



Status Fuels and Vehicles

Global Fuel Economy Initiative

Indonesia

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INDONESIA



Content

- Fuels Supply and Demand
- Fuels Subsidy as the threat
- Energy Mix (Existing 2005 and Prediction for 2025)
- Clean Fuels and Vehicles Standard in South East Asia
- Progress on Dialog toward Clean Fuels and Vehicles Roadmap (Indonesia and South East Asia)
- GFEI – Indonesian Project
- Conclusion and Recommendation

Worsening Ambient Air Quality AAQS Report 2008

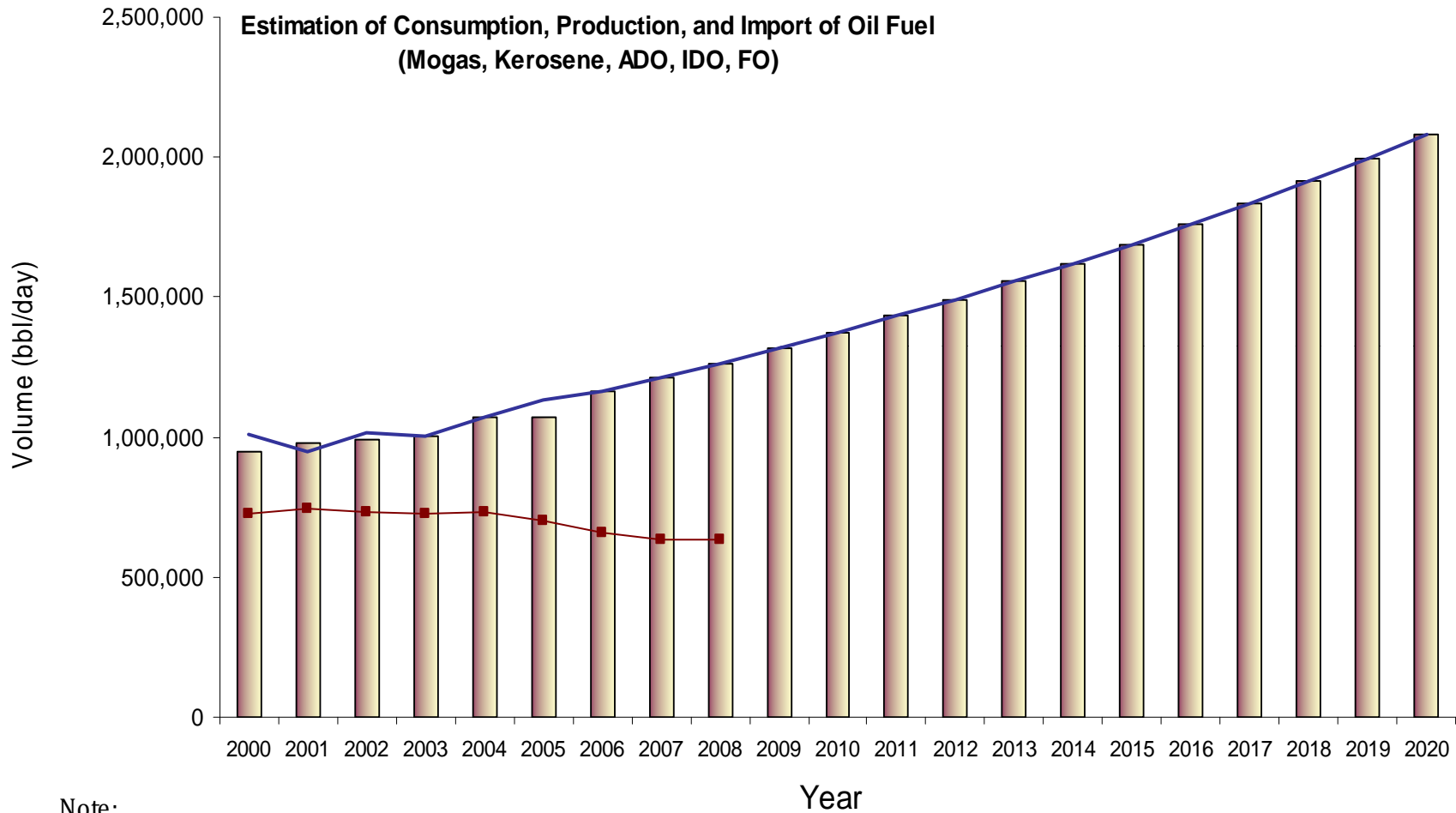
| City | Good Air Status | Parameter Dominant |
|--------------|-----------------|--------------------|
| Jakarta | 81 | PM ₁₀ |
| Bandung | 10 | PM ₁₀ |
| Semarang | 6 | PM ₁₀ |
| Surabaya | 58 | SO ₂ |
| Medan | 16 | CO |
| Palangkaraya | 123 | O ₃ |

