Introductory Remarks

Elodie Journet
Australian Senior Trade Commissioner to the Philippines and Micronesia
• Where are we now
• Where are we heading
  › Strategic Directions for 2017-2040
• What are the challenges and opportunities
WHERE ARE WE NOW

Power Supply and Demand Highlights
January – June 2017

Installed Capacity: 21,621 MW
Dependable Capacity: 19,537 MW
Available Capacity: 15,393 MW

Gross Generation: 44,648,716 MWh
Committed Capacity: 5,839 MW
Indicative Capacity: 22,160 MW

Gross Power Generation (January–June 2017)
44,648,716 MWh

49% Coal
3% Oil-based
21% Natural Gas
14% Geothermal
10% Hydro
1% Wind
1% Biomass
1% Solar

15,128 MW INSTALLED CAPACITY

LUZON

GN Power
First Gen
PSALM
Others
Aboitiz

3% 17%
20%
13%
16%
15%

GBPL

3%

QPPL
2%

Phinma
3%

MPPCL
3%

DMCI
4%

GN Power
SMEC

4%

PSALM

13%

SMEC

20%

3%

Others

16%

Aboitiz

15%

First Gen

17%

Others

16%

Aboitiz

15%

First Gen

17%

Others

16%

Aboitiz

15%

First Gen

17%

Others

16%
WHERE ARE WE GOING. STRATEGIC DIRECTIONS 2017-2040

1. ENSURE ENERGY SECURITY. AUDIT AND ASSESSMENT FOR POWER GENERATION, TRANSMISSION AND DISTRIBUTION FACILITIES
2. BUILD AN LNG TERMINAL FOR A FUTURE “CLEAN ENERGY CITY”
3. ACHIEVE 100% ELECTRIFICATION RATE OF TARGETED UNELECTRIFIED HOUSEHOLDS BY 2022
4. CONNECT THE MINDANAO GRID WITH THE INTERCONNECTED LUZON AND VISAYAS GRIDS BY 2020
5. INCREASE RENEWABLE ENERGY CAPACITY FROM 32% TO 50% BY 2030
6. PROMOTE TECHNOLOGY INNOVATION THROUGH RESEARCH AND DEVELOPMENT. SMART ENERGY TECHNOLOGIES. INFRASTRUCTURE FOR NEXT GENERATION VEHICLES
**CHALLENGES**

- Challenges in the energy sector:
  - Unequal access to power - 2.36 million households remain without electricity in rural areas and in Southern Mindanao
  - Electricity cost is the highest in the region
  - Depletion of readily available resources
  - Persistent blackouts
  - Asset maximisation is not implemented
  - Geopolitical issues

**OPPORTUNITIES**

- Micro-grid to reach far-flung areas
- Engineering services for power plants
- Supply of coal and natural gas by 2024
- Engineering services for natural gas
- Innovative solar technology
- Energy storage software solutions
- Reinforcement of existing transmission facilities, substations
- Consulting services for energy projects of Asian Development Bank
- ADB Clean Energy Forum on 4 to 8 June 2018.
Is THE Philippines A Good Investment Destination

Tetchi Cruz-Capellan
President, Philippine Solar Power Alliance
Chief Executive Officer, SunAsia Energy
Philippine Solar Power Alliance

- Not-for-Profit association comprised by manufacturers, project developers, rooftop installers, EPC Contractors, and Utility Companies;
- Since 2010, the Alliance serves as a dialogue partner of government;
- Platform of the global movement for solar energy use;
- Builds local capacity through our regular training;
- Facilitator of technology exchange thru conferences, exhibitions and international partnership.
OUR PLACE IN THE SUN...
Renewable Energy law of 2008

- RE Law is one of the most comprehensive & forward-looking law in the world;

- The Declaration of Principles commits to:
  
  ...self-reliance from fossil fuel;

  ...protection from the harmful effects of GHG emissions;

- ...government support for RE projects through fiscal and non-fiscal incentives.
2011: Implementing Rules Were Put In Place...

