ENERGY TRANSITIONS TOWARDS RENEWABLE ENERGY IN INDONESIA

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Director General of New, Renewable Energy and Energy Conservation

at Energy Transition Dialogue 2022: ASEAN Outlook for Zero Carbon Energy”
INDONESIA’S COMMITMENT AND NRE POTENTIAL

The Law on Energy and Law and Electricity mandate that the NRE supply and utilization should be increased.

TARGET & NDC REALIZATION

<table>
<thead>
<tr>
<th>NDC TARGET 2030</th>
<th>THE PRESIDENT’S DIRECTIVES</th>
</tr>
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<tbody>
<tr>
<td><strong>UNFCCC - COP21, DECEMBER 2015</strong></td>
<td>Reducing GHG emission for 29% or 41% (by international assistance) by 2030 based on NDC</td>
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<tr>
<td><strong>LEADERS SUMMIT ON CLIMATE, APRIL 2021</strong></td>
<td>Opening up energy transition investment through the development of biofuel, lithium battery industry, and electric vehicle.</td>
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<tr>
<td><strong>PIDATO KENEGARAAN 16 AGUSTUS 2021</strong></td>
<td>Transforming towards NRE, as well as well accelerating green technology-based economy, will be a crucial change in our economy.</td>
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<tr>
<td><strong>COP 26, 2 NOVEMBER 2021</strong></td>
<td>Indonesia would be able to contribute faster for the World’s Net-Zero Emission</td>
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NRE POTENTIAL

<table>
<thead>
<tr>
<th>ENERGY</th>
<th>POTENTIAL (GW)</th>
<th>UTILIZATION(*) (MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOLAR</td>
<td>3.295</td>
<td>203.7</td>
</tr>
<tr>
<td>HYDRO</td>
<td>95</td>
<td>6.601,9</td>
</tr>
<tr>
<td>BIOENERGY</td>
<td>57</td>
<td>1920.4</td>
</tr>
<tr>
<td>WIND</td>
<td>155</td>
<td>154.3</td>
</tr>
<tr>
<td>GEOTHERMAL</td>
<td>24</td>
<td>2276.9</td>
</tr>
<tr>
<td>OCEAN</td>
<td>60</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3.686</td>
<td>11.157</td>
</tr>
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MITIGATION REALIZATION

01 Probable renewable energy potential is being calculated. While, the current utilization has been only 0,3% of the total potential.

02 The existing new energy potential hasn’t also been maximally developed.

Notes:
(*) Based on data December 2021
Nuclear Potential: Uranium 89.483 ton - Thorium 143.234 ton

Abbreviation: CM: Counter Measure; CM1: self effort; CM2: international assistance; IPPU: industrial processes and production use

Direktorat Jenderal EBTKE @2022
ENERGY TRANSITIONS ROADMAP TOWARDS NET ZERO EMISSION

1) The timeline for strategic achievement towards net zero emission on energy sector
2) The roadmap is a joint commitment between the Government and stakeholders to achieve NZE by 2060

2025: Emission reduction
198 Million ton CO₂

2030: Emission reduction
314 Million ton CO₂

2035: Emission reduction
475 Million ton CO₂

2040: Emission reduction
796 Million ton CO₂

2050: Emission reduction
956 Million ton CO₂

2060: Emission reduction
1.526 Million ton CO₂

2021 – 2025

Supply:
- Rooftop Solar PV implementation 3,6 GW.
- NRE PP Development in capacity of 10,6 GW.
- Gas PP gasification 1,7 GW.
- Take out CFPP 8,8 GW in RUPTL.
- Diesel PP conversion to NRE PP.
- Steam Gas PP 0,8 GW as the substitution of CFPP.

Demand:
- The reduction of imported LPG with induction cooker for 8,2 million households.
- Electric vehicle: 400 thousand of four wheelers and 3,7 million of two wheelers.
- City gas for 5,2 million houses.
- Fuel gas (BBG) cars for 100 thousand.
- The implementation of Energy Management and MEPS.

2026 – 2030

Supply:
- NRE PP development for 10,3 GW to substitute the CFPP.

Demand:
- The reduction of imported LPG with induction cooker for 18,2 million households.
- Electric vehicle: 2 million of four wheelers and 13 million of two wheelers.
- City gas for 10 million houses.
- Fuel gas (BBG) cars for 300 thousand.
- DME utilization to substitute LPG for 20,4 million household.
- The implementation of Energy Management and MEPS.

