

COP16 & MOP6 Side Event
Shifting to Low-carbon and Climate resilient
Development in Asia and the Pacific

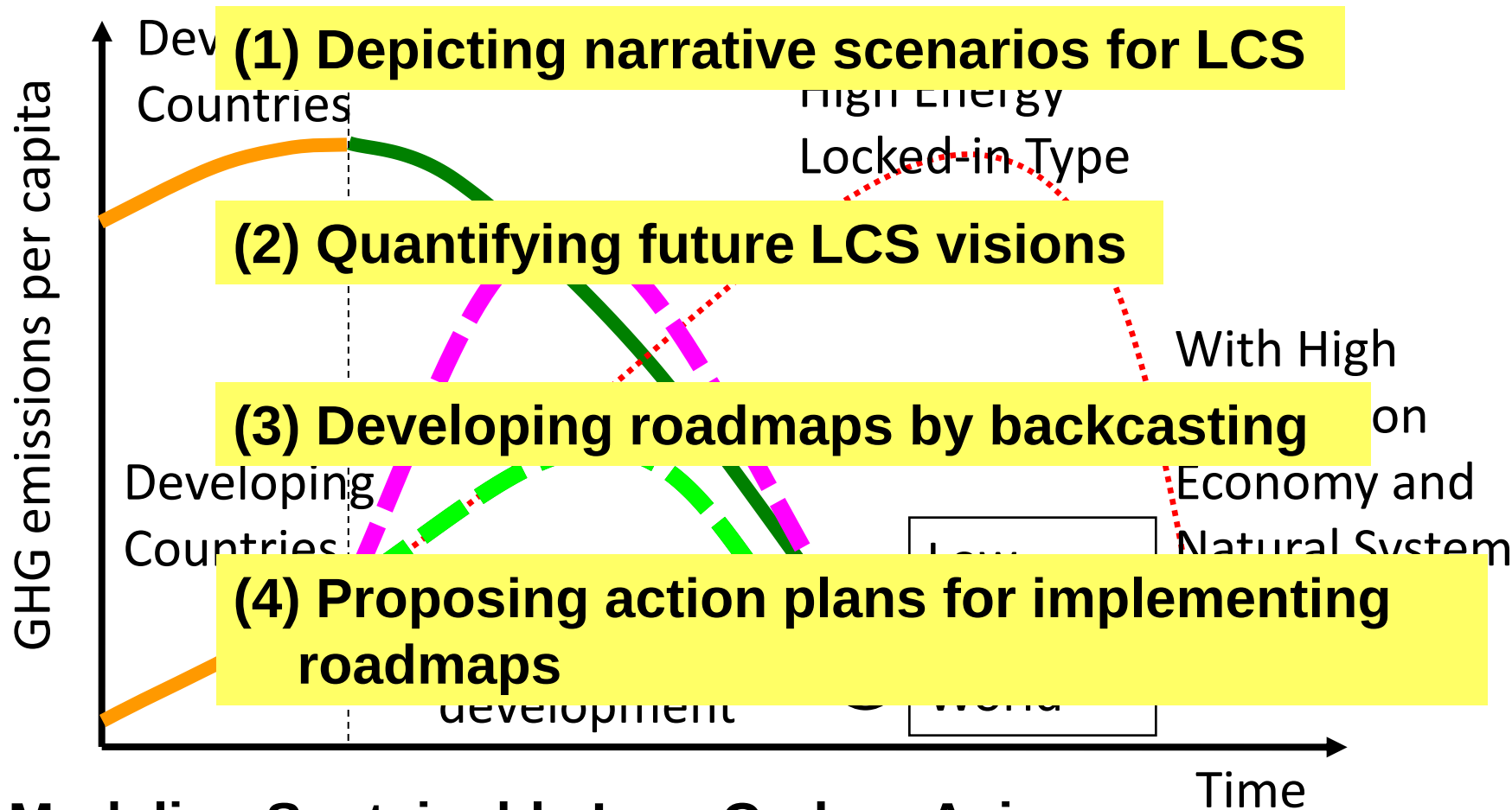
NIES Panel: Asia Low Carbon Society Scenarios

Mikiko Kainuma and Junichi Fujino (NIES, Japan),
P.R. Shukla (IIM, India) and
Kejun Jiang (ERI, China)

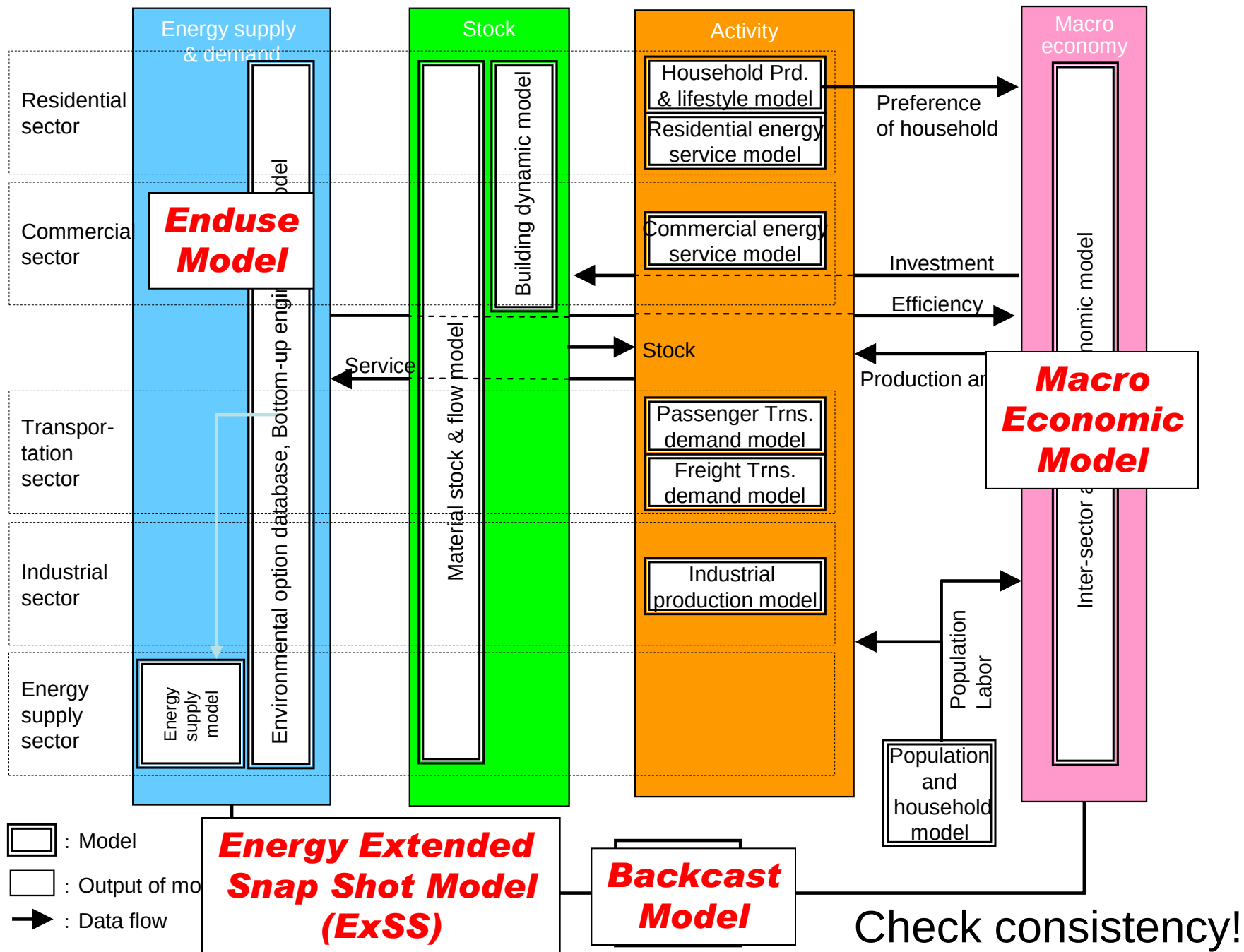
Mamey Room, Cancunmesse, Cancun, Mexico
Friday, 3 December 2010



