JICA Project for Capacity Development Asisstance for
Low Carbon Development in the Republic of Indonesia
Jakarta, 7 December 2017

# IMPLEMENTATION OF EMISSION REDUCTION USING CO-GENERATION IN CAR MANUFACTURING


by

**F Sales Sudaryono**

Plant Engineering & SHE Division Head

PT. Toyota Motor Manufacturing Indonesia [TMMIN]

# Outline

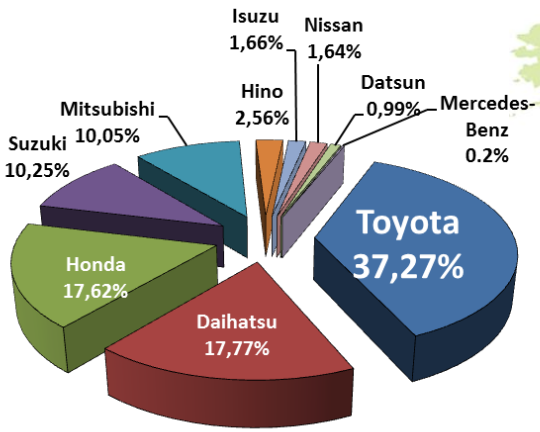
# Overview of TOYOTA Indonesia

TOYOTA INDONESIA
PT Toyota Motor Manufacturing Indonesia

**TOYOTA has two local companies in Indonesia, which are TMMIN for vehicle manufacturing and TAM for distribution**

| Toyota Motor Manufacturing Indonesia (TMMIN) | | Toyota-Astra Motor (TAM) |
|---|---|---|
| Vehicle/ Parts Production and Export | Business Area | Vehicle/Parts Distribution |
| TOYOTA 95% ASTRA 5% | Investment Ratio | ASTRA 50% TOYOTA 50% |

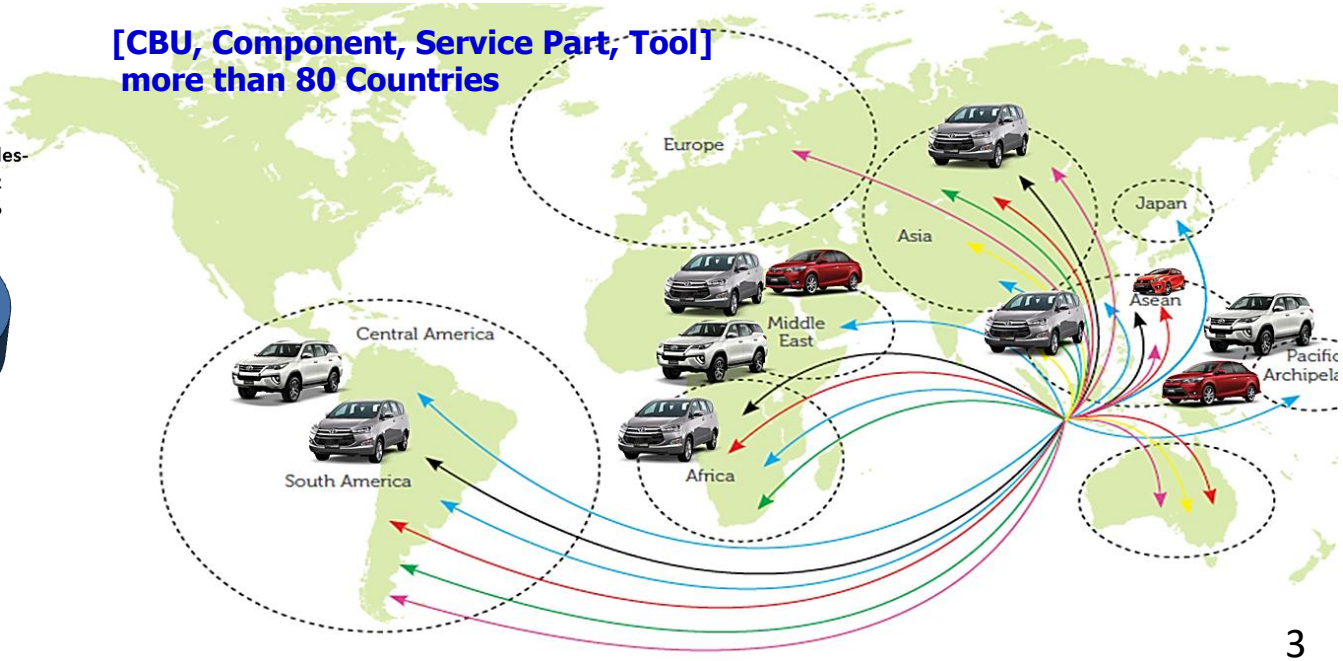
## *Domestic Market Share*




[as Jan-Sept 2017]

## Export Destination

**[CBU, Component, Service Part, Tool] more than 80 Countries**



# Toyota Motor Mfg Indonesia [TMMIN] Business Overview

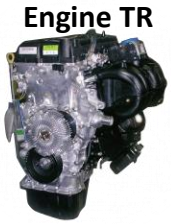
TOYOTA INDONESIA
PT Toyota Motor Manufacturing Indonesia



