

Air Pollution and Transportation Management in Bandung City, Indonesia



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Bandung city

- ▶ Bandung city is the capital of West Java Province in Indonesia, the country's third largest city with the population of 2.5 million in 2013.
- ▶ Bandung is located 768 metres above sea level, approximately 140 kilometres south east of Jakarta, Bandung has cooler temperatures year-round than most other Indonesian cities.
- ▶ The city lies on a river basin surrounded by volcanic mountains.

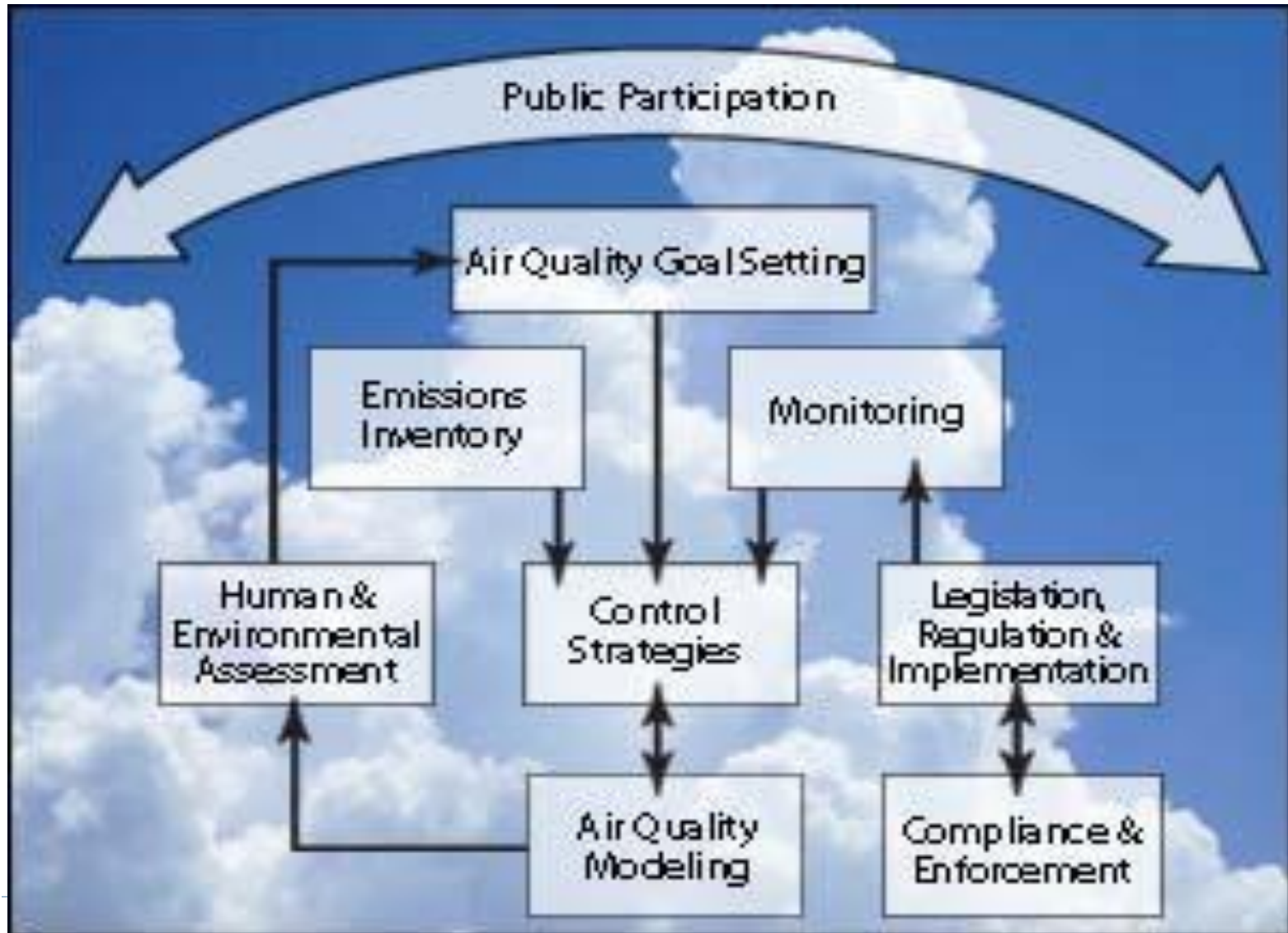


Air Pollution Problem in Bandung

- ▶ Large urban agglomerations in Bandung inevitably lead to air pollution.
- ▶ Bandung lack systematic measurements of air pollution.
- ▶ Bandung's air pollutants are trapped by a combination of surrounding mountains and the city's concave, bowl-like footprint, preventing their release into the upper atmosphere



