Air Quality Measures

South Korea

2016.12

Ministry of Environment

Current Air Quality Status in South Korea

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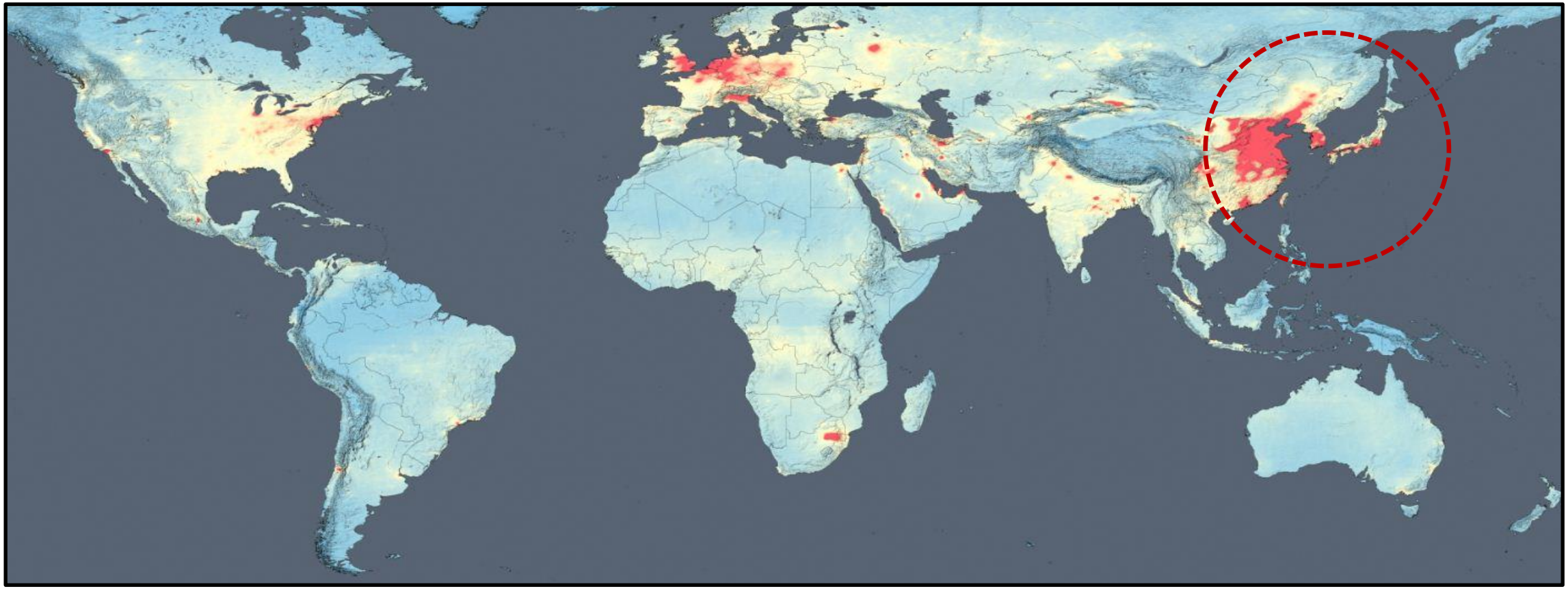
1 Current Air Quality Status in South Korea

❖ According to NASA Satellite Air Quality Map*, South Korea is one of the most concerned countries regarding air pollution (averaged over 2014).

* Its major index is NOx mostly caused by power plants and automobiles.



