the countries the WRI studied, climate finance is transformational, that is, all the above characteristics have emerged as a result of the financing arrangements. Furthermore, successes have been scaled up or replicated or both. The WRI found this to be the case in Chile, China, Denmark, Germany, Mexico, Portugal and Uruguay. It found finance to be potentially transformational in, among others, Bangladesh, India, Thailand and Tunisia. In the Philippines as in Indonesia, the WRI has found climate finance to be in its early stage development or in some cases, having *missed opportunities* for low-carbon energy transformation. The charts from this working paper are presented below.





Source: Westphal, M.I., and J. Thwaites. 2016. "Transformational Climate Finance: An Exploration of Low-Carbon Energy." Working Paper. Washington, DC: World Resources Institute. Available online at <u>http://www.</u> wri.org/publication/transformational-climate-finance.

How can finance be a catalyst for the development of renewable energy and the transformation of the energy landscape? The same working paper identifies key factors such as

- National ownership
- Stakeholder engagement and participation

- A stable enabling environment
- Financial incentives aligned to address market distortions
- Strategic use of resource to mobilize private investment
- •Technology and innovation investments
- Innovative financial instruments and arrangements
- Continuous learning and improvement

Red lights and humps to financing RE in the Philippines

At present, financing renewable energy in the Philippines is primarily an exclusive privilege for the few who could tap the lending windows of government banks and a few large commercial banks. The development of RE itself faces numerous red lights and obstacles; likewise the financing of RE. The World Bank intervention to enable rural electric cooperatives to obtain commercial bank loans for RE appears to be a welcome development for the more stable RECs.

At the policy level, the feed-in tariffs (FITs) are not universally applicable. Instead, the regulators have placed caps on the installed amounts of various types of RE that would be eligible for the FITs. This alone makes the financing of RE in the Philippines less secure. The process of applying for FIT eligibility also adds to the risk factors: Construction of the RE project must be at least 80 percent complete before the project holder can apply for FIT eligibility. FITs are also reviewed every three years or when the caps set by the regulators have been reached. The implication of this is that should the term of the loan be longer than three years (which it should), then the lender faces the risk that the RE installation cannot pay for itself should the regulators lower the FITs while the loan is still being paid.

Another red light is the national government's bias for coal. RE used to account for 45 percent of total electricity generation but today its share has fallen by nearly half. A clear cut policy for the development of RE is needed in order to make financing for RE tenable. "Secure, predictable policies", to quote from Greenpeace, are key to getting theRE. A government that pays lip service to RE but in reality pushes coal is in effect signaling to the banks NOT to lend for RE.

RE advocate Roberto Verzola has argued that more than FIT rates, net metering is the key to the development of grid-connected renewable energy (primarily, solar power), especially considering the very high electricity rates in the Philippines. However, the regulators have also allowed the distribution utilities to shape the rules and procedures of net metering, resulting in highly unfavorable terms for prosumers. Net metering in its unadulterated shape and form must be practiced in the Philippines for RE to spread, especially among the unconnected and those with tight budgets.

As discussed in the previous section, the local experiences in various countries around the world are showing us that going RE is doable, and that there are many ways to finance this. A number of countries have chosen to provide subsidies and tax credits in support of RE. The Aquino government would certainly balk at this; it has prided itself on raising the tax effort. But before rejecting this outright, the government should take a hard look at the implicit subsidies it has been giving for coal.

The figures for the latter are not readily available. But in a working paper released in May 2015, the International Monetary Fund (IMF) has estimated that worldwide, the "post-tax" subsidies for fossil fuels (taking into account the environmental costs) are running to \$4.9 trillion in 2013, and are expected to reach \$5.3 trillion this year. The biggest contributor to this figure, according to the authors of the IMF working paper, is coal. While the reader is cautioned about the actual estimates, the authors maintain: "...[W]hile there is ample scope for refining the estimates of energy subsidies and reform impacts or for undertaking further sensitivity analysis, the key findings of the paper are clear: energy subsidies are very large; their removal would generate very substantial environmental, revenue, and welfare gains; and their reform should begin immediately, albeit gradually, given the uncertainty over the precise level of energy taxes required."

