Meeting the energy challenge in the world's largest archipelago

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Pertamina Refinery Directorate

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Outline

- Potential of Indonesia
- Pertamina corporate vision 2025
- Pertamina refining vision 2025
- Challenges faced by Pertamina
- Pertamina refining strategy
  - Upgrading of current refinery
  - Building grass root refinery
Indonesia is the largest economy in Southeast Asia...

Share of GDP in ASEAN

Total GDP = USD 1848 billion; 2011

Indonesia: 40%
Thailand: 18%
Malaysia: 14%
Singapore: 13%
Vietnam: 6%
Laos: 6%
Phillipines: 6%
Camobodia: 1%
Brunei: 1%
Myanmar: 2%

SOURCE: McKinsey Global Institute
...with one of the fastest stable growth in the world

Overview of OECD and BRIC plus South Africa

Percent

<table>
<thead>
<tr>
<th>Real GDP growth 2000-10</th>
<th>GDP growth, standard deviation, annualised, 2000-10</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>China</strong></td>
<td><strong>Indonesia</strong></td>
</tr>
<tr>
<td><strong>India</strong></td>
<td><strong>Australia</strong></td>
</tr>
<tr>
<td><strong>Indonesia</strong></td>
<td><strong>Portugal</strong></td>
</tr>
<tr>
<td><strong>Russia</strong></td>
<td><strong>Norway</strong></td>
</tr>
<tr>
<td><strong>Slovakia</strong></td>
<td><strong>France</strong></td>
</tr>
<tr>
<td><strong>South Korea</strong></td>
<td><strong>New Zealand</strong></td>
</tr>
<tr>
<td><strong>Turkey</strong></td>
<td><strong>Belgium</strong></td>
</tr>
<tr>
<td><strong>Poland</strong></td>
<td><strong>Switzerland</strong></td>
</tr>
<tr>
<td><strong>Estonia</strong></td>
<td><strong>Canada</strong></td>
</tr>
<tr>
<td><strong>Chile</strong></td>
<td><strong>India</strong></td>
</tr>
<tr>
<td><strong>Brazil</strong></td>
<td><strong>South Korea</strong></td>
</tr>
<tr>
<td><strong>South Africa</strong></td>
<td><strong>Poland</strong></td>
</tr>
<tr>
<td><strong>Czech Republic</strong></td>
<td><strong>China</strong></td>
</tr>
<tr>
<td><strong>Israel</strong></td>
<td><strong>Netherlands</strong></td>
</tr>
<tr>
<td><strong>Australia</strong></td>
<td><strong>United States</strong></td>
</tr>
<tr>
<td><strong>Average rest</strong></td>
<td><strong>Average rest</strong></td>
</tr>
</tbody>
</table>

11.5 | 0.9
7.7 | 0.9
5.2 | 1.5
4.9 | 1.6
4.9 | 1.6
4.2 | 1.7
4.0 | 1.7
3.9 | 1.8
3.8 | 1.8
3.7 | 1.8
3.6 | 2.0
3.5 | 2.0
3.4 | 2.0
3.1 | 2.1
3.1 | 2.1
1.7 | 3.4

