Planning for the energy future

Energy planning is a crucial task for policy-makers and other stakeholders in the Philippines to ensure energy security and affordable and sustainable supply in the long term. The changing dynamics in the Philippine energy sector will lead to increasing complexity and the need for faster decision-making to match the pace of changing boundary conditions. The energy planning regime will have to adapt in a number of ways over the coming years to ensure it can achieve its planning objectives and avoid unnecessary public losses, including 'stranded assets'.

Energy Planning

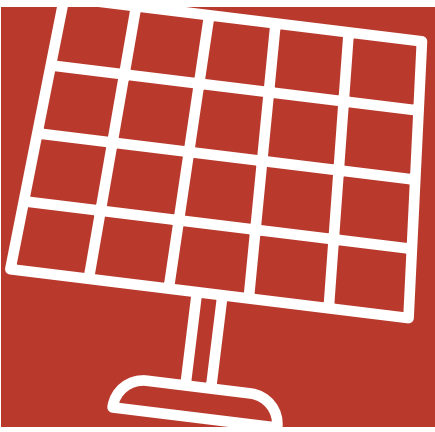
Energy planning activities are diverse and differ from stakeholder to stakeholder. For government, they include assessing long-term demand and evaluating options for expanding generation capacity and transmission while ensuring that energy prices for consumers do not become prohibitive. Government energy planning is never a goal in itself; it is the mechanism with which a government translates energy policies into action to achieve its sector goals and targets. In a market-based system, such as that of the Philippines, government needs to influence the actions of private stakeholders by shaping appropriate economic incentives in line with its goals. Good planning helps in identifying optimal investment options by laying the foundations for key decisions, by exploring different options for achieving government objectives in an evolving energy system and by formulating appropriate strategies, programs and action plans. It also provides the public and private sectors with guidance to ensure better alignment with policy objectives and long-term goals.

RECENT AND IMMINENT DISRUPTIVE CHANGES IN THE ENERGY SECTOR ARE FUNDAMENTALLY TRANSFORMING THE BASIC ASSUMPTIONS AND METHODOLOGICAL REQUIREMENTS OF ENERGY PLANNING.

The Philippines already has a comprehensive and well-structured set of energy plans and planning tools set up under Electric Power Industry Reform Act (EPIRA), which are highly appropriate to sector realities of the 1990s and 2000s.

Ongoing sector liberalization has led to a multiplication of power sector participants, changes in customer behavior and the creation of new business models.

Since 2001, the Philippine energy sector has undergone an impressive process of liberalization. Generation capacity has mostly been privatized, with only a few power plants remaining in public hands. Compared to the state utility model before EPIRA, a larger number of players are now involved in the overall decision-making process, and sector stakeholders have very diverse roles, objectives, negotiating powers, budgets, data requirements and software tools. For example, the integrated Wholesale Electricity Spot Market (WESM) in Luzon and the Visayas now has 350 registered participants.[1] Further reforms, such as the planned implementation of retail competition and open access (RCOA), will further impact on customer behavior and the business models of distribution utilities (DUs). If more customers can choose their energy source, these consumers will influence the DUs' actions and decision-making as well as the evolution of the retail market.[2] The option of net metering turns former electricity consumers into what are known as 'prosumers' – consumers of electricity who also produce and sell electricity back to the grid, often through a rooftop solar photovoltaic (PV) system – and this is leading to new and changed roles in the sector.