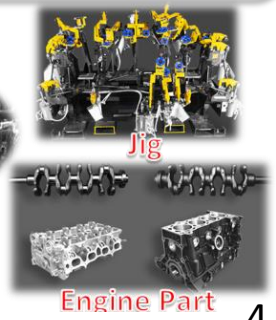



| | VEHICLE PLANT | | UNIT & COMPONENT PLANT | | |
|---|---|---|---|---|---|
| | Karawang 1 | Karawang 2 | KRW#3 | Sunter 1 | Sunter 2 |
| Location | Karawang- West Java | | | North Jakarta | |
| Start of Production | 1998 | 2013 | 2016 | 1973 | 1977 |
| Production Line-Up | Kijang Innova; Fortuner | Etios Valco Vios, Limo Yaris & Sienta | *RNR Engine* | TR Engine | Stamping parts/dies; castings |
| Annual Production Capacity | 130,000 unit/Y | 120,000 unit/Y | 216,000 unit/Y | Engines: 195,000 unit/Y<br>Iron castings: 12,000 ton/Y | |
| | **Land area : 100 Ha** | | **150 Ha** | **4 Ha** | **15 Ha** |
| No of Employee | ±3.500 | ±1.500 | ±1.200 | ±1.300 | ±2.000 |







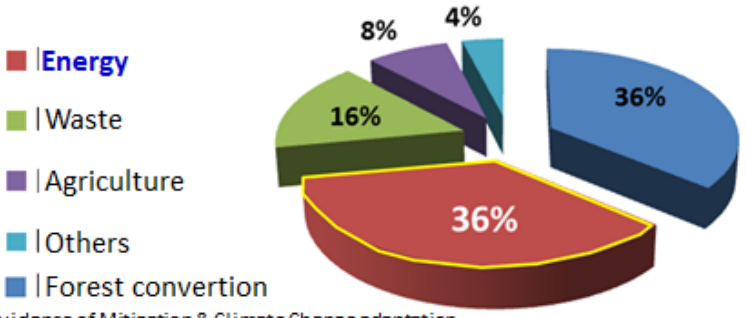


# 1. $CO_2$ Emission in Indonesia & Policy

TOYOTA INDONESIA
PT Toyota Motor Manufacturing Indonesia

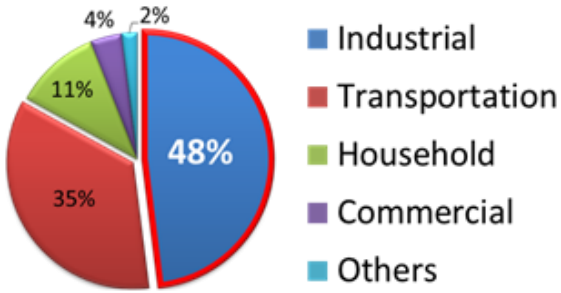
**Indonesian Goverment take action by setting policy as commitment in Paris Agreement COP-22**

## Indonesia $CO_2$ Emission Profile




*Guidance of Mitigation & Climate Change adaptation, Ministry of Environment & Forestry

## Energy Consumption per sector [ 2016]

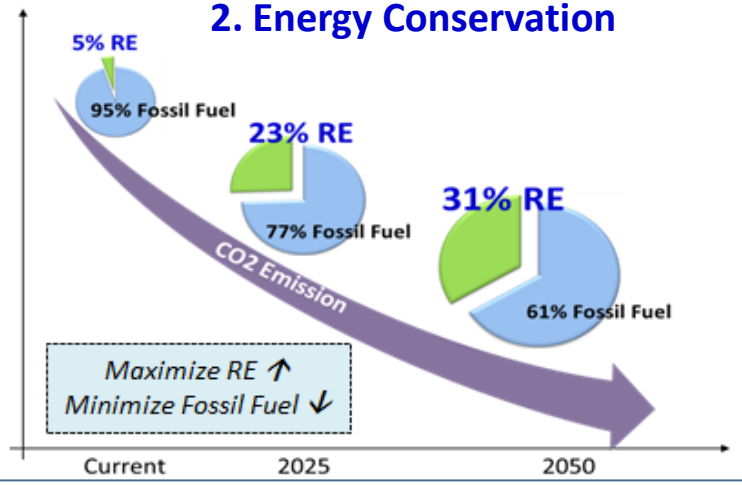



## Government Policy

### 1. Energy Efficiency

| No | Sector | Target Saving [2025] |
|---|---|---|
| 1 | Industrial | 17% |
| 2 | Comercial | 15% |
| 3 | Transportation | 20% |
| 4 | Household | 15% |
| 5 | Others [ agriculture, construction, mining ] | - |

