

Air Pollution in Asia and the Pacific:

Implementing 25 Solutions to Help 1 Billion People Breathe Cleaner Air by 2030

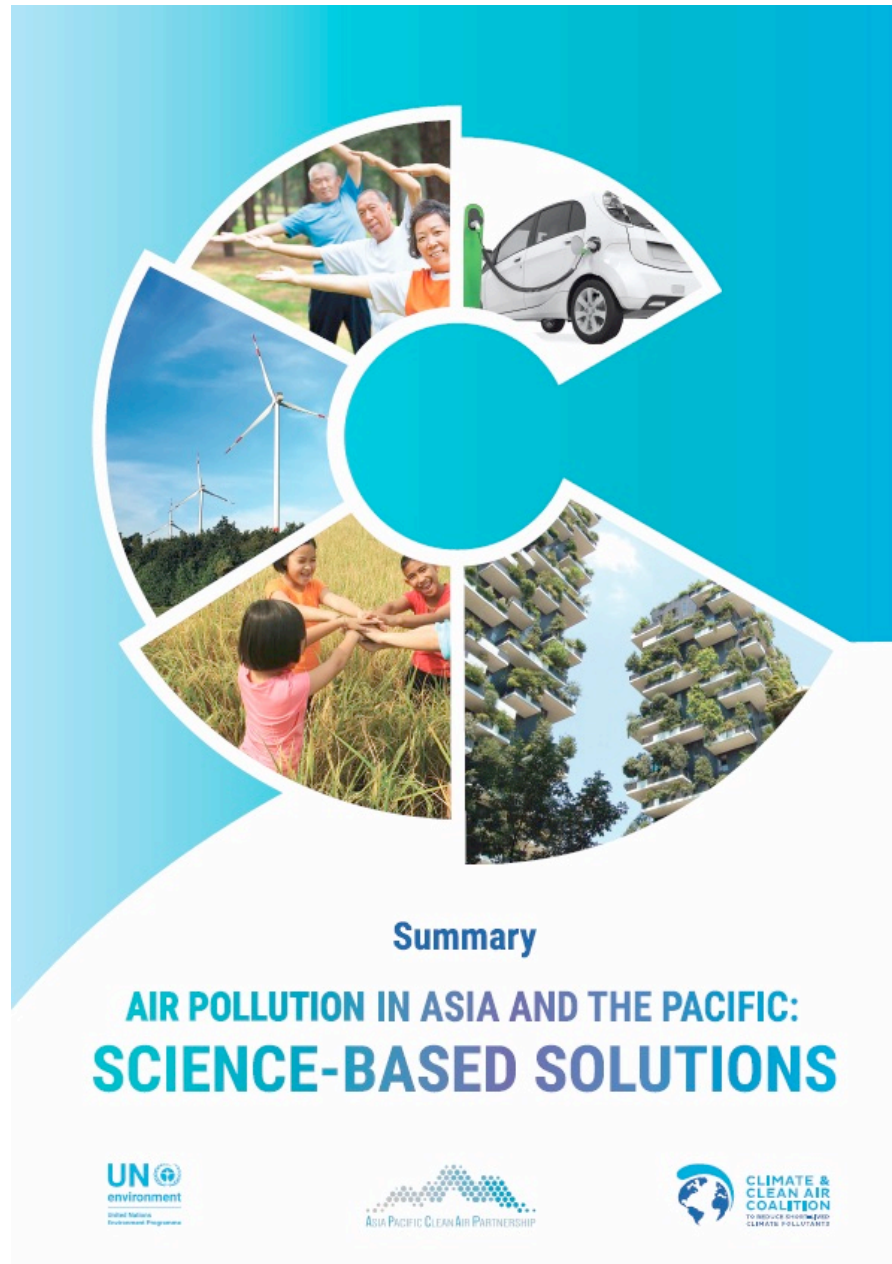


Eric Zusman

Research Director

Institute for Global Environmental Strategies (IGES), Japan

This is not an ADB material. The views expressed in this document are the views of the author/s and/or their organizations and do not necessarily reflect the views or policies of the Asian Development Bank, or its Board of Governors, or the governments they represent. ADB does not guarantee the accuracy and/or completeness of the material's contents, and accepts no responsibility for any direct or indirect consequence of their use or reliance, whether wholly or partially. Please feel free to contact the authors directly should you have queries.



UN Environment

**Asia Pacific Clean Air Partnership
(APCAP)**

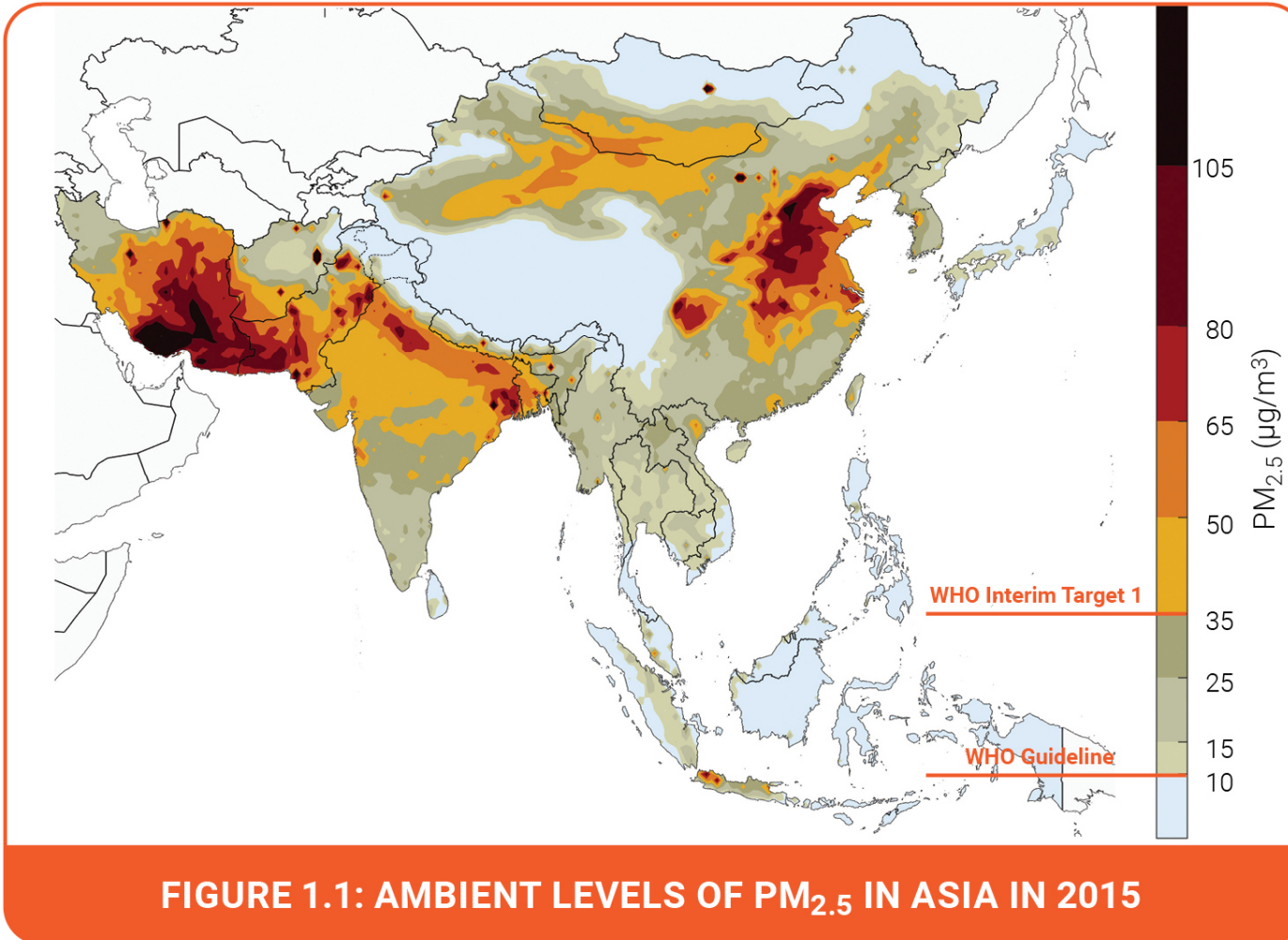
**and the Climate and Clean Air Coalition
(CCAC)**