2012: Installation Target Was Set at 50Mw Solar; Net Metering Rules in Place

2013: Approval of the Feed-In Tariff, Php9.68/kwh (USD0.22)

2014: Increased Solar Target to 500Mw and Tariff Rate of Php8.69/kwh (USD0.18)
Before Renewable Energy Law, only 1MW installed capacity was recorded. After the FiT program, solar reached 1GW mark.
LARGEST SOLAR ROOFTOP IN ASEAN

Cavite Solar : 40Mw
Location : Cavite, Luzon

EPC : Asia Konstruct
Commissioning Date : December, 2014
7th largest solar in the world

HelioSolar : 128Mw
Location : Cadiz, Negros Occidental
Commissioning Date : 2016
EPC : Bouygues
BIGGEST SOLAR ON MALL ROOF

Rooftop Solar : 1.2Mw
Location : SM North Mall

EPC : Solar Philippines
Commissioning Date : November, 2014
What Will the Future Look Like?

Solar Installation Target: 2016-2030

![Cumulative Target Solar Installation Chart](chart.png)
DRIVING SOLAR INSTALLATION: HIGH COST OF ELECTRICITY

RESIDENTIAL ELECTRICITY BILL COMPONENTS (Php / kWh)
RATE CHANGE FOR THE MONTH OF NOVEMBER 2013 (200 kWh RESIDENTIAL CONSUMPTION)

- GENERATION
  - WESM Wholesale Electricity Spot Market
  - IPPs Independent Power Producers

- TRANSMISSION
  - NGCP National Grid Corporation of the Philippines

- NO INCREASE

- DISTRIBUTION
  - Meralco

- TAXES
  - Value-Added Tax
  - Local Franchise Tax

- OTHERS
  - Subsidy
  - System Loss

= Php 1.24 PER KILOWATT HOUR

NOVEMBER 2013
RESIDENTIAL BILL AT TYPICAL CONSUMPTION LEVELS

<table>
<thead>
<tr>
<th>kWh Consumption</th>
<th>Total Bill</th>
<th>Generation</th>
<th>Transmission</th>
<th>Meralco Distribution</th>
<th>Taxes*</th>
<th>Others**</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>Php 888.67</td>
<td>Php 566.73</td>
<td>Php 93.33</td>
<td>Php 248.22</td>
<td>Php 79.15</td>
<td>Php (-98.76)</td>
</tr>
<tr>
<td>200</td>
<td>Php 2,212.00</td>
<td>Php 1,133.46</td>
<td>Php 186.66</td>
<td>Php 471.56</td>
<td>Php 206.80</td>
<td>Php 213.52</td>
</tr>
<tr>
<td>300</td>
<td>Php 3,424.64</td>
<td>Php 1,700.19</td>
<td>Php 279.99</td>
<td>Php 802.09</td>
<td>Php 322.09</td>
<td>Php 320.28</td>
</tr>
<tr>
<td>500</td>
<td>Php 6,209.38</td>
<td>Php 2,833.65</td>
<td>Php 466.65</td>
<td>Php 1,782.48</td>
<td>Php 592.80</td>
<td>Php 533.80</td>
</tr>
</tbody>
</table>
Retail Competition and Open Access

1. Customers have the freedom to choose energy supplier.
2. From 1MW customer, contestable market will decrease to 750KW after a year.
3. This will be lowered to 750KW,
4. then 500KW,
5. until it reaches the load of the residential sector.
ENERGY ACCESS
Connections/Population

POTENTIAL
17.484 Million / 88 Million

WITH ACCESS
13.442 Million / 68 Million

W/OUT ACCESS
4.042 Million / 20 Million
RESOLUTION 21: CASH INCENTIVES IN OFF-GRID
($0.11/KWH TO $1.89/KWH ADDITION TO $0.2@/KWH)

(b) "Cash Incentive of RE Developer for Missionary Electrification" shall refer to the cash generation-based incentive per kilowatt hour generated, equivalent to fifty percent (50%) of the universal charge for power needed to service missionary areas where the RE Developer operates the same, to be chargeable against the UC-ME.

