ENERGY & ENVIRONMENT

IEA side-event

Electricity at the core of climate mitigation

Combining policy instruments for least-cost climate mitigation

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Outline

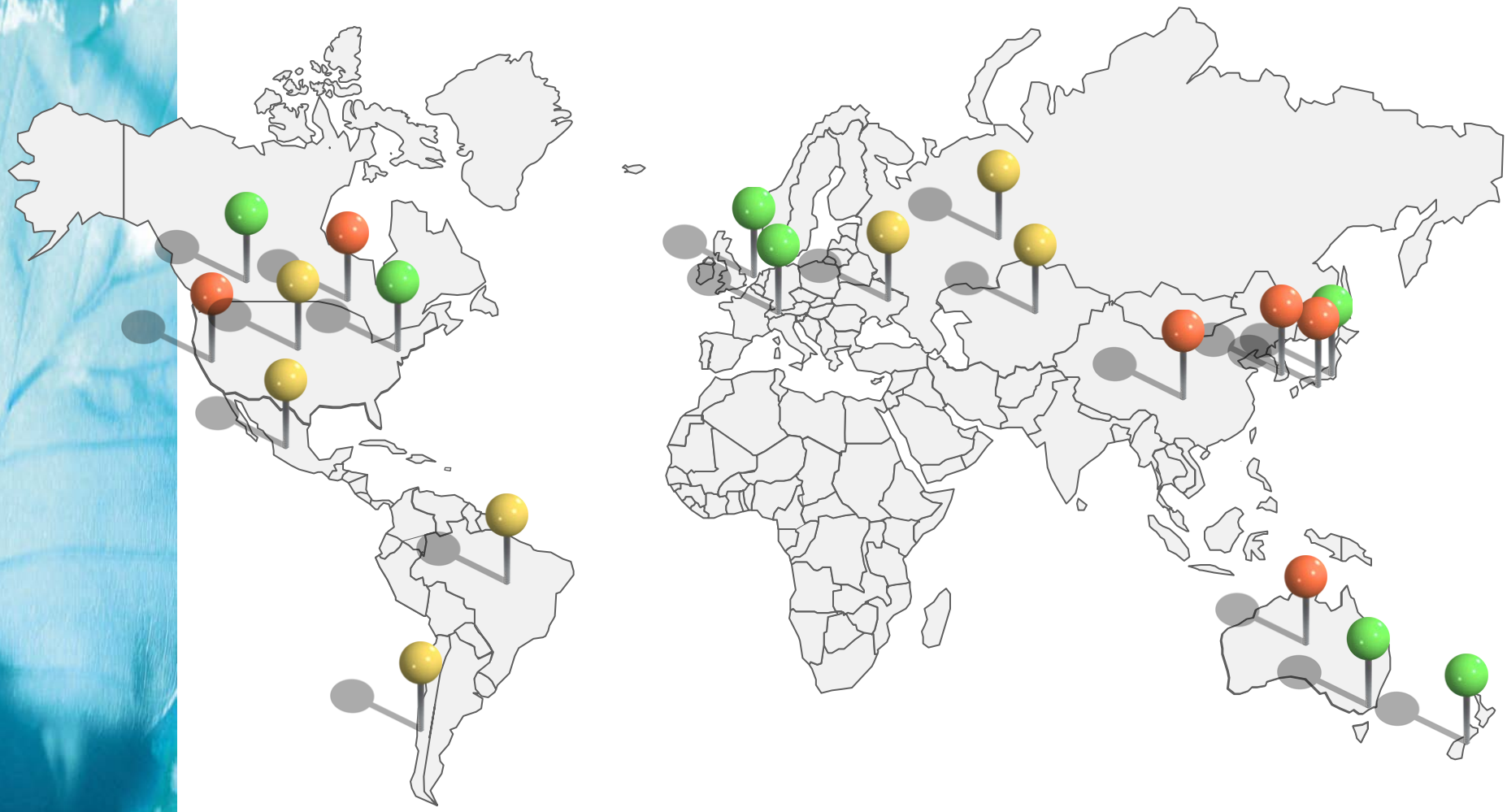
- Carbon pricing: a review of GHG emissions trading systems (ETS)

