



Issues and Trends in the Development and Transfer of Energy Efficiency Technologies: IEA Studies and Perspectives

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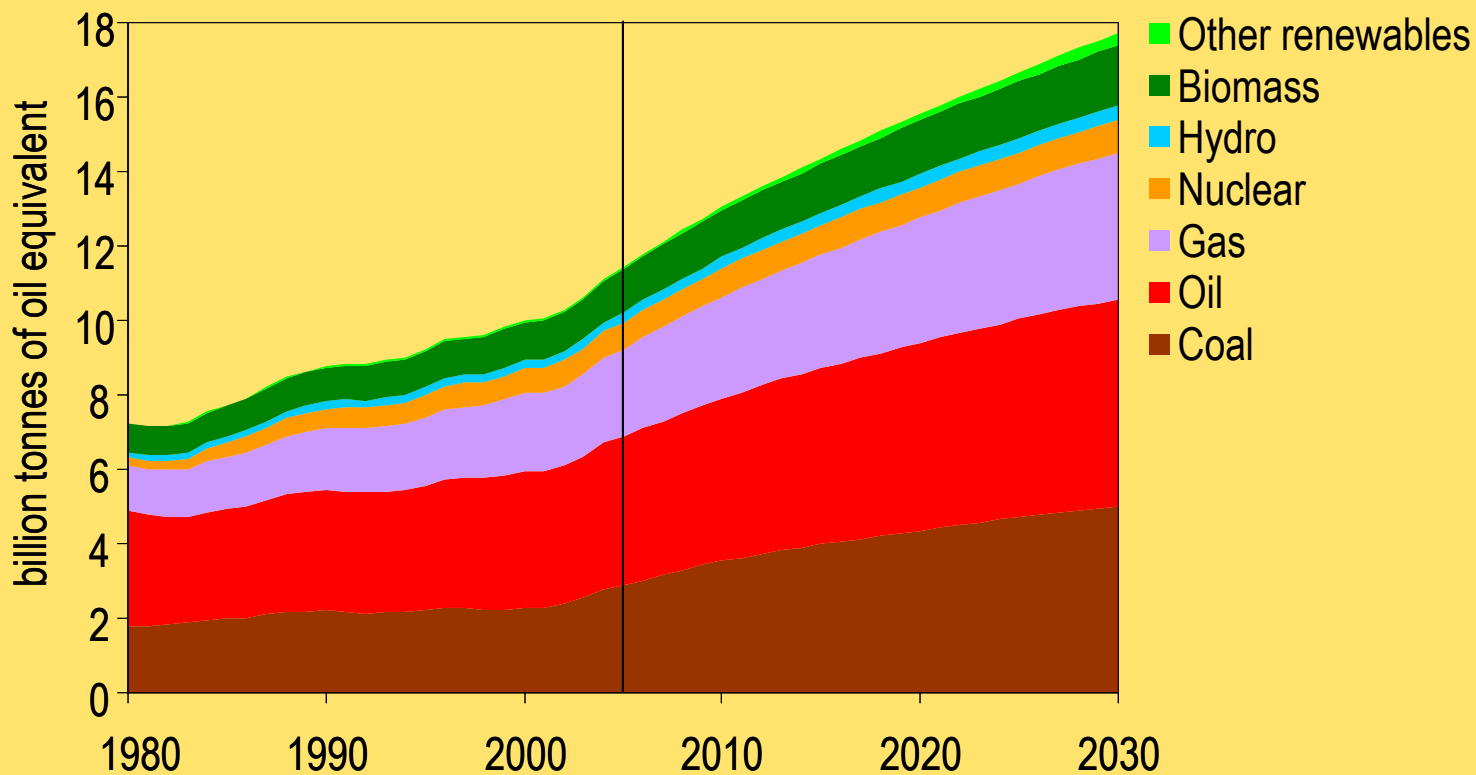
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Reference Scenario: World Primary Energy Demand

WORLD
ENERGY
OUTLOOK
2007

China
and India
Insights



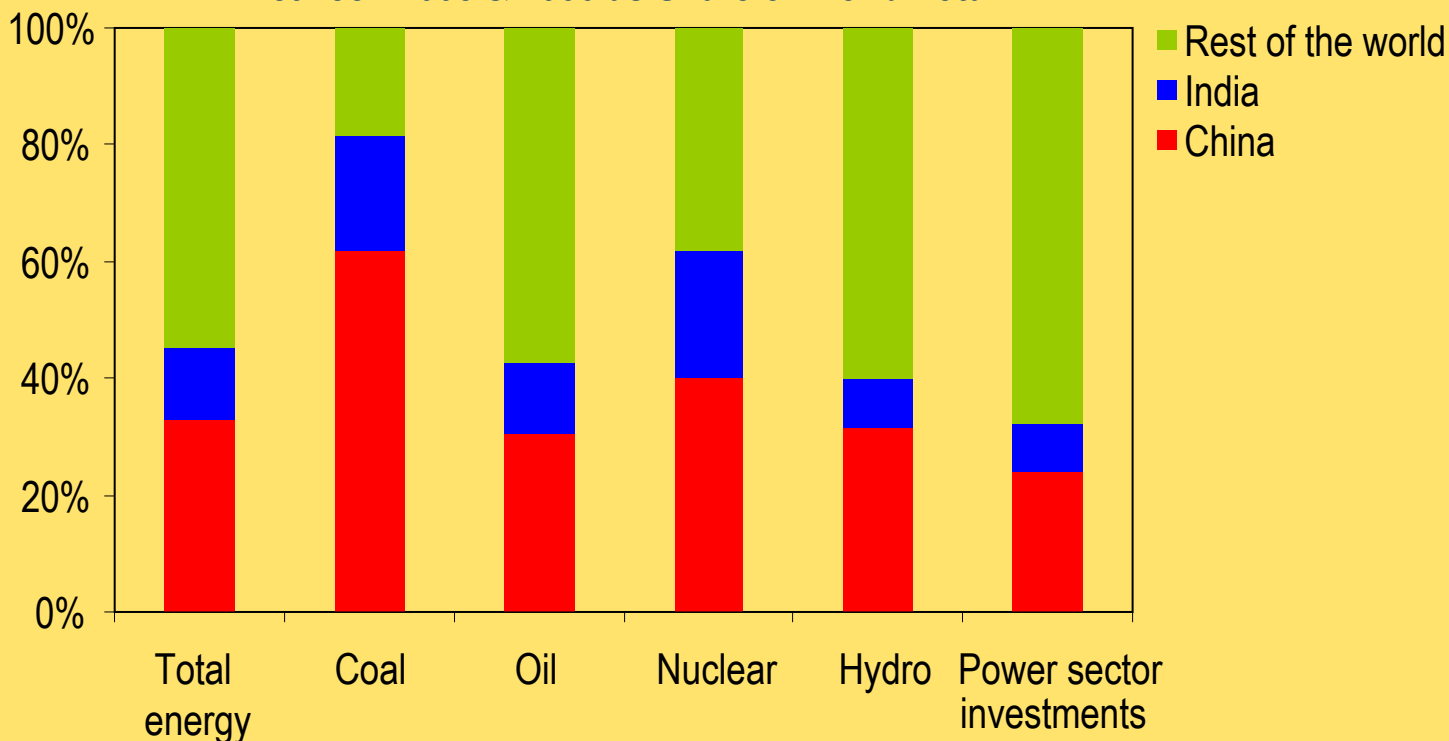
Global demand grows by more than half over the next quarter of a century, with coal use rising most in absolute terms

