Current Status of Electrification in Viet Nam

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Chiang Mai, September 2018
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3. Current Status of Rural Electrification in Viet Nam
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1. Background

- Population: 93.7 million persons;
- Area: 331,698 km²;
- Urban population: 32.9 million persons (35.1%);
- GDP (nominal): US$220 billion → 2,385 US$ per capita;
- Primary energy consumption: ~78.3 MTOE (→ 835.7 kgoe per capita);
- Total electricity consumption: 174 TWh → 1,852 kWh per capita;
- Electrification rate: 98.95% of rural households (end of 2016);
2. Power system of Viet Nam

General of Power System in Viet Nam

**Transmission**

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 kV lines</td>
<td>km</td>
<td>7,446</td>
</tr>
<tr>
<td>220 kV lines</td>
<td>km</td>
<td>16,071</td>
</tr>
<tr>
<td>500 kV transformers</td>
<td>MVA</td>
<td>26,100</td>
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<tr>
<td>220 kV transformers</td>
<td>MVA</td>
<td>41,538</td>
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</table>

**Distribution**

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>220 kV lines</td>
<td>km</td>
<td>108</td>
</tr>
<tr>
<td>110 kV lines</td>
<td>km</td>
<td>19,335</td>
</tr>
<tr>
<td>Medium and low voltage lines</td>
<td>km</td>
<td>495,688</td>
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<tr>
<td>220 kV transformers</td>
<td>MVA</td>
<td>3,250</td>
</tr>
<tr>
<td>110 kV transformers</td>
<td>MVA</td>
<td>52,360</td>
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<tr>
<td>Medium and low voltage transformers</td>
<td>MVA</td>
<td>89,609</td>
</tr>
</tbody>
</table>

Plan to 2030

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>2016-2020</th>
<th>2021-2025</th>
<th>2026-2030</th>
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</thead>
<tbody>
<tr>
<td>500 kV substation</td>
<td>MVA</td>
<td>26,700</td>
<td>26,400</td>
<td>23,550</td>
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<tr>
<td>220 kV substation</td>
<td>MVA</td>
<td>34,966</td>
<td>33,888</td>
<td>32,750</td>
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<tr>
<td>500 kV lines</td>
<td>km</td>
<td>2,746</td>
<td>3,592</td>
<td>3,714</td>
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<tr>
<td>220 kV lines</td>
<td>km</td>
<td>7,488</td>
<td>4,076</td>
<td>3,435</td>
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</tbody>
</table>
2. Power system of Viet Nam

The rate of power supply

- Agriculture, Forestry and Aquaculture: 34%
- Industry and Construction: 54%
- Commercial & Hotels, Banks: 6%
- Administration & Residential: 2%
- Others: 4%

Source: EVN’s annual report 2017
3. Current Status of Rural Electrification in Viet Nam

- **1976**: Restored after the war
- **1980**: Preparing
- **1986**: Start
- **1986-1993**: Self-management, CPR agri, glue, commune, dist
- **1993**: CPR 63%, EVN 19%
- **1997**: CPR 63%, EVN 34%
- **2004**: Cooperate (66%), EVN (34%)
- **2009**: EVN 80% Cooperate 20%
- **2015**: Continuous

**Timeline**
- 1976: 2.5%
- 1980: 10%
- 1986: 14%
- 1993: 61%
- 1997: 87%
- 2006: 95%
- 2015: 98%

**Key Events**
- CPR 63%, EVN 19%
- EVN 80% Cooperate 20%
- EVN 8 pilot communes
- Decision 208
- Electricity Law
- Decree No.22
3. Current Status of Rural Electrification in Viet Nam

Period 1: Restored after the war (1976-1985): (2.5% to 9.3%)

- The country’s economy in restored after war
- National Power System only supplied to cities and industry areas
- Power consumption about 44 kWh/person (1976) to 70 kWh/person (1985)
- In Rural area only supplied the power to pump station of agriculture
3. Current Status of Rural Electrification in Viet Nam

Period 2: Preparing (1986-1993): (10% to 14%)

- 1986 VN have innovation policy, after 2 years, VN from imported rice to be exported country of rice.