Bandung Air Quality Management



Air Quality Monitoring

- ▶ Continues Monitoring System in 5 locations (AQMS-Air Quality Management System) from 1999, owned and operated by Ministry of Environment, Indonesia.
 - ▶ However, since 2004 a technical problem have occurred on data transmission and since 2011 the AQMS have not calibrated well.
 - ▶ AQMS is located in (1) Dago Pakar, (2) Aria Graha, (3) Tegallega, (4) Batununggal, and (5) Cisaranten Wetan.
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AQMS in Bandung city

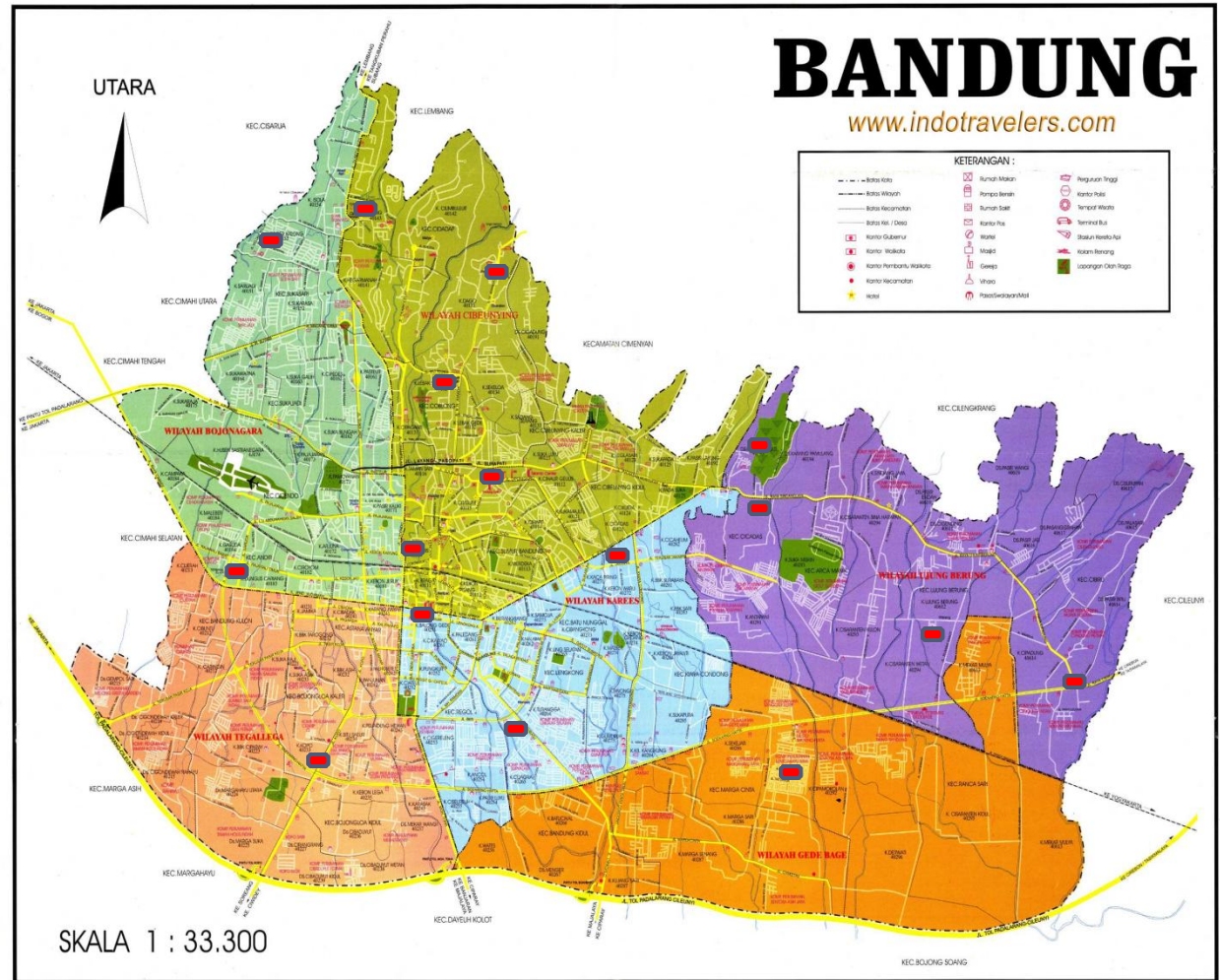


Air Quality Monitoring (2)

- ▶ Non-continue Air Quality Monitoring. Bandung city carried out many non-continue air quality monitoring activities in Bandung.