Asian LCS scenarios study

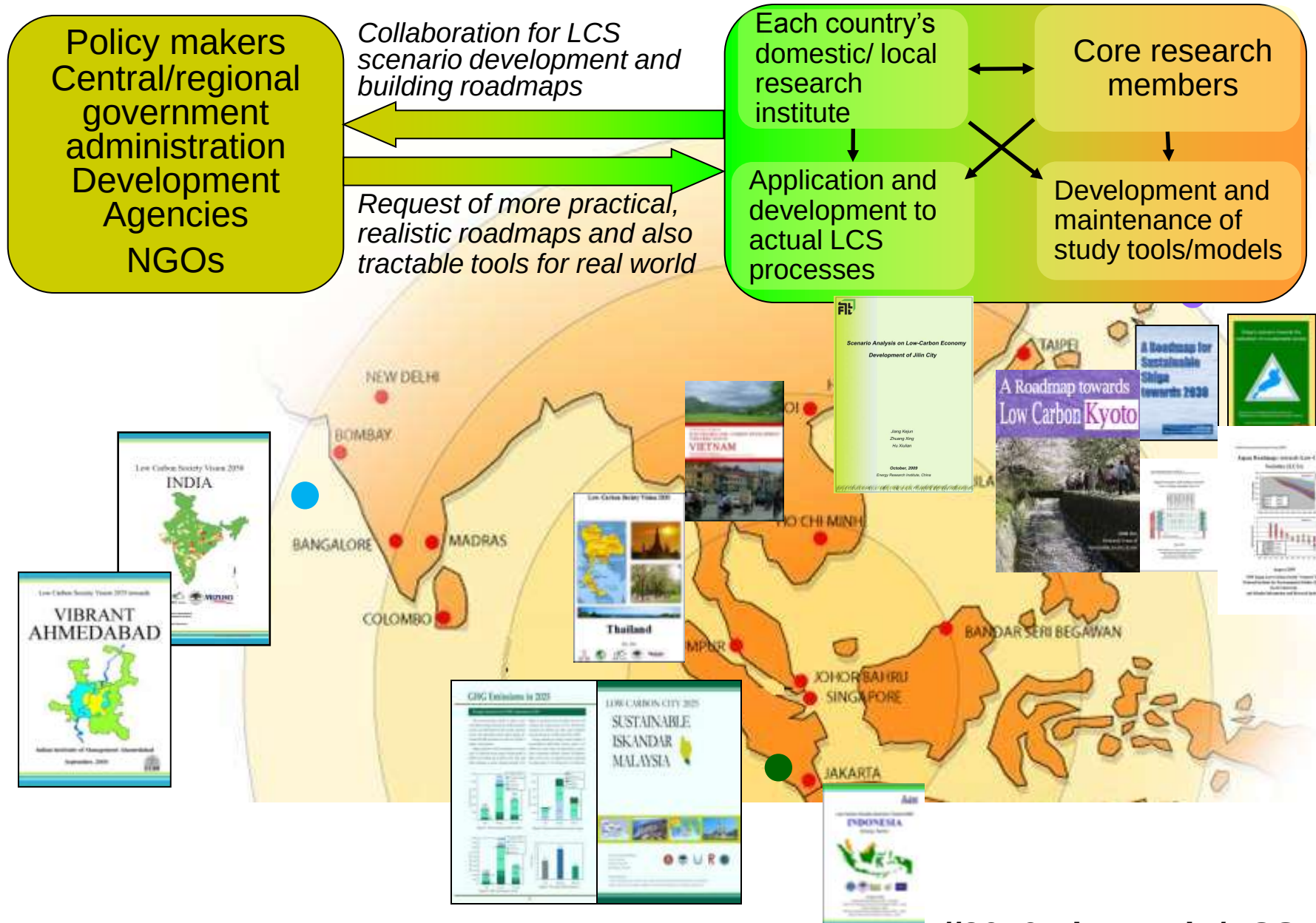


Modeling Sustainable Low-Carbon Asia



AIM (Asia-Pacific Integrated Modeling) for Asia LCS scenarios

How to deploy our study to real world



Example of concrete execution plan towards Local LCS

- Roadmap towards Low Carbon Kyoto study -

Action 1 Walkable City, Kyoto

The "Walkable City, Kyoto" action will reduce CO₂ emissions in 2030 by 722 kt-CO₂. These are measures for promoting urban design that prioritizes pedestrians and public transport in order to reduce CO₂ emissions in the transport sector.

In part because Kyoto City has already actively promoted this measure, we estimate that many of the measures in the roadmap can be completed by the year 2020. However, other measures such as road pricing and the introduction of light rail transit (LRT) that involve long-term construction work or more significant changes to the transport structure will take longer, so all of the measures will not be completed until 2028.

The objective of "Promotion of mobility management" is to promote the use of public transport by the general public. "Implementation of transport demand management (TDM)" is needed to bring about a voluntary change in the attitude of the general public. This measure will employ educational pamphlets and related maps to encourage the use of public transport, opinion surveys of transport behavior and so on.

"Construction of pedestrian transit malls" is a measure designed to bring about a shift from the use of privately owned automobiles to public transport as the means of transport used by the general public. The sidewalks along Shijo-dori in the city center will be widened to secure a comfortable pedestrian space and promote a modal shift on the part of the general public. The use of pedestrian transit malls by the general public will enable CO₂ emissions to be reduced by 32 kt-CO₂.

Moreover, as many tourists visit Kyoto from other areas, it is important to have these tourists use public transport as well. "Attraction of tourists using public transport" is the measure that will be employed to promote the use of public transport by tourists. Publicity campaigns will be held at major train stations in the Kinki and Chubu districts to invite tourists to come by public transport. Moreover, the introduction of intelligent buses that travel between tourist spots in the city will encourage tourists to use public transport to travel within the city as well. These measures will reduce CO₂ emissions by 12 kt-CO₂.

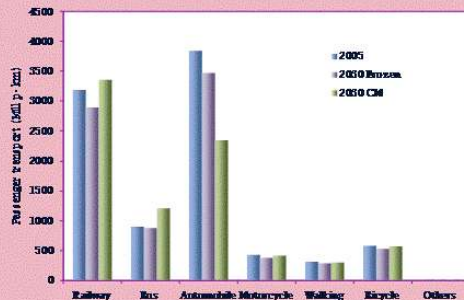


Figure 7 Passenger transport volume

In the "Kansai current levels" case, the modal share for means of transport is the same in 2050 as it was in 2005. In the "corrective measures" case, a modal shift has occurred from privately owned automobiles to other means of transport, with the result that the automobile share has decreased and the share of public transport, bicycle and pedestrian transit has increased.

In the "corrective measures" case, the modal share for means of transport within the region that was occupied by automobiles has shifted 10% to trains, 20% to buses, 2% to pedestrian transit, and 7% to bicycles. Moreover, inter-regional transport within the city by automobile has shifted 10% to trains, 20% to buses, and 5% each to pedestrian transit and bicycles. Transport to places outside the region by automobile has shifted 50% to trains.

Six Action Plans in Kyoto

Walkable city, Kyoto

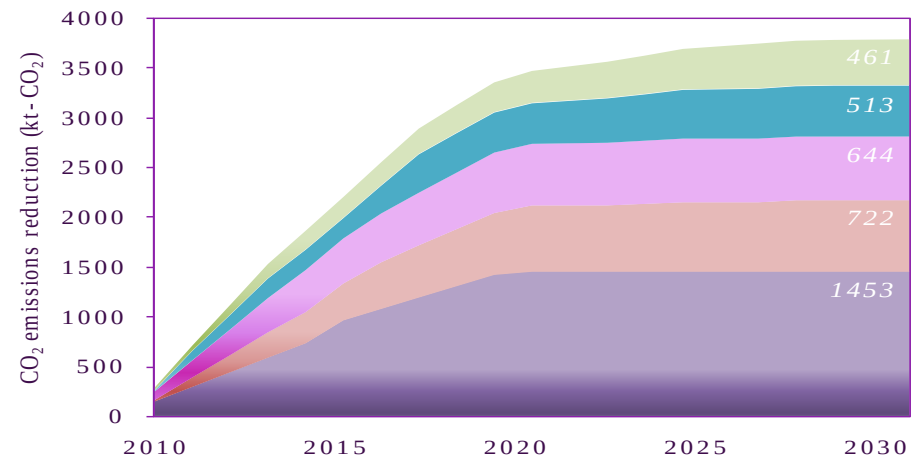
Decarbonization of Industry

Kyoto-style Buildings and Forest Development

Comprehensive Use of Renewable Energy

Low Carbon Lifestyle

Establishment of a Funding Mechanism



Low Carbon Cities: Sustainable Iskandar Malaysia

Establishment of a sustainable low - carbon society in Iskandar Malaysia

Create awareness among local authorities, the State government, stakeholders and the community urgent and decisive actions to be taken to realize a robust growth and low - carbon Malaysia