### 2. Energy Conservation




***Source : National Energy Policy –KEN PP no. 79/2014***

# Toyota Action to Reduce $CO_2$ Emission

# 2. Toyota Commitment of $CO_2$ Emission Reduction

TOYOTA INDONESIA
PT Toyota Motor Manufacturing Indonesia

**Toyota has inherited a corporate philosophy "Challenge" to cope with environmental issues as one of the top priority overlooking for the next 2 to 3 decades**

***Long-term Vision " Toyota Environment Challenge 2050"***


***Challenge to ZERO & Beyond***

***Concrete Action of Toyota Six Challenges***

| | | |
|---|---|---|
| Challenge achieving zero | 1 New Vehicle Zero CO2 Emission | Develop & Spread next generation vehicle<br>*Fossil fuel → Renewable energy* |
| | 2 Life cycle Zero CO2 Emission | Eco-friendly design from materials to disposal<br>*Eco Friendly Materials Car design* |
| | 3 Plant Zero CO2 Emission | Low CO2 –emitting innovative technology- at Plant<br>*Through energy saving & Renewable energy* |
| Net Positive Impact Challenge | 4 Minimizing & Optimizing Water usage | Thoroughly reduce amount of water used & clean |
| | 5 Establishing a Recycling-based Society & System | Roll out resource recycling system globally |
| | 6 Establishing a Future Society in Harmony with Nature | All Toyota joint activities to connect communities and with the world |