In Germany's experience with *energiewende* (transition to RE), it is clear that the twin national policies of priority dispatch for RE and the feed-in-tariffs were sufficient to render it viable both for banks to lend for RE, and for German citizens to borrow from

the banks to finance their RE investments. Not only did *energiewende* broaden the base of power generation; it also broadened the financial base for lending and borrowing for RE.

This is a crucial lesson that the Philippines must seriously consider, particularly when the tendency of those in power over the power sector is to refuse to relinquish it. The challenge of the finance sector-in the Philippines and throughout the world—is to enable the transformation of the Philippine power sector into one that is sustainable, affordable and accessible to all. There are critical success factors in the path towards this transformation and the role that finance can play in this transformation. At present the government itself needs to have a more definite and unequivocal view on renewable energy. The banks and businesses must be more aware of the transformations taking place in many places around the world as a result of the RE. And our people must be informed and involved.

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Success Stories from Local Communities



The moving powers of San Luis

by **Job Bordamonte** Center for Power Issues and Initiatives (CPII)

As a veteran social activist, Mayor Mariano "Nano" Tangson of San Luis, Aurora Province, was able to provide his native *kababayans* something to energize their spirits to fight for a better society, as well as a happy community sustainably powered by renewable energy (RE).

Mayor Tangson's RE project dramatically transformed his sleepy third class municipality into a dynamic second class town with a flourishing local tourism industry to boot. All these were made possible through the promotion of the majestic Dimatubo Water Falls made more attractive with its component mini-hydro power project.

Turning vision into reality

A former seminarian who used to conduct intensive community organizing work during the Martial Law era in the whole of Aurora province, Mayor Tangson knows every terrain in his locality. He was also familiar with its political landscape as he came from a family of public servants in San Luis. This combination propelled him into office. As a visionary public servant, he easily garnered the votes needed to occupy the various posts he contested – from town Mayor to the Provincial Board and now as a returning chief executive of San Luis.

Among his many achievements from his innovative style of leadership is the development of the San Luis Mini-Hydro Power Plant (SLMHPP). Attending conferences and seminars gave Mayor Nano a wide exposure to social development paradigms, including sustainable energy. From there he initiated preliminary investigations, surveys, studies and a series of public consultations in pursuit of his pet projects. One concern that motivates him is how to generate additional income for his municipality.

Mayor Tangson strongly believed that the Dimatubo Falls can be developed as an ecotourism site and at the same time generate electricity. He was also confident that San Luis and its people would have the capacity to overcome the challenges of financing the project through bank loans and equity from local revenue. In fact, he was able to secure the initial loan coming from the Embassy of the Czech Republic especially for the needed turbines.

The project

The San Luis Mini-Hydro Power Plant is a local government subsidiary established primarily to tap the natural resources of the municipality and to augment the power needs of the local distribution utility, the Aurora Electric Cooperative, Inc. (AURELCO).

The envisioned eco-tourism and power project was admired by the people and quickly implemented after the approval by the Sangguniang Bayan in 2003. As an ecotourism project, the municipal government decided to develop only the downstream part at the foot of Dimatubo falls to preserve its majestic beauty. The project is located two and half (2.5) kilometers away from the National Highway.

Type and Number of Plant Installed	2 Turbine generator sets
Installed Capacity in Megawatt	0.80
Plant Capacity Factor in Percentage	60%
Fuel Type (Fuel as start-up but mainly Hydro	HYDRO
Point of Interconnection	2.5 Km from the Power House
Economic Life in Years	10 years minimum
Estimated Project Cost	Php 72,827,881.87
Date of Commissioning	May 2, 2008
Plant Efficiency	Turbine = 90.3%, Generator = 96%
Total Storage Volume in Cubic Meters	800 cu.m.
Reservoir	Concrete Dam with 2m height of ogee, 16m wide and 25m assumed length. Masonry at core with reinforced concrete facing. Reinforced steel bar matting interconnected with vertical rock anchors will be integrated. One (1) sluiceway with motorized operated steel gates at one end of the dam for flushing of sediments from the head pond. An intake structure connected at the right bank of the dam.
Waterways	Thru Penstock A 0.97mtr diameter. A 8mm thickness pipeline used of 1.250km. Pipeline. Pipeline protected with anchor blocks. Anchoring, other parts protected with concrete cover.
Power House	An area of 160m ² (20m.x 8m.Dimension) floor level located at an elevation of 139masl, above the riverbed, Foundation are constructed of concrete with surface walls made of CHB the roof is made of sheet metal supported by wooden trusses.