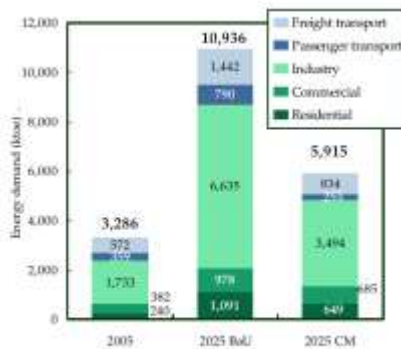


Figure 6. Final energy demand by sector

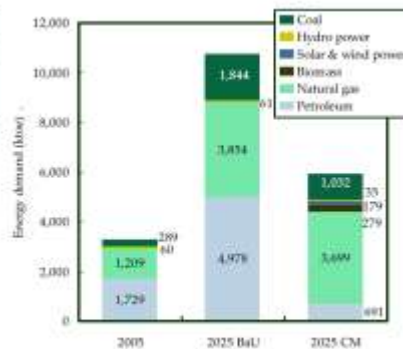


Figure 7. Energy demand by primary energy

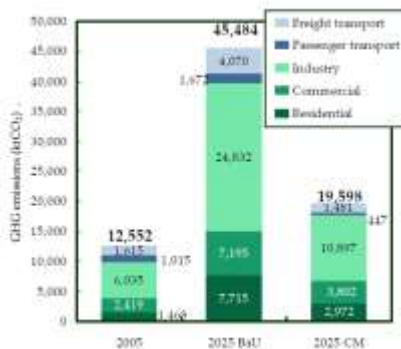


Figure 8. GHG emissions by sector

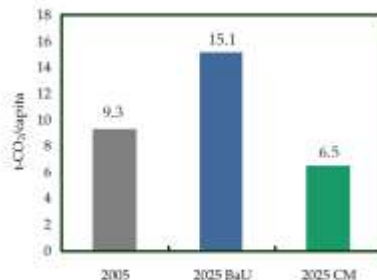
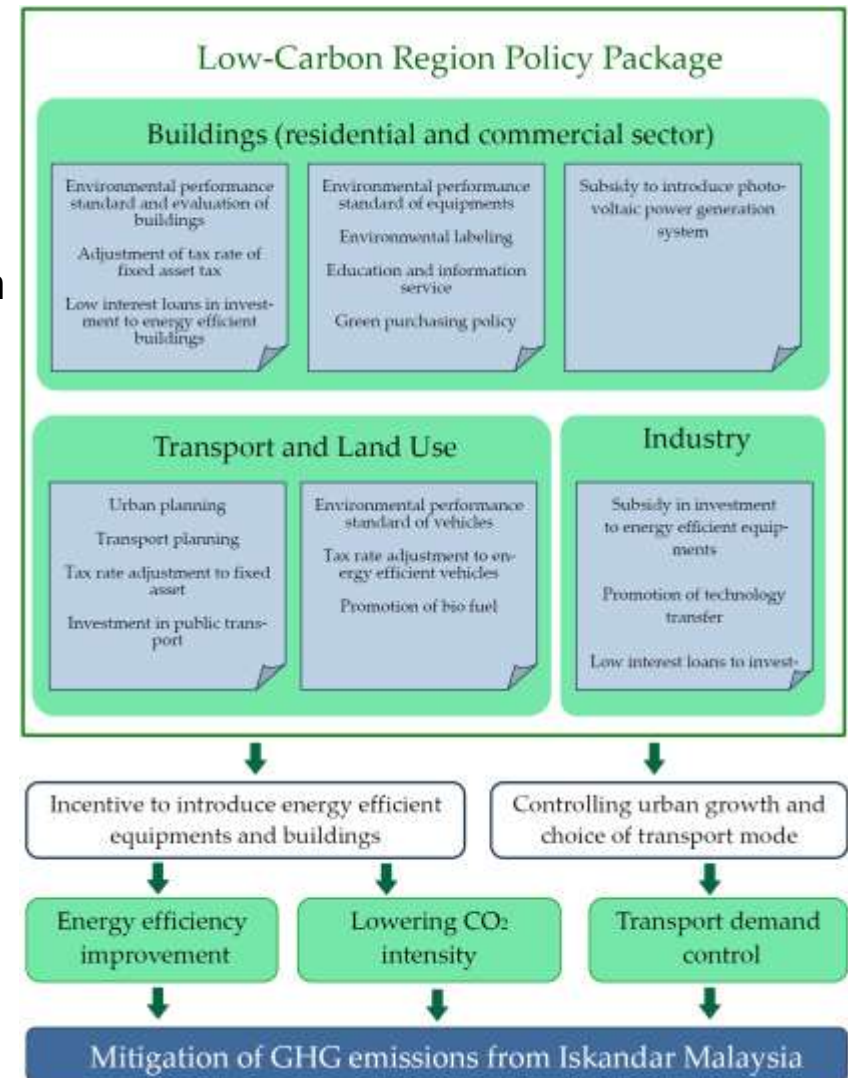


Figure 9. Per capita GHG emissions



India: Commitments, Actions and Drivers

Commitments and Actions

Copenhagen Commitments

- 20 to 25% Emissions Intensity Reduction from 2005 to 2020
- Per Capita Emissions Below OECD Average (through 2100)

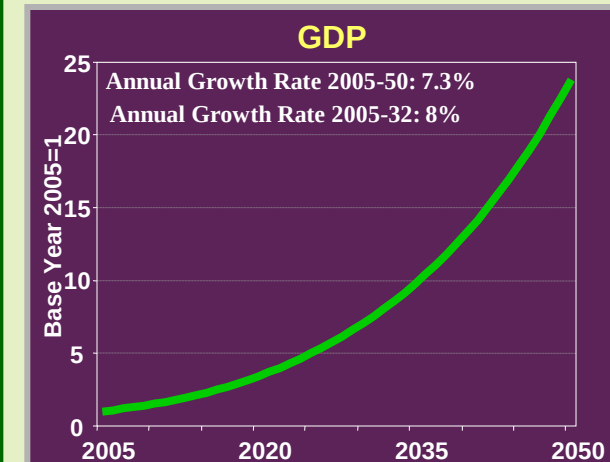
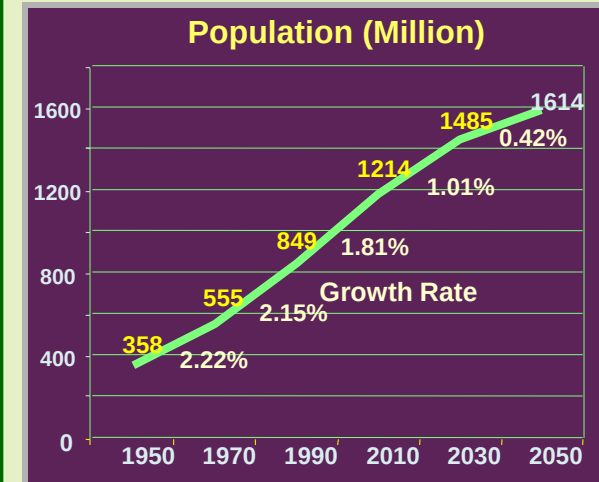
National Climate Change Action Plan - 8 National Missions

1. Solar Energy (20 GW by 2022; 2 GW off-grid; 20 m sq. m collectors)
2. Enhanced energy efficiency (Avoided capacity of 19000 MW by 2014-15)
3. Sustainable habitat
4. Water Sector (20% water use efficiency improvement)
5. Sustaining the Himalayan eco-system
6. A "Green India" (20 Mil. Hectare afforestation by 2020; Forest cover from 23 to 33%)
7. Sustainable agriculture (micro irrigation promotion in 40 m ha)
8. Strategic knowledge for climate change