- The need for complementary measures: energy efficiency in end-use electricity

Review of existing and proposed ETS

- Not the theory but the practice of emissions trading
- Share information on such practice as countries consider this option
- Lessons learned (especially from EU ETS)

2. Current and Proposed Emissions Trading Systems

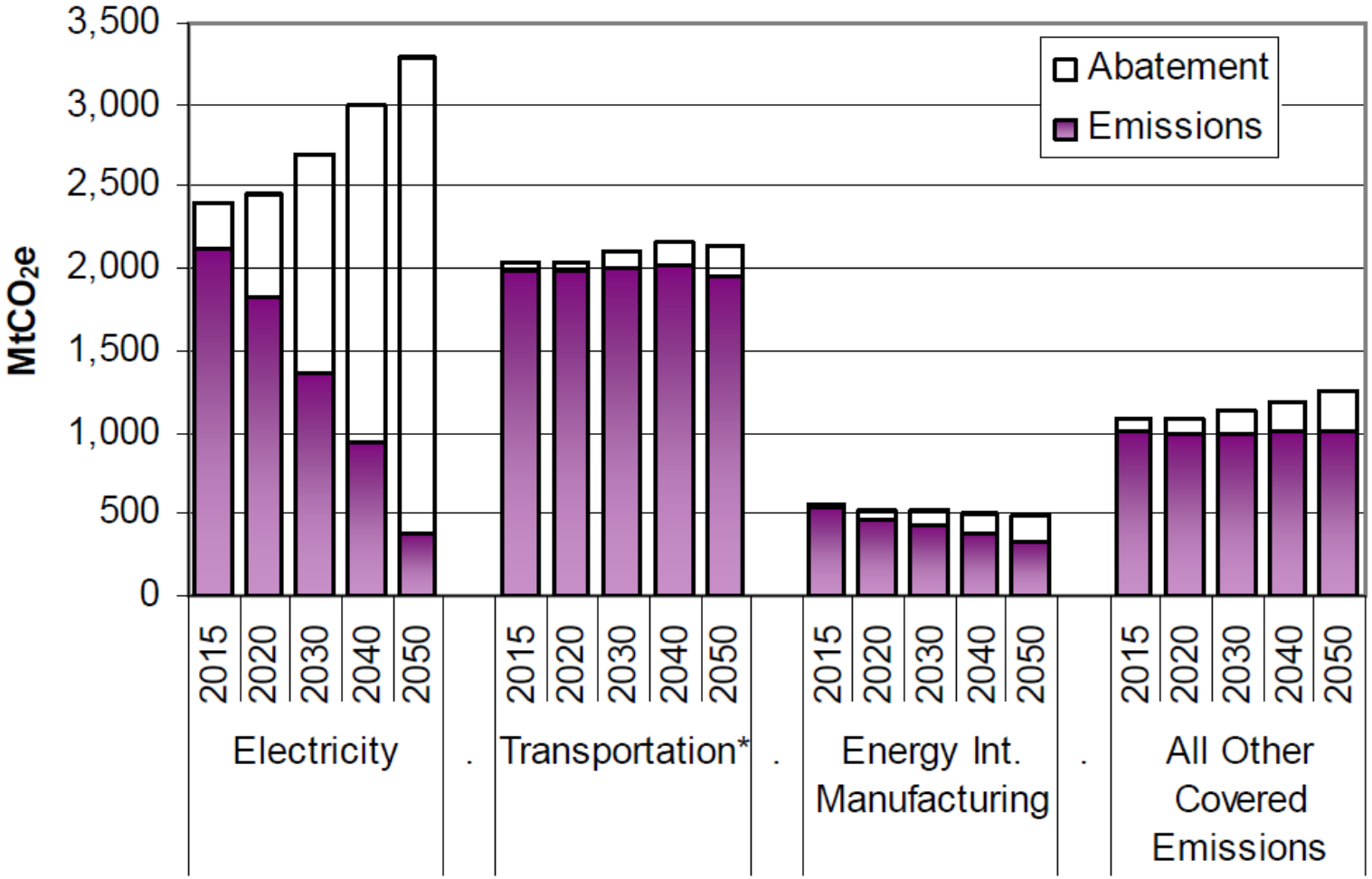


Operating

Likely (?)