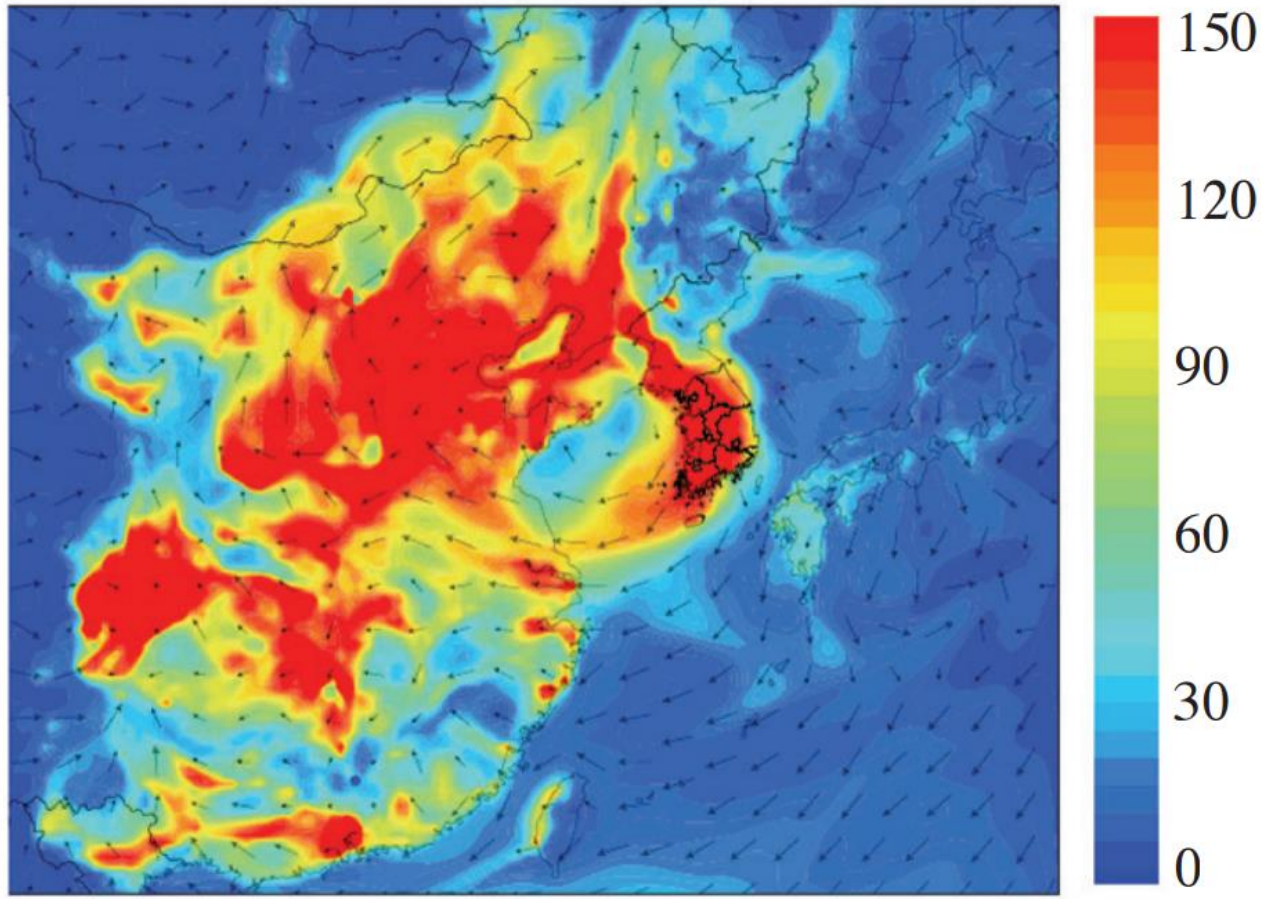
Source: NASA

1 Current Air Quality Status in South Korea

- Transboundary particles exacerbate Korea's PM concentrations (Source: OECD performance review draft)
- For an high concentration episode (24 Feb 2014), the contribution rate of neighboring countries was analyzed as 51.94%(Source: KOSAE)

  * Besides, high population density and rapid industrialization led high density of fine dust

