

Energy and Health: Reflections from Indonesia

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Ir. Satya Widya Yudha, M.Sc, Ph.D (Cand.)

Vice Chairman of Commission VII &

Chairman of the Green Economy Caucus

The House of Representatives of the Republic of Indonesia

Air pollution in Indonesia

Overview



- Land transportation contributes around 12% of total national CO₂ emissions, and almost 90% of urban air pollution (CO, HC, NO_x, SO_x, PM, O₃)
- **90% of transportation emissions comes from road transportation**
- 70% of city pollution comes from the transportation sector
- Government's burden on fuel subsidy (data for revised state budget 2017):
 - National consumption of subsidized fuels is 16.11 million KI for gasoline; 15.5 million KL for diesel; 0.61 million KI for kerosene
- IEA 2016: Indonesia is ranked third globally for premature deaths due to air pollution

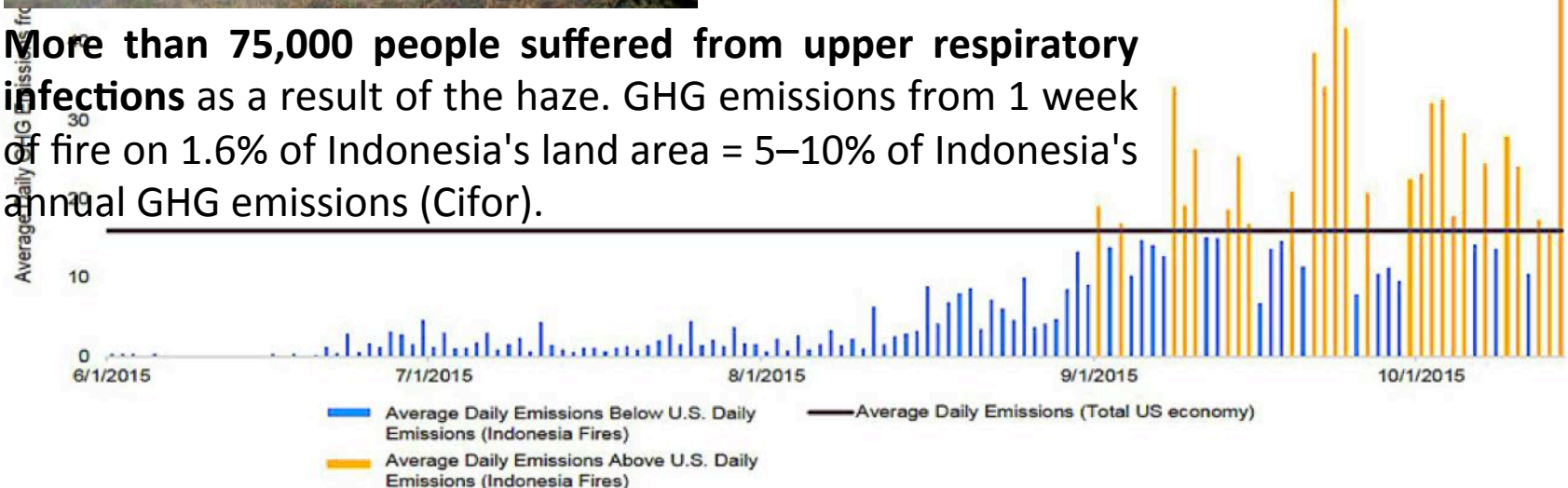
Air pollution in Indonesia

Haze, forest fires in LULUCF sector



From September to October 2015, **daily estimated GHG emissions from fires in Indonesia surpassed average daily emissions from the entire US economy** (approximately 15.95 Mt CO₂ per day). A massive spike in emissions can be seen on October 14, when 4,719 fires were observed.

More than 75,000 people suffered from upper respiratory infections as a result of the haze. GHG emissions from 1 week of fire on 1.6% of Indonesia's land area = 5–10% of Indonesia's annual GHG emissions (Cifor).



