

Fossil Fuels Combating Climate Change

Carbon Abatement from Fossil fuels – The UK Government Strategy

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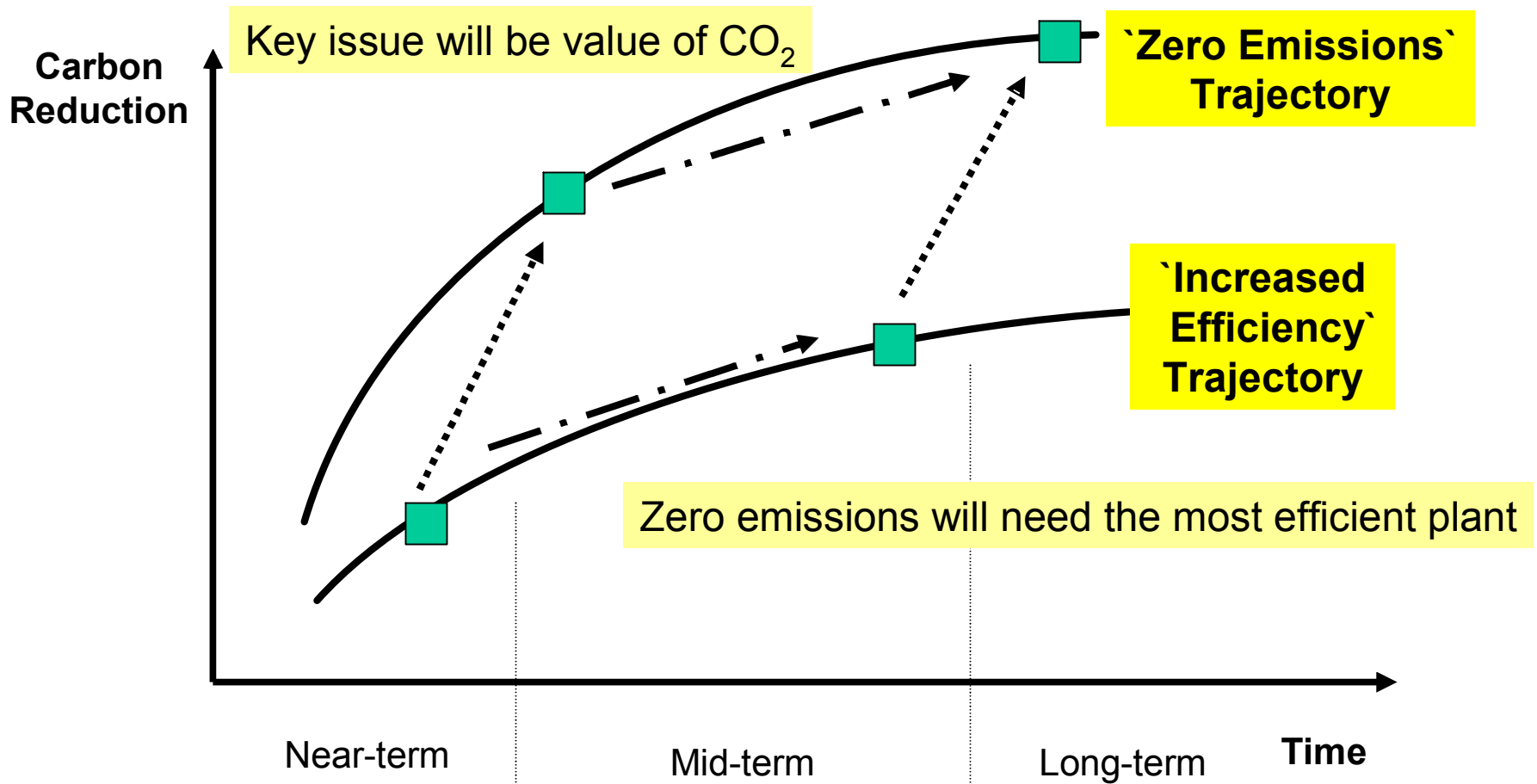
CAT Strategy

- What are CATs
- Why do we need them?
- How do CATs compare with other options?
- When will we need CATs?
- What needs to be done?
- Why should governments help?

What are CATs

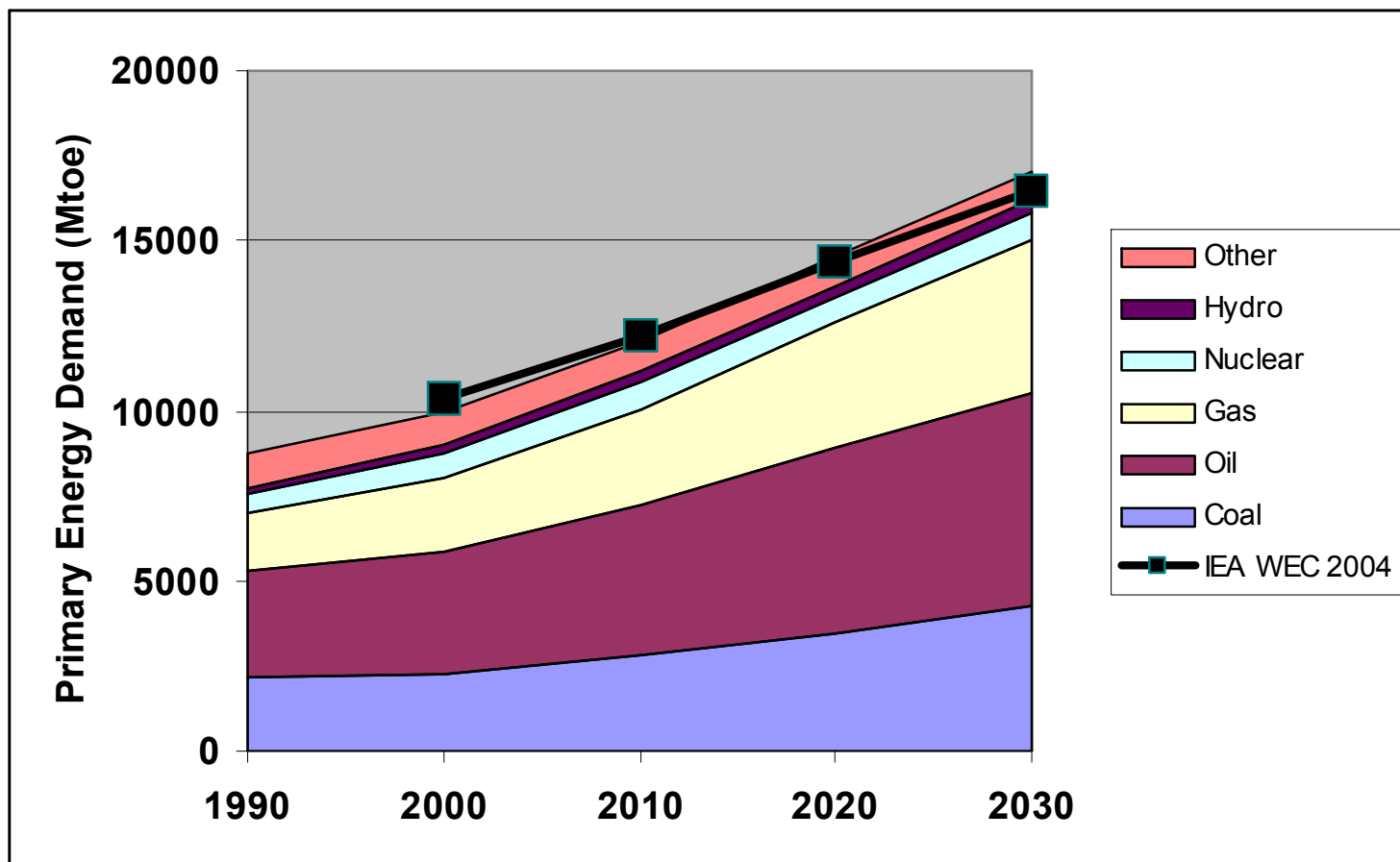
- Improved combustion efficiency (15-20% CO₂)
- Fuel switching (5-10% CO₂)
- Carbon Dioxide capture and storage (90% CO₂)

