

The 6th Annual Meeting of LCS-RNet

Rome, October 1st-2nd 2014

Parallel Session 4-2: How can emission pathway modeling contribute to raising
ambition levels of nationally determined contributions (NDC)?

Emission pathway modeling to analyze national ambition levels of decarbonization

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The presentation is based on the Deep Decarbonization
Pathways Project (DDPP:www.deepdecarbonization.org) and
AIM modeling(<http://www-iam.nies.go.jp/aim>)

Objectives and organization of DDPP

- ❑ Understand and demonstrate how **individual countries** can transition to a low-carbon economy consistent with the 2°C target
 - Credibility and appropriation by national stakeholders
 - Structured and detailed dialogue btw countries on transformations

- ❑ An initiative of IDDRI and SDSN – 15 countries (70% of 2010 CO2 emissions)
 - 15 Country Research Teams acting independently of their governments
 - Expert-based judgments
 - Country-scale models
 - Policy relevance

Approach

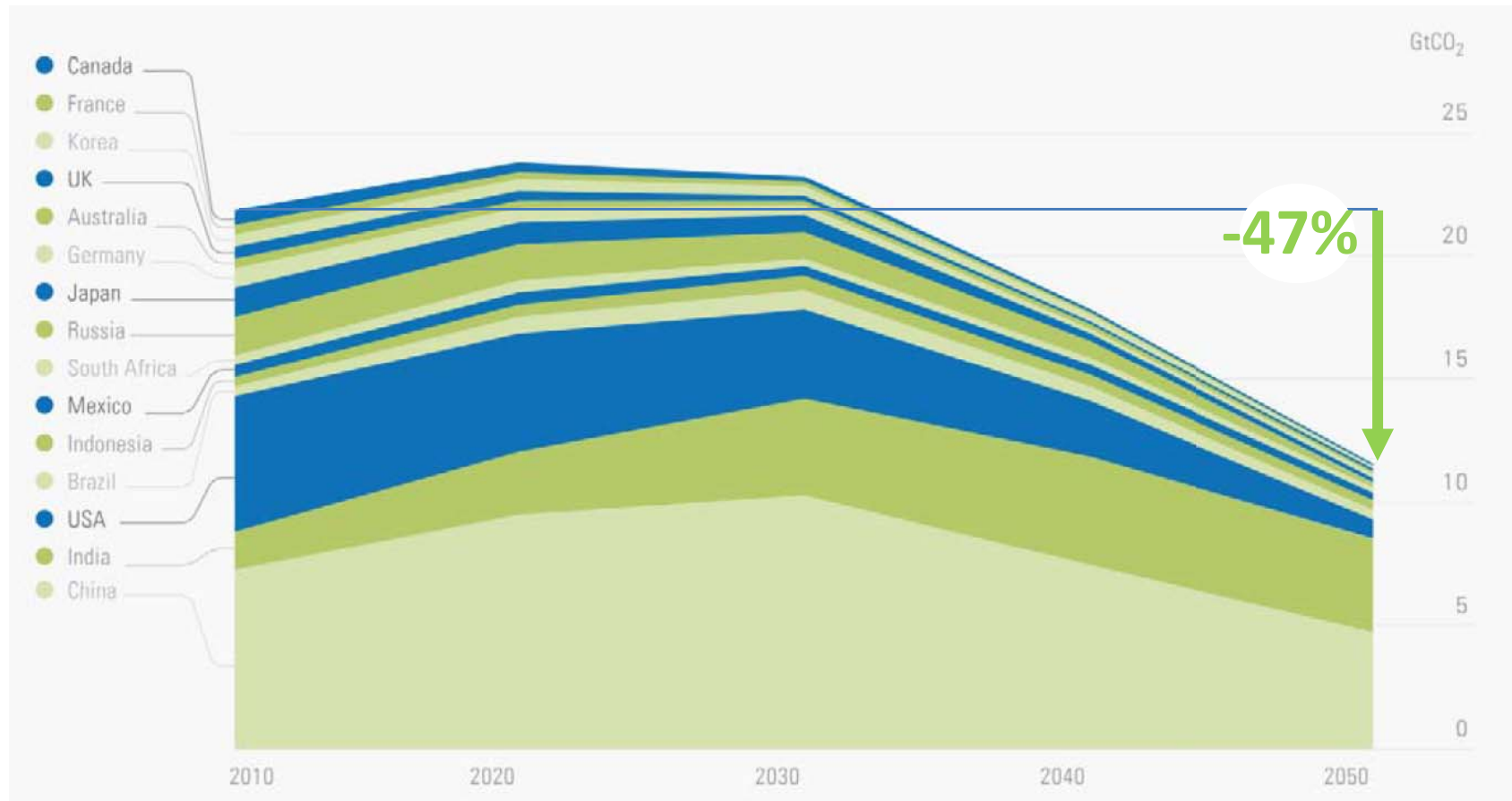
Elaborate **national, bottom-up and long-term** decarbonization pathways towards the 2°C target (DDPs)

- ❑ Development & mitigation pathways
 - national circumstances : socio-economic conditions, development aspirations, infrastructure stock, resource endowments ...