(r) "Missionary Electrification Subsidy" or "ME Subsidy" shall refer to the subsidy funded from the UC-ME and the funds sourced by NPC SPUG from appropriations from Congress, the utilization of private capital, multilateral aids or grants, Official Development Assistance (ODA) Funds and others, expressed in Peso per Kilowatt-hour, whose ultimate beneficiaries are end-users in missionary electrification areas. It shall be calculated as the difference between an NPP-TCGR or NPC SPUG TCGR, and the applicable Subsidized/Approved Generation Rate. NPC SPUG shall petition the ERC for the setting and approval of the ME Subsidy in accordance with Article V of these Guidelines.
TAKE A CLOSER LOOK AT THE PHILIPPINES…
THERE IS MORE SUN IN THE PHILIPPINES...

The Only Event in the ASEAN Region that Comprehensively Tackles Storage and PV Solar

ASEAN Solar + Energy Storage
Manila, Philippines
14-15 November, 2018

Officially Endorsed by

ASEAN LARGEST SOLAR + STORAGE EVENT

CONFERENCE REGISTRATION NOW OPEN
www.aseanenergystorage.com

secretariat@greeningtheislands.net
press@greeningtheislands.net
www.greeningtheislands.net
SOLAR ENERGY EVENTS IN THE PHILIPPINES

• Events:
  › **Greening the Islands Conference and Exhibition**
  › 12-13 November in Boracay Philippines

  › **3rd Annual ASEAN Solar+Energy Storage Congress & Expo**
  › 14-15 November 2018 in Manila Philippines

  › **ADB Asia Clean Energy Forum**
  › 4-8 June 2018 in Manila
Vietnam
Renewable Energy Overview

Shannon Leahy
Trade Commissioner

Hoa Nguyen
Senior Business Development Manager
Austrade Vietnam
DID YOU KNOW?

• Vietnam has become:
  › Australia’s fastest growing export market in ASEAN for over the past decade.

• Australia is now the biggest coal exporter to Vietnam.

• Australia has exported more than $131 million worth of METS to Vietnam since 2012.

• Vietnam GDP in 2017 was at 6.81% highest in 6 years

• Vietnam’s energy demand increase from 54 (2015) $\Rightarrow$ 90 (2025) $\Rightarrow$ 134.5 (2035) million tonnes of oil equivalent (TOEs).

• Up to 2016, energy demand steadily grew at 11% p.a. energy demand expects to increase $\sim$5.1% p.a until 2025

• The installed capacity for energy to reach 61GW, 97GW, and 127.7GW by 2020, 2025, and 2030, respectively. The country may need US$148 billion to develop the energy sector between now and 2030.

• July 2017 the total registered solar projects soared by the US9.35 cents feed-in-tariff set by the Government

• Vietnam’s RE development strategy by 2030 with a vision to 2050 targets to increase the ratio of power generated from RE to 32 percent by 2030 and 43 percent by 2050.

• Vietnam set a goal to reach 6,000MW by 2030 for wind power and 12,000MW for Solar power
VIETNAM’S POWER GENERATION MIX (2016)

Installed capacity by sources

- Hydro: 42.1%
- Coal: 34.0%
- Natural Gas: 17.4%
- Renewable: 5.4%
- Import: 1.4%

Total: 42.762 MW (including imports)

Source: MOIT
VIETNAM POTENTIAL AND STATUS OF RE DEVELOPMENT

- **Small hydro**
  - Potential: > 7,000 MW
  - Present: ~1670 MW

- **Biomass**
  - Potential: >2000 MW
  - Present: 170 MW

- **Biogas**
  - Potential: >100 MW
  - Present: >1.6 MW

- **Solar energy**
  - Potential: 4-5kWh/m²/day
  - Present: 4 MW
  - Grid-connected: 0.6MW