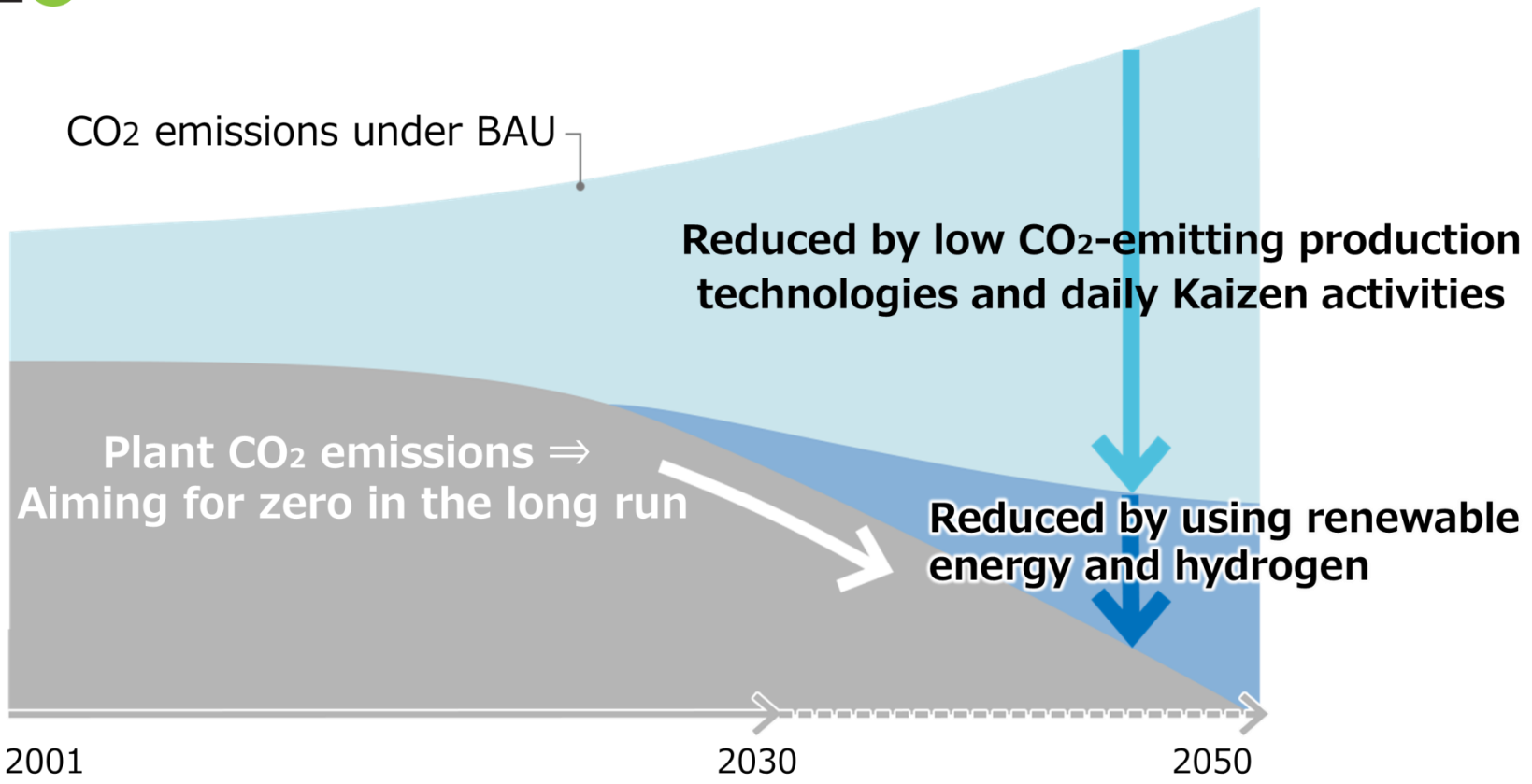
7

*Source : TMC Chairman, Mr. Uchiyamada on Toyota Environment Forum

# 2. Toyota Commitment of $CO_2$ Emission Reduction

## *2.1. Toyota Global Action & $CO_2$ Emission Reduction Challenge*

### Challenge3 - Plant Zero $CO_2$ Emission



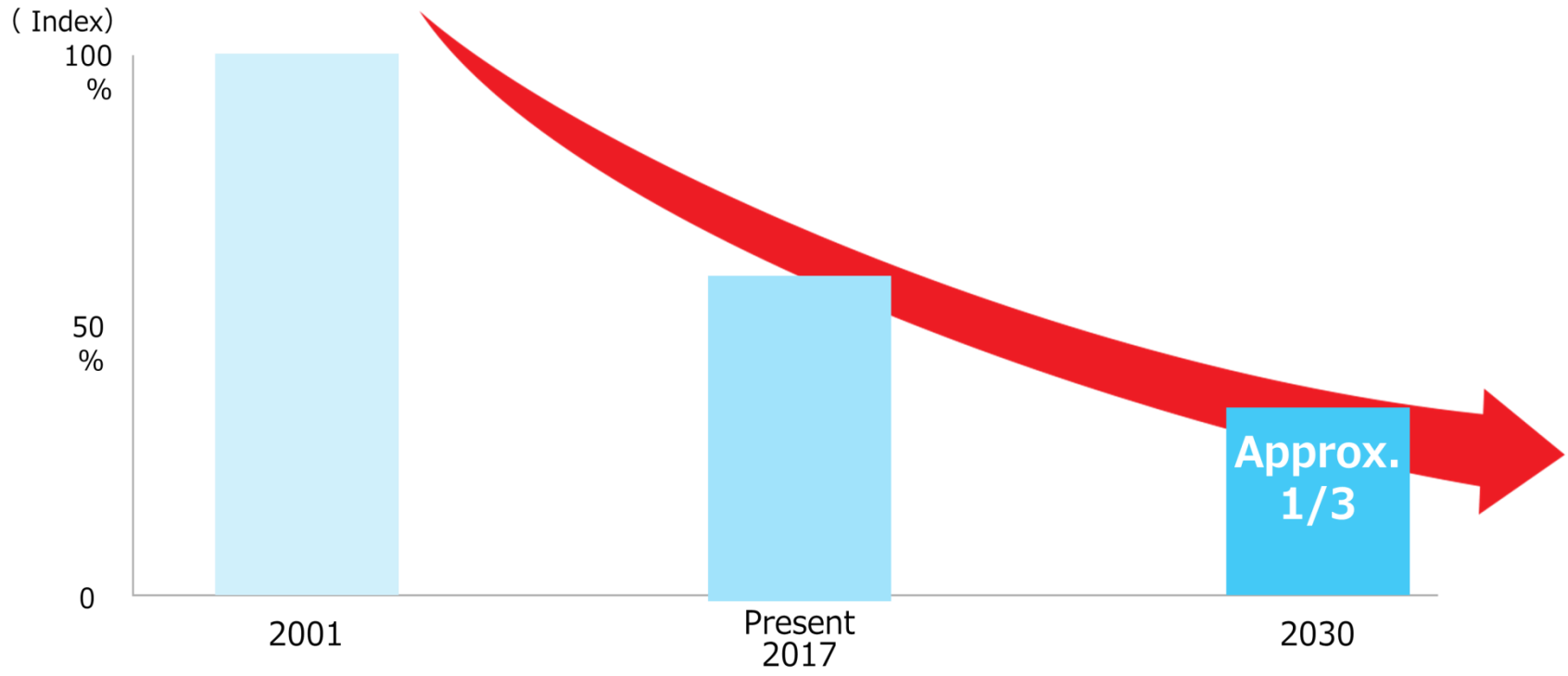

*Source : TMC Chairman, Mr. Uchiyamada on Toyota Environment Forum

# 2. Toyota Commitment of $CO_2$ Emission Reduction

TOYOTA INDONESIA
PT Toyota Motor Manufacturing Indonesia

**Aim to reduce $CO_2$ emission from all over Toyota's Plant world wide**

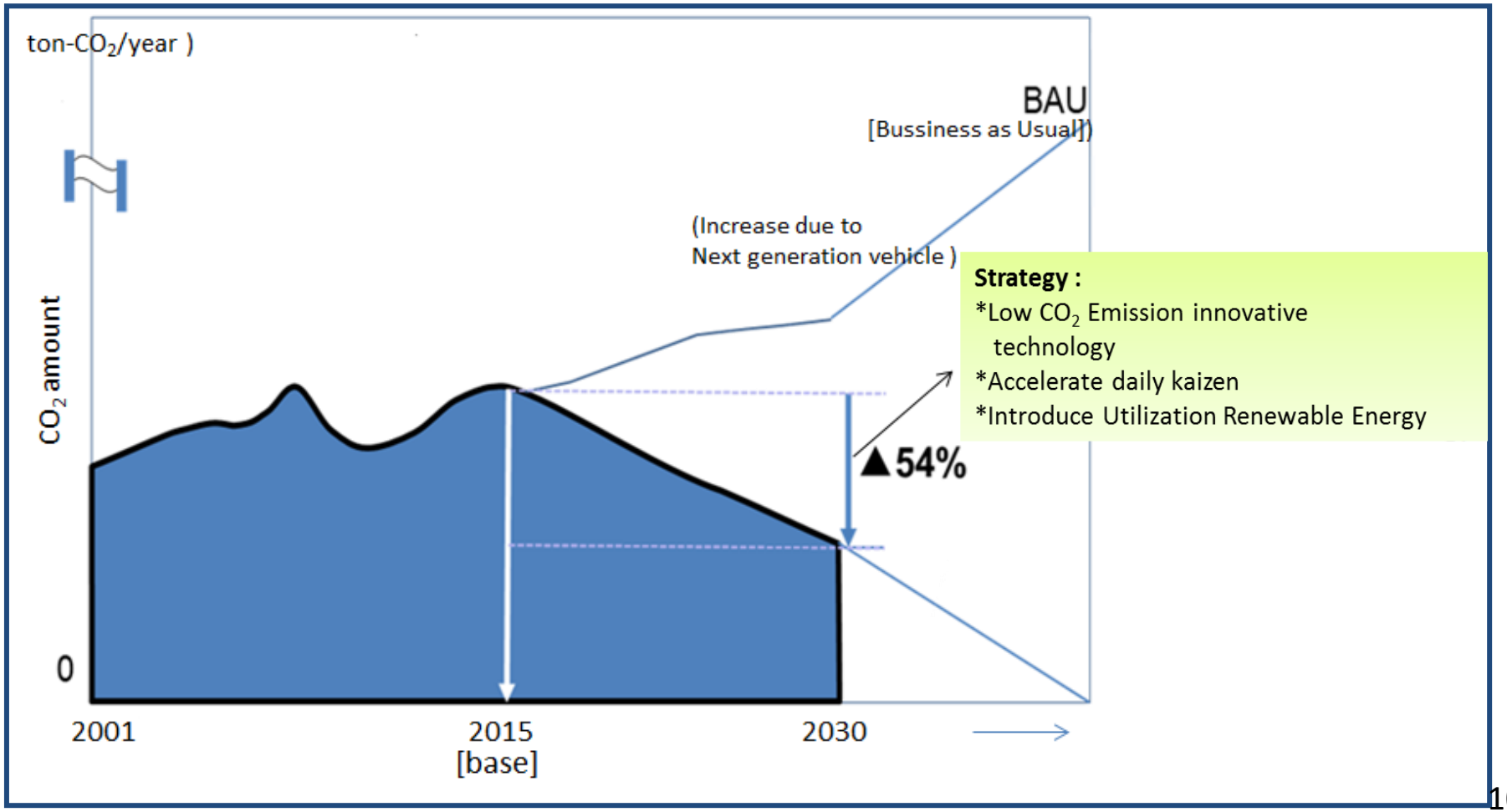
**Initiatives for reduction by low $CO_2$ production technologies and daily Kaizen activities**



# 2. Toyota Commitment of $CO_2$ Emission Reduction

## *2.2. Toyota Asia Pacific – $CO_2$ Reduction Strategy*

**Toward 2030, Toyota in Asia Pacific set scenario which aim to reduce $CO_2$ emission**



# *Implementation of $CO_2$ emission Reduction in Toyota Asia Pacific*

TOYOTA INDONESIA
PT Toyota Motor Manufacturing Indonesia