SOURCE: Conference Board Total Economy Database; IMF; World Bank; McKinsey Global Institute analysis
In 2050 Indonesia’s GDP is projected to be higher than Germany and France.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>U.S.</td>
<td>15,094</td>
<td>China</td>
<td>30,634</td>
<td>China</td>
<td>53,856</td>
</tr>
<tr>
<td>2</td>
<td>China</td>
<td>11,347</td>
<td>U.S.</td>
<td>23,376</td>
<td>U.S.</td>
<td>37,998</td>
</tr>
<tr>
<td>3</td>
<td>India</td>
<td>4,531</td>
<td>India</td>
<td>13,716</td>
<td>India</td>
<td>34,704</td>
</tr>
<tr>
<td>4</td>
<td>Japan</td>
<td>4,381</td>
<td>Japan</td>
<td>5,842</td>
<td>Japan</td>
<td>8,825</td>
</tr>
<tr>
<td>5</td>
<td>Germany</td>
<td>3,221</td>
<td>Russia</td>
<td>5,308</td>
<td>Russia</td>
<td>8,013</td>
</tr>
<tr>
<td>6</td>
<td>Russia</td>
<td>3,031</td>
<td>Brazil</td>
<td>4,685</td>
<td>Brazil</td>
<td>7,409</td>
</tr>
<tr>
<td>7</td>
<td>Brazil</td>
<td>2,305</td>
<td>Germany</td>
<td>4,118</td>
<td>Germany</td>
<td>6,345</td>
</tr>
<tr>
<td>8</td>
<td>France</td>
<td>2,303</td>
<td>Mexico</td>
<td>3,662</td>
<td>Mexico</td>
<td>5,598</td>
</tr>
<tr>
<td>10</td>
<td>Italy</td>
<td>1,979</td>
<td>France</td>
<td>3,427</td>
<td>France</td>
<td>3,679</td>
</tr>
<tr>
<td>11</td>
<td>Mexico</td>
<td>1,761</td>
<td>Indonesia</td>
<td>2,912</td>
<td>Indonesia</td>
<td>5,032</td>
</tr>
<tr>
<td>12</td>
<td>Spain</td>
<td>1,512</td>
<td>Turkey</td>
<td>2,760</td>
<td>Turkey</td>
<td>3,964</td>
</tr>
<tr>
<td>13</td>
<td>South Korea</td>
<td>1,504</td>
<td>Italy</td>
<td>2,629</td>
<td>Italy</td>
<td>3,867</td>
</tr>
<tr>
<td>14</td>
<td>Canada</td>
<td>1,398</td>
<td>Korea</td>
<td>2,454</td>
<td>Korea</td>
<td>3,612</td>
</tr>
<tr>
<td>15</td>
<td>Turkey</td>
<td>1,243</td>
<td>Spain</td>
<td>2,327</td>
<td>Spain</td>
<td>3,549</td>
</tr>
<tr>
<td>16</td>
<td>Indonesia</td>
<td>1,131</td>
<td>Canada</td>
<td>2,148</td>
<td>Canada</td>
<td>2,620</td>
</tr>
<tr>
<td>17</td>
<td>Australia</td>
<td>893</td>
<td>Saudi Arabia</td>
<td>1,582</td>
<td>Saudi Arabia</td>
<td>3,090</td>
</tr>
<tr>
<td>18</td>
<td>Poland</td>
<td>813</td>
<td>Australia</td>
<td>1,535</td>
<td>Australia</td>
<td>2,715</td>
</tr>
<tr>
<td>19</td>
<td>Argentia</td>
<td>720</td>
<td>Poland</td>
<td>1,415</td>
<td>Poland</td>
<td>2,620</td>
</tr>
<tr>
<td>20</td>
<td>Saudi Arabia</td>
<td>686</td>
<td>Argentia</td>
<td>1,407</td>
<td>Argentia</td>
<td>2,620</td>
</tr>
</tbody>
</table>

SOURCE: World bank estimates for 2011, PWC estimates for 2030 and 2050
Indonesia’s strong economic growth is expected to continue, driven by the domestic consumer demand

An estimated 90 million Indonesians could join the consuming class by 2030

<table>
<thead>
<tr>
<th>Year</th>
<th>Below consuming class</th>
<th>Consuming class ¹</th>
<th>Additional people in the consuming class</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>195</td>
<td>45</td>
<td>40</td>
</tr>
<tr>
<td>2020</td>
<td>180</td>
<td>85</td>
<td>90</td>
</tr>
<tr>
<td>2030</td>
<td>145</td>
<td>135</td>
<td></td>
</tr>
</tbody>
</table>

¹ Consuming class defined as individuals with an annual net income of above 3,000 at 2005 purchasing power parity
2 Based on 5-6% GDP growth scenario

SOURCE: McKinsey Consumer and Shopper Insight (CSI Indonesia 2011); 2010 Population Census; Indonesia’s Central Bureau of Statistics
### Energy demand is expected to grow in line with the economic growth

#### Indonesian primary energy demand 2030

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>2010</th>
<th>2030</th>
<th>Growth 2010-30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
<td>64</td>
<td>63</td>
<td>127</td>
</tr>
<tr>
<td>Coal</td>
<td>30</td>
<td>152</td>
<td>181</td>
</tr>
<tr>
<td>Natural gas</td>
<td>33</td>
<td>59</td>
<td>91</td>
</tr>
<tr>
<td>Other res&lt;sup&gt;1&lt;/sup&gt;</td>
<td>53</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>Geothermal</td>
<td></td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>Biofuels/biochemicals</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Hydro</td>
<td></td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

