Installation of Gas Engine Cogeneration System to Supply Electricity and Heat to the Vehicle Manufacturing Plant

PT. Toyota Motor Manufacturing Indonesia [TMMIN]
Outline

1. TMMIN Company Profile
2. National & Global Policy for CO2 Reduction
3. CO2 Reduction Activity
   3.1. CO₂ Reduction Roadmap
   3.2. Co-Gen Project
4. Closing
1. TMMIN COMPANY PROFILE

1.1. Introduction of Toyota Indonesia

TMMIN as Vehicle OEM influences total Automotive Industries with more than 130 companies and more than 100 thousand employees.
TMMIN currently has five plants in Sunter and Karawang that produce 5 vehicle models and 2 engine types from raw materials-component parts-fully assembled vehicle unit.
Overview of TMMIN Production Plants

Toyota Indonesia has been operating for 48 years (established 1971) and its products already been exported to more than 80 countries

<table>
<thead>
<tr>
<th>Plant</th>
<th>Start operation</th>
<th>Production Items</th>
<th>Capacity per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunter 1</td>
<td>1973</td>
<td>(1) TR Engine (2) Engine/Body Parts</td>
<td>(1) Engine 195,000 Units (2) 11,000 Containers</td>
</tr>
<tr>
<td>Sunter 2</td>
<td>1977</td>
<td>(1) Press &amp; Casting Parts (2) Dies &amp; Jigs</td>
<td>(1) 96,000 Units &amp; 12,000 Tons (2) 240 C-points</td>
</tr>
<tr>
<td>Karawang 1</td>
<td>1998</td>
<td>(1) KIJANG INNOVA (2) FORTUNER</td>
<td>130,000 Vehicles</td>
</tr>
<tr>
<td>Karawang 2</td>
<td>2013</td>
<td>(1) VIOS (2) YARIS (3) SIENTA</td>
<td>120,000 Vehicles</td>
</tr>
<tr>
<td>Karawang 3</td>
<td>2016</td>
<td>R-NR Engine</td>
<td>216,000 Units</td>
</tr>
</tbody>
</table>
2. National & Global Policy
Related with CO2 Reduction
Background

Toyota Indonesia Activity in Environment is based on Indonesian Government Policy & also Global Toyota Environmental Challenge 2050

COP Climate Change

Indonesia Govt Commitment

"Indonesia committed to decrease emission by 29% in 2030 and 41% with international support"

"Reducing emission will be done through energy, forest & land management, and maritime sectors"

Global Toyota Environmental Challenge

CO2 Generated in Indonesia by sectors

- 5% Others
- 1% Agriculture
- 1% Waste Business
- 10% Transportation
- 23% Energy
- 60% Forestry

Toyota Indonesia Activity to contribute to CO2 Reduction
Toyota has a global challenge for low carbon society by 2050 and based on this, Toyota Indonesia also set KPI by each challenges.

### Toyota Environmental Challenge 2050

#### Toyota Global Challenge

- **Zero Carbon Emission**
  - New Vehicle Zero CO2 Emissions Challenge
  - Plant Zero CO2 Emissions Challenge
  - Life Cycle Zero CO2 Emissions Challenge

- **Net Positive Impact**
  - Minimizing & Optimizing Water Usage
  - Waste Recycling based Society & Systems
  - Future Society in Harmony with Nature

### Toyota Indonesia KPI

- **Develop Eco-friendly Vehicle**
  - Develop eco-friendly new vehicle generation

- **Low CO2 & Innovative Technology Plant**
  - Implement innovative technology plant to further reduce CO2 in vehicle manufacturing process

- **Green Supply Chain**
  - Realize green supply chain by environmental management & CO2 reduction in supplier, logistics, and dealers

- **Minimizing Water Usage**
  - Reduce water usage in vehicle manufacturing process

- **Waste Recycling System**
  - Develop waste reduction & recycling system

- **Harmony with Nature**
  - Develop CSR, sustainable community & plantation

Source: Toyota Global HP, Toyota Indonesia Internal
Toyota keeps working to improve efficiency and implement innovative technology to further reduce CO2 in vehicle manufacturing.

Low CO2 and Innovative Technology in Manufacturing Process

- Shifting to Lower CO2 Energy Source
  - BEFORE
    - Public Electric (Fossil Fuel)
    - Diesel Fuel (Fossil Fuel)
  - AFTER
    - RE: Solar PV, Wind Turbin
    - Public Electric (Fossil Fuel)
    - Co-Gen
    - Natural Gas (Low CO2)

- Apply Low CO2 Equipment & 3R Energy
  - Low CO2 Innovative Technology Equipment
    - High Efficiency by VSD Compressor
    - Transformer
    - Chiller
  - 3R Energy (Reduce, Reuse, Recycle) in Process
    - Eliminate Electric by Gravity (KARAKURI)
    - Utilize Energy Recovery with Economizer

Toyota Indonesia Target
- 2015: 27%
- 2019: ~20%
- ~2025: >50%
3. TMMIN CO2 REDUCTION ACTIVITY

3.1. TMMIN CO2 Reduction Roadmap

Further CO2 reduction in manufacturing by improving efficiency & innovative technology

**Challenge**: Plant Zero CO2

**CO2 Reduction Activity**

- Award & Recognition
  - ASEAN Best Energy Award in Laos 2015
  - Green Award by KRW Regent 2016
  - Best AP Env. Award 2016
  - Env. Award by Ministry of Env. 2016
  - Participating in CO2 Conference COP 23 Bonn – Germany, Nov’17
  - Best AP Env. Award 2018

**AWARENESS**
- Education
- Face to Face Communication

**ENERGY EFFICIENCY**
- Karakuri System
- 3 Wet Painting Process
- Air Dryer
- Economizer & Inverter
- Transparent Roof & Air Flow System

**ENERGY CONSERVATION**
- Substitute to Natural Gas
- 2050 Plant Zero CO2
- Co-generation 2019
3.2 TMMIN Co-Generation Project
[Joint Credit Mechanism]

Joint Crediting Mechanism is a proposal by Government of Japan-Indonesia to encourage Japanese private sector to invest on Low Carbon Development activities in Indonesia by giving incentive.

**TMMIN Gas Engine Co-Generation System Image**
# TMMIN Co-Generation System

<table>
<thead>
<tr>
<th>Item</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Source (Electric)</td>
<td>100% Electric: by PLN</td>
<td>55% Electric: by PLN + Co-Gen</td>
</tr>
<tr>
<td></td>
<td>TMMIN P#1-2</td>
<td>TMMIN P#1-2</td>
</tr>
</tbody>
</table>

## Detail System

- **Energy Source**: PLN
- **Steam Supply**: TMMIN P#1-2
- **Hot Water Supply**: TMMIN P#1-2
- **Electric Supply**: Co-Gen

- Reduce Natural Gas Usage for Boiler by Utilizing Heat Waste of Co-Generation System
Total CO2 Reduction up to Sept 2019 already reduce 35,069 Ton CO2 [22 mths]
4. CLOSING

a. Future Action

- Study renewable energy [regulation, technology, economical investment scheme, etc.]

b. Support JCM by share this activity to other company concerned to apply this improvement (Daihatsu, Denso, etc)
Thank you!

Eco Friendly Manufacturing & Product in Harmony with Nature for Customer’s Smiles!