

Directions to 2050

Realizing the full potential of technology

- Actions to promote RD&DD
- Involving developing countries
- Utilising the market

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**World Business Council for Sustainable Development
Energy and Climate**



World Business Council for
Sustainable Development

Our energy system



Oil



Biomass



Gas



Coal



Nuclear



Renewables

Primary Energy

Liquids



Direct combustion
Industry and
Manufacturing



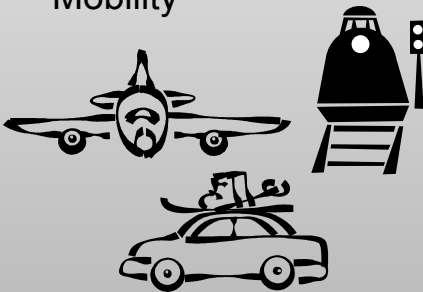
Energy

Power
Generation



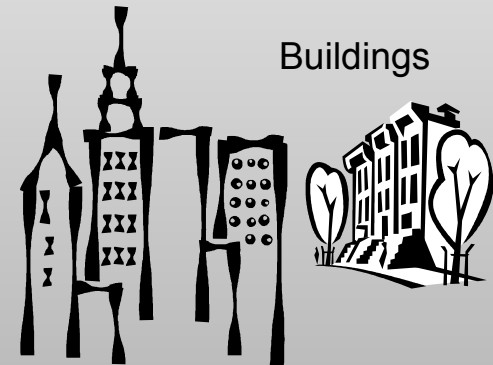
Final Energy

Mobility



Consumer
Choices

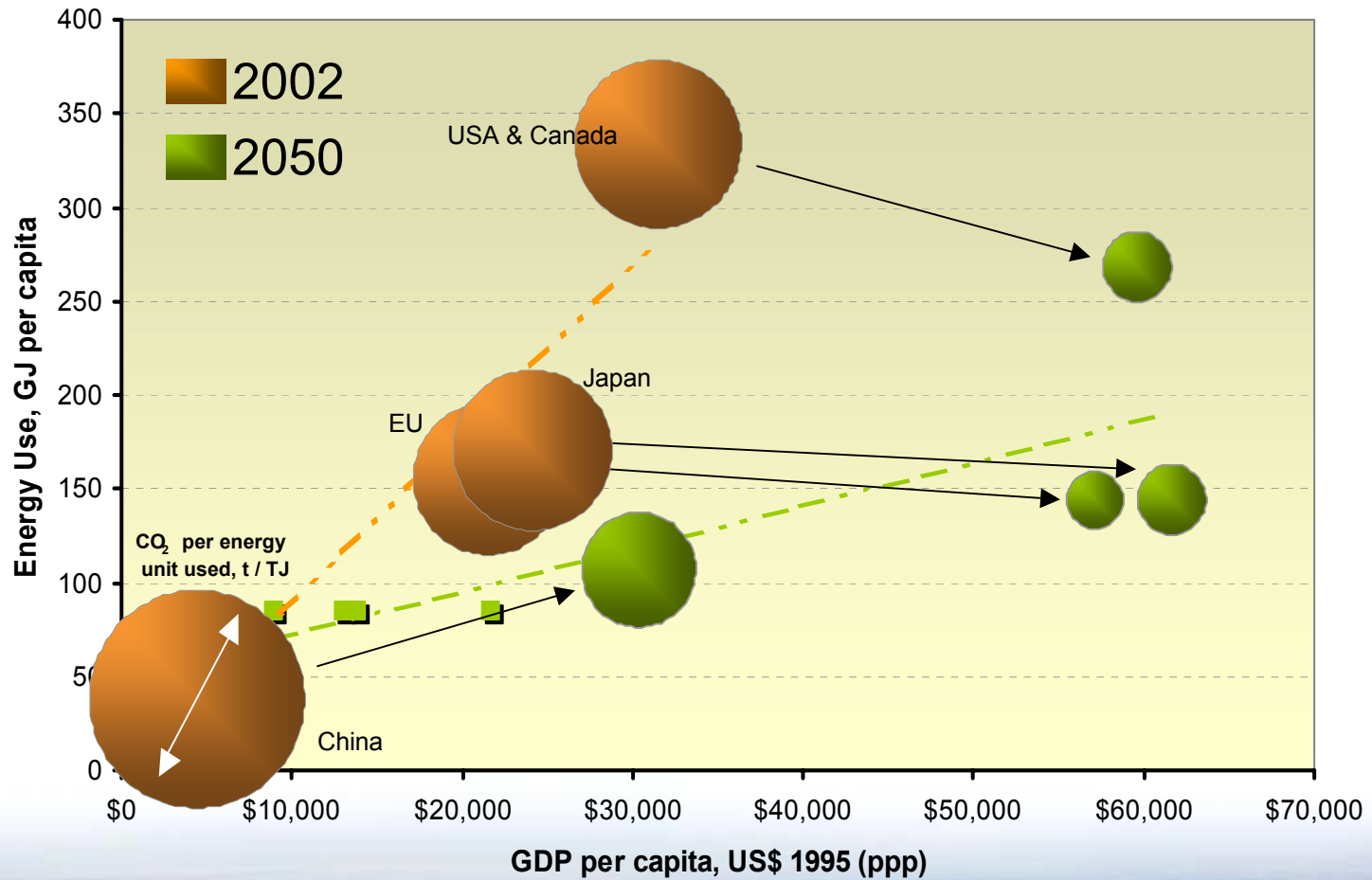
Buildings





Pathways to 2050

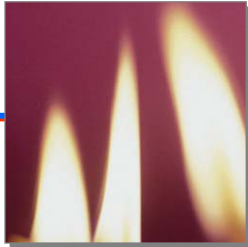
A significant shift required in both “energy per GDP” and “CO₂ per unit of energy used”





Options for change – enabling technologies

Emission reduction (CO₂ / unit energy)



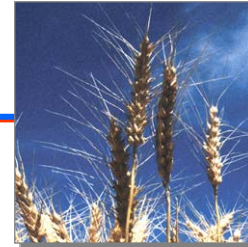
A further shift to natural gas



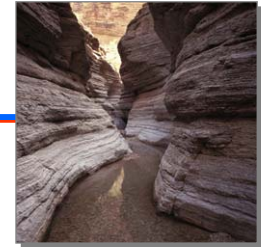
Nuclear power



Renewables



Bio-products



Carbon capture and storage

Energy conservation and efficiency (energy / unit GDP)