**Annual growth**

- Oil: 3%
- Coal: 9%
- Natural gas: 5%
- Other res<sup>1</sup>: 0%
- Geothermal: 13%
- Biofuels/biochemicals: 29%
- Hydro: 7%

**Share 2010**

- Oil: 35%
- Coal: 16%
- Natural gas: 18%
- Other res<sup>1</sup>: 29%
- Geothermal: 0%
- Biofuels/biochemicals: 0%
- Hydro: 1%

**Share 2030**

- Oil: 27%
- Coal: 39%
- Natural gas: 20%
- Other res<sup>1</sup>: 11%
- Geothermal: 2%
- Biofuels/biochemicals: 1%
- Hydro: 1%

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1 Solar, wind, nuclear, firewood, dung, biomass for power (rice residues, sugar, rubber, palm oil, agribusiness cogeneration).

**Source:** IEA; FACTS; ASEAN; McKinsey Global Institute analysis

- Oil will continue to be an important energy source in Indonesia in 2030.
- The value of Indonesia's energy market could increase from about $80 billion today to around $210 billion in 2030.
Indonesia petrochemicals is also very attractive market with accelerating demand growth

Indonesian demand for petrochemical products is growing rapidly

<table>
<thead>
<tr>
<th>Year</th>
<th>000 metric tons of major products</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>7,350</td>
</tr>
<tr>
<td>2005</td>
<td>7,950</td>
</tr>
<tr>
<td>2010</td>
<td>8,750</td>
</tr>
<tr>
<td>2015</td>
<td>11,550</td>
</tr>
<tr>
<td>2020</td>
<td>14,600</td>
</tr>
<tr>
<td>2024F</td>
<td>16,700</td>
</tr>
</tbody>
</table>

- **Growth in petrochemical demand** expected to be even higher once domestic supply enables new downstream product manufacturing.
- Indonesia will likely remain a net importer in near/mid term due to insufficient domestic production capacity.

1 Products include olefins, polyolefin derivatives, aromatics and butadiene derivatives

SOURCE: CMAI/IHS
Pertamina is active in all segments of the value chain

Overview of PERTAMINA

- Largest company in Indonesia
- 2012 revenues of USD 80 bn
- 15,000 employees

- 6 refineries with capacity in excess of 1 million barrels/day
- ~5,000 retail fuel stations
- ~5 bn+ barrels of oil reserves
- ~450 MBOE/day of oil & gas production
- ~95% market share in Retail fuel
- ~75% market share in Industrial fuels
- ~60% market share in Lubricants
- ~10% market share in Petrochemicals

Pertamina is the sole refiner and major retailer of petroleum products in Indonesia

One of Pertamina’s mission is to meet Indonesia’s petroleum and demand

Opportunity to expand into petchem market

SOURCE: PERTAMINA
Pertamina’s aspiration is to be a Fortune 100 “Asian Energy Champion” by 2025

- Be a Fortune 100 company
- Revenue of approx. USD 200 billion
- EBITDA of ~USD 40 billion
- Integrated energy company (incl. CBM, geothermal, renewable)
- Leading domestic player as well as international footprint

SOURCE: Pertamina
Pertamina 2025 Asian Energy Championship aspiration

“Asian Energy Champion”
‘Fortune 100’ position (Revenue ~$200b USD, EBITDA ~$40b USD)

Leadership in existing core
- E&P
  Leading Asian NOC: 2.2 mmbopd production with domestic leadership (50%) and intl foot-print (~30% of own prodn.)