CAT Options are complementary

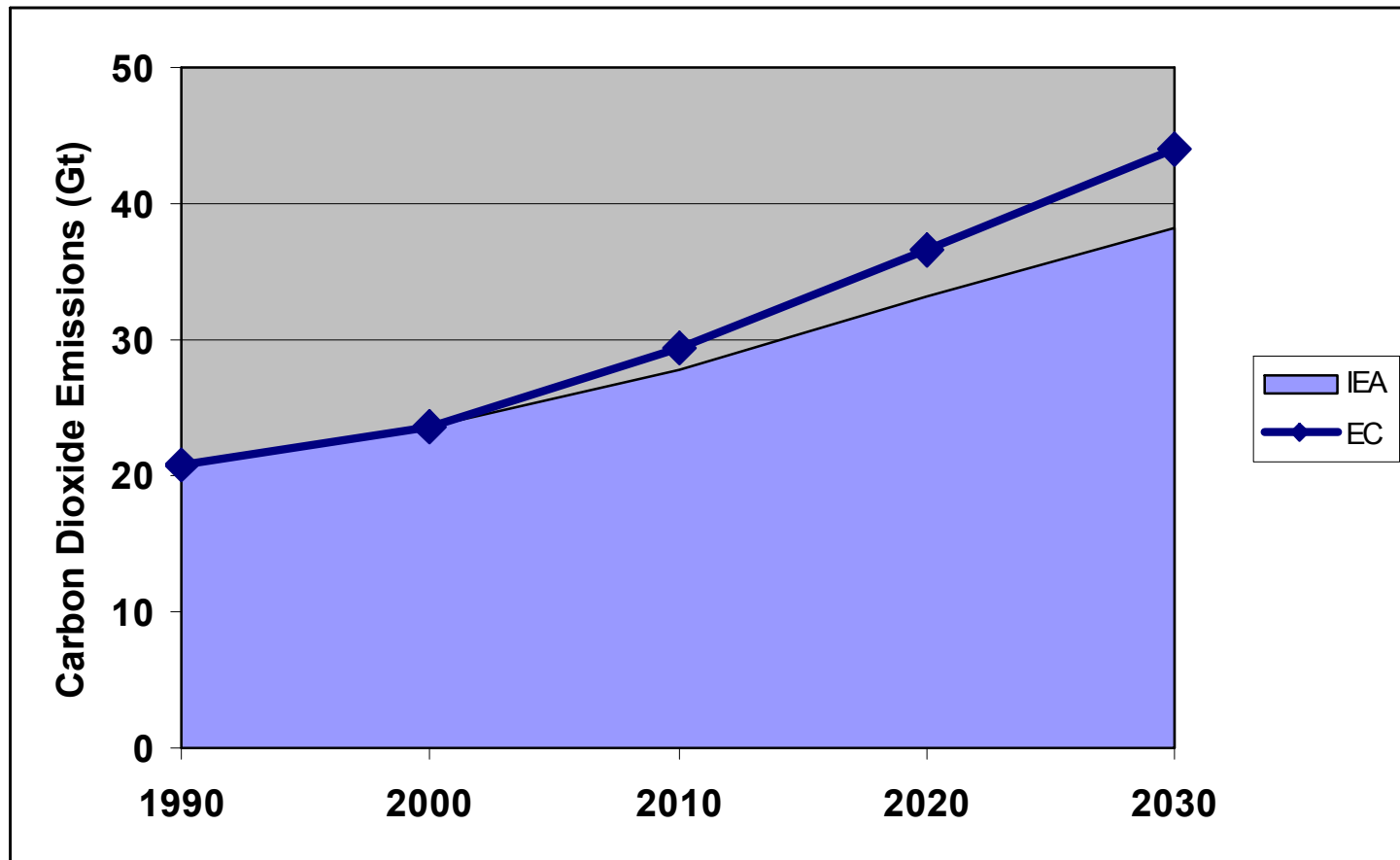


Why do we need CATS?

World Primary Energy Demand (European Energy and Transport – Trends to 2030)