Mass transportation



Road transport



Buildings



Low energy appliances



Doing things differently

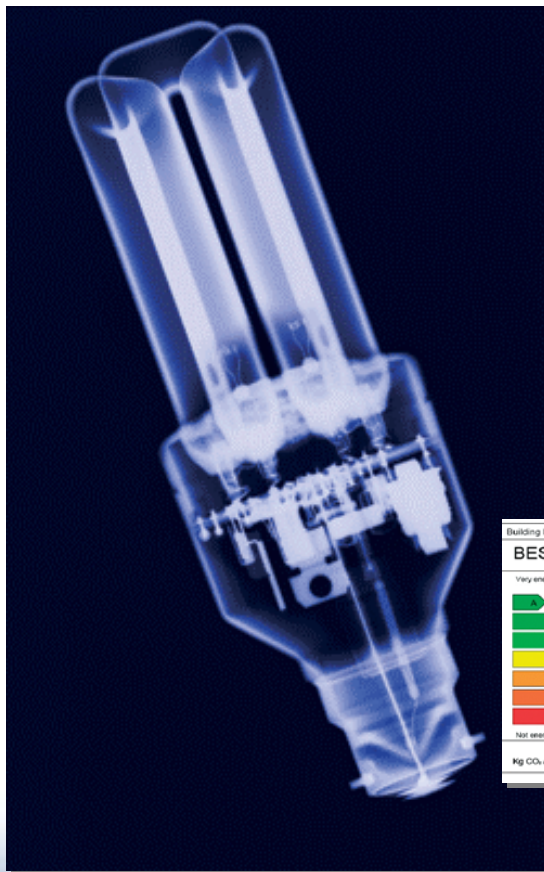




Global Milestones – Energy Efficiency

2025

2050



Achieved **significant efficiency gains**, with developed countries improving by more than 2% annually.

Building Energy Performance	As built
BESTCert	Asset rating
Very energy efficient	
Not energy efficient	
Kg CO ₂ /m ² per year	calculated
	50.3

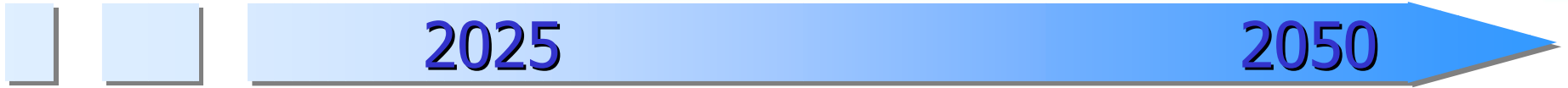


Continue to achieve significant **energy efficiency** gains in all countries.

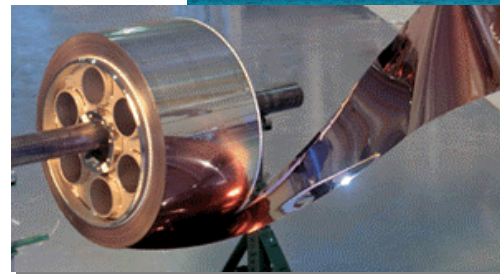




Global Milestones – Renewables



Introduced **wind and solar power** on a significant scale globally, with over 1 TW of installed wind capacity.

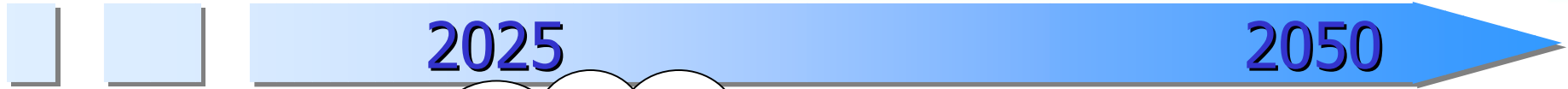


Deployed **wind, wave, tidal and solar power** on a large scale globally, with renewables (including hydro & biomass) contributing about half to the power sector.



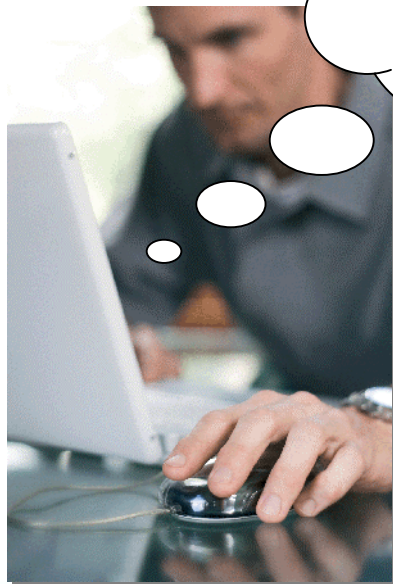
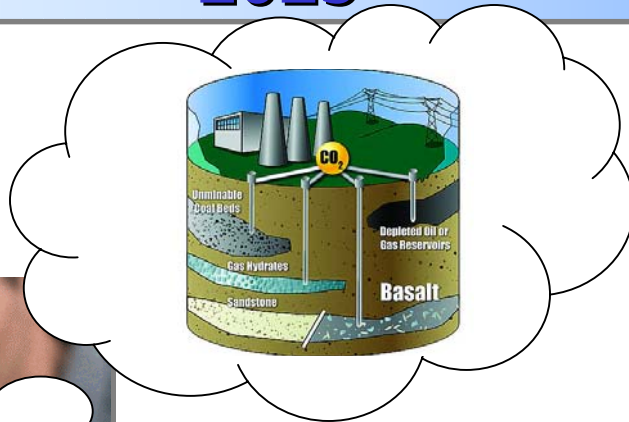


Global Milestones – Carbon Capture and Storage

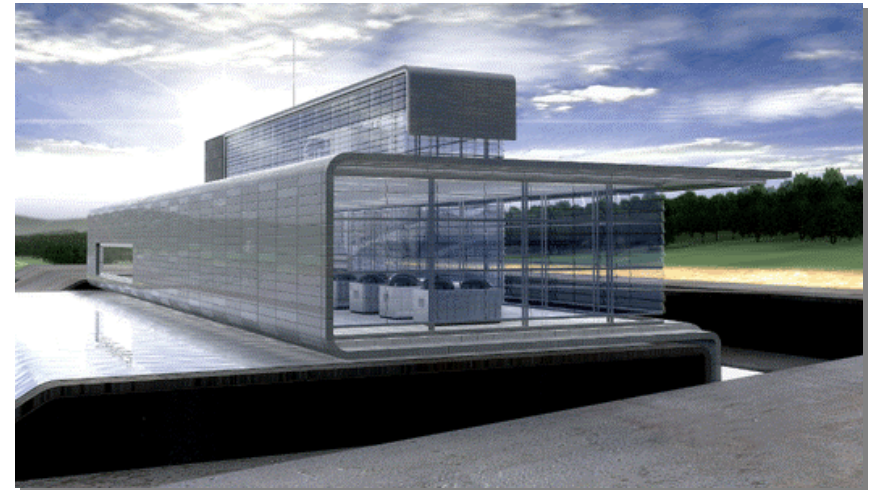


2025

2050



Commercialised coal power generation with **carbon capture and storage** and have some 100 or more plants in operation globally.



