

Climate Change: Challenges and Business Opportunities

by

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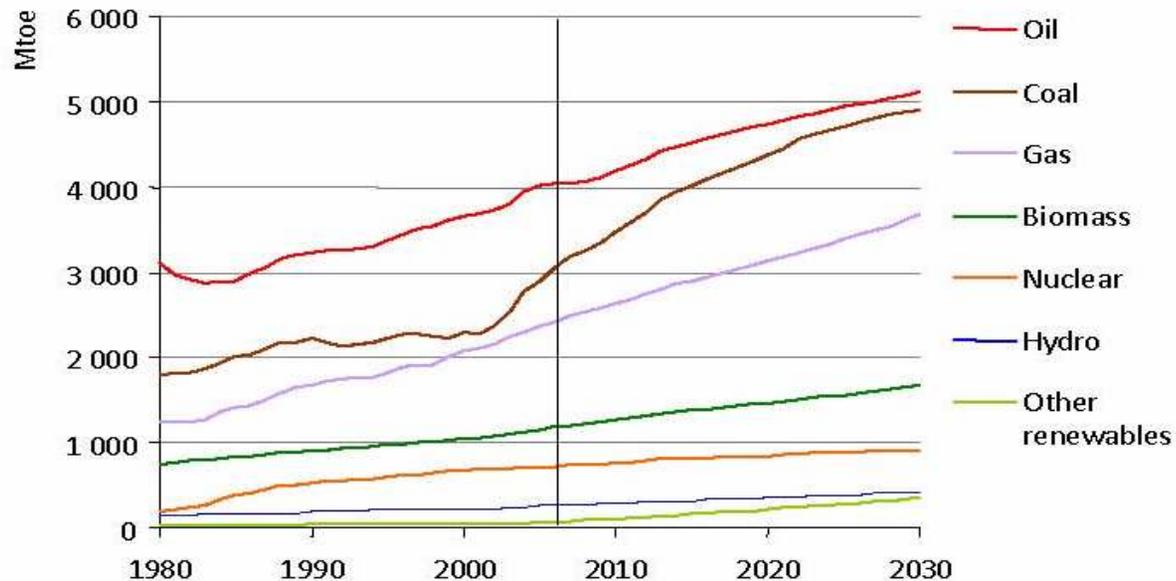
**ENSEARCH, Kuala Lumpur, Malaysia
2 November 2009**

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What We Know

The Science and Economics of Climate Change

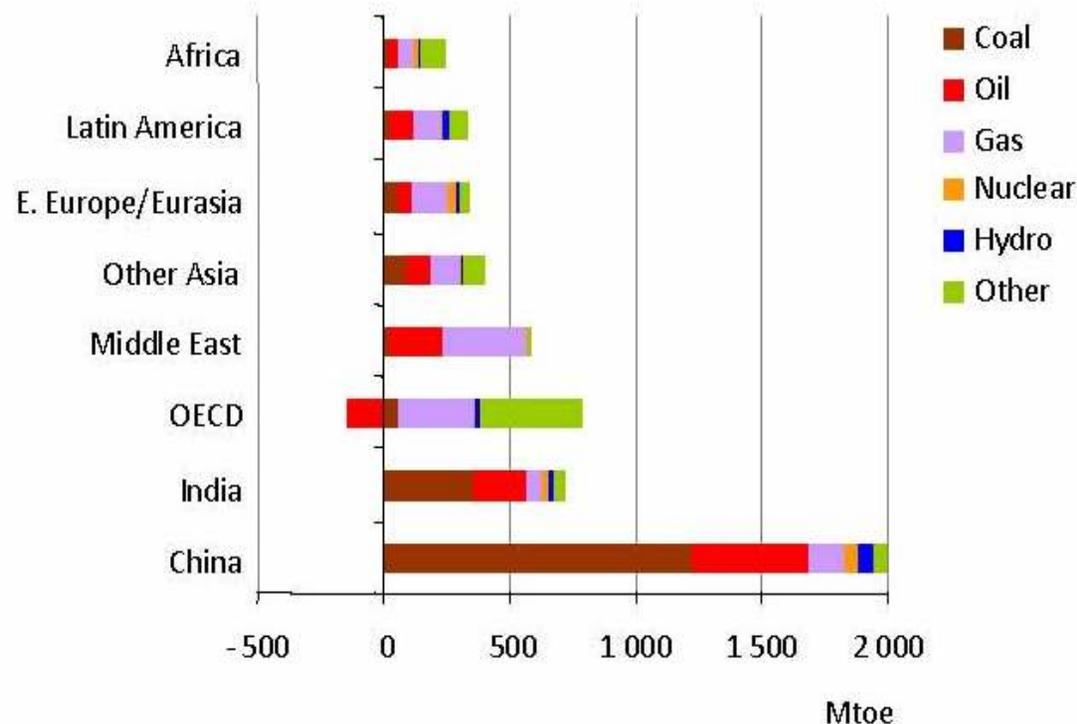
World Primary Energy Demand in the Reference Scenario, 2030



World energy demand expands by 45% between now and 2030 – an average rate of increase of 1.6% per year – with coal accounting for more than a third of the overall rise

Source: World Energy Outlook 2008. International Energy Agency (IEA).

Incremental Primary Energy Demand in the Reference Scenario, 2006-2030

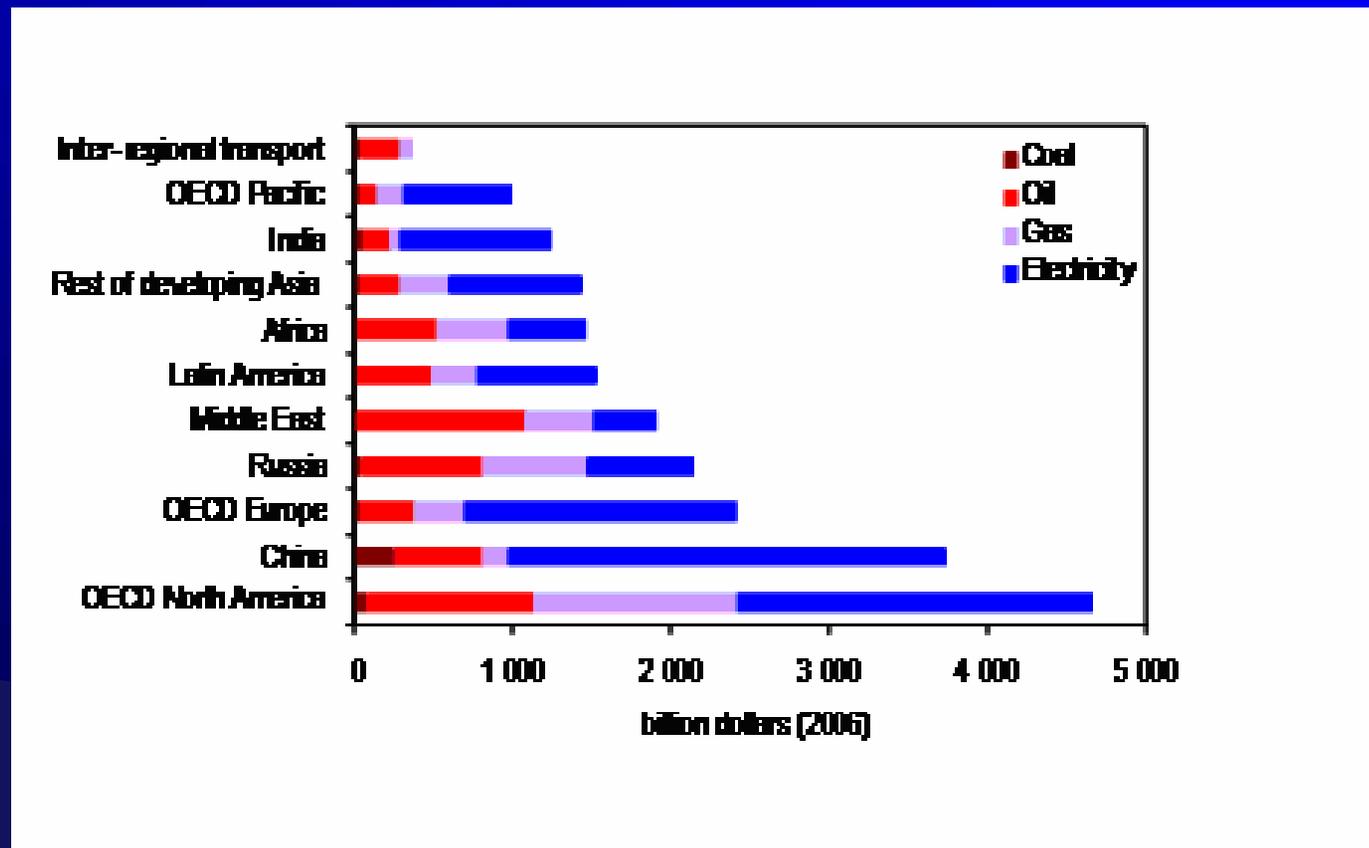


The increase in China's energy demand to 2030 – the result of its sheer market size & stronger economic growth prospects – dwarfs that of all other countries & regions

Source: World Energy Outlook 2008. IEA.

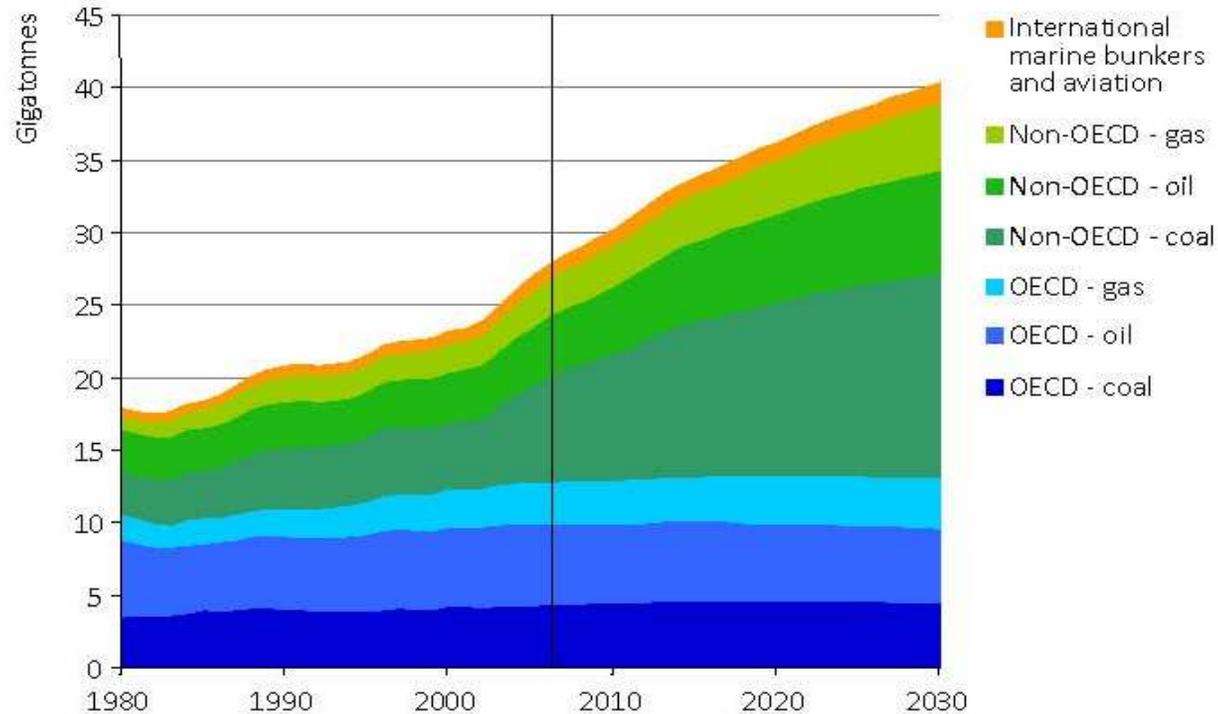
Investment needs for Energy are huge.