Influence from Neighboring Countries

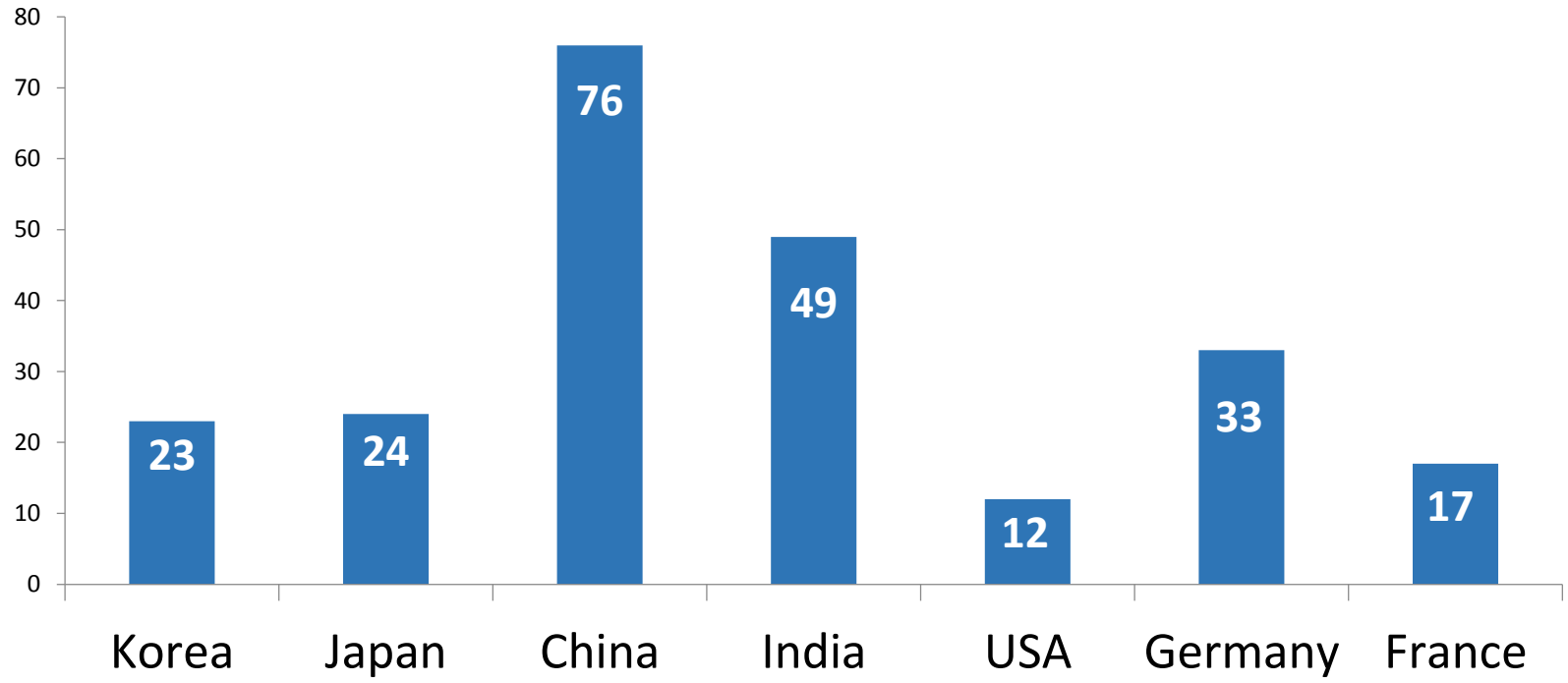


Source: Korean Society for Atmospheric Environment(KOSAE)

1 Current Air Quality Status in South Korea

❖ In terms of premature deaths caused by outdoor air pollution, South Korea is one the vulnerable countries.

Premature Deaths from Outdoor Air Pollution(Unit: deaths per 100,000 capita)



Source: WHO(2016), Ambient Air Pollution: A Global Assessment of exposure and burden of disease

Source Analysis on $PM_{2.5}$

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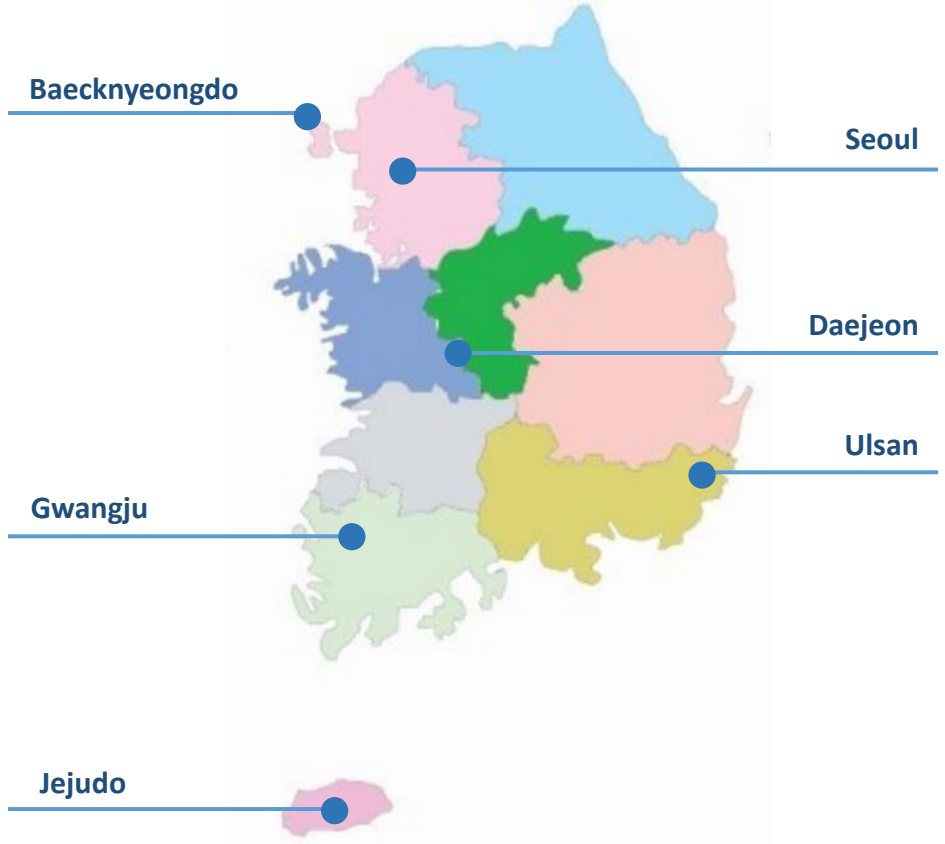
Source Analysis on PM2.5

❖ With aggravating air pollution, Korea puts an high importance on clear **cause analysis** (domestic sources + influence from other countries) in preparing actions to improve its aggravating air quality.