  - Midstream gas
    Integrated gas champion with trans-Sumatera and trans-Jawa gas infra-structure
  - Refining
    Economically competitive refining capacity; Top quartile operating performance
  - Industrial fuels & lubes
    Maintain position of strength with over 50% market share, while sustaining profitability
  - Trading
    Optimize supply chain and improve profitability

Growth in new businesses
- PetChem
  Largest petchem player in Indonesia with 35% market share, high margins through integration

  - Coal
    Leader in alternate technology (e.g. CBM, UCG) while maximizing coal production
  - Biofuels
    Serving mandate of 20% blend; upstream presence to reduce losses and supply risk
  - Power
    One of the largest Indonesian IPP player with ~ 3-5 GW capacity

Increase efficiency in PSO
- Oil products
  Maintain position of strength with 60% market share; new service model through “New pasti pas” and NFR

  - LPG
    Optimize supply chain and infrastructure
  - Shipping
    Support own supply chain and also build third party service model

Project & Technology Center: Technology leader on CBM, Geothermal, EOR and deepwater; Strong project executor with delivery on time and within budget

Organization & Capability: Accountability and delivery; Employer of choice to attract and retain best talent

SOURCE: Pertamina
Pertamina Refining vision is to become a World Class Downstream Business by 2025

**Vision 2025**
- Among the largest refining capacity in Asia Pacific
- Largest petrochemical business in Southeast Asia
- Top quartile operating and business performance

**Business strategy**
1. Increase **crude supply flexibility** and increase Refining margin
2. Build competitive **Refinery and Integrated Petrochemical business**
3. Develop internal capability to support Refinery and Integrated Petrochemical business

**Functional excellence**
- **Safety and reliability**
  - HSSE management
  - Reliability and maintenance management
- **Profitability**
  - Optimization and planning management
  - Technology management
  - Budget management
- **Growth**
  - Business development
  - Project management
- **Sustainability**
  - Human resources management

**Pertamina Production System**

**SOURCE:** Pertamina
Pertamina is focusing on 2 elements in its strategic agenda

### Vision 2025

- Among the largest refining capacity in Asia Pacific
- Largest petrochemical business in Southeast Asia
- Top quartile operating and business performance

### Current challenges

- **A** Rising energy demand
- **B** More challenging crude slate

### Pertamina Refining strategic agenda

1. **Existing refineries**
   - Upgrade existing refineries to allow higher sulfur and imported crude slate
   - Upgrade from low-value to high-value products
   - Increase net profit margin through operational excellence
   - Meet product quality requirements

2. **Grass Root Refineries**
   - Build Grass Root Refineries
   - Build Integrated Petrochemical plants
   - Develop manufacturing and marketing partnerships

---

1 Including increasing product quality to capture economic and environmental benefits, bottom conversion units,
Pertamina is focusing on 2 elements in its strategic agenda

**Vision 2025**
- Among the largest refining capacity in Asia Pacific
- Largest petrochemical business in Southeast Asia
- Top quartile operating and business performance

**Current challenges**
- A Rising energy demand
- B More challenging crude slate

### Pertamina Refining strategic agenda

<table>
<thead>
<tr>
<th></th>
<th>Pertamina Refining strategic agenda</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Existing refineries</strong></td>
</tr>
<tr>
<td></td>
<td>Upgrade existing refineries to allow higher sulfur and imported crude slate</td>
</tr>
<tr>
<td></td>
<td>Upgrade from low-value to high-value products¹</td>
</tr>
<tr>
<td></td>
<td>Increase net profit margin through operational excellence</td>
</tr>
<tr>
<td></td>
<td>Meet product quality requirements</td>
</tr>
<tr>
<td>2</td>
<td><strong>Grass Root Refineries</strong></td>
</tr>
<tr>
<td></td>
<td>Build Grass Root Refineries</td>
</tr>
<tr>
<td></td>
<td>Build Integrated Petrochemical plants</td>
</tr>
<tr>
<td></td>
<td>Develop manufacturing and marketing partnerships</td>
</tr>
</tbody>
</table>

¹ Including increasing product quality to capture economic and environmental benefits, bottom conversion units.
Fuel demand in Indonesia is estimated to grow at a rate of ~4% per annum.

Indonesian demand for fuel product will continue to grow.

