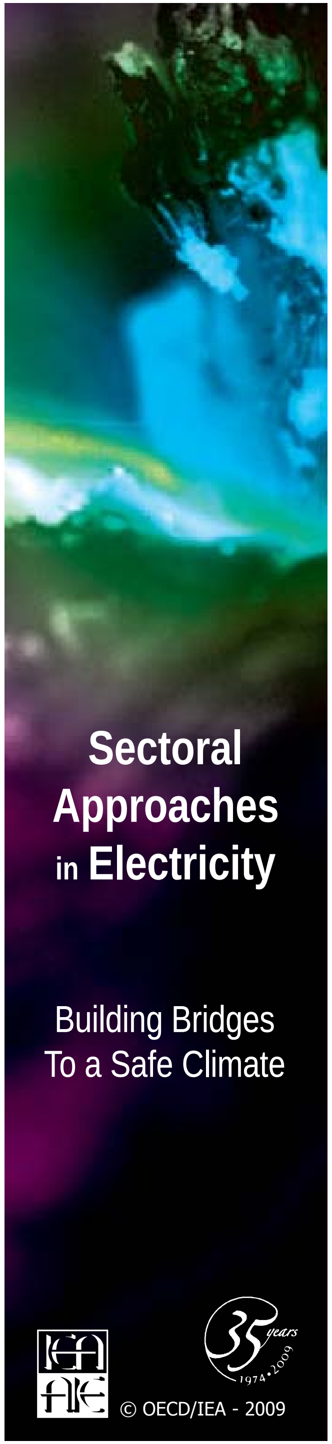
INTERNATIONAL ENERGY AGENCY

Sectoral Approaches in Electricity

Building Bridges to a Safe Climate

Richard Baron
Head of climate change unit, IEA

35 years 1974 • 2009

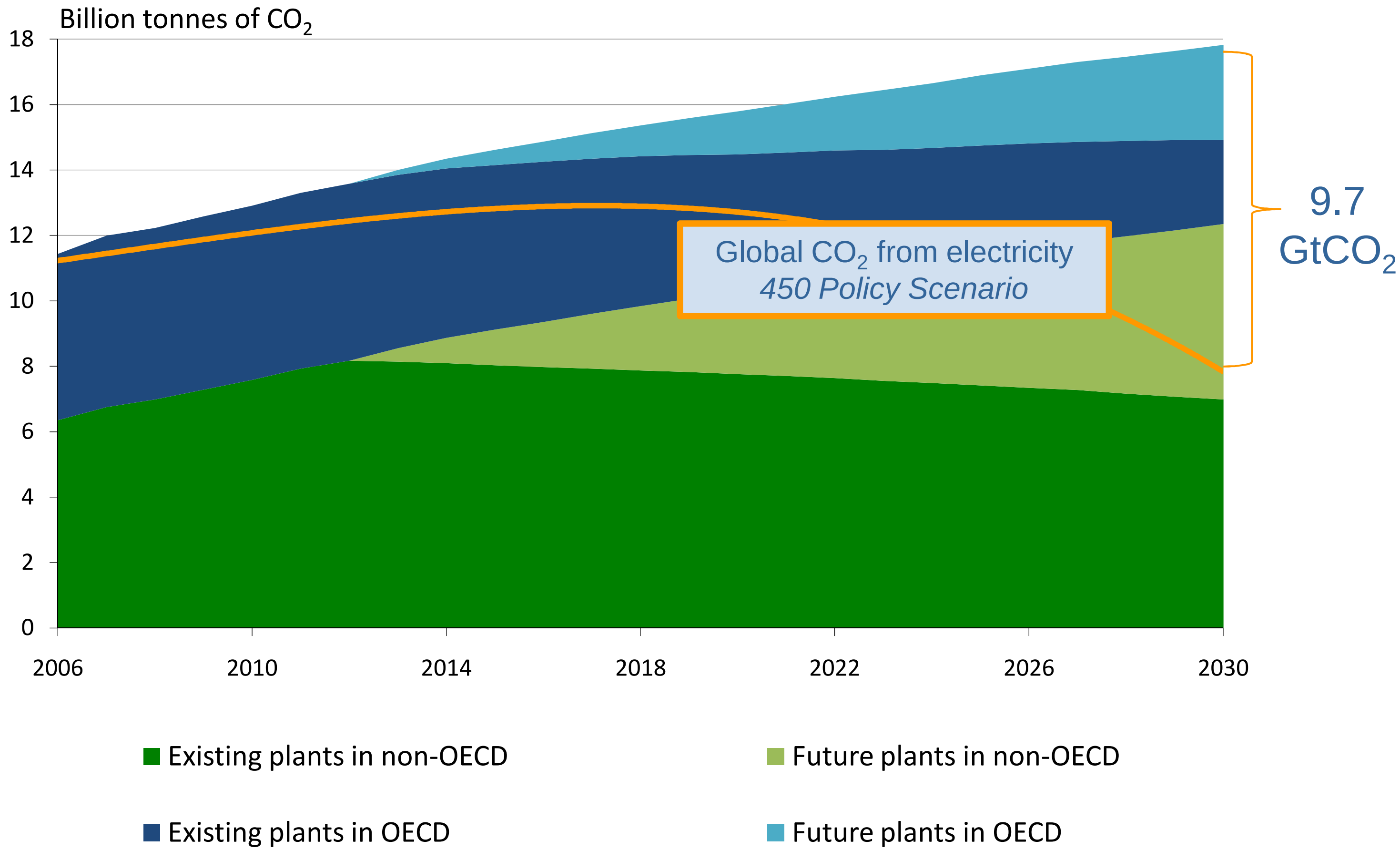


Objective

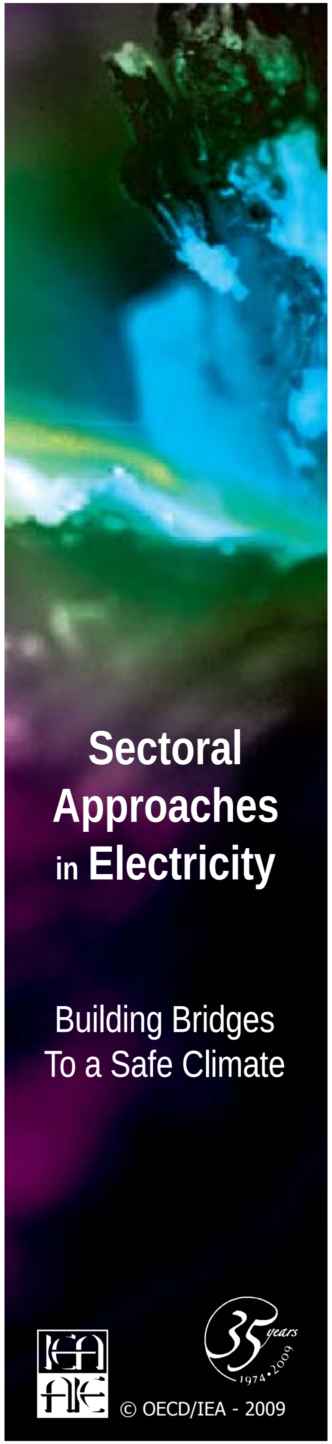
- Identify key areas of intervention in the energy sector to achieve a safe global climate
- Explore policy options best able to trigger change
- Focus of this book: the electricity sector in developing countries

CO_2 emissions from electricity: Reference and 450 Policy Scenarios

(IEA *World Energy Outlook 2008*)



Without new policy measures, electricity-related CO2 emissions will grow by 58% from today's levels by 2030.