Domestic Actions

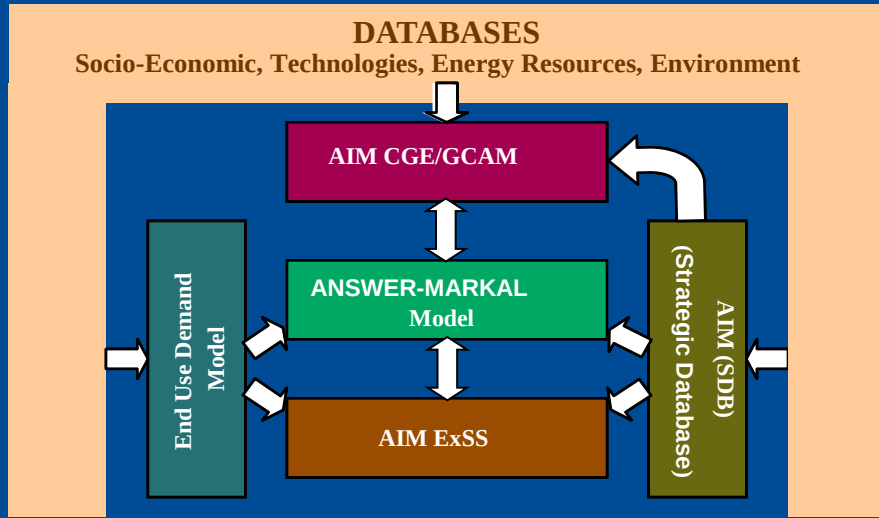
- Carbon tax on coal to fund clean energy
 - US \$1/ton on domestic & imported coal; funds to be use for Clean Energy
- Enhanced Energy Efficiency measures
 - National Solar mission (20 GW by 2022; 2 GW off-grid; 20 m sq. m collectors)
- Mass Distribution of CFLs
 - Potential reduction of 6 GW of electricity demand

Drivers of Economy



BAU Projections

Integrated Modeling Framework

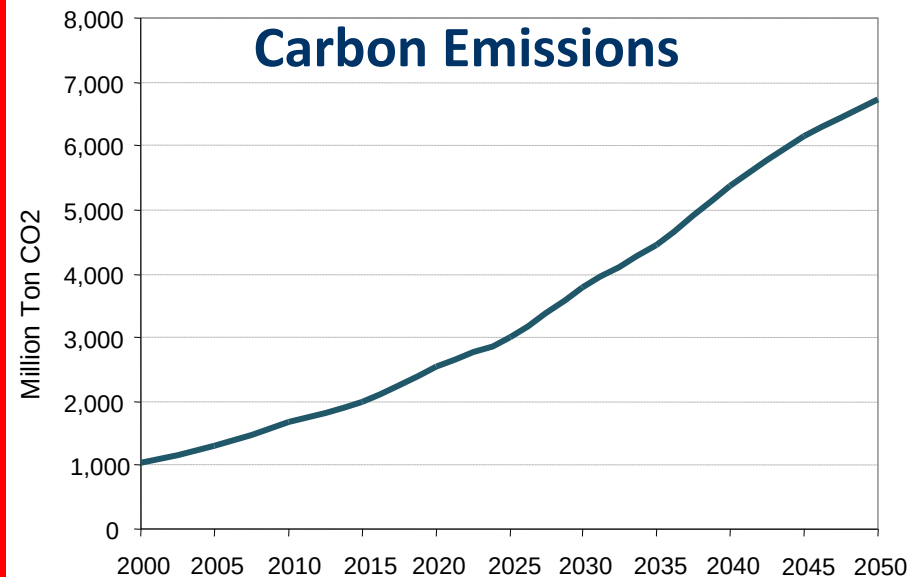
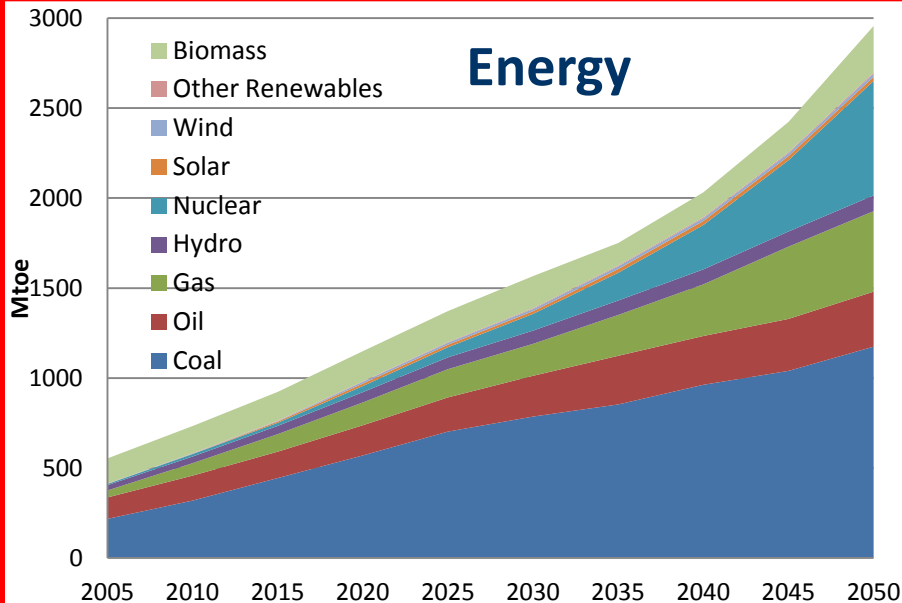


% Annual Intensity Decoupling: BAU

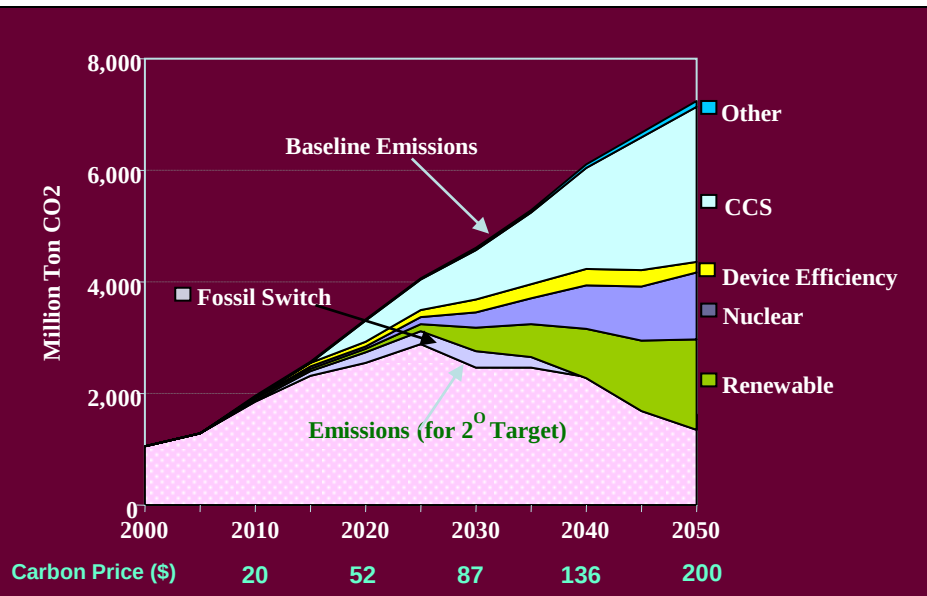
Period	Energy	Emissions
2005-2020	2.7	2.8
2005-2050	3.0	3.6

% Annual Energy intensity decoupling for Copenhagen Commitment:

- 1.5 to 1.9 Percent



2°C Stabilization: Mitigation Alternatives



Conventional Approach: transition with conventional path and carbon price

- High Carbon Price
- Climate Focused Technology Push
- Top-down/Supply-side actions