- ❑ Transparent pathways
 - sectorally disaggregated and technology-explicit

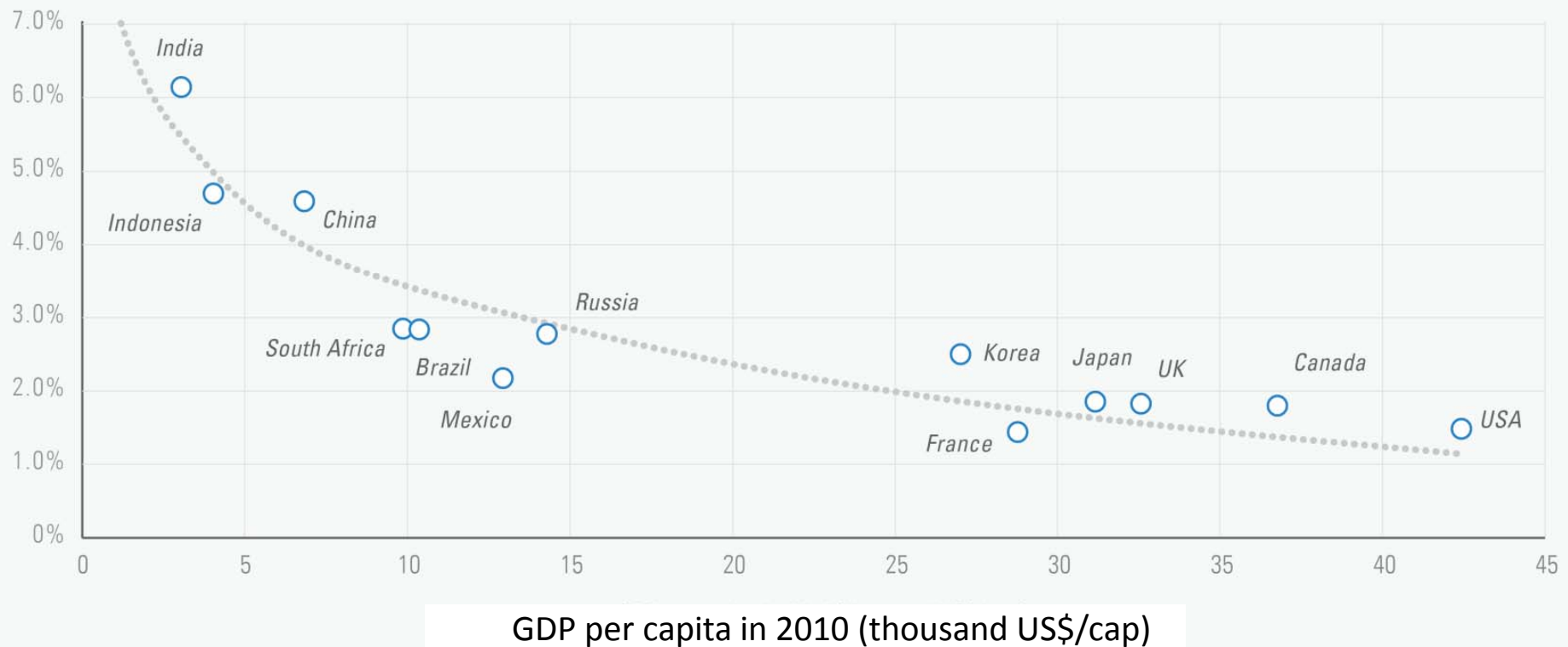
- ❑ A backcasting approach to 2050
 - address the tension btw initial situation and LT demanding target

Energy-related CO₂ emissions trajectories in the 15 DDPs



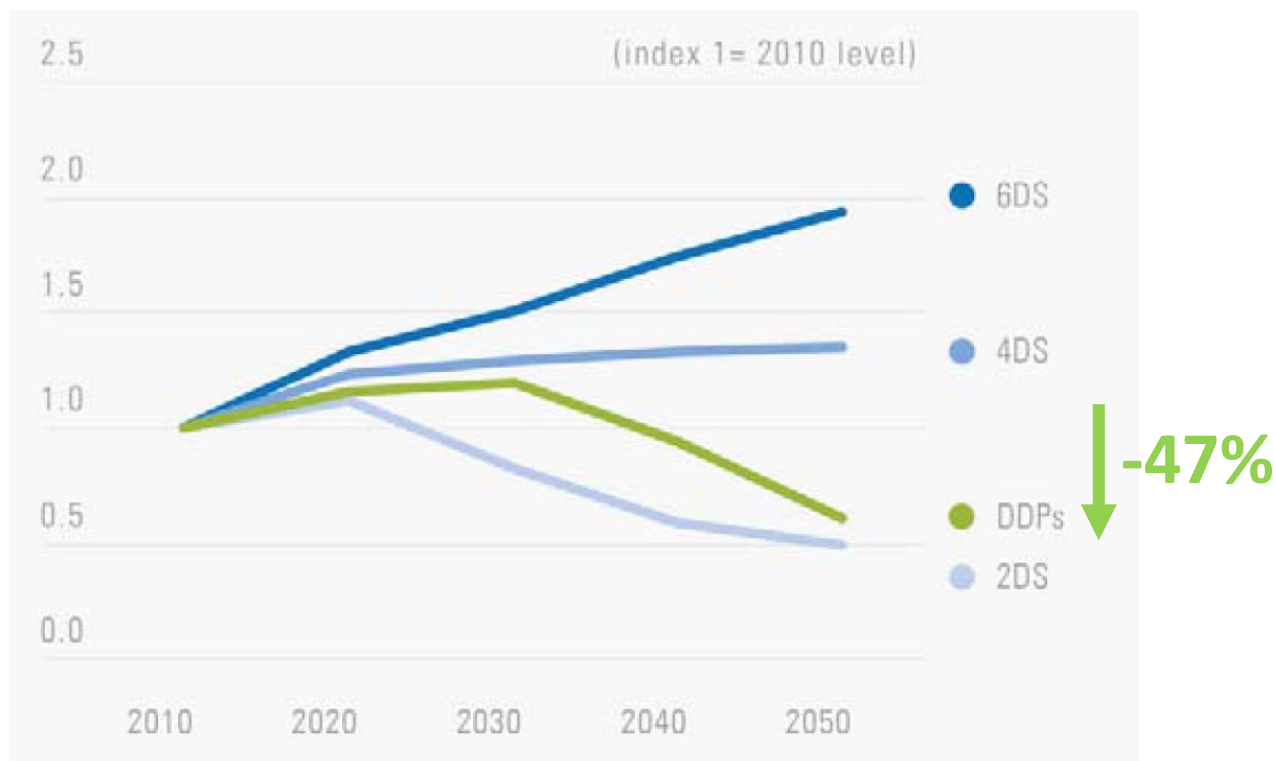
Wealth increase over 2010-2050 in the 15 DDPs

Figure 6.1. Average annual growth rate of GDP per capita between 2010 and 2050



Combined seven country DDPs

Compared to the CO₂-energy emissions reduction trajectories of IEA scenarios (2DS, 4DS, and 6DS)



Note: The comparison only includes the DDPs for Brazil, China, India, Mexico, Russia, South Africa, and the USA to match the countries analyzed as part of the IEA scenarios.