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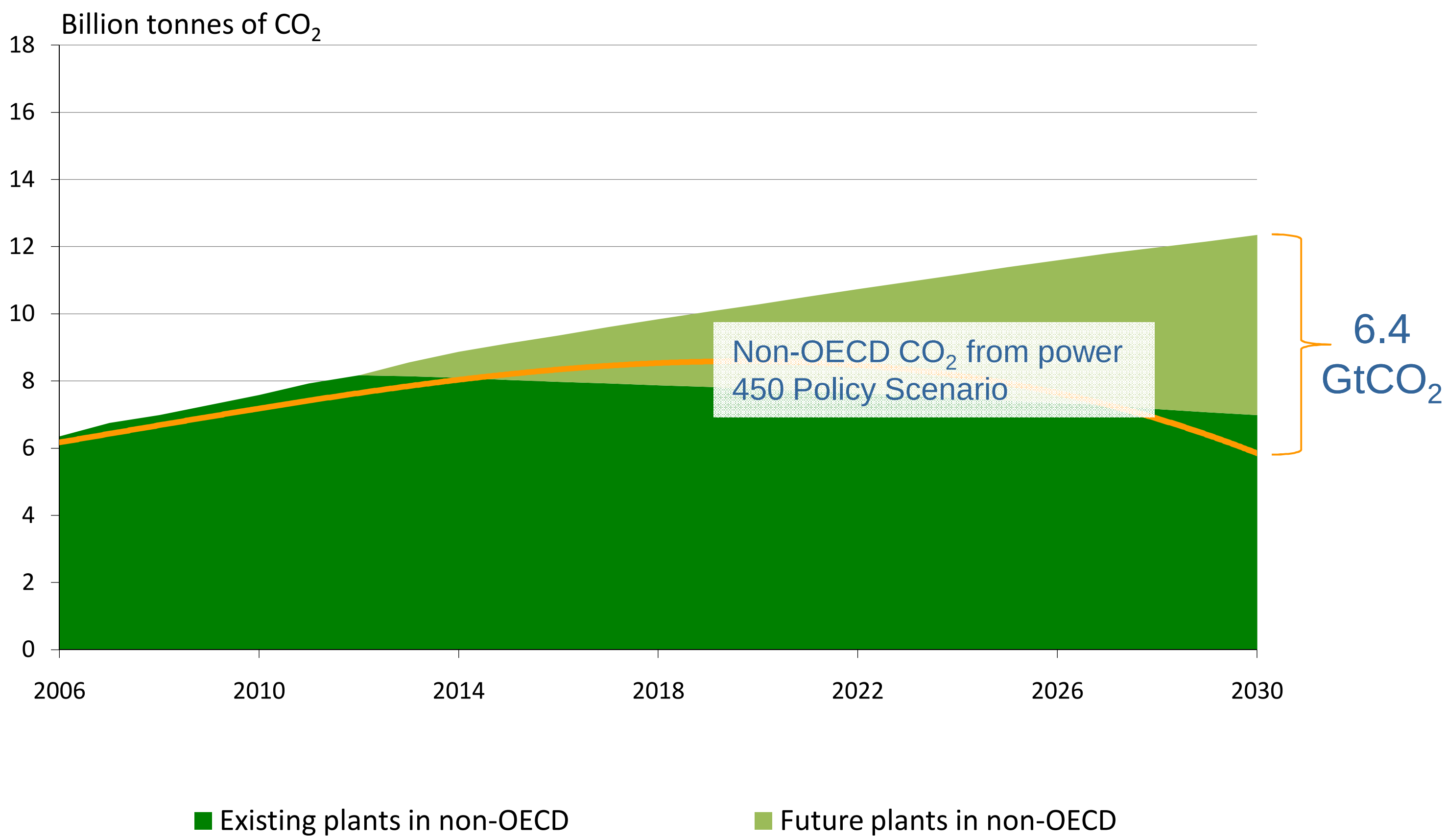
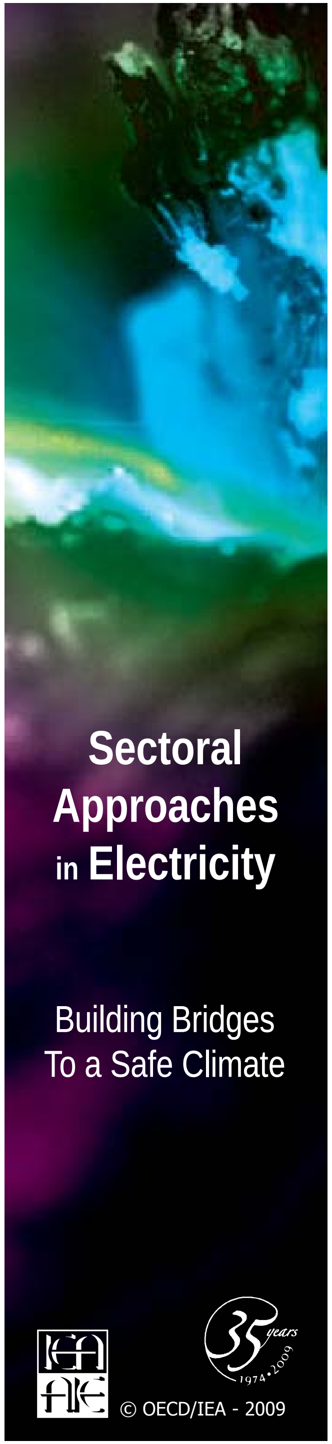
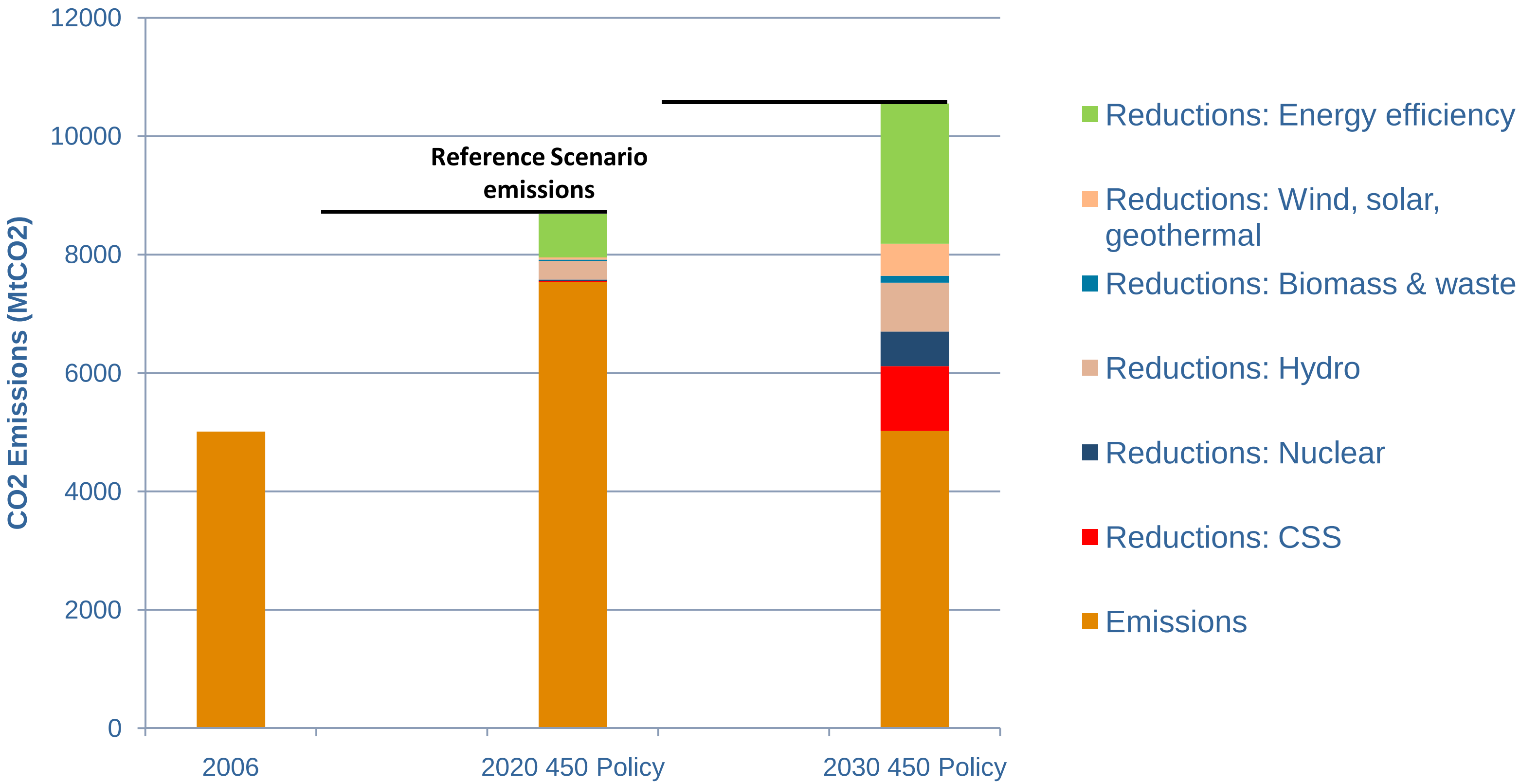