Technology Co-operation Areas

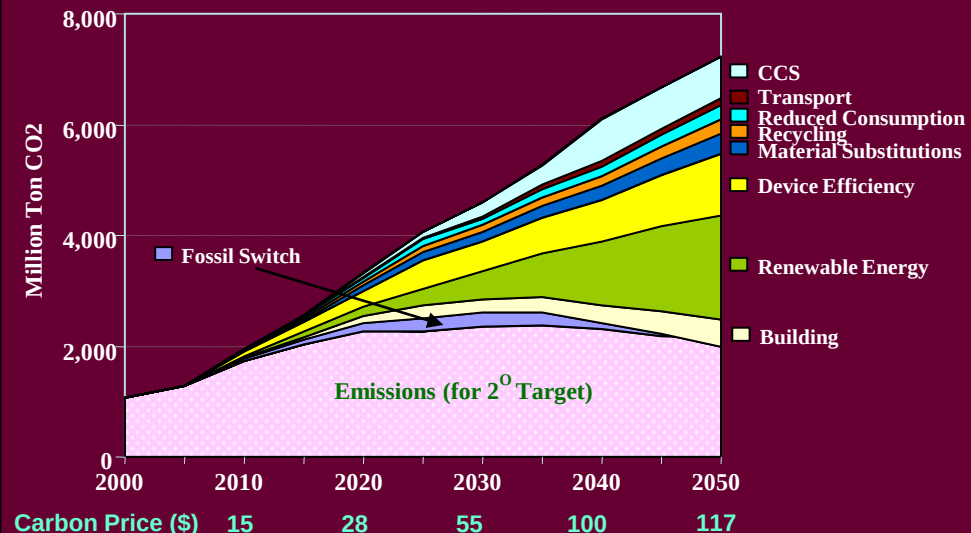
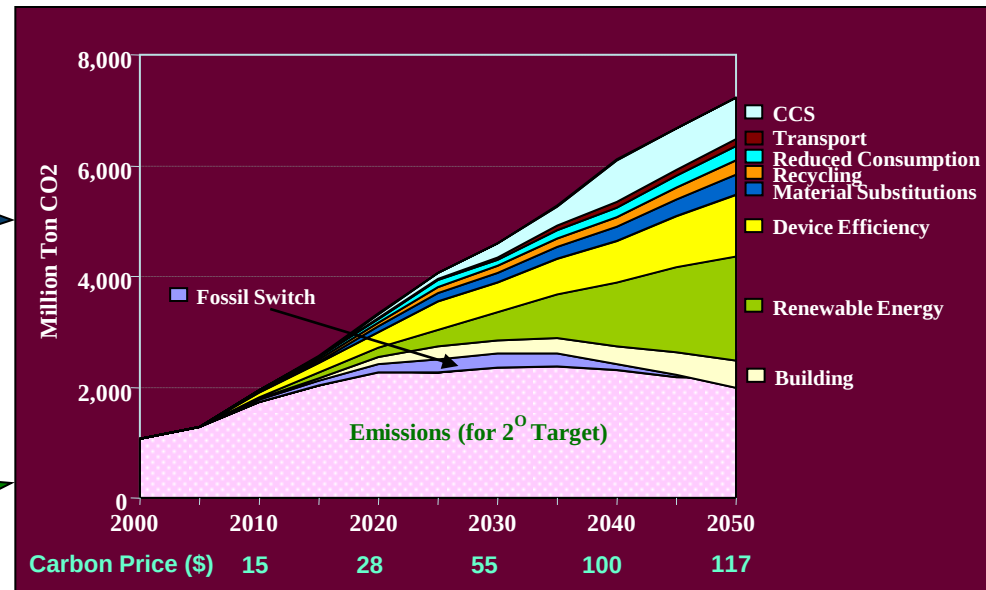
- Energy Efficiency
- Wind/Solar/Biomass/Small Hydro
- Nuclear/CCS

Sustainability Approach: aligning climate and sustainable development actions

- Low Carbon Price
- Bottom-up/Demand-side actions
- Behavioural change
- Diverse Technology portfolio

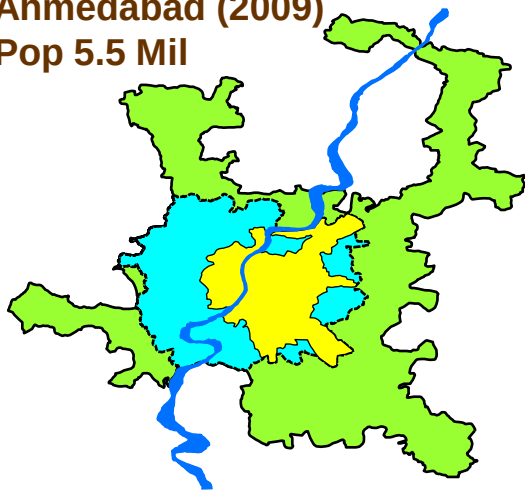
Technology Co-operation Areas

- Transport Infrastructure Technologies
- 3R, Material Substitutes, Renewable Energy
- Process Technologies
- Urban Planning, Behavioral Changes