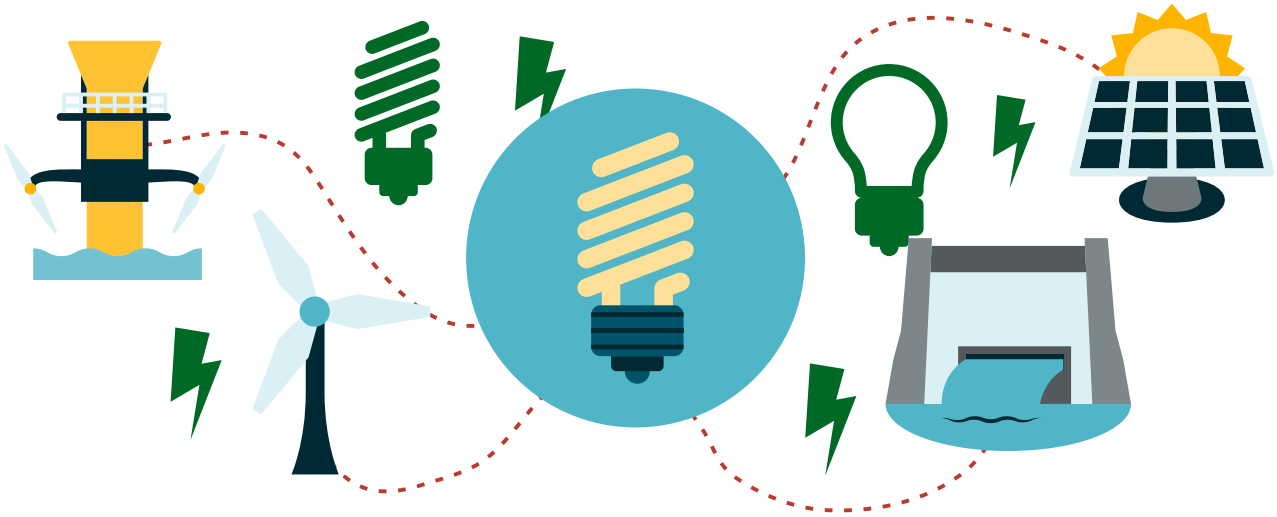


Falling costs for solar in the Philippines

Several Power Supply Agreements (PSAs) for solar energy went through the Competitive Selection Process (CSP) recently. The final rates are significantly lower than under the Feed-in Tariff (FIT) (PHP 8.69/kWh).

In 2016, solar companies bid PHP 5.39/kWh and PHP 4.69 PHP/kWh to supply power. In 2017, rates fell even further. When Citicore Power Inc. offered PHP 3.50/kWh for the supply of up to 85 MW, this was challenged by Solar Philippines with an offer of PHP 2.9999/kWh.

Technological innovation will change the way power systems operate in the future.



Continuous innovation and reduction in the cost of renewable energy technologies (in particular solar and wind power) and in energy storage will inevitably bring these technologies on to the market on a significant scale. As investment costs have fallen, solar photovoltaic (PV) power plants have already made grid-connected PV economically viable for several market segments in the Philippines. Whether supported by policy instruments or not, growing proportions of variable RE can be expected solely as a result of the market forces of price reductions, changing the generation mix in the Philippines in ways that will require changes to current operating practices.

Small rooftop solar systems will increase the amount of distributed generation. Grids will be affected by power injected at local low voltage levels, which in some cases will result in multidirectional power flows (power may sometimes flow from distribution to transmission level). The increased need for flexibility of conventional power plants, to balance the variable output of solar and wind generation, will make inflexible 'baseload' generation obsolete as a concept, boosting the need for new forms of ancillary services and flexible long-term capacity provision. This has implications both for generation and for transmission planning.

Furthermore, technological innovation has improved information and communication technologies (ICT) and driven the 'Internet of Things' (IOT). Smart metering and smart grids will enable utilities, NGCP and other power sector stakeholders to gather new and improved data relevant to the planning process and to control certain elements of the power system more directly and immediately, e.g. for demand-side management. Meralco has already set itself the goal of installing 3.3 million smart meters in its area to better address network concerns, including a quicker response in isolating defective connections.

Increased uncertainty and volatility regarding fossil-energy-resource prices in tandem with low interest rates for equity and debt financing have made long-term policy and investment decisions riskier than in previous decades.