Deployed coal power generation with **carbon capture and storage** and have some 1000 or more plants in operation globally.





Global Milestones – Nuclear

2025

2050



Gained full public acceptance of **nuclear power** as a viable zero-carbon power generation option and restarted long term growth in this industry.

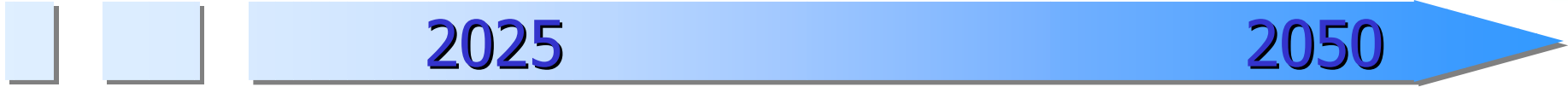


Expanded the role of **nuclear** in power generation, reaching some 10% globally.





Global Milestones – Vehicles



Achieved wide deployment of **high efficiency vehicles** (e.g. hybrid diesel) in developed countries, with developing countries following, and started deployment of (near) zero emission vehicles.



Deployed **high efficiency vehicles** globally, with overall efficiency doubling (20 => 40 mpg) through the period.



Global Milestones – Automotive Fuels

2025

2050



Recognised the potential of **advanced bio-fuels** and reached a level of more than 5% bio-fuels in transport fuels globally.



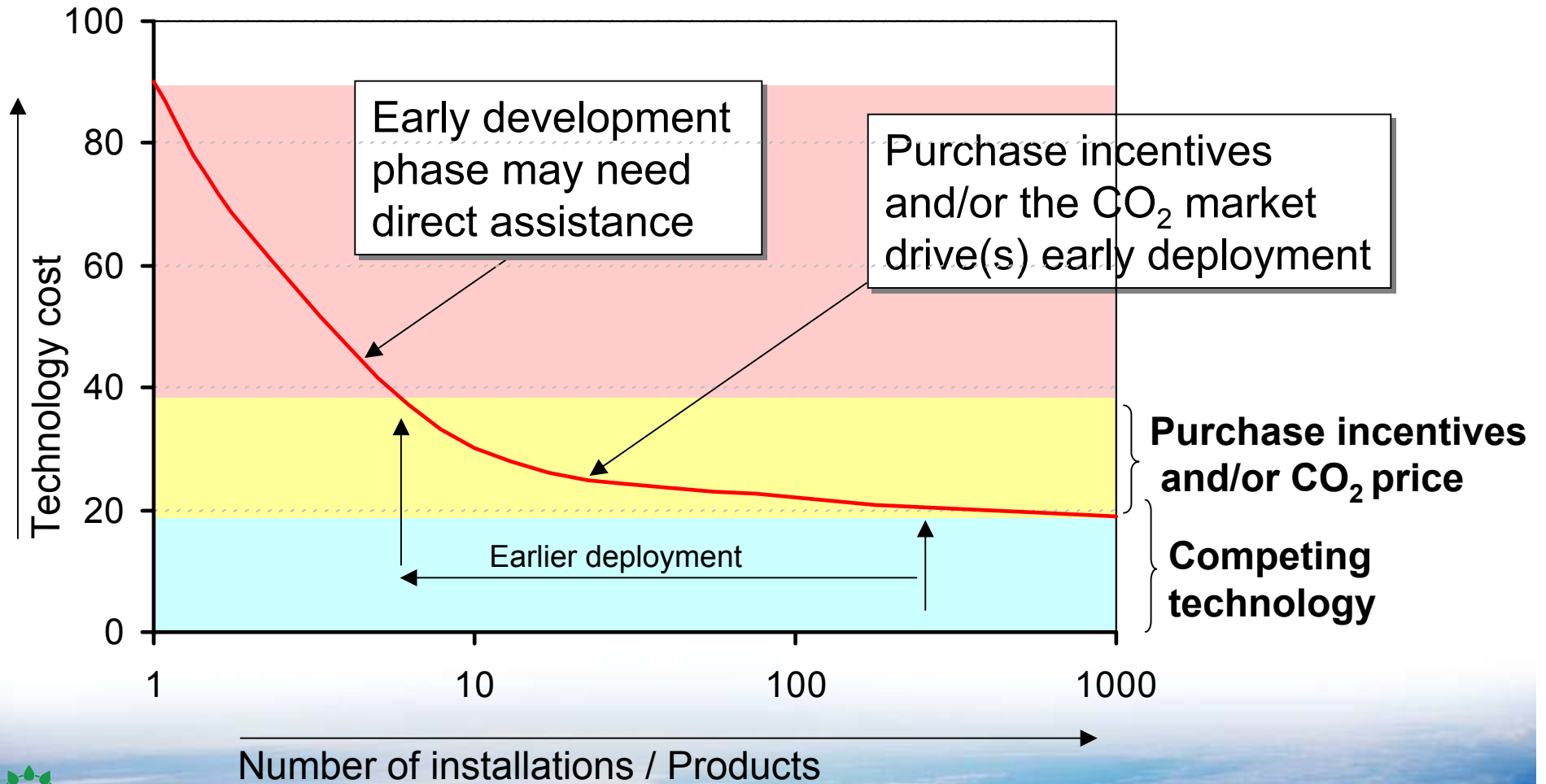
A range of alternative vehicle fuels such as **advanced bio-fuels, electricity** and **hydrogen** in everyday use and making up some 40% of road transport fuel.