Energy efficiency vs decarbonization of fuels over different time horizons

Figure 6.7. Decadal percent change in Energy/GDP and CO₂/Energy for the 15 DDPs, 2010 to 2050

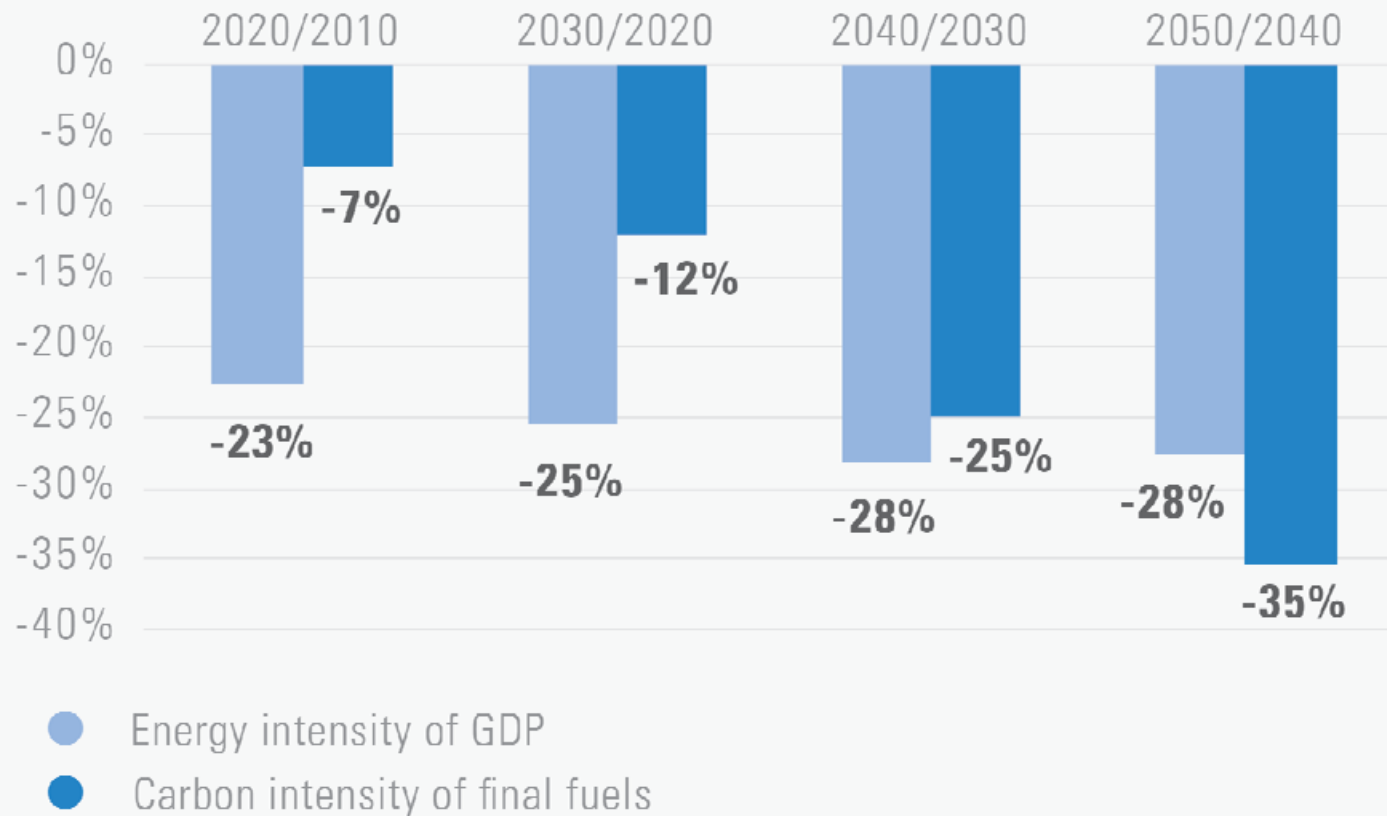
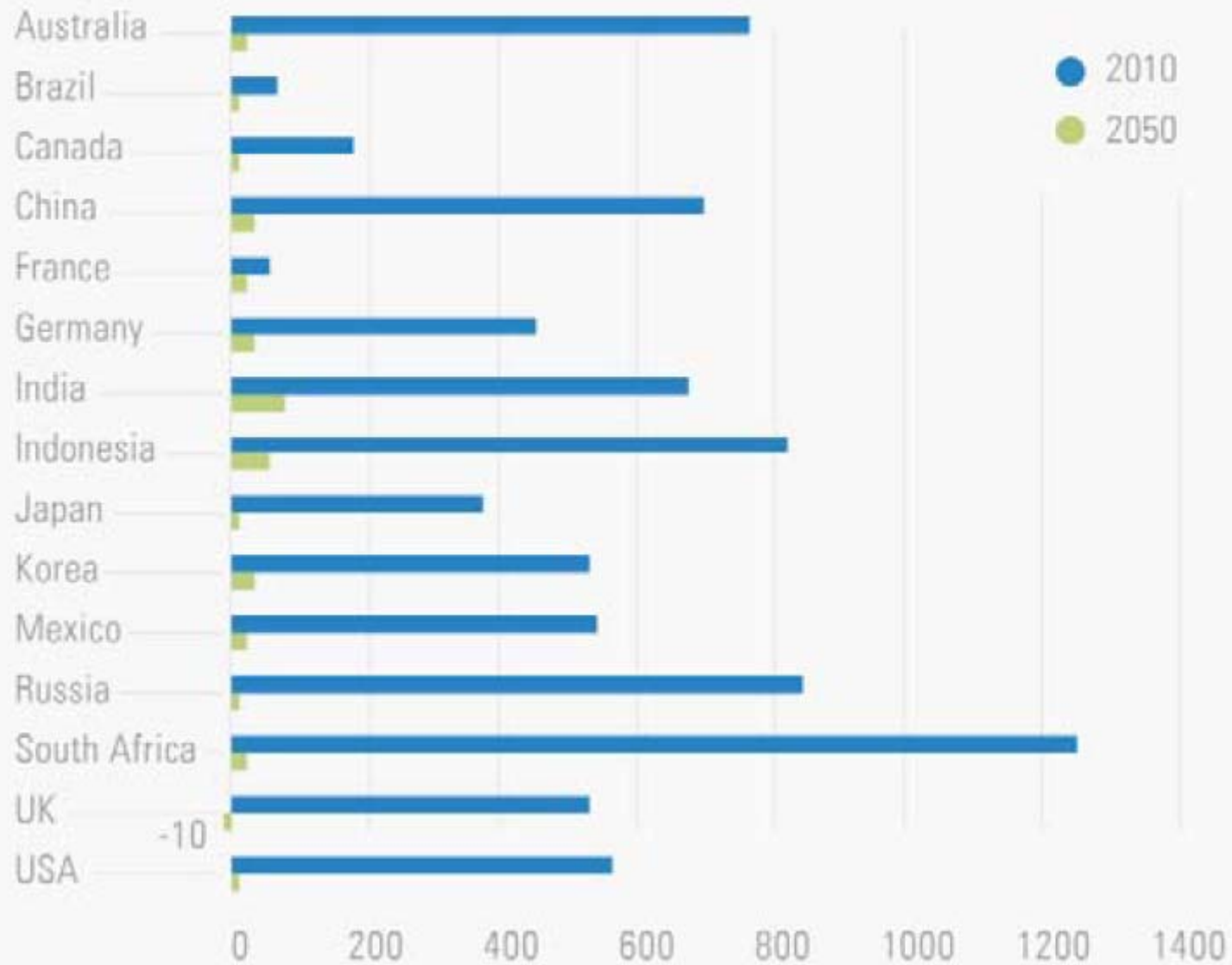
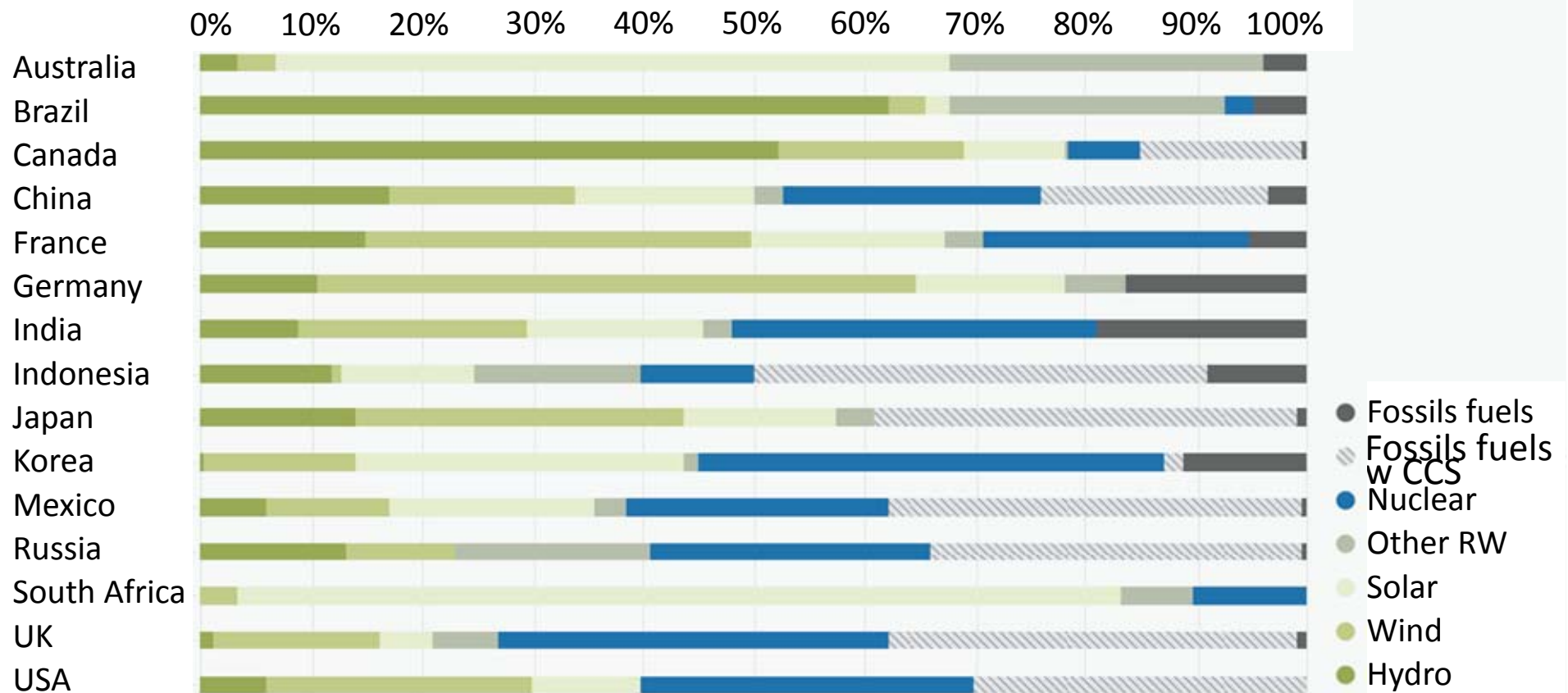


Figure 6.10. Carbon intensity of electricity production (tCO₂/toe)



Power generation mix in 2050 in the 15 DDPPs

Figure 6.11. Characterization of electricity production in 2050



Some key insights from national DDPs

Key technical pillars to decarbonization are common to all countries (Energy efficiency, Low carbon electricity, Fuel switching) but ...