How to move away from the projected "carbon lock-in" of power generation in developing countries? How does such change translate into opportunities for emerging economies?

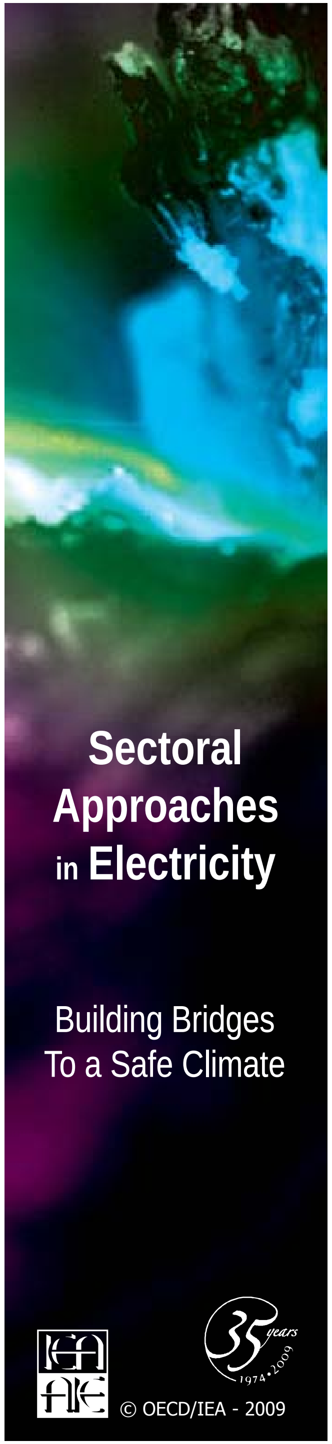


What is the potential to reduce CO_2 power sector emissions in major non-OECD economies*



* Here: Brazil, China, India, Indonesia, Iran, Russia, Saudi Arabia

Source: *WEO 2008*

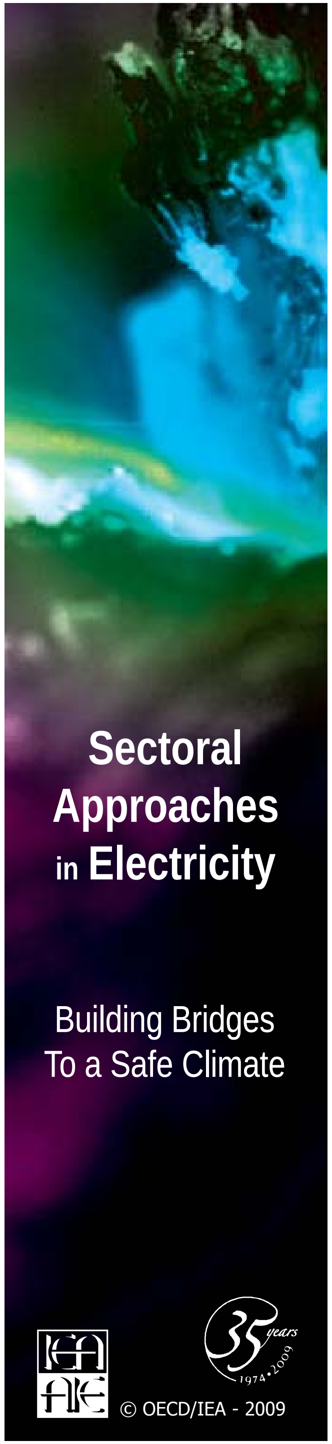


From potential to international action – lessons from activities under the Kyoto Protocol

- **Main instrument to foster action in developing countries: Clean Development Mechanism**
  - **Projects reduce emissions**
  - **Credits for avoided emissions are sold on the carbon market**

- **Some success in power generation**
- **Very small impact on energy efficiency (EE)**
- **A far cry from what is needed to stabilise global climate**

➔ **Sectoral approaches aim to broaden the scope of GHG mitigation in developing countries, with support by developed countries**