- **Wind**
  - Potential: ~8,000 MW (>=6 m/s)
  - Present: 180 MW
  - Many projects (F/S): ~3000MW

- **Geothermal**
  - Potential: 340-400 MW
  - Present: 0 MW

- **Solid wastes**
  - Potential: >320 MW
  - Present: 2.4 MW

- **Ocean energy**
  - Potential of tidal power: 100-200 MW
  - Present: 0 MW

Source: MOIT
## VIETNAM RE DEVELOPMENT GOALS

<table>
<thead>
<tr>
<th>Renewable Energy (MW)</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind</td>
<td>800</td>
<td>2,000</td>
<td>6,000</td>
</tr>
<tr>
<td>Solar</td>
<td>850</td>
<td>4,000</td>
<td>12,000</td>
</tr>
<tr>
<td>Biomass and others</td>
<td>750</td>
<td>1,824</td>
<td>3,281</td>
</tr>
<tr>
<td>Small hydro</td>
<td>3,540</td>
<td>4,239</td>
<td>5,915</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5,940</td>
<td>12,063</td>
<td>27,195</td>
</tr>
</tbody>
</table>

**Source:** MOIT
KEY GOVERNMENT ENERGY PLAYERS

- National energy group
- Power generation (3 Gencos including coal, gas, hydro and renewables)
- National Transmission Grid
- Distribution and retails (5 utilities companies)
- Electricity Market Operator
- Power trading

- National energy group focusing on oil and gas
- Upstream: oil and gas exploration
- Downstream: oil producer, petrochemical processing businesses
- Power generation (coal and gas)
- Oil and gas services

- National energy group
- National Coal mining
- Mineral mining and processing
- Power generation (mainly coal)
- Coal producer and trader/importer
- Mining services
# Overview of the Policies on Renewable Energy (1)

<table>
<thead>
<tr>
<th>Types of RE</th>
<th>Status</th>
<th>Key features</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small hydro</td>
<td>Avoidable costs</td>
<td>Annual, seasonal (~5 US cents/kWh)</td>
<td></td>
</tr>
<tr>
<td>Wind</td>
<td>FIT</td>
<td>7.8 US cents/kWh</td>
<td>Under revision</td>
</tr>
<tr>
<td>Biomass</td>
<td>FIT</td>
<td>- Cogeneration: 5.8 US cents/kWh</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Generation cost of imported-coal-fired power (~7.6 US cents/kWh in 2016)</td>
<td></td>
</tr>
<tr>
<td>Waste-to-energy</td>
<td>FIT</td>
<td>- Landfill gas: 7.28 US cents/kWh</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Waste burning: 10.05 US cents/kWh</td>
<td></td>
</tr>
<tr>
<td>Solar</td>
<td>FIT</td>
<td>- Solar power plant: FIT 9.35 US cents/kWh</td>
<td>Projects need to operate by 30 June 2019</td>
</tr>
<tr>
<td>Biogas</td>
<td>FIT</td>
<td>Under study</td>
<td></td>
</tr>
<tr>
<td>Geothermal</td>
<td>FIT</td>
<td>Under study</td>
<td></td>
</tr>
</tbody>
</table>

*Source: MOIT*
Corporate income tax: 10% for 15 years, exemption for the first 4 years and 50% reduction in the next 9 years.

Exemptions from import duty

Power sale/purchase obligations: EVN shall buy all the power produced by solar power projects

PPA template valid for 20 years
SOLAR:

Installed capacity:
- 2015 - 2020: 1.3 TWh ~ 1 GW
- 2020 - 2030: 34 TWh ~ 26.3 GW

Investment capital:
- 2015 - 2020: USD 2.6 billion
- 2020 - 2030: USD 68.2 billion

Up to now:
About 25 projects already added to the masterplan ~ 1.300 MW
About 4 projects at the stage of basic design approval ~ 200 MW

The projects *are mostly concentrated in 5 provinces:
- DakLak (1/3 of the projects) – 6500 MW
- Binh Thuan – 2400 MW
- TayNinh – 2000 MW
- NinhThuan – 1900 MW
- Khanh Hoa – 1000 MW

Source: MOIT & GIZ support programme
VIETNAM ENERGY MISSION MAY 2018 (21-24 MAY)

WHY YOU SHOULD PARTICIPATE

• Develop an understanding of Vietnam’s energy development strategy, potential projects, and commercial opportunities.