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Parameters of Air Quality Monitoring (Non continuous method)

- ▶ Hydrocarbon (HC)
- ▶ Lead or Plumbum (Pb)
- ▶ Nitrogen-Dioxide (NO₂)
- ▶ Loudness (dB)
- ▶ Carbonmonoxide (CO)
- ▶ Sulphurdioxide (SO₂)
- ▶ Particulate Matter (PM₁₀)
- ▶ Ozone (O₃)



Pollutants Parameter Grouping base on Principal Components Analysis Methods

	GROUP		
	①	②	③
	NO _x	CO	SO ₂
	Pb	SPM	O ₃
	HC		
PROCCES	GASOLINE COMBUSTION/ DIESEL	FOSSIL FUEL COMBUSTION, DUST AND SOLID WASTE	COAL COMBUSTIONS
SOURCE	VEHICLE  (42%)	DOMESTIC  (16%)	INDUSTRY  (15%)

Air Quality Control Strategies

- ▶ To control emission from vehicles, Bandung conducted Vehicle Emission Test Program and introduced parking-building low emission.



Car Free Days

- ▶ Bandung Car Free Days where establish every Sunday morning from 06.00 am to 10.00 am located in Dago Street, Merdeka Street and Buahbatu Street and will added by at least 30 more streets in whole Bandung or equal to one main street in every district.

CAR FREE DAY



Clean Emission Zone for Parking Area

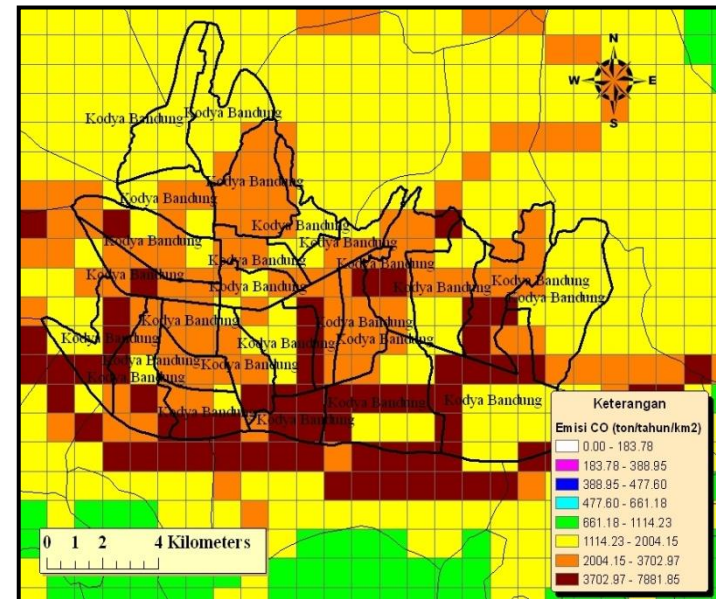
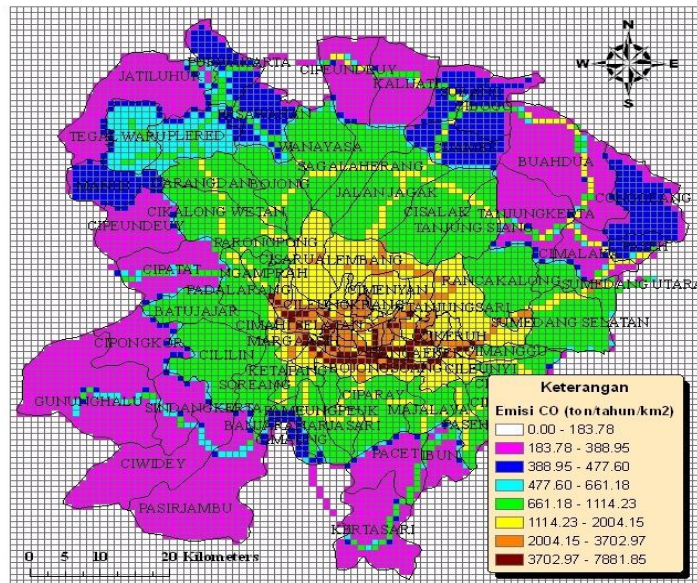


Clean Emission Zone determined as a zone which can only access by low emission vehicles or vehicle which had passes the efficient emission test. Several Government Office, Public Parking site, City Park and several Mall and Corporate Official Site were participate in regulating Clean Emission Zone Programs.