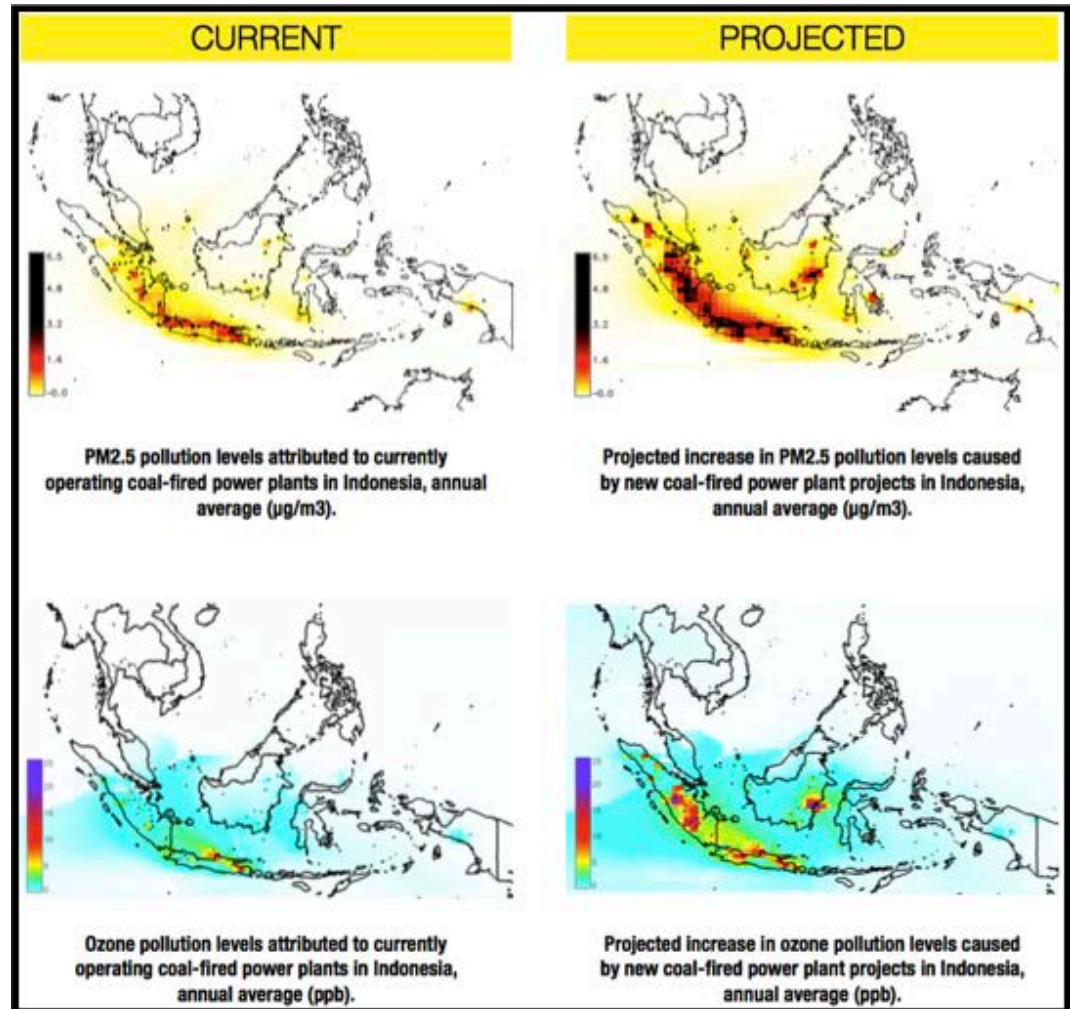
Air pollution in Indonesia

Premature deaths from coal



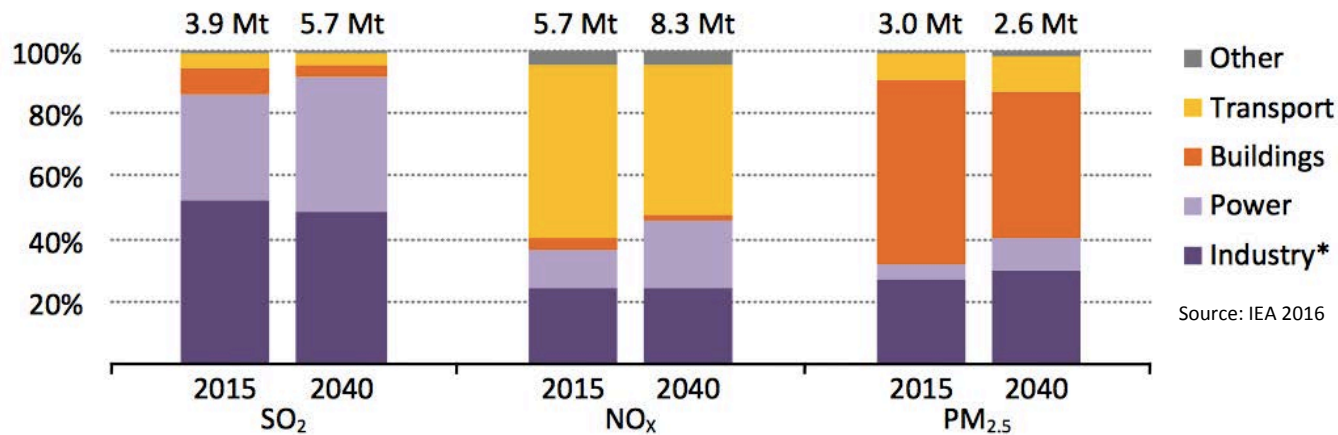
- Indonesia Electricity Project (35GW) used to contradict Indonesia Energy mix target as regulated by the GR 79/2014 on National Energy Policy.