Technologies with high upfront investment and low variable costs, such as variable RE, are economically and financially more attractive at today's relatively low interest rates for equity and debt financing (capital costs). However, where models used for planning are based on the absolute and relative net present values of thermal and RE power generation, these lower interest rates significantly increase the uncertainty of modelling results. This makes policy and investment decisions based on long-term planning riskier than in past decades. The volatility of fuel prices and the possible value of future carbon abatements add further uncertainty to decisions and planning processes.

Greenhouse gas emissions will become a more important parameter in the energy planning system.

In October 2015, the Philippines submitted an Intended Nationally Determined Contribution (INDC) to the United Nations, mapping a 70% reduction of GHG emissions against the 'business as usual' scenario. The Government of the Philippines is still considering what specific GHG emission reductions and energy sector mitigation targets to set for its Nationally Determined Contributions (NDCs). However, given the role the energy sector plays in the Philippines' overall emissions, it is likely that clean energy sources such as RE will contribute to the achievement of these goals. GHG reduction targets, commitments and action plans therefore require new planning processes and/or the adaptation of existing planning processes at various levels to ensure overall coherence, which may require government intervention in power generation planning and decision-making. All available options relating to the planning of power sector development must be considered to ensure that costs and benefits can be balanced when determining an optimal national approach.

THE CHANGING DYNAMICS IN THE PHILIPPINE ENERGY SECTOR WILL LEAD TO INCREASING COMPLEXITY AND THE NEED FOR FASTER DECISION-MAKING TO MATCH THE PACE OF CHANGING BOUNDARY CONDITIONS. THE ENERGY PLANNING REGIME WILL HAVE TO ADAPT IN A NUMBER OF WAYS OVER THE COMING YEARS TO ENSURE IT CAN ACHIEVE ITS PLANNING OBJECTIVES AND AVOID UNNECESSARY PUBLIC LOSSES, INCLUDING 'STRANDED ASSETS'.

The guiding role of the Government will become more important in ensuring that planning prioritizes benefits to the overall power system over individual project interests.

After formulating its goals and targets, the Government will have to add specific market design elements or regulations to the power markets, as well as incentives and other policy mechanisms to achieve them. By quickly identifying 'no-regret' options (investment incentives and reforms with low risks but high overall benefits at low cost), the Government can ensure that some initial measures can be implemented while the planning for other, more uncertain mid- to long-term decisions is still ongoing. For example, even while the overall long-term transmission planning related to areas with the best RE resources is ongoing, it may be beneficial to focus some investments on installing smaller and more distributed RE where they already provide significant benefits to the system under both the existing and the probable forthcoming transmission system, e.g. installing solar PV systems close to urban centers where the period of peak demand is similar to peak solar power generation.

Grid congestion as a result of unguided capacity additions

In recent years, installed capacity in Negros Occidental, especially from solar PV, grew rapidly, congesting transmission lines. The situation was exacerbated by the addition of a new coal-fired power plant on Panay and two biomass projects on Negros. Because of insufficient transmission capacity in the Visayas, some generation, including that from solar PV, had to be temporarily curtailed until the situation could be resolved through completion of the Cebu-Negros-Panay 230-kV Backbone Project. Such situations can be avoided by timely and integrated planning of transmission investments and active spatial guidance of generation investments.

The existing energy planning system and methods used will need to be adjusted and streamlined.

The long-term energy and power sector plans will need to be within and outside the sector. Content and recurrence of existing key plans will have to respond to the need for support for decision-making in the political process, the regulatory process, and the information needs of stakeholders and the public about the Government's intentions. For example, the Power Development Plan currently has limited ability to determine the optimal siting of generation and expansion of transmission, because the planning lacks a spatial dimension that would enable transmission costs to be considered. By contrast, interim modelling exercises should be carried out more frequently to guide adjustments and detect changes in boundary conditions, such as technology and fuel prices. A broader mix of non-binding short-, medium and longer-term scenarios for the energy sector will have to be considered.

Planning for the (very) long term vs. short term decision making

Energy systems in 25 years' time will be significantly different from those we see today. Although it is unclear which new features will prevail in the Philippines, it is important to keep as many options as possible open and to consider how the Philippines, with its particular archipelagic nature and resources, can develop. The very long-term view can be explored by contrasting scenarios and using planning tools with little implicit optimisation.