- \$22 trillion up to 2030 – over half in developing countries
- 17% (\$3.7 trillion) for China and 6% (\$1.3 trillion) for India



Source: World Energy Outlook 2007. IEA.

Energy-related CO2 Emissions in the Reference Scenario

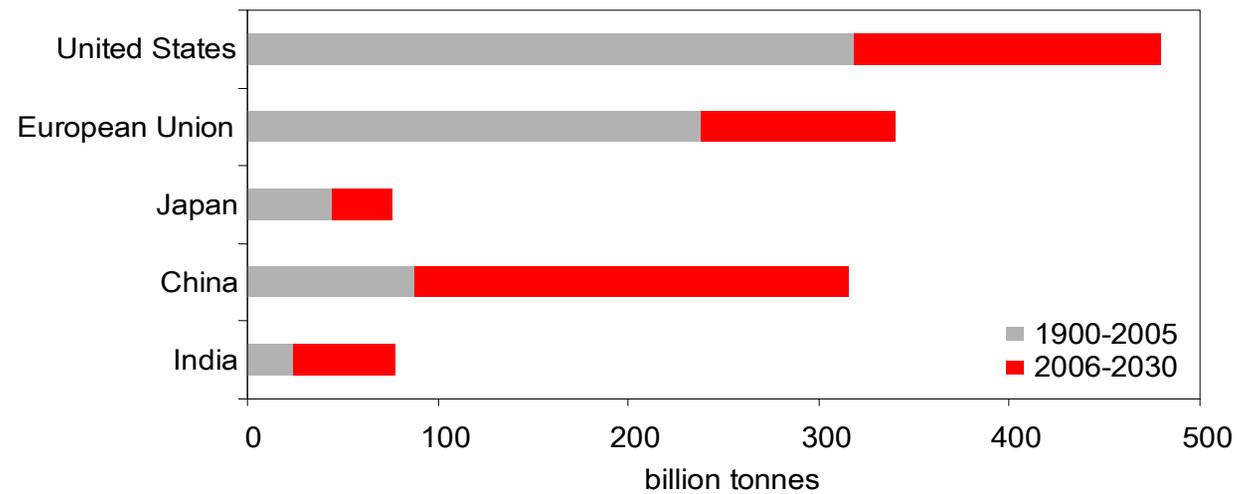


97% of the projected increase in emissions between now & 2030 comes from non-OECD countries – three-quarters from China, India & the Middle East alone

Source: World Energy Outlook 2008. IEA.

Reference Scenario: China & India in Global CO₂ Emissions

Cumulative Energy-Related CO₂ Emissions



***Around 60% of the global increase in emissions in 2005-2030
comes from China & India***

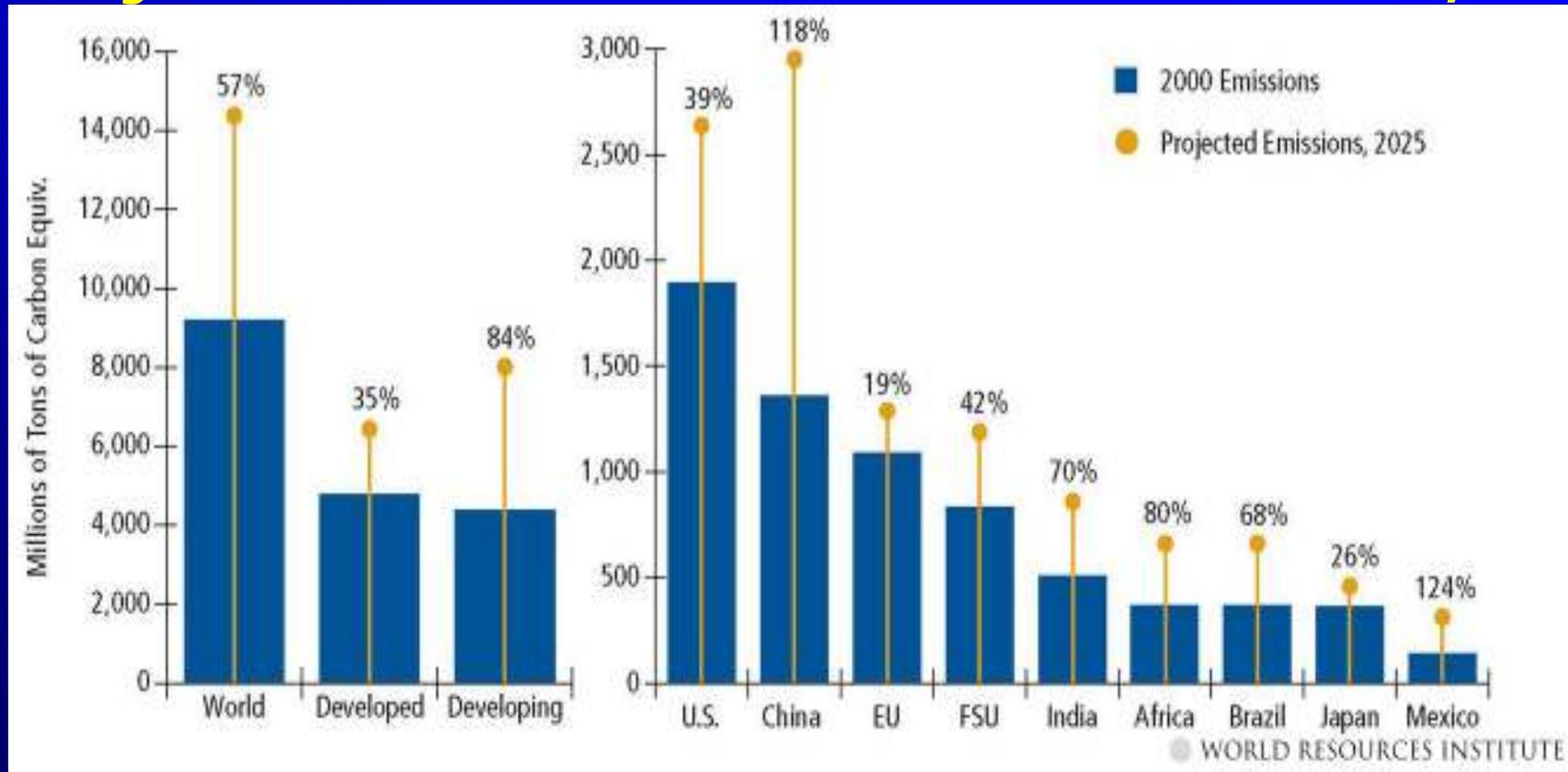
Source: World Energy Outlook 2007. IEA.

The world's five biggest emitters of energy-related CO₂

Country/region	% of global emissions in 2007	% of global emissions in 2020 in the Reference Scenario
China	21	27
United States	20	16
European Union	14	11
India	4	6
Russia	6	5
Total	65	65

Source: World Energy Outlook 2008. IEA.

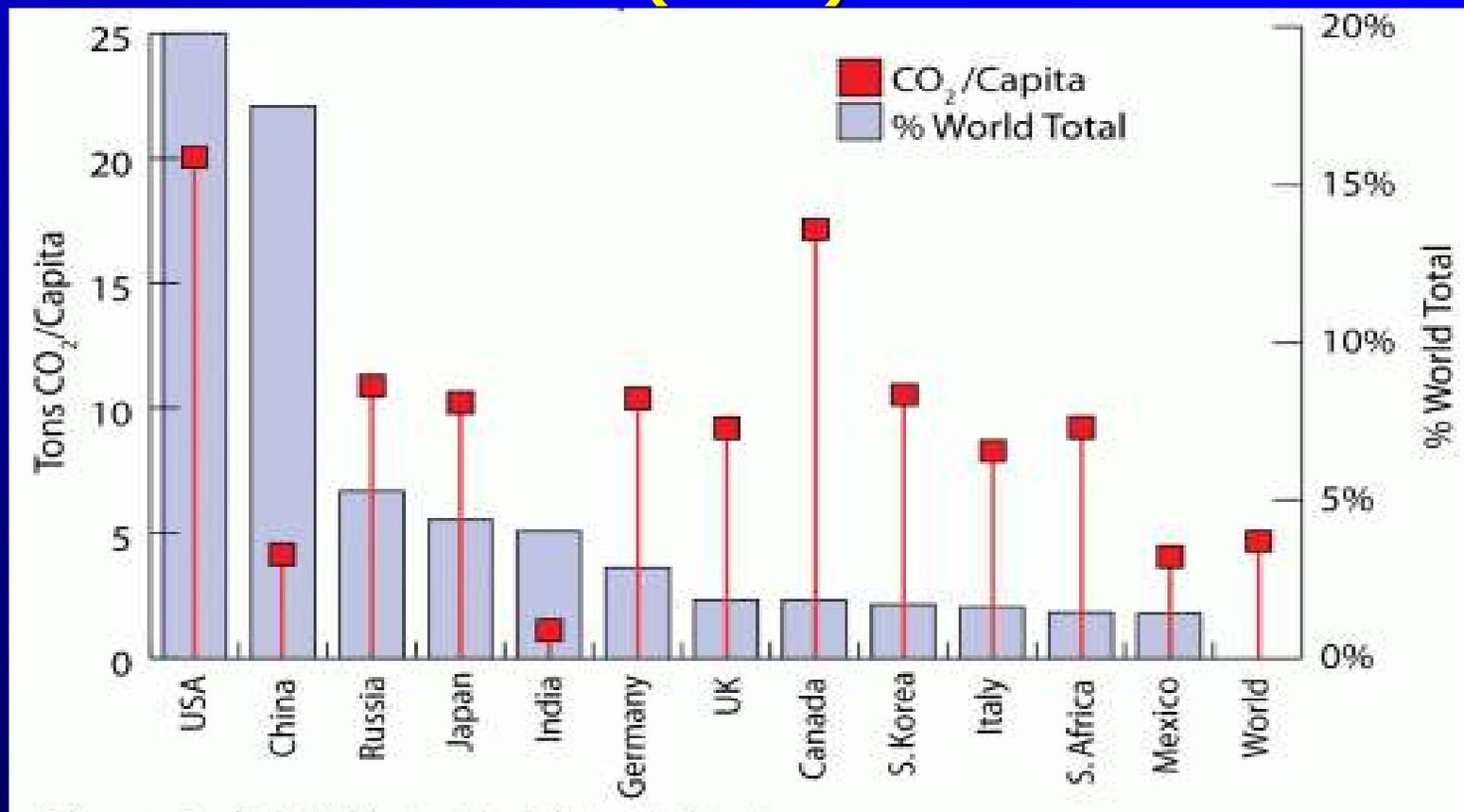
Projected Emissions of Greenhouse Gases, 2025



Sources & Notes: World Resources Institute. Projections are based on IEA, 2003 (reference case, CO₂ from fossil fuels) and POLES (non-CO₂ gases) (EC, 2003). GHGs do not include CO₂ from land use change. "FSU" is former Soviet Union.