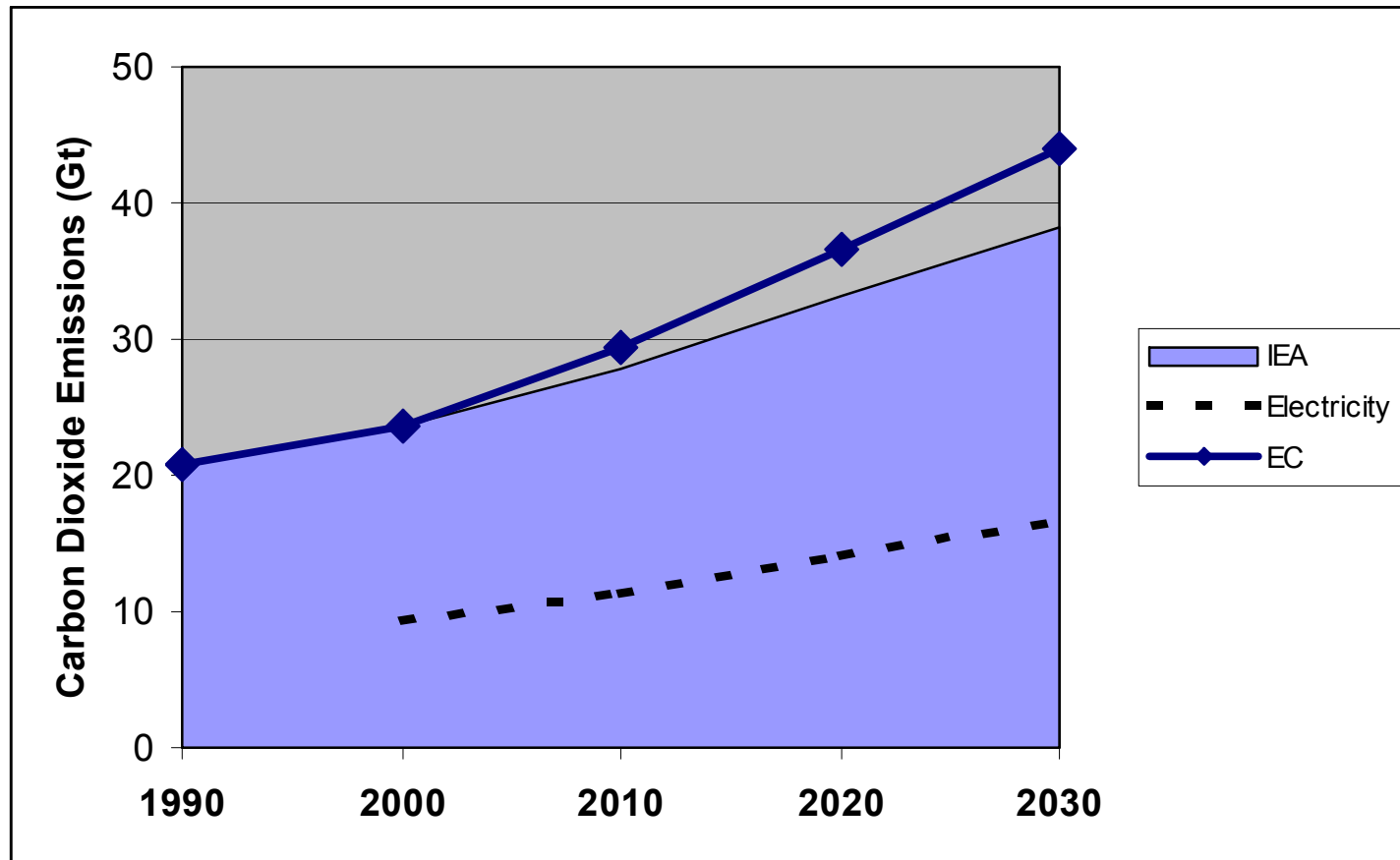


World Carbon Dioxide Emissions (IEA WEO 2004)



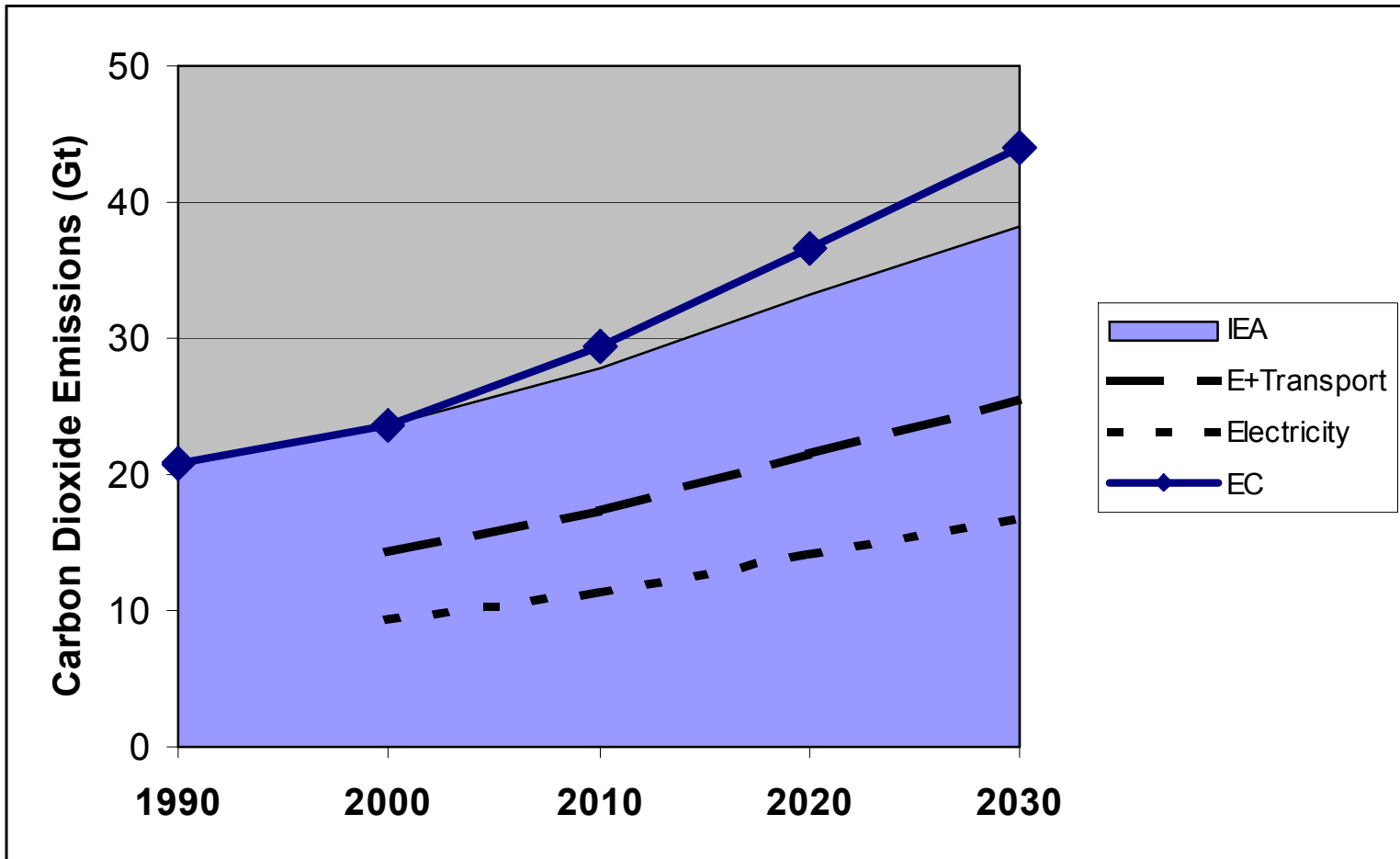
World Carbon Dioxide Emissions

(IEA WEO 2004)



World Carbon Dioxide Emissions

(IEA WEO 2004)



Carbon Lock-in

New and replacement fossil fuel power generation capacity (GW)

	2010	2020	2030
World	520	967	1205
OECD	160	309	363
Developing Countries	343	587	750
Transition Economies	16	72	90
European Union (25)	39	105	132
North America	83	141	171
China	162	210	260
India	24	66	97
Russia	5	27	34

CATs have a large potential for reducing CO₂ emissions

Potential reductions in CO₂ from different CATs applied to coal fired power plant in 2020 (Mt CO₂/yr) (G8 analysis)

Country/Region	Retrofit	BAT	Co-firing	CCS
World	1176	798	973	6341
OECD	320	268	419	2956
Developing Countries	655	436	490	3096
Transition Economies	181	77	63	307
China	424	316	305	1877
India	127	86	85	515
Russia	120	47	39	176