107 authors

53 reviewers

The report aims to support efforts to address air pollution in Asia and the Pacific by providing options for tackling air pollution in the context of the SDGs.

Air pollution is a serious health crisis across Asia and the Pacific

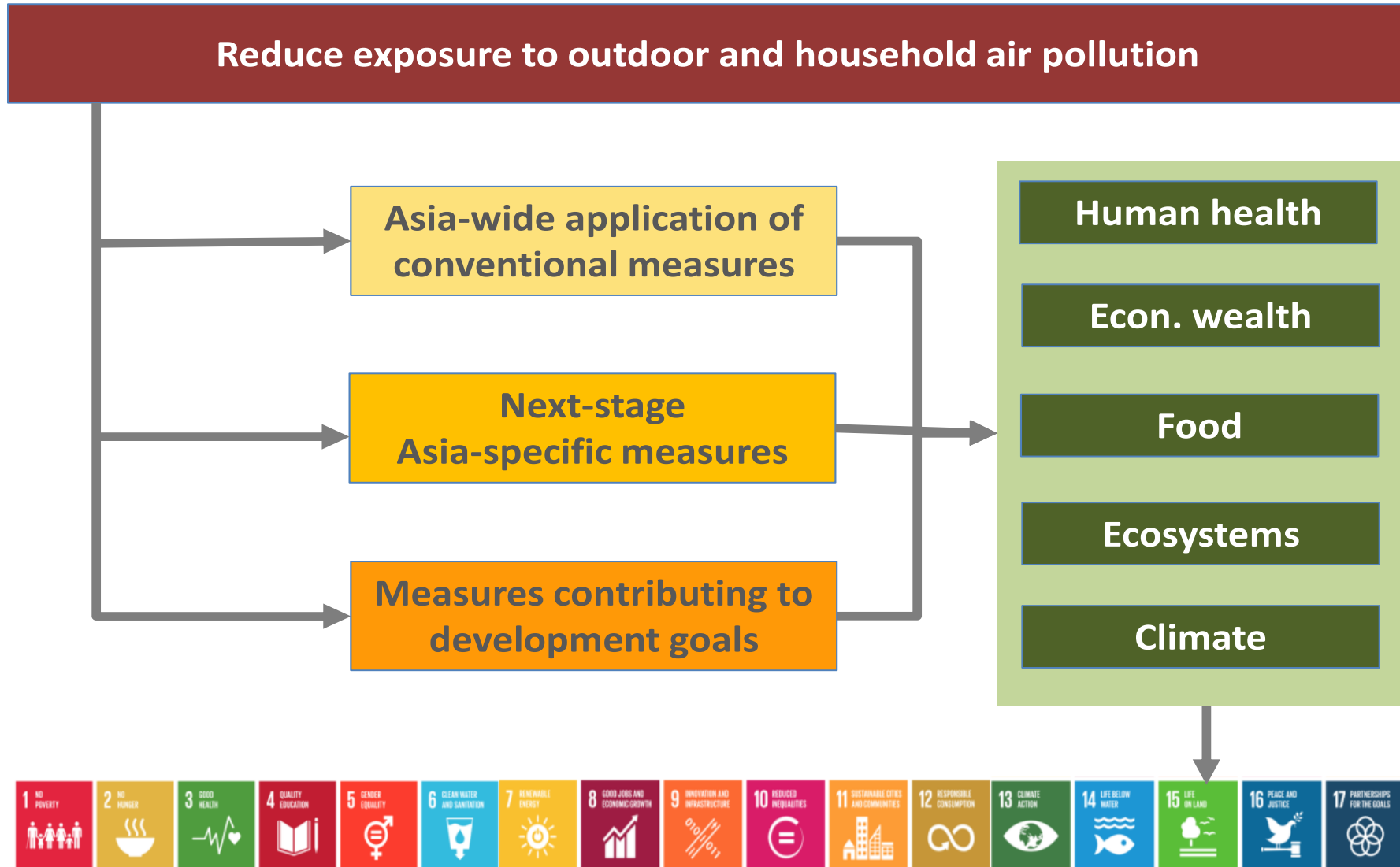


<8% of people in Asia and Pacific enjoy clean air

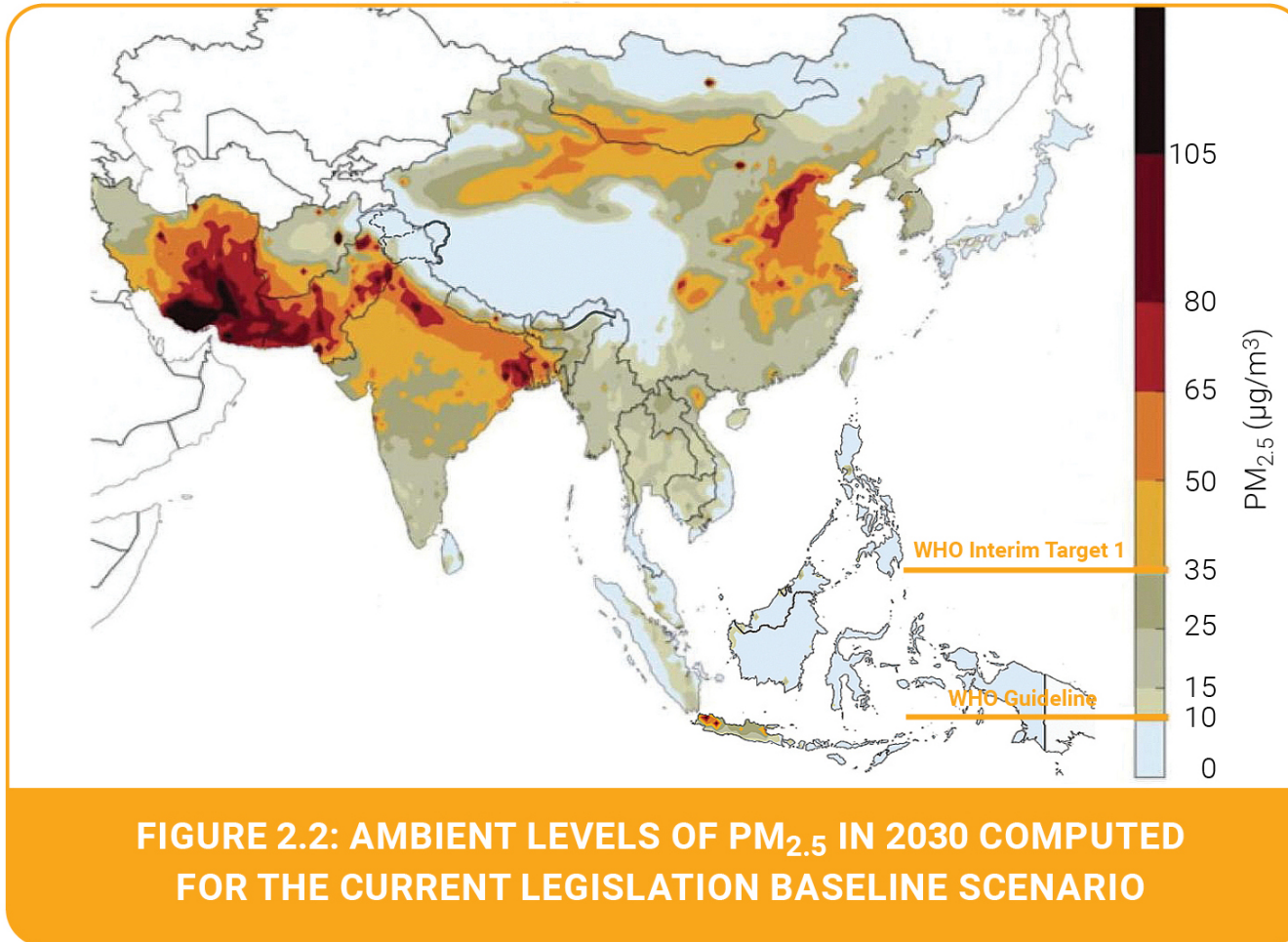
In 2015, 4 billion people were exposed to high levels of air pollution

Highest numbers in South and East Asia

Conceptual Framework



Current policies will avoid further large-scale deterioration but not achieve air quality standards



Full implementation, coupled with 80% expected economic growth forecast could result in no further increase in air pollution while lifting tens of millions out of poverty,

But....

4 billion will remain exposed to health-damaging levels of air pollution

So – we need more ambition to reduce health impacts in the next decades

TOP 25 CLEAN AIR MEASURES – a portfolio of options

**ASIA-WIDE
APPLICATION OF
CONVENTIONAL
MEASURES**

**NEXT GENERATION AIR
QUALITY MEASURES THAT
ARE NOT YET MAJOR
COMPONENTS OF CLEAN
AIR POLICIES**

**MEASURES WHICH
CONTRIBUTE TO
DEVELOPMENT
PRIORITIES WITH AIR
QUALITY BENEFITS**

Looking for the measures that lead to the largest reduction in the population exposed to PM_{2.5} plus methane measures which will reduce tropospheric ozone and HFCs which reduce near-term warming