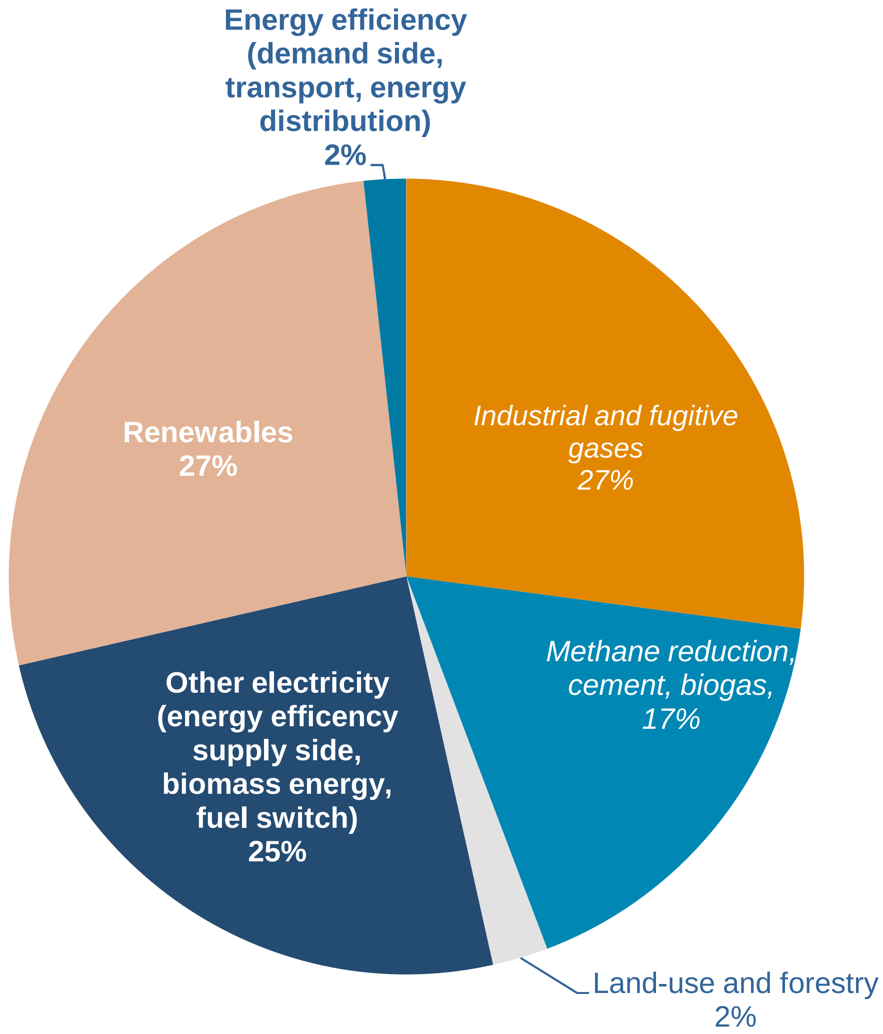


Issued and expected emission reductions from CDM until 2012 – by project type

CDM pipeline information: Less than 1.5 $GtCO_2$ listed in electricity until 2012 – Likely delivery: 400Mt-600 $MtCO_2$ range.

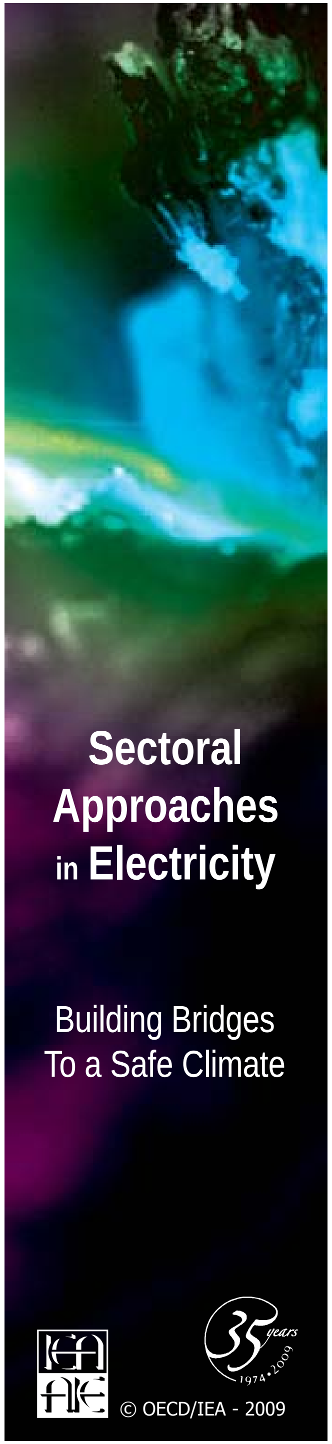
Projected electricity emissions over that decade in non-Annex I: 60 $GtCO_2$

Growth trend in CO_2 from electricity in non-AI since 2000: +8% per year



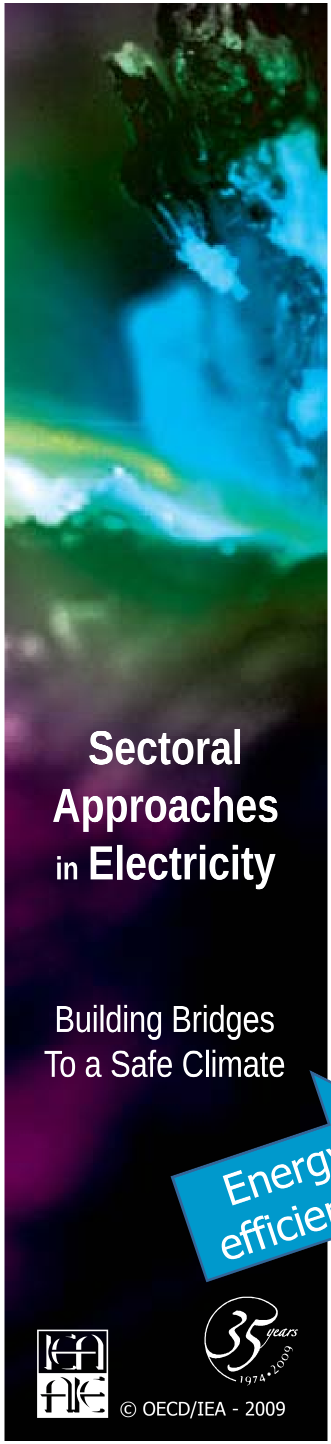
Maximum total reductions from CDM: 2.9 $GtCO_2$