2031 – 2035

Supply:
- No more additional fossil PP.
- No more Diesel PP.
- Retirement of CFPP 6 GW*).
- NRE PP Development: PLTS 99 GW, Hydro 3,1 GW, Bioenergy 3,1 GW and PLTP 5,6 GW.
- Hydrogen utilization 328 MW.
- Battery utilization 7 GW.

Demand:
- Induction cooker for 28,2 million households.
- Electric vehicle: 12,3 million of four wheelers and 105 million of two wheelers.
- City gas for 20,3 million houses.
- Fuel gas (BBG) cars for 800 thousand.

2036 – 2040

Supply:
- Retirement of CFPP 3 GW**)
- NRE PP Development : PLTS 82,2 GW, PLTB 17,5 GW, Hydro 13,7 GW, Bioenergy 23 GW, PLTP 3 GW, PLTAL 1,3 GW and Nuclear 5 GW
- Hydrogen utilization 332 MW.
- Battery utilization 46 GW

Demand:
- Induction cooker for 38,2 million households.
- Electric vehicle: 20,5 million of four wheelers and 229 million of two wheelers.
- City gas for 23,4 million houses.
- Fuel gas (BBG) cars for 2,8 million.

2041 – 2050

Supply:
- Retirement of CFPP 31 GW**)
- NRE PP Development : PLTS 180,2 GW, PLTB 17,5 GW, Hydro 13,7 GW, Bioenergy 23 GW, PLTP 3 GW, PLTAL 1,3 GW and Nuclear 5 GW
- Hydrogen utilization 9 GW
- Battery utilization 151 GW

Demand:
- Induction cooker for 58 million households.
- Electric vehicle: 38,2 million of four wheelers and 229 million of two wheelers.
- City gas for 23,9 million houses.
- Fuel gas (BBG) cars for 2,8 million.

2051 – 2060

Supply:
- Retirement of CFPP 8 GW*)
- Retirement of Steam Gas PP 8 GW
- NRE PP Development : 8,2 GW, PLTB 11,6 GW, Hydro 37,9 GW, Bioenergy 2,1 GW, PLTP 3 GW, PLTAL 12,1 GW and Nuclear 30 GW
- Hydrogen utilization 52 GW
- Battery utilization 140 GW

Demand:
- Induction cooker for 58 million households.
- Electric vehicle: 69,6 million of four wheelers and 229 million of two wheelers.
- City gas for 23,9 million houses.
- Fuel gas (BBG) cars for 2,8 million.

*) CFPP age of PLN & PPU maximum 30 years dan IPP 25-30 years (based on PPA)
**CFPP PHASING OUT POTENTIAL USING ETM SCHEME**

**Ownership**
- 83% PLN
- 17% IPP

**Plant-level Indicator**
- **Size:**
  - Large
  - Avg unit: 305 MW
  - Avg plant: 850 MW
- **Age:**
  - Mature
  - Avg: 13 years old
- **Utilisation:**
  - Medium utilisation
  - Avg: 68%
- **Emissions:**
  - Very high
  - Avg: 1.00 tCO₂e/MWh

**Indicative CFPP characteristics**

1. MoF and ADB identified CFPP capacity for 16.2GW including PLN and non-PLN business areas;
2. CFPP phasing out contributes to emission reduction on power plant sector to be replaced by NRE PP;
3. Energy Transition Mechanism (ETM) is expected to assist financing for NRE PP development.

**ENERGY TRANSITION MECHANISM (ETM) PROCESS**

1. **CFPP DEVELOPER**
   - CFPP assets are released to entities appointed by the Government.
   - The PLTU developer can get the replacement value of assets without any loss (considering investments and potential revenues)

2. **ENTITIES APPOINTED BY THE GOVERNMENT**
   - Get a low cost of funding for the takeover of the previous owner’s CFPP assets
   - Owns and operates the acquired CFPP assets.
   - Operated up to agreed termination date with faster downtime.

3. **FINANCING SOURCE (ENERGY TRANSITION MECHANISM)**
   - Multilateral banks, including concessional loans, are the first loss guarantees to create **blended finance** for the NRE incentive stimulus.
   - Domestic and international private sector investors
   - Long term investors with low cost and low interest

4. **DEVELOPMENT OF NEW NRE PP**
   - NRE development, given the first chance.
   - Longer operating period
   - Funding Support from cap and trade/tax. Tax Allowance Fiscal Support, Electricity Subsidy, Licensing
Thank you

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