- Greenpeace Indonesia and Harvard University Research Report (August 2015): the 35GW development project was originally expected to increase the number of premature deaths due to pollution from coal-fired power plants from 6,500 people/year to 28,300 people/year → **before parliamentary intervention.**



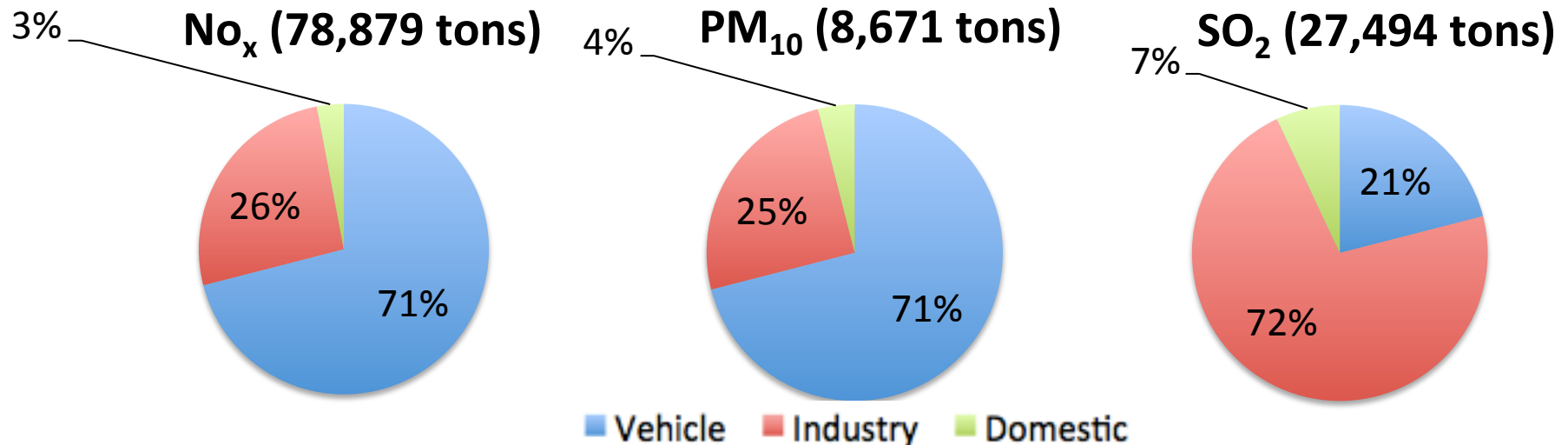
Composition of pollutants

Comparison: SE Asia & Jakarta



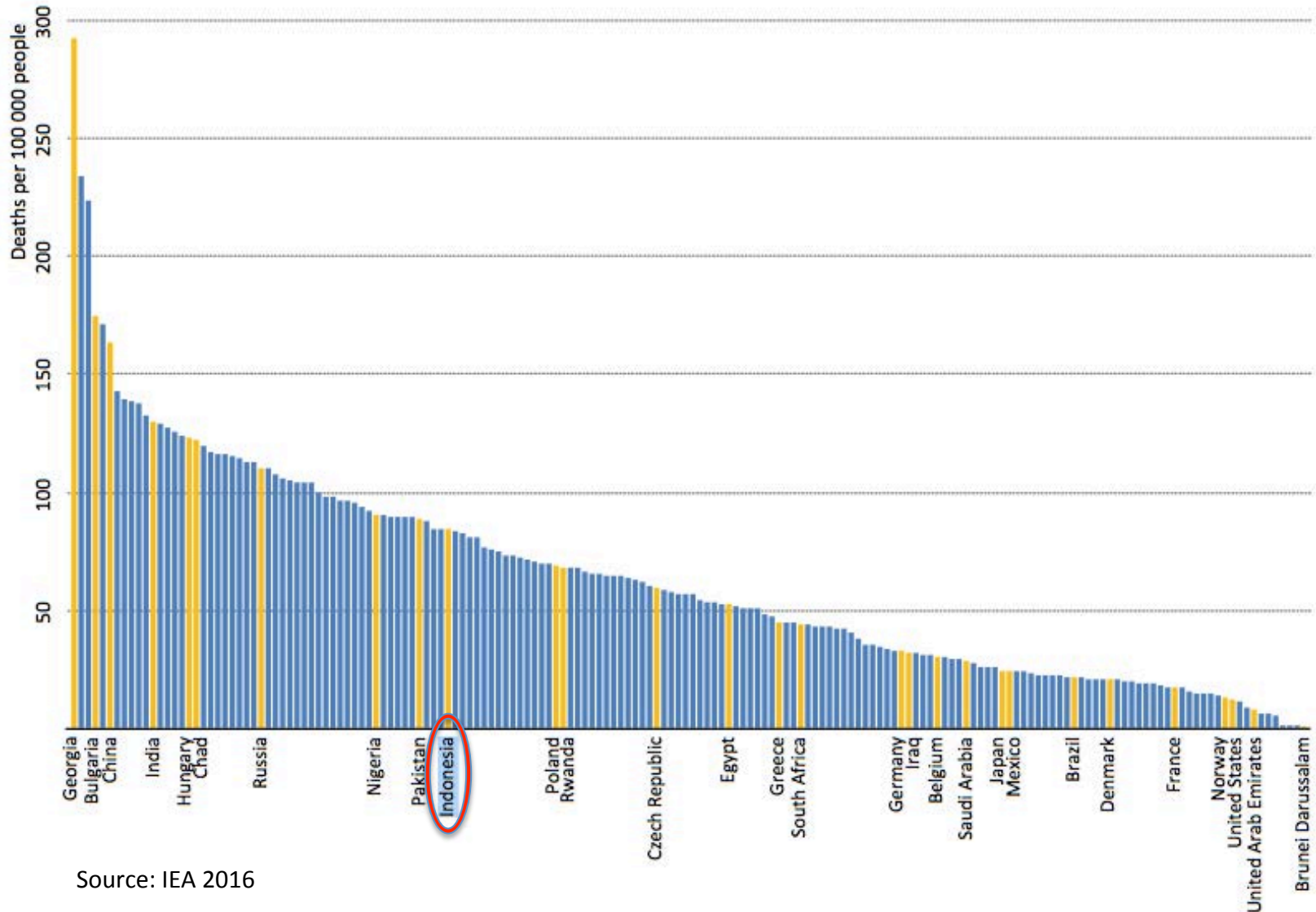
Majority of air pollution in Jakarta (below) is from vehicle emissions

(Asian Development Bank 2006 — Forecast Until 2017, data from Ministry of Environment and Forestry)



Where do we stand?