Considering

Covered GHG Emissions by Sector
Scenario 8 - Updated H.R. 2454



Source: US EPA

Emerging Lessons

- No free allocation for electricity generation
- Set ambitious targets
- Provide clear long-term investment signals
- Don’t over-estimate cost impacts
- Allow flexibility in early years
- Supplementary policies will be needed

Searching for a least-cost CO_2 reduction strategy

The role of measures complementing CO_2 pricing

Searching for a least-cost CO_2 reduction strategy

The need for complementary measures

Back to basics

- Recommendation to use 'cap-and-trade' (or a tax) to deliver a least-cost outcome
- Theoretical conditions for the cost-effectiveness of cap-and-trade systems
  - The price signal diffuses through the economic system, triggering reductions where justified by CO_2 price
  - It should send a signal to all possible investors in mitigation
  - Markets ought to be complete, and offer hedging against alternative states of the world
  - Negligible transaction costs
- These conditions are not always met
  - ➔ Can complementary measures restore the theoretical and economic ideal of carbon pricing?

Where the price signal does not go Example: end-use electricity

- Barriers to rational energy use include
  - Externalities (energy market failures)
  - Lack of information on efficient alternatives
  - Lack of information on cost advantages
    - Cost advantages too small to be noticed
  - "Principal-Agent": *Landlord-Tenant* situations ("my investment for their savings?")
- Why does this matter for cap-and-trade and the electricity sector?
  - Barriers are such that CO_2 price, via electricity prices, is not "received"
  - Energy efficiency CO_2 mitigation potential untapped

Illustrating the principal-agent problem
TV – set-top boxes (stb)

- 1.4 billion units installed by 2030, with a projected electricity use of 210 TWh (+100 $MtCO_2$)
- 80 TWh cost-effectively saved by 2030
  - Least life-cycle cost method – no net cost, net savings to users
  - ~ 40 $MtCO_2$ saved that year alone
- Incentives to improve efficiency?
  - STB manufacturer → cable companies → TV viewers
  - Manufacturers have no incentive to go efficient as TV viewers will not choose cable companies on basis of STB efficiency and have no choice between equipments
  - → Action: Minimum energy performance standard needed to get manufacturers to put the right technology on the market

Identify barriers, estimate cost-benefit, take appropriate measures

Source: IEA (2009), Gadgets and Gigawatts – Policies for Energy Efficient Electronics. OECD/IEA, Paris.

What about energy consumption rebound?

- "Saving costs through energy efficiency *here* frees resources to consume more energy *there*"
- Estimates of rebound effect across end-uses: 10 to 30% of energy savings could be lost
- These estimates assume constant energy prices
- CO_2 pricing would in fact increase energy prices, and reduce the rebound effect

➔ Energy efficiency measures must be seen as a complement not a substitute to carbon pricing