Low $CO_2$ Emission technology applied in all Toyota Asia Pacific & will be expand more in the future

# Implementation of $CO_2$ Emission Reduction in Toyota Motor Manufacturing Indonesia

# TMMIN Milestone of $CO_2$ Emission & Water Reduction

TOYOTA INDONESIA
PT Toyota Motor Manufacturing Indonesia

**Steady improve daily activities & adoption of the latest innovative low $CO_2$ & water reduction technologies**

2050 Plant Zero $CO_2$
② Energy Efficiency
③ Energy Conservation
① Awareness

$CO_2$ | Water

## ① AWARENESS

Continuos Improvement

Face to Face Communication

Education

Purchased : 100%

## AWARD & RECOGNITION

ASEAN Best Energy Award in Laos 2015

Green Award by KRW Regent 2016

Env. Award by Ministry of Env. 2016

Participating COP 23 Bonn – Germany, Nov'17

## ② ENERGY EFFICIENCY

*Karakuri System*

Automation Water Spray

*3 Wet Painting Process*

Rain Water Recycle Facility

Purchased : 80%

*Economizer & Inverter*

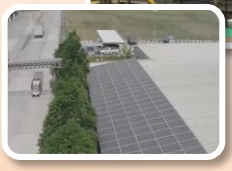
Membrane Bio Reactor (MBR)