Source: UNEP Risø, CDM pipeline, consulted in May 2009

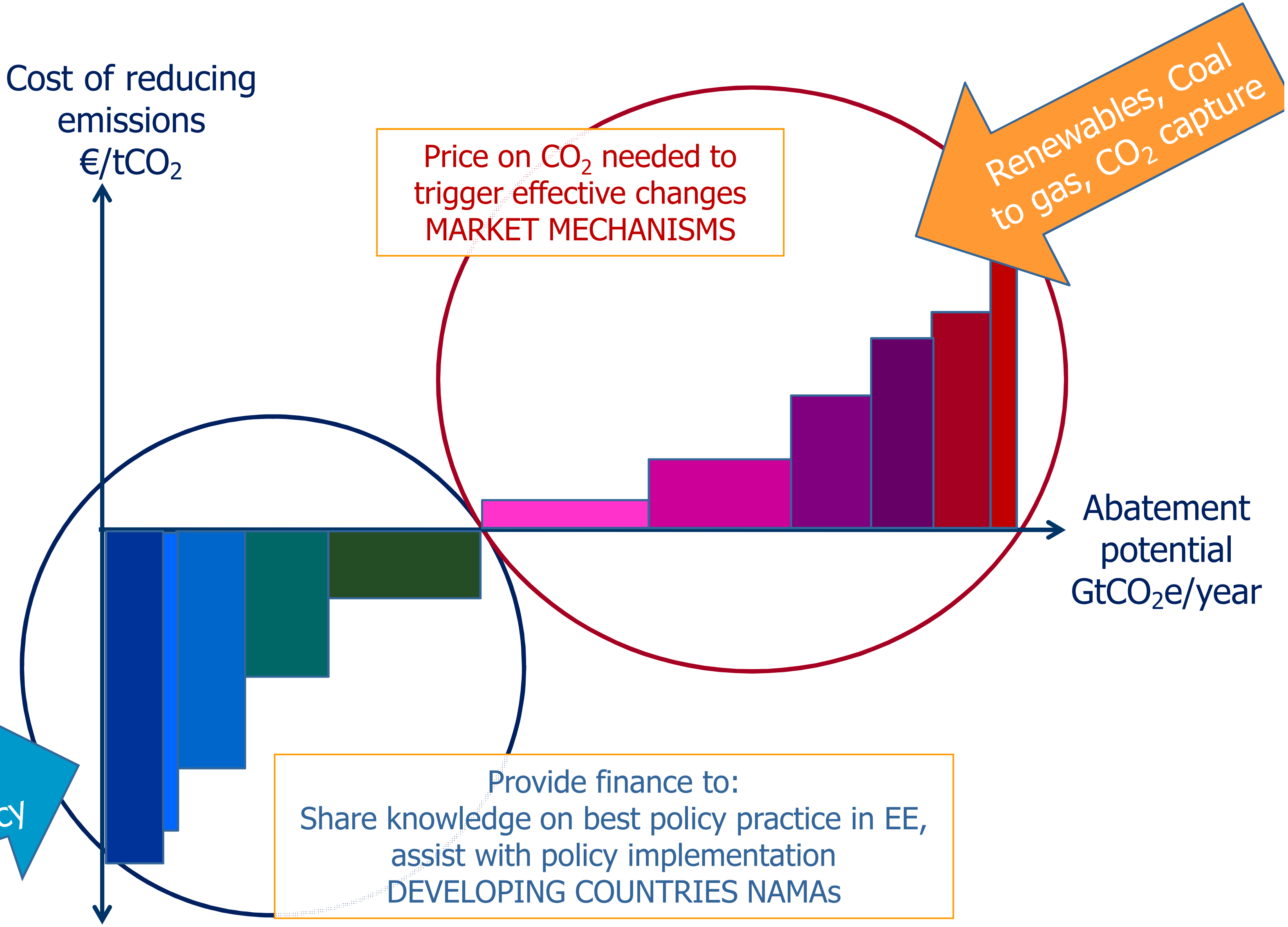


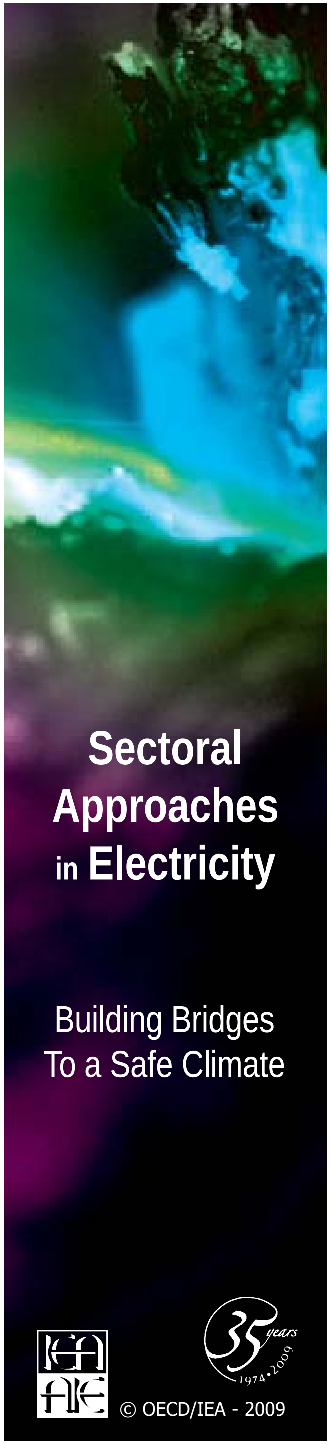
IEA recommendation to address CO_2 from electricity: A two-tiered sectoral approach

- **Broaden the reach of the carbon market from projects to sectors**
- **Support more ambitious energy efficiency policy implementation**
- **How does this tie in with the UNFCCC Copenhagen agenda?**