- **Domestic polluting-sources**
  - ➢ **Emission statistics**
  - ➢ **Super-Sites** (Intensive monitoring station network)

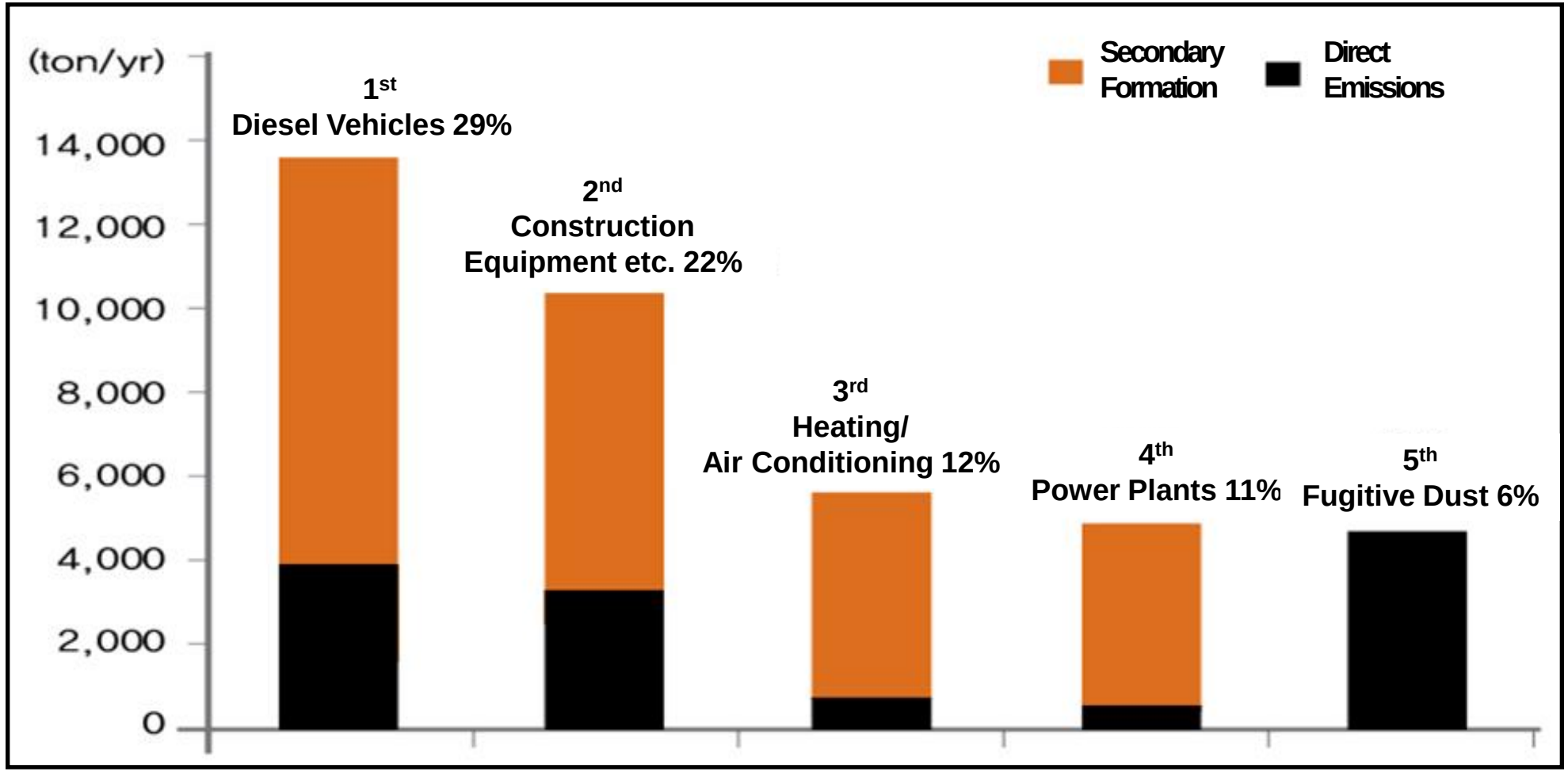
Based on the dedicated information above, **secondary formation** and **contribution rate of each local part** are also reflected in preparing actions.