Source: Ministry of Environment 2008

Transportation and Air Pollution Issue

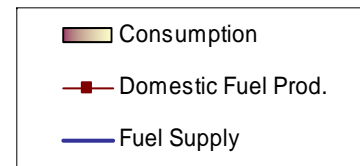
- Motor vehicle is growing faster with old engine technology and worse on I/M
- Disaster Air Pollution:
 - Transportation is major air pollution contributor in cities
 - Transport sector absorbs significant portion of fuels
 - Contributes to 23% GHG emission
- Traffic jam:
 - Increasing of transportation demand/mobility
 - Dominated by private car and motor-cycle
 - Social and economic loss almost US\$ 500 million p.a. (Jakarta), and US\$ 65 million p.a. (Bandung),
 - Increasing of emission load in the city.
- Low on public transport services

FUEL SUPPLY & DEMAND



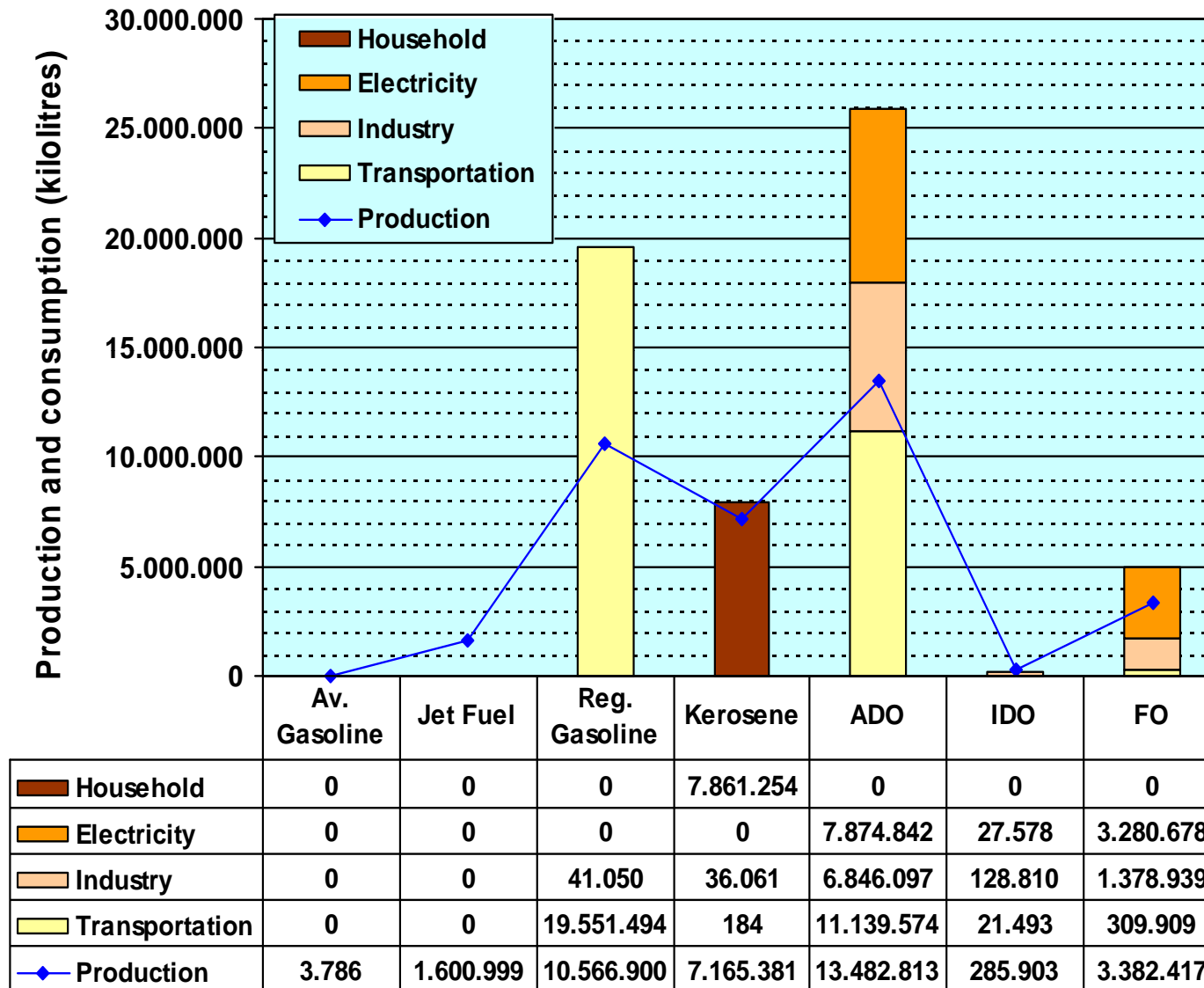
Note:

- Fuel Supply = Domestic fuel production + Import
- Data on 2006-2020 import = Consumption - Production
- Fuel consumption growth (average) 1995-2005 is 4,6%
- Assuming average fuel consumption growth of 4,5% in 2006-2020



INDONESIA

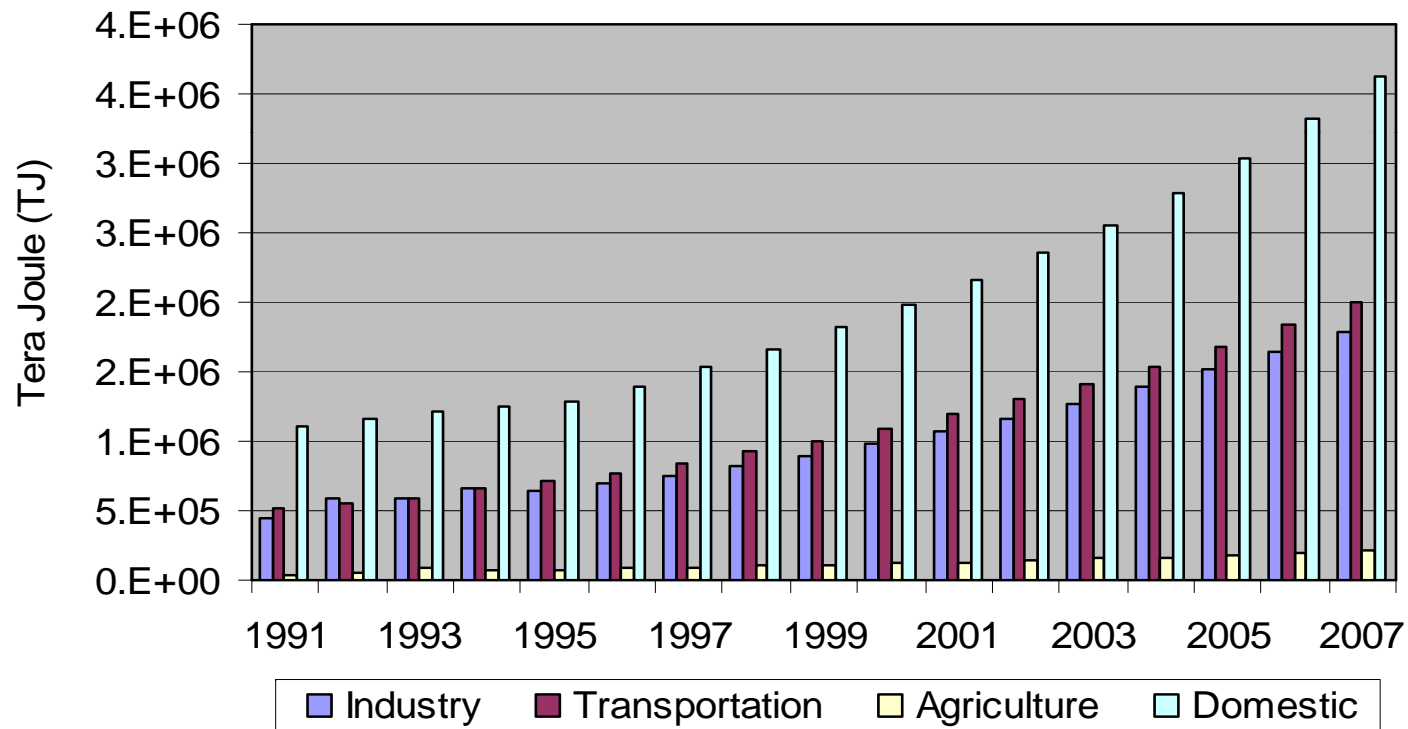
OIL FUEL PRODUCTION & CONSUMPTION 2008



Note:

- Data on fuel production until Nov. 2008
- Data on Av. Gasoline & jet fuel consumption not available yet