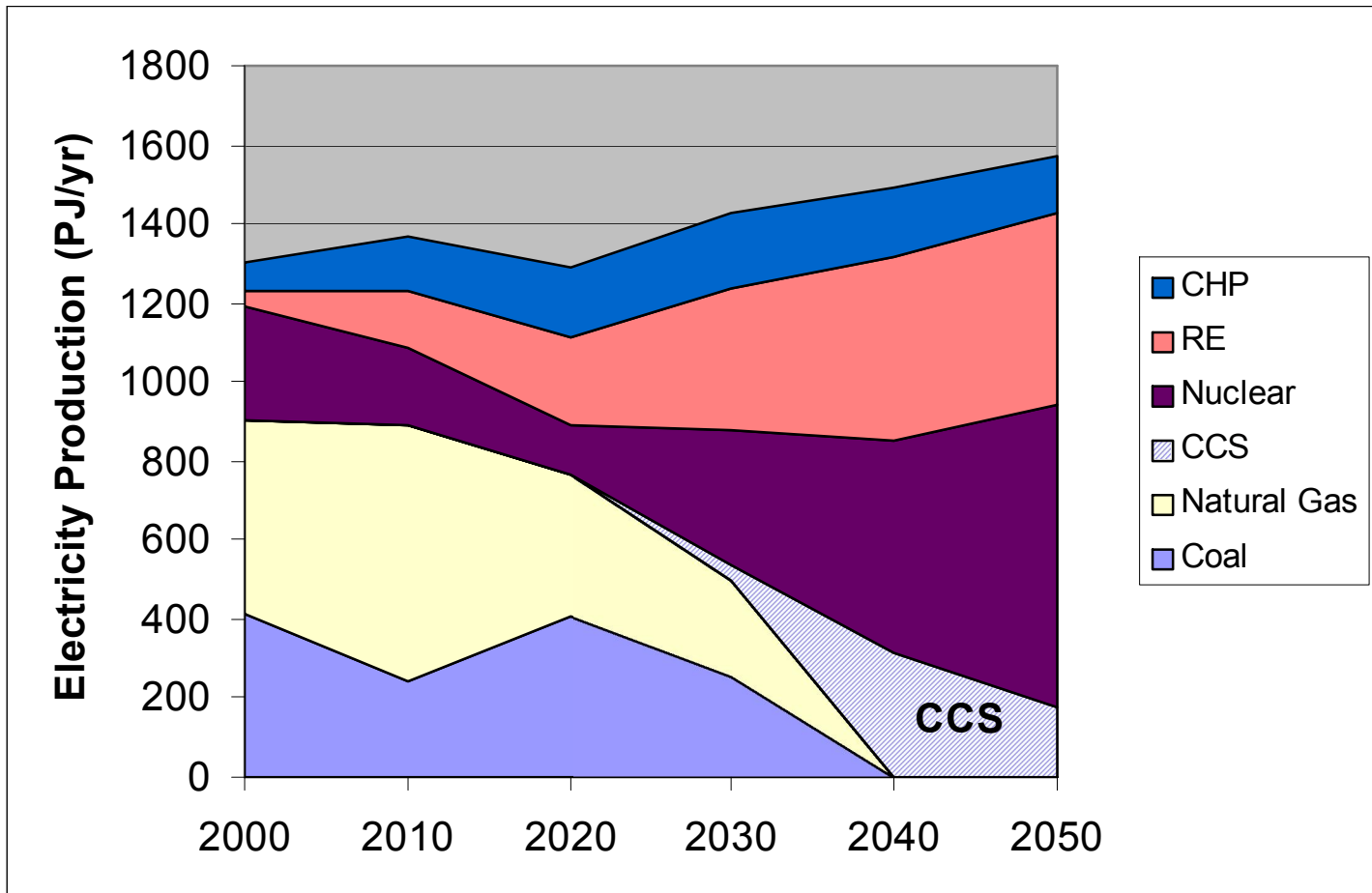
How do CATs compare with other low carbon options?

How do CATs compare with other options? (Generation Cost £/MWh in 2020)

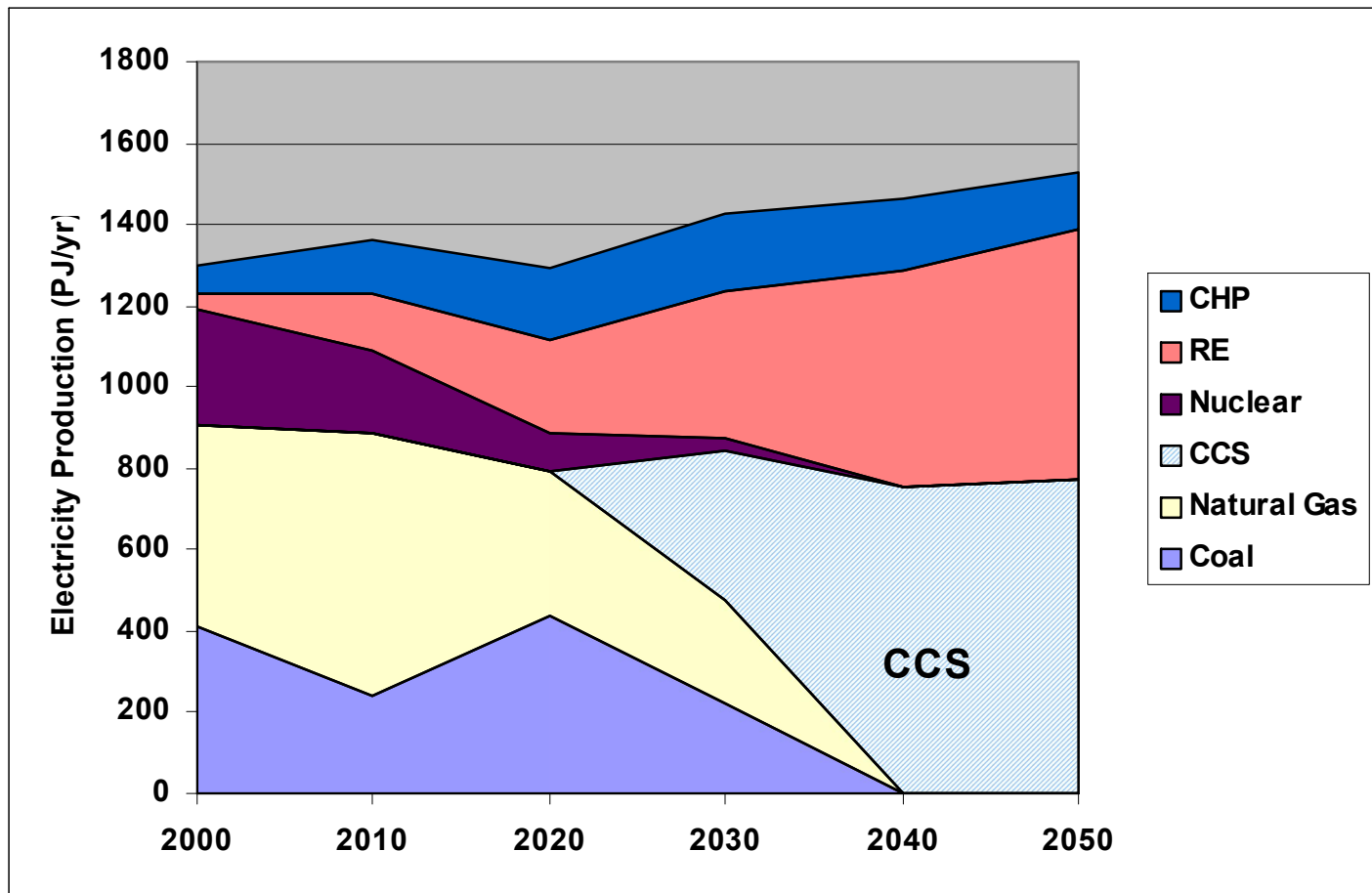
Technology	Low	Medium	Medium/high	High
Gas	23	33	43	47
Coal	32	44	53	63
Nuclear	34	37	40	41
Gas (capture & storage)	31	36	43	43
Coal (capture & storage)	38	39	40	41
Onshore wind	29	33	37	39
Offshore wind	47	56	66	90
Energy crops	36	44	53	85
Marine	65	90	118	178

When will we need CATs?