Technical Description of the Project

Preparation and Initial Implementation Stage

On February 17, 2003, the LGU of San Luis entered into an agreement with UPP Associates Inc. represented by Dangal Delos Angeles to undertake a Comprehensive Feasibility Study. It also hired Allied Services Geo-Technical Drilling for detailed engineering works and Structural Design Program.

This table shows the cost of the Initial Feasibility Study and Schedule of Payments:

Cabanatuan branch. The loan was approved on June 23, 2003 with a total amount of 37 million payable within 7 years.

However, a series of typhoons (Violy, Winnie and Yoyong) hit San Luis in 2004 causing delays in project implementation. Initial pipes were submerged due to water and soil erosion, others were carried away by the floodwaters and could no longer be retrieved. The pedestal upstream was deformed and the access road going to the project site was likewise damaged. Other problems also emerged such as the sudden

Total Payment comin	PhP1,694,000.00	
3 rd Payment	September 22, 2003	PhP239,000.00
2 nd Payment	August 21, 2003	PhP655,000.00
1 st Payment	June 19, 2003	PhP800,000.00

With internal allotment (portion of 20% Development Fund) as bases, only a 500 kilowatt capacity was originally envisioned, although its civil structures especially the pipeline and the power plant were designed for higher capability in anticipation of future expansion. Hydrology studies undertaken by UPP confirm a maximum power generating capacity of 1,200 kilowatts.

To guarantee the sale of electricity to be generated, Mayor Tangson and Members of the Sangguniang Bayan signed a Memorandum of Agreement (MOA) with AURELCO for the latter's purchase of all the power produced by the power plant.

The initial estimated project cost would reach PhP 45 million. To finance the project, the LGU of San Luis applied for a loan with the Philippine National Bank, increase in the cost of pipes and other construction materials. Considering such construction difficulties and financial constraints, the project's construction was temporarily halted for nearly a year.

A major adjustment was needed in order to adapt to the said condition, primarily the re-survey and re-design of Penstock.¹ This entailed additional costs:

Mini-Dam Construction	PhP 4,999,703.69
Concrete Pedestal	PhP3,093,048.32
Power House	PhP3,500,000.00
Steel Pipes	PhP13,545,604.40

Considering the significant amount of additional investment required, and the desire to finish the project, a critical consultation was held with the members of the Local Finance Committee as well as the

¹ Pipeline protected with anchor blocks. Anchoring, other parts protected with concrete cover.

members of the Sangguniang Bayan to seek guidance and approval of the proposed adjustments.

Furthermore, the original design of 500 kilowatts maximum capacity was modified to 750 kilowatts and then to 1.2 megawatts. Because of this, two options were taken into consideration by Mayor Tangson: whether to apply for additional loan with PNB or enter into a Buy–Out scheme of the loan through the Baler branch of the Land Bank of the Philippines, which offered a lower interest rate. Since they also want to eliminate the risk and time of travelling from San Luis to Cabanatuan, the loan buy–out was a more practical option they considered.

However, it took almost a year before a resolution was approved by the Sangguniang Bayan authorizing the buy–out of LBP of the PNB loan. And due to adjustments made in the project, the original loan of PHP 37 million was no longer enough to finance the project which reached a new total of PHP 57 million.

Another resolution No. 01 – 25 series of 2007, was passed on July 02, 2007 authorizing the LGU to secure additional loan from the LBP amounting to PhP 3

million to finance additional works for penstock and for the commissioning fee. The total final amount was further increased to Php 77,244,139.22.