Final energy consumption by sector



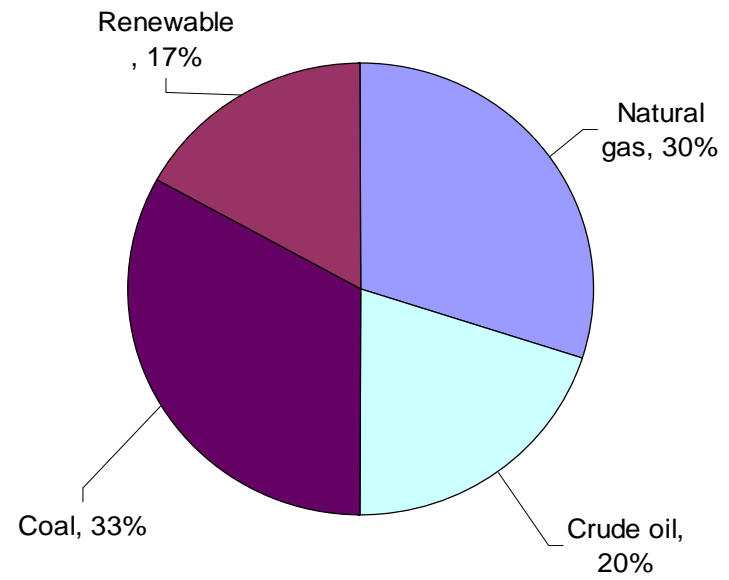
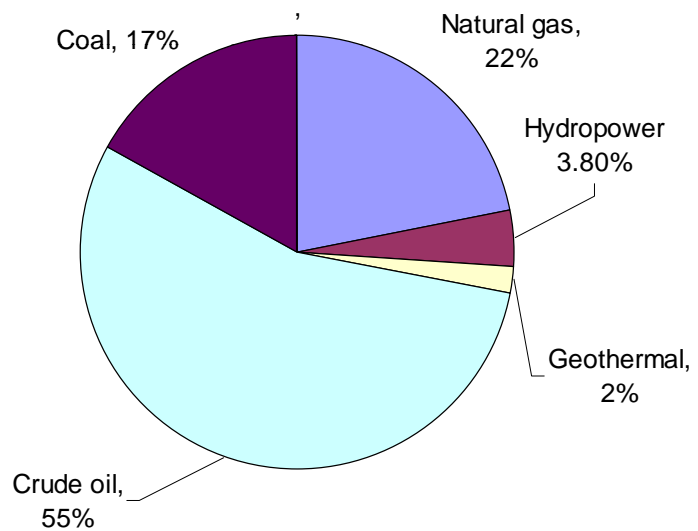
Source: MoEMR, processed by KPBB 2008