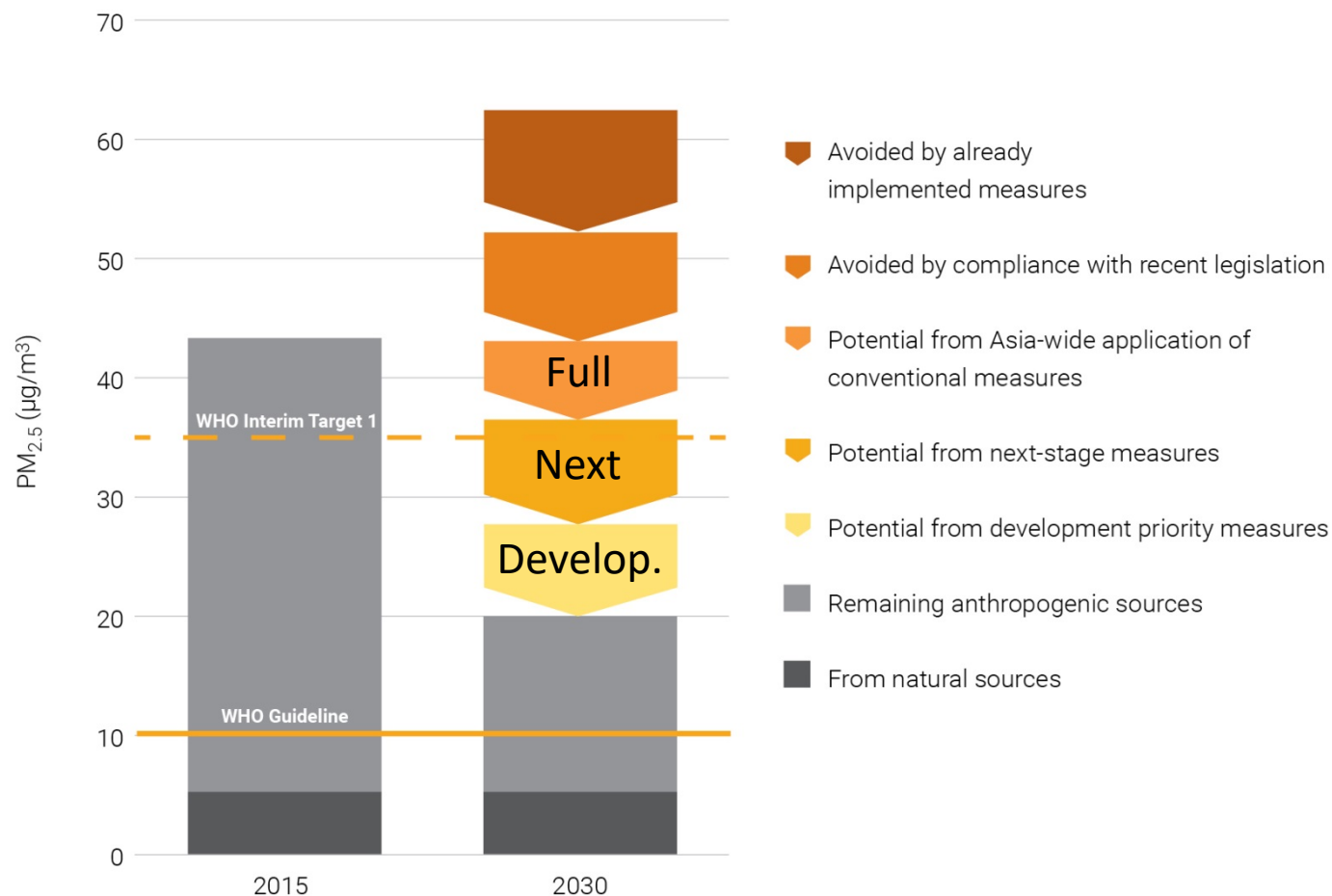


FIGURE 2.3: POTENTIAL CONTRIBUTIONS OF THE THREE PORTFOLIOS OF MEASURES TO POPULATION-WEIGHTED MEAN EXPOSURE TO PM_{2.5}

The Top 25 measures will provide clean air [$<10\mu\text{g m}^{-3}$] to 1 billion people in 2030

And reduce the number of people facing the highest WHO Interim Target ($35\mu\text{g m}^{-3}$) by 80%

Full application of conventional measures to all countries in Asia

Post-combustion controls

Introduce state-of-the-art end-of-pipe measures to reduce sulphur dioxide, nitrogen oxides and particulate emissions at power stations and in large-scale industry

Industrial process emissions standards

Introduce advanced emissions standards in industries, e.g., iron and steel plants, cement factories, glass production, chemical industry, etc.

Emissions standards for road vehicles

Strengthen all emissions standards; special focus on regulation of light- and heavy-duty diesel vehicles

Vehicle inspection and maintenance

Enforce mandatory checks and repairs for vehicles

Dust control

Suppress construction and road dust; increase green areas

Next-stage air quality measures [*on dispersed sources*]

Agricultural crop residues

Manage agricultural residues, including strict enforcement of bans on open burning

Residential waste burning

Strictly enforce bans on open burning of household waste

Prevention of forest and peatland fires

Prevent forest and peatland fires through improved forest, land and water management and fire prevention strategies

Livestock manure management

Introduce covered storage and efficient application of manures; encourage anaerobic digestion

Nitrogen fertilizer application

Establish efficient application; for urea also use urease inhibitors and/or substitute with, for example, ammonium nitrate