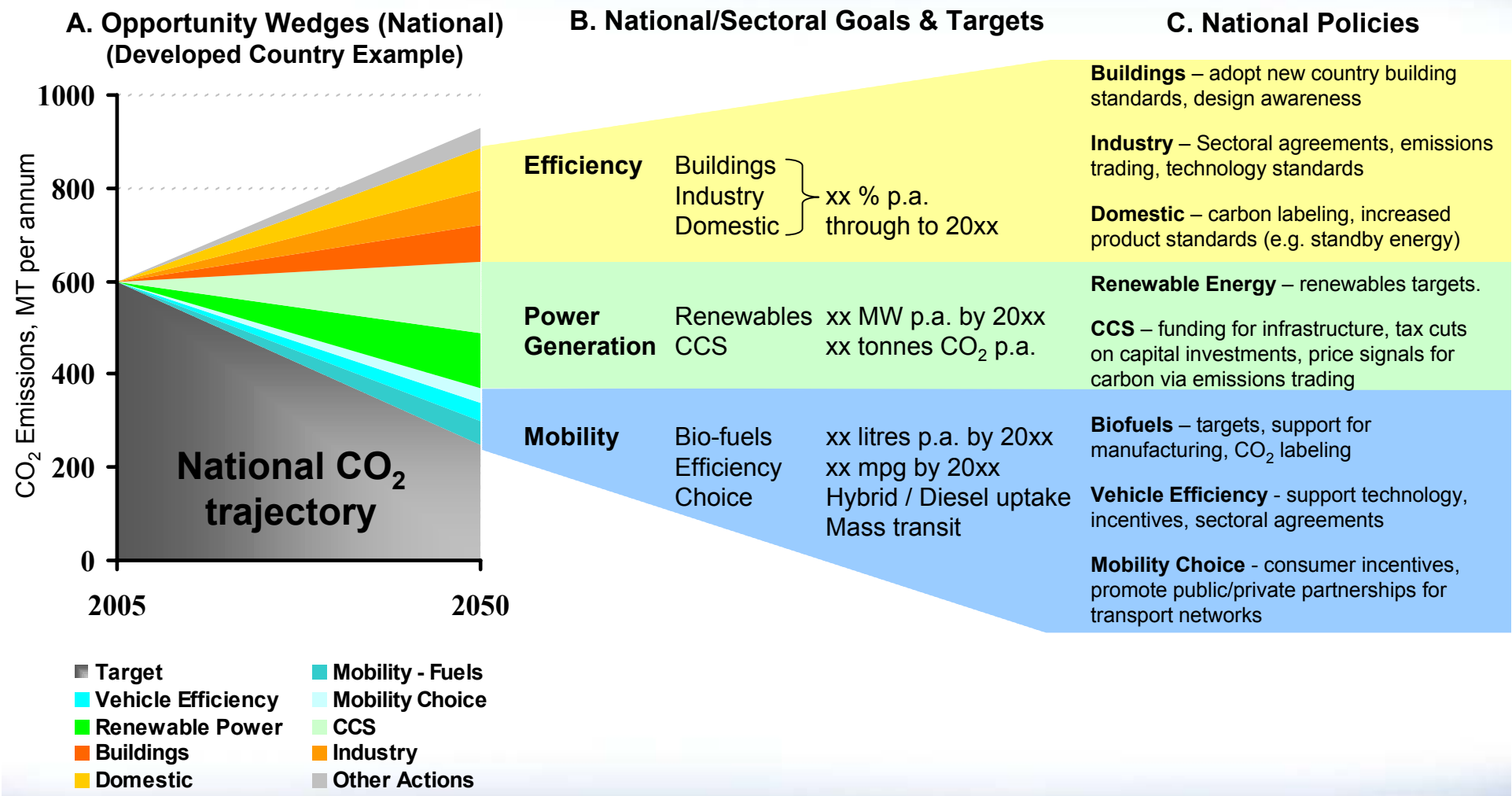
Technology development and deployment

Future policy must focus on both the **development** of new technology and the rapid **deployment** of the both new and existing technology





Opportunity starts at the national / sectoral level





The development of energy policy

Energy policy is set at the national level. It is now one of the principal responsibilities of government.

The development of energy policy is responsive to;

- Financial considerations
- Available natural resources
- Security of supply
- Environmental signals

A future framework must recognise the sovereign nature of energy policy decisions, but at the same time provide clarity, context and drive for such decisions.





A future framework – What is needed?

1. A long-term goal

- ✓ Established by 2010
- ✓ Described in terms of CO₂e* emissions.

2. Technology development and deployment framework

- ✓ Expanded support for R&D
- ✓ Global standards
- ✓ Technology transfer driven by standards
- ✓ Risk management

3. Emissions management at national and sectoral level

- ✓ Bottom-up approach aligned with energy policy
- ✓ Sector by sector
- ✓ Expanded project mechanism
- ✓ Progressive inclusion of all countries

4. Linkage framework to encourage international trading





Clean development partnerships & programs

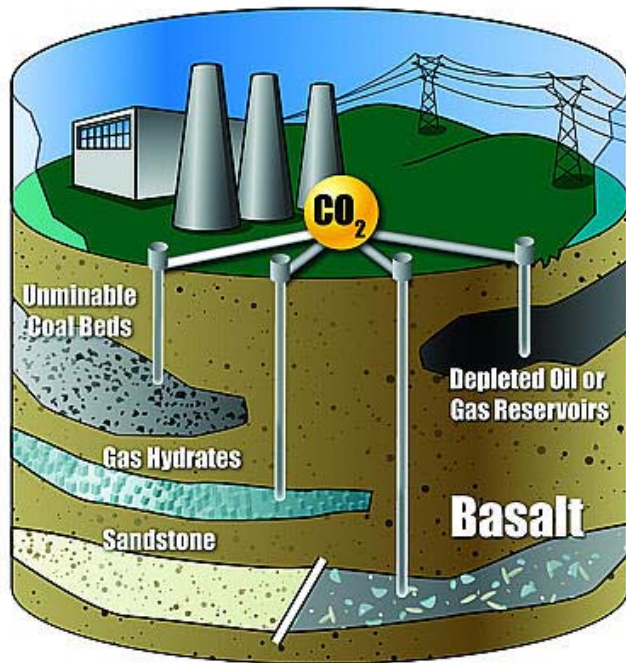
Clean development partnerships and technology programs based on standards and benchmarking can drive new technology development.