- 1990 VN agricultural tax exemption, so many commune used electricity to rural electricity

- Power sources began to rise

- Power transmission line 500 kV began to be installed
Period 3: Start (1994-1997): (14 % to 61%)

This period has many milestone:

- Number of rural household were connected to national grid to be jumpy (14 % to 61 %), average growth rate is 15.3%/year (~1.6 mls household/year)

- It is spontaneous process by power demand

- Not formed a management system organized and no standard for rural grid
This period was a key driver for development, but also to the many problems:

- Electricity demand in rural areas become more urgent
- Conditions necessary to Power Source: HB hydro power plant (1920 MW)
- Transmission Grid: 500 kV transmission line (connected from North – South area)
- Capital for this period mainly from the local and population
3. Current Status of Rural Electrification in Viet Nam

Period 3 (1994-1997): Start (14% to 61%)

- Motivation and financial contributions of the phase 3:

![Bar chart showing financial contributions for MV, LV, and MV+LV phases.]

- MV:
  - Government budget & Power Sector: 25%
  - Provincial and surcharge: 40%
  - Contribution from customers: 35%

- LV:
  - Government budget & Power Sector: 15%
  - Provincial and surcharge: 19%
  - Contribution from customers: 66%

- MV+LV:
  - Government budget & Power Sector: 21%
  - Provincial and surcharge: 31%
  - Contribution from customers: 48%
3. Current Status of Rural Electrification in Viet Nam

Period 4 (1998-2004): Improvement of management (61 % to 87 %)

- The rate of grid connected annual fell 3.7%
- The proportion of investment capital transferred to the electricity sector (Electricity of Vietnam)
- Policy, legal and technical aspects of rural electrification programs were seted (Decree No 22; No 45 and Power Law)
- Received the active involvement of international organizations: WB, ADB, Sweden…
3. Current Status of Rural Electrification in Viet Nam

Period 5: Moving from quantity to quality (92 % to 95 %)

- Consolidated the requirements of management
- Moved from expansion to renovation
- Direct assistance from the central budget, the investment mechanism formed for ethnic minority regions
3. Current Status of Rural Electrification in Viet Nam

Period 6: Uniformity for the quality of the final phase

- **Important milestone of this phase is the Government's Decision No 21 (2009) and Government's Decision No 2081 (2013)**

- **Electricity prices for household consumers have agreed on a common price for urban and rural areas, according to the price of stairs**

- **Most of the management units have weak capacity at the local were handed over the power grid to power company**
### 3. Current Status of Rural Electrification in Viet Nam

#### Percentage of Rural Electrification

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</thead>
<tbody>
<tr>
<td>Communes</td>
<td>98.72%</td>
<td>99.36%</td>
<td>99.57%</td>
<td>99.70%</td>
<td>99.85%</td>
<td>99.97%</td>
</tr>
<tr>
<td>Rural households</td>
<td>96.65%</td>
<td>97.19%</td>
<td>97.85%</td>
<td>98.05%</td>
<td>98.49%</td>
<td>98.69%</td>
</tr>
</tbody>
</table>
The Target of Rural Electrification Program in Vietnam Period 2017-2020:

Supply Electricity for **1,090,900** households (99.9%):

+ 500,000 households have not electricity,

+ 509,900 households to supply themselves: low quality, unsafe and high power losses…

+ 17 communes (100%)

+ 9,753 villages (100%)

The progress made in meeting energy target and main strategy

- Development of transmission line power system for voltage levels;

- National grid connection to local gid: Mid-Voltage, Low-Voltage, Development of Distribution Line, Transformation…

- Innovation of management and operation mode, power business

- Development of Renewable Energy source (solar energy, wind power, biogas, …)
5. The main challenges in meeting the target

The remaining households mostly from mountainous areas and islands, terrain and transportation and installation are difficulties; Investment’s cost is high.
5. The main challenges in meeting the target

- Electricity consumption in rural areas are very small; All most of rural power projects are not economically feasible.
- This has hindered the investment process.
- Vietnam have just removed from the list of poor countries.
- It is very difficult to access preferential loans.
Thanks for your attention!

Chiang Mai, September 2018