In the short and medium term, it is crucial to develop the energy and power sector with no-regret options, i.e. options which are beneficial under a wide range of scenarios. This may include abandoning the policy of awarding long-term, inflexible PPAs, which may turn out to be costly and create roadblocks, and developing more appropriate structures and operations and more flexible mechanisms. The existing arrangements for programming (PEP, PDP) and medium-term planning (e.g. the TDP) need to be revised to achieve this.

Asset stranding

Assset stranding results when assets do not deliver an economic return in line with the project's initial expectations. Asset stranding can be a result of insufficient planning. A recent study highlights the risks of asset stranding in the Philippines. Asset stranding is already taking place in Mindanao due to an oversupply of approximately 700 MW of coal and hydropower and the lack of connections to the national grid. This can mean further high and unnecessary costs to ratepayers and/or taxpayers as well as losses to investors.

Planning will need to be enhanced by new methods and state-of-the-art software tools.

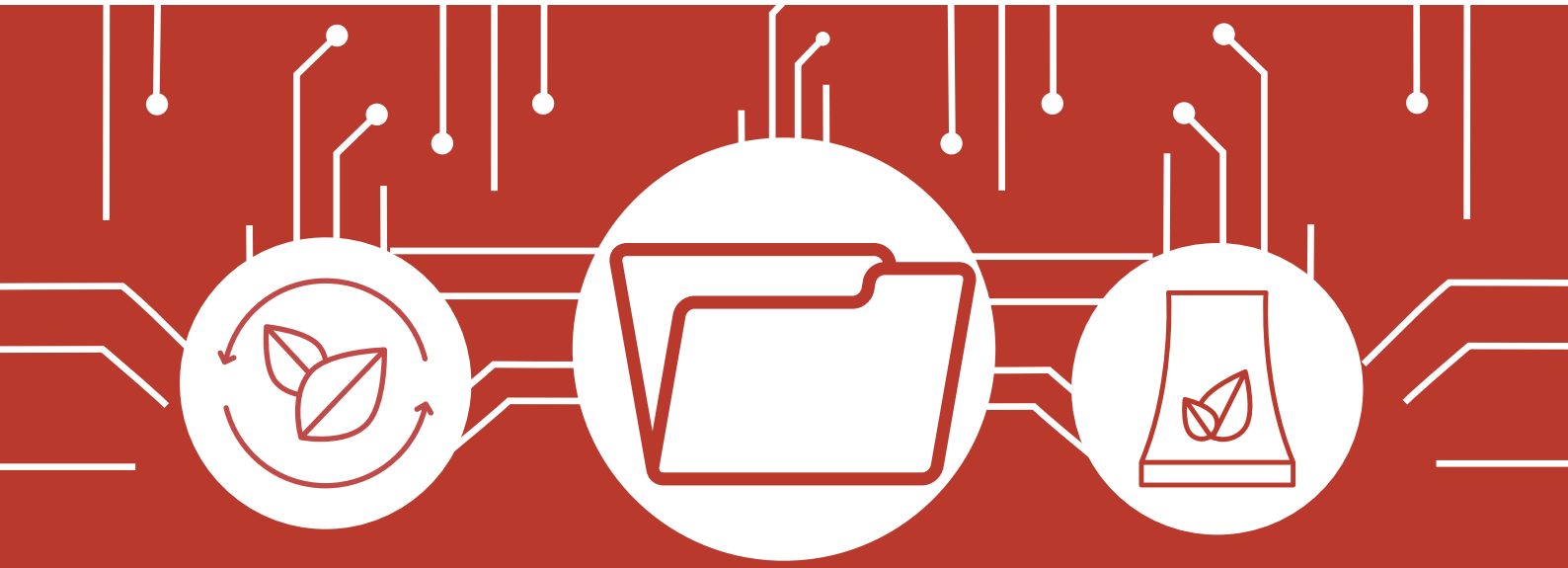
The DOE will require a versatile analysis and planning capacity, with access to various data and modelling instruments to be used for policy decision support as well as program design. The appropriate data system and decision-support tools are diverse. The tool mix should include short-, medium- and long-term analysis,

as well as low-cost models with few data requirements that can be used widely alongside models that require more time, data or budget and are therefore used less often.