Developing Asia's emissions are expected to continue to increase significantly, led by China and India

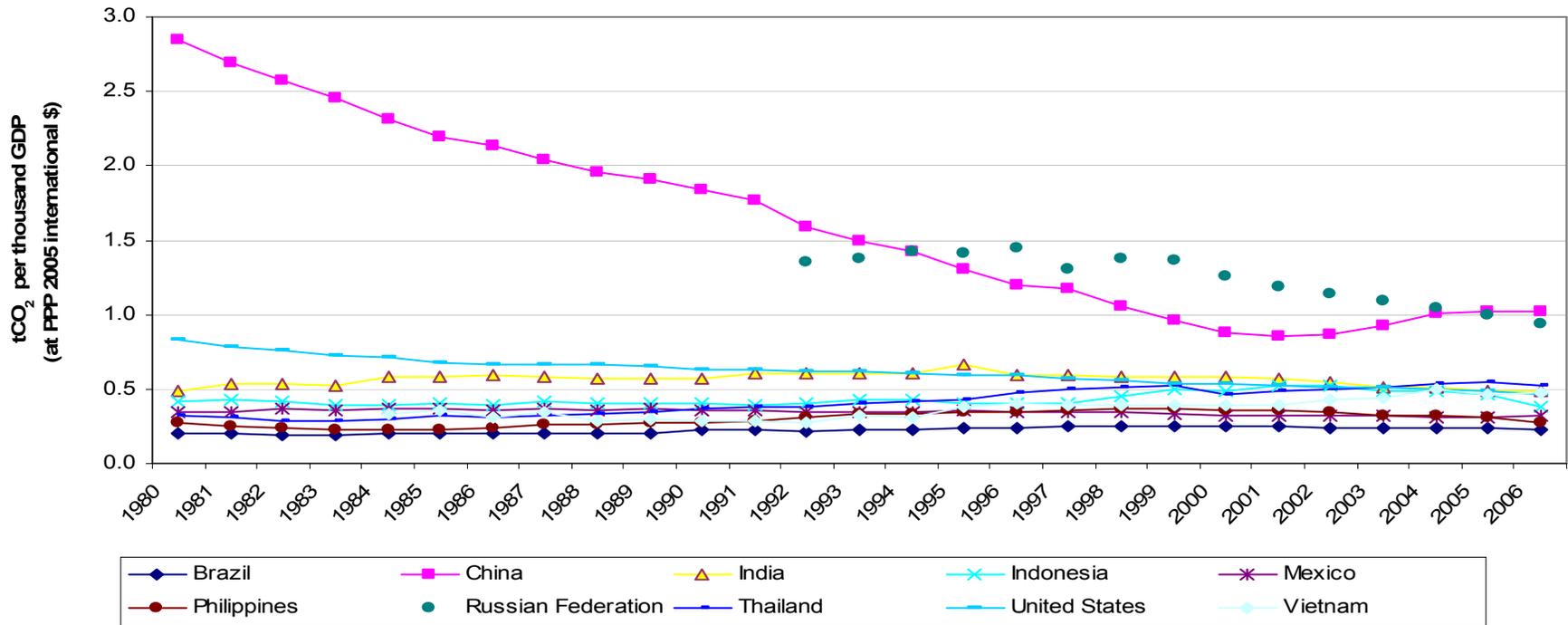
Top 12 CO₂ Emitting Countries & Per Capita Emissions (2004)



Source: Climate Analysis Indicators Tool, WRI 2004.

However, **per capita emissions in developing Asia** (China and India) remain **relatively low** compared to developed countries.

CO₂ Intensity (GDP, PPP 2005 international \$)



Note: PPP – Purchasing Power Parity

Source: Climate Analysis Indicators Tool. World Resources Institute. 2006.

Emission per GDP of **China** has dropped substantially.

From 2006-2030, IEA projects that **China, India and Russia will have most significant annual reduction of emissions intensity (per GDP).**

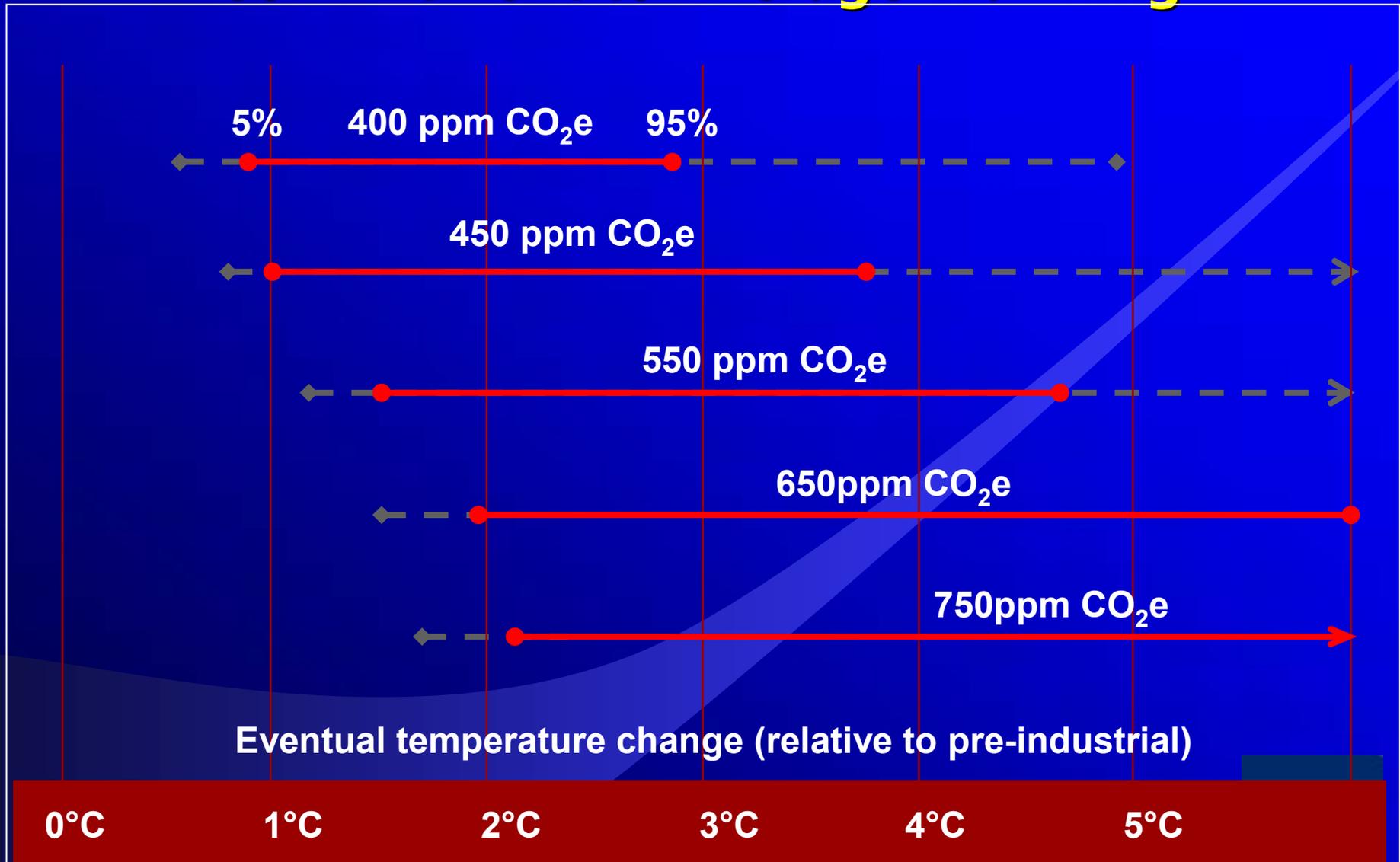
The Science of Climate Change

Climate is changing in an unprecedented manner

Warming of the climate system is unequivocal

(Intergovernmental Panel on Climate Change, 2007)

Stabilization Targets and Commitment to Average Warming



Targetted scenario is 450-550ppm, now closer to 450ppm which is about 50% reduction

The analyses of scenarios indicate that whichever target scenario adopted, the challenge is huge

550 Policy Scenario

- Corresponds to a c.3°C global temperature rise
- Energy demand continues to expand, but fuel mix is markedly different
- CO₂ price in OECD countries reaches \$90/tonne in 2030
- Additional investment equal to 0.25% of GDP

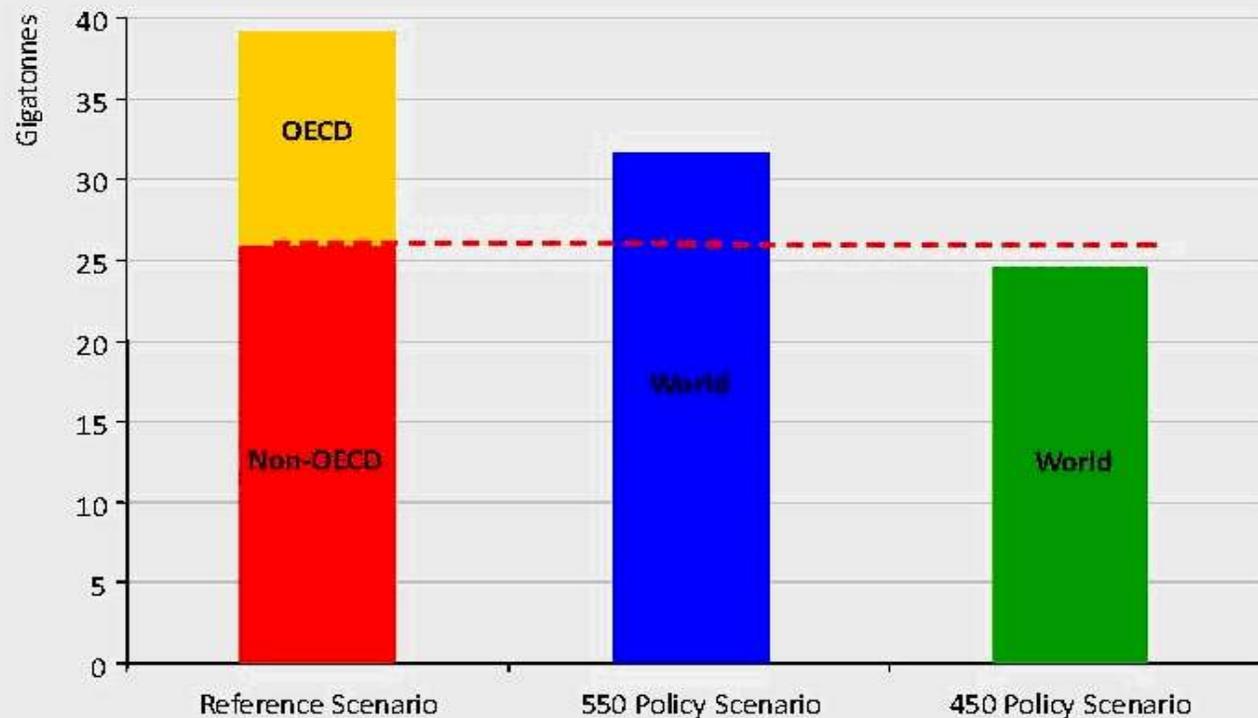
450 Policy Scenario

- Corresponds to a c.2°C global temperature rise
- Energy demand grows, but half as fast as in Reference Scenario
- Rapid deployment of low-carbon technologies – particularly CCS
- Big fall in non-OECD emissions
- CO₂ price in 2030 reaches \$180/tonne
- Additional investment equal to 0.6% of GDP

Source: World Energy Outlook 2008. IEA.

OECD countries alone cannot put the world in a 450 ppm greenhouse gas emissions trajectory by 2030

The developing countries will also need to do their share, specially emerging countries in Asia



Source: World Energy Outlook 2008. IEA.