• Hear from local experts and get an update on Vietnam’s current and future plans.

• Increase the awareness of Australia’s capabilities in energy and of your own company brand.

• Access key industry and government stakeholders, potential buyers, agents, and distributors through targeted roundtables, business matching, and various networking functions.

• Direct interaction with Vietnam provincial government who attracting renewable energy investments.

• Meet and network with potential customers including:
  › State-owned coal, power, oil and gas, and port companies
  › Private and foreign owned companies
  › Local energy agents and distributors.

• Receive on-the-ground assistance from Austrade and its partners and advice on how to successfully enter and operate in Vietnam.
VIETNAM – FAST GROWTH, HUGE POTENTIAL

“Vietnam plans 4,338 mw of new installed capacity in 2018 for energy security, requiring investment of $6 billion”
WHAT IS DRAGON CAPITAL?

- Biggest player in Vietnamese listed equity; total Asset-under-management of US$ 3bn
- Co-founded domestic investment firm, Vietnam Fund Managers (VFM) in 2003
- Investor in leading stock broker Ho Chi Minh Securities Co. (HSC)
- Offices in HCMC, Hong Kong, Bangkok, U.K.
- Regulated by Hong Kong’s SFA and United Kingdom’s FCA

CLEAN DEVELOPMENT TEAM

- Private Equity investment since 2010 in clean development (energy, water and waste)
- Majority of Investments in Clean Energy (hydro, solar, waste) across SE Asia (TCLV)
- Takes Controlling or Large Minority Equity Stakes and Facilitates Debt Finance
- Co-Invests with Industry Expert Equity Partners – IPPs, Developers, Utilities
- Operations Teams in HCMC, Vietnam and Bangkok, Thailand
**TRACK RECORD**

- **Small hydro project, Central Vietnam**
  - **Sector:** Small hydro
  - **Size:** 8.1MW run of river hydro plant
  - **Status:** Renovated and upgraded, operating profitably since 2015

- **Solar farm, Thailand**
  - **Sector:** Solar PV – Exited Dec 2017
  - **Size:** 29MW solar farms
  - **Status:** Greenfield development, COD on Dec 30th 2015

- **Rooftop solar PV, Vietnam**
  - **Sector:** Start Up Rooftop solar PV
  - **Size:** Aggregated portfolio
  - **Status:** Greenfield

- **Water treatment facility, Cambodia**
  - **Sector:** Water treatment
  - **Size:** 590,000m$^3$/day
  - **Status:** Operating asset with expansion

- **Solid Waste Management, Cambodia**
  - **Sector:** Solid Waste Management
  - **Size:** 282 tons/day
  - **Status:** Operating asset with expansion
Significant power demand growth, 10%/year, 98% grid cover, retail price is low and subsidised

Energy Security is a major concern in southern region, dry season, daily peak demand (10am-3pm)

E VN  is not credit-worthy (but is the monopoly power buyer/retailer and largest power producer)

Market-Based Pricing, Removal of Subsidies for Coal and Deregulation has not yet occurred

In 2017 96% of new power generation was funded with ODA loans to the state and was 81% coal

Result: A Gap in the Risk and Return for Clean Energy/Efficiency and low non-state investment
PPA RISKS

Thailand

- Alternative Energy Consumption Target Plan (AEDP – 2015) – 6,000 MW installed capacity by 2036
- 800 MWp Solar development in 2 phases (Agro-Solar):
  - **Phase 1**: 300MWp target – installed 281.32MWp
    - FIT USD16c/kWh for 25 years
    - Signing PPA within 120 days COD Dec 2016
  - **Phase 2**: 518MWp target - announced in Q2/2017
    - Public bidding with pre-screened investors
    - FIT: USD 12c/kWh for 25 years COD June 2018
- Investment incentives:
  - 8-year corporate income tax exemption
  - Exemption of import duty on machinery
- Acceptable PPA terms and conditions by local and international financial institutions

→ A vibrant and mature solar market with different debt financing options and multiple investors local and foreign

→ High Government risk exists beyond 2018.