Substitute to Natural Gas

RO

Purchased : 5%

## ③ ENERGY CONSERVATION



Solar PV

Co-Generation

## $CO_2$ Target

: ↓17%

TOYOTA: ↓>20%

Achievement FY15-current : approx. ↓11%

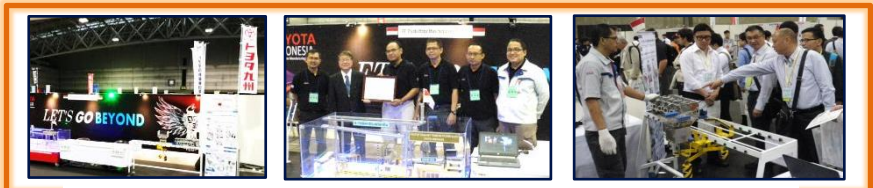

2017 — 2025 — 2050

# Daily kaizen [Example]- initiatives for *Karakuri* mechanism

TOYOTA INDONESIA
PT Toyota Motor Manufacturing Indonesia

## What is "Karakuri Kaizen" ?

**KARAKURI means :**
Use mechanical equipment device to create movement without external energy

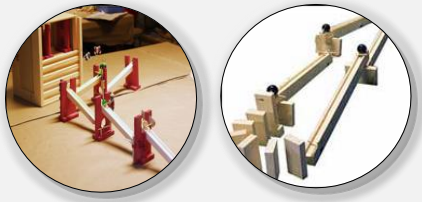


Toyota Indonesia participate in Japan Karakuri Exhibition 2017

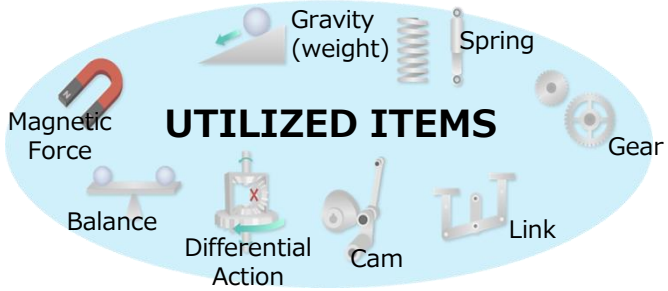
**ORIGINAL APPLICATION**

KARAKURI NINGYO
Japanese Mechanized Puppet

PHYTAGORA SWITCH
Trick Mechanism



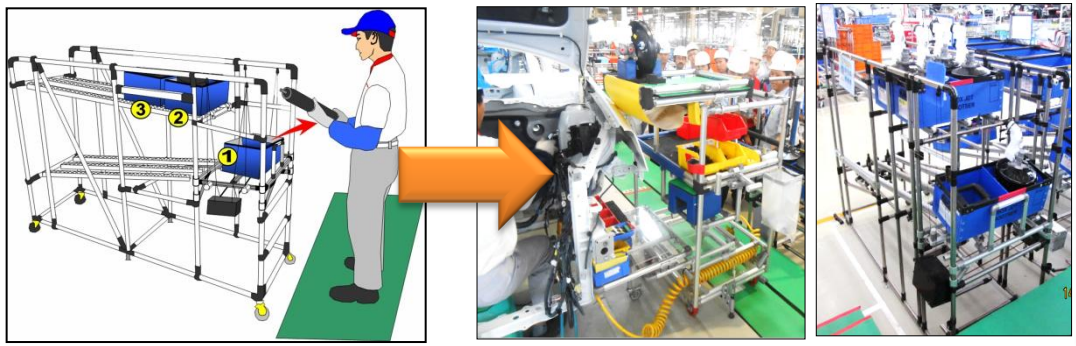
***Wisdom & Ingenuity***



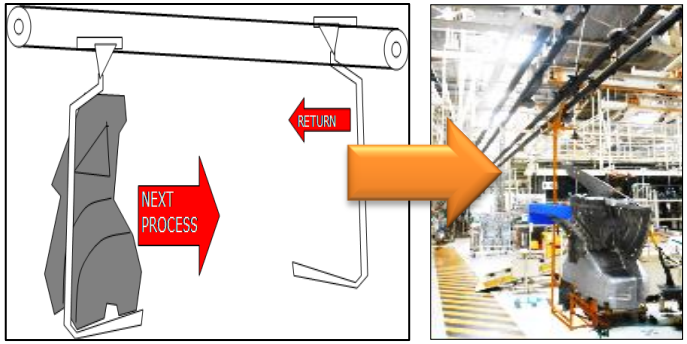