Likely Impacts in Asia

- Impacts in Asia are already serious, and will worsen further in future
- Economic costs are significant



Floods



Glacier Melt in the Himalayas



Waterlogging



Cyclones & tidal surges



River bank erosion



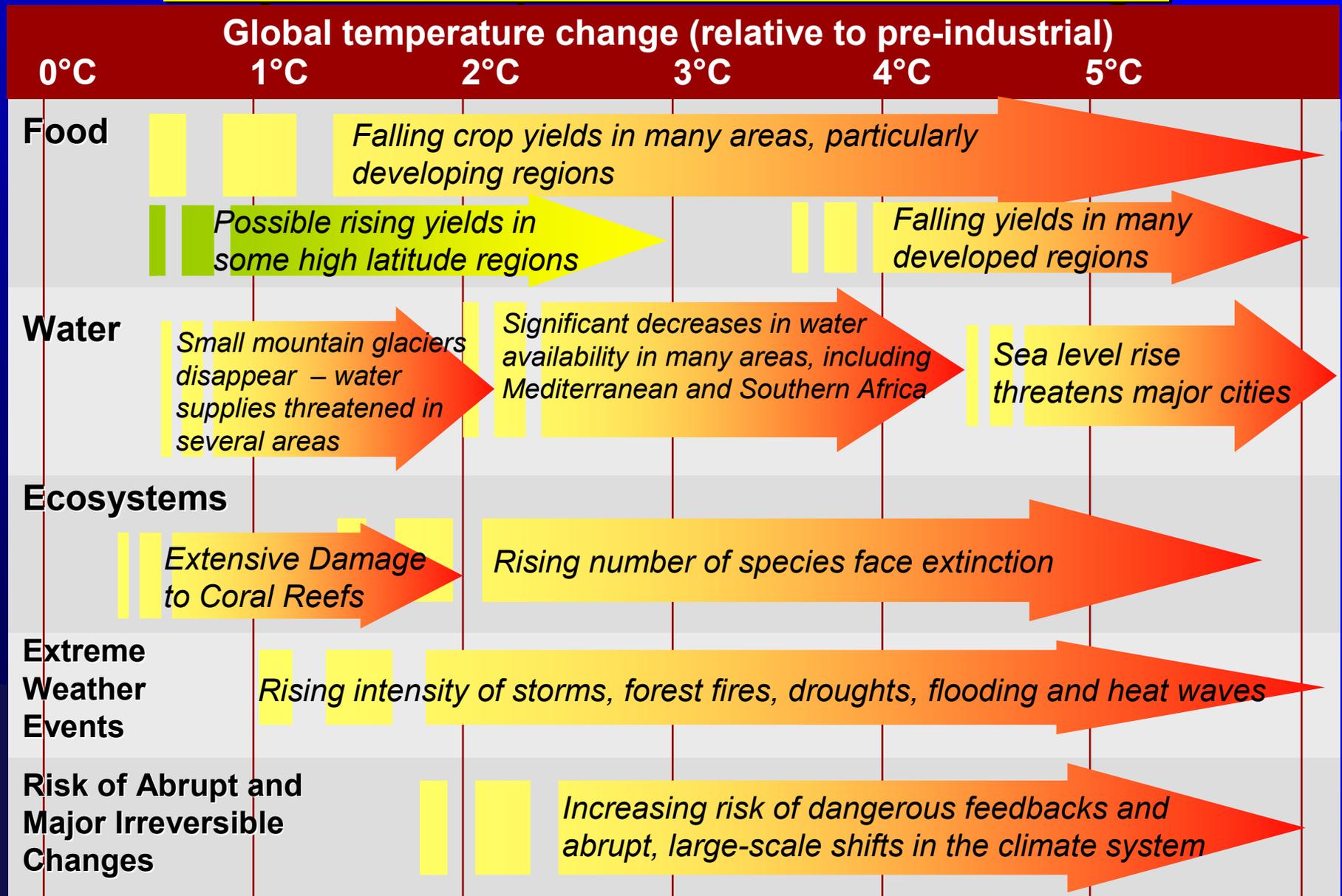
Salinity



16 Droughts

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Projected impacts of climate change



Specific Impacts

- ✓ Flood zone refugees in **India** between 20 - 60 million
- ✓ 17% of **Bangladesh** could be permanently lost to sea level rise coupled with land subsidence. An estimated 15 million would be displaced
- ✓ In **Southeast Asia**, mean temperatures to rise to **1.9°- 3.7°C** by **2100** – global warming stronger over mainland SE Asia
- ✓ Southeast Asia sea level rise 40 cm higher by 2100
 - ✓ **Indonesia** - likely to lose 2,000 small islands by 2030
 - ✓ **Philippines** - 100-cm rise in sea level by 2080 to inundate 5,000 hectare of Manila Bay area and affect 2.5 million people
- ✓ Sea level rise of **Pacific island countries** the last decade ranged from **2.5-21.4mm/year**

Economics of Climate Change

- ✓ The **costs** and risks of climate change is equivalent to losing at least **5-20% of global GDP** per year
- ✓ Economics of **containing** the global warming below 2°C will mean an annual **cost of 1% GDP**
- ✓ **India and S.E. Asia** could lose on average **2-3%** and as much as a **9-13% (95 percentile) of GDP** by 2100
- ✓ **ADB study** informs that **economy-wide loss** for Indonesia, Philippines, Thailand and Viet Nam can be as high as **6.7% of GDP per year**
- ✓ **300,000** people dead, lives of **325 million** people affected and **economic losses of \$125 billion** yearly

Summary: Science and Economics

- ✓ With our **best efforts**, AND if we **start now**, we can, at best, **contain the increase to 2°C by 2050**
- ✓ To do this, we need to **cut carbon emissions to** a level of about **450ppm of CO₂**
- ✓ Absolute **rise in emissions in developing Asia** significant BUT **emissions intensity relatively low**. Emissions per capita for China and India are forecasted to decline up to 2030
- ✓ Even if OECD countries were to reduce their emissions to zero, a **450ppm trajectory by 2030** will not be **possible without** participation by **non-OECD countries**
- ✓ Have to do **adaptation** measures to contain rise to **2°C**
- ✓ **Economic and social** costs are high (**> 1% of GDP**)

Summary: Science and Economics

It is in the best interest of all – particularly the developing countries of Asia and the Pacific - to transition to low-carbon growth.

Two Global Challenges

- Challenge to address the Financial and Economic Crisis
- Challenge to address Global Climate Change

Global Financial Turmoil and Economic Crisis

- Critical time for world economy
- **Asia** is now **leading the recovery** out of the global recession
- Asian Development Outlook 2009 Update:
 - ✓ Developing Asia to grow by **3.9% in 2009** and **6.4% in 2010**
- But Asia's **growth** has been **energy intensive**
 - ✓ Developing Asia - **30%** of global energy-related CO₂ emissions.
 - ✓ may be **43% by 2030** by some estimates
- More than **900 million** people still live on less than \$1.25 a day in the region.

Global Financial Turmoil and Economic Crisis

Crisis an Opportunity: Green Stimulus Initiatives

1. Global Recession has caused unparalleled **fall in greenhouse gas emissions**
 - ✓ A **quarter of reduction** as a result of regulation
 - ✓ Ex: Europe's target to cut emissions by 20% by 2020, US car emission standards and China's energy efficiency policies
2. **Significant resources** for infrastructure under governments' Stimulus Packages for Green Investments

Global Financial Turmoil and Economic Crisis

Green Stimulus Packages: Opportunity for Financing Transformation to Low-Carbon Growth

- ✓ Of China's \$586 billion package, \$221 billion has green features.
- ✓ US' \$787 billion stimulus package – renewable energy, energy efficiency and technology development prominently featured.
- ✓ Japan's \$5 billion facility for water systems, solar power, etc.
- ✓ Korea's \$31 billion "Green New Deal".

Global Financial Turmoil and Economic Crisis

- Even before the financial crisis and without the green stimulus packages, developing Asia's infrastructure requirements **\$4.7 trillion** over next 10 years
- Environment - **\$100 billion** yearly
 - ✓ Renewable - **\$30 billion**
 - ✓ Adaptation - **\$28 billion**
 - ✓ Energy efficiency - **\$14 billion**
 - ✓ Sustainable water resources - **\$8 billion**
- Great opportunity to building infrastructure that are energy efficient and climate change friendly and promote low carbon economy

Growing Opportunities for Business

- ✓ Revenues from low-carbon goods and services **now generate more revenue than aerospace and defence sectors combined**
- ✓ **Global turnover** of climate change companies, including renewable, **\$534 billion** in 2008 (aerospace and defence sectors, **\$530 billion**)
- ✓ **Employment** in climate-related business now **2.4 million globally**
- ✓ **Revenue** from climate change business sector would likely **exceed \$2 trillion by 2020**

The Challenge of Climate Change

**Meeting Climate Change
targets by 2020 will require**

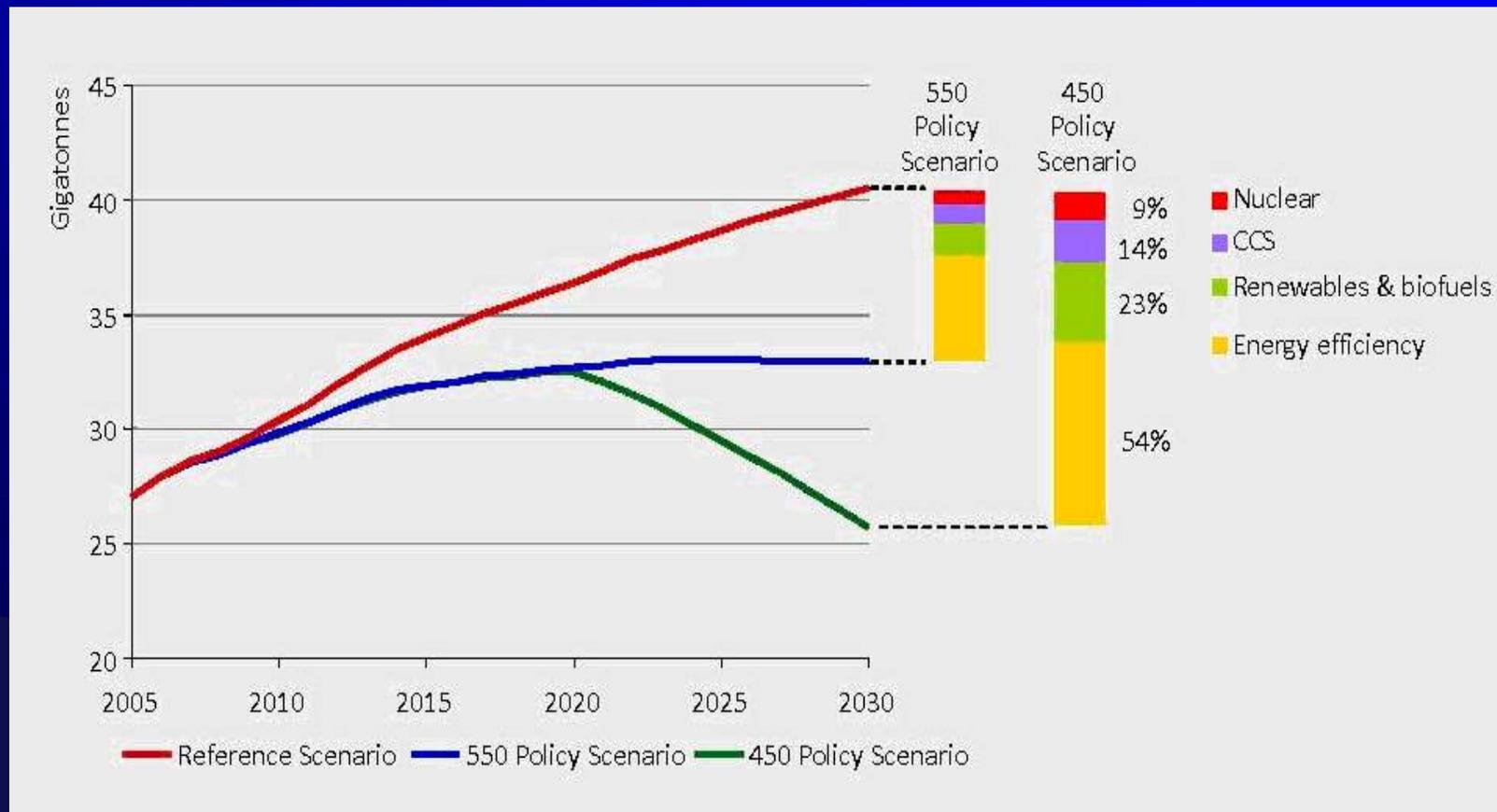
**Moving into Low Carbon
Economy**

Promoting Low-Carbon Transition by:

1. transforming the **energy sector**
2. transforming the **transport sector** and addressing **urban development challenges**
3. transforming **agriculture and land use change**
4. transforming the **financing mechanisms**

1. Transforming the Energy Sector:

Energy efficiency from low-carbon energy will contribute the most savings (54%) to enable a 450ppm scenario



Source: World Energy Outlook 2008. IEA.