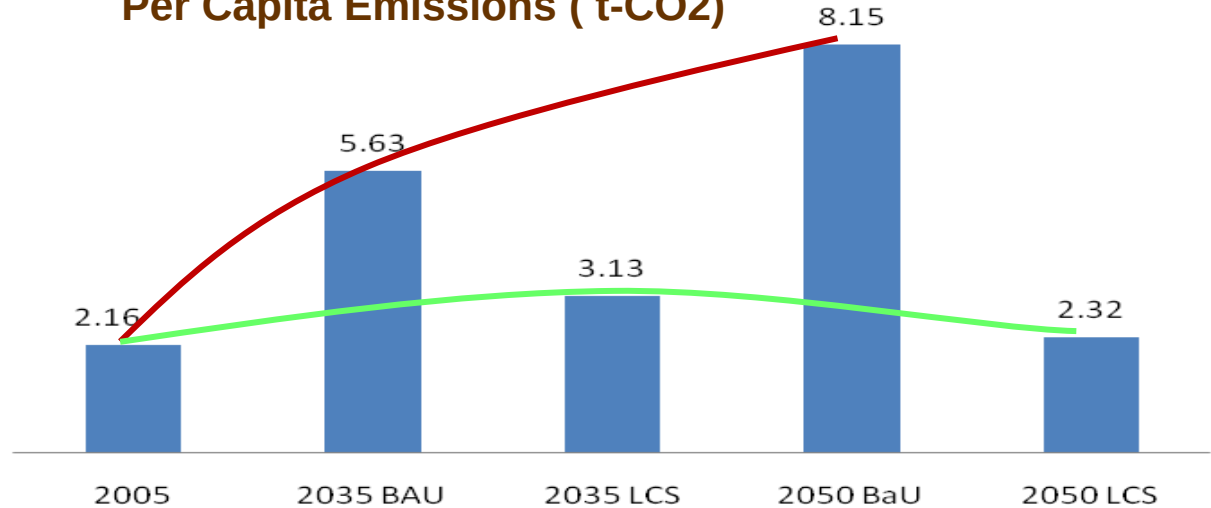


City Planning: Climate and Co-benefits

Ahmedabad (2009)
Pop 5.5 Mil

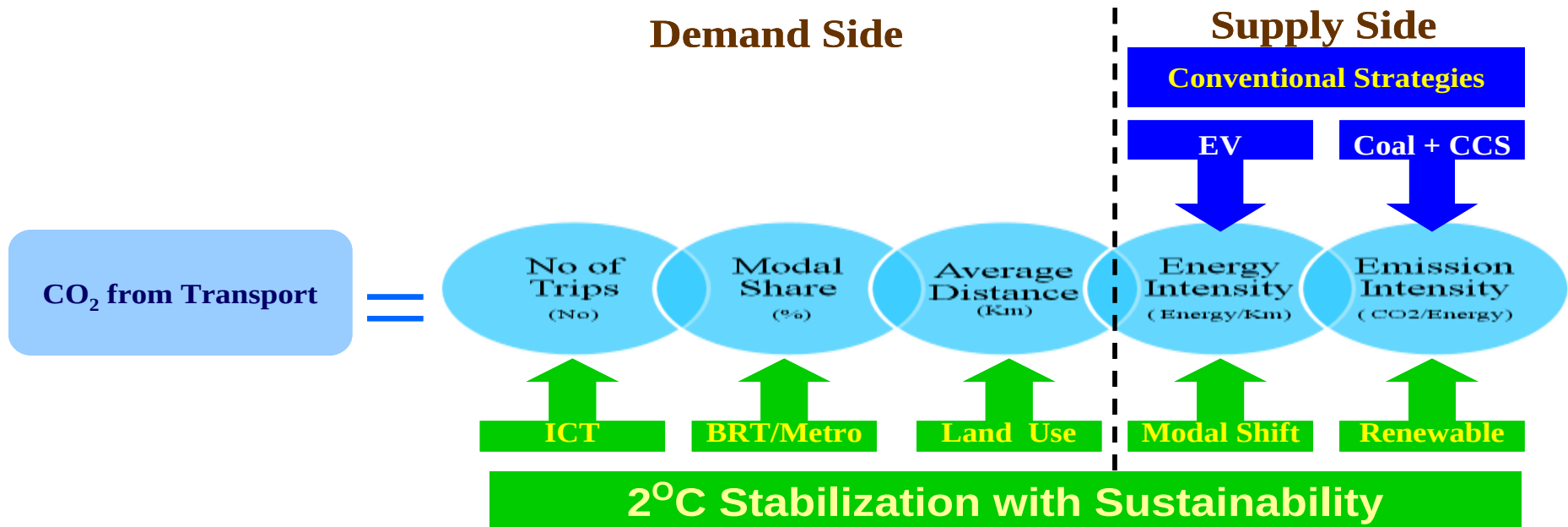


Per Capita Emissions (t-CO₂)