**MBCD of major products demand**

<table>
<thead>
<tr>
<th>Product</th>
<th>2011</th>
<th>2012</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gasoline</td>
<td>500</td>
<td>600</td>
<td>700</td>
<td>800</td>
<td>900</td>
</tr>
<tr>
<td>Gasoil</td>
<td>1,000</td>
<td>1,200</td>
<td>1,400</td>
<td>1,600</td>
<td>1,800</td>
</tr>
<tr>
<td>Jet fuel</td>
<td>1,500</td>
<td>1,800</td>
<td>2,100</td>
<td>2,400</td>
<td>2,700</td>
</tr>
<tr>
<td>LPG</td>
<td>2,000</td>
<td>2,400</td>
<td>2,800</td>
<td>3,200</td>
<td>3,600</td>
</tr>
</tbody>
</table>

**CAGR (percent)**

- Gasoline: 6.7%
- Gasoil: 2.6%
- Jet fuel: 8.0%
- LPG: 1.8%

**RISING ENERGY DEMAND**
Indonesia will remain a net importer of gasoline and LPG in near / mid term due to insufficient domestic production capacity.

Indonesia remain short of ~450 MBCD of gasoline by 2025.

Indonesia remain short of ~35 MBCD of LPG by 2025.

1 2020 and 2025 data includes upgrading of existing refinery and 2 GRR.

SOURCE: Pertamina
Indonesia will be slightly deficit in avtur and surplus in gasoil with the upgrading of existing refineries and 2 GRR

Indonesia be short of ~15 MBCD of Avtur by 2025

Indonesia be surplus in gasoil of ~270 MBCD by 2025

1 2020 and 2025 data includes upgrading of existing refinery and 2 GRR

SOURCE: Pertamina
Domestic crude production is declining by ~8% between 2011 and 2020

Domestic crude production forecast, MBD

<table>
<thead>
<tr>
<th>Year</th>
<th>MBD</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>902</td>
</tr>
<tr>
<td>2012</td>
<td>895</td>
</tr>
<tr>
<td>2013</td>
<td>878</td>
</tr>
<tr>
<td>2014</td>
<td>891</td>
</tr>
<tr>
<td>2015</td>
<td>948</td>
</tr>
<tr>
<td>2016</td>
<td>918</td>
</tr>
<tr>
<td>2017</td>
<td>893</td>
</tr>
<tr>
<td>2018</td>
<td>866</td>
</tr>
<tr>
<td>2019</td>
<td>842</td>
</tr>
<tr>
<td>2020</td>
<td>826</td>
</tr>
</tbody>
</table>

SOURCE: FACTS, Woodmac
In 2020, sour crudes will have greater availability than sweet crudes, necessitating shift towards more sour crude as base feedstock.

Crude availability in 2020; categorized by sulfur

<table>
<thead>
<tr>
<th>Sulfur Range</th>
<th>Sweet Crude MBD</th>
<th>Sour Crude MBD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 0.2%</td>
<td>4,886</td>
<td>15,575</td>
</tr>
<tr>
<td>0.21 - 0.5%</td>
<td>2,935</td>
<td>2,158</td>
</tr>
<tr>
<td>0.51 - 1%</td>
<td>2,069</td>
<td>9,831</td>
</tr>
<tr>
<td>1.01 - 1.5%</td>
<td>1,566</td>
<td>1,475</td>
</tr>
<tr>
<td>1.51 - 2%</td>
<td>1,547</td>
<td>0</td>
</tr>
<tr>
<td>Above 2%</td>
<td>1,225</td>
<td>2,113</td>
</tr>
</tbody>
</table>

1 Selected crudes potentially available to Pertamina

SOURCE: Crude database; FACTS; WoodMac
Pertamina is focusing on 2 elements in its strategic agenda

**Vision 2025**
- Among the largest refining capacity in Asia Pacific
- Largest petrochemical business in Southeast Asia
- Top quartile operating and business performance

**Pertamina Refining strategic agenda**

1. **Existing refineries**
   - Upgrade existing refineries to allow higher sulfur and imported crude slate
   - Upgrade from low-value to high-value products
   - Increase net profit margin through operational excellence
   - Meet product quality requirements

2. **Grass Root Refineries**
   - Build Grass Root Refineries
   - Build Integrated Petrochemical plants
   - Develop manufacturing and marketing partnerships

**Current challenges**

- **A** Rising energy demand
- **B** More challenging crude slate

---

1 Including increasing product quality to capture economic and environmental benefits, bottom conversion units,
Pertamina currently has 5 major refineries in Indonesia with total capacity in excess of 1000 MBSD.