Other major Components in the Implementation Stage

A major part of the implementation stage entailed securing all the necessary permits, as well as some crucial policy guidelines with regard to ownership, control and management:

- 1. Facilitation of environmental compliance requirements (DENR)
- 2. Use of run-of-river/natural resource (National Water Resource Board)
- 3. Local Hosting (Barangay Resolution)
- 4. Delineation of relationship between LGU and AURELCO
- 5. Certificate of Compliance from the Energy Regulatory Commission

Commercial Operation

On December 17, 2012, the Energy Regulatory Commission (ERC) approved the joint rate petition by Aurelco and SLMHPP amounting to PhP5.1061 per kWh which is higher than the power purchase agreement of PhP4.4395 per kWh (true costs) and the provisionally approved rate of only PhP2.98 per kWh.

According to the ERC, the provisionally approved rate of PhP2.98 per kWh does not reflect other costs, including operations and a rate of return that would be necessary to make the project more sustainable.

The approved rate is broken down as follows:

Capital Components	PhP
Depreciation	7,226,555.60
RORB (WACC – 11.29%)	9,063,436.40
Total	16,289,992.00
Operation and Maintenance Expenses	
Consultancy Fee	210,240.00
Maintenance Cost	336,384.00
Supplies Expenses	229,529.00
Franchise Benefits to Host Communities	39,744.00
General and Administrative Expenses	3,187,617.48
Total	4,003,514.48
Total Required Revenue	20,293,506.48
Divided by Billing Determinant (kWh)	3,974,400 kWh
Generation Rate (PhP per kWh)	5.1061/kWh



Image: www.facebook.com/sanluislgu

Immediate Impact of SLMHPP

Upon commercial operations, consumers were able to realize savings as their power bill fell by 10 percent compared to the price they had to pay other power producers. The transmission cost was also avoided as SLMHPP is directly connected to the distribution system of Aurelco. They also enjoyed security of supply during peak hours.

Furthermore, SLMHPP is able to supply a significant share of 19.5 percent of power generation to Aurelco. On the revenue side, 78 percent of the local income of San Luis has come from the SLMHPP since 2012. Likewise, a dramatic rise in tourist arrivals was recorded from January to April of 2014 (27,602 local and foreign combined).

Leadership and democracy at work

Clearly, a democratic and innovative leadership is what is needed to pursue a collective vision of sustainable development. Mayor Tangson is a rare kind among our LGU leaders. By exercising his leadership and skills both in organizing, optimizing resources and mobilizing the people in pursuit of a common goal, the SLMHPP was born to power the needs of San Luis today and in the future.

This serves as an example of how the innate powers of an LGU are effectively utilized for transformative purposes such as building renewable energy projects. Today, developing our indigenous renewable energy sources has already gained enormous recognition that even banks, other financial institutions and enterprising Filipinos proclaim their readiness to promote.

Yet the basic challenge begins with having a vision, the capacity to build the constituency around that vision, and mobilizing the people in turning the gifts of nature into sources of sustainable energy for the primary benefit of local communities in whose care these resources are given.

The 90-10 Vision

How it's being done in Romblon

by Wilson Fortaleza

Center for Power Issues and Initiatives (CPII)

Romblon islands are located at the center of the Philippine archipelago. Seven islands and islets compose the province, the biggest of which is Tablas, followed by Sibuyan and then the capital island town, Romblon.

Being a Romblomanon myself, I've been witness to how my province lived in darkness and isolation because power, for so many years, was not available. Life was very slow and monotonous because of modicum economic activities. Grinding poverty, as a consequence, drove many Romlomanons to seek opportunities in Manila or in nearby, more economically advanced urban provinces of Iloilo and Batangas.

Power arrived in the province in the late 80's under the missionary electrification program of the National Power Corporation (NPC) and the National Electrification Administration (NEA). Two electric cooperatives were formed to service two franchise areas – the Tablas Island Electric Cooperative (TIELCO) covering the islands of Tablas and San Jose, and the Romblon Electric Cooperative (ROMELCO) for the islands of Romblon, Sibuyan, and the remaining islands of the province of Romblon.