Asia-Pacific Partnership on Clean Development & Climate





Managing new technology risks



Direct and Indirect Incentives

- Well funded clean development networks with aggressive targets for pilot and near commercial demonstrations.
- R&D incentives
- Infrastructure funding
- CO₂ product labelling

Regulatory Uncertainty

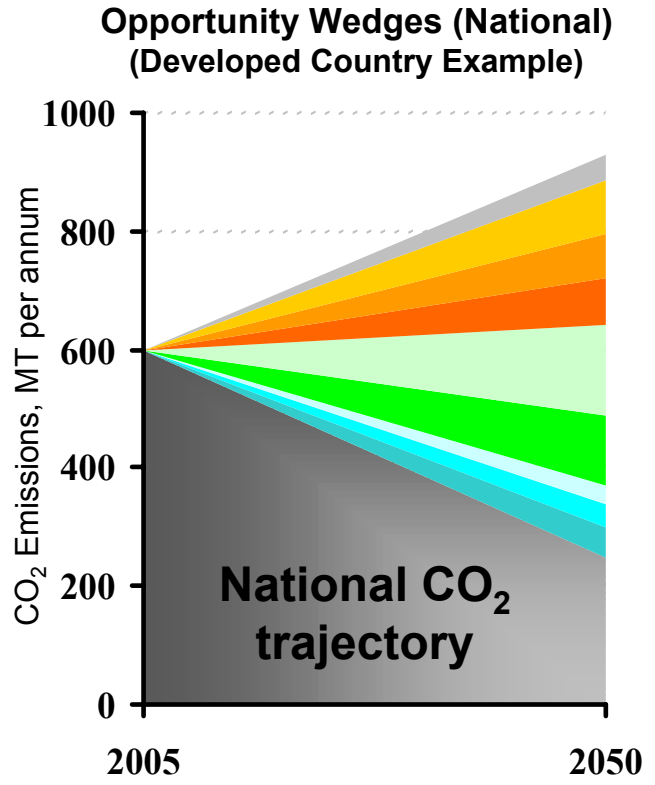
- Multilateral financing mechanisms such as GEF
- Far-out issuance of reduction units as a special case within the project mechanisms.



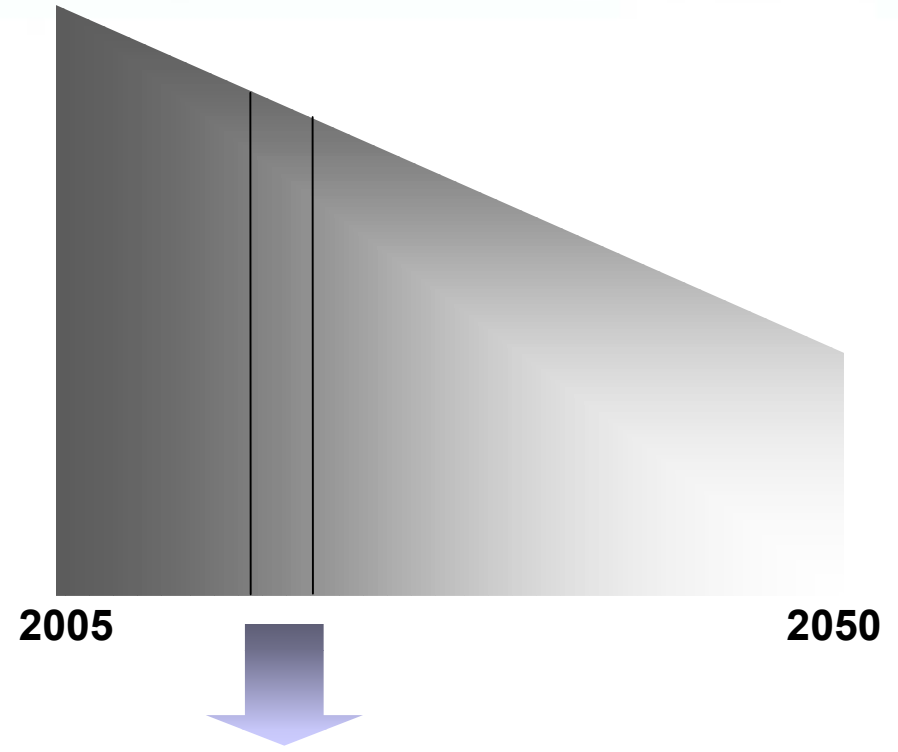


CO₂ targets and trading at national level

At the national level:



- Target
- Vehicle Efficiency
- Renewable Power
- Buildings
- Domestic
- Mobility - Fuels
- Mobility Choice
- CCS
- Industry
- Other Actions



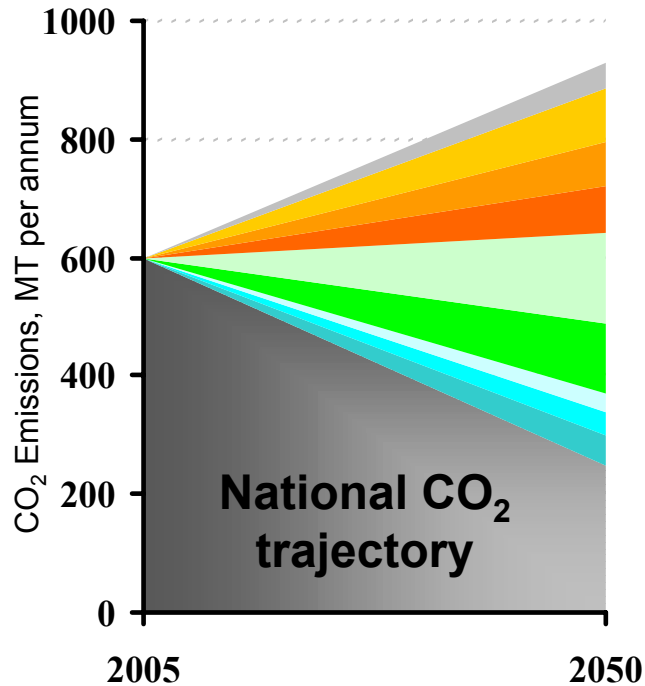
Trajectory for 2013 to 2018 for international allocation purposes.