Reference Scenario: The Emerging Giants of World Energy

WORLD ENERGY OUTLOOK 2007

China and India Insights

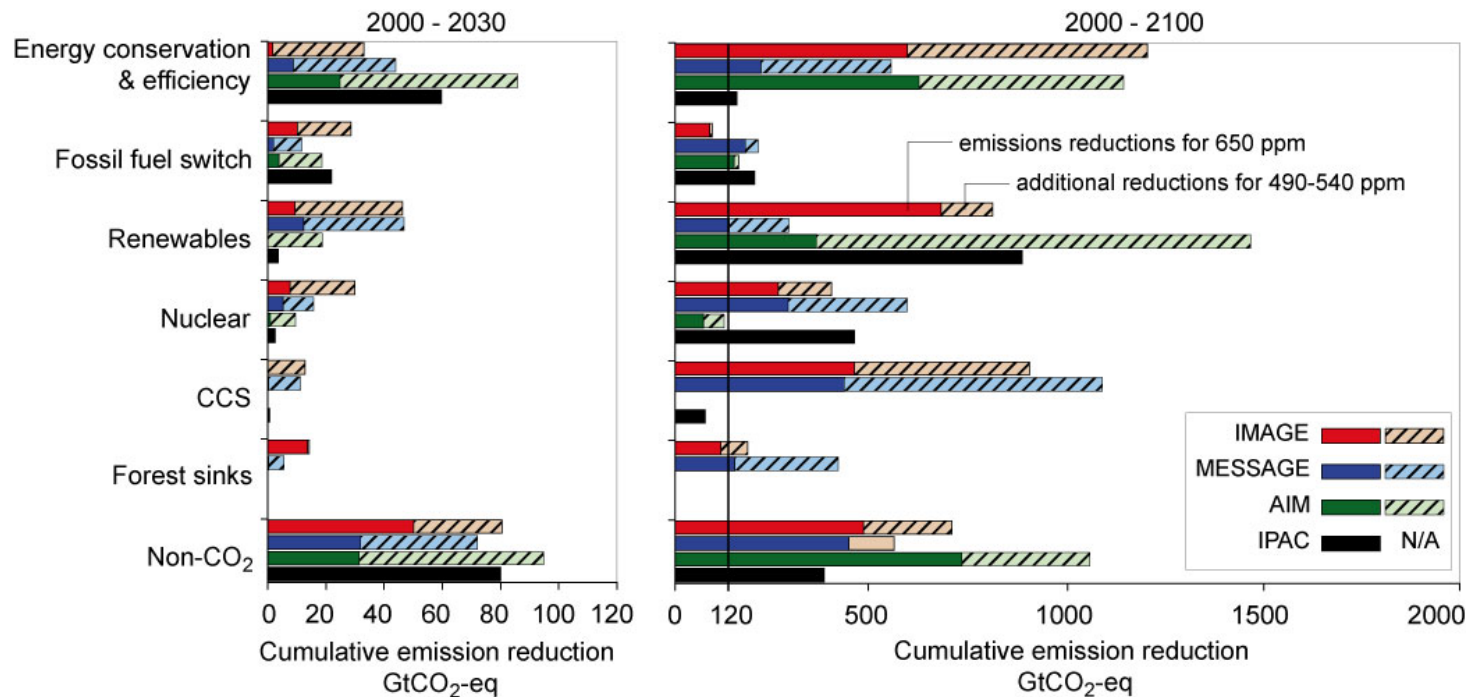
Increase in Primary Energy Demand & Investment Between 2005 & 2030 as Share of World Total



China & India will contribute more than 40% of the increase in global energy demand to 2030 on current trends

Technology

- **The range of stabilization levels can be achieved by**
 - deployment of a portfolio of technologies that are currently available and
 - those that are expected to be commercialised in coming decades.
- **This assumes that appropriate and effective incentives are in place for development, acquisition, deployment and diffusion of technologies and for addressing related barriers**