Comparison of air pollution mortality rate



Source: IEA 2016

Effects of air pollution

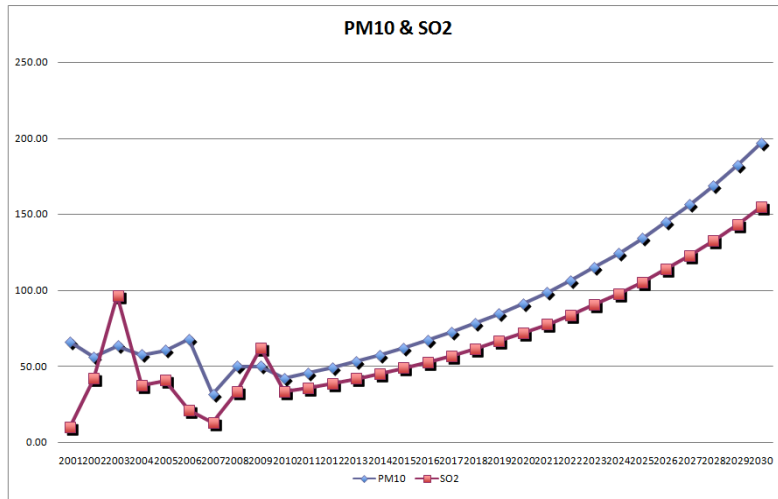
Case: Jakarta 2010



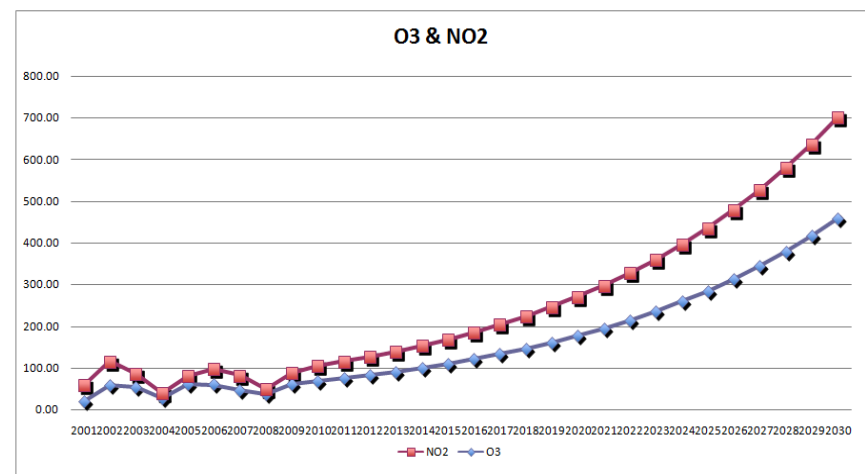
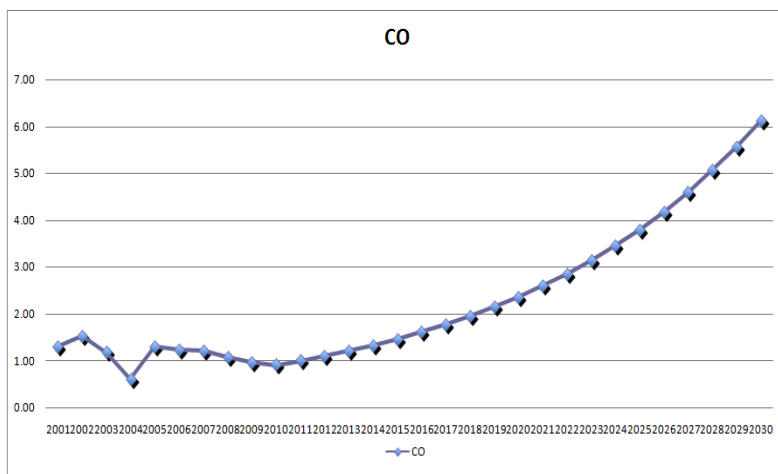
The population of Jakarta is 9,607,787 (2010)
57.8% of the population suffers from various air pollution-related diseases:

- 1,210,581 people suffer from asthmatic bronchiale (compare with 500,000 people from Ostro's research in 1994)
- 173,487 people with bronchopneumonia
- 2,449,986 people with ARI
- 336,273 people with pneumonia
- 153,724 people with COPD
- 1,246,130 people with coronary artery diseases

Total health cost: IDR38.5 trillion / USD54 billion
(compare with USD220 million in 1989 -> Resosudarmo & Napitupulu 2004)



Source: KPBB 2015

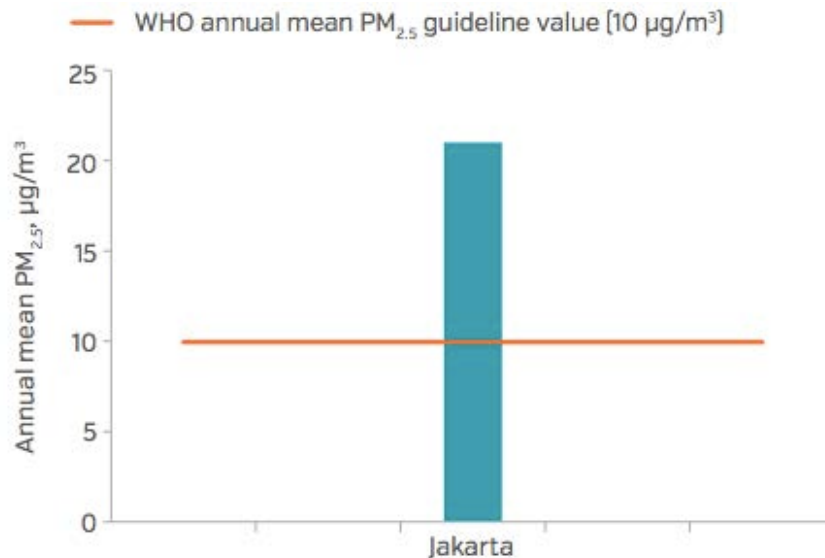


Effects of air pollution

Outdoor & household exposure



Outdoor air pollution in cities in Jakarta, Indonesia, annual mean PM_{2.5} (µg/m³) 2010



In 2010, Jakarta had an annual mean PM_{2.5} level that was above the WHO guideline value of 10 µg/m³.