Final energy mix

2005

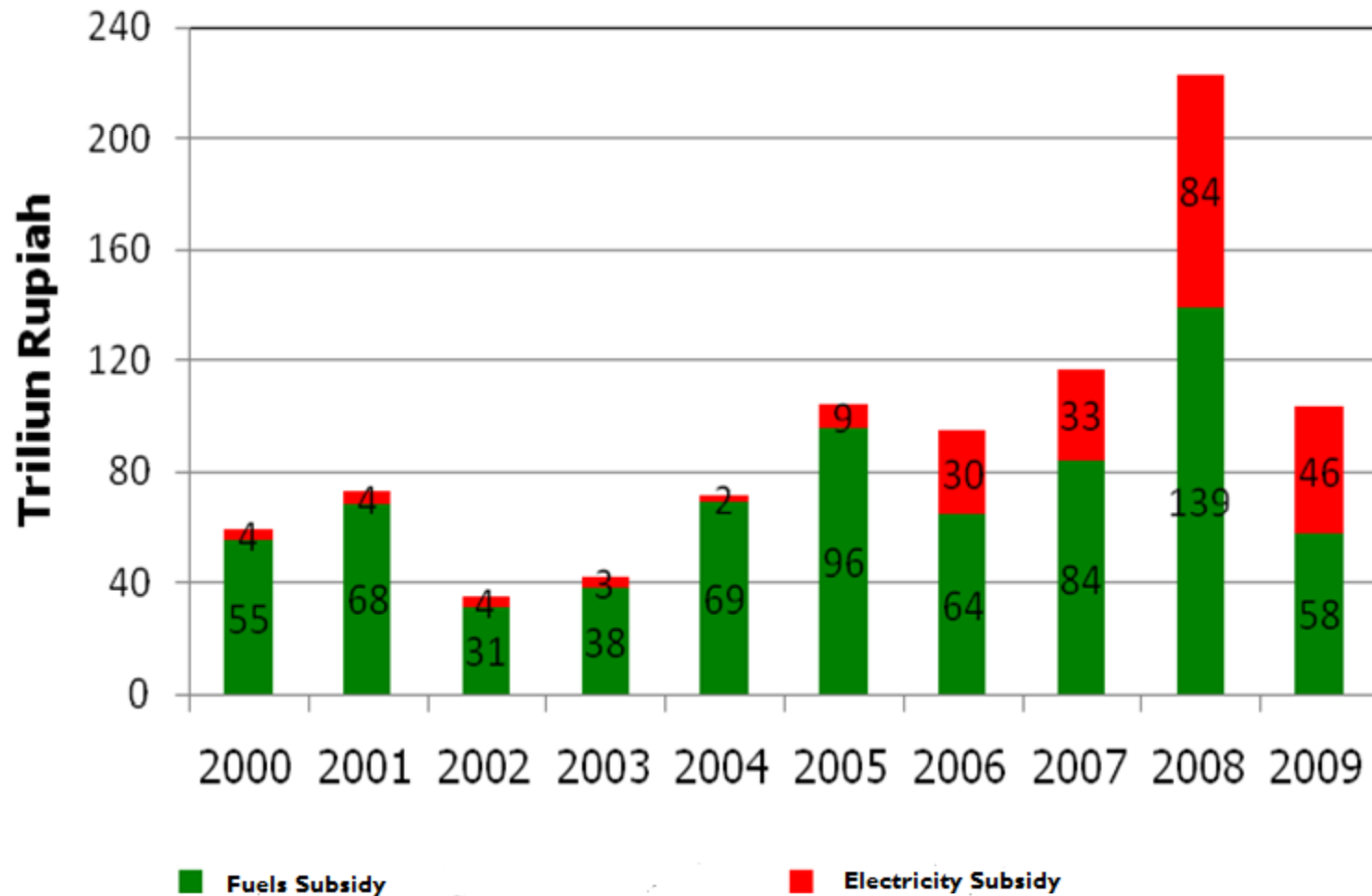


2025
(Presidential Decree)



Source: MoEMR, processed by KPBB 2008

Energy Subsidies



Phase out FF subsidies in 2014

Social Issue

- Indonesia is a democratic country:
 - Strong civil society movement
 - Public interest is the sensitive issue to raise social pressure:
 - Phase-out of fuels subsidy
 - Increasing of fuel price
 - Certain industries have interest to keep fuels subsidy.
- Needs the compromised option to solve the fossil fuel subsidy phase-out:
 - Tax incentive policy
 - Non fossil fuels.

Emission Standard

New Light Duty Vehicle (Selected Asia Pacific Countries)

| Country | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---------------------------|-----------------------|----------|---------|---------|---------|----------|------------------------|----------|---------|---------|----------|
| Australia | | | Euro II | | | Euro III | | Euro IV | | Euro V | |
| Bangladesh ⁽¹⁾ | | | | | | Euro I | | | | | |
| Bhutan | Euro I | | | Euro II | | | | | | | |
| China | Euro I | | | | Euro II | | | Euro III | | Euro IV | |
| Hong Kong | Euro II | Euro III | | | | | Euro IV | | | | |
| India | Euro I | | | | | Euro II | | | | | Euro III |
| Indonesia | | | | | | | | Euro II | | | |
| Malaysia | Euro I ⁽²⁾ | | | | | | | | | | |
| New Zealand | | | | | Euro II | | Euro III | | Euro IV | | |
| Philippines | | Euro I | | | | | | | Euro II | | |
| Singapore | | Euro II | | | | | Euro IV ⁽³⁾ | | | | |
| South Korea | | | | | | | Euro IV | | Euro V | | |
| Thailand | Euro I | Euro II | | | | Euro III | | | | | |