- RU II: Dumai
  - 170 MBSD
  - NCI: 7.50

- RU III: Plaju
  - 118 MBSD
  - NCI: 3.10

- RU VI: Balongan
  - 125 MBSD
  - NCI: 11.90

- RU IV: Cilacap
  - 348 MBSD
  - NCI: 3.98

- RU V: Balikpapan
  - 260 MBSD
  - NCI: 3.27

Total capacity: 1031 MBSD
Average NCI: 5.30
One of the largest in the Asia Pacific
Pertamina have multiple projects in the masterplan and will need financial support for masterplan execution.

Sample potential projects:

- **Balikpapan**
  - Upgrade material to handle ~1.5% wt S in crude
  - Build 150 MBSD HDS
  - Build H2 plant
  - Revamp CDU IV by 40 MBSD
  - Revamp HCU A/B by 10 MBSD
  - Build 40 MBSD RFCC+ 45 MBSD VRHDS

- **Dumai**
  - Build logistic infrastructure
  - Upgrade material to handle ~1% wt S in crude
  - Build 103 MBSD DHDT
  - Revamp CDU by 44 MBSD
  - Revamp coker by 7 MBSD
  - Revamp PL-1 by 3 MBSD
  - Build natural gas infrastructure

- **Plaju**
  - Upgrade material to handle ~1% wt S in crude
  - Build 93 MBSD HDS
  - Build 180 MBSD CDU
  - Build 40 MBSD RFCC
  - Build 22 MBSD CCR

- **Balongan**
  - Upgrade material to handle ~1% wt S in crude
  - Revamp and build HDS
  - Revamp CDU by 35 MBSD

- **Cilacap**
  - Upgrade material to handle ~1% wt S in crude
  - Revamp PL-2 by 4 MBSD
  - Build 51 MBSD HCU
  - Build 47 MBSD VRHDS
  - Build 90 MBSD HDS
  - Build natural gas infrastructure

**NOT EXHAUSTIVE**

Sample potential projects:

- **Total capex requirement of USD 10 – 12 billion**
  - Increase flexibility
  - Increase profitability
  - Meet Euro IV product quality
UPGRADE EXISTING REFINERIES

1. Refining Masterplan upgrading projects will help reducing fuel demand deficit by increasing production of major and key specialties products

Pertamina production

<table>
<thead>
<tr>
<th>Major products</th>
<th>Average 2009 - 2012</th>
<th>Masterplan initiatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPG KTA</td>
<td>757</td>
<td>1,883</td>
</tr>
<tr>
<td>Gasoline Mil KL/yr</td>
<td>11</td>
<td>20</td>
</tr>
<tr>
<td>Gasoil Mil KL/yr</td>
<td>18</td>
<td>35</td>
</tr>
<tr>
<td>Avtur Mil KL/yr</td>
<td>2.7</td>
<td>3.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specialties products</th>
<th>Average 2009 - 2012</th>
<th>Masterplan initiatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>PP KTA</td>
<td>305</td>
<td>664</td>
</tr>
<tr>
<td>Paraxylene KTA</td>
<td>251</td>
<td>297</td>
</tr>
<tr>
<td>Benzene KTA</td>
<td>94</td>
<td>112</td>
</tr>
</tbody>
</table>

PRELIMINARY

SOURCE: Beicip, Pertamina, Team analysis
Pertamina is focusing on 2 elements in its strategic agenda

### Vision 2025
- Among the largest refining capacity in Asia Pacific
- Largest petrochemical business in Southeast Asia
- Top quartile operating and business performance

### Current challenges
1. Rising energy demand
2. More challenging crude slate

### Pertamina Refining strategic agenda

#### Existing refineries
- Upgrade existing refineries to allow higher sulfur and imported crude slate
- Upgrade from low-value to high-value products
- Increase net profit margin through operational excellence
- Meet product quality requirements

#### Grass Root Refineries
- Build Grass Root Refineries
- Build Integrated Petrochemical plants
- Develop manufacturing and marketing partnerships

---

1 Including increasing product quality to capture economic and environmental benefits, bottom conversion units,
Pertamina currently studying several options to build Grass Root Refineries

