International Energy Agency
1974•2014

Secure • Sustainable • Together

Climate and energy policy integration

Takashi Hattori, Head of Unit

Environment and Climate Change

LCS-RNET 6th Annual Meeting

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Outline

- IEA's 3 E's
- Transformation to low carbon societies
- Policies for energy sector transformation
- Multiple goals and multiple benefits
- Components for realising policy integration

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IEA

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Founded in 1974

- **Formed in wake of 1973 oil embargo with mission to promote member country energy security -- autonomous agency of the Organisation for Economic Cooperation and Development (OECD)**

29 member countries

Headquarters: Paris

Decision-making body: Governing Board

- Consists of member country representatives
- Under the Governing Board, several committees are focusing on each area

Secretariat:

- **Staff of around 240,** mainly energy experts and statisticians from its member countries

IEA 3 E's of Sound Energy Policy

Energy Security

- Promote diversity, efficiency and flexibility within the energy sectors of the IEA member countries. Remain prepared collectively to respond to energy emergencies. Expand international cooperation with all global players in the energy markets.

Environmental Protection

- Enhance awareness of options for addressing the climate change challenge. Promote greenhouse gas emission abatement, through enhanced energy efficiency and the use of cleaner fossil fuels. Develop more environmentally acceptable energy options.

Economic Growth

- Ensure the stable supply of energy to IEA member countries and promote free markets in order to foster economic growth.

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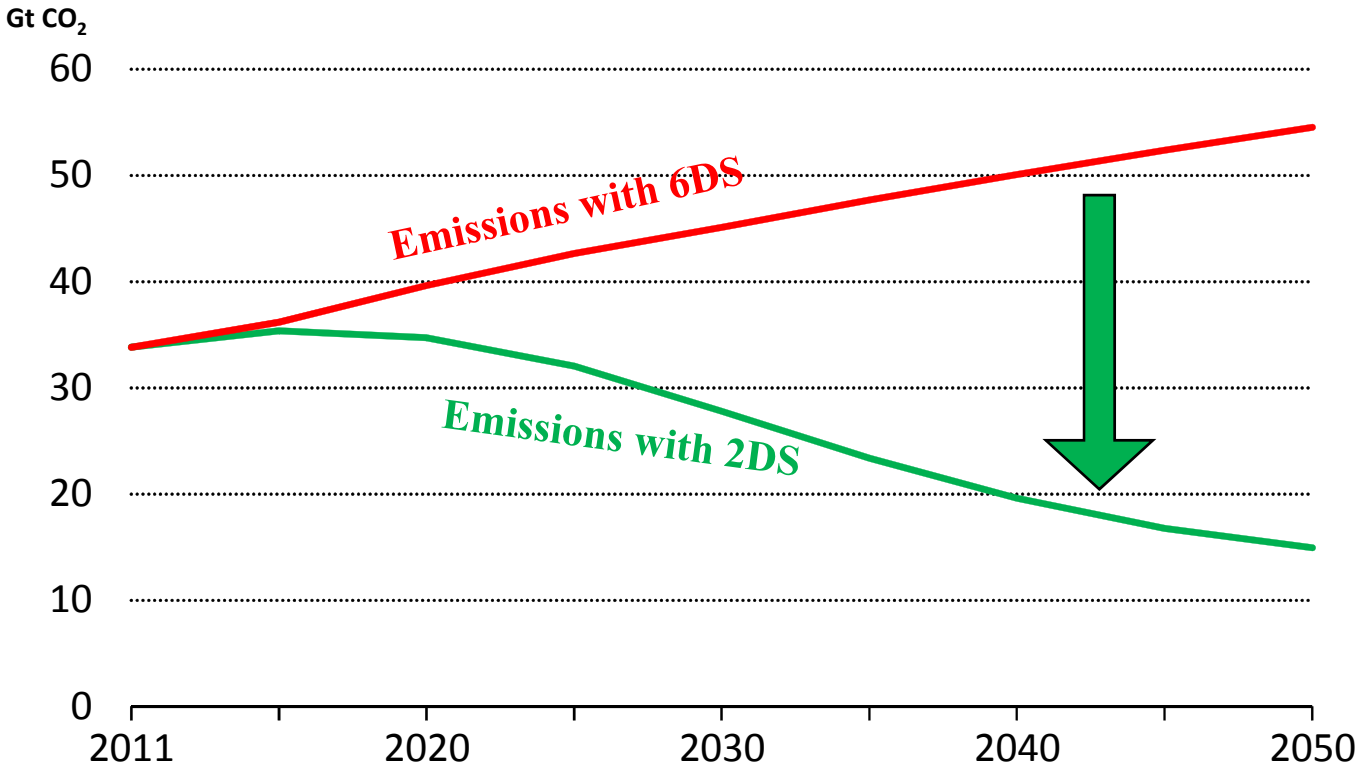
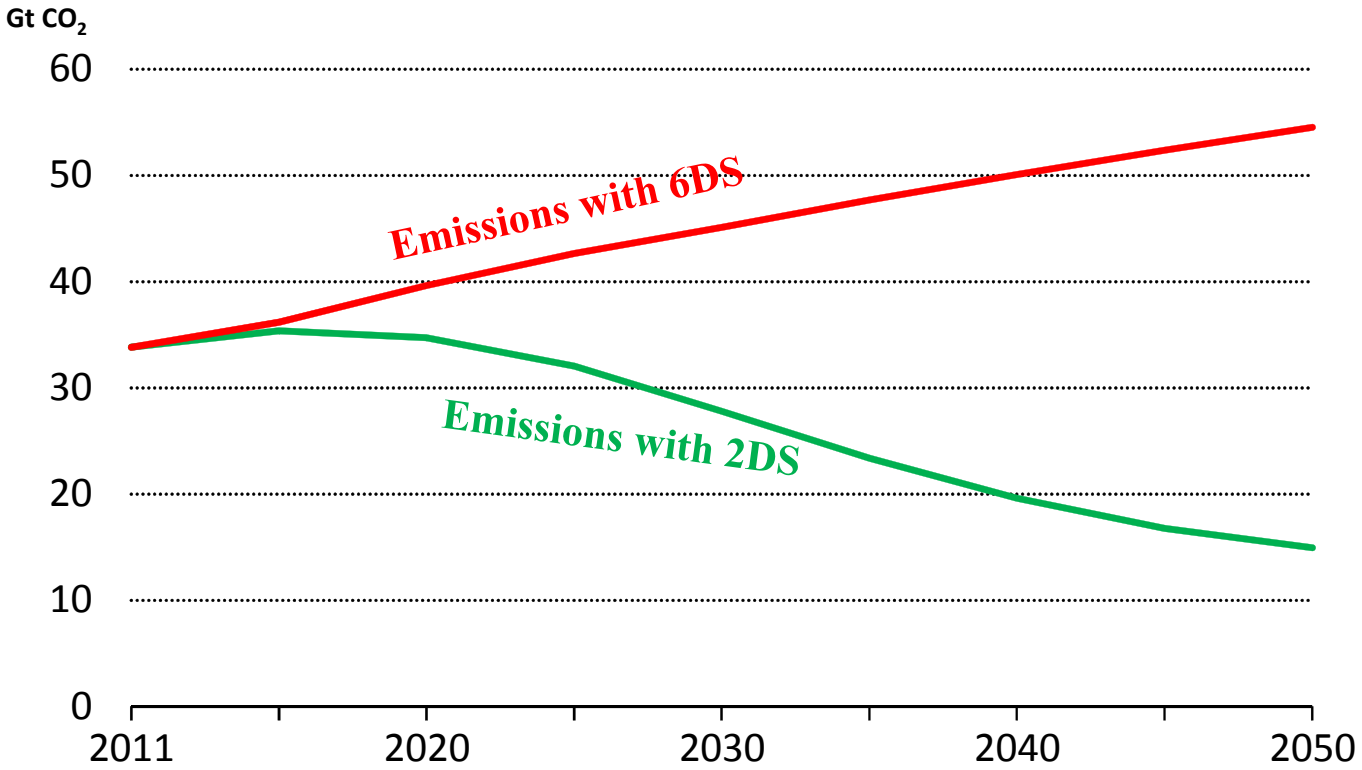
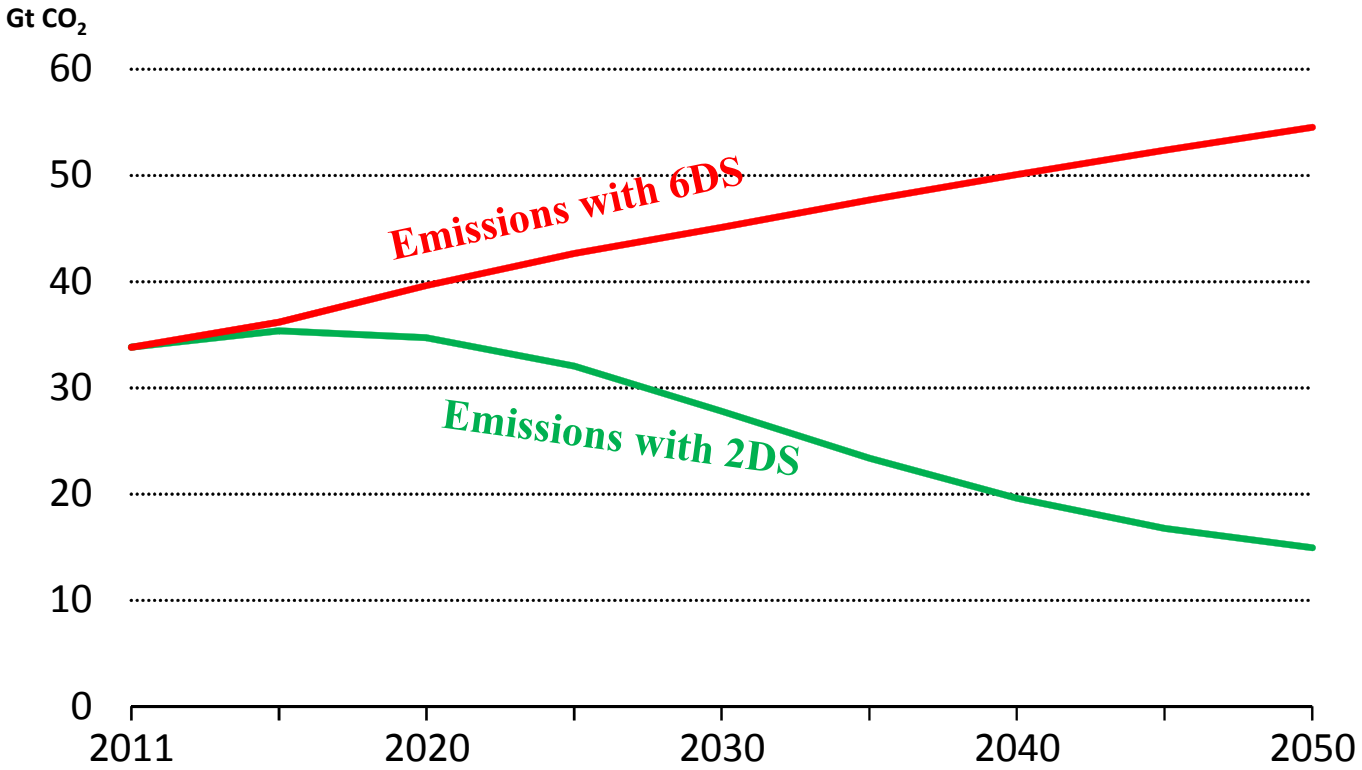
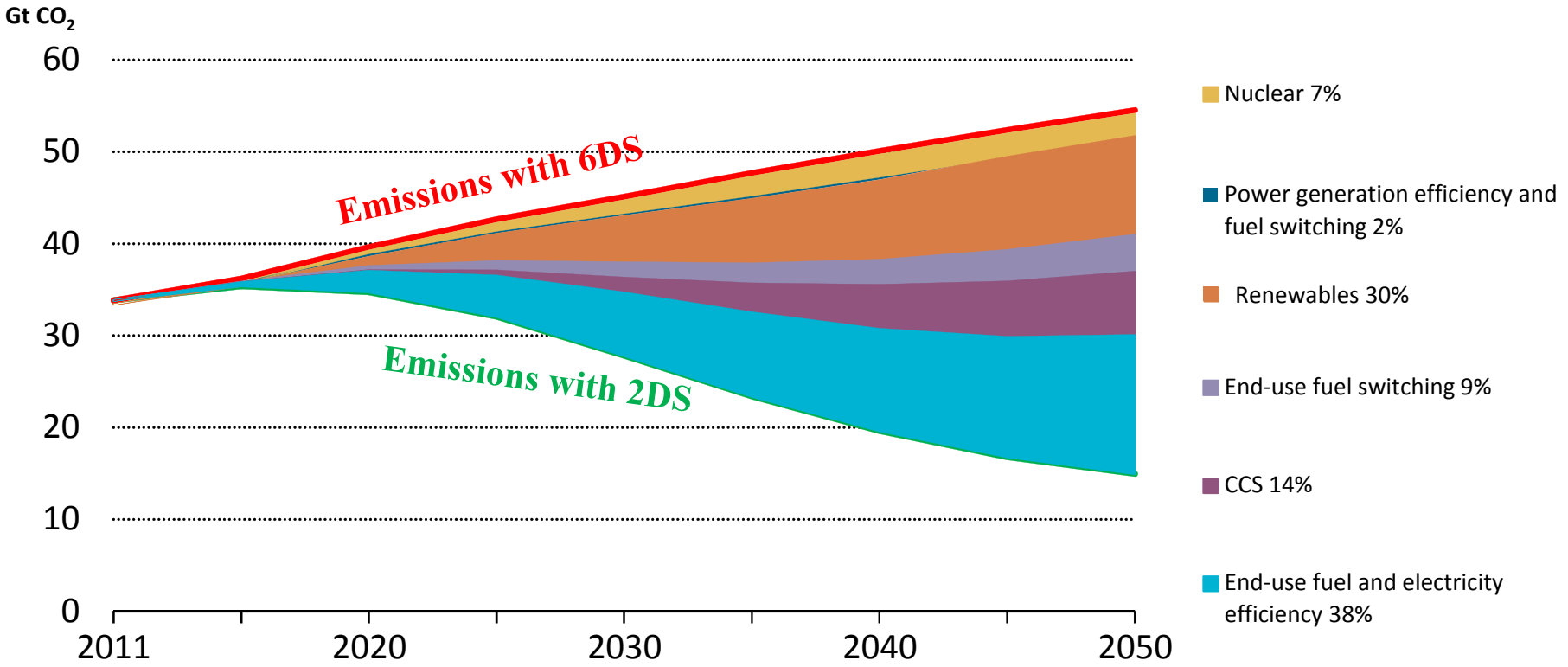
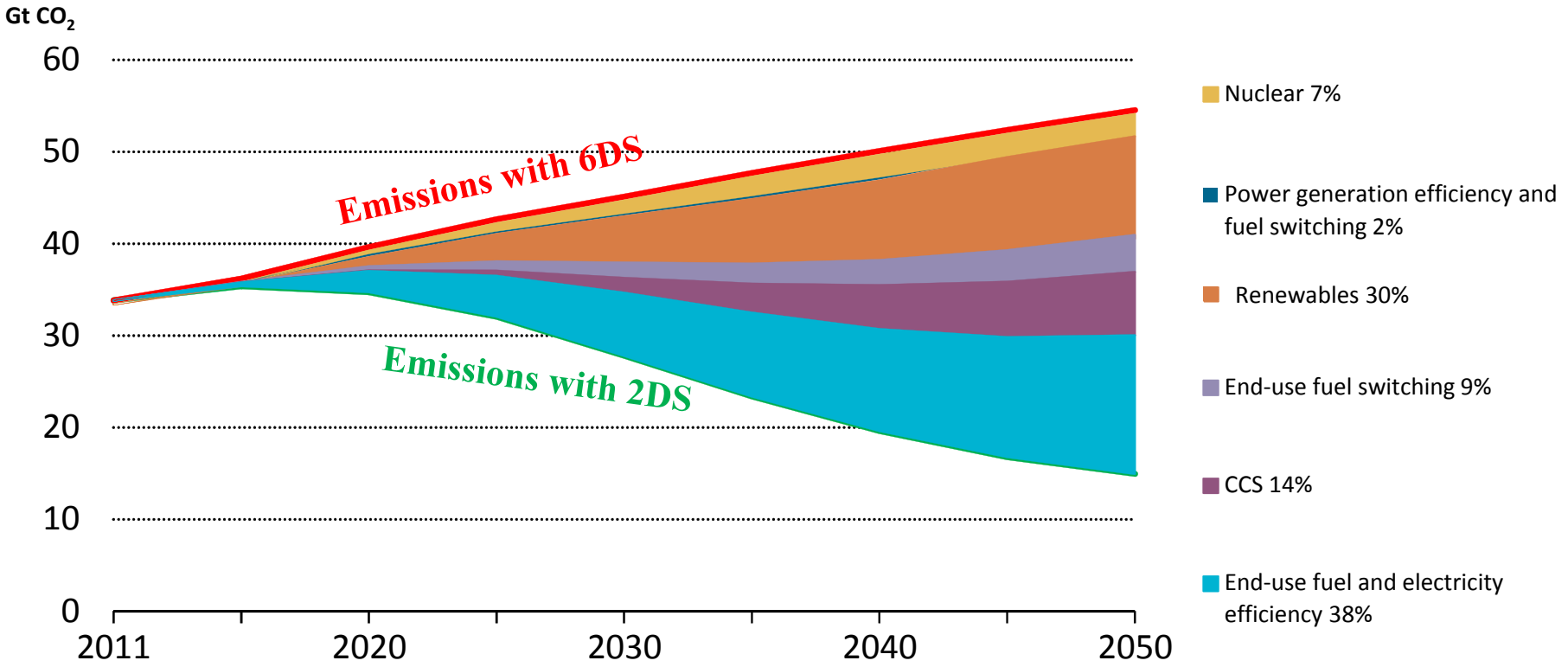
6°C world vs 2°C world