Brick kilns

Improve efficiency and introduce emissions standards

International shipping

Require low-sulphur fuels and control of particulate emissions

Solvent use and refineries

Introduce low-solvent paints for industrial and do-it-yourself applications; leak detection; incineration and recovery

Measures contributing to priority goals for development [energy, agriculture, urban planning] with benefits for air quality [including methane-related measures] + HFC measures

Clean cooking and heating

Use clean fuels – electricity, natural gas, liquefied petroleum gas (LPG) in cities, and LPG and advanced biomass cooking and heating stoves in rural areas; substitution of coal by briquettes

Renewables for power generation

Use incentives to foster extended use of wind, solar and hydro power for electricity generation and phase out the least efficient plants

Energy efficiency for households

Use incentives to improve the energy efficiency of household appliances, buildings, lighting, heating and cooling; encourage roof-top solar installations

Energy efficiency standards for industry

Introduce ambitious energy efficiency standards for industry

Electric vehicles

Promote the use of electric vehicles

Improved public transport

Encourage a shift from private passenger vehicles to public transport

Solid waste management

Encourage centralized waste collection with source separation and treatment, including gas utilization

Rice paddies

Encourage intermittent aeration of continuously flooded paddies

Wastewater treatment

Introduce well-managed two-stage treatment with biogas recovery

Coal mining

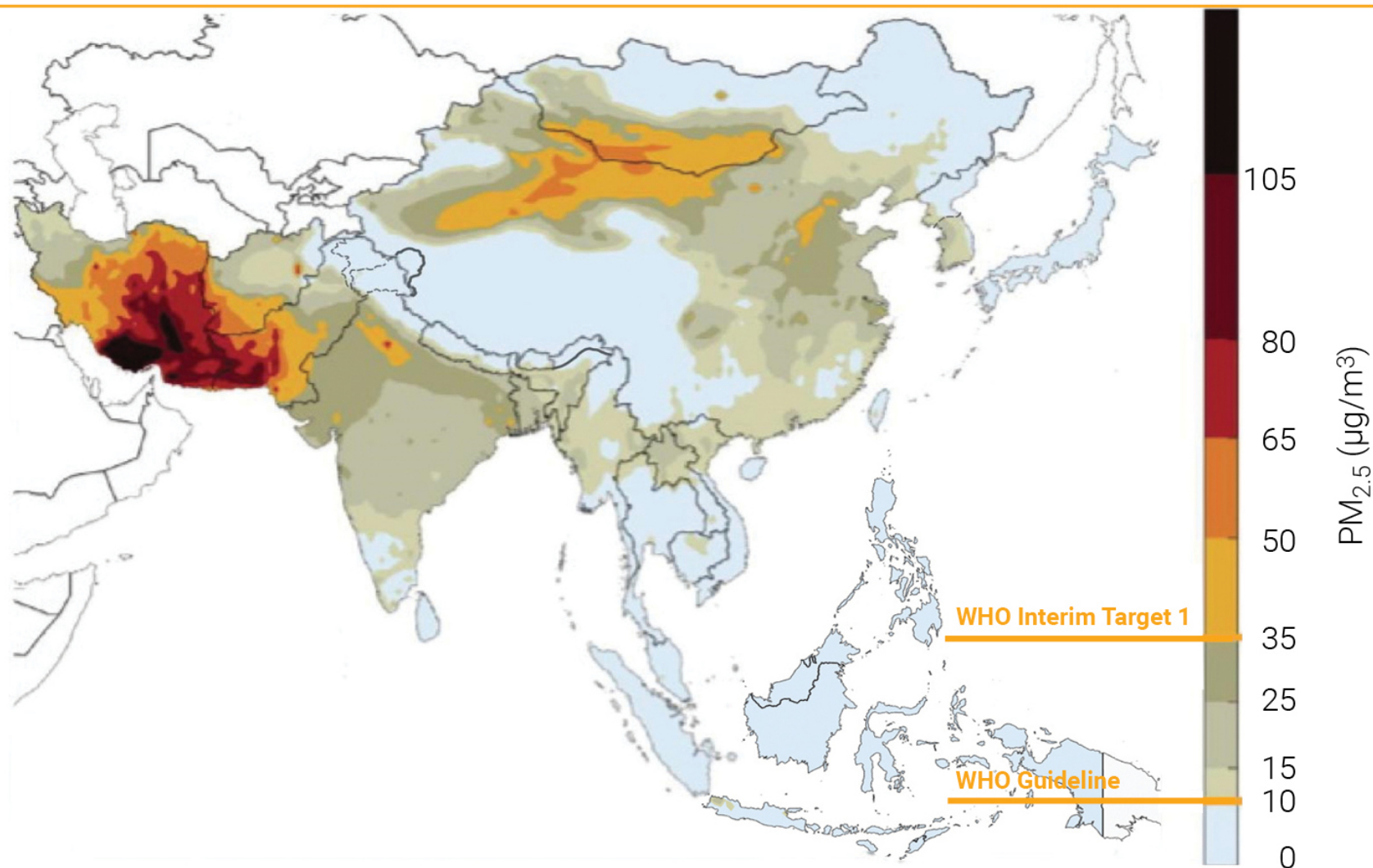
Encourage pre-mining recovery of coal mine gas