- ... they require a scaling-up of international cooperation on research and policies (technology development, financial flows)
- ... they are developed in function of national circumstances
- ... they must be articulated in time: urgent energy efficiency!

Deep decarbonization can be compatible with...

- ... continued wealth increase (esp. in emerging countries)
- ... access to development as measured by activity levels

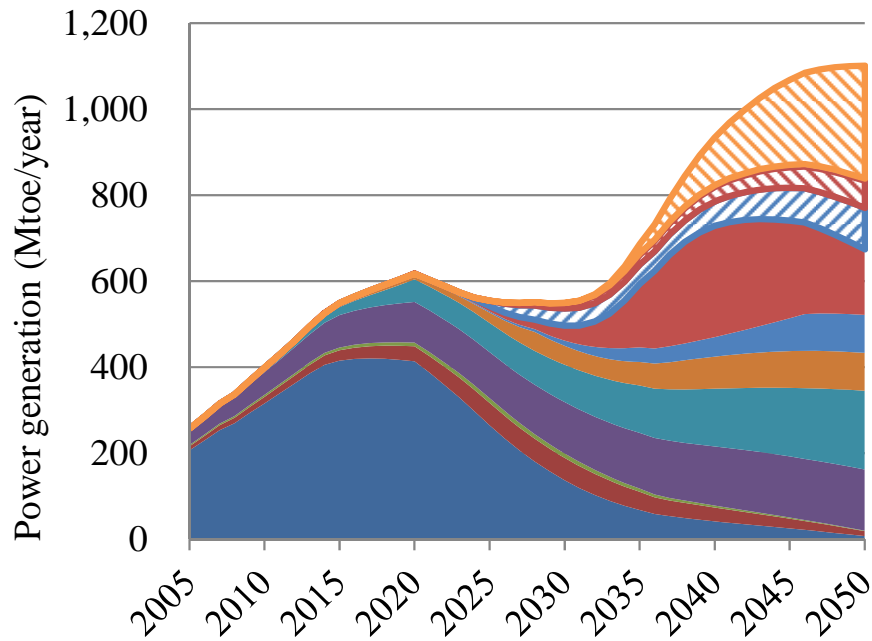
Some sectors are difficult to decarbonize with only technical solutions

- Structural change, development styles and energy needs

The importance of a long-term vision to elaborate short-term plans

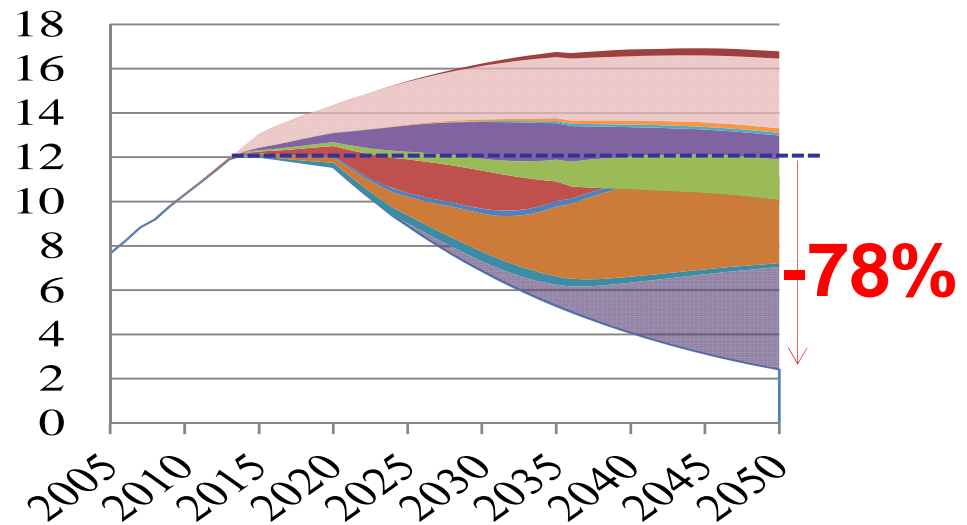
Mitigation case in the advanced scenario in China by AIM/CGE model

Power generation by source



- Bio w/CCS
- Bio
- Hyd
- Gas w/CCS
- Sol
- Gas
- Oil w/CCS
- Win
- Oil
- Coal w/CCS
- Nuc
- Coal
- Geo