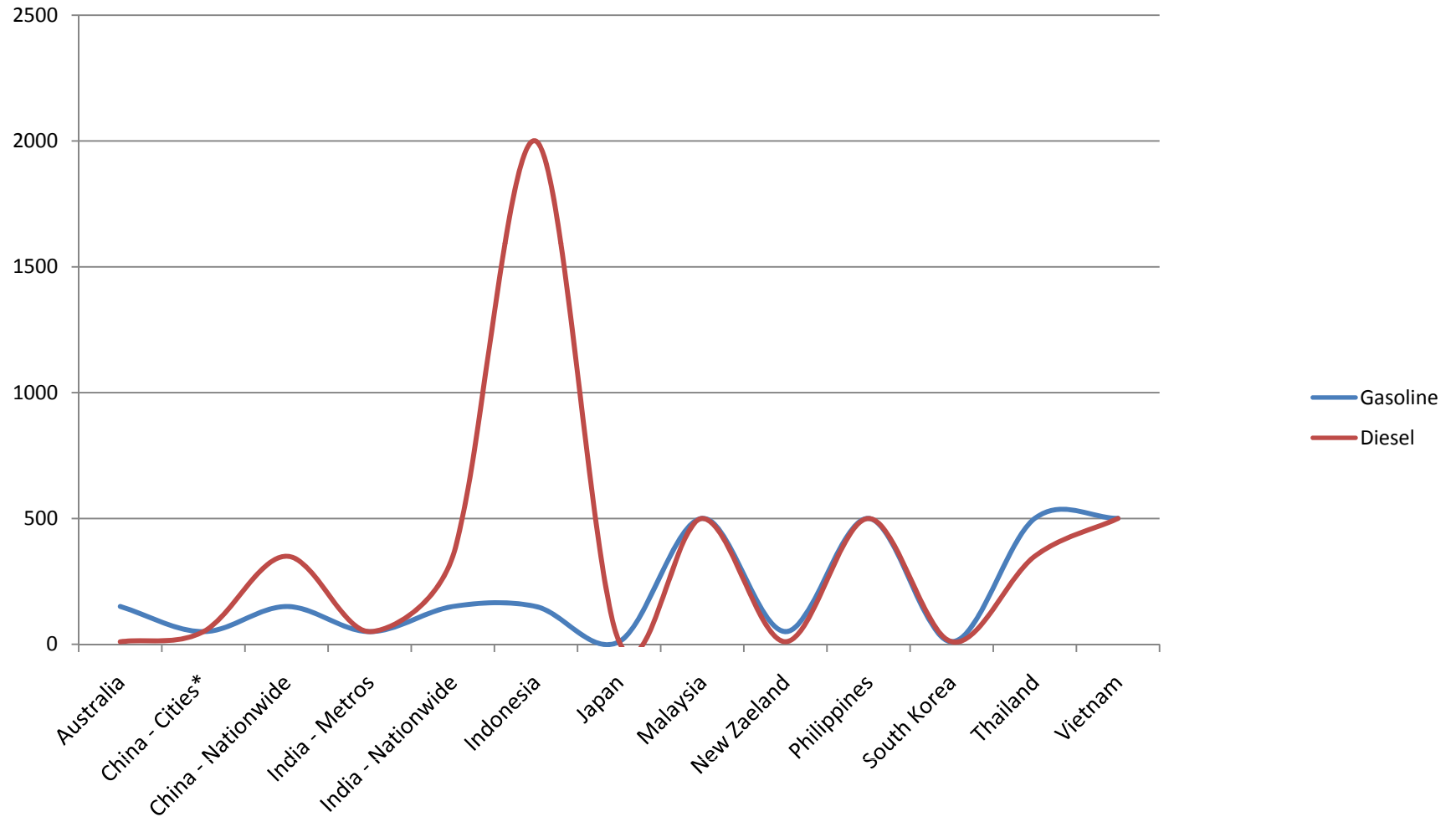
Note:

- (1) Diesel only. Gasoline and CNG at Euro II
- (2) Diesel only. Gasoline at Euro II
- (3) Diesel only.

Source: IFQC

Fuels Sulfur Content in Asia (ppm)

2010



Fuels Specification Roadmap

Base on 2007 Assesment*

| Year | 2007- 2011 | 2012 - 2015 | 2016 - 2020 | 2021 - 2025 |
|-----------------------------|--|---|--|--|
| Gasoline | Euro 2 Produced by UP II, UP III, UP IV ,UP V, UP VI & UP VII | EURO 3 Produced y by UP IV,VII | EURO 3 Produced by all refineries. EURO 4 produced by New Refinery | EURO 4 Produced by all refineries. EURO 4 produced by New Refinery |
| ADO | EURO 2 Produced UP II,VI | EURO 2 Produced by all refineries | EURO 3 Produced by all refineries. EURO 4 produced by New Refinery | EURO 3 Produced by all refineries. EURO 4 produced by New Refinery |
| Refinery Development | | | | |
| Modification | | Construction of RCCU in UP IV & V (2015) Construction isomerization units in IV & V(2014) | | Addition of Selective Hydrogenation in UP IV,V |
| Addition of Refining unit | | Addition of Desulfurization unit in UP IV | Addition of Benzene Splitter in UP II, III, V | Addition of Desulfurization UP VII |
| Contruction Of New Refinery | | 150 MBCD (2014) Standard EURO 4 | | |

*Today has been revised by Pertamina

The Challenges to Improve Fuels Quality

(Pertamina)

Quality Gap: Domestic Product vs EURO

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| Properties | Unit | Specification | | | | | | |
|------------------|-------|-------------------|---------------------------|--------------------|----------------------------|-----------|-----------|-----------|
| | | Domestic Refinery | | Domestic Refinery | | Global | | |
| | | Reguler | Pertamax Pertamax Plus | Premium Reguler | Pertamax/ Pertamax Plus | EURO II | EURO III | EURO IV |
| RON | | 88 | 91 - 95 | 88 min | 91/95 | 91/95 min | 95 min | 95 min |
| Sulfur content | mg/kg | 50 - 200 | 50 - 100 | 500 max | 500 max | 500 max | 150 max | 50/10 |
| Lead content | g/l | < 0.006 | < 0.006 | 0.013 max | none | 0.013 max | 0.005 max | 0.005 max |
| Benzene content | %v/v | 1 - 3 | 1 - 3 | - | 5 max | 5 max | 1 max | 1 max |
| Aromatic content | %v/v | 20 - 44 | 20 - 44 | - | 50/40 max | 42 max | 42 max | 35 max |
| Olefin content | %v/v | 2 - 29 | 2 - 29 | - | - | 18 max | 18 max | 18 max |
| Vapour pressure | kPa | 49 - 60 | 49 - 60 | 62 max | 60 max | 60 max | 60 max | 60 max |