Vietnam

- Solar Decision 11/2017/QD-TTg for energy development setting FIT USD 9.35c/kWh – **expires 30th June 2019**
- Wind FIT USD 7.8c/kWh – **expires 31st December 2020**
- Investment incentives:
  - Corporate income tax, Import duty, Land rental
- High development risks and complicated licensing process
- Draft PPA issued in May 2017, 20-years deemed “**un-bankable**” by international developers and financiers
- Local debt at 9% - 12%, variable rates, with limited capacity by local banks. No international banks are willing to provide debt financing

→ 200+ “registered” Solar projects of 17,000 MW with ambiguous finance, inexperienced project developers

→ Solar Projects with finance, land and grid 350m – 500mw

→ 2020/2021 Wind and Solar may enter a “**Phase II**” with competitive reverse auctions for PPAs, (assumes a bankable PPA and creditworthy offtaker will be offered)
INVESTMENT INCENTIVES FOR CLEAN ENERGY

Support from the Government of Vietnam is one of the key market drivers

<table>
<thead>
<tr>
<th>RE Sources</th>
<th>Supporting Mechanism</th>
<th>Price (US cents)</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar PV</td>
<td>Feed-in-Tariff (FIT)</td>
<td>9.35c/kWh</td>
<td>Dec 11/2017/QD-TTg</td>
</tr>
<tr>
<td>Small hydro-power</td>
<td>Avoided cost Tariff (ACT)</td>
<td>~5c/kWh</td>
<td>Adjusted annually by MOIT</td>
</tr>
<tr>
<td>Wind</td>
<td>FIT</td>
<td>7.8c/kWh</td>
<td>Dec 37/2011/QD-TTg</td>
</tr>
<tr>
<td>Biomass</td>
<td>FIT</td>
<td>7.34 – 7.55c/kWh</td>
<td>Dec 942/2016/QD-BCT</td>
</tr>
<tr>
<td>Waste-to-energy</td>
<td>FIT</td>
<td>7.28 – 10.05c/kWh</td>
<td>Dec 31/2014/QD-TTg</td>
</tr>
</tbody>
</table>

Other incentives for RE Developments:

- Long term Standard Power Purchase Agreement (e.g. 20yrs Wind and Solar PPA)
- Income indexed to US$ dollar for wind, solar and biomass (Not small hydro)
- Import duty exemption on clean energy related technology
- Corporate Income Tax exemption and reduction – normal (No/Low CIT for 15 years)
SUMMARY AND THE FUTURE VIEW

The RE and EE markets are in an early development stage with high risk and high returns available, there are a small number of foreign contractors established in the market so far. The potential market is huge and early mover investors are fully engaged. This will last until 2020/2021.

1. Wind power growth will see steady growth, including some “near shore” projects
2. Energy Efficiency for heavy industry needs concessional financing to progress (ADB, GCF and WBG are designing interventions) EE could reduce demand by 11% to 2030
3. Solar investors, local and foreign partners will build up 500mw of solar by June 2019
4. The Coal expansion plan falls further behind schedule we see a possibility that the wind and solar targets are increased in Spring 2019 to compensate

By 2020/2021 we will see a radical shift to a low risk, institutionalised market for wind and solar (“Scaling Solar” – IFC) reverse auctions. Large Targets 8000mw and 6000mw by 2030

Vietnam needs 4,338mw of new installed capacity in 2018 for energy security, which needs investment of $6billion
THANK YOU!

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