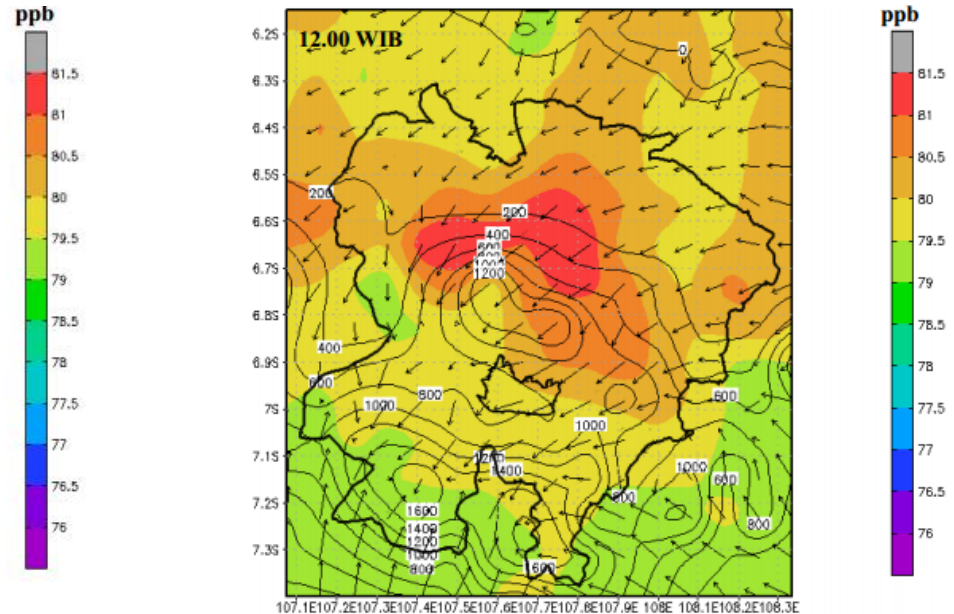
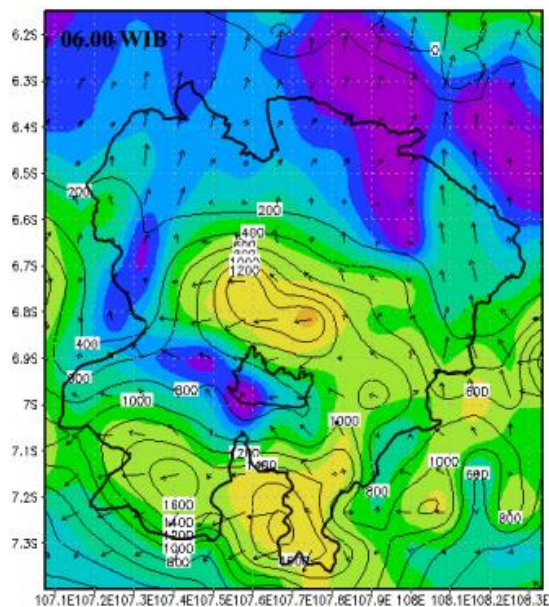
Emission Load Analysis

- ▶ Collaborating with university (Env. Engg. ITB), Bandung has been conducting **preliminary study** for emission load analysis for Bandung city.



Air Quality Modeling

- ▶ Collaborating with university (Env. Engg. ITB), Bandung has been conducting **preliminary study** for air quality dispersion modeling for SO₂, NO₂, O₃, CO, and PM₁₀.