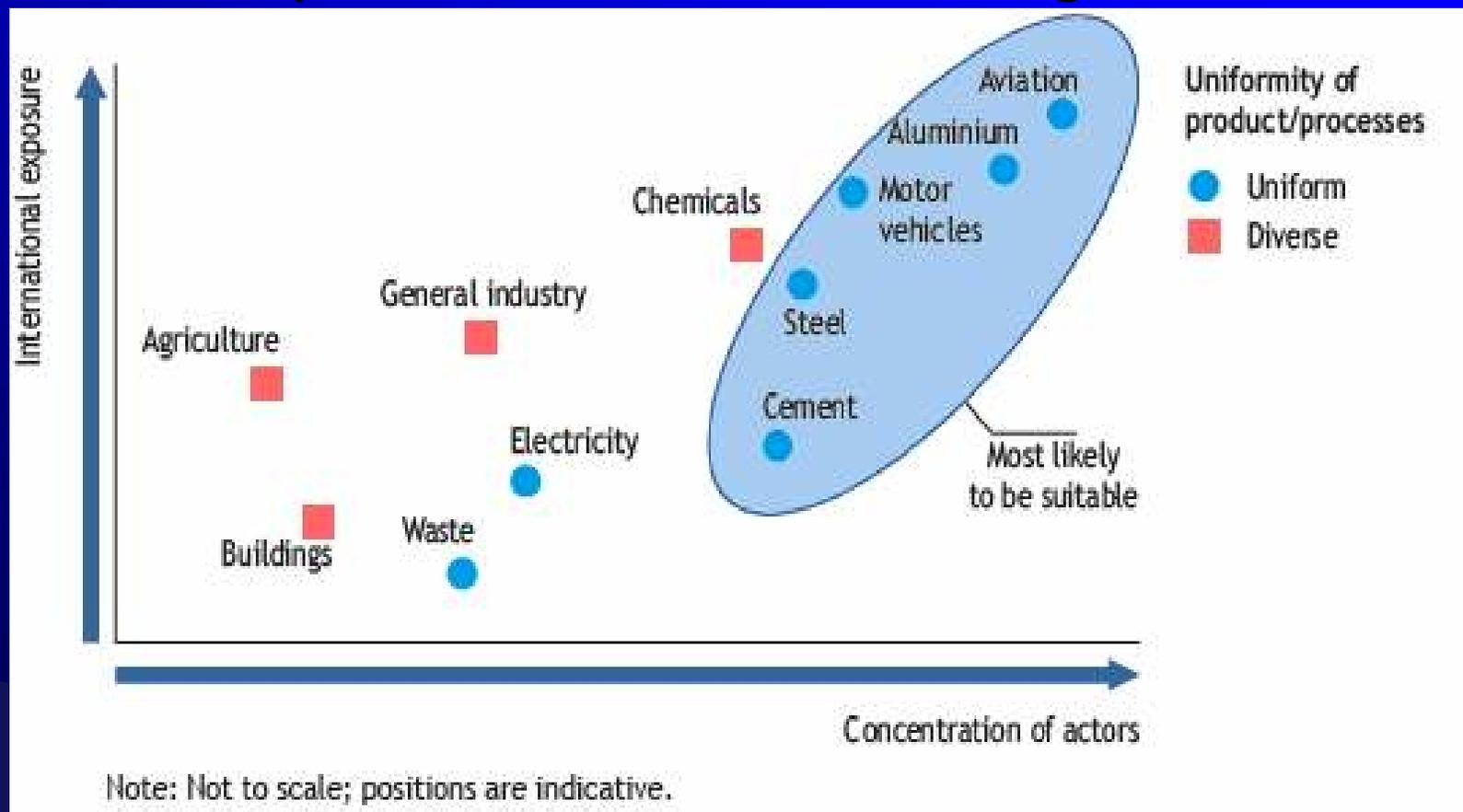
1. Transforming the Energy Sector: Energy Efficiency

Some opportunities for business include:

- ✓ Majority of global executives regard climate change as **strategically important**, e.g., moving into energy efficient operations
- ✓ Significant opportunities for **expansion of private sector energy saving companies (ESCOs)**
- ✓ **Consumers** more willing to use more energy-efficient appliances, recycle, etc

1. Transforming the Energy Sector: Energy Efficiency

Suitability of Sectors to Sectoral Agreements



Source: World Energy Outlook 2008. IEA.

1. Transforming the Energy Sector: Energy Efficiency

Selected actions policy makers can take include:

- ✓ Enhancing the use of **building codes**, e.g., codes requiring insulation and efficient lighting systems
- ✓ Implementing **regulations to enforce energy efficiency** e.g., labelling of appliances such as CFC refrigerators
- ✓ Changing regulations to ensure **appropriate carbon emissions standards of polluting industries** – **sectoral approaches**
- ✓ Providing **enabling environment to support private sector energy saving companies (ESCOs)** such as guarantee mechanisms and/or tax incentives

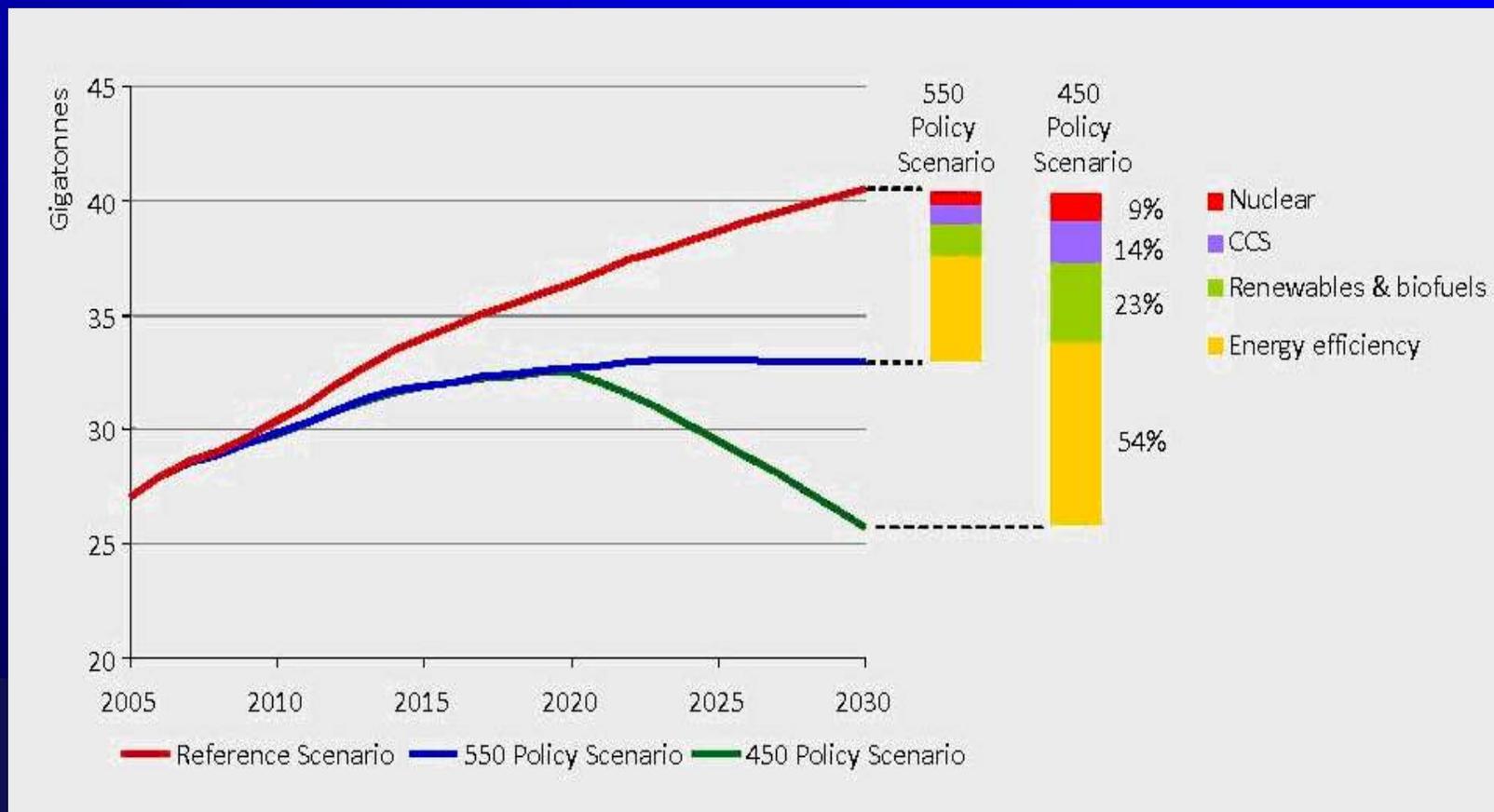
1. Transforming the Energy Sector: Energy Efficiency

Examples of Energy Efficiency Projects:

- ✓ PHI: Energy Efficiency Project
 - ✓ FIRR 206%, EIRR 99%
 - ✓ Retrofit 40 government office buildings with efficient lighting
- ✓ PAK: Energy Efficiency Program and Project
 - ✓ FIRR 97%, EIRR 66%
 - ✓ 1 million tons CO₂ equivalent annual reduction in GHG emissions
- ✓ PRC: Guangdong Energy Efficiency Program
 - ✓ FIRR average of 16.6% versus cost of capital of 7.5%
 - ✓ EIRR ranging from 20.9-44.7%, with environmental benefits

1. Transforming the Energy Sector:

Renewable and biofuels will contribute 23% of CO₂ savings to enable a 450ppm scenario



Source: World Energy Outlook 2008. IEA.