Super-Site Network

Source Analysis on PM2.5

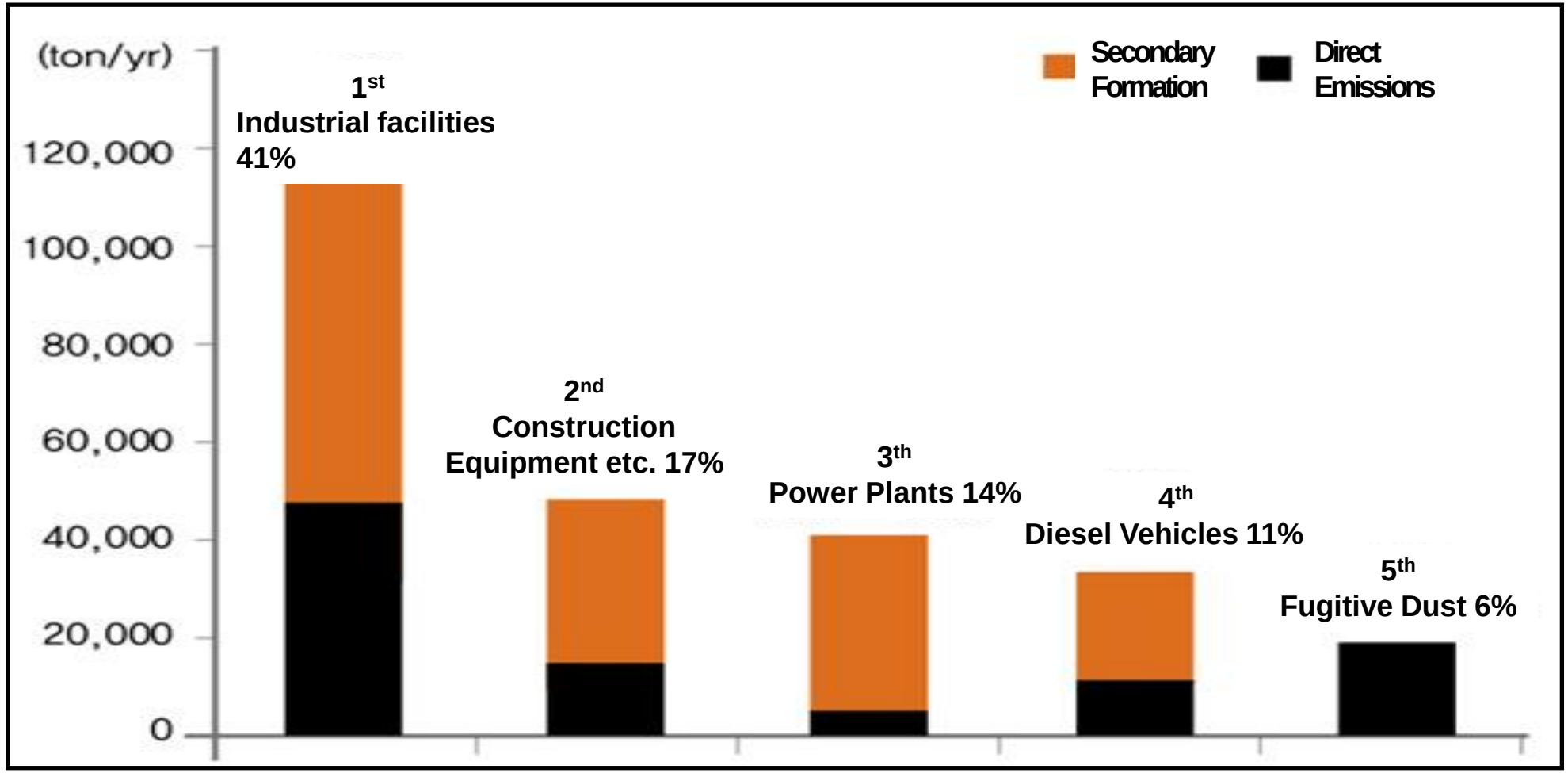
❖ Metropolitan Areas



Share to total emissions by $PM_{2.5}$ Source

Source Analysis on PM2.5

❖ Nationwide



Share to total emissions by $PM_{2.5}$ Source

Special Measures on Air Quality

(announced on Jun. 3, 2016)