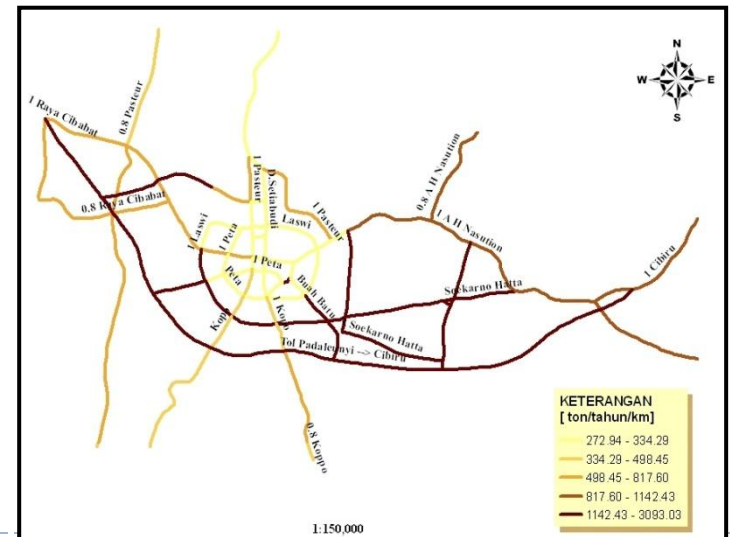
Legislation and Regulation

- ▶ Air quality in Bandung City is managed through a range of municipal government acts and regulations (laws). The national and provincial government also plays an important role due to regulate better air quality in Bandung.



Transportation in Bandung

- ▶ Number of vehicles in 2011 was 1,320,749 units, i.e. motorcycles (947,477 units, 72%) and cars (138,522 units, 10.4%). The growth in vehicle traffic volume is between 10 - 15 percent per year.



Solution in Bandung (1): Eco-city and eco-village

- ▶ Bandung city implemented eco-city and eco-village concept.
 - ▶ In fact, the concept of eco-city and eco-village has emerged given the rapid pace of urbanization in Bandung city.
 - ▶ Ecocities essentially integrate economic, environmental and social considerations and develop projects, programmes, plans and policies towards sustainable governance of Bandung city.
 - ▶ Public involvement in this process is very important.
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Solution in Bandung (2): Eco-city and eco-village

- ▶ Bandung city has committed to becoming the sustainable and green city by developing and supporting green initiatives such as urban bicycling, use of renewable energy, promote urban farming and roof garden, and sustainable solid waste management.
 - ▶ Eco-village is more emphasis on adoption to local culture, renewable energy especially based on solar and biomass, organic farming, low water intensive usage with decentralized and community driven solutions.
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Solution in Bandung (3): Eco-city and eco-village

- ▶ The challenge is to develop an eco-village for high density living—a urban village that provided a variety of housing options and lifestyle choices based on sustainability, innovation and a strong sense of community.
 - ▶ Therefore, Bandung city initiated first eco-village in Tamansari-Cihampelas area as a eco-village model number one or Bandung EcoVillage#1.
 - ▶ Bandung Ecovillage#1 Tamansari-Cihampelas objective is to become more socially, economically and ecologically sustainable.
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Solution in Bandung (3): Eco-city and eco-village

- ▶ Concretely, Bandung Ecovillage#1 seek alternatives to ecologically destructive electrical, water, transportation, and waste-treatment systems, as well as the larger social systems that mirror and support them.
 - ▶ Bandung Ecovillage#1 reduce social impact from the breakdown of traditional forms of community, wasteful consumerist lifestyles, the destruction of natural habitat, urban sprawl, factory farming, and over-reliance on fossil fuels.
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Component Bandung Ecovillage#1

- ▶ Sustainable Transportation
 - ▶ Sustainable Solid Waste Management
 - ▶ Sustainable Drainage System
 - ▶ Integrated Wastewater Treatment
 - ▶ Urban Farming
 - ▶ Low Consumption and Renewable Energy
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Sustainable Transportation

- ▶ Bike Sharing
 - ▶ Bandung Ecovillage#1 has provided bicycle sharing system that is a service in which bicycles are made available for shared use to individuals on a very short term basis.
- ▶ Automated parking building
 - ▶ To reduce ground parking space, Ecovillage will build multi-story concrete structure with an internal elevator to transport cars to upper levels where attendants parked the cars



Sustainable Transportation

► Bus

- Bandung has developed Mass Rapid Transportation facilities. Bandung Ecovillage program will increase amount of bus in Bandung.



► Skywalk

- To increase bike user and walking habit, Ecovillage will provide Skywalk, a steel bridge along Jalan Tamansari-Cihampelas road.



Thank you for your attention...