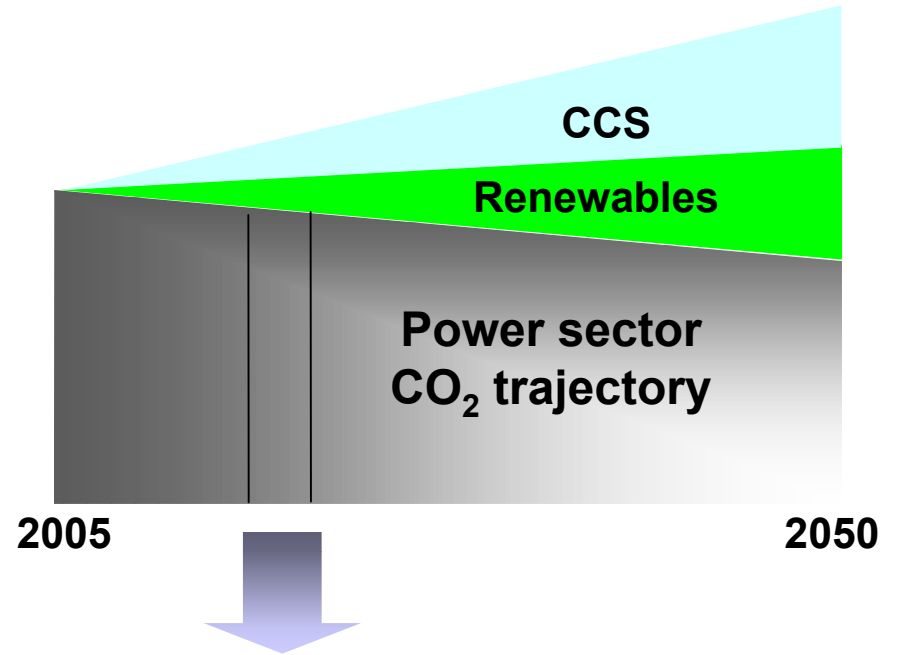
CO₂ targets and trading derived from sectors

Or at the sector level only:

Opportunity Wedges (National) (Developed Country Example)



- Target
- Vehicle Efficiency
- Renewable Power
- Buildings
- Domestic
- Mobility - Fuels
- Mobility Choice
- CCS
- Industry
- Other Actions



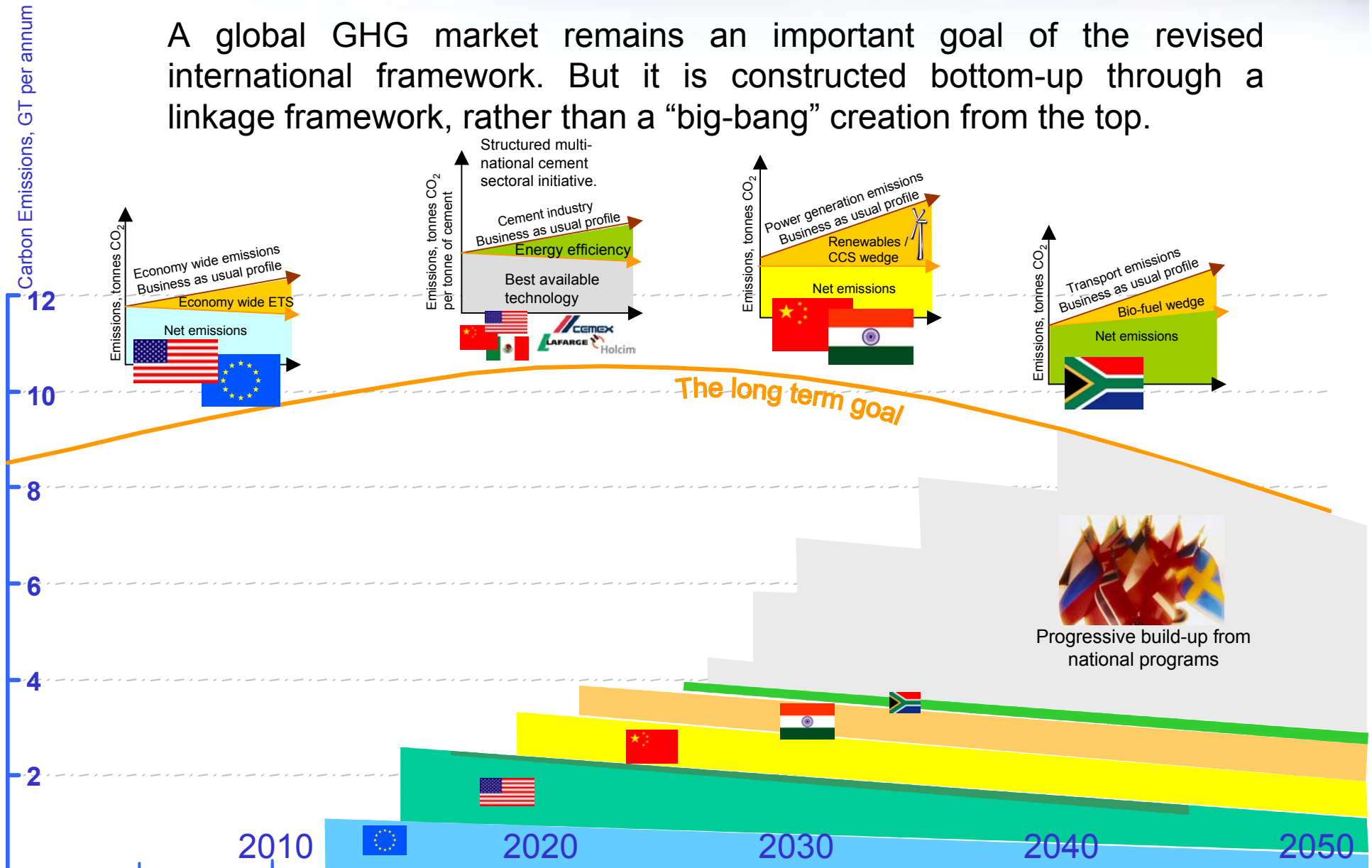
Trajectory for 2013 to 2018 for international allocation purposes.





Progressive Build-Up from National Programs

A global GHG market remains an important goal of the revised international framework. But it is constructed bottom-up through a linkage framework, rather than a “big-bang” creation from the top.