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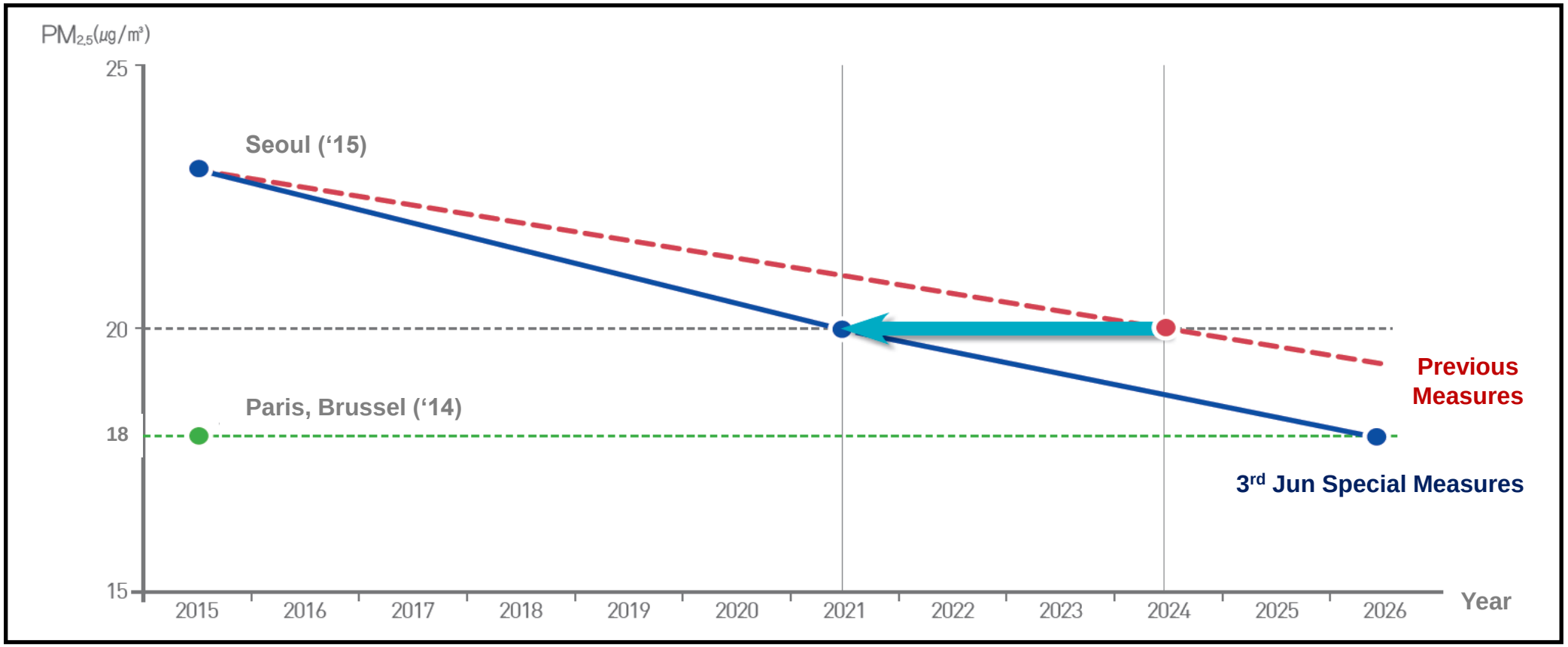
Overview

Vision — Clean and Blue Sky for the Breathable Air

Target — Gradual mitigation of PM $_{2.5}$ to 20㎍/㎥ for 2021 and 18㎍/㎥* for 2026



Overview

Five Fundamental Direction	
	1. Intensive Reduction of Domestic Sources
	2. PM · CO2 Reduction, as the New Growth Engine Industry
	3. Environmental Cooperation with Neighboring Countries
	4. Innovation of Warning and Alarming System
	5. Increase of Awareness on Nationwide Participation

3 Expected Effects of Special Measures

Emission Source (Share)	Transportation (29%)	Generation · Industry (55%)	Near-Residence (16%)
Special Measures	New Diesel Vehicles	Fossil Fuel Power Plants	Road Dusts
	In-use Diesel Vehicles	Metropolitan Areas	Construction Dusts
	Env.-friendly Vehicles		Illegal Open Burning
	Construction Equipment, etc.	Non-Metropolitan Areas	Meat Charbroiling
Reduction rate to BAU	**23%**	**12%**	**16%**

14% reduction of domestic emission, compared to its total BAU

3 Characteristics of the Set of Special Measures

❖ Although the latest set of special measures shows limit in satisfying the citizens expecting tangible improvement in a short-term, it is believed as the most **practical and advanced set of measures** than ever.

01 **Significantly strengthen regulation on diesel vehicles**	02 **Decide to review to reform relative energy prices**	03 **Include measures on coal-fired power plants**
04 **Include a measure to replace old buses with CNG buses**	05 **Create the platform for increasing the number of eco-friendly cars**	06 **Tighten cooperation with neighboring countries**

3 Significantly strengthen regulation on diesel vehicles

❖ Reduce NOx from new diesel vehicles

- (Real-driving emission standard) Newly set a **standard on real-driving emission certification** for new diesel vehicles, in order to reduce NOx (Sep 2017 ~ 3.5 ton ↓)
- (Low-emission vehicle standard) Tighten the current standard for designating a diesel vehicle as a low-emission car **to the level applying to a gasoline and gas vehicle** (2016, revised enforcement regulations under「Special Act on Metropolitan Air Quality Improvement)