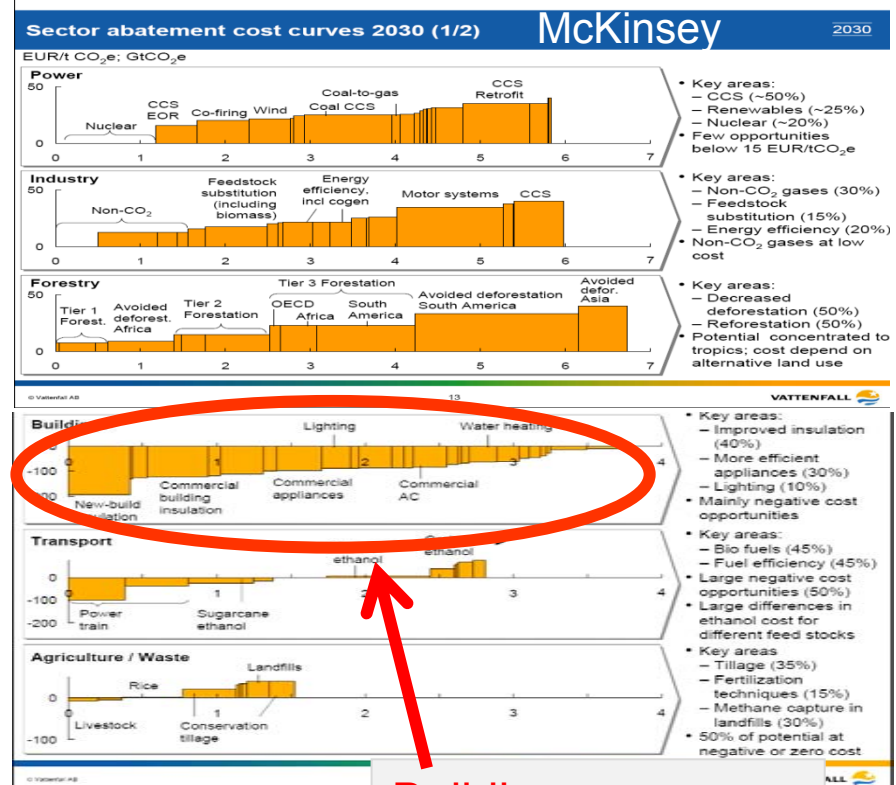
Results

- 8 case studies, 5 countries

	Energy use affected by PA problem (PJ)	Total sectoral energy use in 2005 in the relevant country (PJ)	Energy use affected by PA problem as a % of total sectoral energy use
Residential sector			
Refrigerators, space heating, water heating and lighting, US	3 546.0	11 296.5	31.4%
House heating Netherlands	105.0	433.0	24.3%
Set top boxes US	68.4	11 296.5	0.6%
Commercial sector-office space			
Japan	60.5	2 575.1	2.3%
Netherlands	24.5	316.6	7.7%
Norway	5.4	103.2	5.2%
End-use appliances: Vending machines			
Japan	6.1	2 575.1	0.2%
Australia	1.5	243.5	0.6%
Total	3 817.9	28 839.6	14.3%

Great Potential in Buildings

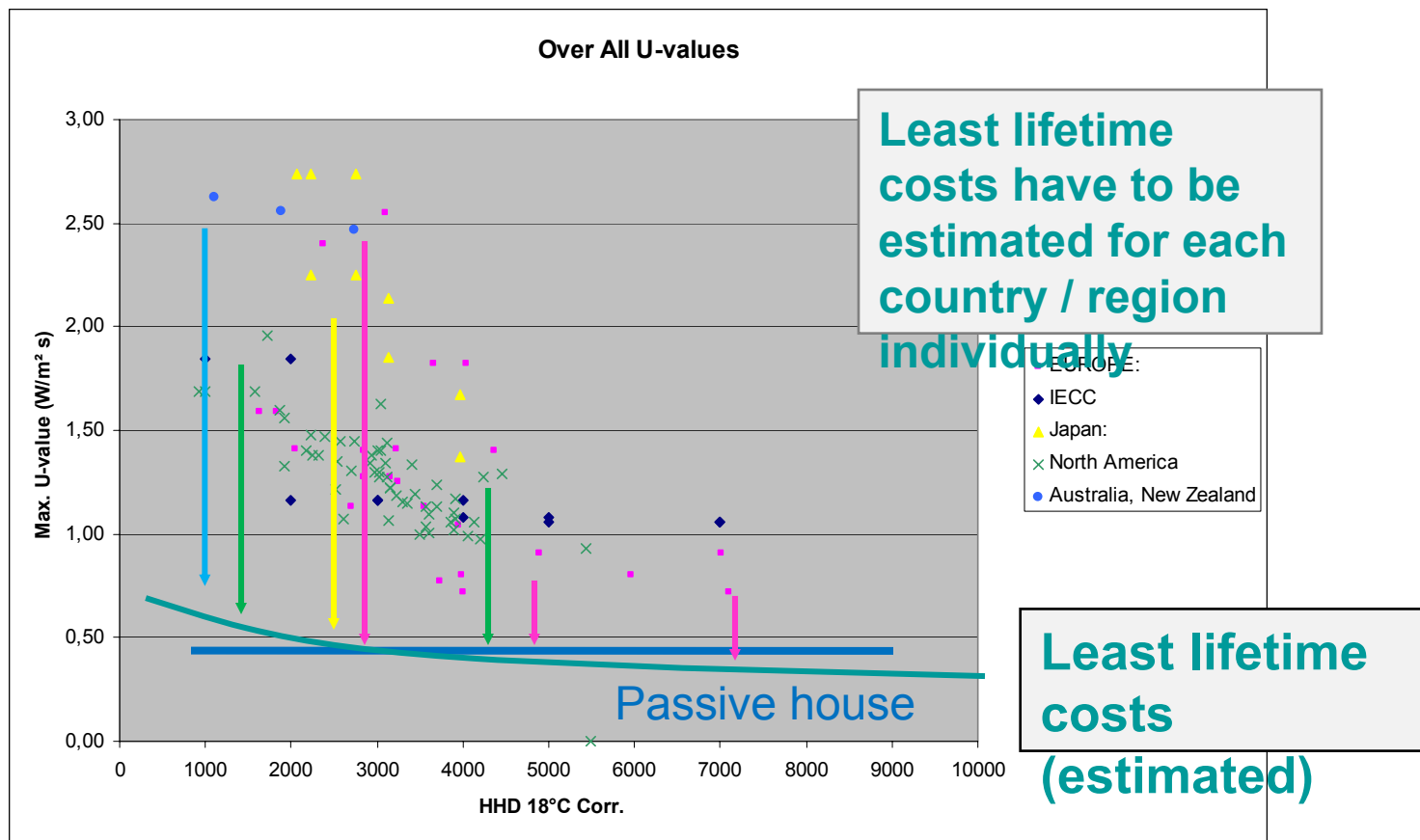
- EE in buildings is compelling compared to other climate abatement policies.
- Many reports show reductions up to 50 % at low or no costs.
- What if we take these savings even further ?
- How far can EE in buildings bring us ?