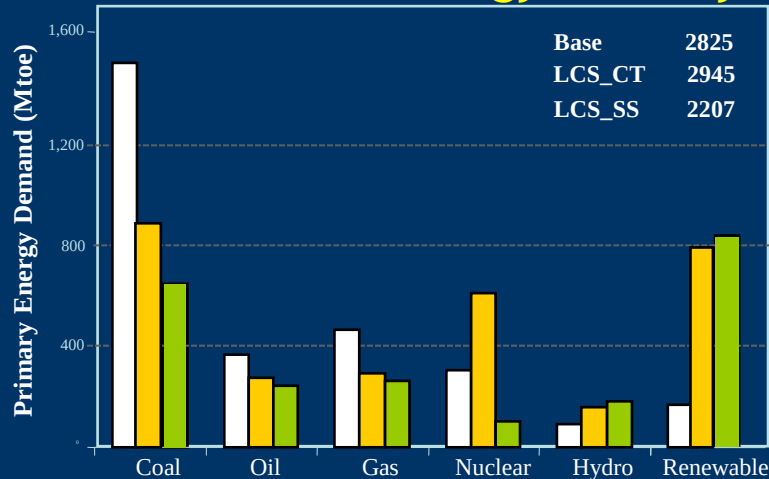
Demand Side

Supply Side

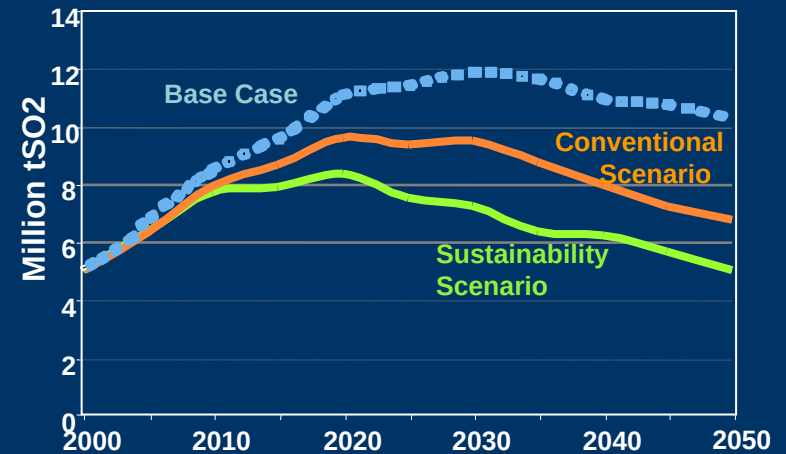


Co-benefits and Social Value of Carbon

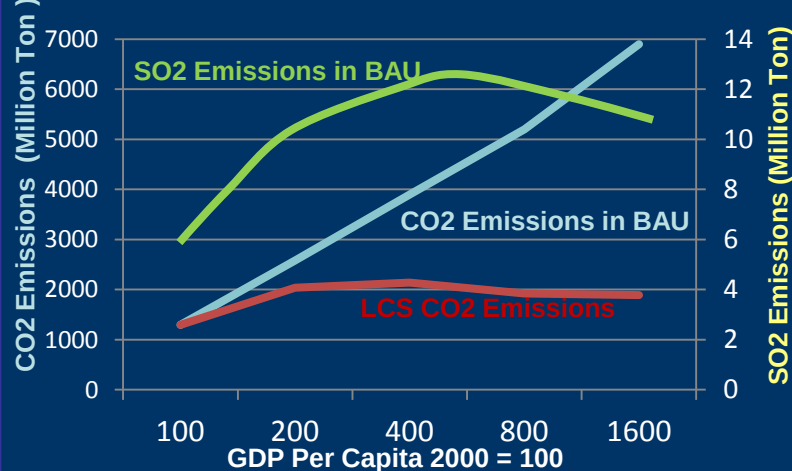
Co benefits: Energy Security



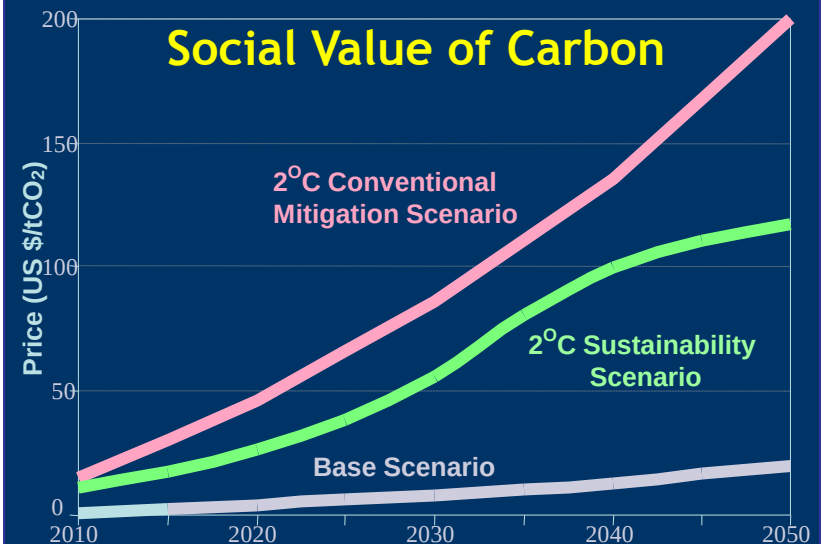
Co-benefits: SO₂ Emissions



Emissions and Income



Social Value of Carbon



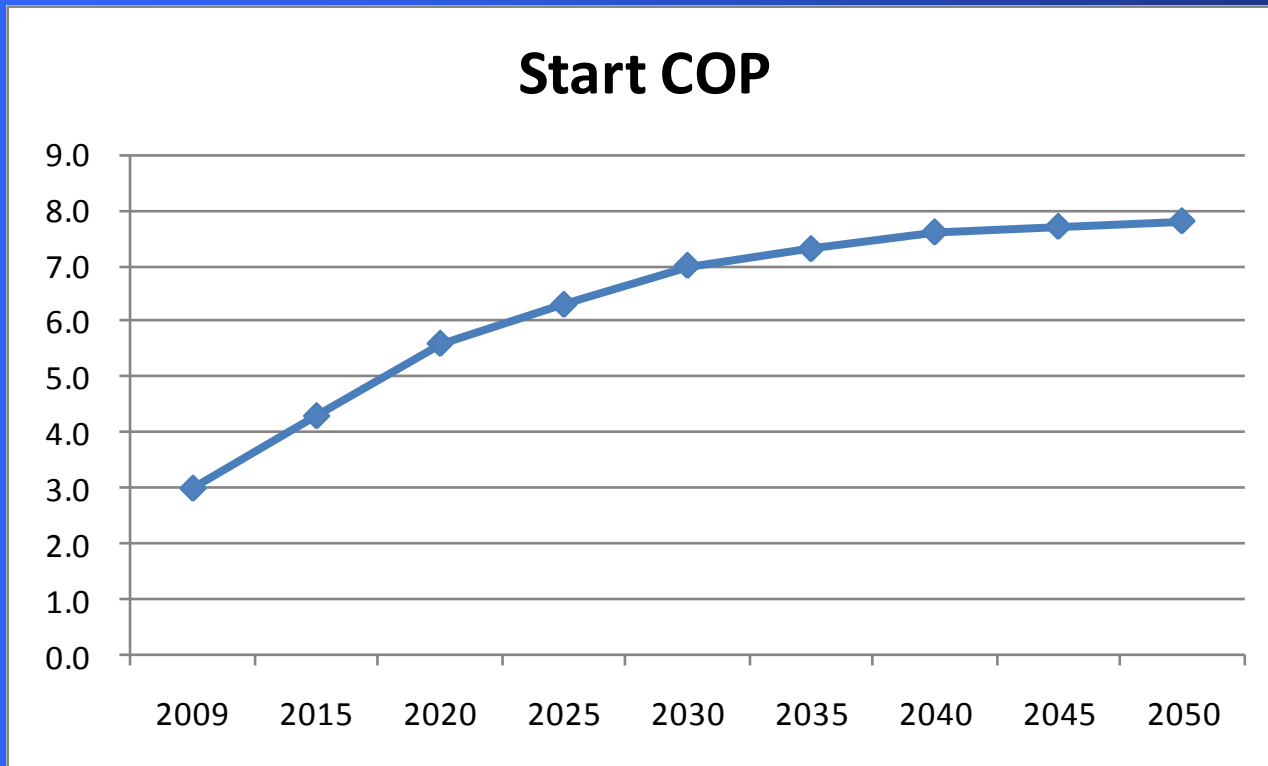
28 key technologies in the enhanced low carbon scenario in China

No.	Sector	Technology	Description	Note
1	Industry technology	High efficiency energy equipment	High efficiency furnace, kiln, waste heat recovery system, high efficiency process technologies, advanced electric motor	Nearly in market
2		New manufacture process technology for cement and steel		
3		CCS	In cement, steel making, refinery, ethylene manufacture	
4	Transport	Super high efficiency diesel vehicle	Advanced diesel hybrid engine	
5		Electric car		
6		Fuel cell car		
7		High efficiency aircraft	30% higher energy efficiency	
8		Bio-fuel aircraft		
9	Building	Super high efficiency air-conditioner	With COP>7	
10		LED lighting		
11		In house renewable energy system	Solar PV/Wind/Solar hot water and space heating	
12		Heat pumps		Mature
13		High isolation building		Mature
14		High efficiency electric appliance		Mature before 2030
15	Power generation	IGCC/Poly-Generation	With efficiency above 55%	
16		IGCC/Fuel cell	With efficiency above 60%	
17		On shore Wind		Mature
18		Off shore wind		Mature before 2020
19		Solar PV		
20		Solar Thermal		
21		4 th Generation Nuclear		
22		Advanced NGCC	With efficiency above 65%	
23		Biomass IGCC		
24		CCS in power generation		
25	Alternative fuels	Second generation bio-ethanol		
26		Bio-diesel	Vehicles, ships, vessels	
27	Grid	Smart grid		
28	Circulating technologies	Recycle, reuse, reducing material use		

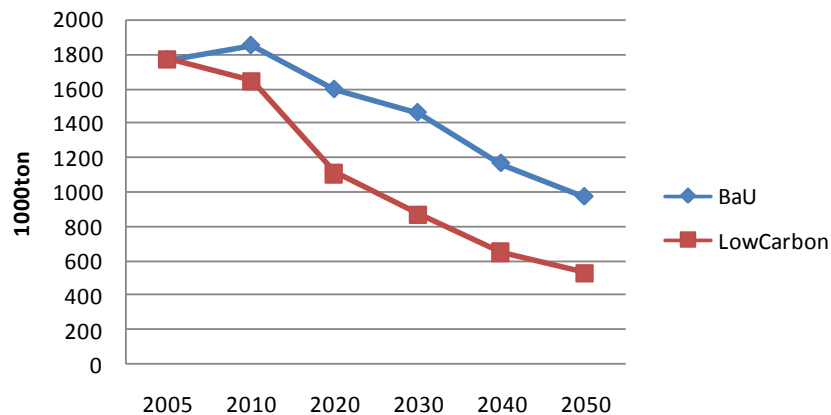


Policy roadmap: Super high efficiency air conditioner

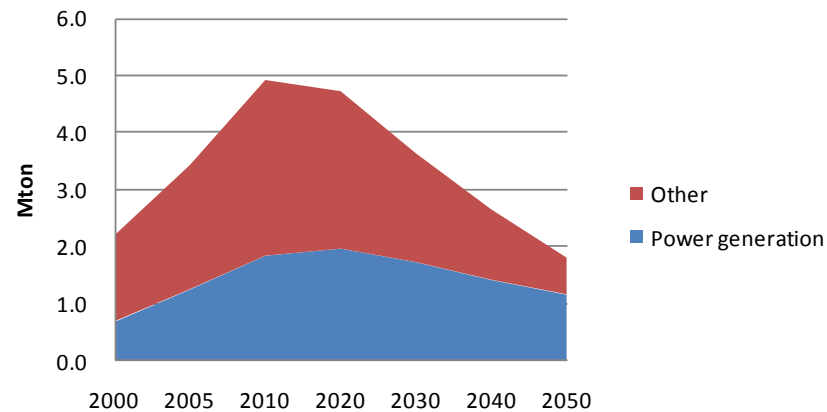
- Efficiency Standard: COP, MEPS
- Government Planning
- Subsidy