❖ Reduce PM and NOx from in-use diesel vehicles

- (Before warranty) Corrective action of manufacturers (recall) → The vehicles for which recall action is not taken will be treated disqualified. This is to increase effectiveness of the action.
- (After warranty) Strengthen the standard of exhausts from diesel vehicles (Tighter emission standard, newly established NOx standard) → For failure of satisfying the standard, order to take low-emission actions → For negligence, impose fines

❖ Lower emissions from old diesel vehicles

- For large diesel vehicles, increase the number of targets supported by the PM-Nox simultaneous reduction project (15 million won/unit)
- For medium-small diesel vehicles, increase the number of targets supported by the early-scrapping project (0.1-7 million won/unit)

3 Decide to review to reform relative energy prices

❖ It is agreed to decide whether reforming relative energy prices after **conducting joint researches of four national research institutes**

- Review the necessity to reform the current relative energy prices, considering its impact on environment and industry, opinions of stakeholders, and relevant international circumstances
- Decide whether reforming or not, based on the results of joint-research (Korea Institute for Public Finance, Korea Environment Institute, Korea Transport Institute, and Korea Energy Economics Institute) and public hearings.

Overview on 2005's Energy Tax Reform

- **Purpose**: To prevent the air pollution aggravating by public sales of diesel cars in 2005
- **Content**: Considering the international level (OECD in 2004⇒100:86:45), reform the relative prices of 'Gasoline: Diesel: LPG' from 100:70:53 to 100:85:50 (gradual increase for 3 years from 2005 to 2007)
- **History**: 2 years required to revise the relevant law after the decision on reforming relative prices was taken (May, 2003)
  - 20 May 2003 : Decision was taken to reform relative energy prices
  - Dec 2003 ~ Aug 2004 : Research was jointly led by four Ministries (Ministry of Strategy and Finance, Ministry of Industry, Ministry of Environment, Ministry of Land, Infrastructure, and Transport)
  - 24 Dec 2004 : The 2nd Energy Tax Reform Plan (Draft) was confirmed (Economic Ministerial Meeting)
  - 8 Jul 2005 : Relevant laws were revised and implemented (Traffic Tax Act, Special Consumption Tax Act, enforcement ordinances of the law)

3 Include measures on coal-fired power plants

❖ Reduce PM from coal-fired power plants

- Take relevant actions on **10 old coal-fired power plants**, within the level not to restrict electric supply
  - ① Close, ② Replacement (coal-fired →LNG generation), ③ Fuel transition (Coal→ Biofuel,etc.)
- Extensive retrofit of existing power plants
  - (20 years↑) After formulating a plan for performance improvement, reform or replace desulfurization or de nitrification apparatus
  - (20 years ↓) More investment on apparatus for SOx, NOx and dust reduction
- Apply the same level of standard that covers Yeongheung thermal power plant to the newly constructed coal-fired power plants
- For the three power plants in the Chungnam region (Dangjin, Taean, Boryeong), promote emission reduction by “Voluntary Agreement” between Government-Utility-Municipality

❖ Increase the share of environmental-friendly power in the energy mix

- **Increase environmental-friendly power mix** to reduce environmental costs(air pollution, GHGs), social conflicts (long-range transmission grid)
  - When formulating next power demand-supply plan, decrease the share of coal-fired power but increase renewable energy
- Install env.-friendly generation facilities based at landfill sites, etc and co-reduce PM and GHGs (gases from metropolitan area’s landfill sites, photovoltaic facilities (20MW in 2016) etc.)

3 Include measures to replace old buses with CNG buses

❖ Phase out diesel buses and replace them with CNG buses

- **Out of 50,000 buses on regular routes, only 27,000 are CNG buses**
- **The rest of 23,000 (intra-city: 7,000, inter-city: 9,000, and others: 7,000) are also planned to be replaced with CNG buses**

(As of the end of 2015, unit)

Total	Intra-city	Inter-city	Rural area · Town bus
49,991 (CNG Bus)	34,314 (27,437)	9,332 (97)	6,345 (2,045)

- (More support purchase cost of CNG buses) When replacing diesel buses with **CNG** buses, more financial support will be provided (from 2017)
- (Support the fuel cost difference between CNG and diesel) Increase the range of targets covered by fuel tax subsidies from diesel buses (380.09won/L) to **CNG buses** (84.24 won/㎥)
- (Increase the number of CNG stations) Provide sites for CNG stations at Express-way service areas, mitigate related regulations, consider financial supports
- (CNG bus) All chartered buses and on-route buses will be replaced with CNG buses by providing CNG fuel tax subsidies and enlarging the charging infrastructure.