Larger potentials at small costs !

Buildings can deliver large potentials at negative costs

Overall U-value



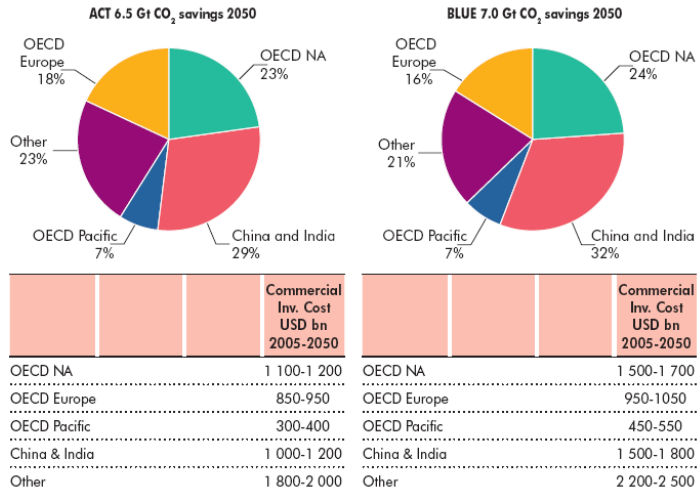
Saving potentials are substantial in all regions !

Buildings

Roadmaps – Example Efficiency Buildings and Appliances

15% of CO₂ reduction potential in BLUE Map

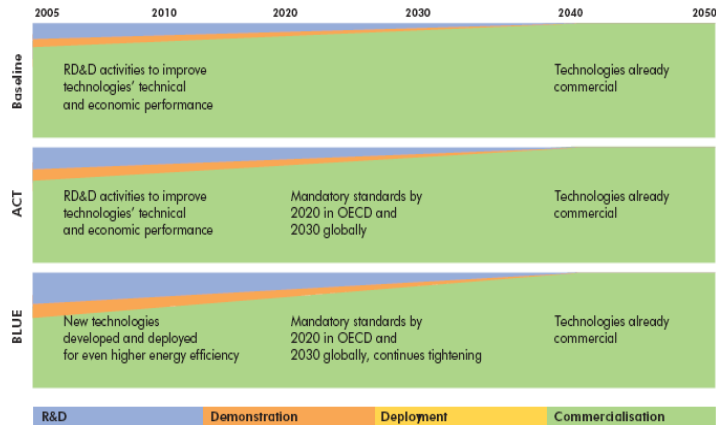
Energy efficiency in buildings and appliances



Technology targets

	ACT: Emissions Stabilisation	BLUE: 50% Emissions Reduction
Diffusion		
Limit standby power use to 1-Watt.	Implemented in OECD countries between now and 2030; and globally by 2040	Implemented in OECD countries between now and 2020; and globally by 2030
Tighten or establish minimum energy efficiency standards for all major existing appliances	New appliances standards shifted to LLCC between now and 2020 in OECD and by 2030 globally	New appliance standards shifted to BAT between now and 2020 in OECD and globally by 2030.
Mandatory standards across full range of mass-produced equipment	Appliances brought under standards by 2030 in OECD and by 2040 globally	Standards for appliances by 2020 in OECD and 2030 globally. Continuous tightening required
Building codes	Cold countries at "low-energy" standard from 2015 and globally from 2030	Cold countries to meet "passive house" levels by 2015, and globally from 2030
Adopt best practice in lighting efficiency	Policy must shift to LLCC from 2015	Policy must begin shift to BAT from 2025 onwards
Promote low-energy houses and fuel switching	Simplified planning requirements to encourage low-energy buildings and alternative fuel sources (especially solar)	

Technology timeline



Key actions needed

- Monitor energy efficiency improvements in existing buildings and appliances. Need to collect consistent and comprehensive data on end-use consumption and energy efficiency worldwide.
- Implementation of mandatory minimum efficiency performance standards (MEPS), harmonised at a high level of efficiency and implemented worldwide, ongoing tightening will be required.
- International standards need to be reviewed regularly to ensure adequate vigor.

Key areas for international collaboration

- Establish a common set of efficiency "tiers" from which countries could draw when they establish minimum energy performance standards.
- Facilitate the rapid exchange of BAT in the buildings sector to ensure rapid uptake worldwide.
- Promote the diffusion of passive house design, construction techniques and energy technologies.

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PERSPECTIVES
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Scenarios &
Strategies
to 2050

INTERNATIONAL

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Very best practice identified so far

- Taking new buildings to zero (active and intelligent):
 - Passive level in 2020, zero in 2030, plus 15 kWh in 2040 - in OECD
 - Developing countries 10 years later ?
- Existing building stock:
 - Refurbishment with factor 10 or at least factor 6 for 2 – 2½ % of stock every year
 - Demands of energy efficiency by all refurbishment
- Efficient products:
 - Efficient windows, boilers, air-conditioners
 - Heat exchange on ventilation, heat pumps
- Building integrated renewable energy:
 - Demand for solar heating of sanitary water
 - Strong incentives for solar heating in existing buildings
 - PV incentives or demands
- Specific demands for public buildings:
 - Plus energy from 2020