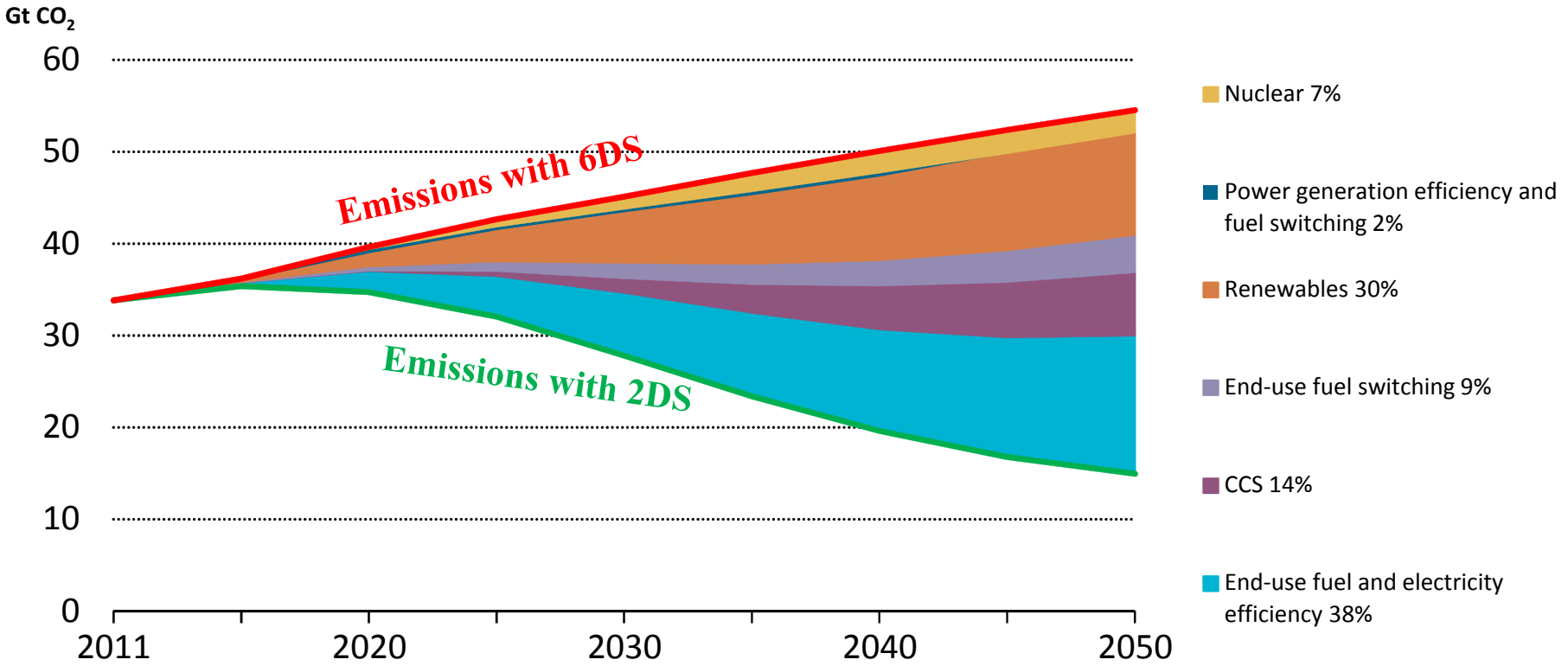




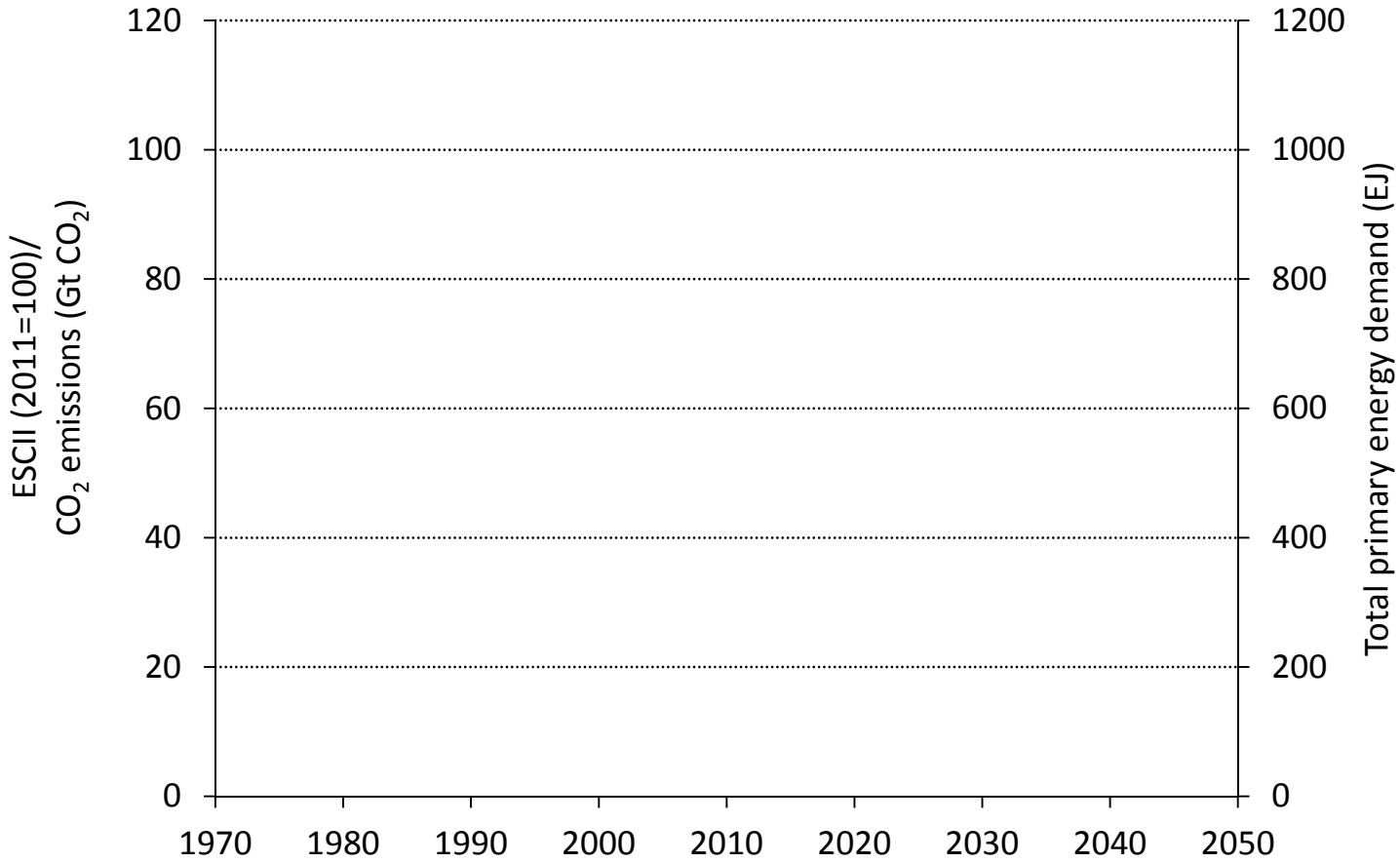






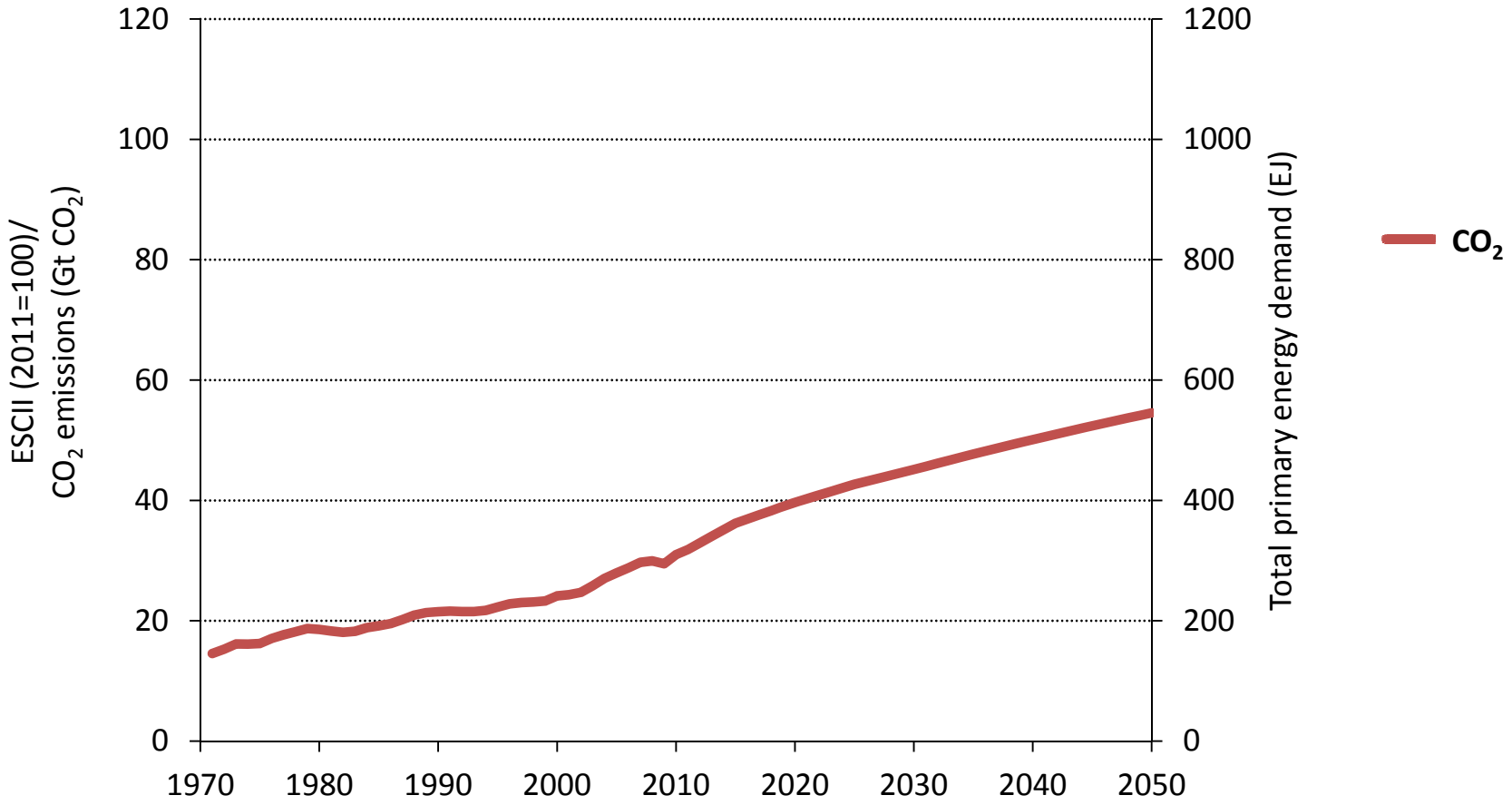


Energy CO_2 Emissions: Intensity x Demand



Energy CO_2 Emissions: Intensity x Demand

In 6DS



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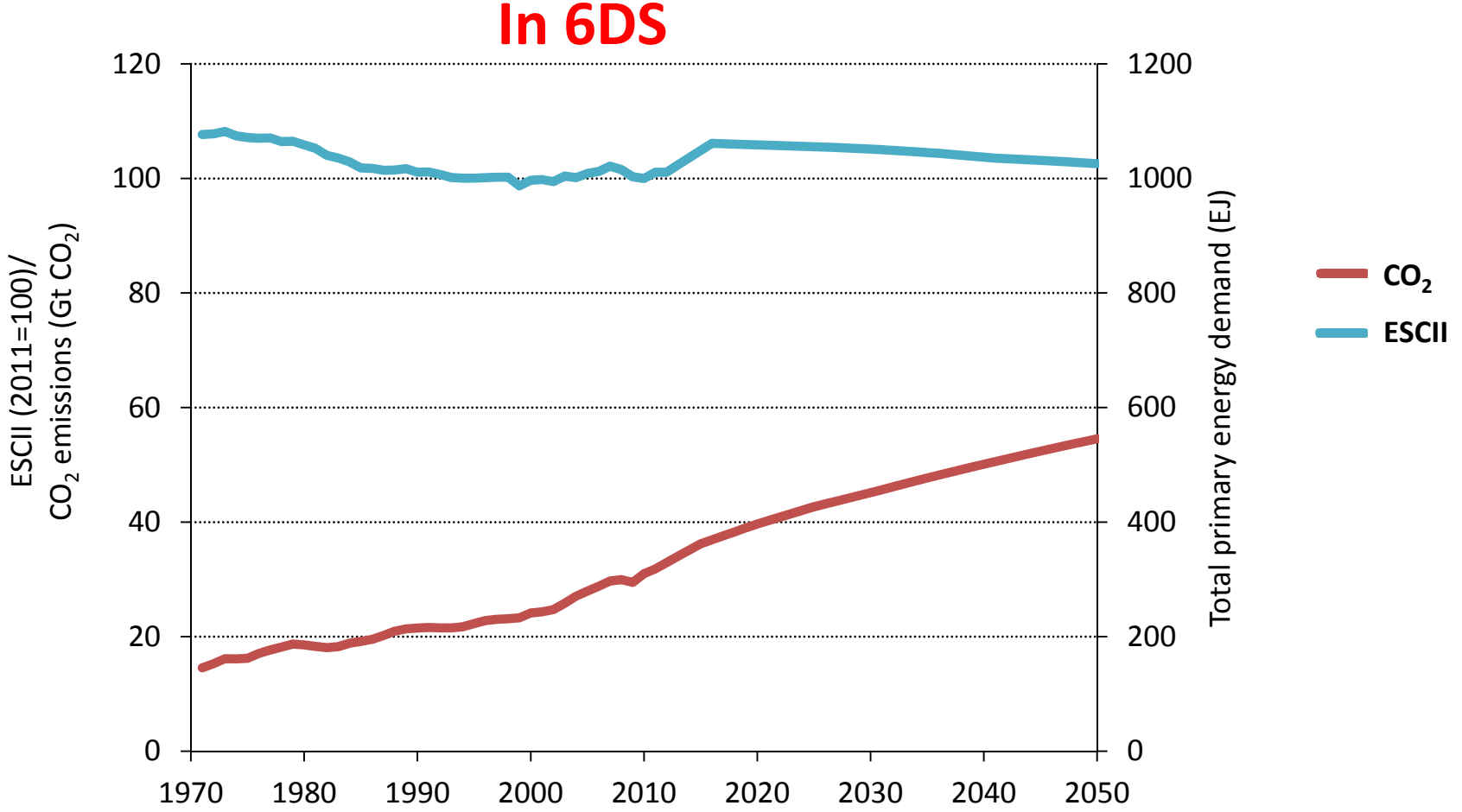