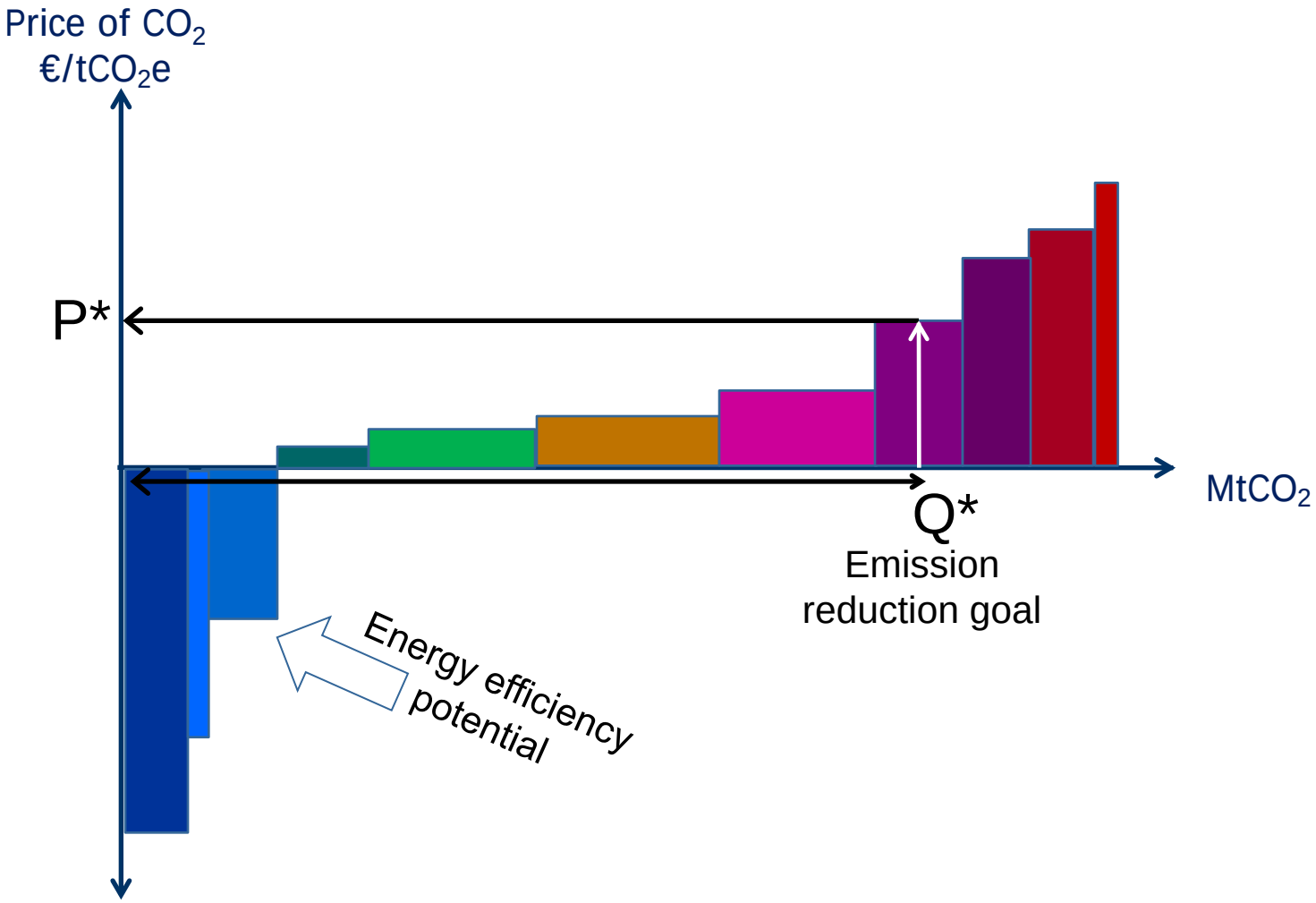
Source: IEA (2005), Learning from the critics. OECD/IEA, Paris.

How does this all relate to cost-effectiveness of cap-and-trade systems?

- End-use energy efficiency offers a significant potential for energy saving and CO_2 reduction potential
- Missing this potential implies going for more expensive emission reductions
- Higher marginal cost → higher market price of CO2 allowances → higher economic cost