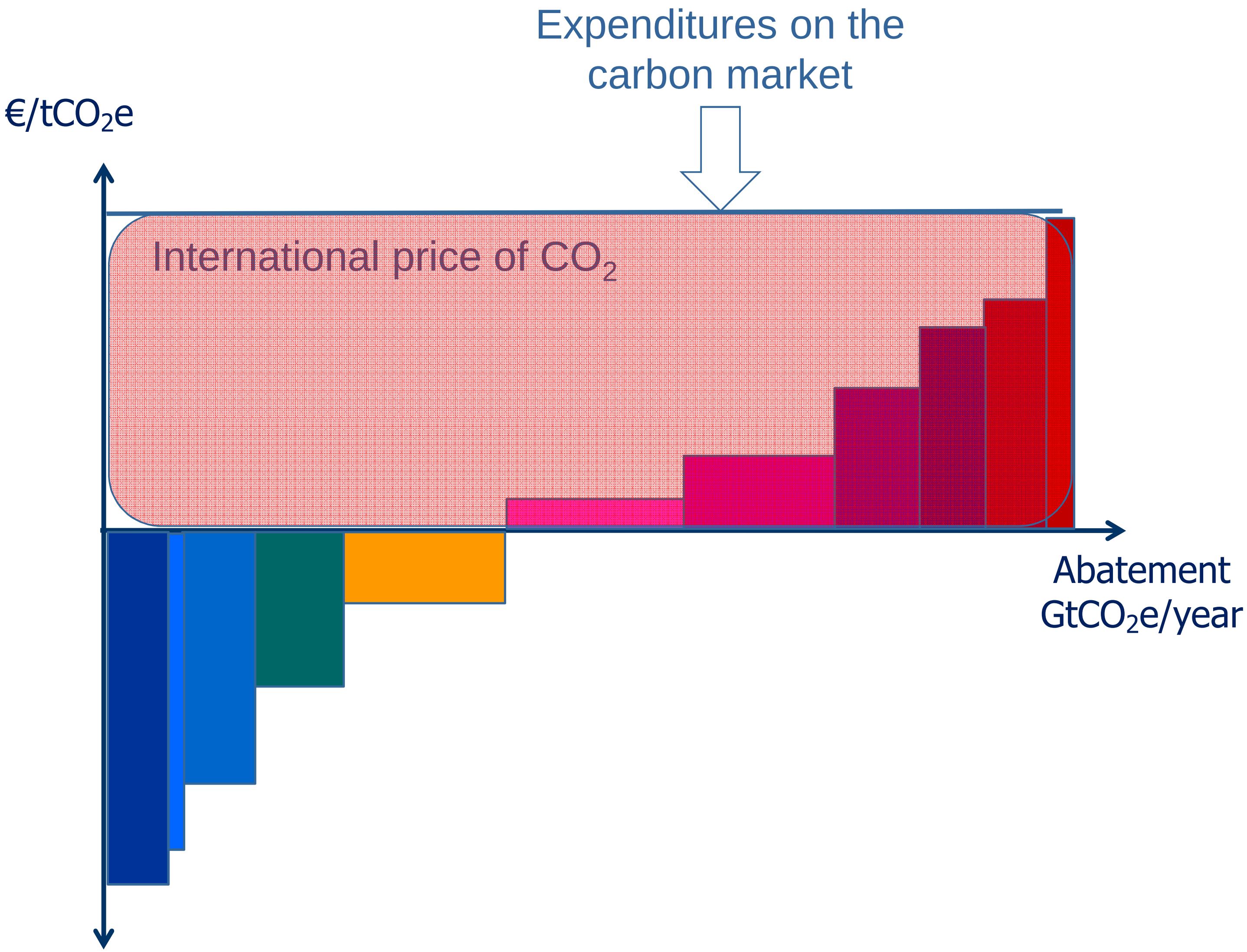


A two-tiered approach: targeting instruments to potentials

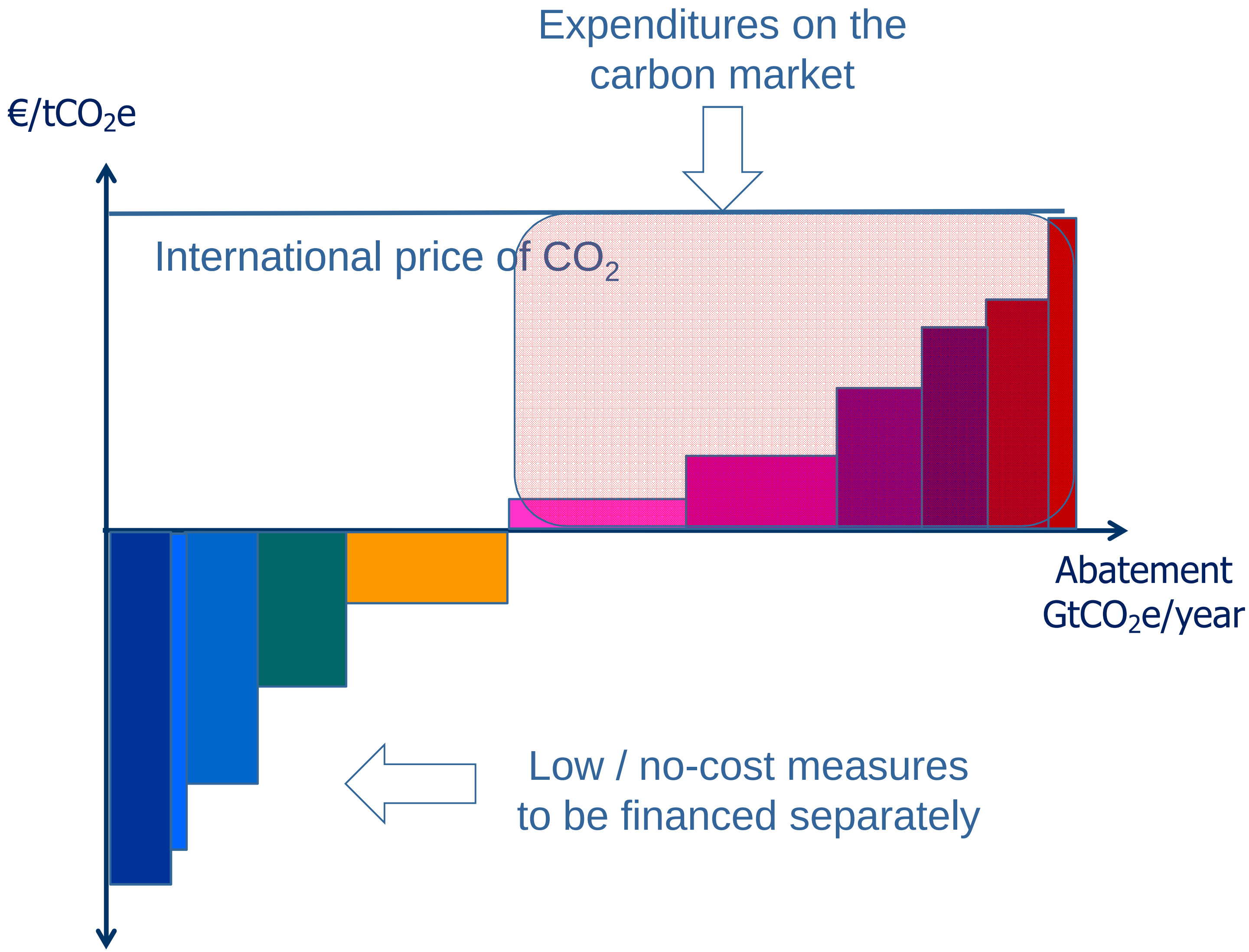


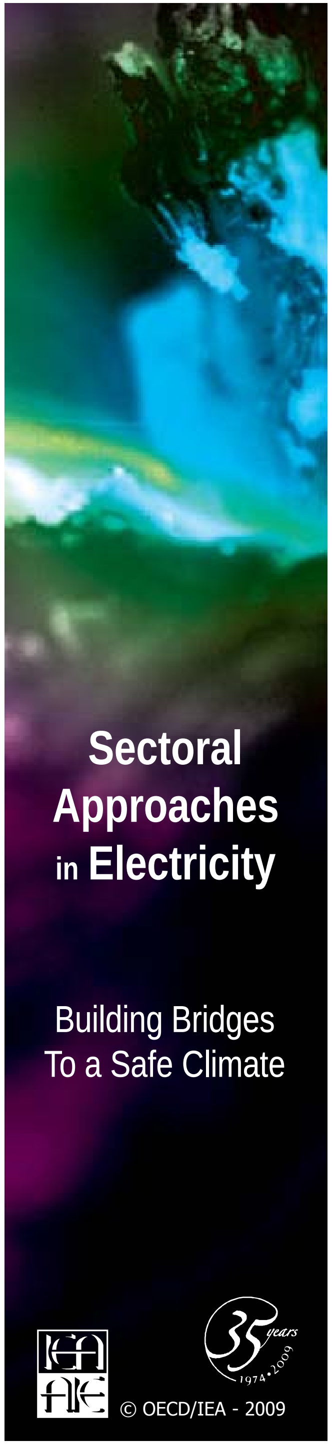


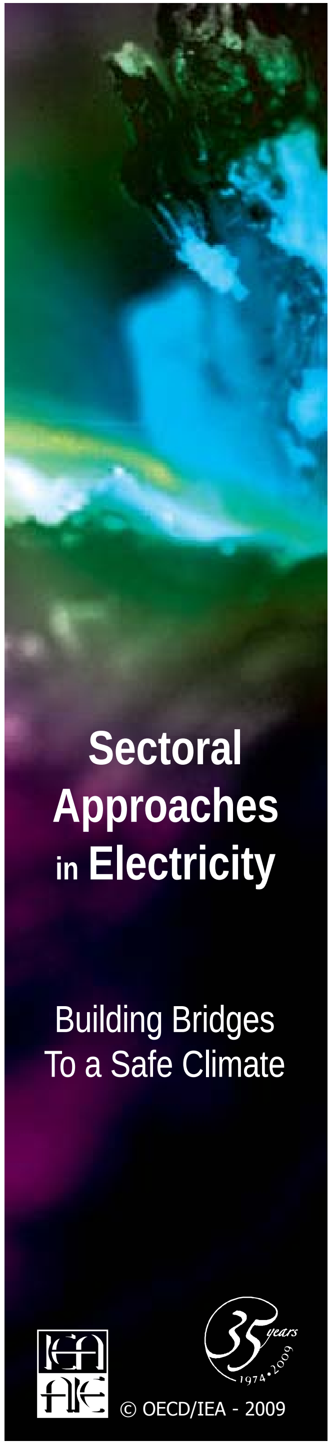
A cost perspective: a rational the use of the carbon market (1)