1. Transforming the Energy Sector : Renewables

- ✓ Renewables will continue to expand rapidly
- ✓ Renewables supported 7% of global primary energy needs in 2006
- ✓ IEA estimates Renewables will be 10% of primary energy mix by 2030
- ✓ Countries like China and India already have enabling policies for renewable energy

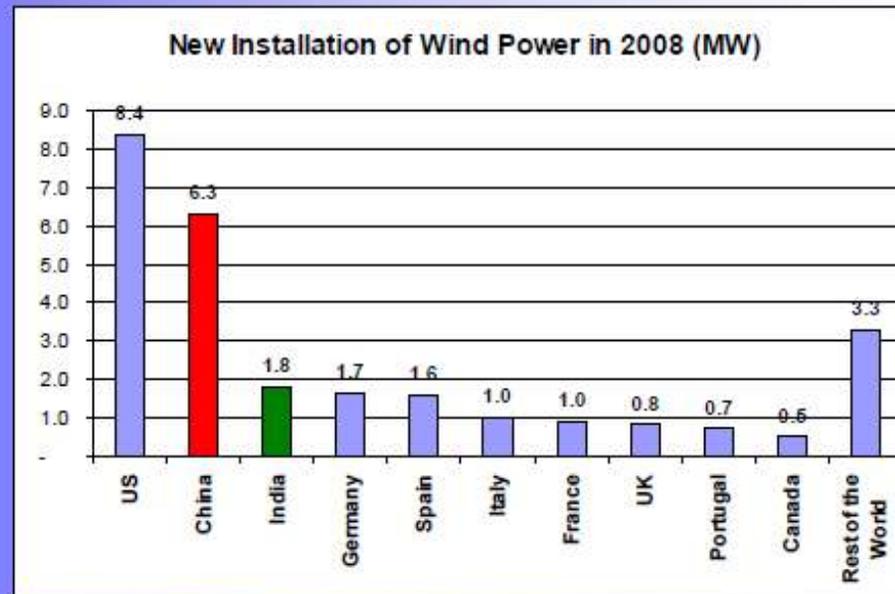
1. Transforming the Energy Sector : Renewables

- ✓ In **China**, the Renewable Energy Law became effective in January 2006 and **requires 10%** of total capacity addition to be renewable
- ✓ In **India**, several states have committed a target of **6-10%** of its energy resources from renewable energy by **2010**
 - ✓ **India's solar yield is already bigger** than any country, except the US
- ✓ **China and India** are **biggest** producers of wind power



India and the PRC:

Among the fastest growing wind power markets



- Ranking #2 (PRC – 6.3 GW) and #3 (India – 1.8 GW) in the world for new installation

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1. Transforming the Energy Sector : Renewables

8 key renewable energy sources:

1. Onshore Wind
2. Offshore Wind
3. Solar Photovoltaic (PV)
4. Solar Thermal Electricity Generation (STEG)
5. Municipal Solid Waste-to-Energy (MSW)
6. Sugar-based Ethanol
7. Cellulosic and Next Generation Biofuels
8. Geothermal Power

1. Transforming the Energy Sector: Renewables

Examples of Renewable/Clean Energy Projects:

- ✓ IND: Tata Wind Power
 - ✓ FIRR 12.1% vs cost of capital of 5.4%
 - ✓ EIRR 16.1%
 - ✓ Cashflow of \$1.1 million/year from CER credits
- ✓ PRC: Inner Mongolia Wind Power
 - ✓ FIRR 8.5%, EIRR 20%
 - ✓ \$33 million CER revenues over 25 years
- ✓ THAI: Biomass Project
 - ✓ FIRR 13.2% , EIRR 37%
- ✓ PRC: Municipal Waste to Energy Project
 - ✓ FIRR 9.8% vs cost of capital of 5.4%, EIRR 15%

1. Transforming the Energy Sector : Renewables

Some business opportunities include:

- ✓ Growing private sector interest and initiatives to go for **green technologies**
- ✓ **Green stimulus packages**
- ✓ Huge **donor community support** for green technologies
- ✓ **Institutional investors** like CalPERs now have clean energy programs of investments

1. Transforming the Energy Sector : Renewables

Selected actions policy makers can take include :

- ✓ Setting **priorities and targets** of renewable energy sources
- ✓ Setting **differentiated feed-in tariffs** for different energy sources
- ✓ **Deregulating** where appropriate to support cost-efficient and appropriate clean and renewable energy technologies
- ✓ Provide incentives for **efficiency power plants**

1. Transforming the Energy Sector : Coal

The Choice of Coal Technology

- ✓ China and India are shifting away from sub-critical to super-critical power plants, where appropriate
- ✓ Need coal efficiency standards - adopting integrated gasification combined cycle technology (or IGCCs)

Carbon Capture and Sequestration (CCS)

- ✓ Coalmine methane (CMM) which now accounts for 6% of global methane emissions
- ✓ By 2020, state of the art technologies could reduce coal sector emissions in the China, South Asia and Southeast Asia by 84%

The Economics of Coal

- ✓ With a **cost** imposition of even **at least \$12/tonne of CO₂ emissions**, the preference **will shift away from coal-fired power plants** to other energy sources like nuclear
- ✓ At **\$50/tonne of CO₂ emissions**, it will be more economical to build coal-capture plants and pay for transport and storage of CO₂ emissions
- ✓ We will **continue to rely on coal-burning power plants** in the foreseeable future
- ✓ A coal-fired power plant will last for **40-50 years**

The Choice of Coal Technology

- ✓ The investment choice today will make huge difference for the next 40-50 years
- ✓ China and India are shifting away from sub-critical to super-critical power plants, where appropriate
- ✓ Need coal efficiency standards - adopting integrated gasification combined cycle technology (or IGCCs)
- ✓ Around 18 IGCCs in operation, which is less than 1% of total coal power plants
- ✓ Around 27 new IGCCs and carbon-capture-capable plants planned in 2009-2016

1. Transforming the Energy Sector : Coal Technology

Some business opportunities include:

- ✓ Growing private sector interest and initiatives to go for **green technologies**
 - ✓ For example, **CO₂ injection and storage** is likely to reach **\$80 billion** by 2030
 - ✓ **Transport of CO₂** will **exceed \$15 billion** by 2030
- ✓ **Green stimulus packages**
- ✓ Huge **donor community support** for clean coal technologies

1. Transforming the Energy Sector: Coal

Examples of Coal Projects:

- ✓ VIE: Mong Duong 1 Thermal Power Project
 - ✓ \$1.1 billion total project size, 15% government
 - ✓ VietNam sets to **use clean coal technology** at this early critical stage of its economic development
 - ✓ **Poor quality** of **anthracite** in project area rules out use of super critical boiler technology
 - ✓ **Circulating fluidized bed** technology was chosen and will reduce CO₂e by **30,000 tons** per year

1. Transforming the Energy Sector : Coal Technology

Selected actions policy makers can take include :

- ✓ A **clear policy on use of coal** is essential
- ✓ A clear understanding of the **most efficient and appropriate technology** for each country at any given point in time is crucial
- ✓ **Deregulating** where appropriate to support cost-efficient and appropriate clean coal technologies
- ✓ Providing **policy environment** to support new **coal technologies**

2. Transforming the Transport Sector and Addressing Urban Development Challenges

- ✓ By 2030, UN estimates that Asia and the Pacific's **population** will reach **4.9 billion**, **55%** of which will **live in urban** areas
- ✓ By 2015, UN estimates **22 mega cities** (population > 10 million people) worldwide, **11 in Asia**
- ✓ Some **44 million people** are being added to our cities each year
- ✓ By 2015, **55% of GHG emissions** will come from cities in Asia
- ✓ Improve urban planning to ensure a **more sustainable lifestyle**

2. Transforming the Transport Sector and Addressing Urban Development Challenges

Selected actions policy makers can take include:

- ✓ Improving **energy efficiency** in the transport sector
 - ✓ **Rail-based transport**, particularly bulk cargo transport is **6-10 times more energy efficient** than the most efficient private vehicles
 - ✓ By shifting to light vehicles like hybrid cars, **total global oil demand will decrease by 13%**, and **CO2 emissions by 39%** by **2030**
- ✓ Considering **tax and other incentives** to support hybrid vehicles and mass transit systems
- ✓ Improving urban planning including using **well-planned mass transport systems** and **land use plans**
- ✓ **Sanitary landfill** for municipal waste management

2. Transforming the Transport Sector and Addressing Urban Development Challenges

Some business opportunities include:

- ✓ By 2030, hybrid or plug-in hybrid light duty vehicles may reach 1 billion units
- ✓ Automotive batteries industry and battery-management systems will benefit from more powerful lithium-based batteries with market potential of over \$150 billion

3. Transforming Agriculture and Land Use Change

- Agriculture:
 - ✓ Global mitigation potential is 5,500-6,000 megatons of CO₂e / year by 2030
 - ✓ Carbon sequestration - nearly 90% of this potential
 - ✓ Potential to reduce methane (CH₄) emission from rice fields by China and India by 26%
 - ✓ Up to 50% of emissions (1,100-3,000mt CO₂-eq/yr) can be mitigated by 2030 through soil carbon sequestration
 - ✓ Potential to reduce emissions by 277 Mt CO₂-eq/year at carbon price of \$20 per ton, equivalent to benefit of \$5.5 billion a year
- Forestry:
 - ✓ Protect forests to lower emissions
 - ✓ Reducing emissions from Deforestation and Forest Degradation (REDD) and new rules for Afforestation and Reforestation could help

Policy for Mainstreaming Adaptation

- ✓ There is **not enough knowledge** on addressing **country-specific** adaptation
- ✓ **Financial and technical resources** for adaptation fall **short** of global needs, specially for developing countries
- ✓ **Project** interventions
- ✓ Portfolio-at-Risk **assessments**
- ✓ Climate **impact and adaptation measures**

4. Transforming the Financial Mechanisms

Better Use of the Growing Carbon Market

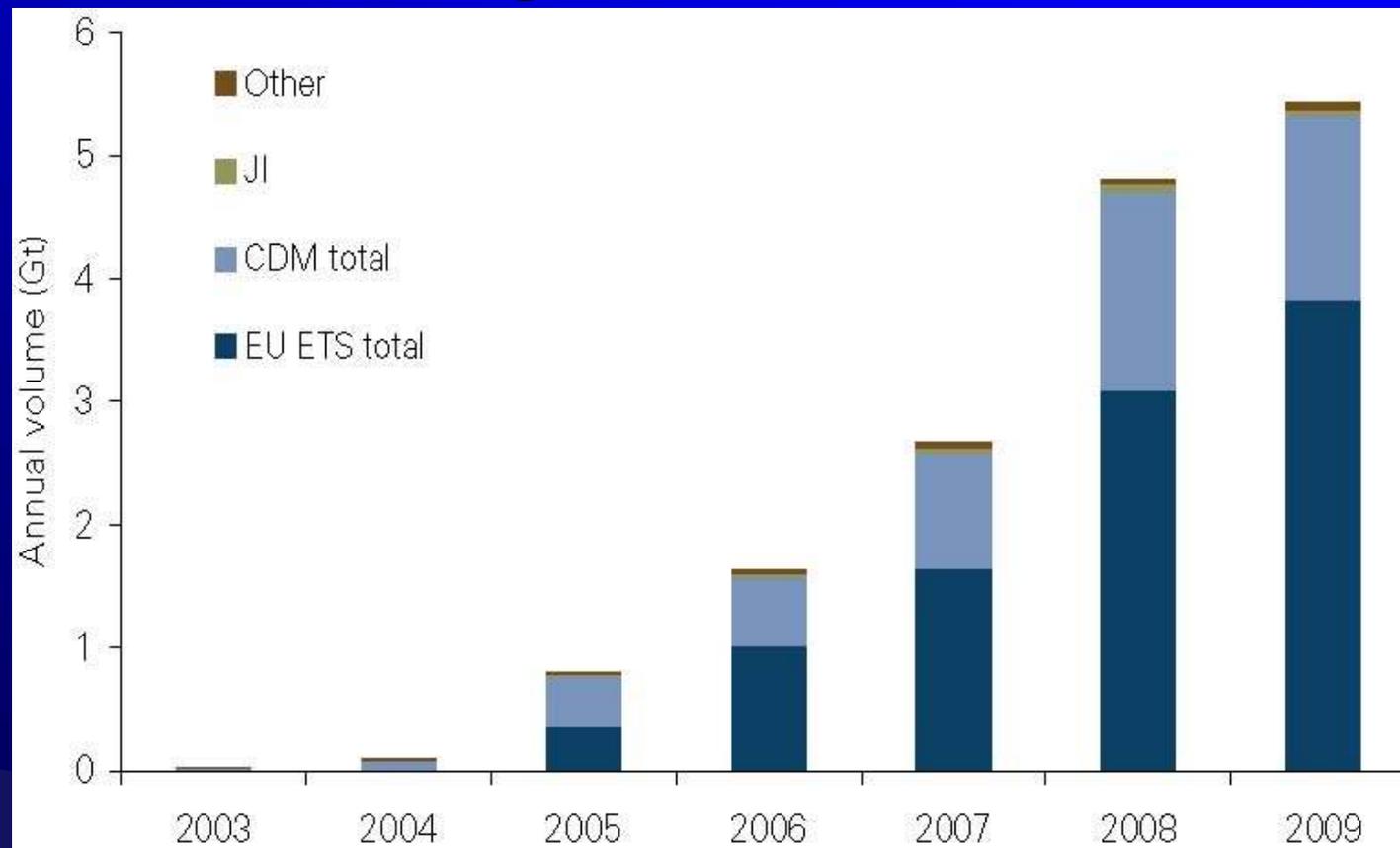
✓ 2005 - €9.4 billion; 2008 - €62.6 billion