**Adopt for Production Equipment** → **Utilize mechanical energy [No electric power]**

## Application Example in TMMIN

**Eliminate Electric from Conveyor [Use roller & gravity]**




**Energy Less [Use gravity to transfer part]**

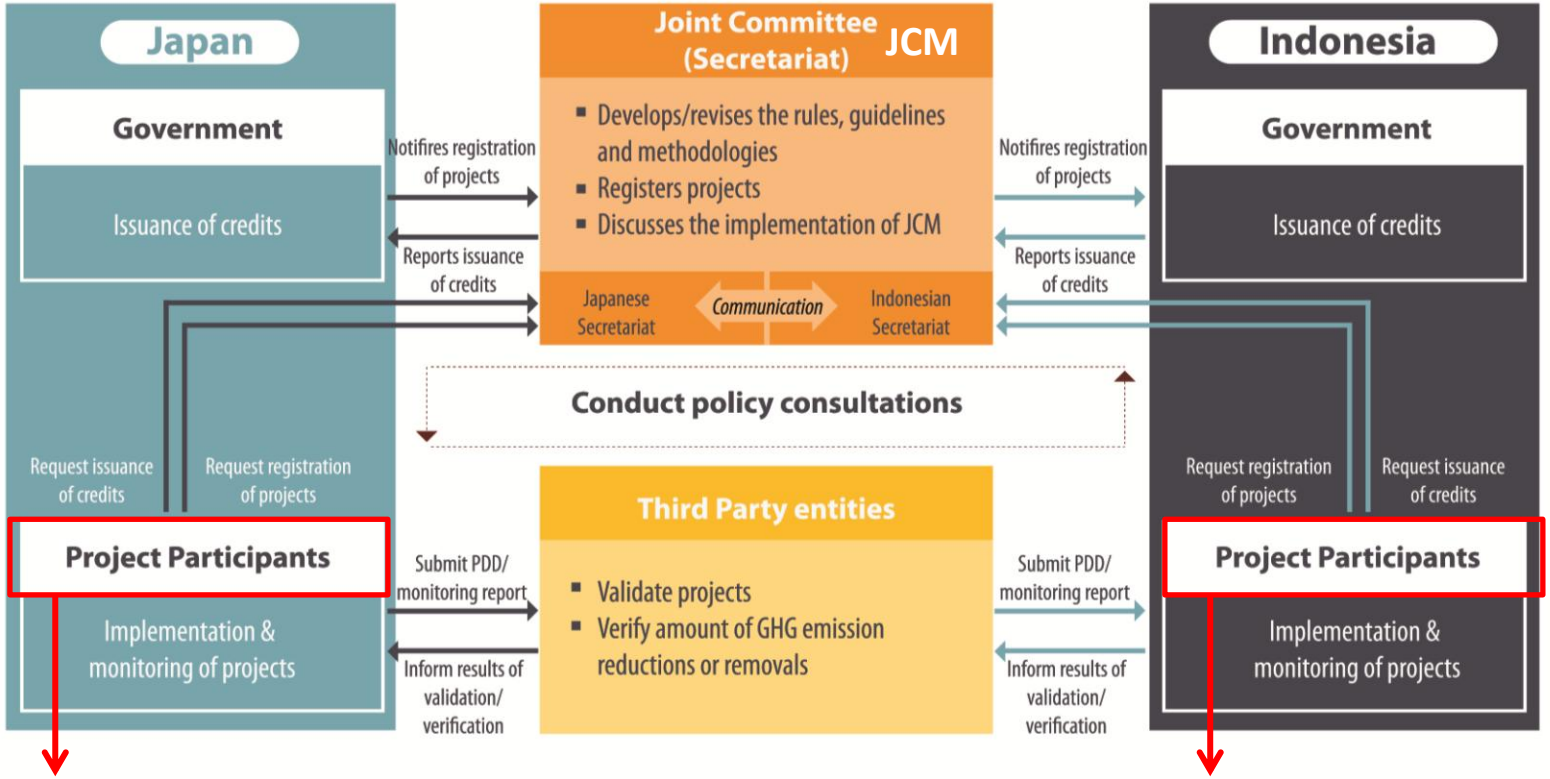


# OVERVIEW

## JCM – Indonesia
## [Joint Credit Mechanism]
## TMMIN Co-Generation Project

# JCM Indonesia & Mechanism

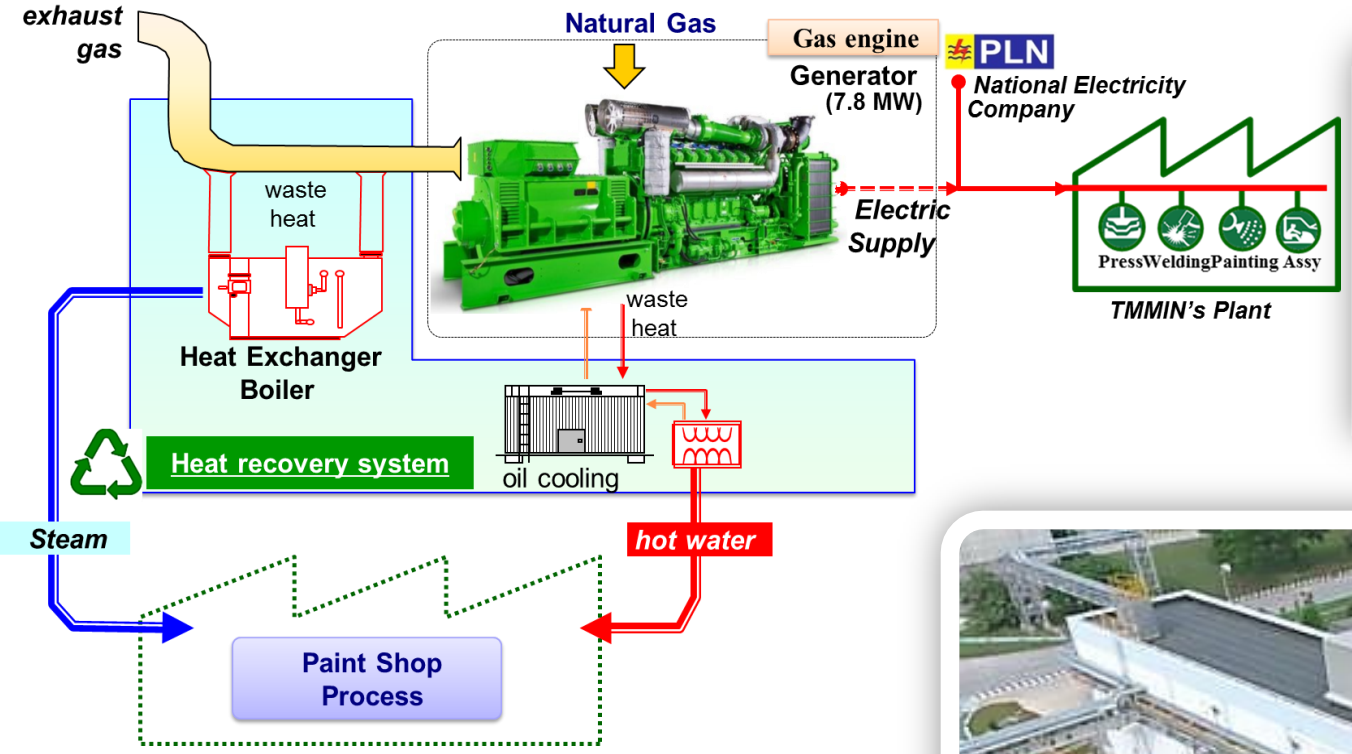
**Joint Crediting Mechanism** is a proposal by Government of Japan to encourage Japanese private sector organizations to invest on Low Carbon Development activities in Indonesia by giving incentive. The Government of Indonesia and The Government of Japan have been signed a cooperation agreement on August 2013




**Toyota Tsusho Corp Jpn**

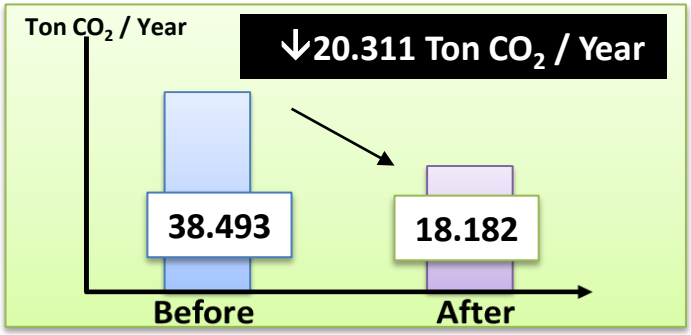
**Toyota Motor Manufacturing Indonesia [TMMIN]**

# TMMIN Co-Generation System Image




Gas Engine