Percentage of Deaths From Ischaemic Heart Disease, Stroke, Lung Cancer, COPD, ARI (2012)

■ 29% (164,314 out of total 566,600) Attributable to Household Air Pollution

In Indonesia, about 45% percent of an estimated **25,300 child deaths** due to acute lower respiratory infections is attributable to household air pollution.

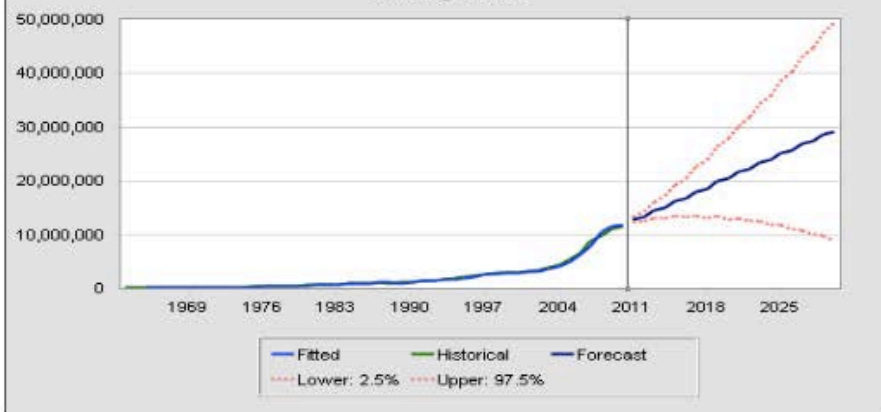
Source: WHO 2015

Vehicle forecast: 2030

Unstoppable growth?

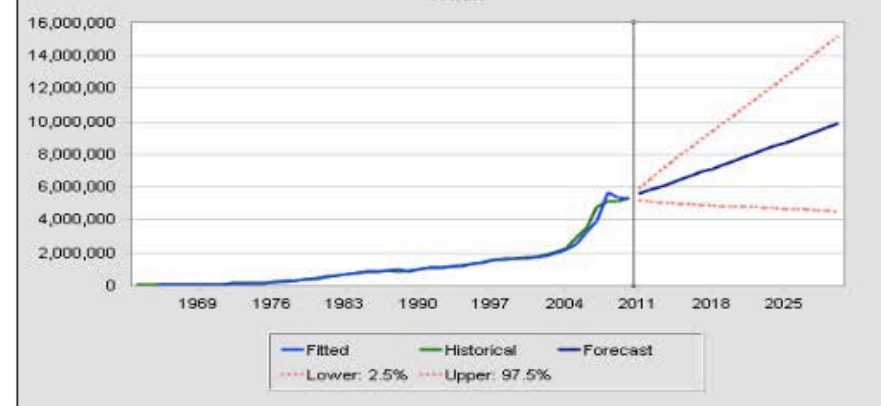


Passenger Cars



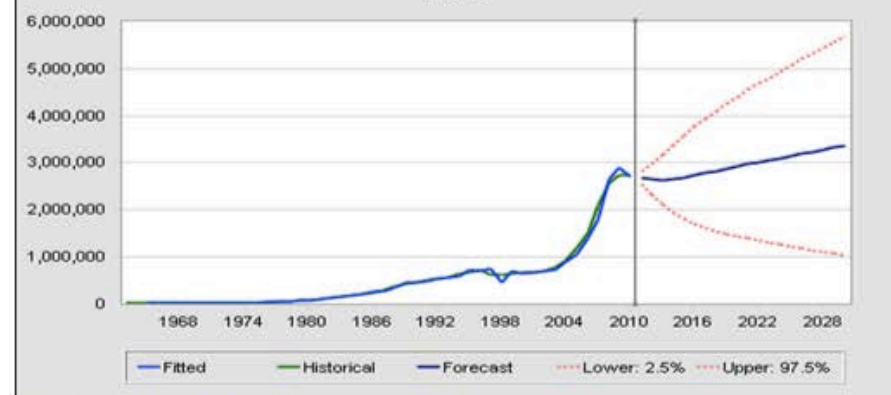
Best method : ARIMA(1,2,1)
Error measure (RMSE) : 232634.60