A cost perspective: a rational the use of the carbon market (2)







On the generation side

- **A carbon price is needed urgently**
  - **The international carbon market is one possible vehicle**
  - **Country-specific baselines for crediting / domestic cap-and-trade**
    - **How to design/agree sectoral baselines**
- **Other support measures**
  - **Experience on best policy practice for development of renewables**
  - **Support improvement in performance of existing plants**
  - **RD&D on breakthrough technologies (CCS)**

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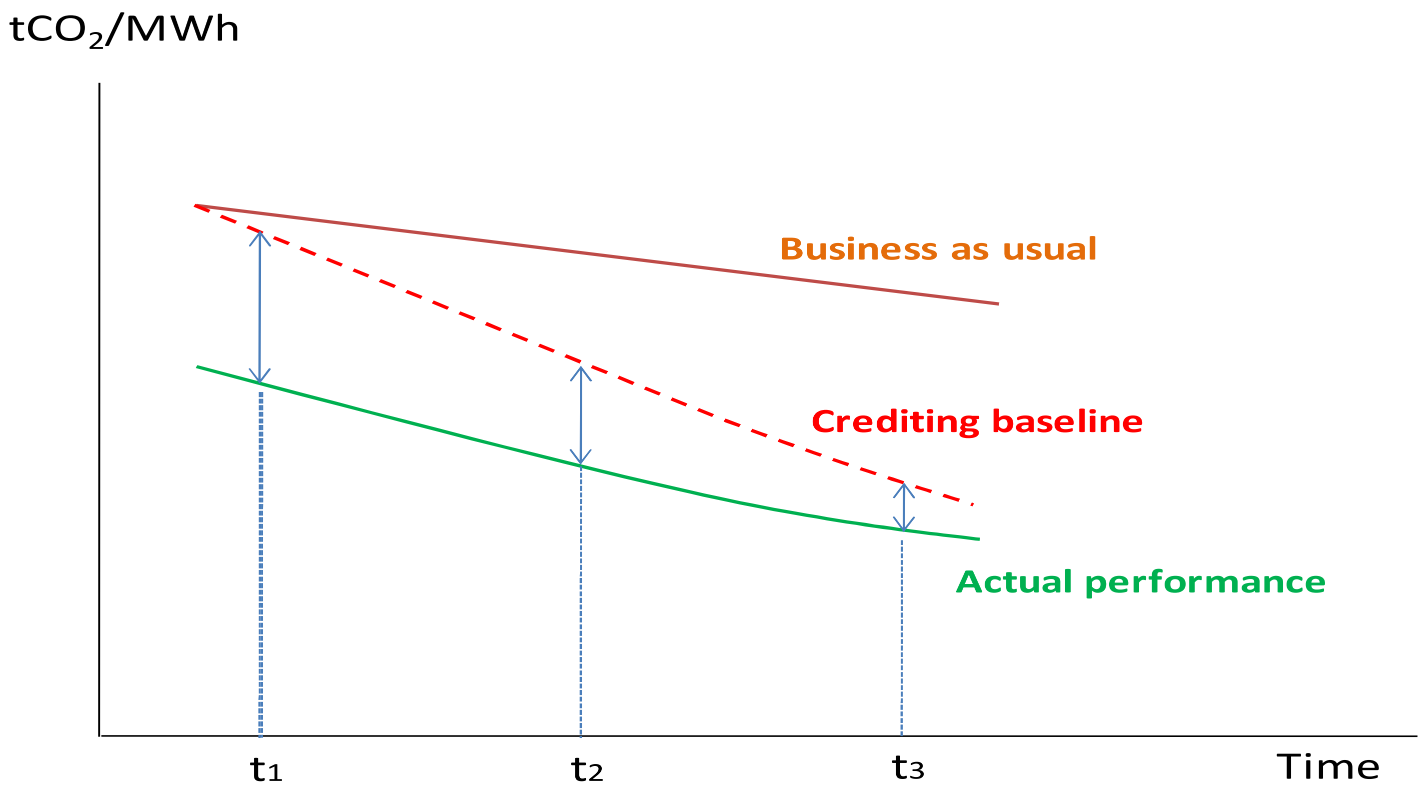
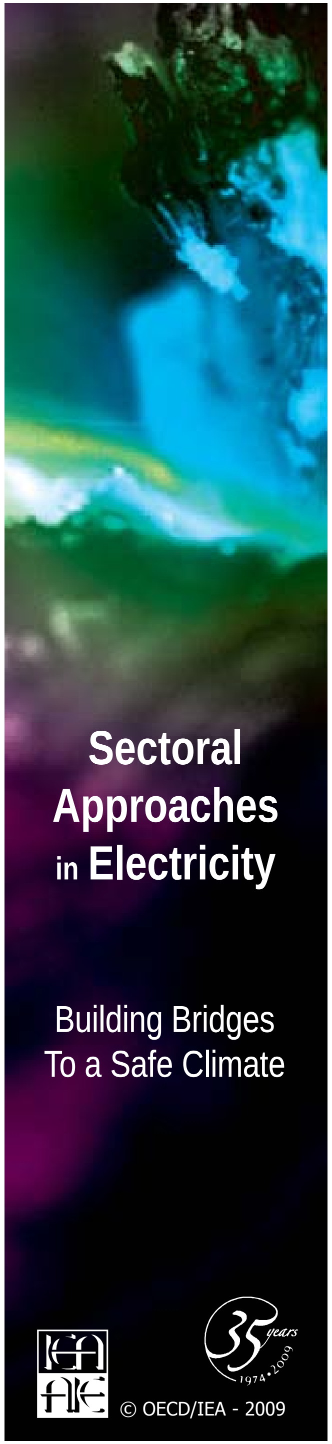
Dynamic baseline to encourage early investment



Key message: ***Dynamic baselines are adjusted to reflect improvements of sector's performance; baselines encourage early actions to minimise carbon lock-in.***

Evolution of plant efficiency



Source: The Federation of Electric Power Companies,2009

***Key message:* Thermal power plants can operate near design efficiency for decades with proper operations and maintenance. Plant on site B emits some 24% to 27% more CO_2 to generate the same quality of electricity than its original design would require.**

Ongoing efforts in emerging economies - CHINA

- Electricity output could grow by 100% between 2007 and 2020
  - Coal dominates but nuclear and renewables on the rise (goals revised upward)
  - IEA 450 scenario : Chinese emissions could be 18% below 2007 by 2030
- National Action Plan on Climate Change, includes:
  - Renewables and nuclear objectives
  - Energy efficiency
- Top 1000 Entreprises Programme
  - Energy efficiency in industry
- **Regional capacity to implement and monitor change**