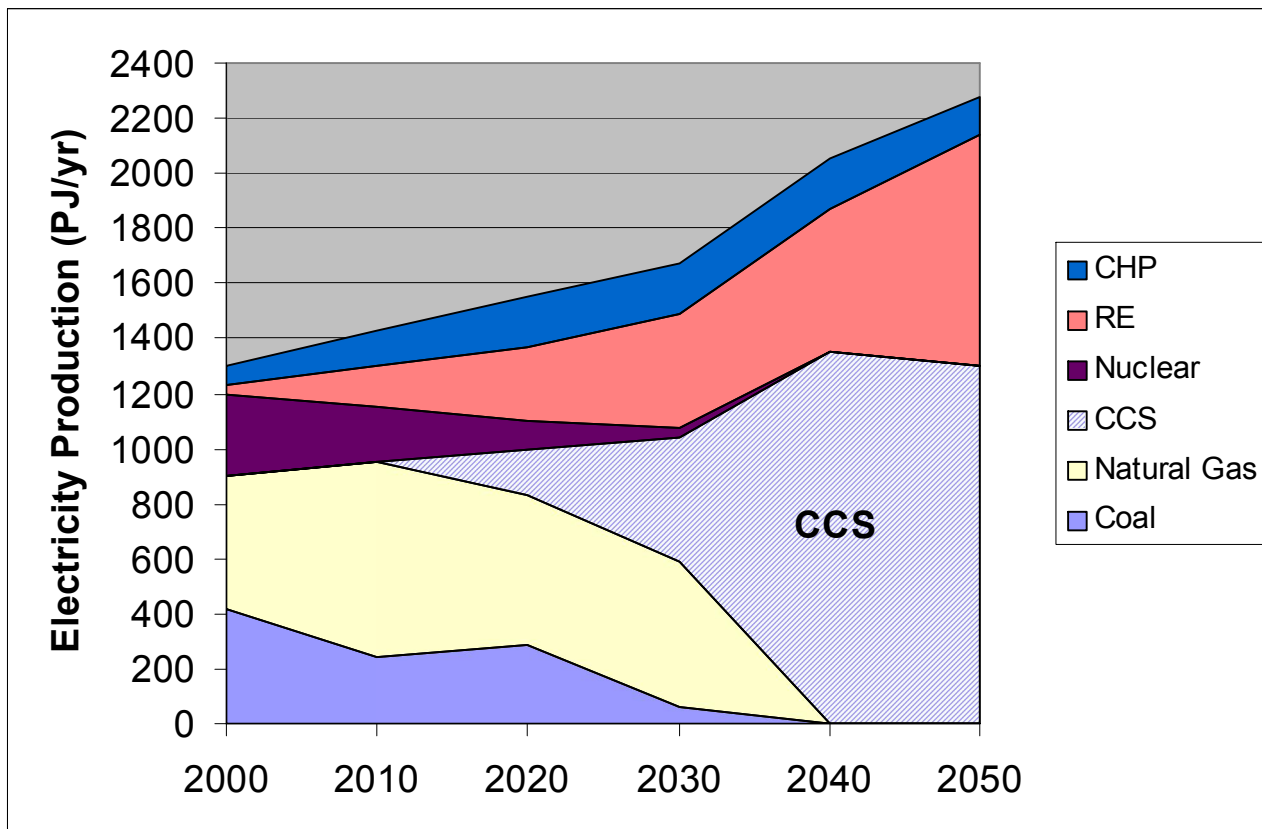
Fuel Mix in Electricity Generation - 60% CO₂ Reduction by 2050



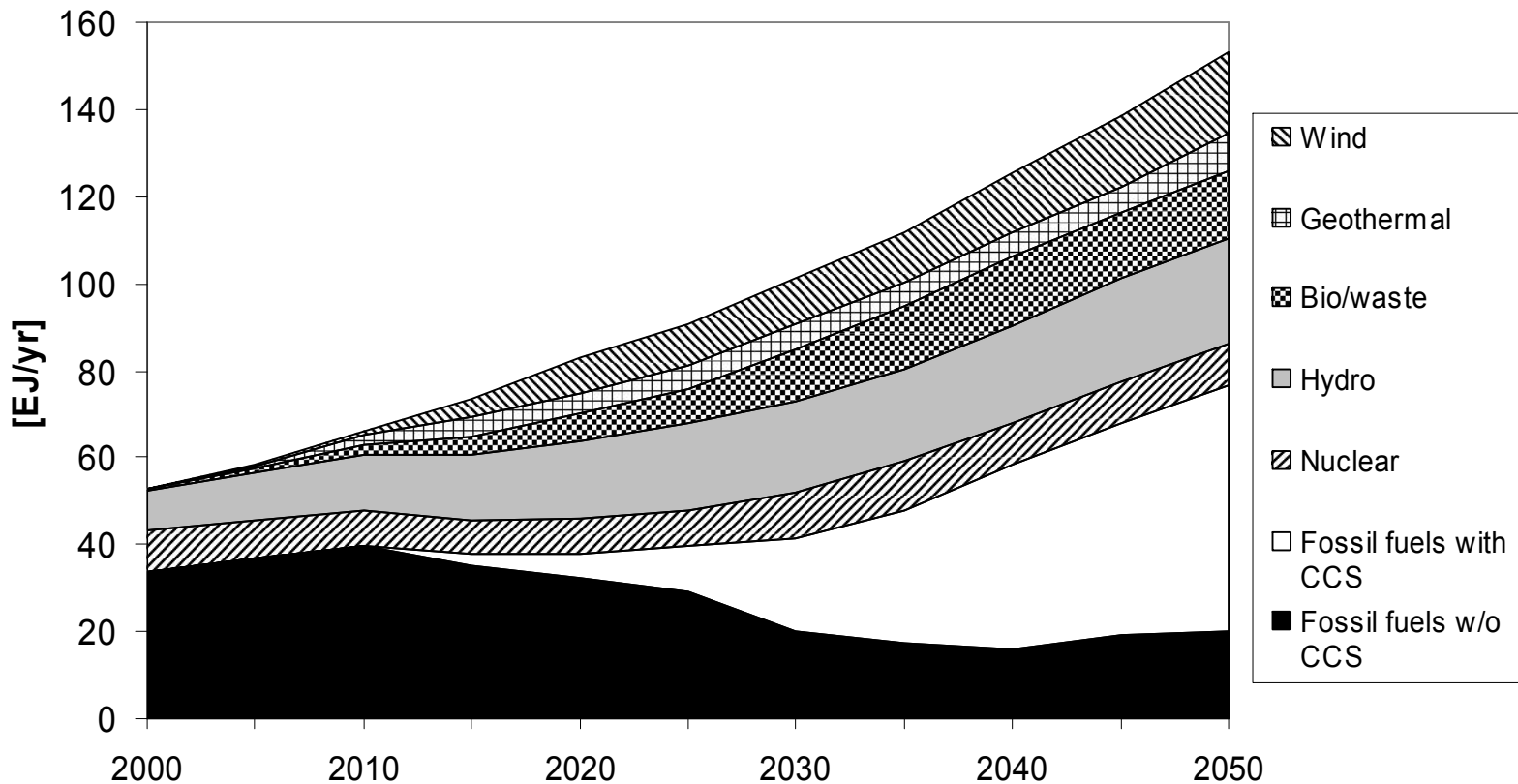
Fuel Mix in Electricity Generation - 60% CO₂ Reduction in 2050 (no new nuclear)