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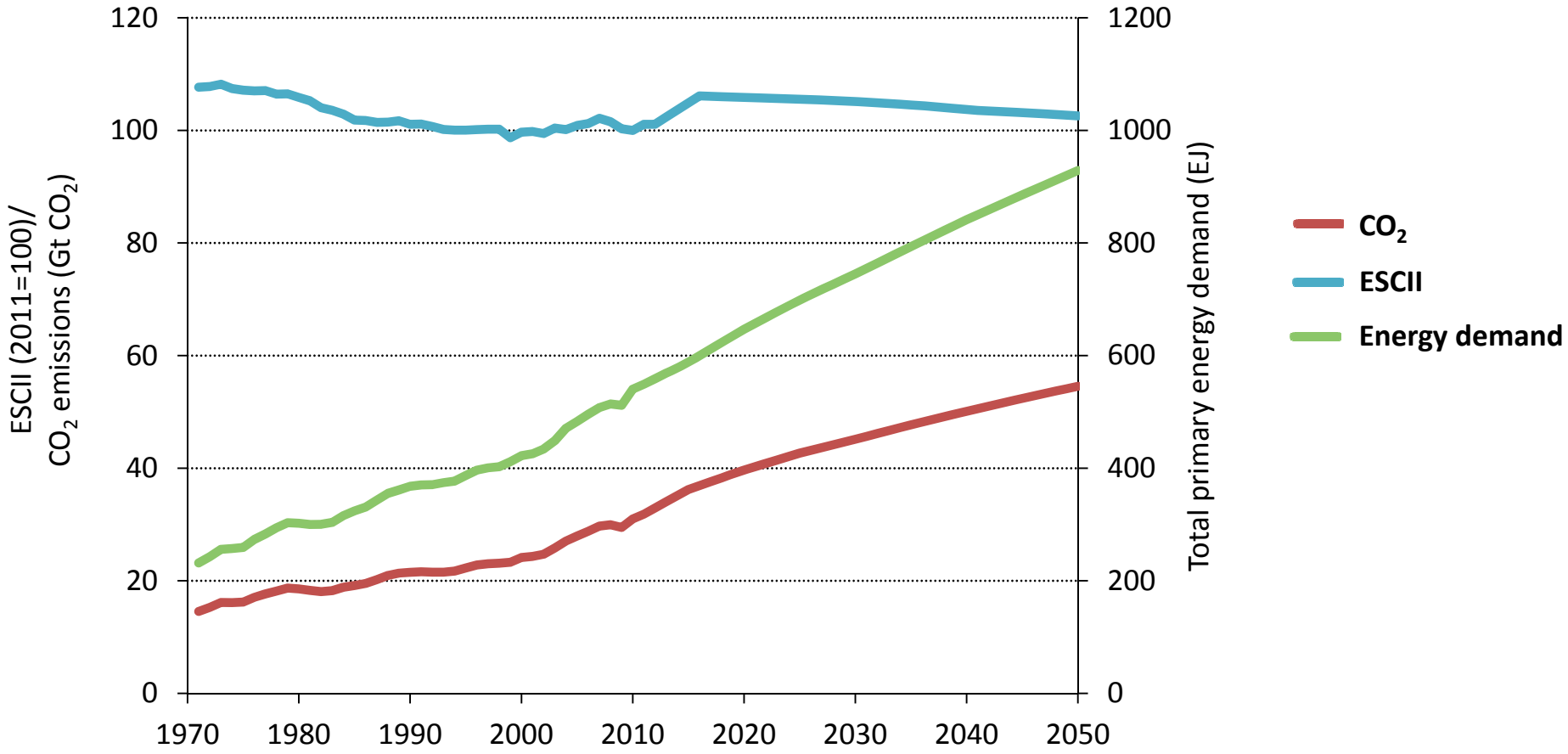

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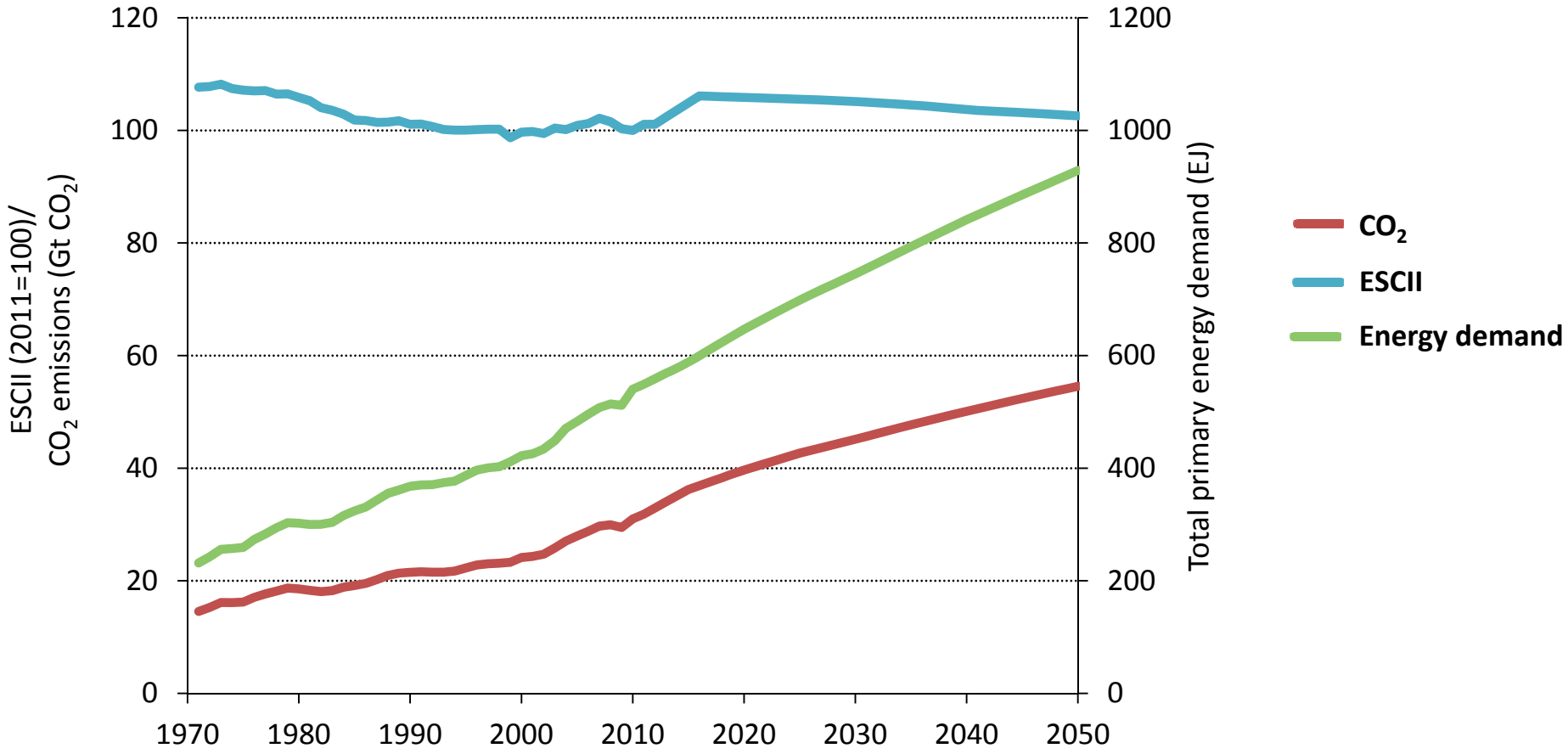

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The Energy Mix

(ESCII: tracking the CO_2 intensity of global energy supply)