Oil and gas production

Encourage recovery of associated petroleum gas; stop routine flaring; improve leakage control

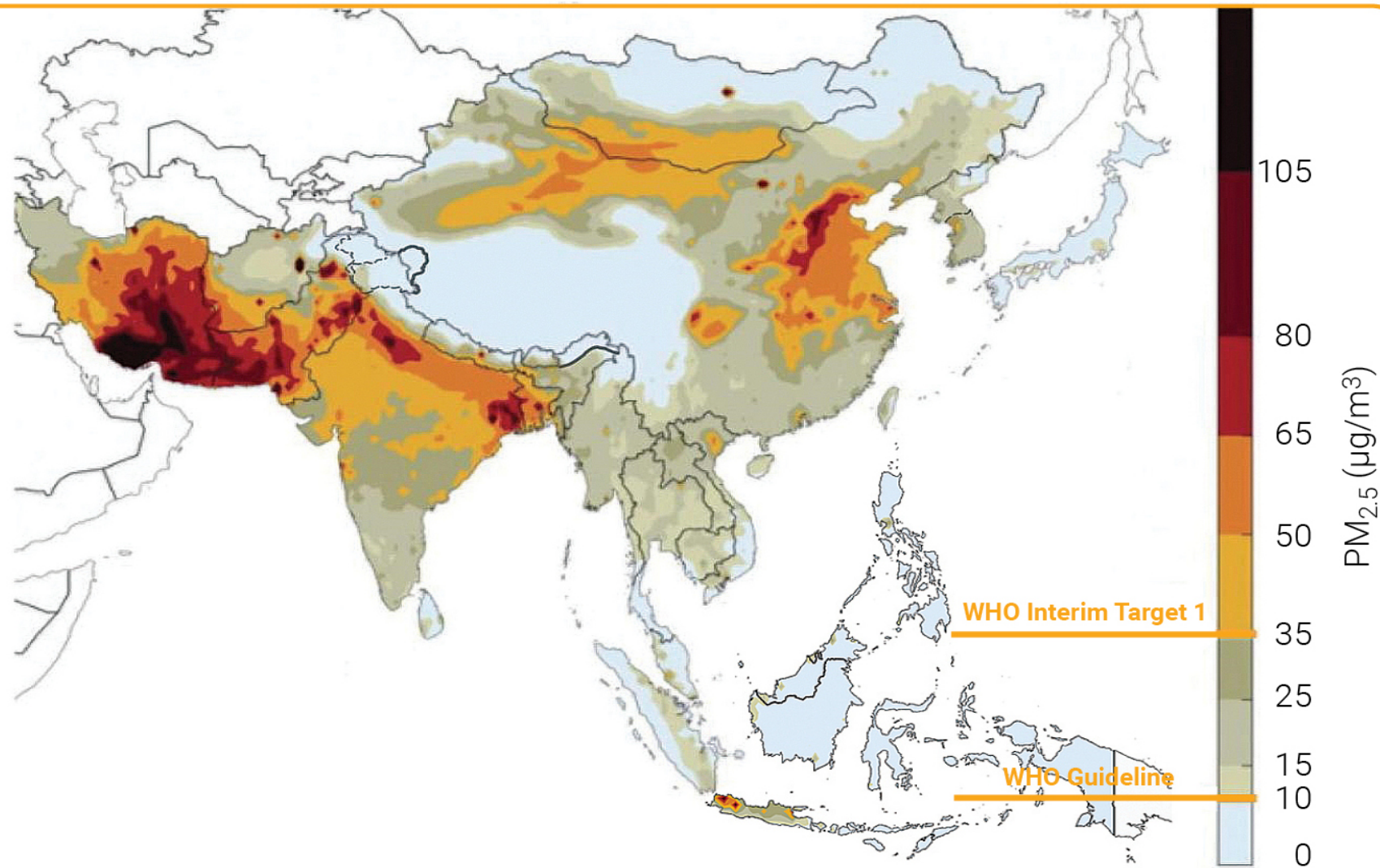
(HFC) refrigerant replacement

Ensure full compliance with the Kigali Amendment



Map showing $PM_{2.5}$ after implementation of the Top 25 Measures

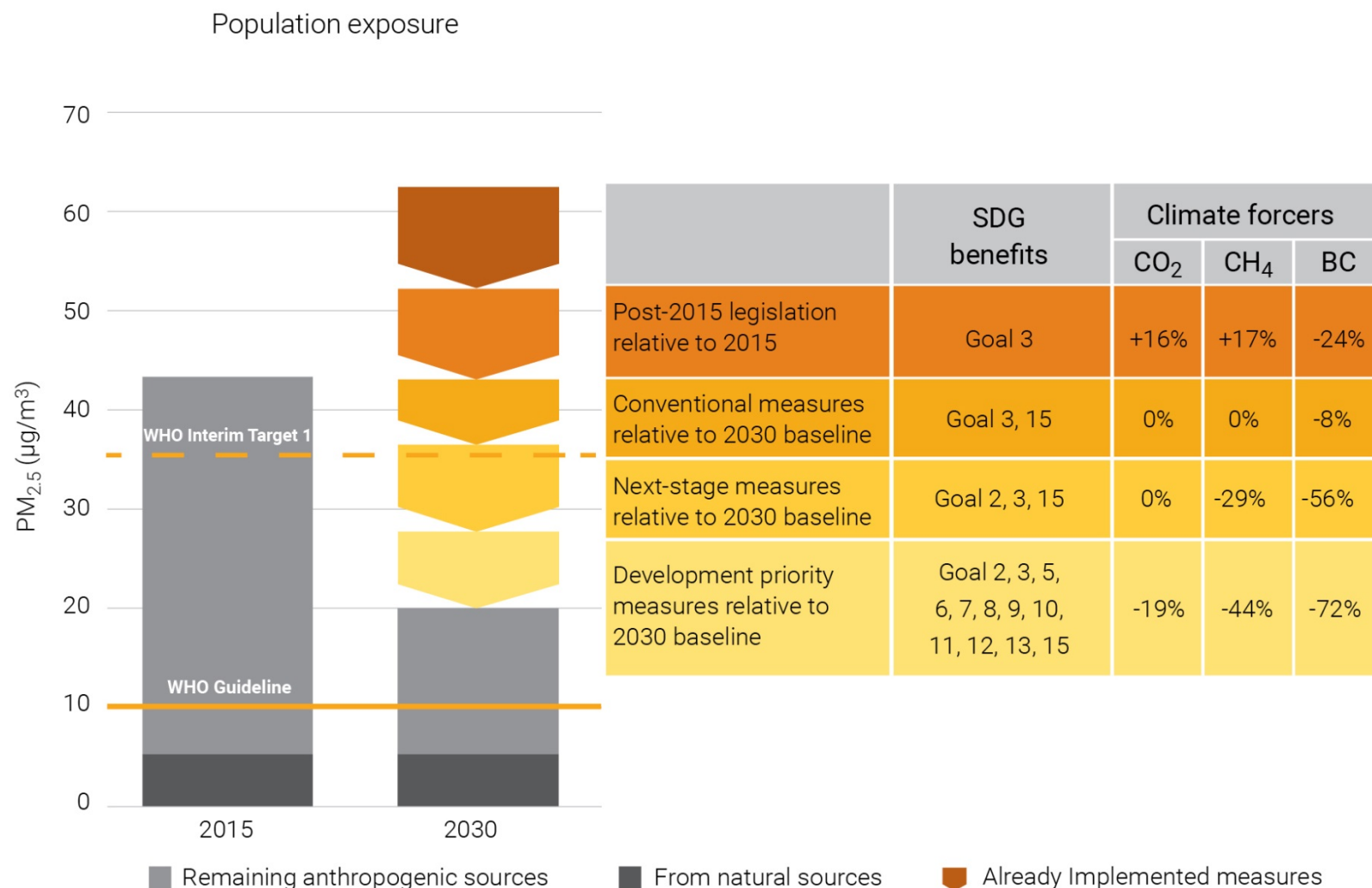
FIGURE 2.5: $PM_{2.5}$ CONCENTRATIONS IN 2030 AFTER IMPLEMENTATION OF THE TOP 25 CLEAN AIR MEASURES



.....compared to
the baseline

.....a big
improvement!

**FIGURE 2.2: AMBIENT LEVELS OF PM_{2.5} IN 2030 COMPUTED
FOR THE CURRENT LEGISLATION BASELINE SCENARIO**



All measures link to key SDG attainment

All 25 measures reduce:

CO₂ by ~20%;

CH₄ by ~40%

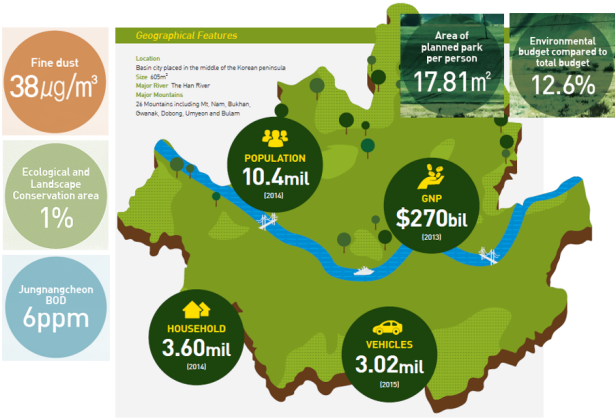
BC by ~70%

HFC by ~80%

FIGURE 2.10: IMPACT OF THE TOP 25 CLEAN AIR MEASURES IN REDUCING POPULATION EXPOSURE TO PM_{2.5}, AND BENEFITS FOR CLIMATE AND THE SUSTAINABLE DEVELOPMENT GOALS

Case Study: Seoul's One Less Nuclear Plant

As of 2012, 94.6% of Seoul's energy came from oil, LNG and electricity for households, commercial, transport (86.2%).



Reducing the city's energy demand equals to the capacity of 1 nuclear power plant (1GW, 2 million TOE) by 2014.

The longer-term objective was reaching 20% energy self-sufficiency by 2020.

[Electricity Consumption of Nation and Major Cities] (Unit: GWh)