Good examples on these and more policies requested

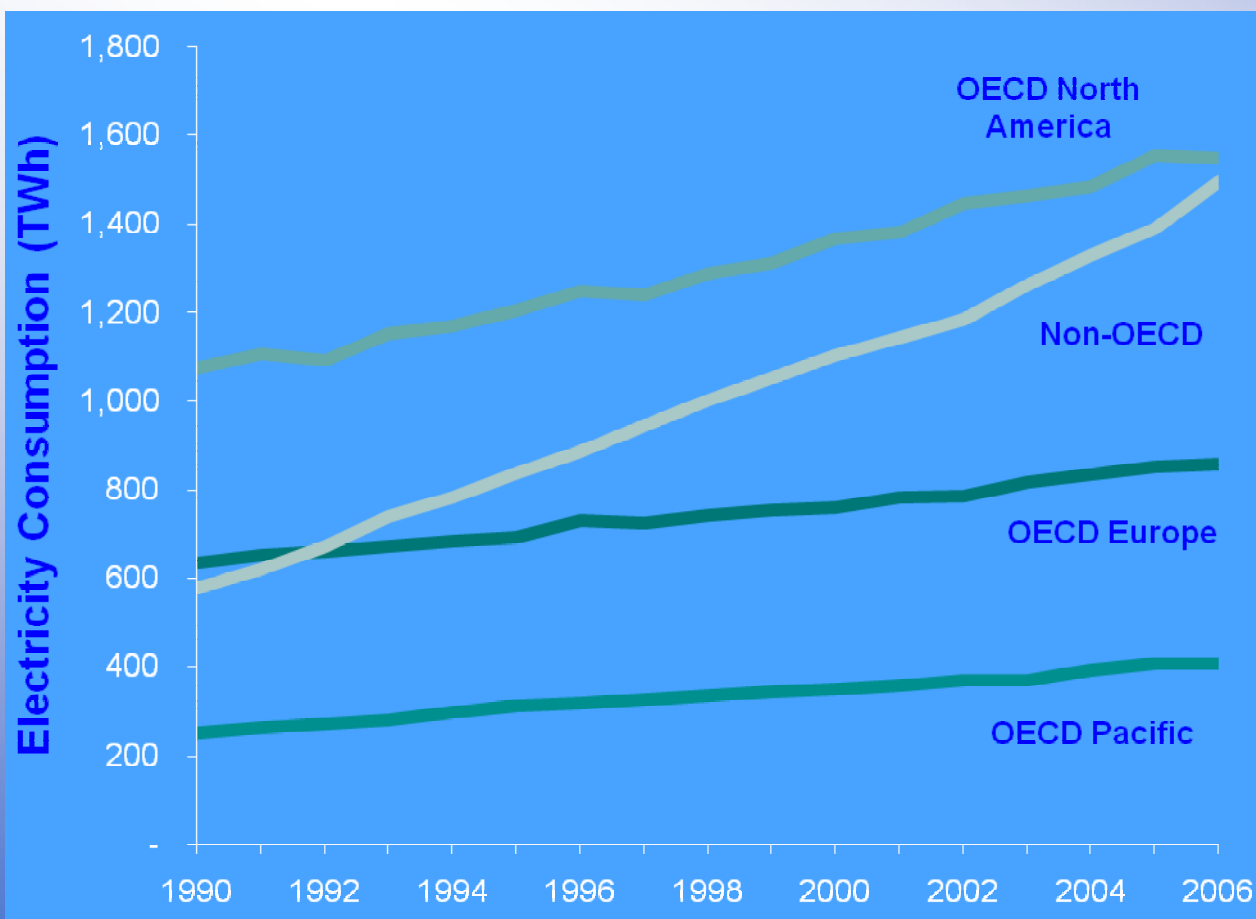


Additional Considerations

- A price on carbon is essential, but not enough because of market failures.
- Energy efficiency technology can move quickly and policy now essential
 - ◆ It buys time
- For North-South transfer, policy can't just be for developed countries
 - ◆ Enabling investment environments also important
- Expanding domestic incentives systems in industrialised countries to developing countries could accelerate market penetration for all.



Global Residential Electricity



- Non-OECD growth at twice the rate of OECD

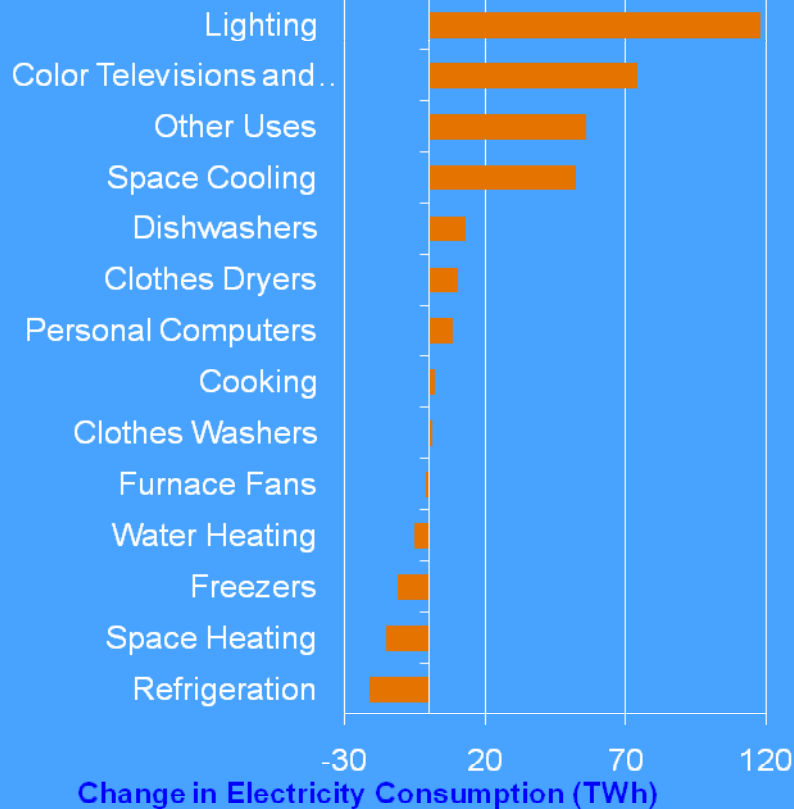
- But, OECD still accounts for 75% of electricity consumption