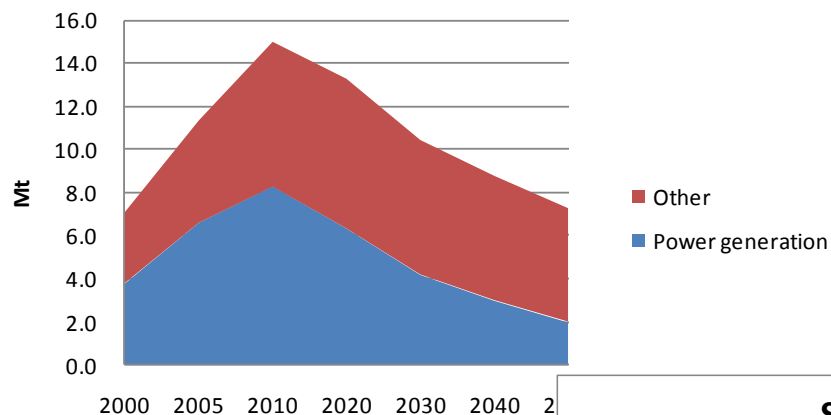
Black Carbon Emission in China



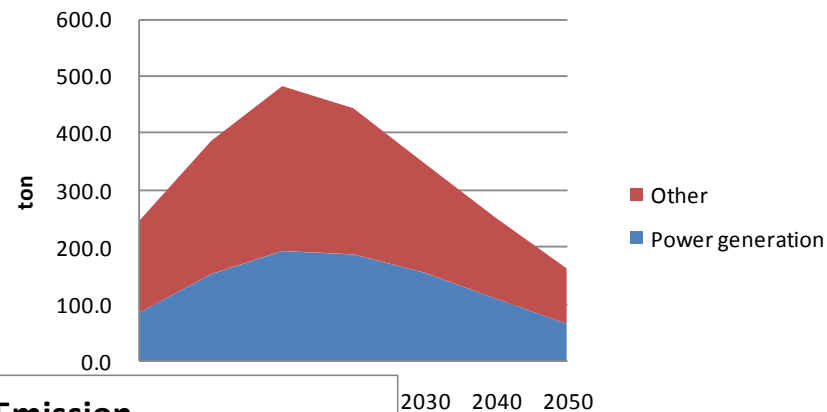
PM2.5 Emission



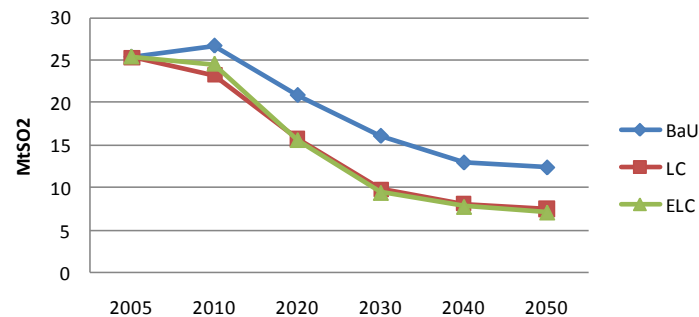
NOx Emission in China, ELC scenario



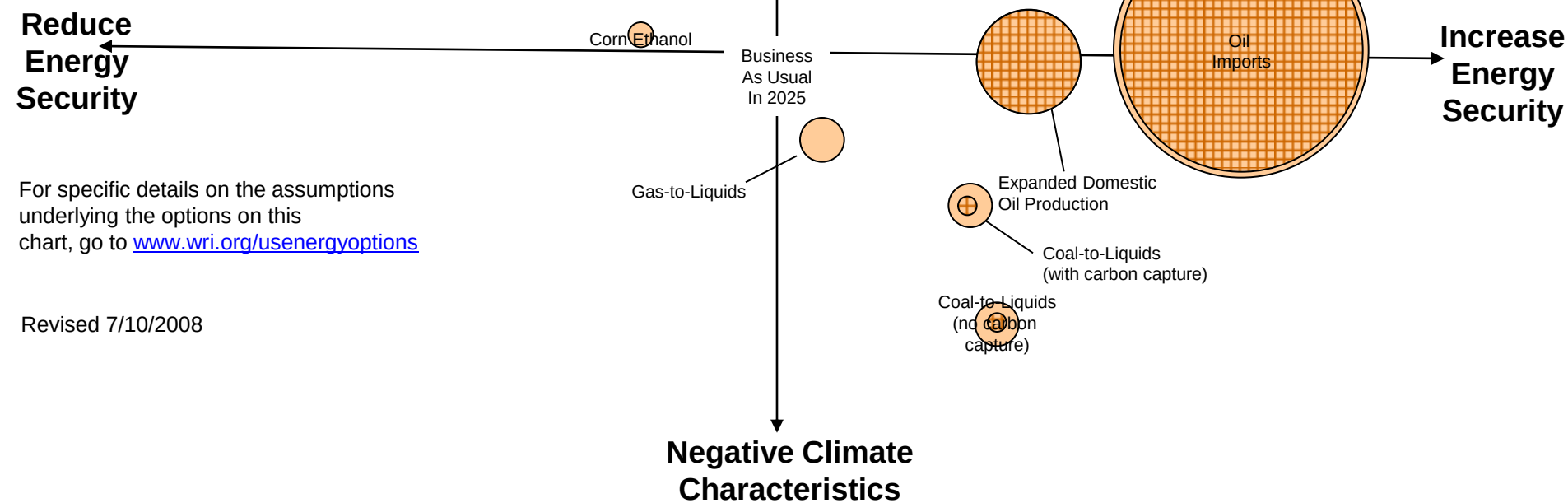
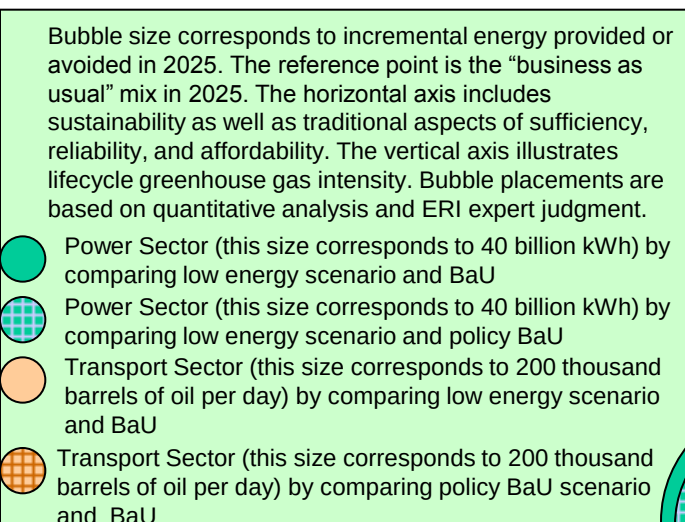
Mercury Emission



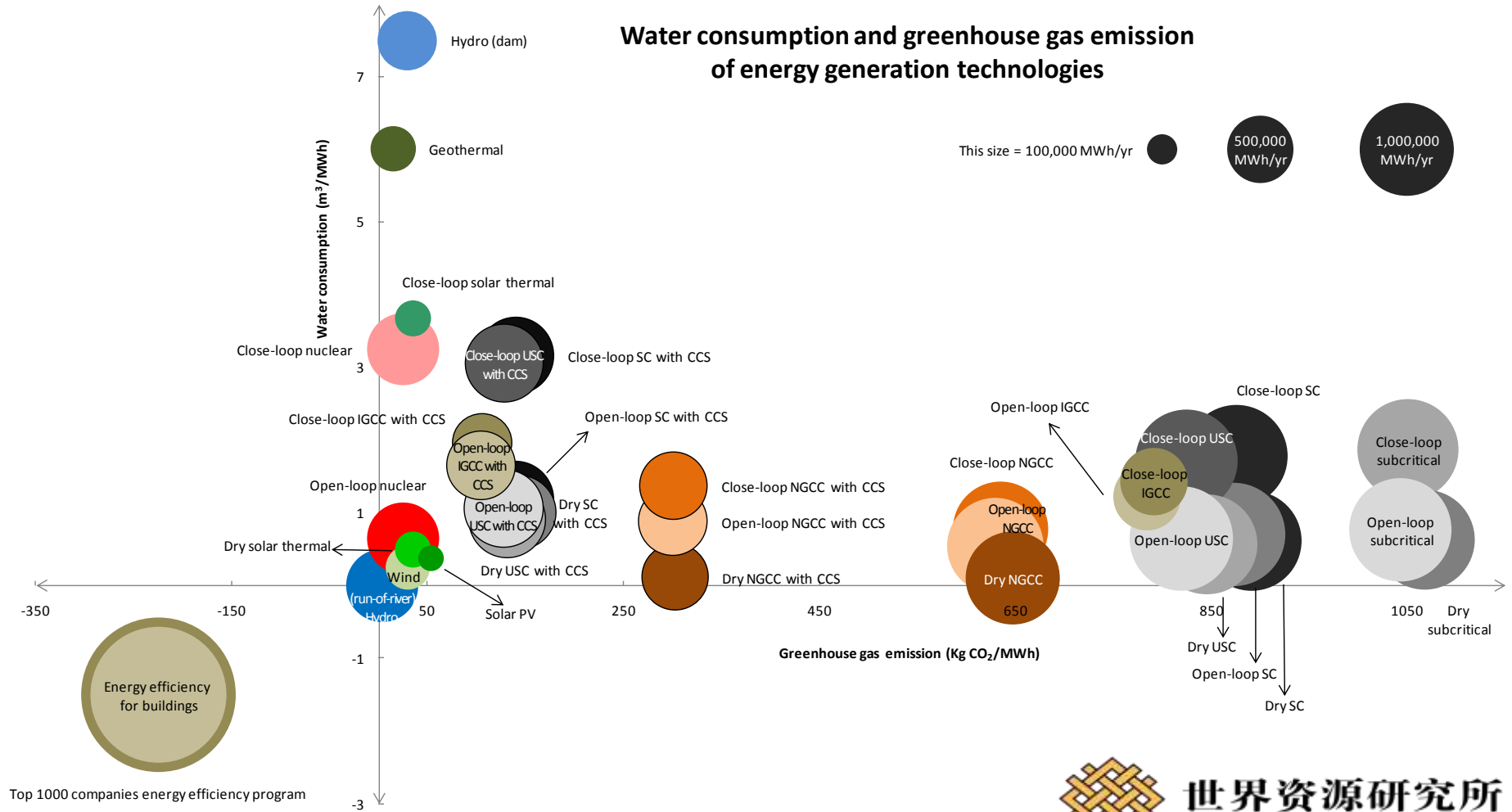
SO2 Emission



A Snapshot of Selected China Energy Options Today: Climate and Energy Security Impacts and Tradeoffs in 2025



Water consumption and greenhouse gas emission of energy generation technologies



Thank you very much!