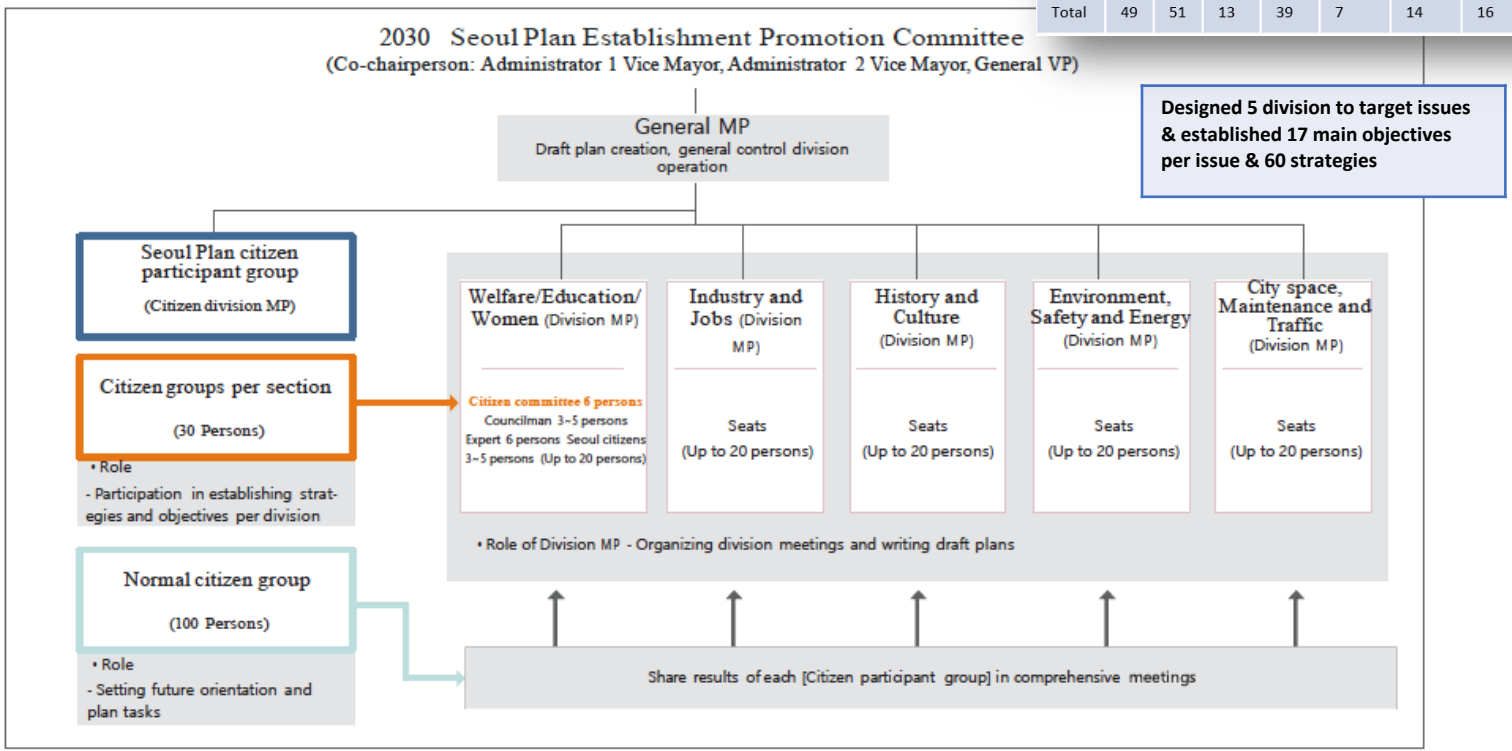
	2011	2012	2013	2014	Rate
					(2011→2014)
Nation	455,070	466,593	474,849	477,592	4.9
Seoul	46,903	47,234	46,555	45,019	-4.0
Daegu	14,822	14,955	15,080	14,859	0.2
Gwangju	8,047	8,131	8,274	8,197	1.9
Daejeon	9,060	9,160	9,225	9,103	0.5

Case Study: Seoul's
One Less Nuclear Plant (cont.)