Mitigation measures



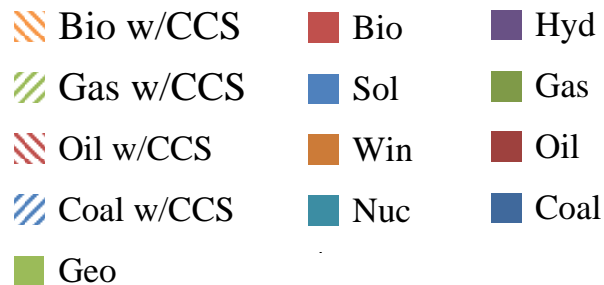
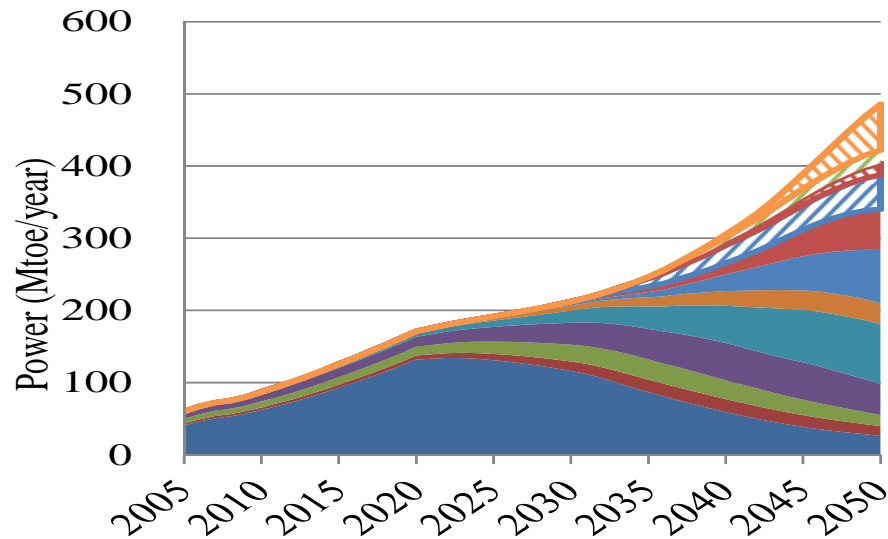
- Other
- Power_efficiency
- Non-energy GHG
- Renewable
- Enduse_efficiency
- Nuclear
- Enduse_fuel_switch
- CCS
- Electricity_demand
- Emission



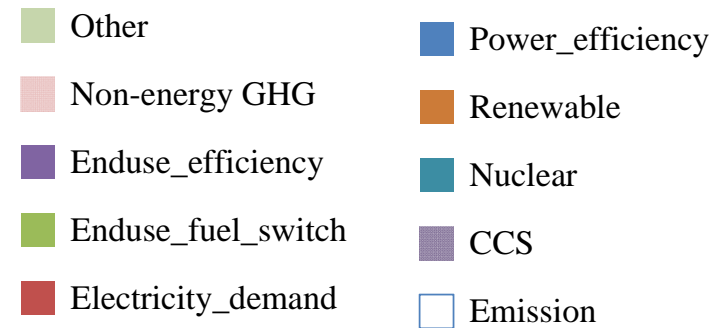
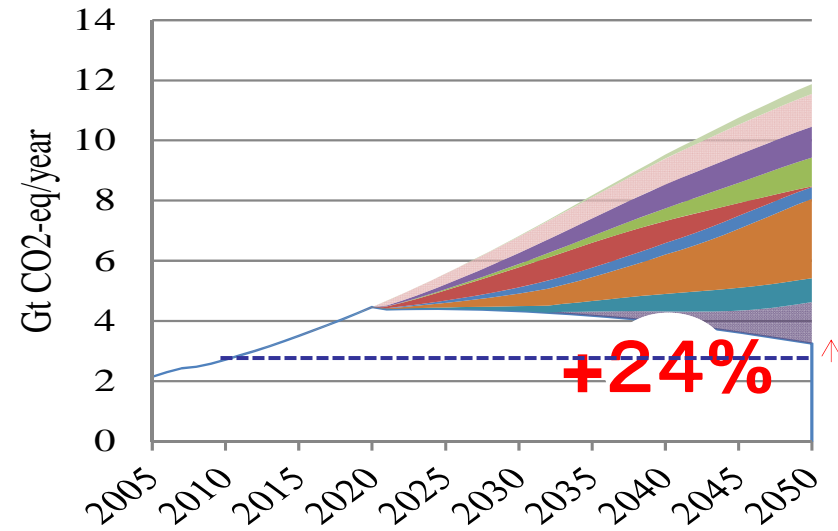
Note: Global target (50% reduction to 1990 level) of GHG emissions is allocated by equal per capita emission principle to each country

Mitigation case in the advanced scenario in India by AIM/CGE model

Power generation by source



Mitigation measures



Note: Global target (50% reduction to 1990 level) of GHG emissions is allocated by equal per capita emission principle to each country

Next Steps

How to deliver transformation to a low carbon society is a question.

- Reform of energy systems
 - ✓ Energy security will promote use of local renewables
 - ✓ Co-benefit (e.g. clean air) will promote non-fossil energy
 - ✓ Reduction of energy bill will promote energy savings
- Redirect investment
 - ✓ Needs to understand costs of transformation can be an opportunity to investments
 - ✓ New governance initiative can promote transformation
 - e.g. Investor governance initiative such as CDP (Carbon Disclosure Project), INCR (Investor Network on Climate Risk)
 - long-term investment strategies
- Behavioral change
- International collaboration
- City/ national/ international level approach
- Linkage between long-term strategies and short-term strategies