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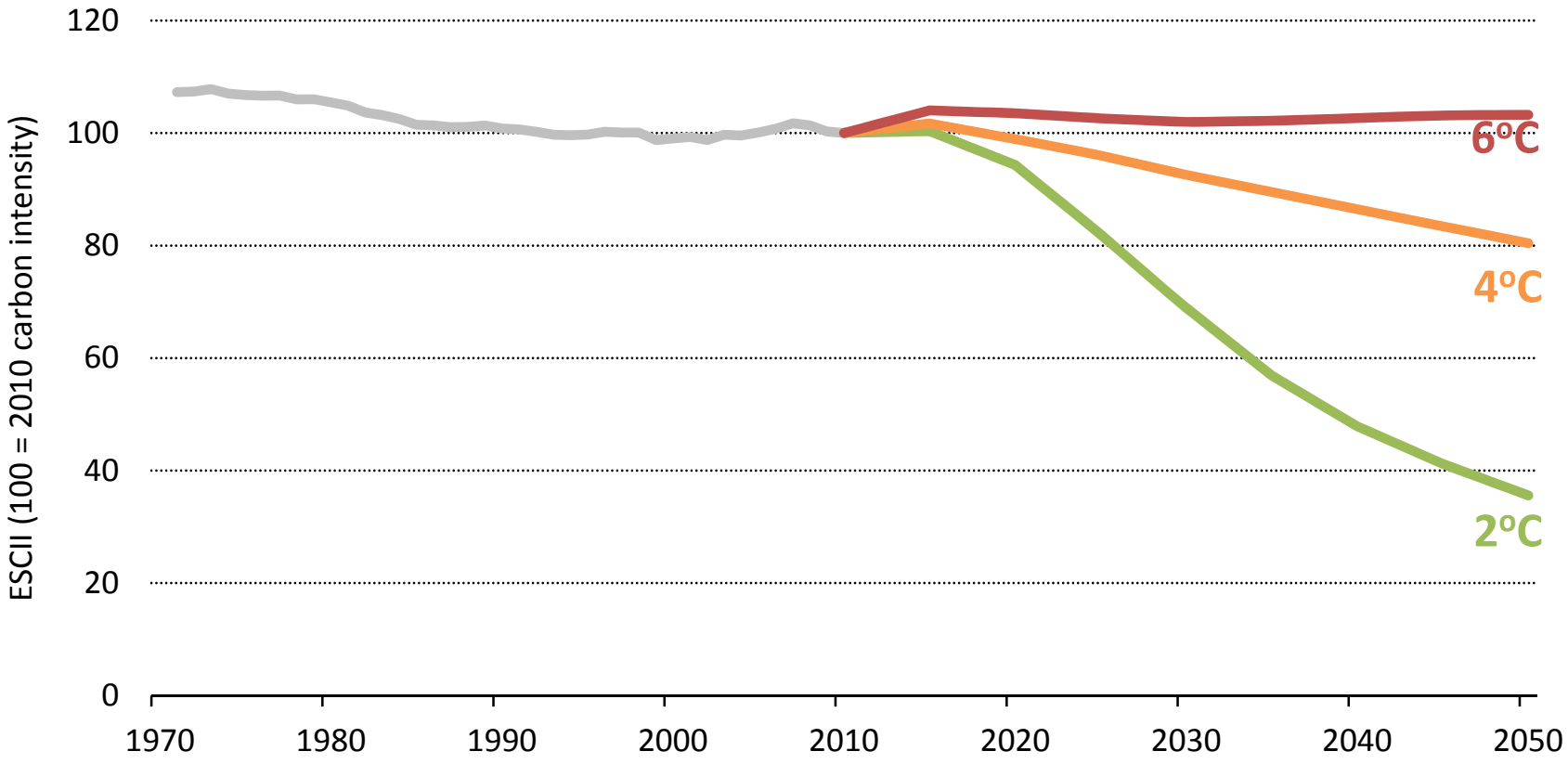
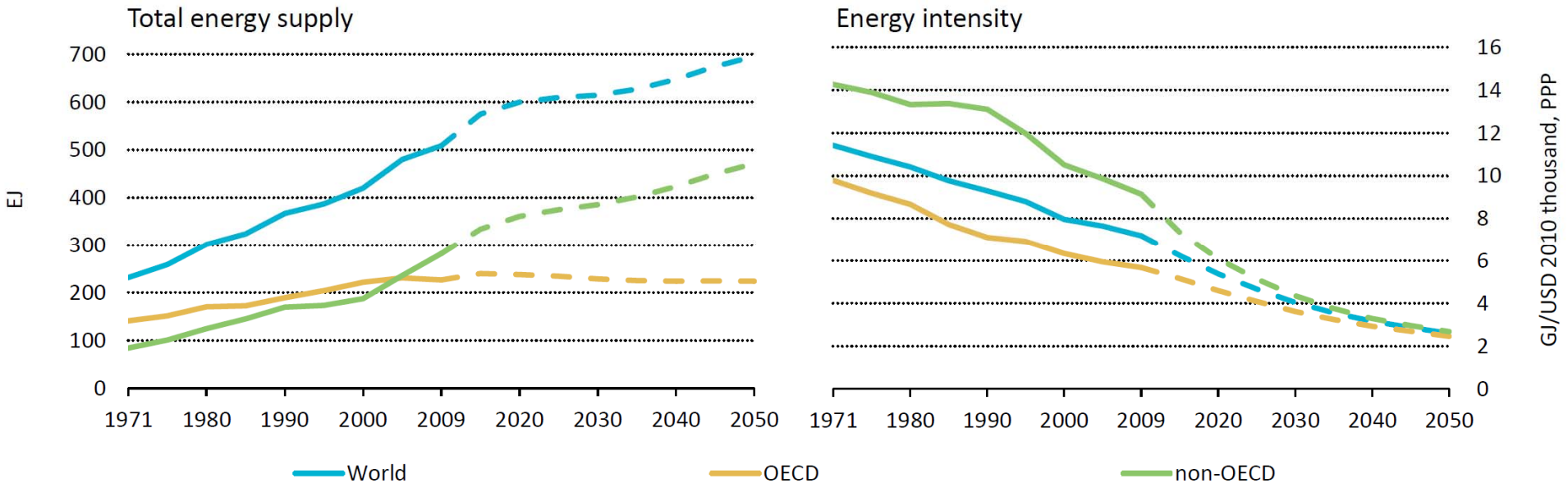
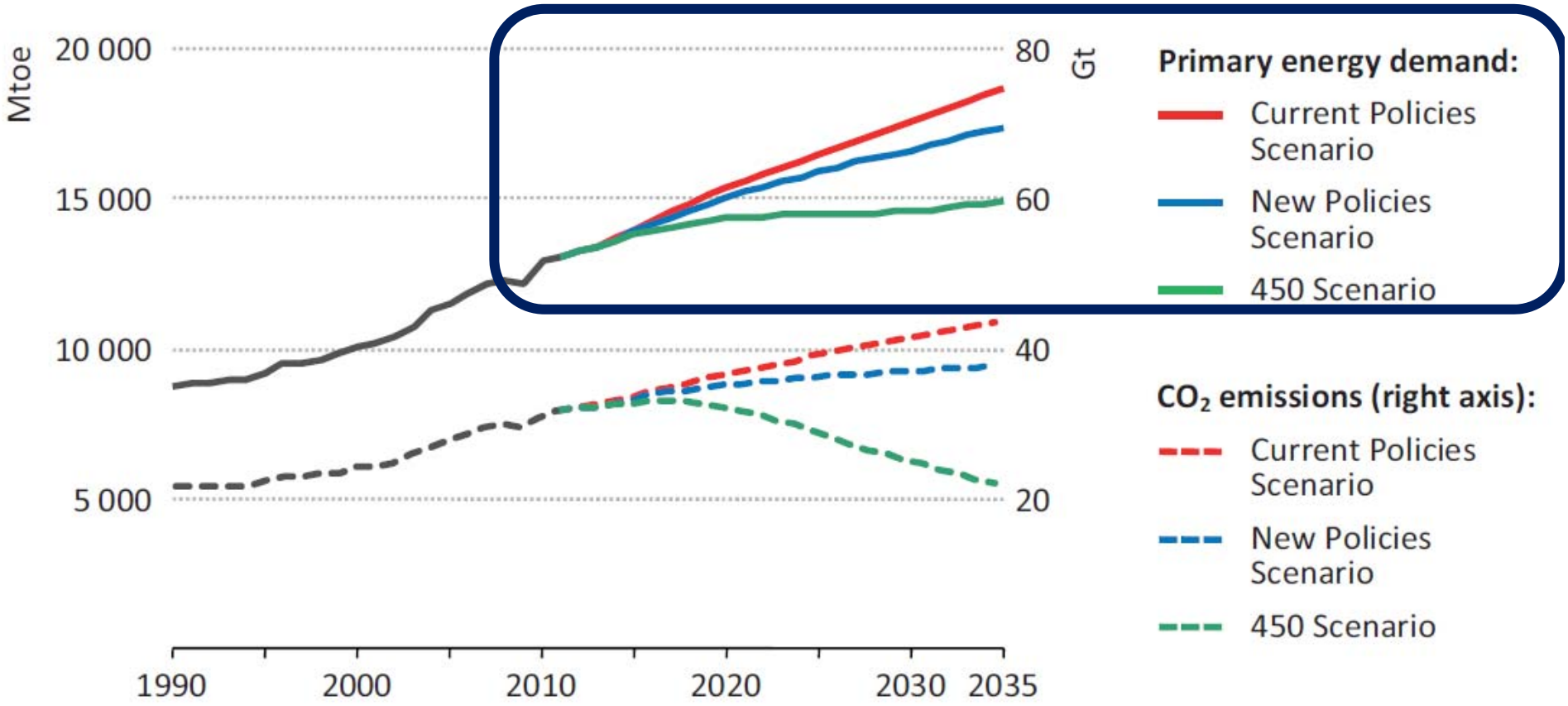


The carbon intensity of energy supply has been stable for the last 40 years, but needs to decrease rapidly in future.

Decoupling energy use from economic activity



Reducing the energy intensity of the economy is vital to achieving the 2DS.



Note: Mtoe = Million tonnes of oil equivalent; Gt = gigatonnes.