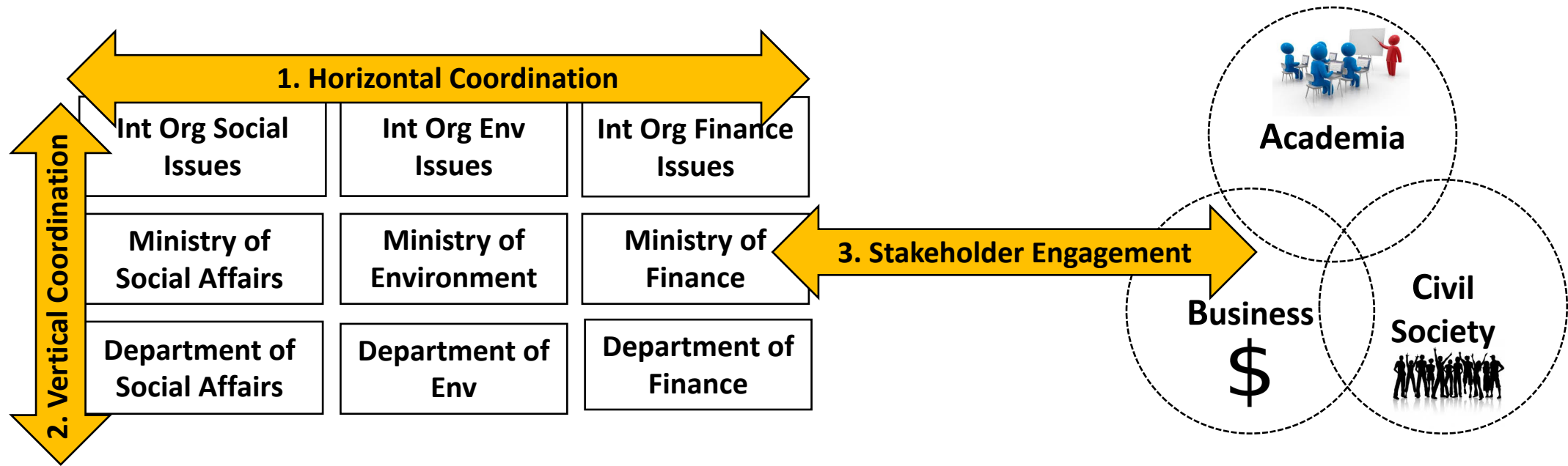


The process introduced a path to 2030

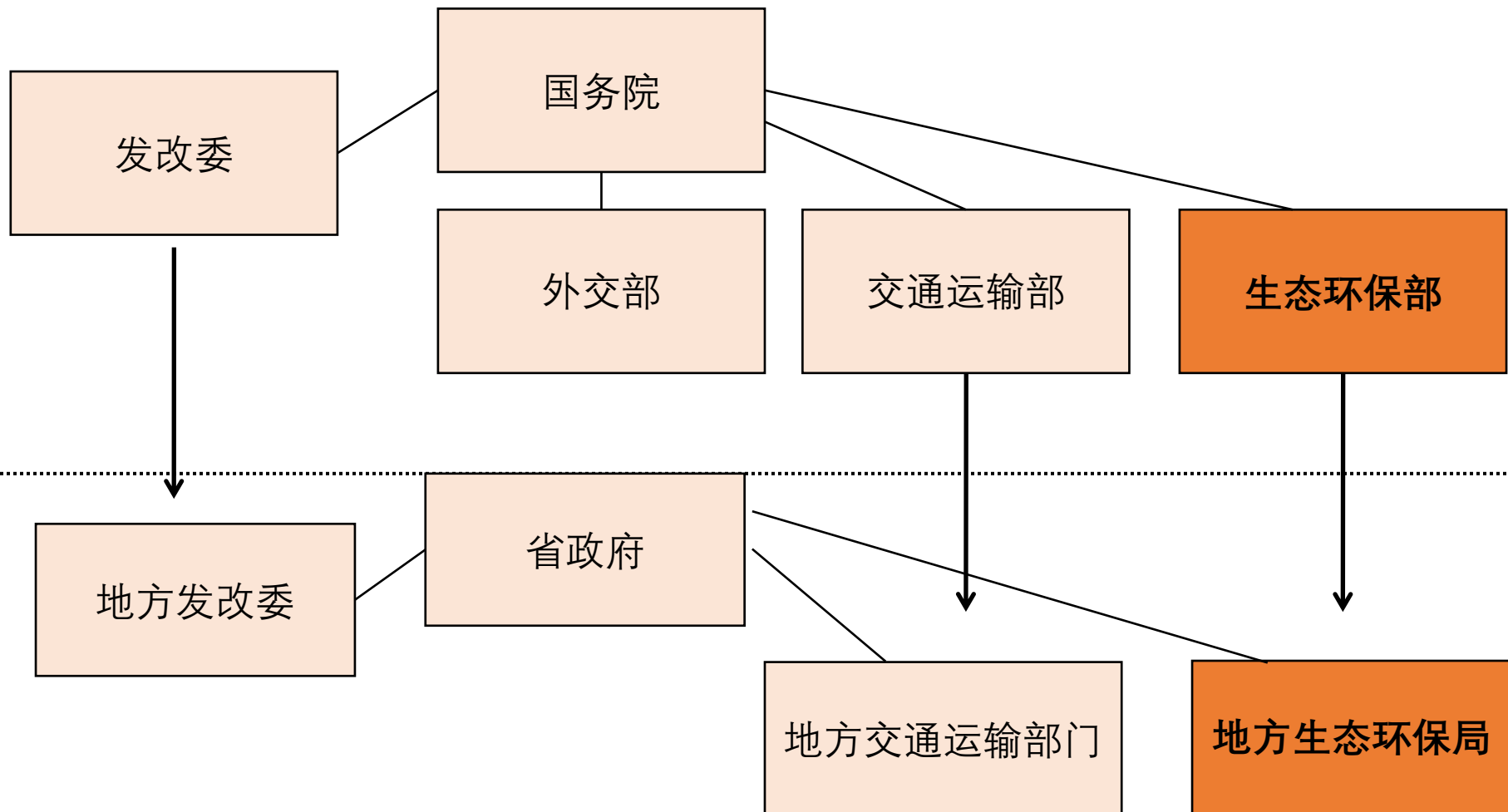
The Institutions supporting this process are important



(Source: modified from www.seoulsolution.kr/en/content/2030-seoul-plan)



The Case of China



China's Leadership Responsibility System

Officials who do not meet targets can be denied:

- annual rewards
- honorary titles
- or promotions

Assessment Indicators	No.	Examination Content	Points	Scoring Standards
Energy-Intensity Target (40 points)	1	Reduction of Energy Consumption per 10,000 RMB of GDP	40	If the annual target is reached, 40 points will be allocated; if only 90% of the target was reached, 36 points will be allocated; if only 80% of the target was reached, 32 points will be allocated; if only 70% of the target was reached, 28 points will be allocated; if only 60% of the target was reached, 24 points will be allocated; if only 50% of the target was reached, 20 points will be allocated. If the target is exceeded, then for every 10% exceeded, an additional 3 points will be allocated for a maximum of 9 points. This indicator has veto power such that if the target set for the year is not fully achieved, then a failing grade will be assessed.
Energy-Saving Measures (60 points)	2	The Energy Efficiency Work of Organizations and Officials	2	1. Establishing the region's energy intensity statistics, monitoring and evaluation system: 1 point. 2. Establishing an energy-efficiency coordination mechanism, a clear division of responsibilities, and regular meetings to study the major issues: 1 point.
	3	Allocation and Implementation of Energy-Efficiency Target	3	1. Allocation of energy saving target: 1 point; 2. Carrying out an investigation and evaluation of progress in achieving the energy saving target: 1 point; 3. Regularly publishing energy consumption indicators: 1 point
	4	Adjusting and Optimizing the Condition of the Industrial Structure	20	1. If the service sector accounted for an increased proportion of the region's GDP: 4 points; 2. If the high-tech industry accounted for an increased proportion of the region's industrial added-value: 4 points; 3. Developing and implementing energy efficiency assessment and review procedures for fixed asset investment projects: 4 points; 4. Completing the year's goal of eliminating retrograde production capacity: 8 points.
	5	Energy-Saving Investment and Implementation of Key Projects	10	1. Establishing special funds for energy efficiency and sufficient implementation: 3 points; 2. Increasing the proportion of annual fiscal revenue allocated for special energy-efficiency funds: 4 points; 3. Organizing and implementing key energy-efficiency projects: 3 points.