Example of city level approach

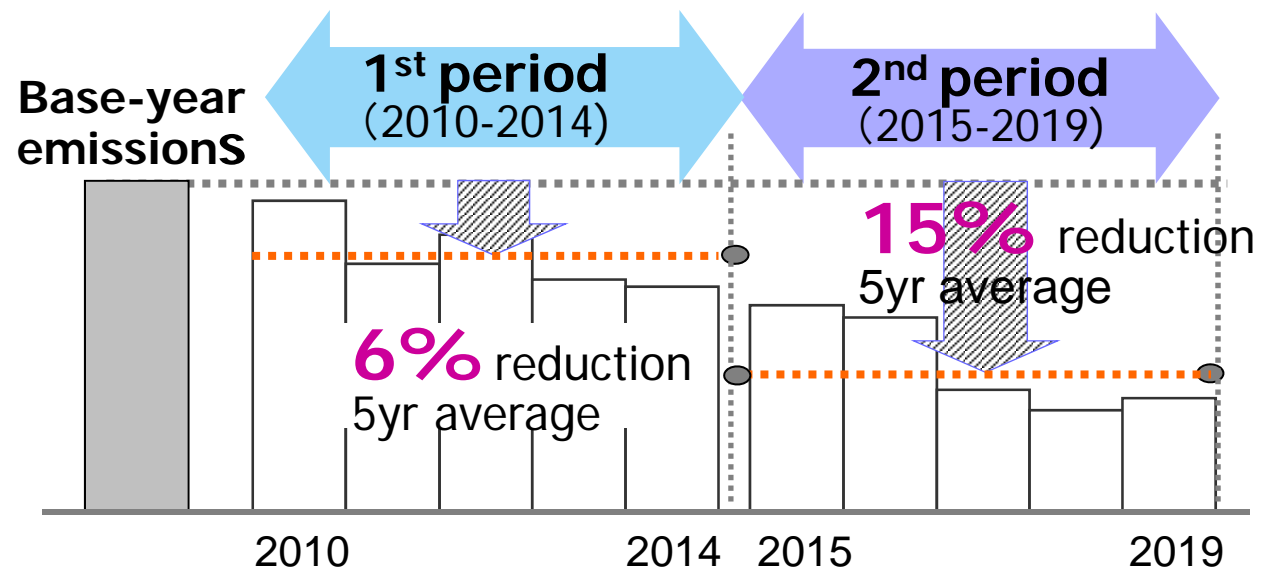
Tokyo Cap-and-Trade: Outline 1

Cap, Covered Facilities, Cap Settings

Cap (Total emissions allowed for the covered sector) was designed to enable Tokyo to achieve "-25% by 2020" emission target

Setting cap on emissions from **1,400** facilities (Mainly commercial bldgs.), accounting for **20%** of Tokyo's total emissions

Under the cap, each building is obligated to reduce emissions by **6,8 %** (first period) and **15,17%** in the second period



Example of city level approach

Tokyo Cap-and-Trade: Outline 2

Trade and Offset

Emission Trading:

Trade scheme can be utilized by owners to fulfill their obligations
Tradable allowances are limited to the excess reductions over compliance obligations

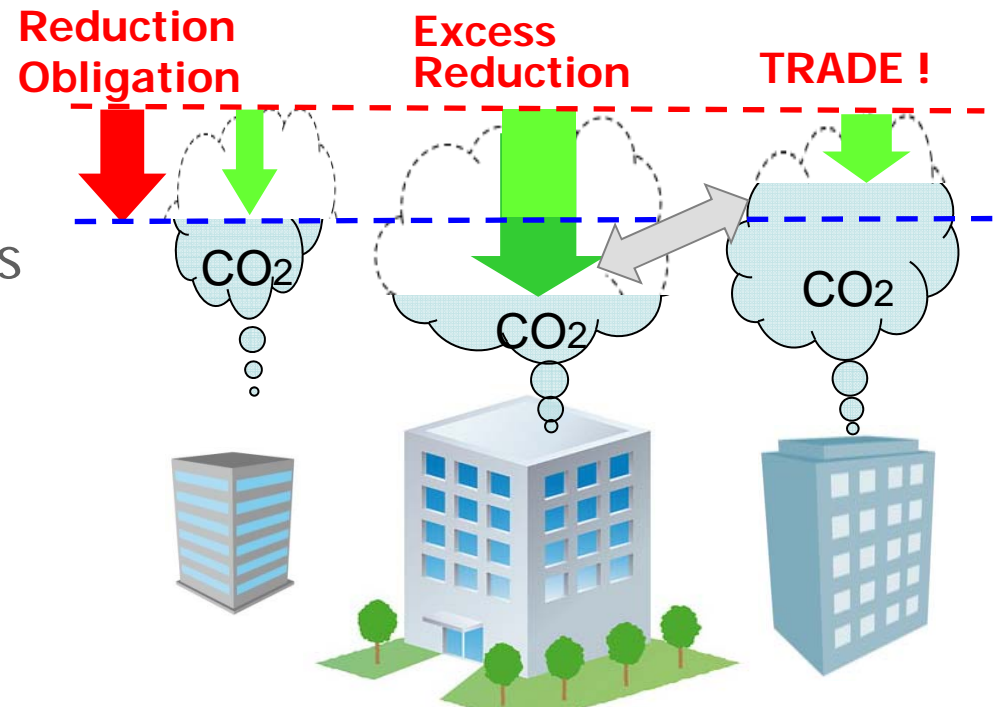
MRV: Monitoring and annual reporting are required
Verification system established for the program

Offset systems:

Renewables, emission reductions in small facilities, etc.

Linkage:

Link with the C&T of an adjacent prefecture

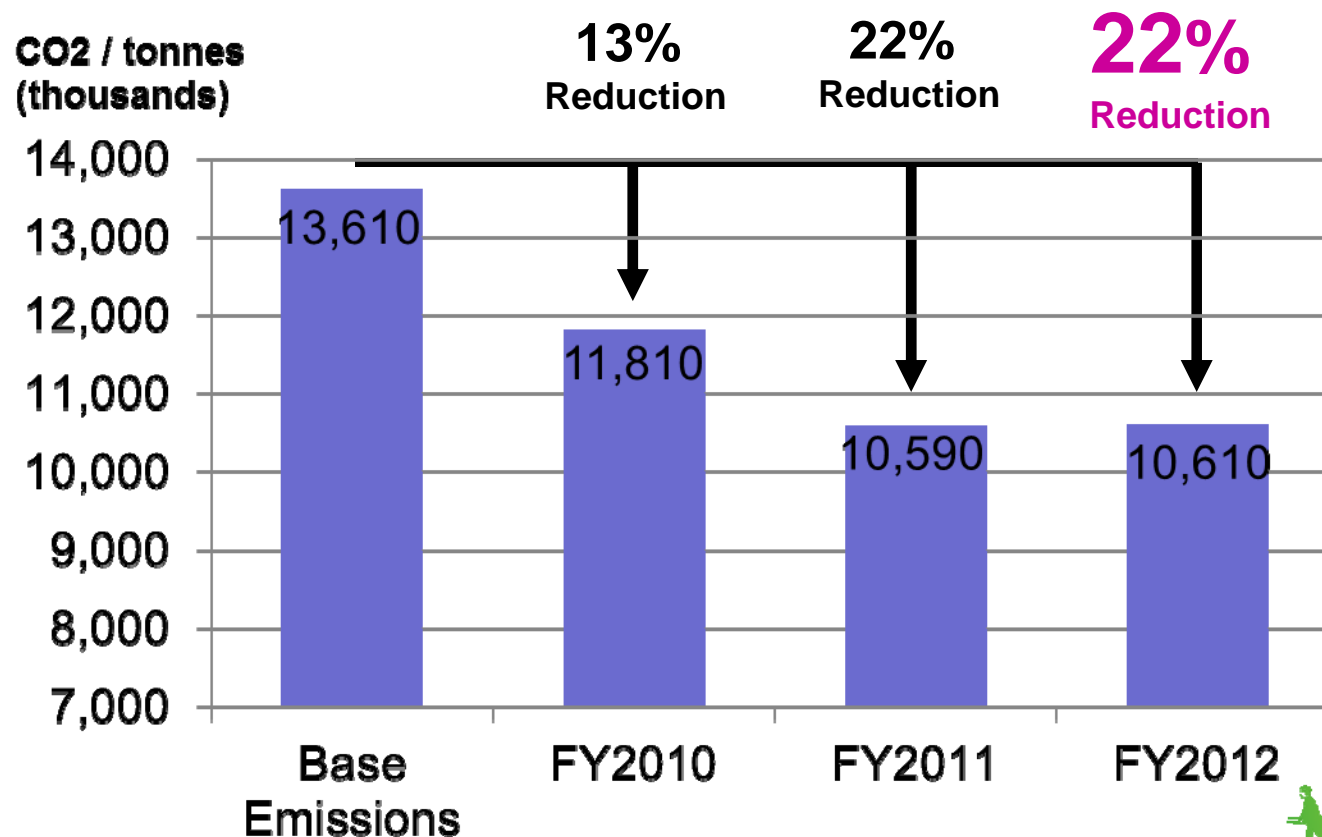


Example of city level approach

Tokyo Cap-and-Trade: Results to Date

Remarkable Reductions in 3 Years

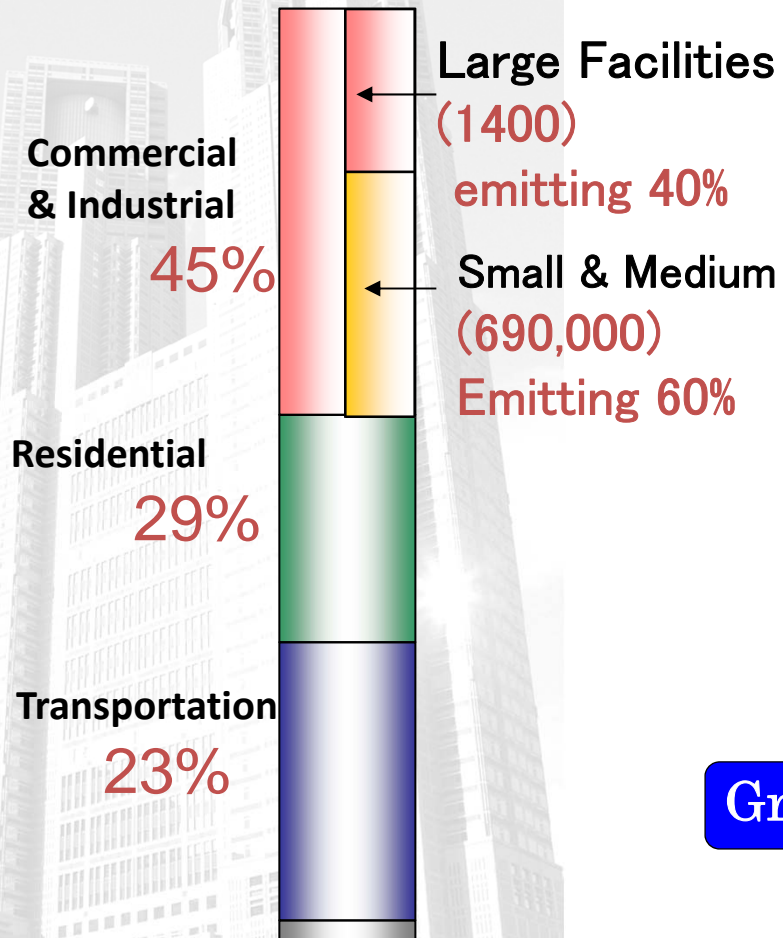
Total CO2 emissions from facilities covered by C&T dropped drastically



Contact us: tokyoets@member.metro.tokyo.jp
TMG Website: www.kankyo.metro.tokyo.jp/en

Portfolio of Tokyo's Climate Change Actions

Total CO2 Emission:
50.39 Mt



Large Facilities

- Cap-and-Trade Program

Small & Medium-sized Facilities

- Carbon Reduction Reporting Program
- Tax Reduction
- Energy-saving & Carbon Credit

Residential Sector

- Energy Saving Advisers
- Environmental Education

Transportation

- Subsidy Program for Evs and pHVs
- Benchmarking & Rating Program for Freight Transportation

Green Building & City development

- Green Building Program
- Green Labeling Program for Condominiums
- Energy Performance Certificate Program

Thank you for your attention!