However, supply of electricity to off-grid islands usually comes from a single source and that is from small diesel plants or barges provided by NPC's Small Power Utility Group (SPUG). As such, the cost of power is high and reliability is always compromised as the system is dependent on the availability of fuel coming from NPC and the volatility in its prices. Intermittence, rationing, and total blackout, therefore, were regular in Romblon.

This seemingly hopeless situation compelled ROMELCO's energetic General Manager, Rene Fajilagutan, to look for possible alternatives to this lingering power problem hounding his jurisdiction. And by attending seminars on power alternatives and climate change, he came up with a definitive answer: Renewable energy systems. In a presentation he made before the **Financing Renewable Energy and Energy Democracy** conference held in Pasig City last 23-24 September 2016, GM Fajilagutan elicited excitement among the participants to his **90-10 Vision** for ROMELCO. The ambition, he said, is for ROMELCO to hit the target of 90% renewable by 2020, with diesel covering the remaining 10%. The goal, he said, is big and ambitious but with the right technology, it is possible.

To prove this claim, GM Fajilugutan showed ROMELCO's three successful renewable energy projects, namely: Cantingas Mini-Hydro Power Plant in Sibuyan Island, Solar-Diesel-Energy Storage Hybrid System in Cobrador Island, and Solar Home Systems. Despite the many challenges he faced in pursuing this projects especially during their development stage, Fajilagutan has been very successful in securing funding support to his pet projects.

The Cantingas Mini-Hydro Power Plant,

with a rated capacity of 1,350 kW, is located at San Fernando, Sibuyan Island, Romblon. It was launched in March 2010 with the capacity of 900kW. It now provides baseload to the whole island of Sibuyan with a population of 56,000. These people now enjoy a 24/7 supply of power. The rate also went down significantly and will continue to slide down until the rates cover only the operations and maintenance of the plant. The bold projection: Rate reduced from approximately Php 4.00 to Php 1.00 per kWh when ROMELCO finishes paying its loans.

The greatest challenge GM Fajilagutan faced was when typhoon Frank struck the island in the middle of the construction of the project. ROMELCO had to repeat the construction which doubled its expenses. The project was financed by World Bank's Rural Power Project which is being implemented by DBP. It also got support from the UNDP/FINESSE Project.

Meanwhile, it only took ROMELCO six months to build the **Solar-Diesel-Energy Storage Hydro System** in Cobrador Island. This 30 kilow kW solar PV capacity system that can be stored in a 180 kWh lithium-ion batteries is combined with a 15-kW diesel generator. The system provides round-theclock electricity to all the 244 households in the island, composed mainly of fisher folks. The project was financed by Asian Development Bank (ADB), Korea Energy Agency (KEA), and the National Electrification Administration (NEA).

ROMELCO's **Solar Home System** is located at Sitio Layag, San Fernando, Romblon with 2.5 Wp and 5.0 Wp capacity. This project helps the consumers do things they could not do before like charging gadgets and lighting bulbs. The project was made possible by the grant from SEACOLOGY.

Solar, Fajilagutan concluded, "Will disrupt the traditional way of providing energy to households and there would be a time when the centralized power source would not be a viable business anymore."

Aside from these three projects, ROMELCO's has ongoing and future renewable energy projects, namely: wind turbine, biomass, and another mini-hydro. Now, who would think that the 90-10 vision is not possible in Romblon?

How a community savings model powered Polopiña Island

by **Ted Aldwin E. Ong** Fellow, Center for Power Issues and Initiatives (CPII)

The residents of Polopiña Island in Concepcion town located in northern Iloilo have never imagined having a lighted home. Their forefathers never had this; most of the younger generation had lived without light or access to electricity.

A third class municipality, Concepcion is located in the northern tip of Iloilo Province in Panay Island in the Visayas Region. Coastal and small island barangays characterize a majority of northern Iloilo towns making fishing a major livelihood activity especially with the abundant marine life from the Visayan Sea.