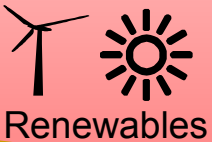


Framework Comparison

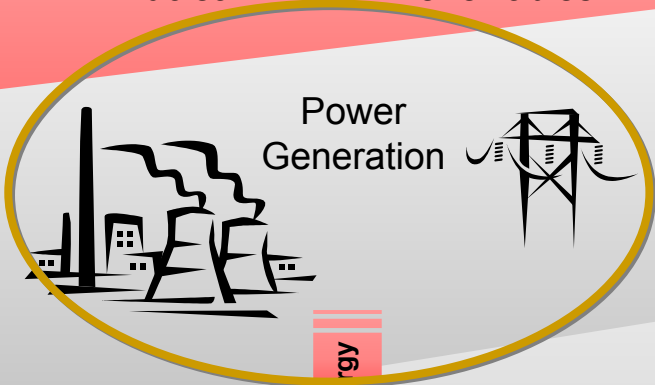
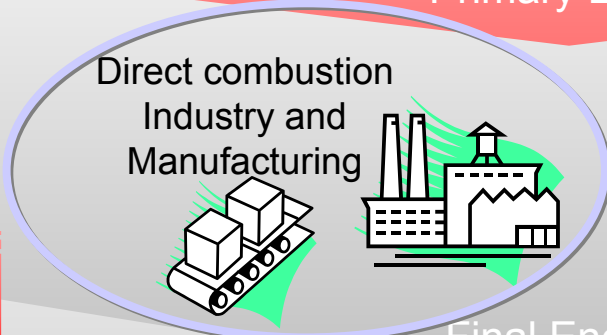
Kyoto – 2008-2012	WBCSD Revised Framework
Top down reduction obligations	Bottom-up – National / sector policies and commitments
Short term (5 year) compliance obligation	Longer term (50 year emissions trajectory)
Allocation of a reduction obligation – equitable allocation difficult to achieve politically	National opportunities and policies aligned with energy security and climate change priorities
Least cost compliance – not enough certainty for large investments in new technologies	Technology development and deployment focus
Emissions market	Deeper engagement of capital markets and greater influence over allocation of capital driven by a wide range of policies and a broad based emissions market.
Targets –tons reduced relative to a baseline	Targets still in terms of carbon reductions – but aligned to specific actions with GHG benefits – e.g. XX MW of wind power by 20XX.



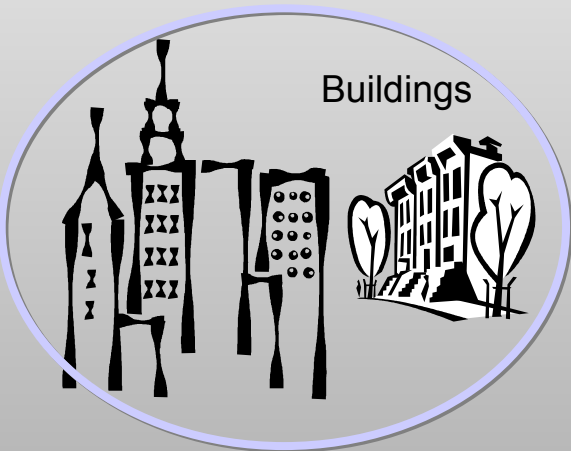
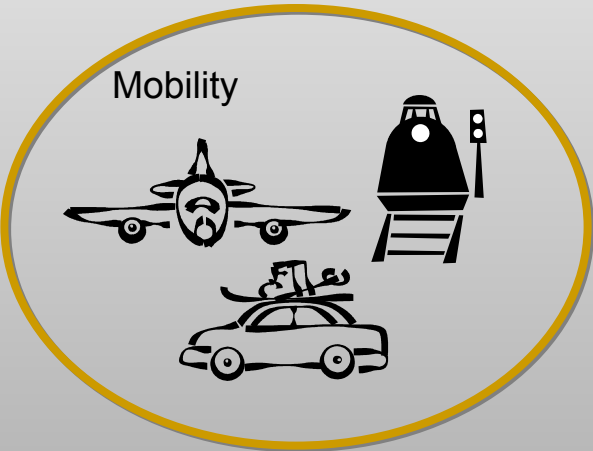
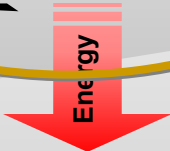
Examples at national level



Primary Energy



Final Energy

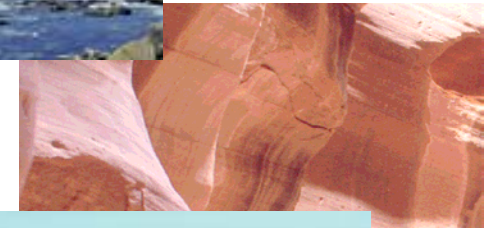




Power Generation – What is needed

Key directions . . .

- Decarbonisation
- GHG emissions management
- Energy efficiency improvements
- Electricity as a preferred domestic and commercial final energy source



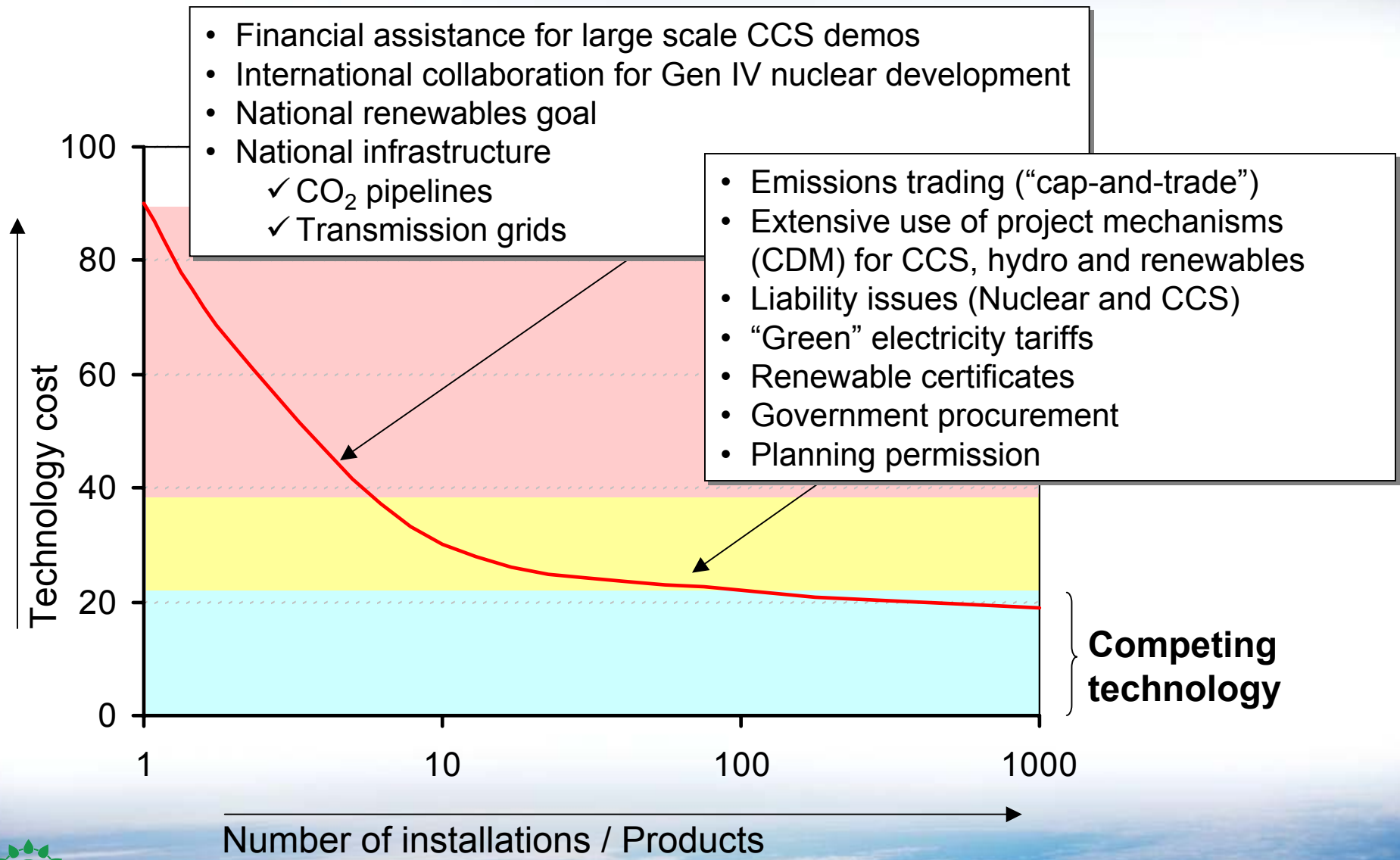
Key technologies...