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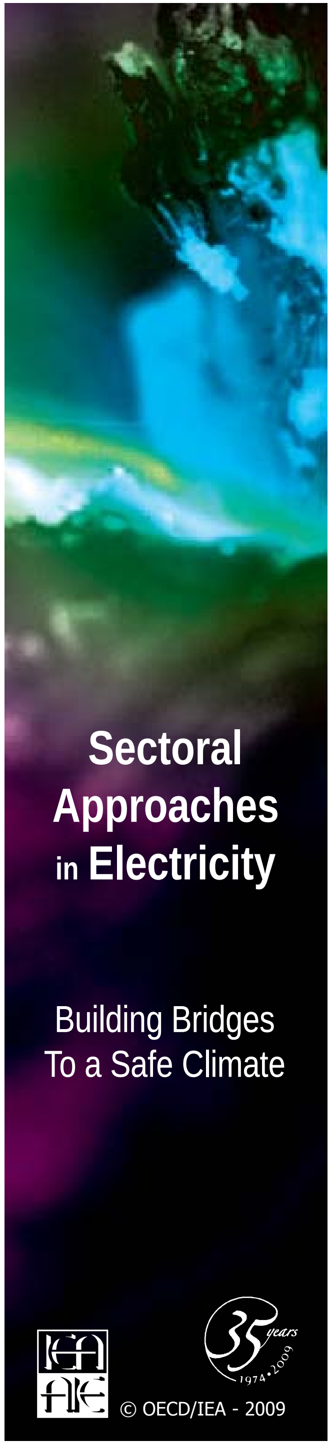
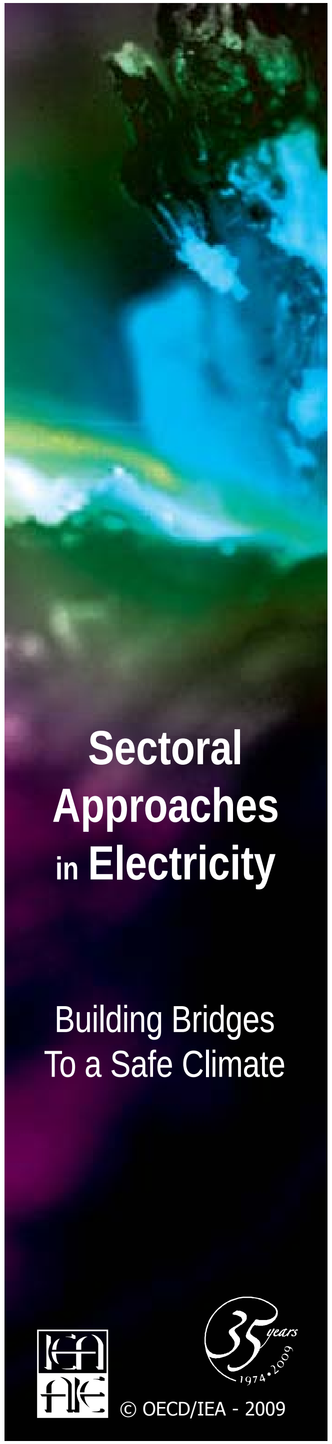


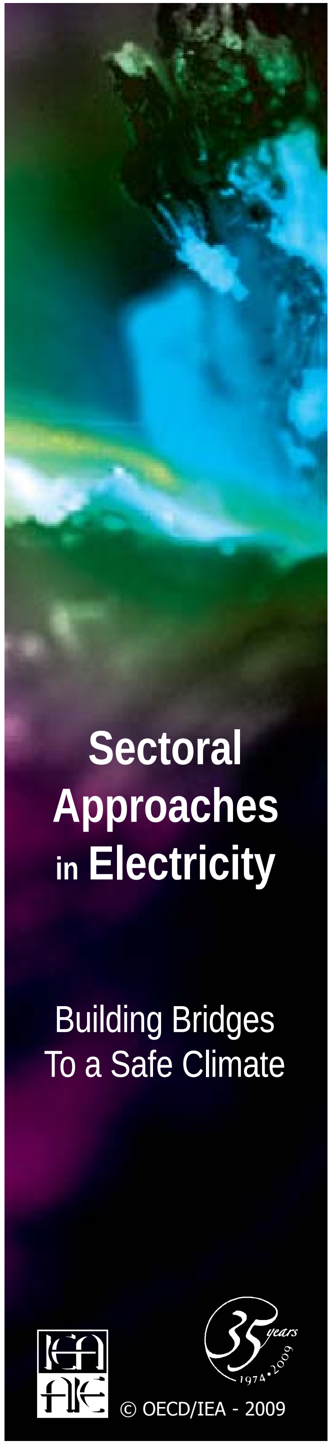
Ongoing efforts in emerging economies - INDIA

- Electricity generation: +170% by 2030 under "business-as-usual"
- Industry is the primary consumer of electricity
- An energy efficiency certificate system (*perform-achieve-trade*) – 15 energy-intensive industries
  - Baselines for all large industrial users
- Robust and comprehensive CO_2/power sector database already used for CDM



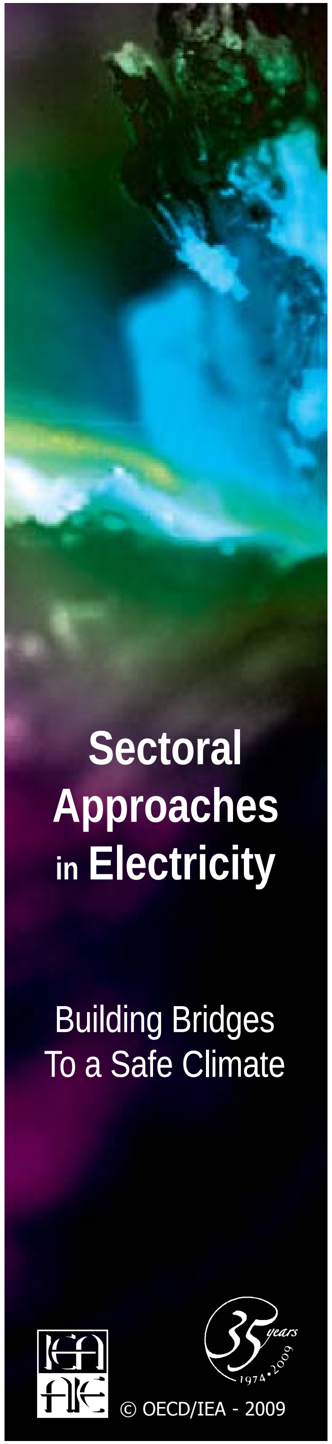
Ongoing efforts in emerging economies - MEXICO

- A long term cap (-50% / 2050)
- Strategy:
  - Cap-and-trade (multi sectoral)
  - Energy efficiency
    - As of 2006, standards related to electricity end-uses saved a total of 16 TWh, and avoided about 2,926 MW of generation capacity
    - Considerable potential remains
  - Renewable energy deployment
  - Fuel switching



Ongoing efforts in emerging economies – SOUTH AFRICA

- Power generation dominated by coal
  - Capability in renewables & nuclear
  - A single, large utility
- **Elaborated long-term climate scenarios**
  - **Large mitigation potential by 2050**
- Energy Efficiency Accord with industry



Sectoral approaches in electricity and the Copenhagen agenda

- **End goal: deliver scaled-up mitigation quickly, in a sector exposed to CO_2 lock-in**
- **Broaden carbon market with new crediting/trading mechanisms (1.b.v)**
- **Create vehicle for policy support, esp. in energy efficiency (NAMAs/MRV)**
  - **Finance for effective policy implementation in energy efficiency**
    - **Best practice in EE is well known - see IEA 25 recommendations to G8 (and progress report)**
- **Countries have started elaborating strategies for lower-CO_2 electricity**
  - **Need a domestic response to the instruments and support measures agreed at UNFCCC, on how to scale-up mitigation in the near term**

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