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We are not on track

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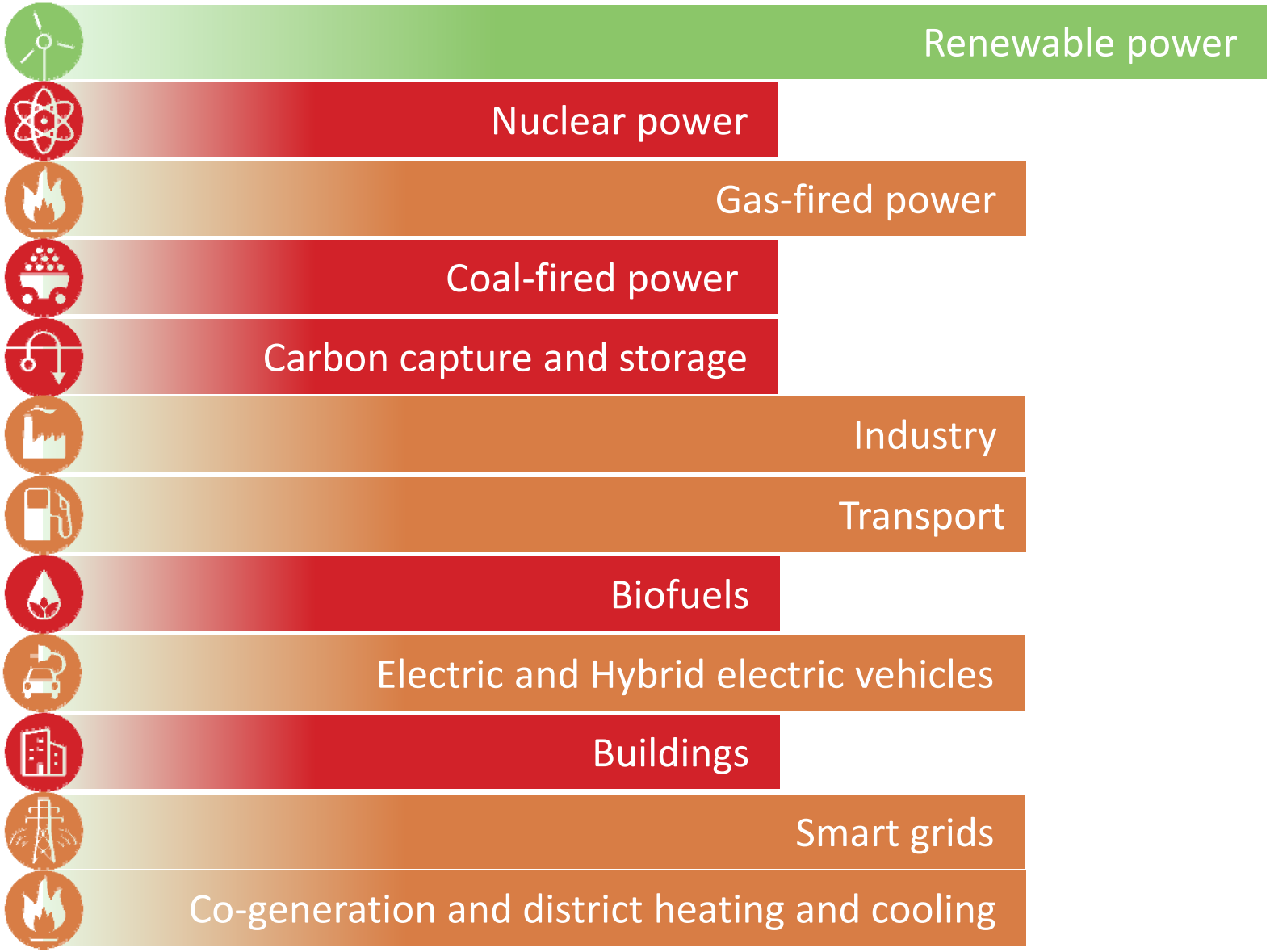
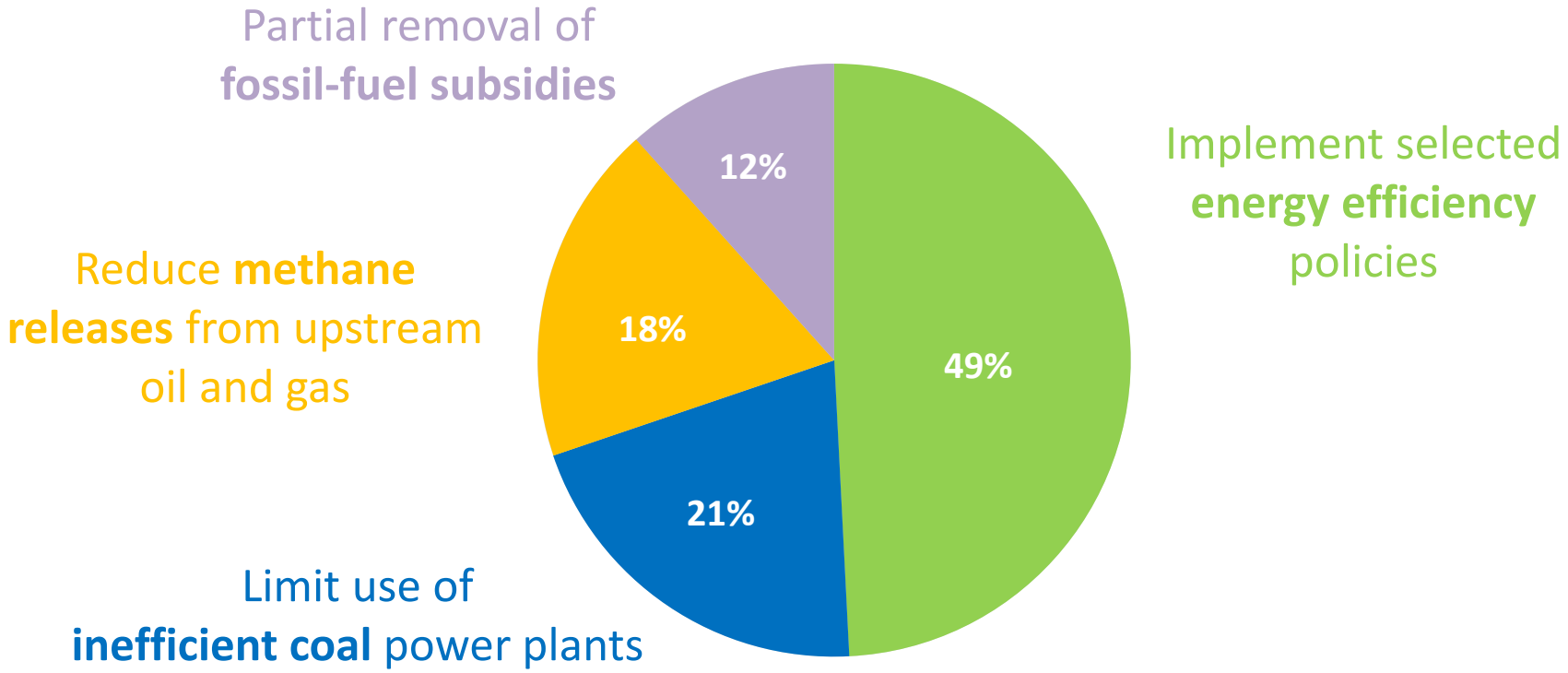


World Energy Outlook

Emissions savings in the 4-for-2 °C Scenario, 2020

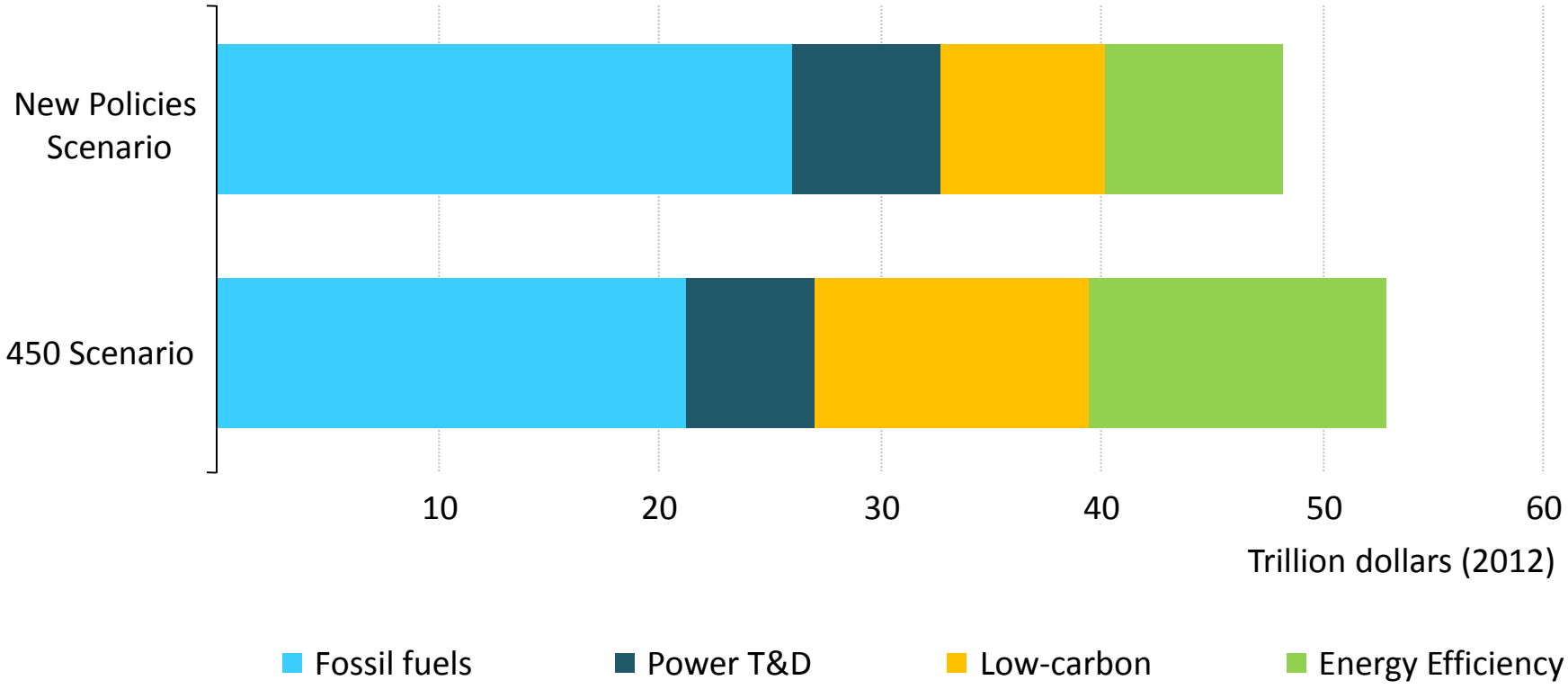


Four measures can stop the growth in emissions by 2020 at no net economic cost, reducing emissions by 3.1 Gt, 80% of the savings required for a 2 °C path