## CO2 Emission Reduced




Co-Generation Plant Overview

# 4. Future Action

TOYOTA INDONESIA
PT Toyota Motor Manufacturing Indonesia

## Daily Kaizen & Low $CO_2$ Technology

AWARENESS

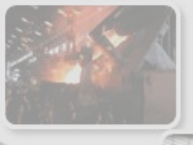
Education

Face to Face Communication

ENERGY EFFICIENCY

Karakuri System

3 Wet Painting Process



MF Furnace

Economizer & Inverter

Air Dryer Dessicant Paper

Solar PV

ENERGY CONSERVATION

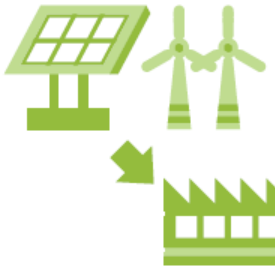
Substitute to Natural Gas

Co-Generation

2001

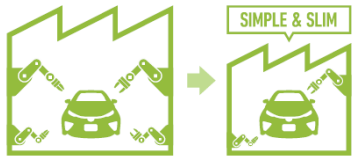
## Innovative Technology & Renewable Energy

*Proactively use renewable energy with consideration for **local characteristics** and **economic efficiency***




***Renewable Energy***

***Innovative Low $CO_2$ technology***




2017 2030 2050

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

# THANK YOU

All for Environment