Planning methods and tools should incorporate the detailed temporal and spatial analysis of demand and supply as well as ways of balancing them to tackle the challenges posed by distributed generation. This means using a new generation of system expansion and operation modelling software tools. New tools can easily model many facets of the recent changes in the energy sector, especially with regard to the behavior of variable RE or storage. The rise of distributed generation also increases the need to model generation and network expansion together. Traditional power plant planning models, such as WASP, lack some essential features but can be complemented by newer and more suitable tools, such as PLEXOS. Tools such as LEAP can facilitate the integration of many stakeholders into the planning process, e.g. by involving civil society in discussions on trade-offs between different scenarios, thus making the planning process more inclusive and transparent.

Planning capacities will need to be systematically strengthened.

Coping with current and future challenges will mean investment in new staff as well as training and development of skills and competencies for new roles and tools. Existing, well-developed competences within government agencies, academia, research institutes, civil society organizations and the private consulting industry will have to be enhanced. Public access to relevant data on the Philippine power system will have to be ensured to enable a transparent process and broad participation by all relevant stakeholders in the planning process. Highly specific technical planning capacities can be contracted out to suitable organisations or agencies with specialised expertise.



The importance of reliable and accessible data

Whichever tools are used for planning, their output can only be as good as the data fed into the models. Public access to reliable data about the power system from generation, transmission and distribution companies is crucial to strengthening planning capacities. In the Philippines, much of this data is not easily available to the general public without time-intensive case-by-case data requests. For Germany and EU countries, significant volumes of data are readily available online from a variety of sources such as the European Network of Transmission System Operators (ENTSO-E: https://transparency.entsoe.eu) or the SMARD platform for power market data (https://www.smard.de).

This factsheet is part of a series on energy issues relevant to current policy discussions in the Philippines. The factsheets aim to provide policymakers and sector practitioners with a rapid overview of some of the most pressing issues in this dynamically evolving sector.

The factsheets were prepared under the 'Support to the Philippines in Shaping and Implementing the International Climate Change Regime' (SupportCCC II) Project implemented by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB).

END NOTES AND RESOURCES

[1] The participants include 105 generating companies, and 171 customers comprising 16 private distribution utilities, 71 ECs, 79 bulk users, and 5 wholesale aggregators. EPIRA 29th status report (24 October 2016)

[2] DOE (2017). Draft Department Circular RCOA Contestable Customers https://www.doe.gov.ph/sites/default/files/pdf/announcements/draft_dc_rcoa_contestable_customer_0.pdf

[3] For details see our forthcoming companion paper on the levelised cost of RE in the PH, to be published under the SupportCCC II Project. In off-grid remote areas, PV with and without batteries has already been the cheapest option for many island applications in the PH for several years.

[4] Distributed generation means the use of many, small-scale power generation technologies located close to the load they serve.

[5] Philstar (2017). Meralco Transforming Network into Smart Grid. Retrieved from: http://www.philstar.com/business/2017/03/16/1681468/meralco-transforming-network-smart-grid

[6] This is because the future 'cash flow' is discounted to present value at a discount rate equal to weighted average capital costs (WACC). The lower this discount factor goes, the higher will be the net benefits used to recover the initial investment (with a profit margin) and the lower will be the net value of the annually recurring costs (which, at less than 2% of investment, are very low for RE power plants – much less than the annually recurring costs for thermal power generation).

[7] Republic of the Philippines (2015). Intended Nationally Determined Contributions. Retrieved from: http://www4.unfccc.int/submissions/INDC/Published%20Documents/Philippines/1/Philippines%20-%20Final%20INDC%20submission.pdf.
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