- High OECD growth rates: Turkey, Korea, Spain and Mexico

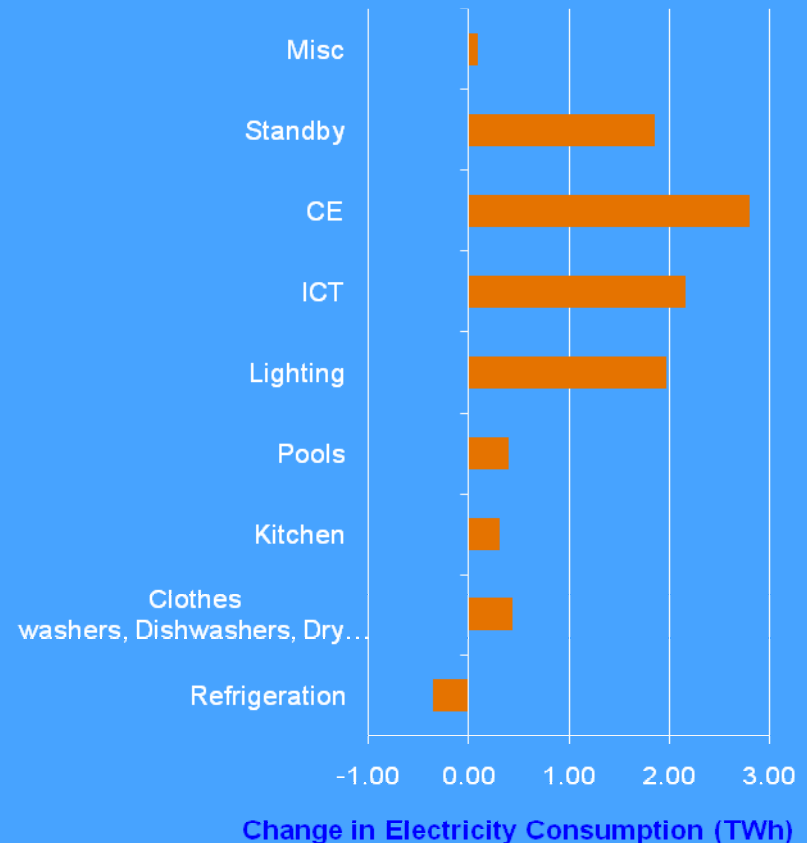
- Low growth rates: Denmark, Sweden, Norway, Czech Republic



What is driving growth in residential electricity?