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| Properties | Unit | Specification | | | | | | |
|----------------|-------|-------------------|-----------|-------------------|-----------|-----------|----------|---------|
| | | Domestic Refinery | | Domestic Refinery | | Global | | |
| | | Reguler | PERTADEx | Solar 48 | Solar 51 | EURO II | EURO III | EURO IV |
| Cetane number | | 49 - 63 | 53 | 48 min | 51 min | 49 min | 51 min | 51 min |
| Density | kg/m3 | 819 - 853 | 840 | 815 - 870 | 820 - 860 | 820 - 860 | 845 max | 845 max |
| Sulfur content | ppm | 400 - 2400 | 200 - 300 | 3500 max | 500 max | 500 max | 350 max | 50 max |
| Distlasi 95% | oC | 380 - 385 | 355 | 370 max | 360 max | 370 max | 360 max | 360 max |

Source: Pertamina

Investment for Refinery Modification

to meet Euro IV Standard

| Gasoline | | | | |
|---|--|---|--|---|
| RU II | RU III | RU IV | RU V | RU VI |
| <ul style="list-style-type: none"> ▪ New Naphtha Hydrotreater ▪ New Reformer ▪ New Ref. SPL ▪ Benzene Saturation ▪ Revamp Platformer I | <ul style="list-style-type: none"> ▪ New Naphtha Hydrotreater ▪ New Reformer ▪ New Ref. SPL ▪ Benzene Saturation | <ul style="list-style-type: none"> ▪ New Naphtha Hydrotreater ▪ New Reformer ▪ New Ref. SPL ▪ Benzene Saturation ▪ Revamp Platformer I | <ul style="list-style-type: none"> ▪ New Naphtha Hydrotreater ▪ New Reformer ▪ New Ref. SPL ▪ Benzene Saturation | De-S RCC Naphthal |
| Diesel Fuel | | | | |
| RU II | RU III | RU IV | RU V | RU VI |
| DHDT 35 MBSD | <ul style="list-style-type: none"> ▪ DHDT 28 MBSD ▪ H2 plant | Revamp THDT, HDT, AHU II | DHDT 60 MBSD | <ul style="list-style-type: none"> ▪ Aktifkan LCO treater ▪ Revamp GO HTU |

It is needed US\$ 800 million.

Source: Pertamina

Note:

RU: Refinery Unit

Indonesia has 7 refinery units which is located in the whole country

Match-making Agenda

Fuels and Vehicle Standard in South East Asia

(Euro 4 Standard)

| COUNTRY | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|-------------|------|------|------|------|------|------|------|------|------|------|------|
| Indonesia | | | | | | | | | | | |
| | | | | | | | | | | | |
| Malaysia | | | | | | | | | | | |
| | | | | | | | | | | | |
| Philippines | | | | | | | | | | | |
| | | | | | | | | | | | |
| Singapore | | | | | | | | | | | |
| | | | | | | | | | | | |
| Thailand | | | | | | | | | | | |
| | | | | | | | | | | | |
| Vietnam | | | | | | | | | | | |
| | | | | | | | | | | | |

Source: AAF, processed by KPBB refer to the Revised Clean Fuel Roadmap-Pertamina

| | |
|--|--|
| | Fuels: Gasoline and Diesel Fuel |
| | Emission Standard New Light Duty Vehicle |

Fuel economy standard

- No fuel economy standard put in place in Indonesia
- Japan is leading in this sector, and getting more stringent
 - o Announced in February 2007, with the target year set for 2015

| | 2004 | 2015 | Improvement rate |
|---------------|----------|----------|------------------|
| Passenger Car | 13.6km/L | 16.8km/L | 23.5% |
| Small Bus | 8.3km/L | 8.9km/L | 7.2% |
| Small Truck | 13.5km/L | 15.2km/L | 12.6% |

Japan's fuel economy standards aim to achieve a maximum efficiency improvement of 23.5% over a period of 10 years

Source: ITPS, 2007

Nat'l Workshop Clean Fuels Strategy

15 April 2010

Objectives:

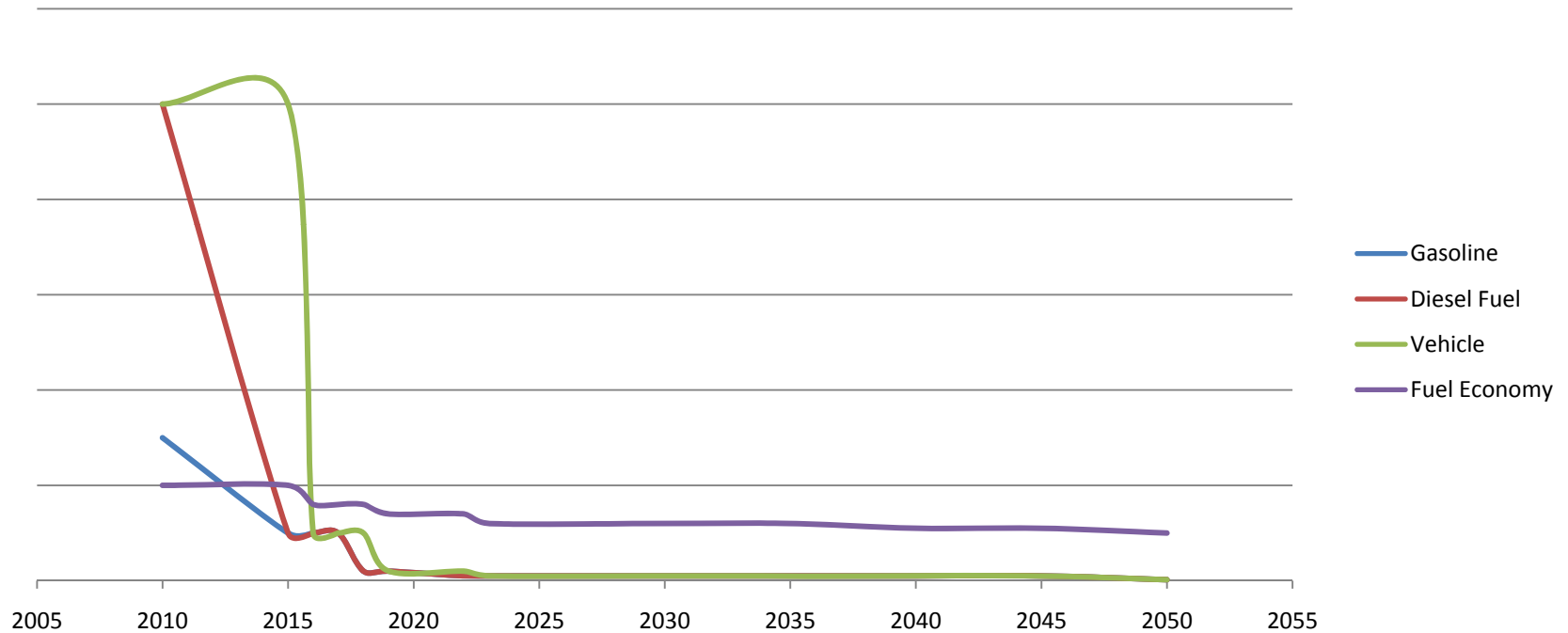
- The overall goal of the workshop is to equip decision makers with knowledge and information on fuels quality improvement programme as trigger to adopt cleaner fuels policy in Indonesia through match-making/harmonize between cleaner fuels and vehicles,
- Entry point to GFEI.

Achievement:

- Reviewed and up dated air quality status, fuels quality, vehicle standard, transport status, and energy consumption in Indonesia, and its analysis related to the Indonesian policies, regulation, standards, programs.
- Promoted GFEI and it project in Indonesia.
- Commitment to harmonize coordination among related decision maker in relation to improve fuel quality in the framework of fuels economy policy (Ministry of Finance, Ministry of Energy, Ministry of Transport, Ministry of Industry, Ministry of Environment, Oil Industry, Auto Industry, NGOs and Universities).

Fuels Economy Approach

Nat'l Workshop "Clean Fuels Strategy", 15 April 2010



Harmonize fuels and vehicles standard in the short-term (3-5 years) is a trigger and entry point to adopt fuel economy policy based on 50% by 2050

Conclusion and Recommendation

- Transportation is major air pollution contributor in cities
- Transport sector absorbs significant portion of fuel subsidy
- Contributes to 25% of GHG emission
- Use of alternative fuels is declining (CNG, LPG, Bio-fuels)
- GFEI is a trigger:
 - Harmonize fuels and vehicles standard in the short-term (3-5 years) is a trigger and entry point to adopt fuel economy policy based on 50% by 2050
- Economic valuation:
 - The potential of carbon reduction by using fuels economy instrument:
 - Fiscal Policy Reform:
 - Adopt clean fuels standard is a requirement to adopt lower emission vehicle
 - Promote fuel efficiency vehicle
 - The valuation on carbon reduction impact of fuels economy instrument
 - Rational fuel pricing policy is a precondition to adopt cleaner fuel standard.
- Technical solution as the option of fuel economy
- Advocacy for Policy Reform:
 - Policy dialog among multi stake holder
 - Policy drafting
 - Public campaign.

Terimakasih Thank You

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