- Renewables
- Nuclear power
- Clean coal technology - including carbon capture and storage (CCS)
- Natural gas





Power Generation – How it could work





Mobility – What is needed

Key directions . . .

Involve fuel producers, vehicle makers and the consumer.

- New more efficient vehicles
- Broadening the range and type of fuels
- Changing the way we use mobility

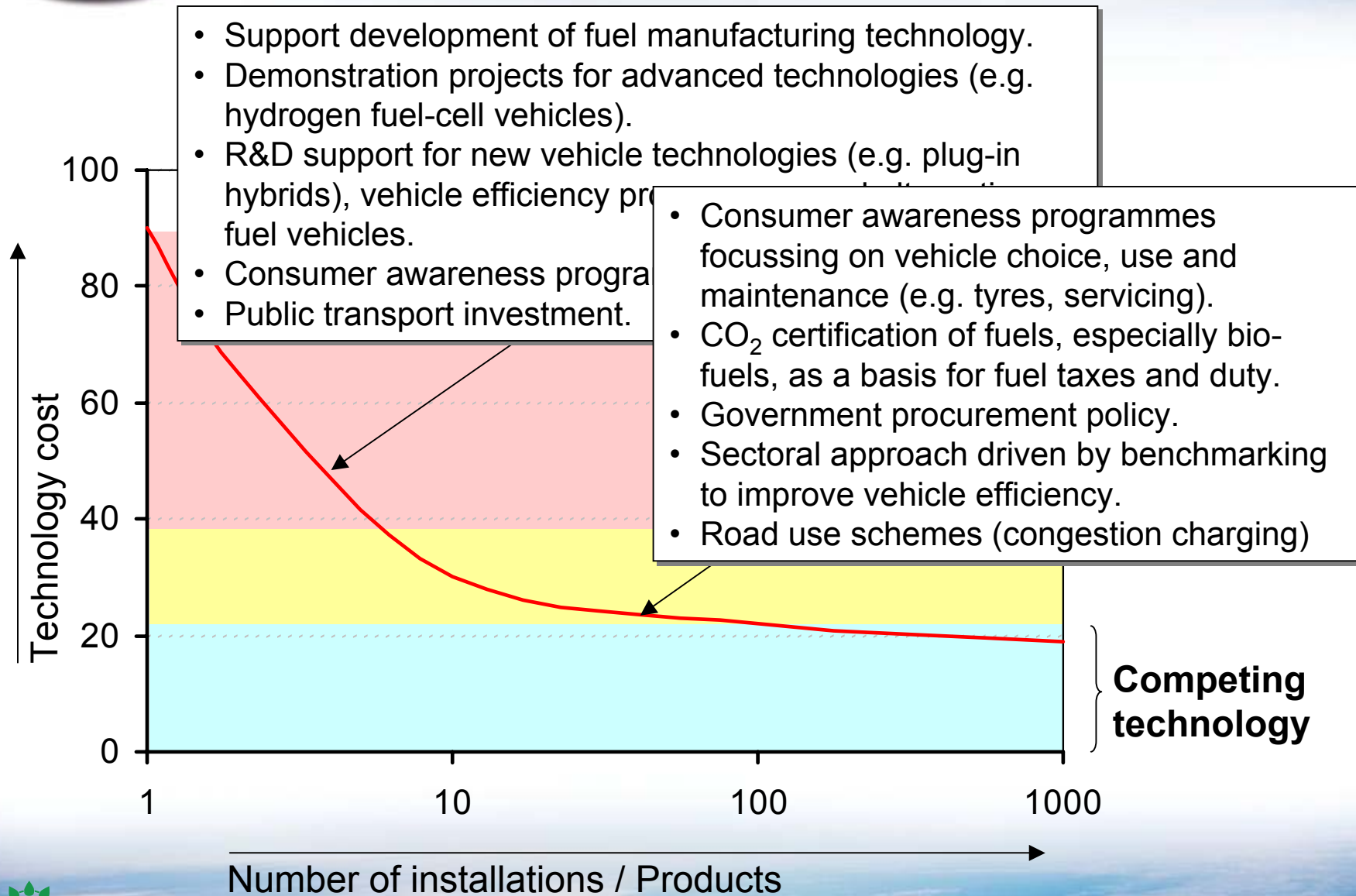


Key technologies . . .

- Hybrids and plug-in hybrids (drive trains and batteries)
- 2nd generation biofuels, synthetic diesels, electricity.
- Integrated public / private transport mechanisms
- Hydrogen



Mobility – How it could work





A Sustainable Energy Future

- Understanding the energy challenge
- Recognising the need for a sustainable approach
- Investing in technology
- Using the markets
- Delivering solutions



Doing it now !



An end in sight?