Fuel Mix in Electricity Generation - 60% CO₂ Reduction in 2050 (limited Energy Efficiency and no nuclear)



Worldwide deployment of CCS in electricity generation (IEA, assuming \$50/t CO₂)



What needs to be done?

Technical development:

- Research, development and demonstration.
- Encourage and support international collaboration.

Non-technical issues:

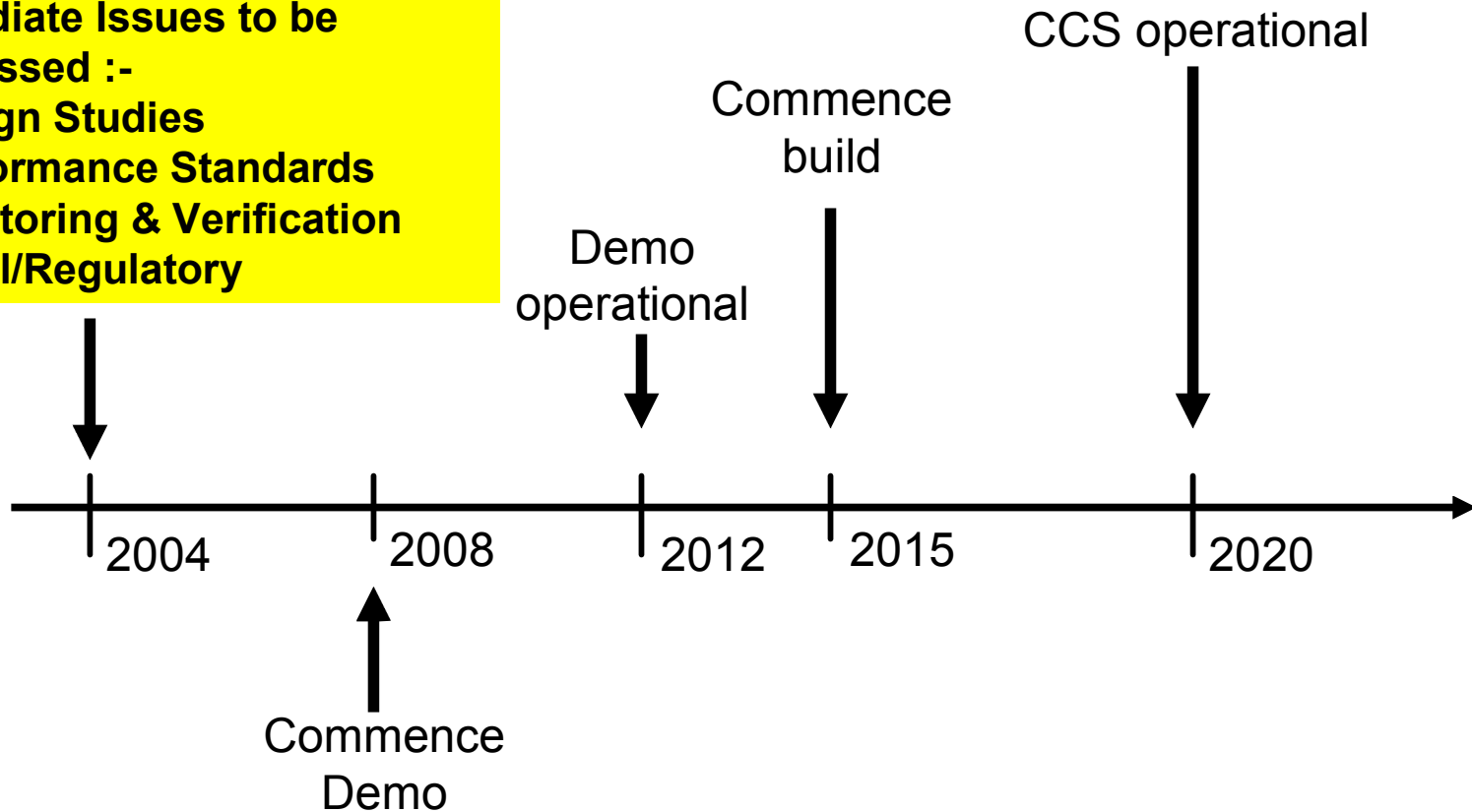
- Potential for new economic instruments.
- Knowledge acquisition and transfer.
- Development of national and international frameworks for regulation and authorisation.
- Increased public awareness