Truck



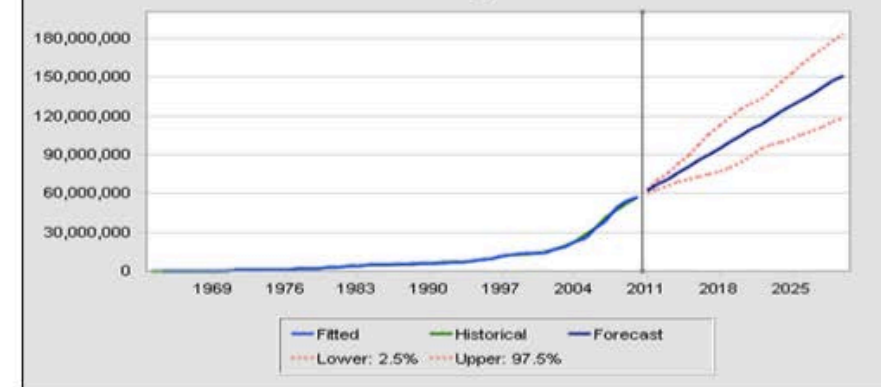
Best method : ARIMA(1,2,1)
Error measure (RMSE) : 176449.44

Buses



Best method : ARIMA(2,2,1)
Error measure (RMSE) : 69296.34

Motor Cycle



Best method : Double Exponential Smoothing
Error measure (RMSE) : 787400.81

How do we move forward?

International commitment: SDGs



- **SDG 3.9** - By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
- **SDG 11.6** - By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management
- **SDG 12.4** - By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment

How do we move forward?

Policy



1. Emissions inventory and monitoring as a baseline of the Air Pollution Control Planning City
 - 30 Air Quality Monitoring Systems (AQMS) already in place, National Mid-Range Development Plan seeks to construct 45 by 2019.
2. Improved vehicle technology and fuel
 - Encouraging the use of alternative materials (CNG, Biofuel, etc.)
 - The use of CNG for public transport (Jakarta: bajaj and Transjakarta; Palembang: Transmusi)
 - The use of used cooking oil in Transpakuan in Bogor
 - Encouraging policies emissions testing and vehicle maintenance
 - Encouraging Fuel Efficiency (Eco-Driving)
 - Use of hybrid technology, electric, and fuel cell
 - Conversion from gasoline-based fuel to gas-based fuel

How do we move forward?

Policy



3. Alternative modes of transportation

- Public transportation (BRT, MRT, Rail Transportation)
- BRT: Transjakarta, Transmusi, Transbatik Solo, Transpakuan (Bogor)

4. Other policies

- Structuring space (Green Open Area/RTH, zoning, etc.)
- Setting work hours, traffic engineering
- Improved “parking rate”
- Car Free Day (coverage and intensity increased): Jakarta, Bandung, Solo, etc.

How do we move forward?

Adoption of Euro 4 standard



ACTIVITIES	2013	2014	2015	2016	2017	2018	2019	2020	2021	2025
Policy Dialogue	Sep-Dec									
Academic	Dec 13 - Mar 14									
Discussion Financing Refinery Modifications		Dec 13- Jun 14								
Balongan refinery modifications and Balikpapan		Oct 14-Sep 16								
New refinery construction										
The application of EURO 4 in Jakarta (BBG)			Oct							
The application of EURO 4 in Large Cities				Oct						
The application of EURO 4 National										
Implementation of the National EURO 5										

- Intensive dialogue about Roadmap Fuel Economy - Vehicle Emission Standard - Euro 4:
 - A variety of multi-stakeholder consultation meetings and consignment
 - Policy Dialogue "readiness refinery in implementing the Euro 4 standard in 2016":
 - Jakarta
 - Balongan refinery
 - Balikpapan refinery
- Preparation of NA Vehicle Emissions Standard - Euro 4
- Implementation of Vehicle Emission Standard - Euro 4 in 2016 gradually:
 - Modifications Balongan and Balikpapan refinery to supply fuel berstandard Euro 4 in several major cities.
 - The Ministry of Finance and the House of Representatives to discuss alternative financing / funding up grade / modification Refinery.
 - Donor agencies to help alternative financing / funding up grade / modification Refinery.
 - Breathe Easy Jakarta Program tentang penerapan Vehicle Emission Standard Euro 4 di Jakarta dengan menggunakan BBG.
- Implementation of Euro 4 nationally in 2021.
- Adoption of Euro 5 nationally in 2025.