End-use savings and cap-and-trade

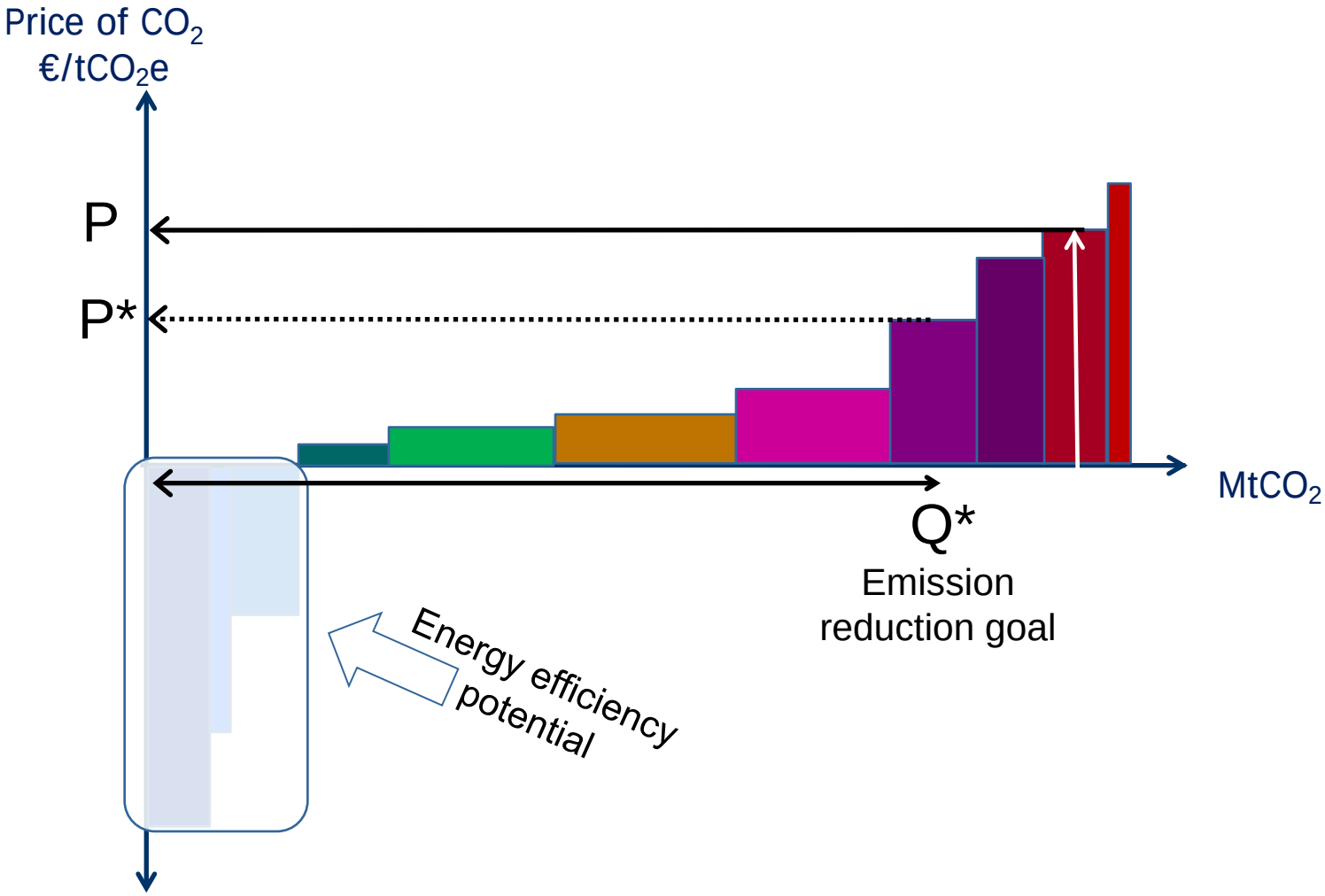
Assuming all potentials can be tapped



Under ideal market conditions, all options including end-use energy efficiency would be exploited, through the price signal

End-use savings and cap-and-trade

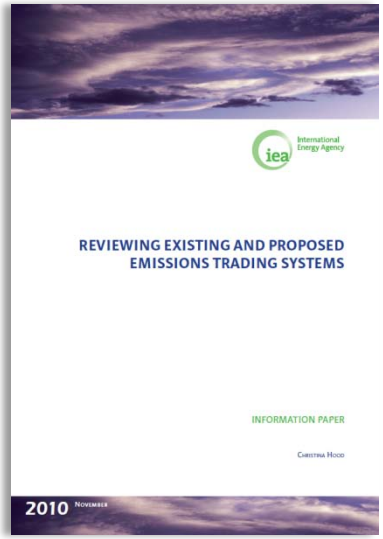
Assuming end-use savings are not *exploited*



No access to end-use energy savings implies relying on higher cost measures in the system ➔ higher price of CO_2 and higher cost to society

Summary

- Carbon pricing is essential to meeting ambitious climate policy goals
- End-use energy efficiency provides a large potential for cost-effective CO_2 emission reductions
- Carbon pricing will not overcome some of the market barriers to energy efficiency
- EE policy intervention necessary in such cases
- EE policies must be assessed against the cost of barrier removal v. CO_2 market price
- EE will facilitate the rapid transition to a more expensive, cleaner, energy supply system
- Ensure goal coherence across policy instruments (cap-and-trade, end-use, low-CO_2 technology support)



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