A new investment landscape for a 2 °C world

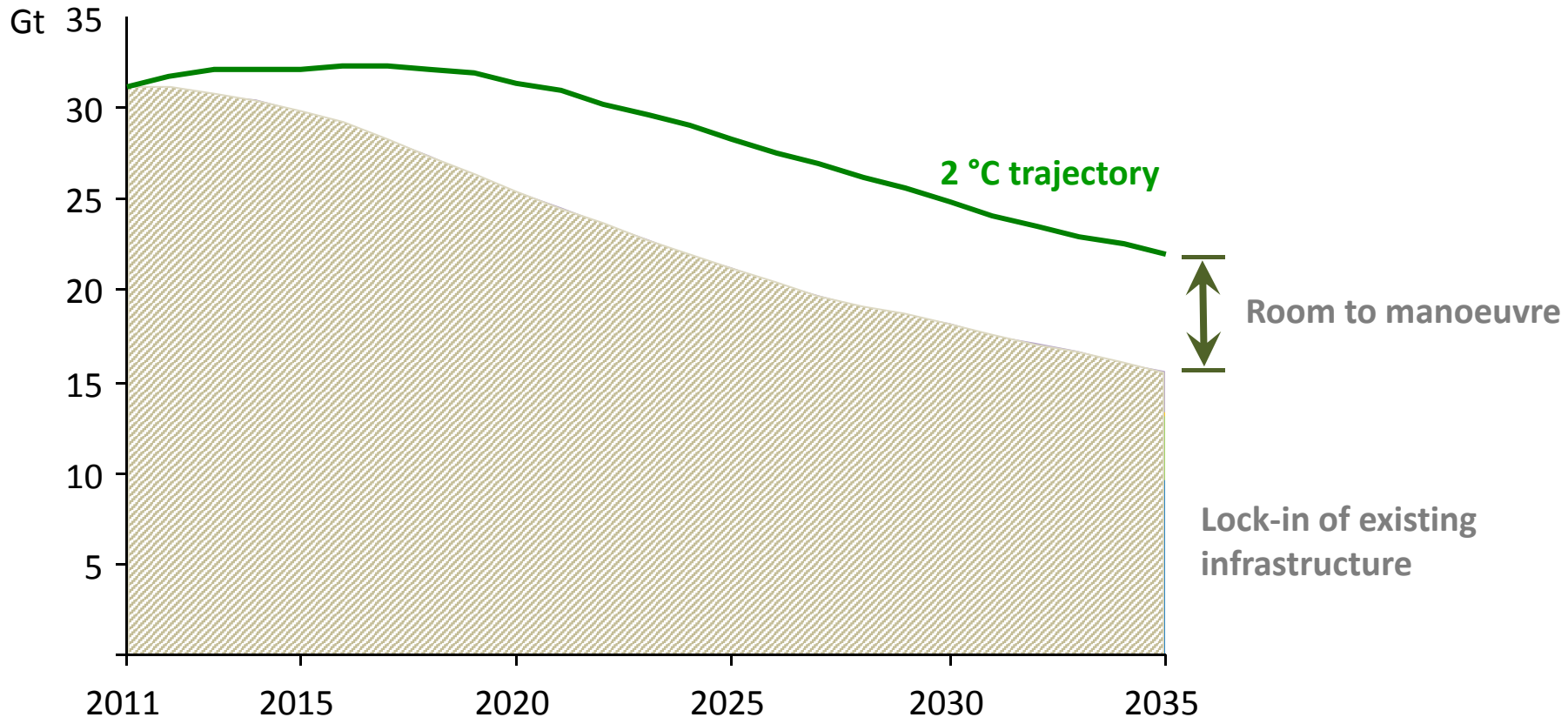
WORLD ENERGY INVESTMENT OUTLOOK
Special Report

Investment in the New Policies and 450 Scenarios, 2014-2035



Efficiency spending is $6 trillion higher & the composition of supply investment changes: CCS is widely deployed, $300 billion of fossil fuel investment is left stranded

“Lock-In” of 2 degree Emissions



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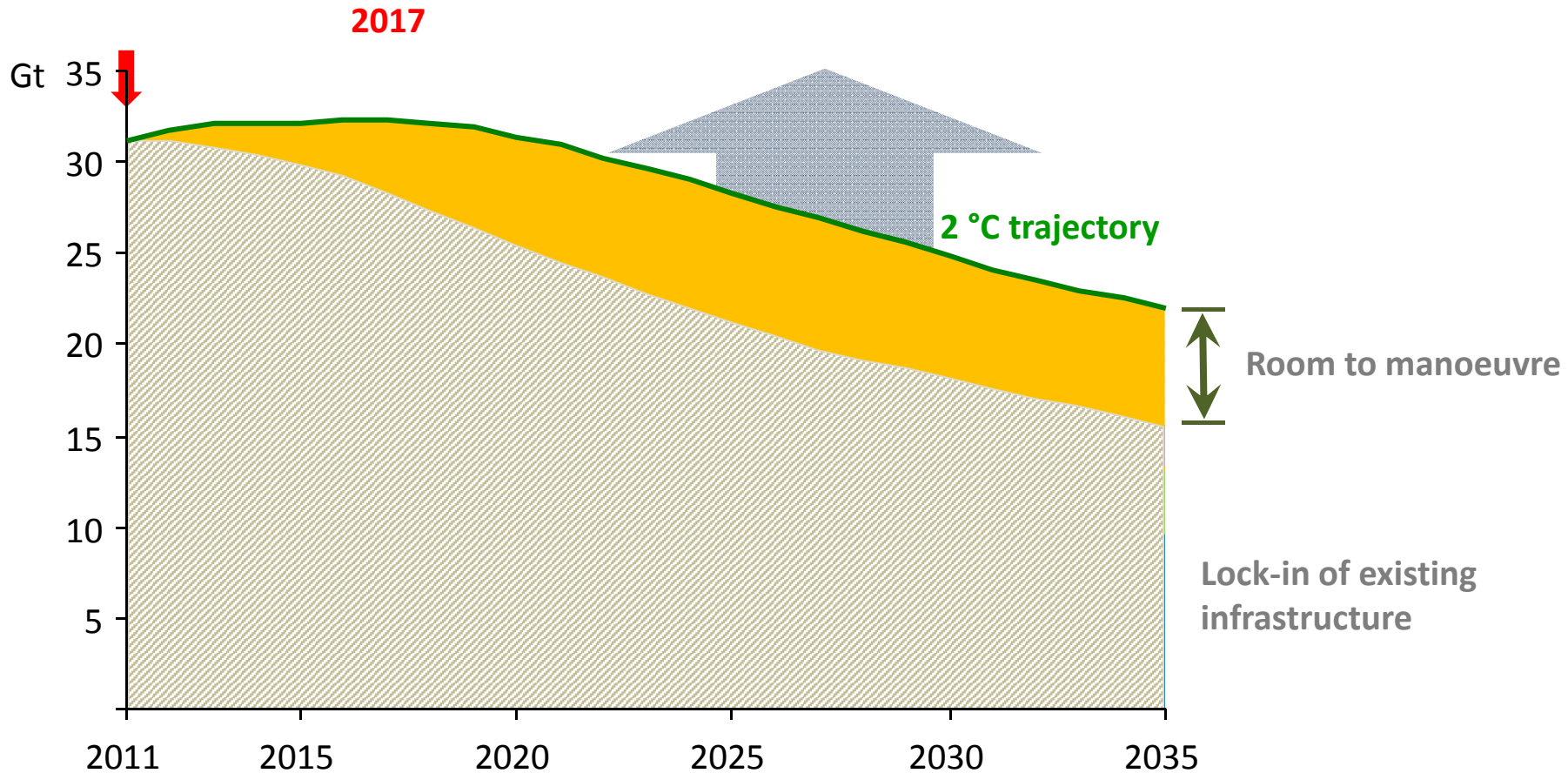
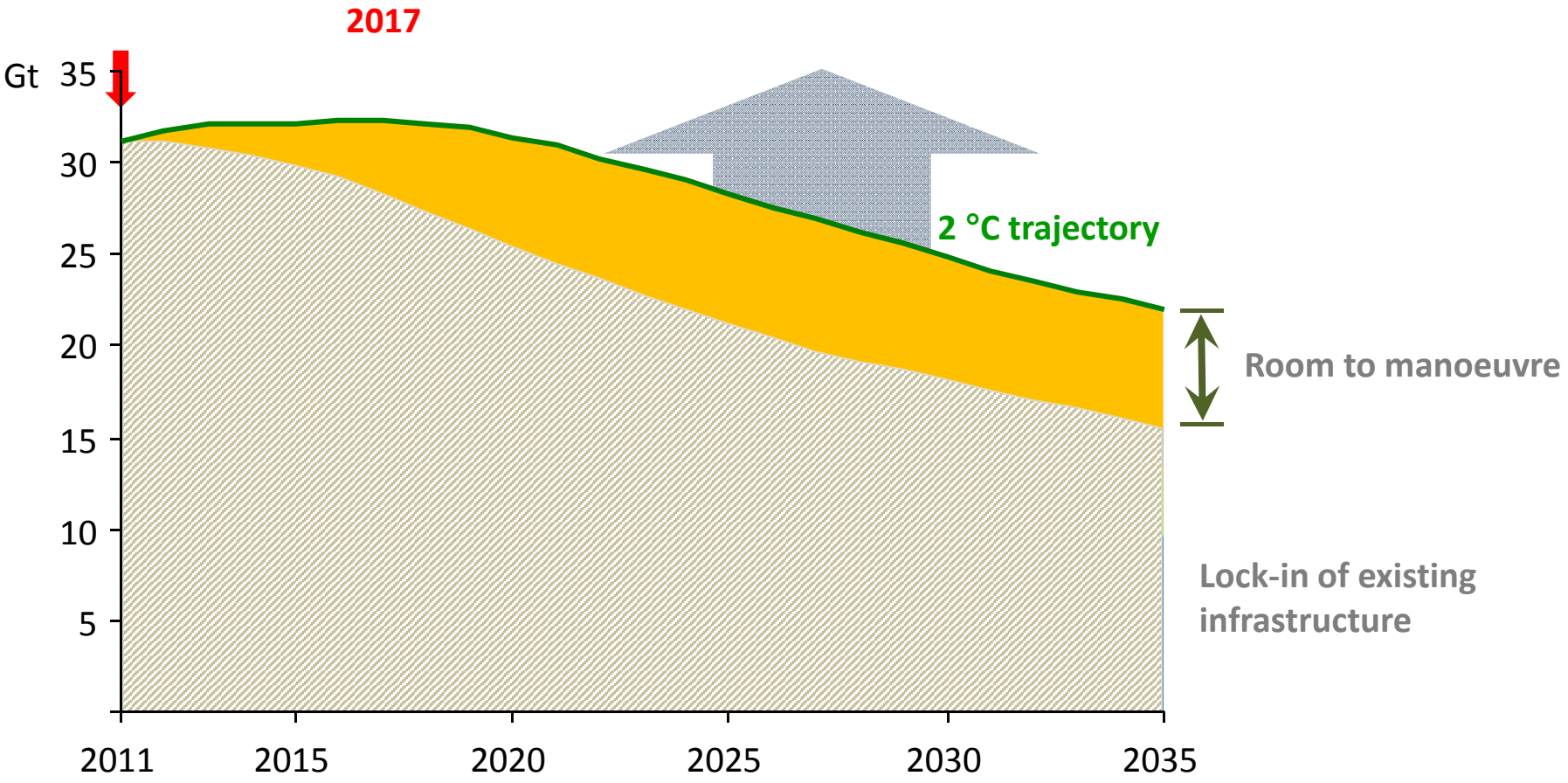