	6	The Development and Expansion of Energy-Efficiency Technology	9	1. Including the development of energy-efficient technologies in the annual science and technology plan: 2 points; 2. Increasing the proportion of annual fiscal revenue spent on energy-efficient technology R & D: 3 points; 3. Implementing energy-efficient technology demonstration projects: 2 points; 4. Organizing and developing mechanisms to promote energy-efficient products and technologies and energy-efficiency services: 2 points.
	7	Managing the Energy-Efficiency of Key Enterprises and Industries	8	1. If key energy-intensive enterprises (including the Top-1000 program) meet their annual energy intensity targets: 3 points; 2. Implementing the annual energy-saving monitoring plan: 1 point; 3. Meeting the annual target rate of implementation for mandatory energy-efficiency standards in newly constructed buildings: 4 points; if 80% of the target is achieved then 2 points; if less than 70% of the target is achieved then no points will be received.
	8	Implementation of Laws and Regulations	3	1. Issuing and improving supporting regulations for the Energy Conservation Law: 1 point; 2. Monitoring, inspecting and enforcing the law with respect to energy-efficiency: 1 point; 3. Implementing standards that limit the energy consumption of energy-intensive products: 1 point
	9	Implementation of Basic Energy-Efficiency Work	5	1. Strengthening energy-efficiency monitoring teams and institutional capacity building: 1 point 2. Improving the system for energy statistics and strengthening energy statistics capacity: 1 point; 3. Installing energy measuring devices in accordance with the requirements: 1 point; 4. Carrying out energy-efficiency awareness and training: 1 point; 5. Implementing the energy-efficiency incentive system: 1 point.
Subtotal			100	

Key Messages

- **Air pollution is creating a public health crisis in Asia and the Pacific**
- **A multi-author UNEP report identified 25 measures that could significantly improve air quality and public health by 2030**
- **Many of these measures have other benefits for climate change and development more generally**
- **Implementing these measures will require more knowledge of what enables success in particular sectors and contexts**
- **It will also require governance arrangements that facilitate coordination across different government agencies and non-state actors**
- **Political incentives for implementation will also matter**