These actions need to be driven in parallel

CCS Timeline

Immediate Issues to be Addressed :-

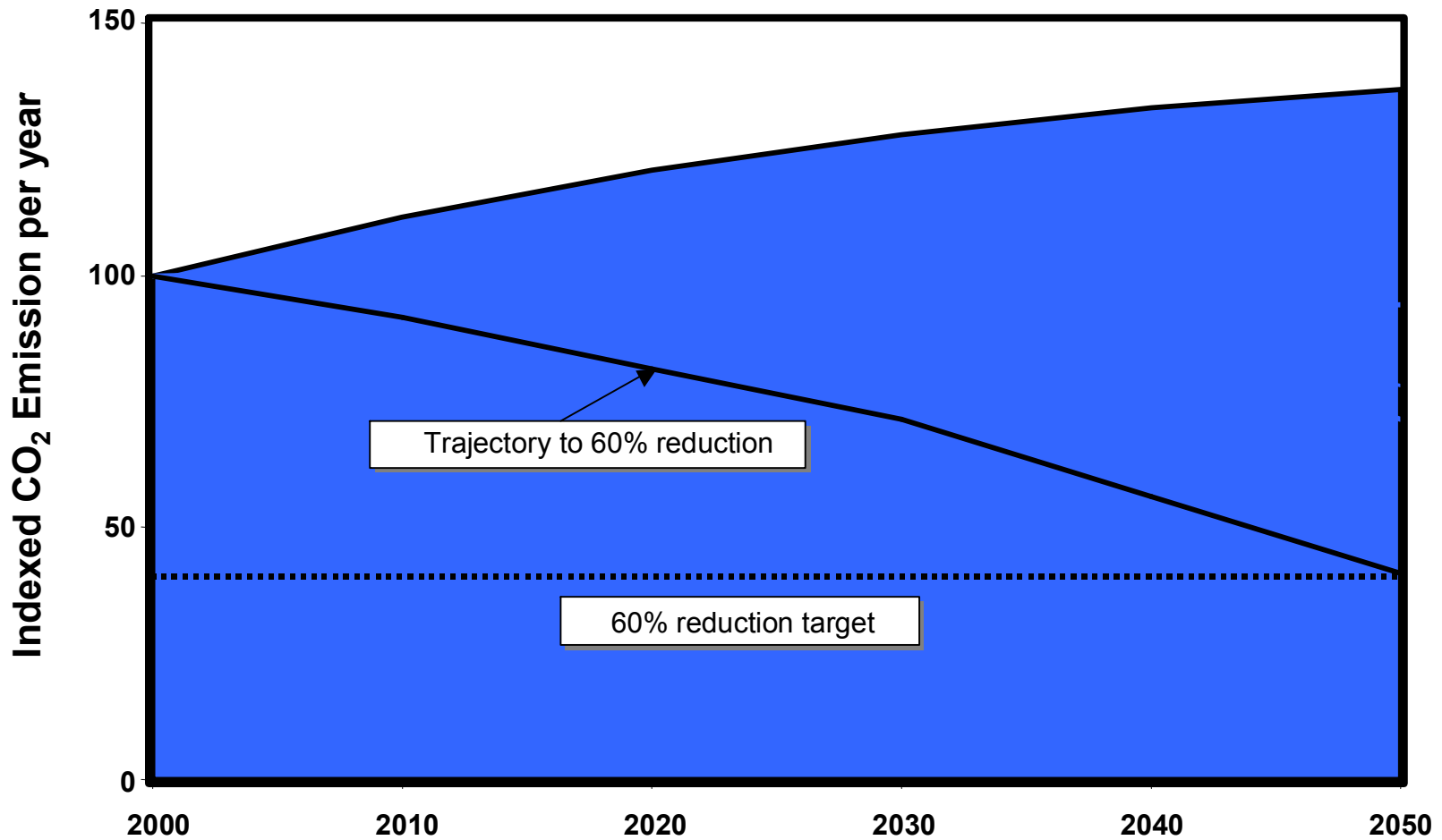
- Design Studies
- Performance Standards
- Monitoring & Verification
- Legal/Regulatory



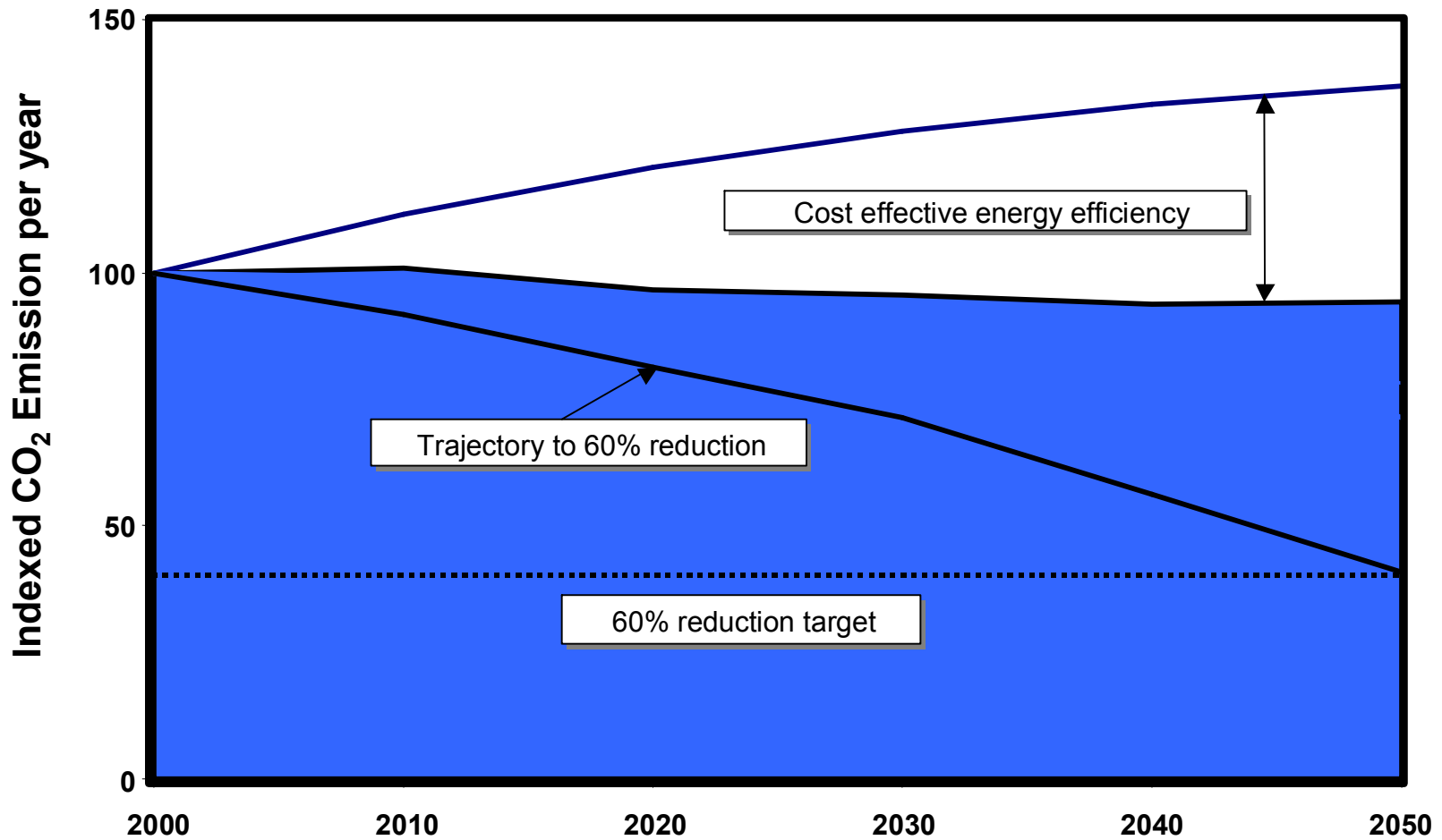
Why government should help?

- Consistent with the UK's world leadership.
- Barriers to effective collaboration across industrial sectors.
- High degree of risk.
- The failure of the market to fully value the abatement of CO₂ emissions.