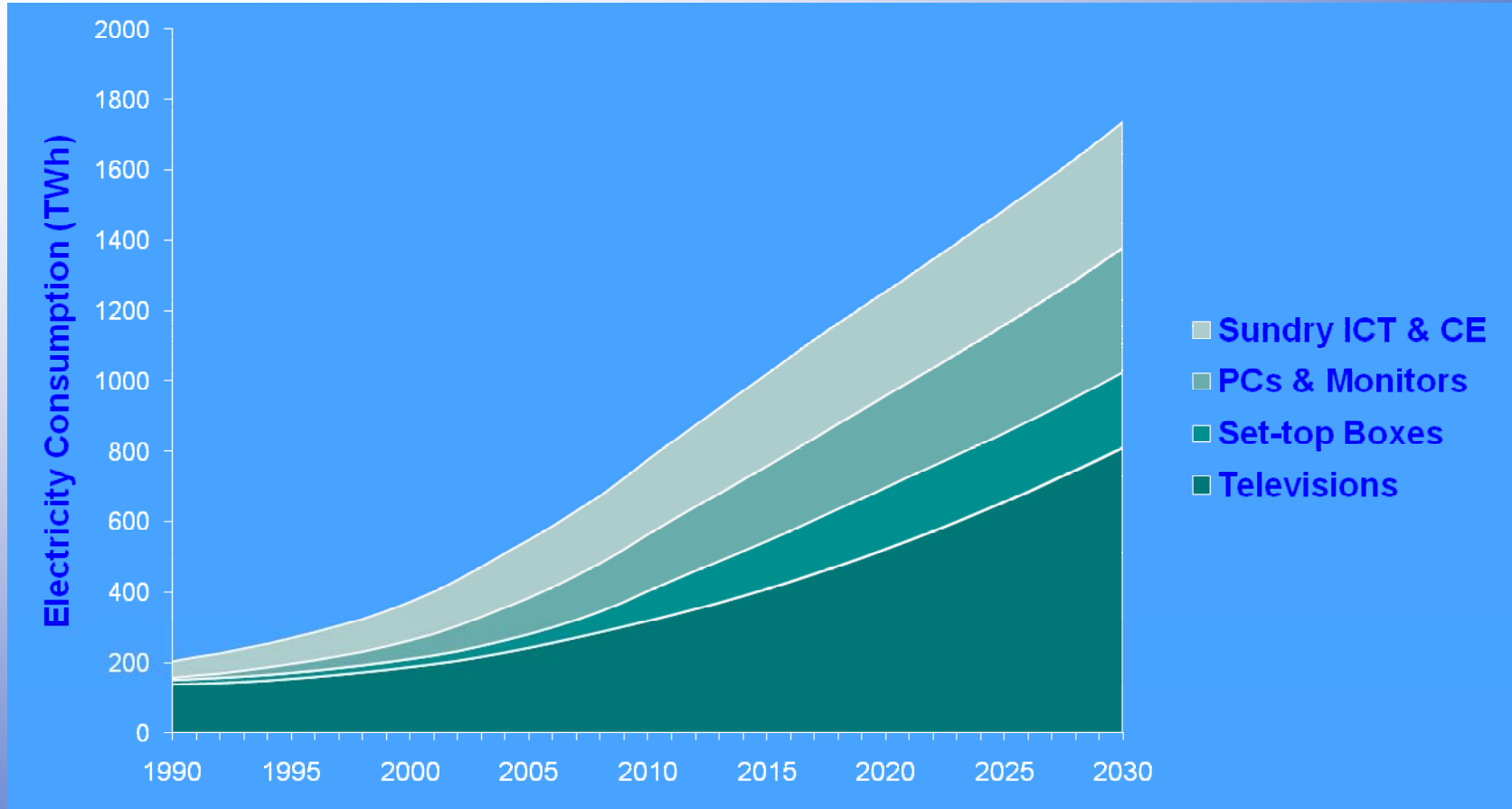
United States, 1998-2008



Australia, 1998-2008



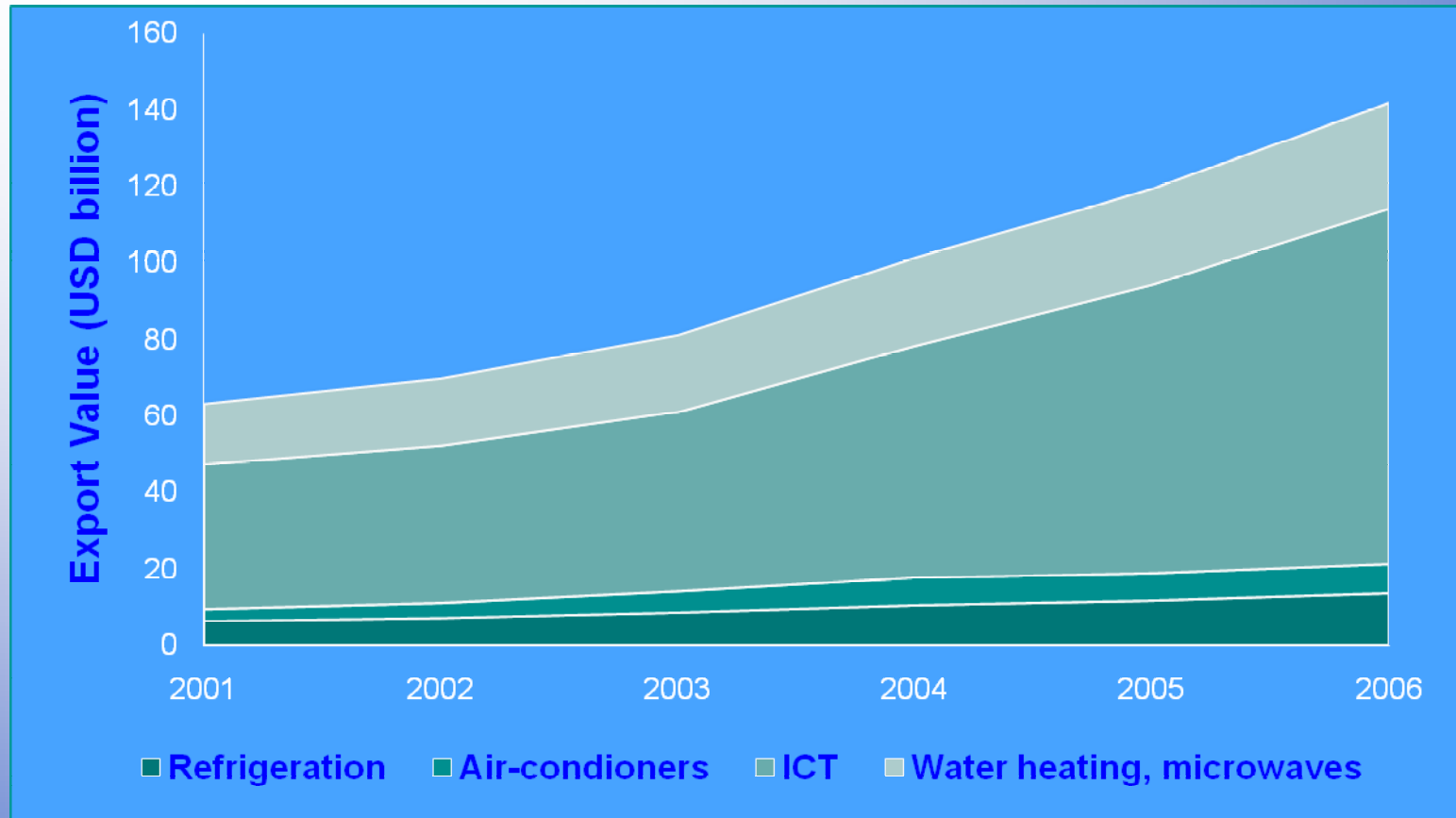
Looking forward



***Sector electricity consumption to increase by 250% by 2030
without further policy intervention***

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International Trade



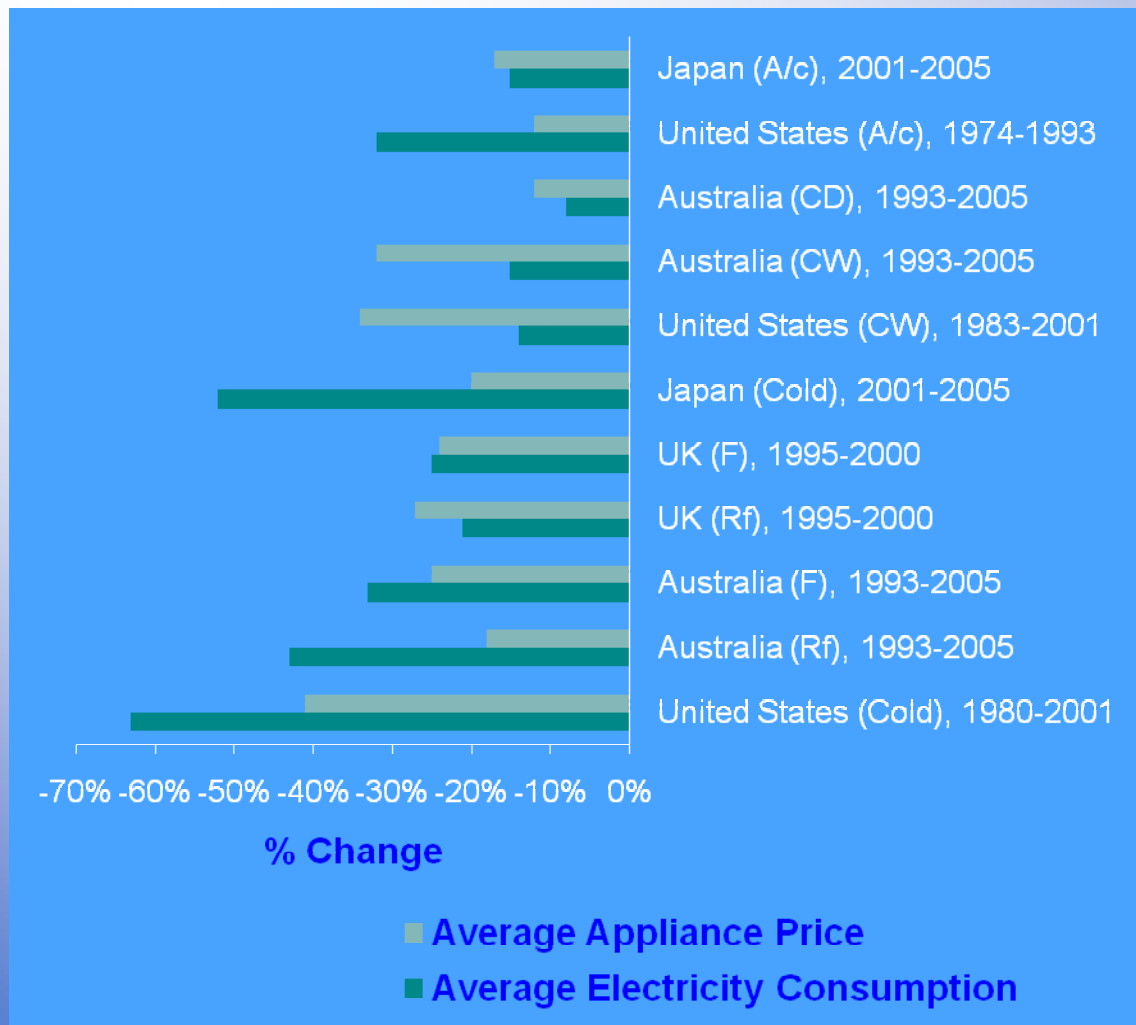
Trade in ICT and CE increased at 20% p.a. since 2001