The US Carbon Market

✓ If the US were to introduce carbon trading, the value would leap to **\$3 trillion a year** by 2030

4. Transforming the Financial Mechanisms

Growing Carbon Market



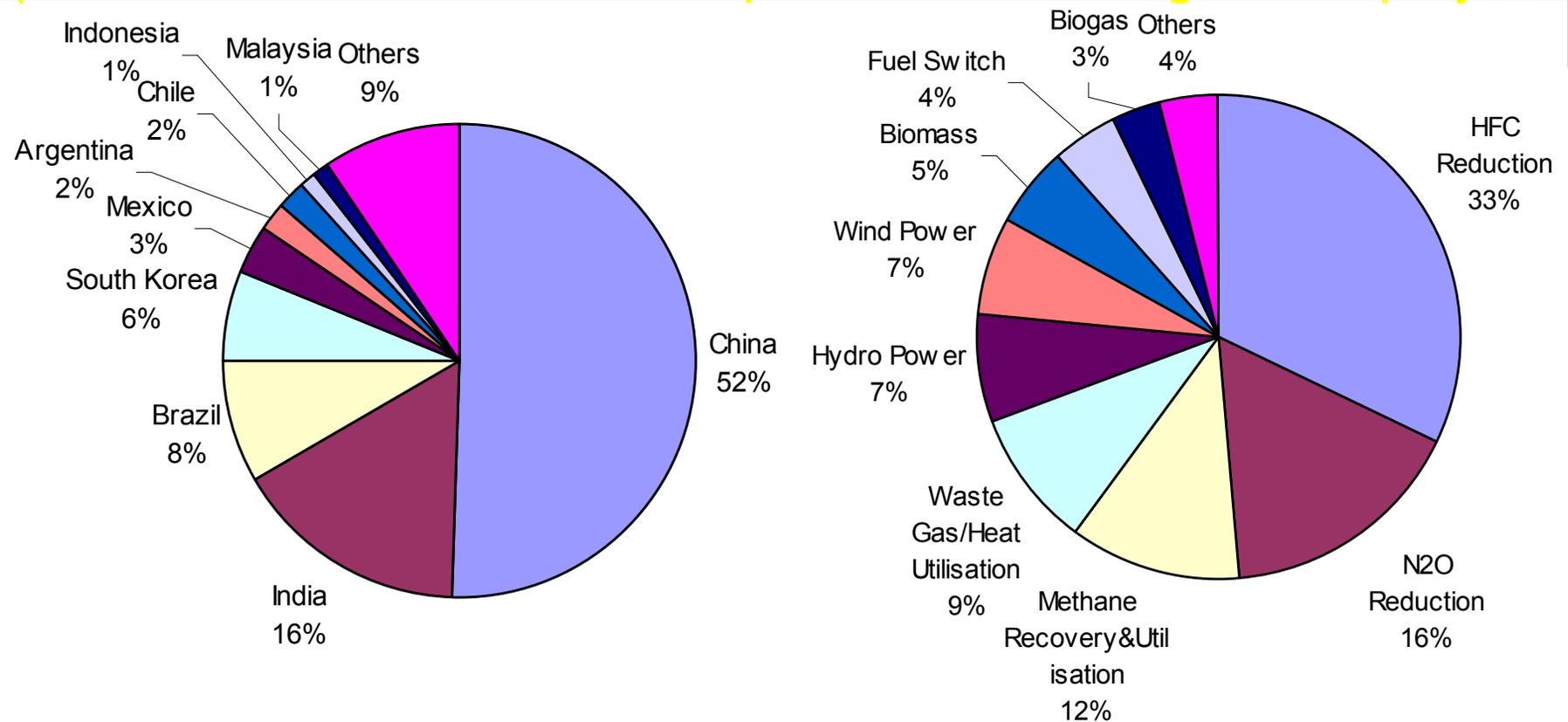
Source: Point Carbon

(Forecast)

4. Transforming the Financial Mechanisms

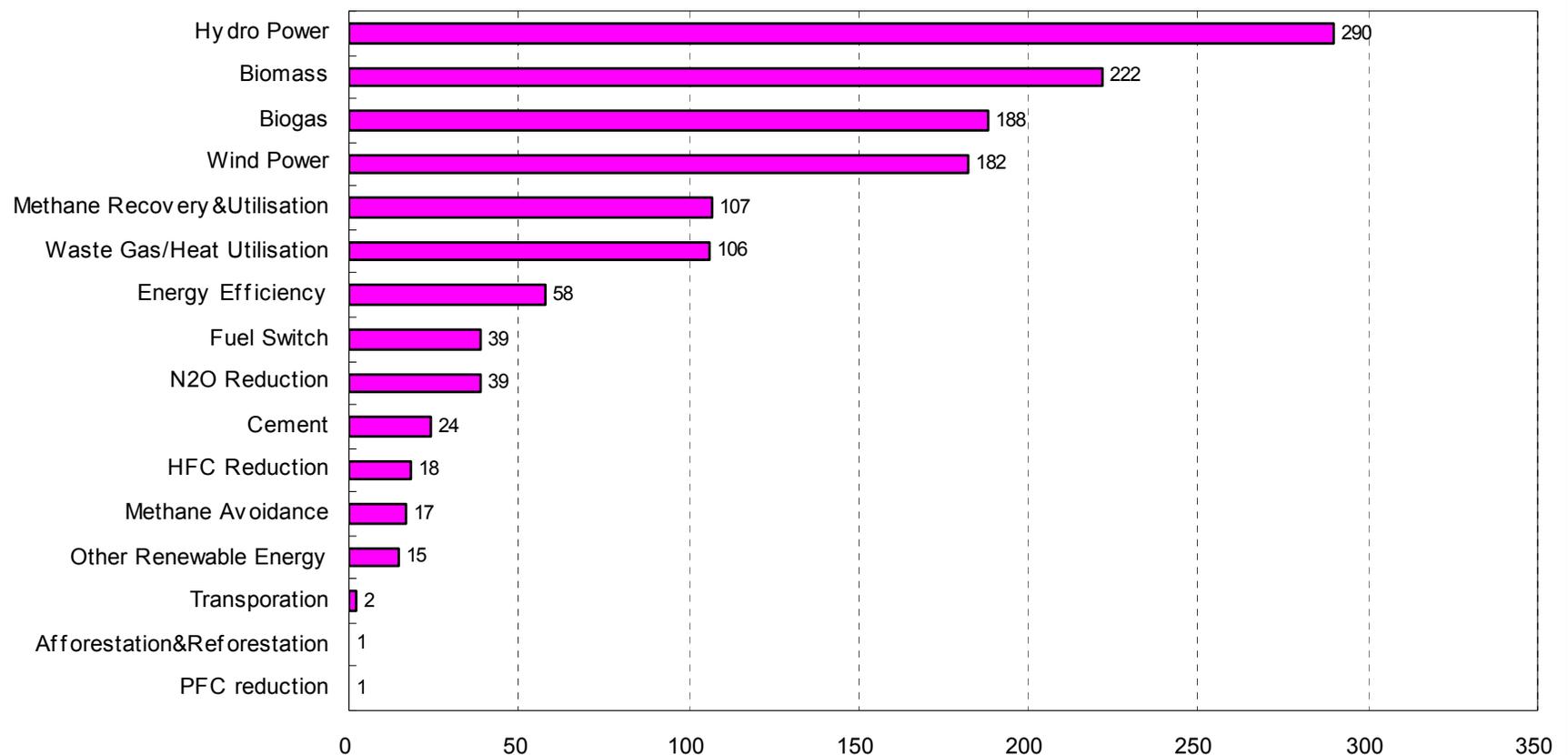
CDM: Snapshot of who and what sells

(Based on estimated credits up to 2012 from registered projects)



4. Transforming the Financial Mechanisms

CDM: What's Selling Number of CDM Projects by Technology



Source: UNFCCC – IGES (as of January 2009)

Understanding under the Kyoto Protocol

CDM Concept

\$50-400/tCO₂e
abatement cost
**Industrialized
Country**

\$0.5-20/tCO₂e
abatement cost
Developing Country

Carbon Credits

(=GHG Emission rights)

Entity A

✓GHG Emissions

Entity B

✓Project Activity

✓Emission Reduction

Finance

Technology

Capacity Building

ADB

CDM Reality

Industrialized
Country

Developing Country

Carbon Credits

Entity A

✓GHG Emissions

Entity B

✓Project Activity
✓Emission Reduction

Payment

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4. Transforming the Financial Mechanisms

Policy Makers and businesses can actively derive benefits from the growing Carbon Market by

- ✓ Actively participating in receiving benefits of carbon reduction credits to support green projects
- ✓ Creating **long-term policy certainty** by promoting arrangements that **look beyond the present 5-year** arrangements under the Kyoto Protocol (i.e., beyond 2012)
- ✓ For example, **China** can generate carbon credits equivalent to annual earnings of up to **\$2.25 billion** which can easily fund over **1500 MW** of additional capacity in wind power every year
- ✓ Creating the **enabling environments** through appropriate regulations to enable a robust carbon market