- BUILD GRASS ROOT REFINERIES
  1. Balongan II
     - Planned capacity: 300 kbd
     - Status: BD
     - Potential: Pertamina jointly with KPI & SK Energy
  2. Jatim (Tuban)
     - Planned capacity: 300 kbd
     - Status: BD
     - Potential: Pertamina jointly with Saudi Aramco
  3. Plaju (APBN)
     - Planned capacity: 300 kbd
     - Status: BD
     - Potential: Pertamina funded by State Budget

- Pertamina has 2 options to bridge demand and supply gap
  - Build refinery either with crude partners or with operating partner
  - Get stake from other refineries in return for guaranteed long term product offtake

SOURCE: Pertamina
Grass Root Refineries projects consist of partnerships and government-funded projects

<table>
<thead>
<tr>
<th>Equity &amp; Partner</th>
<th>Capacity</th>
<th>Location</th>
<th>Start up date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pertamina &amp; Kuwait Petroleum International (KPI)</td>
<td>▪ 300 MBSD</td>
<td>▪ Balongan/Bontang/Banten</td>
<td>▪ November 2019</td>
</tr>
<tr>
<td>2. Pertamina &amp; Aramco Asia</td>
<td>▪ 300 MBSD</td>
<td>▪ Tuban, Jawa Timur</td>
<td>▪ April 2020</td>
</tr>
<tr>
<td>3. Pertamina (Pemerintah)</td>
<td>▪ 300 MBSD</td>
<td>▪ Plaju, Sumsel</td>
<td>▪ December 2020</td>
</tr>
</tbody>
</table>

Context and Objectives

Context

Rapid increase of domestic Gasoline and Diesel demands driving deficits larger and Corporate plan to develop Petrochemical business in order to increase profitability

Objectives

1. Reduce domestic deficits of Gasoline and Diesel
2. Meet domestic Petrochemicals demand
3. Achieve net positive margin at each RU

Feedstock plan

Target: Deg. API 29-35; Sulfur Cont: 1.0-2.7% wt

Crude (MBSD)

1. KPI : 200 KEC + 100 UEA
2. Aramco Asia : 300 Arabian crude
3. Pertamina (Pemerintah) : 300 mixed crude oil

Type

Refinery complex – integrated with Petrochemicals

Rencana Produck

<table>
<thead>
<tr>
<th>BBM</th>
<th>Petrokimia</th>
<th>Lain-Lain</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Euro IV Gasoline</td>
<td>▪ MEG</td>
<td>▪ LPG</td>
</tr>
<tr>
<td>▪ Jet/Kerosene</td>
<td>▪ Polypropylene</td>
<td>▪ Lube oil</td>
</tr>
<tr>
<td>▪ Euro IV Diesel</td>
<td>▪ LDPE/HDPE</td>
<td></td>
</tr>
</tbody>
</table>

SOURCE: Pertamina
Executive summary

- Indonesia is a country with great potential
  - It is the largest economy in SEA with 40% of total SEA GDP
  - Has one of the fastest of the most stable growth in the world
  - Growth with continue with increase in domestic demand and expected to exceed Germany and France by 2050

- This high economic growth also translates to the energy and petrochemical sector
  - Oil demand will double, coal will increase by 6 times, with natural gas demand tripling
  - 5% per-annum growth in petrochemical product demand

- This provides opportunity but also need for Pertamina who is present in all oil and gas value chain to grow especially in the petrochemical business

- However, there are two key challenges faced by Pertamina
  - Rising energy demand – deficit in gasoline and LPG will continue to increase
  - More challenging feedstock – Decrease in domestic crude production coupled with higher availability of import sour crudes

- To overcome challenges and achieve Pertamina’s vision, Pertamina refining is focusing on 2 elements in its strategic agenda
  - Improve existing refineries through
    - Increase flexibility to process higher sulfur and imported crude slate
    - Upgrading from low-value to high-value products through revamp and building new conversion units
    - Increasing net profit margin through operational excellence
    - Meeting product quality requirements
  - Building grass root refinery with potential for integrated petrochemical plants and also developing manufacturing and marketing partnerships – Currently 3 GRR (Jatim, Balongan & Sumatra) are in plan

- This will required conducive business climate, access to funds with 10-12 USD billion required for refinery upgrades and 20-25 USD billion for 3 GRRs and support from all stakeholders