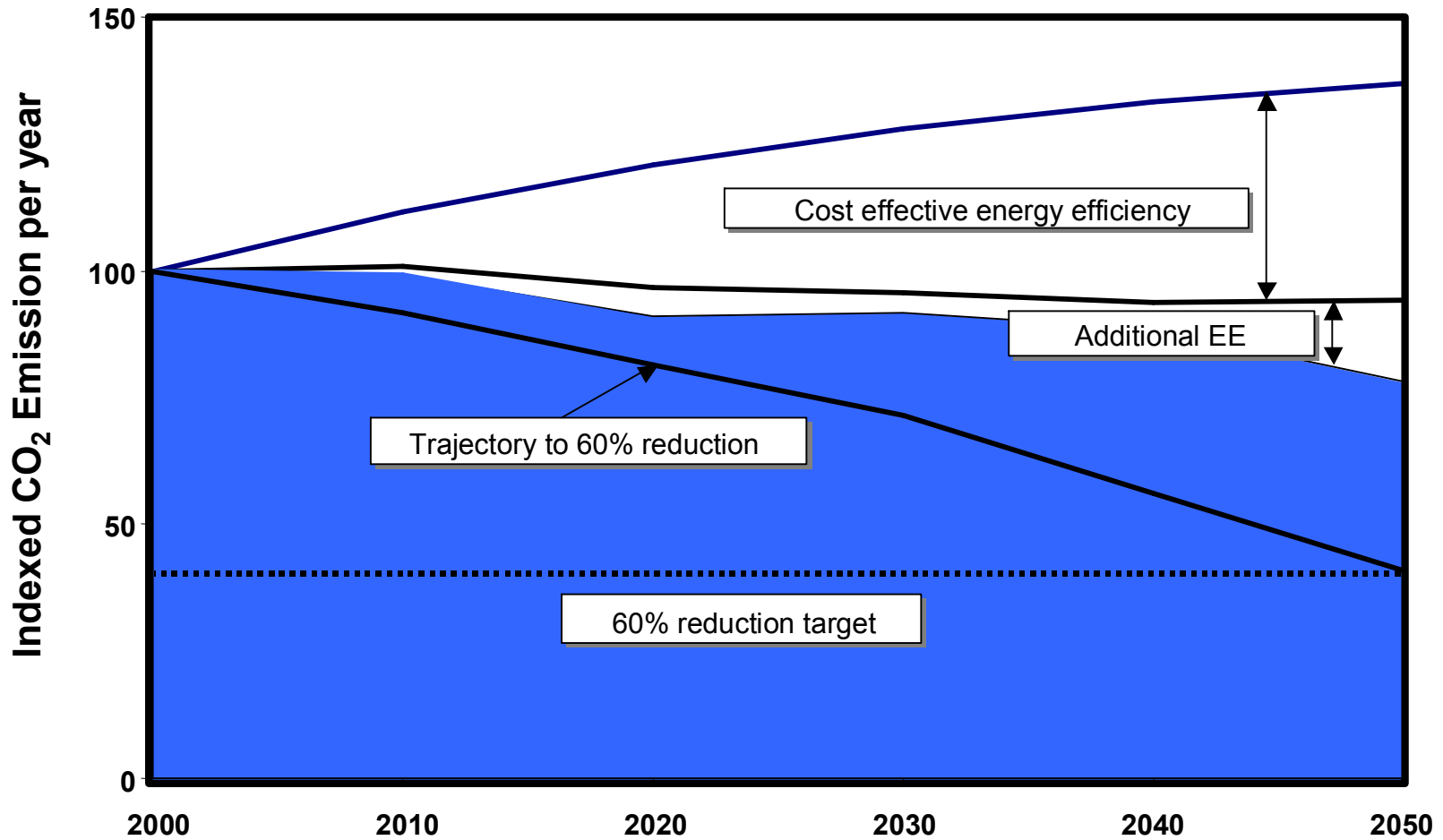
Baseline Scenario – CO₂ emissions to 2050



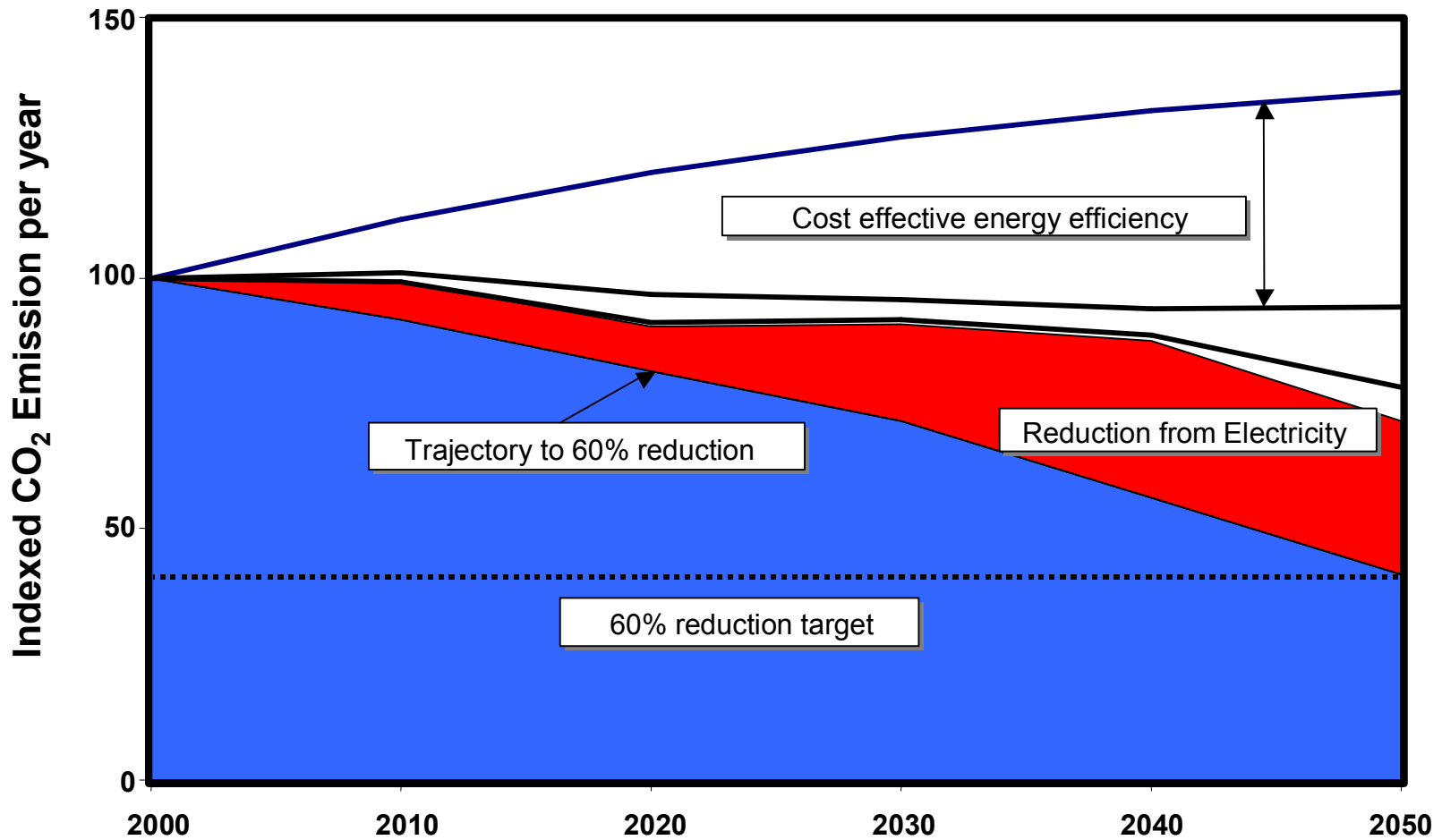
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When will we need CATs?

Baseline Scenarios