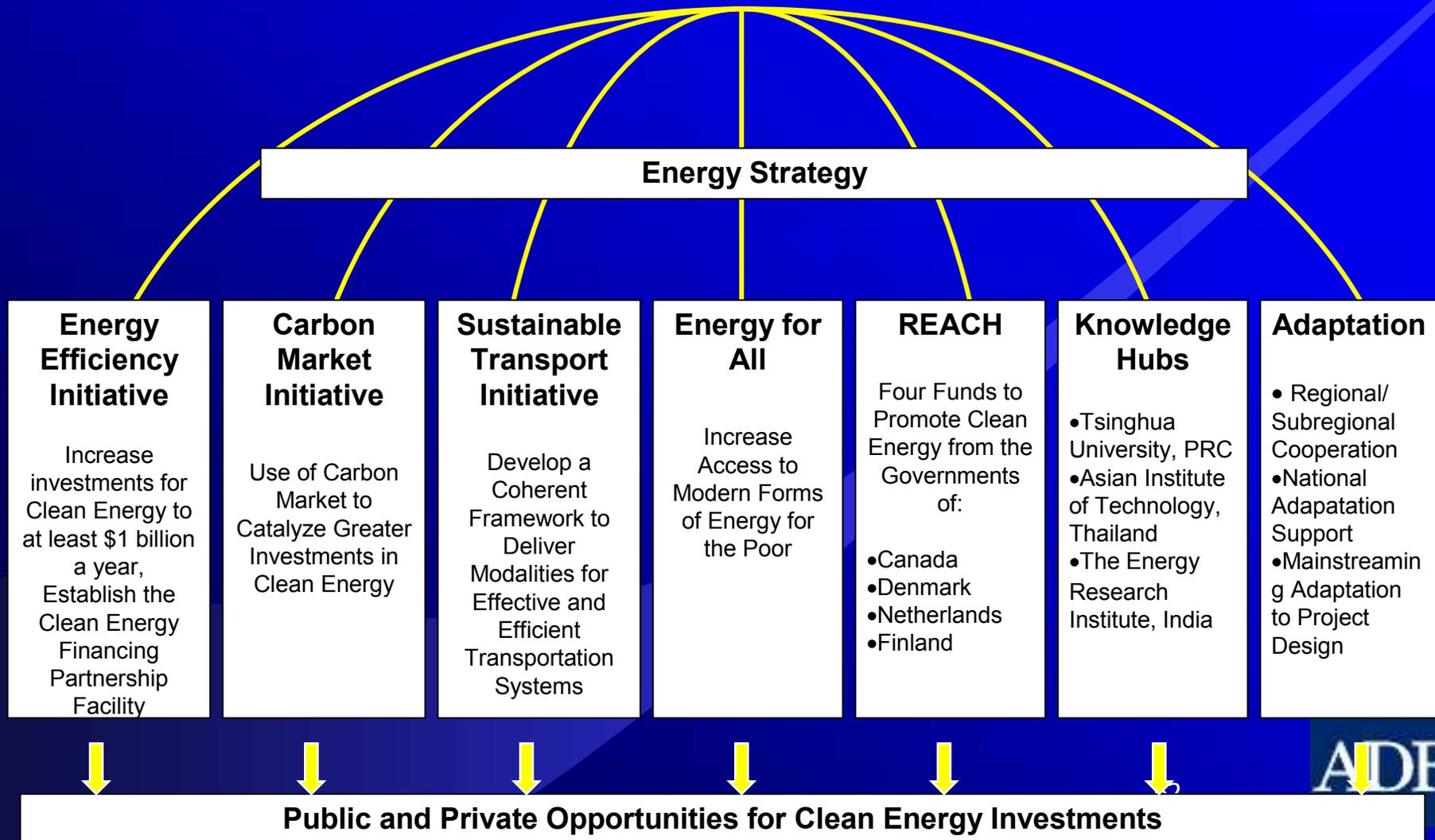
4. Transforming the Financial Mechanisms

Growing Support from Donors for Climate Change Funds and Carbon Funds

- ✓ There is growing support from the donor community for use of carbon funds and policy makers should take advantage of this support
- ✓ The **World Bank Group** has since 2000 contributed a total of **over \$2 billion** in carbon funds and facilities
- ✓ The European Investment Bank (**EIB**) has a Post-2012 **Carbon Credit Fund**
- ✓ **\$6.1 billion Climate Investment Fund (CIF)**

Additional funds expected under the Copenhagen process (e.g., Adaptation Fund, Technology Transfer Fund)

ADB's Clean Energy and Environment Program



ADB's Clean Energy and Environment Program

- Energy Efficiency Initiative - \$1.7 billion in 2008; \$2 billion annually by 2013
- Carbon Market Initiative –
 - \$150 million Asia-Pacific Carbon Fund
 - \$200 million Future Carbon Fund (beyond 2012)
- \$40 million Climate Change Fund
- \$40 million Asia-Pacific Disaster Fund
- ADB actively supports the \$6.1 billion Climate Investment Fund
- Partnership with Australia's Global CCS Institute to manage a \$25 million trust fund
- Sustainable Transport Initiative - \$4 billion per year to transport sector, 2010-2012
- Low Carbon Technology Diffusion Market Place
- REACH – Renewable Energy, Energy Efficiency and Climate Change

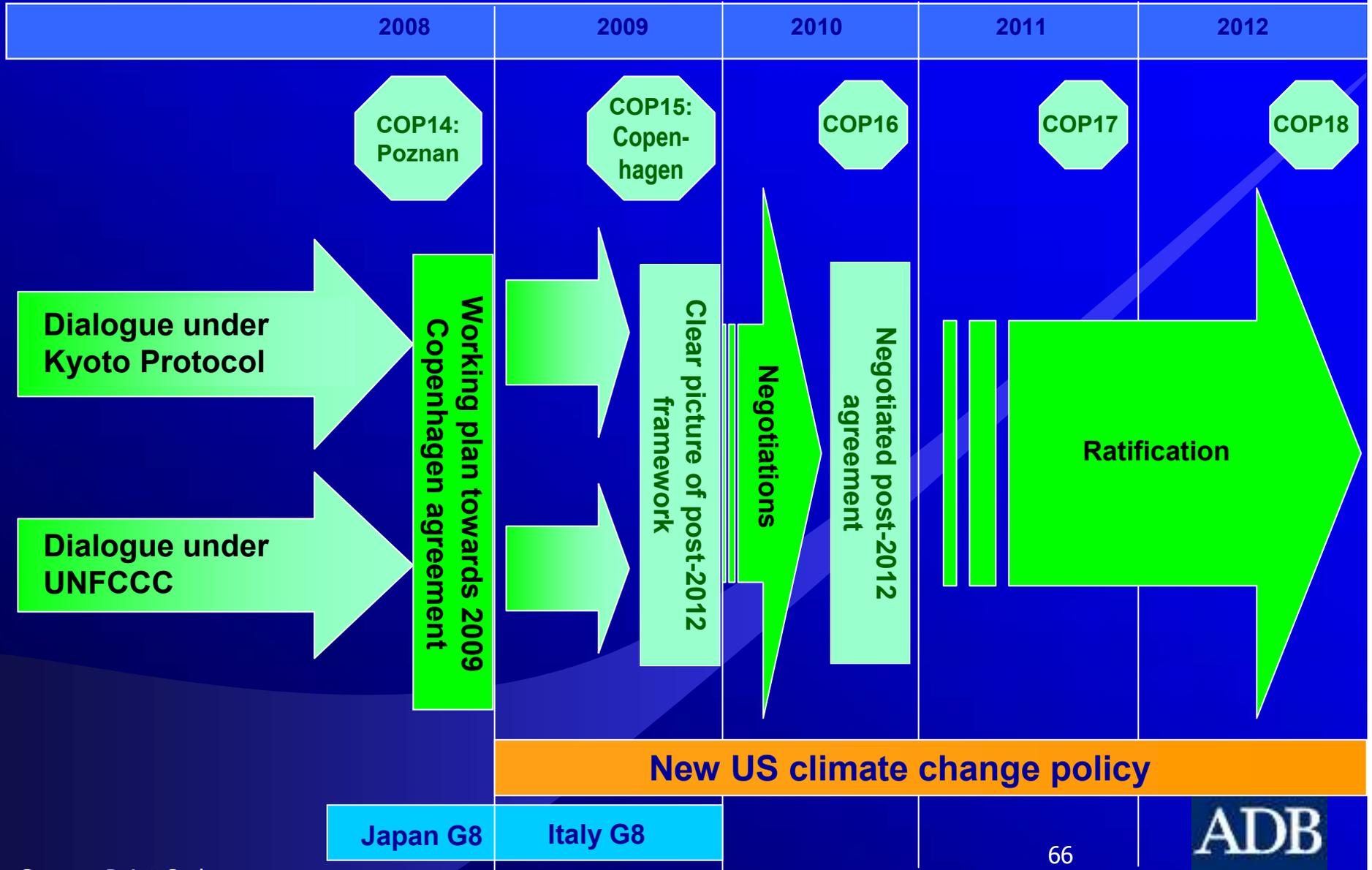
The Copenhagen Climate Change Summit

Key Issues and Likely Outcomes

UNFCCC and Kyoto Protocol Timeline

- 1988: Intergovernmental Panel for Climate Change (IPCC) Formed
- 1992: Framework Convention Signed (at Rio Earth Summit)
- 1994: Convention Enters Into Force
- 1995: IPCC's "Human Fingerprint" Report
- 1997: Kyoto Protocol (KP) Signed
- 2000: Clean Development Mechanisms (CDM) Credit Banking Begins
- 2001: IPCC's Third Assessment Report
- 2005: EU Trading System (parallel to KP) Begins
- 2005: Kyoto Protocol Enters into Force
- 2008: First Commitment Period Starts (5yrs)

Global Negotiation Timeline



Source: Point Carbon

The Copenhagen Climate Change Summit

The Copenhagen Treaty

For COP 15 in Copenhagen to be considered successful, it must achieve a “meaningful long-term response to climate change” by addressing the **four “building blocks”** outlined in the Bali Action Plan (COP 13 of Dec 2007):

1. **Mitigation**
2. **Adaptation**
3. **Technology Transfer**
4. **Finance**

Note: Cop15 is the official name of the Copenhagen climate change summit – the 15th Conference of the Parties (COP) under the United Nations Framework Convention on Climate Change (UNFCCC). COP is the highest body of UNFCCC and consists of environment ministers who meet ~~once~~ once a year.

192 countries have signed the climate change convention.

The logo for the Asian Development Bank (ADB), consisting of the letters 'ADB' in a white, serif font on a dark blue rectangular background.

Copenhagen: Working towards a successful post-Kyoto Protocol agreement

Four Issues:

1. How much are **developed countries** (US, Japan, EU, etc) willing to **commit to reduce emissions**?
2. How much are **major developing countries** (China and India) willing to do to **limit the growth of emissions**?
3. How will **technology transfer and diffusion** happen?
4. How will the transition to low-carbon growth of developing countries be **financed**? How will funds be managed?

The Copenhagen Process

- Lots of Focus on Negotiation
- Less Discussion on Finding Technological Options and Solutions for Solving the Problems

Focus on Technological Solution: Examples

- Energy efficiency technologies for buildings, industries and transport
- Reducing CO₂ from fossil fuel; Carbon Capture and Sequestration (CCS)
- New generation of nuclear power that is safe and reliable for monitoring
- Developing new solar technologies for large scale use and making it economical
- Tapping biofuel (where feasible, without impact on environment and without competing with food production)
- Developing new generation of vehicles – hybrid or electric – for urban areas, etc

Grand Challenges of Engineering in the 21st Century (US NEA) – Some Exciting Possibilities in Future

Out of 14 suggested possibilities, three related to Climate Change:

- ✓ Solar
- ✓ Nuclear fission
- ✓ Carbon capture and sequestration
- ❖ Technology has the chance to solve the problem
- ❖ Financing for R&D and technology transfer at affordable cost is key

Some Q & As on post-2012 negotiations and outcomes

- ✓ Will there be a new international agreement under UNFCCC?
- ✓ How deep will the targets be?
- ✓ Will targets be made stricter during the bargaining process?
- ✓ Will China and India take on targets?
- ✓ How will credits be generated post-2012?

Some Q & As on post-2012 negotiations and outcomes

- ✓ Will REDD credits be permitted or available for compliance in the EU-ETS / US-ETS?
- ✓ Will the CDM be continued?
- ✓ How will developed countries finance adaptation measures as well as contribute to technology transfer?
- ✓ Will the post-2012 regime be finalised in Copenhagen?
- ✓ What will be concluded in Copenhagen?

Thank you!