  - For **M Bus** (Metropolitan area express bus), new permits are issued **only for CNG buses**. For **rural area and inter-city buses,** an **eased standard for driver's license** is applied when introducing CNG vehicles

3 Create the platform for increasing the number of env.-friendly cars

❖ Replace 30% (0.48 million) of vehicles to be newly sold in 2020 (1.6 million) with env.-friendly cars

Category		Current	Previous 2020 Target	New 2020 Target (increased)
Env.-friendly vehicles	**Total**	**Total 0.174 M** (2.6% of newly sold cars)	**Total 1.08 M** (20% of newly sold cars)	**Total 1.5 M** (30% of newly sold cars)
	Electric Cars	60,000	,200,000	250,000
	Hydrogen Cars	100	9,000	10,000
	Hybrid Cars	168,000	870,000	1,240,000
Charging Infrastructure	**Total**	**Total 347**	**Total 1,480**	**Total 3,100**
	Electric	337 units	1,400 units	3,000 units
	Hydrogen	10 stations	80 stations	100 stations

- (Env.-friendly vehicles) Increase the accumulate number of env.-friendly cars to 1.5 million to 2020 (electric cars: 250,000, hydrogen cars: 10,000, hybrid cars: 1,240,000)
  - Old vehicles→ Provide incentives for replacement with env.-friendly heavy duty vehicles (electric, hydrogen) and plan to permit new env.-friendly heavy duty vehicles (2017,r evision on「Trucking Transport Business Act)
  - Enlarge electric vehicles promotion areas from special and metropolitan cities leading cities (10 including Changwon) to small-medium cities and district (*gun*) from 2107
- (Mandatory purchase) Increase the rate of mandatory env.-friendly vehicle purchase for administrative and public agencies (30%→50%) and newly set fines imposed for the failure

3 Create the platform for increasing the number of eco-friendly cars

❖ Build local charging infrastructure (increase to 25% of gas stations until 2020)

- (Charging facilities) Secure total 3,100 (electric 3,0000, hydrogen 100) of public and private charging facilities (Coverage per charging unit : 185.7㎢ in 2015 → 33.2㎢ in 2020)
- (Incentives for charging facilities) Diversify charging methods, support exclusive parking

❖ More incentives for env.-friendly vehicles

- (expressway toll) Review on exemption from expressway tolls for electric and hydrogen vehicles on a temporary basis (second half of 2016)
- (Toll road · Public parking lot) Under consultation of local governments, plan for discounted toll and exemption from parking lot fee
- (Incentives for renting electric vehicles) For businesses who have 50% of electric vehicles out of total vehicles, give tax exemption benefit
- (license plate exclusive for env.-friendly vehicles) In order to provide incentives for env.-friendly vehicles, introduce license plates exclusive for electric and hydrogen vehicles

Cooperation with Neighboring Countries

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4 Regional Cooperation Cases in Other Regions

❖ Case 1:USA-CANADA Air Quality Agreement (AQA)

- **(Overview)** Formulate practical and effective joint-measures to deal with air pollution issues of USA-CANADA boundary area. Discussed from 1978 and adopted in 1991
- **(Activities)** Preliminary environmental performance on transboundary air pollution, bilateral consultation, USA-CANADA Air Quality Committee, biennial joint result report, etc.
- **(Outcome)** Since the agreement was concluded, SOx has been reduced by 50% or more(Canada 58%, USA 78%) and NOx by 40% or more(Canada 45%,USA 47%) (2014 Performance Report)

4 Regional Cooperation Cases in Other Regions

❖ UNECE Convention on Long-range Transboundary Air Pollution (CLRTAP)

- **(Overview)** Information exchange and joint researches on damages caused by acid rain in the European region. Discussed from1960s and adopted on 1979
- **(Outcome)** Under the purpose of CLRTAP, a range of protocols had been adopted on a continuous basis. The protocols provided a systematic foundation for practical cooperation between the parties to reduce air pollutants

4 Current Regional Cooperation Activities for Air Quality

❖ Because air pollution is a shared environmental problem in the region, cooperation among neighboring countries in the spirit of solidarity is crucial.

1. **Korea-China-Japan**
   - Tripartite Environmental Ministers Meeting (TEMM)
   - Air Pollution Policy Dialogue
     WG1: Scientific Research of Air Pollution Prevention &Control
     WG2: Technology and Policy on Air Quality Monitoring & Forecasting

2. **Korea-China**
   - Joint Research (Basement at Beijing)
   - Data Sharing (35 cities of China ↔ 3 cities of Korea)

3. **Korea-Japan**
   - PM 2.5 Bilateral Cooperation Meeting

4. **Regional**
   - EANET (Acid Deposition Monitoring Network in East Asia)
   - LTP (Long-range Transboundary Air Pollutants in Northeast Asia)

Thank you for your attention!!!