Of the 25 barangays that make up Concepcion, 11 are island barangays. These island barangays never had electricity for there are no submarine transmission lines that connect power lines from the mainland to the islands. So while Concepcion's power distribution service provider Iloilo Electric Cooperative III (ILECO III) is connected to the Panay island power grid, island barangays remain off-grid and without electricity. The island folks utilize improvised kerosene lamps made from reused bottles or a paraffin pressurized lantern commonly called "Petromax" for livelihood activities and for lighting during nighttime.

A diesel-fed generator is being operated at Sitio Lo-oc (village) for power use and it is made accessible to nearby households. However, it can accommodate less than 10 households and is available only from 6:00 to 10:00 in the evening with a P10.00 fee.

This is the reason why most family activities are held during daytime or while the sun is still up. Having no electricity has become a way of life. It is the rule rather than the exception.

Typhoon Yolanda

It had to take Super Typhoon Yolanda (Haiyan) that hit the Philippines on November 8, 2013 to make visible Polopiña Island in the map of development workers and humanitarian organizations. The rebuilding project by Iloilo CODE-NGOs which was funded by Christian Aid-UK opened the opportunity to use renewable energy technology by integrating a solar home system to the shelters that were constructed for the survivors.

The basis for the integration of solar power home system was taken from the result of the heat mapping survey it conducted just three months before Typhoon Yolanda hit northern Iloilo. The survey was conducted in two municipalities: Carles and Concepcion in order to determine the energy needs of the households and to facilitate potential support in powering offgrid communities.¹

Lack of power presented a major challenge even among workers of civil society organizations after Typhoon Yolanda. Many of them shared their experience working with off-grid communities under the darkness of night during relief and response, up to early recovery, and later in the rebuilding and rehabilitation work.

This is the reason why it revisited the concept of integrating solar home system even for lighting and charging of small gadgets like cellular phones to its core shelter beneficiaries. Yet technical support and financing presented another major challenge considering the context that island residents were not familiar with solar power technology and that they have low economic capacity having fishing as the source of family income.

Most of the residents, however, were determined to have a light at the household after they learned that solar home system is a viable option and a clean source of energy for electricity.

Powering off-grid community

Iloilo CODE-NGOs proceeded with the project by establishing partnership with the Institute for Climate and Sustainable Cities (iCSC) for technical and capacity building support. On the other hand, it adopted the community-managed savings and credit method to help beneficiaries finance payment for solar home system, a concept developed by World Vision Development Foundation.



Image: RE-Charge Tacloban

The solar home system project was offered to interested poor households who cannot acquire solar power equipment through cash payment. Iloilo CODE-NGOs and iCSC also conducted a household survey to match energy need and capacity to pay by families.

The outcome from the survey was interpreted in the following offering:

- Small Solar Home System Set 30 watts with a cost of P7,200 and payable in 24 months.
- 2. Big Solar Home System Set 60 watts with a cost of P13,000 and payable in 24 months.

¹ Renewable Energy Project presentation by Emmanuel Areño, Executive Director, Iloilo CODE-NGOs, 2016.

Technical and financial support from iCSC

The iCSC provided the needed technical and capacity building support by forming community-based technicians or Solar Scholars and it conducted training on the basics of solar power, installation, maintenance and repair.

The training also covered the use of TekPak, a mobile equipment useful during disasters. The iCSC distributed one TekPak per barangay and assigned the unit under the custody of solar scholars. It also mobilized finance support for the fabrication of solar home systems with a total cost of P1-million.

It also tapped the services of individual technicians and local experts like Ed Arroyo who has done numerous solar project for Iloilo CODE-NGOs.

Operating the financing model

Iloilo CODE-NGOs adopted the Community-Managed Savings and Credit Association (CoMSCA) as financing model that can be adopted by poor families. The CoMSCA was developed by Engr. Ernesto I. Macabenta, a micro-finance specialist who is now the Visayas Associate Director and Savings Champion for South Asia and Pacific Region of World Vision Development Foundation.

The CoMSCA is a an outcome of World Vision's combined experience on the various savings schemes it has adopted and implemented like Peso a Day, Savings and Investment and the Bayanihan Banking System and savings mobilization practices like "paluwagan", repa-repa, and others.²

Why community savings is appropriate method?