Source: International Trade Center, Trade Map Database

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Policy Impacts



•Major appliances have been the primary target for policy measures over the past decade

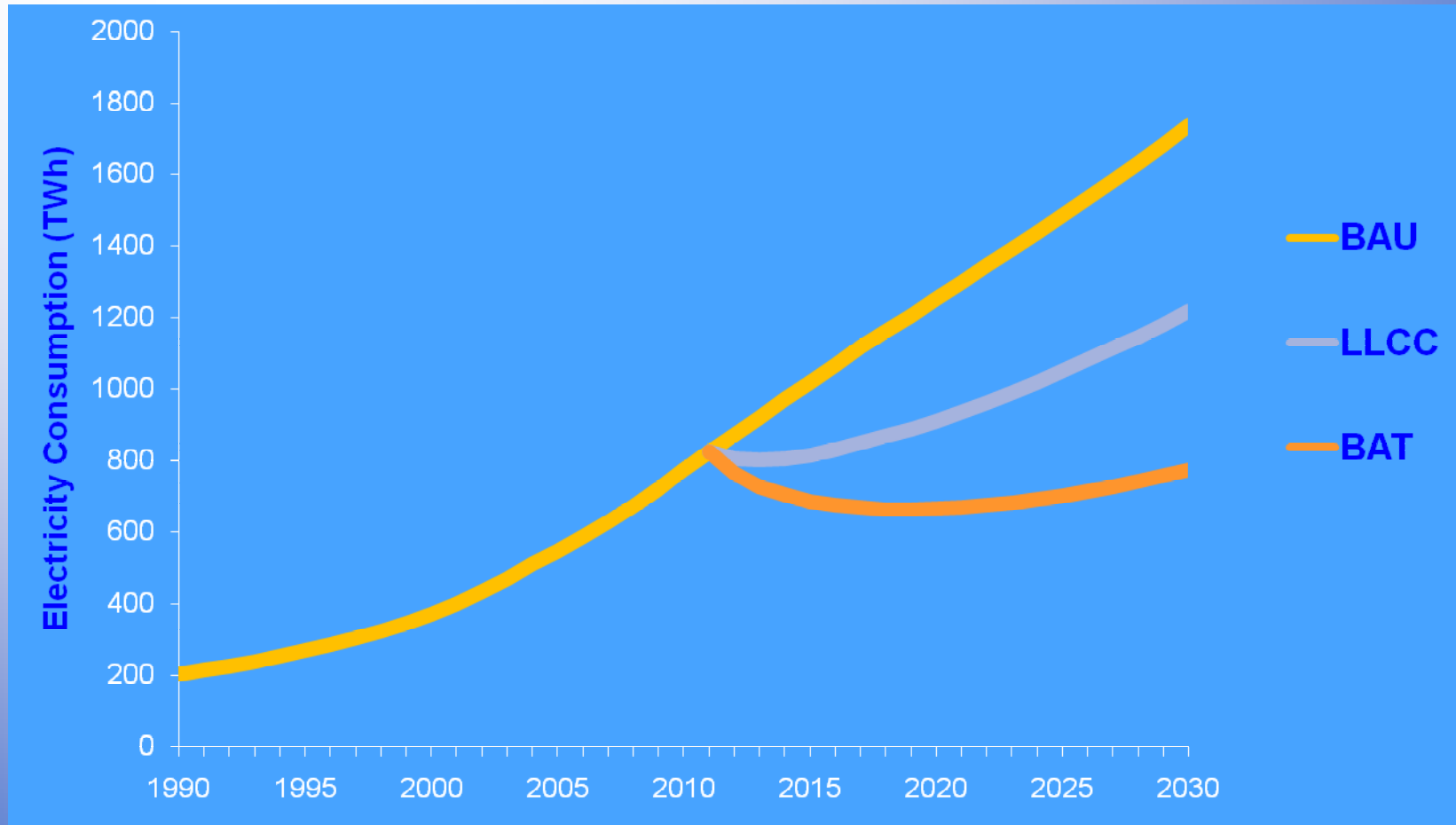
•Significant improvements to efficiency

•At the same time, real prices have fallen

•Extremely cost-effective for consumers



Savings Potential



Examples of Global Savings from IEA Energy Efficiency Recommendations

Recommendation	Exajoules 2030	Mt CO2 2030
Building Codes for New Buildings	4.7 - 7.0	203 - 305
Mandatory Appliance Standards and Labels	7.6 – 10.9	1332 - 1903
Low power modes for electronic equipment	2.5 – 3.0	437 - 525
Incandescent light bulb phase-out	3.3 – 4.3	N/A
Fuel Efficient Tyres for automobiles	2.8 – 4.7	180 - 300