Positive market potential Environmental technologies



Indonesia ranks seventh overall out of 50 countries on the 2015 Top Markets Study (TMS) with the market for environmental technologies valued at USD 6.3 billion in 2016. (International Trade Administration, 2016)

Figure 1: Indonesia Environmental Technologies Market



Source: Environmental Business International with OEEI Analysis, 2016.



The Green Economy Caucus

Promoting green legislation, collaboration



The GEC consists of members from 3 Parliamentary Commissions (Commission VII, Commission XI, and Commission I) and 5 different parties (Golkar, PDIP, Gerindra, HANURA and PAN).

CAPACITY BUILDING FOR PARLIAMENTARY SUPPORT

**RATIFICATION OF PARIS AGREEMENT IN
RECORD TIME**

**OVERSEEING THE IMPLEMENTATION OF
NDC ACROSS THE MINISTRIES**

INITIATIVES & UNDERTAKINGS



COP 21:

**Parliamentary Forum at Pavilion Indonesia;
SSE Leaders Luncheon on Climate Change;
Parliamentary Meeting with Nordic States**

Bali Clean Energy Forum 2016

**Dialogue Series: Paris Agreement and the Way
Forward for Indonesia**

National Waste Day

**Innovative Finance Forum: Sustaining Indonesia's
Tropical Landscape**

GLOBE 1st Climate Change Summit, London

Climate Parliament Gathering, Shanghai, China

Climate Asia Report Launch

**REDD+ Workshop with UNORCID: Capacity Building
for Legislative Staff Members (4 batches)**

The Green Economy Caucus

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The GEC with Andrew Mitchell (Global Canopy Programme), Pavan Sukhdev (GIST Advisory), and Setya Novanto (Chair of the Golkar Party Parliamentary Faction).



On February 21 2014, the Green Economy Caucus signed an MoU with GLOBE International.



GEC members, Dewi Coryati and Mercy Barends, elaborate during a legislative Q&A session.



GEC members, Aryo Djojohadikusumo and Satya Widya Yudha at the Parliamentary Forum in Pavilion Indonesia, COP 21.

The Green Economy Caucus

Promoting green legislation, collaboration



Chairmen of Commission VII and Chairman of the GEC ratify the Paris Agreement along with heads of various state ministries in a public session at the House of Representatives.

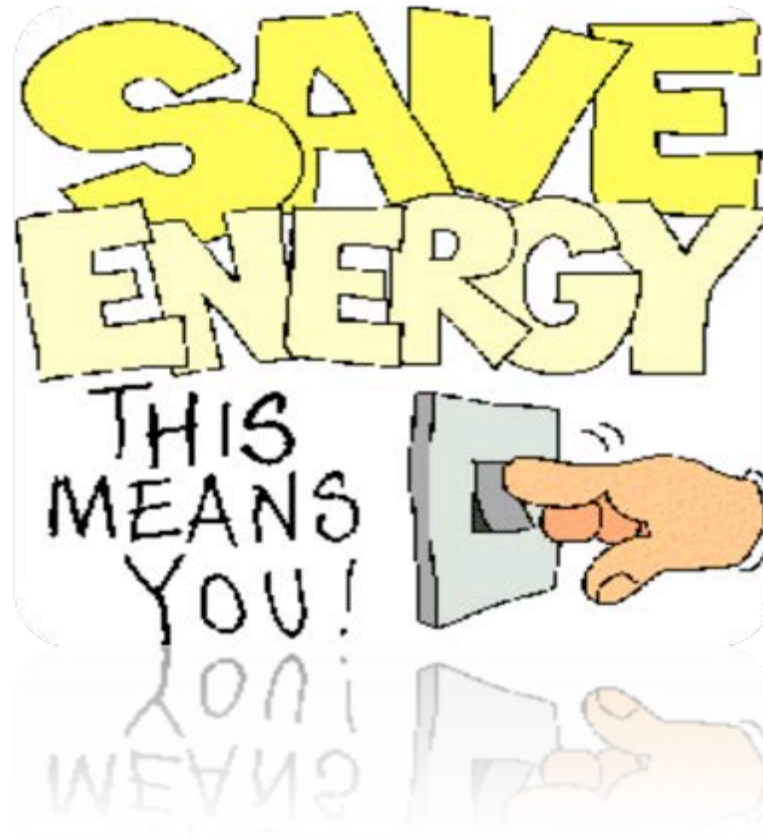


The GEC at the launching of the Tropical Landscapes Finance Facility (TLFF) with UN body leaders, government, parliament, key sector players. (left)



The GEC in collaboration with AirQualityAsia at inaugural meeting on air quality. (right)

THANK YOU



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