The CoMCSA is a community managed initiative. Individuals are organized into clusters or groups in their respective communities. They harness their own available resources for savings. It is selfmanaged by the group itself, providing loans to members.

The community savings method is different from micro-finance facilities. It is selfmanaged, therefore independent.

According to Engr. Macabenta, CoMSCA is an effective system for the Philippine context because many communities cannot gain access to financial services offered by banks or by micro-finance institutions. There are a lot of factors why the poor cannot gain access to formal financial services: lack of legal documents, no proper identification which is required for approval of application, lack of capacity to pay and collateral, poor financial literacy and lack of knowhow on financial matters.

This is the reason why individually-driven and informal finance facility thrive in the country like the so called "Bombay" and why the poor fall prey to excessively high interest schemes that bury them deeper into debt.

Macabenta also explained that CoMSCA is useful for communities because it can finance income generating activities, meet predictable expenses and allow members access to the funds at the community level.

In the case of Polopiña, CoMSCA not only made affordable the solar home systems to poor families, but more than that – it empowered them to earn income by embarking on livelihood activities. It is like hitting two birds with one stone.

² Message by Ernesto I. Macabenta, 2nd National CoMSCA Summit 2016, July 14-16, 2016, Cebu City, Philippines.

How the method was operationalized?³

Individuals were organized into clusters of at least 10 and not more than 25 members.

- The members contribute a weekly share ranging from a minimum of P20.00 to a maximum of P100.00. Each member is allowed to borrow an amount equivalent to twice her/his share. If a member has a P300.00 share, the most that can be borrowed is P600.00. But the cost per share varies depending on the amount agreed upon by cluster members. There are some clusters that agreed on 50 pesos per share.
- The group elects a chairperson, record keeper, box keeper, 2 money counters and three (3) key holders in charge of opening and securing the box which serves as money vault.
- The group holds a weekly meeting lasting no more than an hour. At the meeting they open the box, count the money, and decide how much funds to release to a borrower, and subsequently record the transaction. The schedule of meetings, however, also depends on the agreement reached by cluster members. It may be weekly, bi-monthly, three times a week, or monthly.
- The payments collected are deposited to a fund called "solidarity fund" which will be used for expansion to other poor households and communities.

Iloilo CODE-NGOs organized the shelter beneficiaries and community members into CoMSCA groups. It first formed core shelter beneficiaries of 40 households and an additional 60 households also followed after community members outside the shelter project expressed interest to organize themselves in order to avail of the solar home system.⁴ The organizing effort resulted to a total of 100 household beneficiaries organized in 6 clusters. Each cluster has members ranging from 14 to 22 individuals.

Benefits brought to Polopiña Island?

The community savings method has allowed families to save money and get credit from the group for useful livelihood activities. It brought additional income to the family and enabled them to afford payment for the solar home system at a monthly installment of P60.00 to P70.00 per week.

Through CoMSCA, Polopiña Island households gained lighting and allowed family members to charge gadgets. A household with 30 watts solar power, for instance, was able to install 2 to 3 LED lamps which improved visibility to work at night and increased efficiency in doing household chores.

It also reduced the risk of fire for solar power is safer unlike using kerosene lamps or candles which are flammable. During nighttime, it is also used to provide light outside homes.

As a fishing village, fisherfolks are among the major beneficiary of solar home systems because it did not only provide lighting, but allowed them to charge small batteries used for lighting needed for fishing activities.

One of its positive impact was on women and children. Mothers shared that it improved children's performance at school for household lighting allowed them to study even at night. The women in the community also expressed that solar power has relieved them from lling economic empowerment to poor families and communities.

³ Summary and excerpt from interview with Faye Joy A. Pabiona, project manager, "Rebuilding for Better and Resilient Shelter" Project by Iloilo CODE-NGOs, October 2016.

⁴ Excerpt from the interview with Vilma Perote, CoMCSA Officer, Iloilo CODE-NGOs, October 2016.

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