Planned fossil fuel infrastructure through 2017 will generate all energy emissions under 2DS through 2035

“Lock-In” of 2 degree Emissions

Planned fossil fuel production through 2017 will generate all energy emissions under 2DS through 2035



“Un-locking” high emission assets

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Unlocking action	Policy Options		
	Direct regulation of plants	Regulated change in supply/demand balances	Influence markets via price
Retirement of coal plant	- ownership decision to shut down - regulated lifetime limits - regulated phase-out	- fleet-wide GHG emissions performance standard - regulated increase in renewable capacity - demand reductions	- fuel price changes - carbon pricing - preferential pricing for renewables
Change dispatch of the existing power generation fleet	- “clean-first” dispatch - priority dispatch of renewables	- fleet-wide GHG emissions performance standard	- fuel price changes - carbon pricing - removal of fossil fuel subsidies
Retrofit of coal plant to increase efficiency	- targets for plant retrofit rates	- fleet-wide GHG emissions performance standard	- carbon pricing - removal of fossil fuel subsidies
Retrofit of coal plant for Carbon Capture and Storage (CCS)	- regulated lifetime limits - CCS retrofit mandates	- CCS trading schemes - fleet-wide GHG emissions performance standard	- carbon pricing - preferential pricing for CCS generation
Biomass co-firing or conversion	- ownership decision to convert	- renewable generation quota - fleet-wide GHG emissions performance standard	- carbon pricing - preferential pricing for renewables

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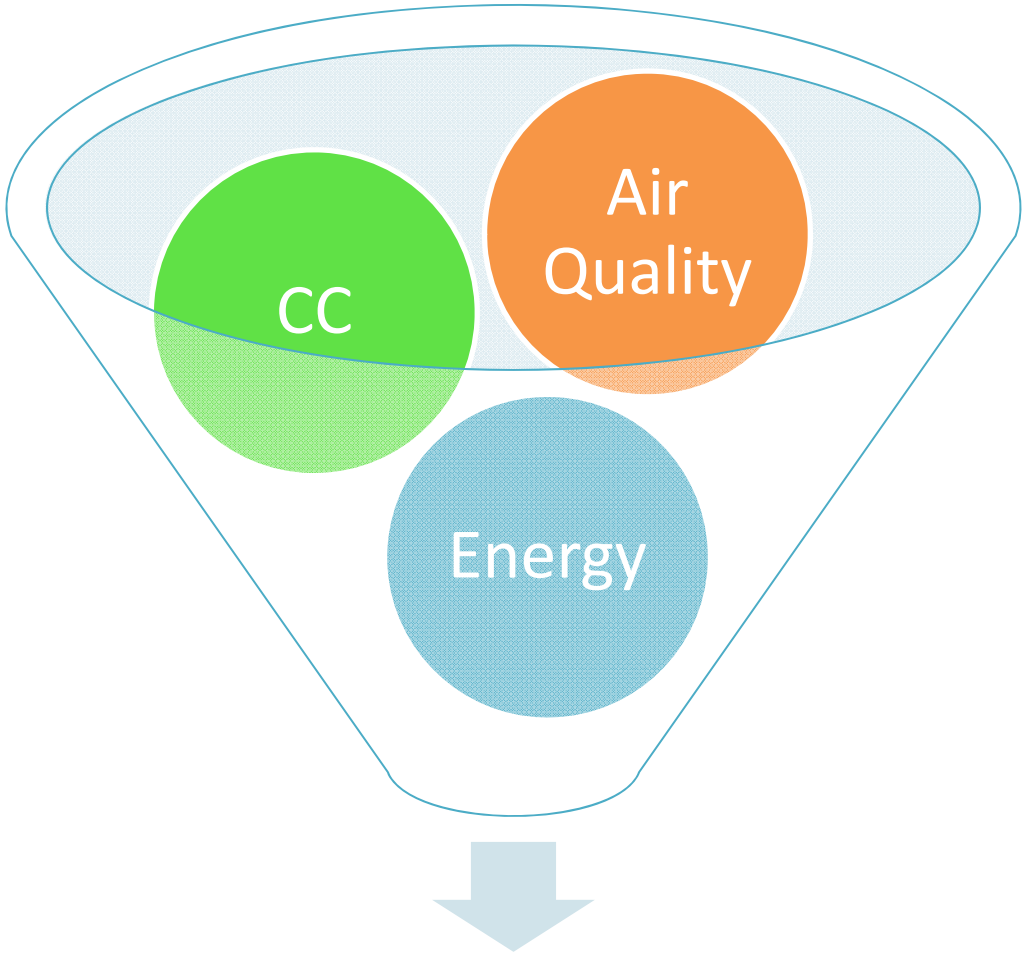
Concerns about local air quality are rising

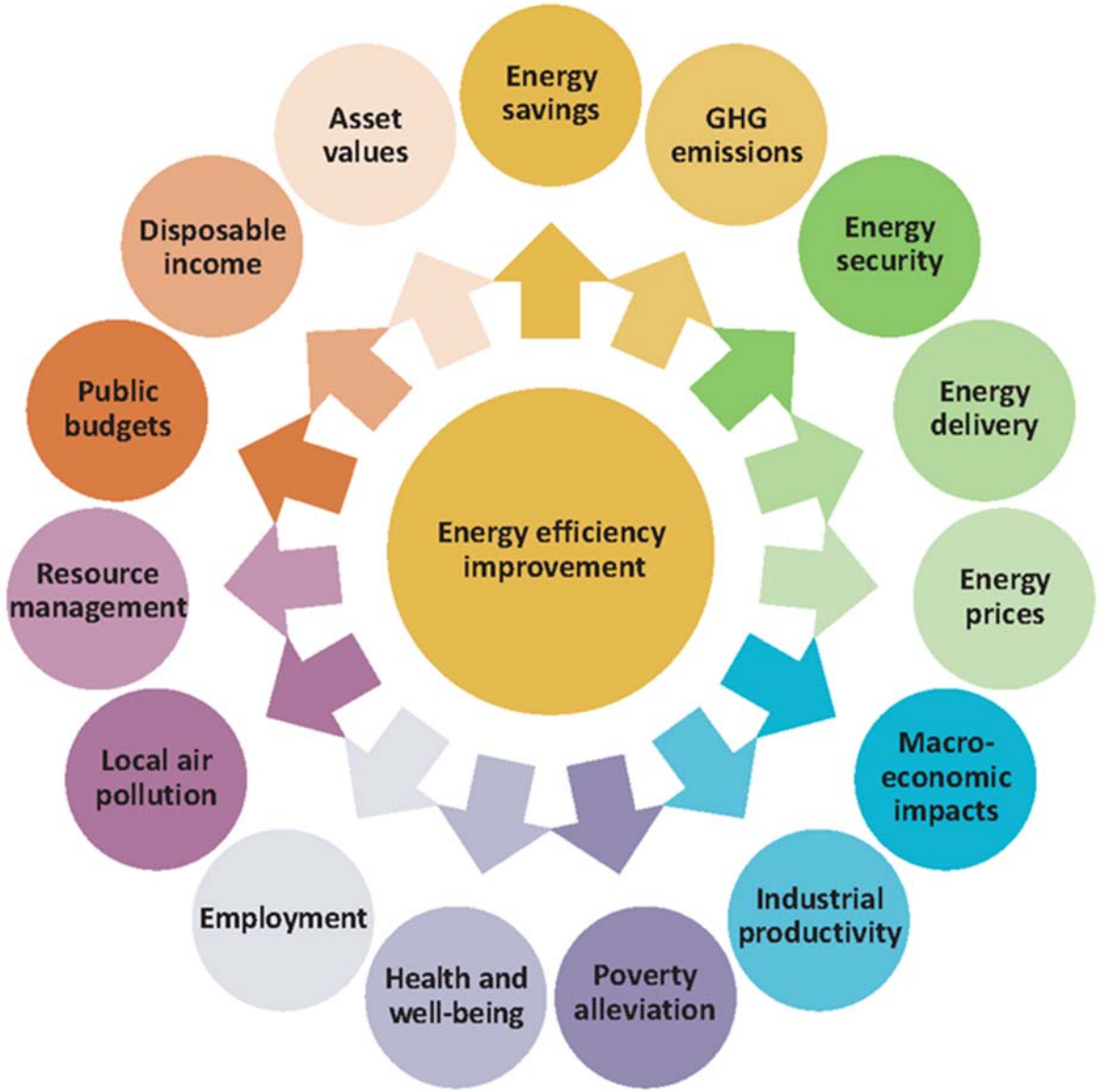
Finding and Exploiting cross-disciplinary synergies



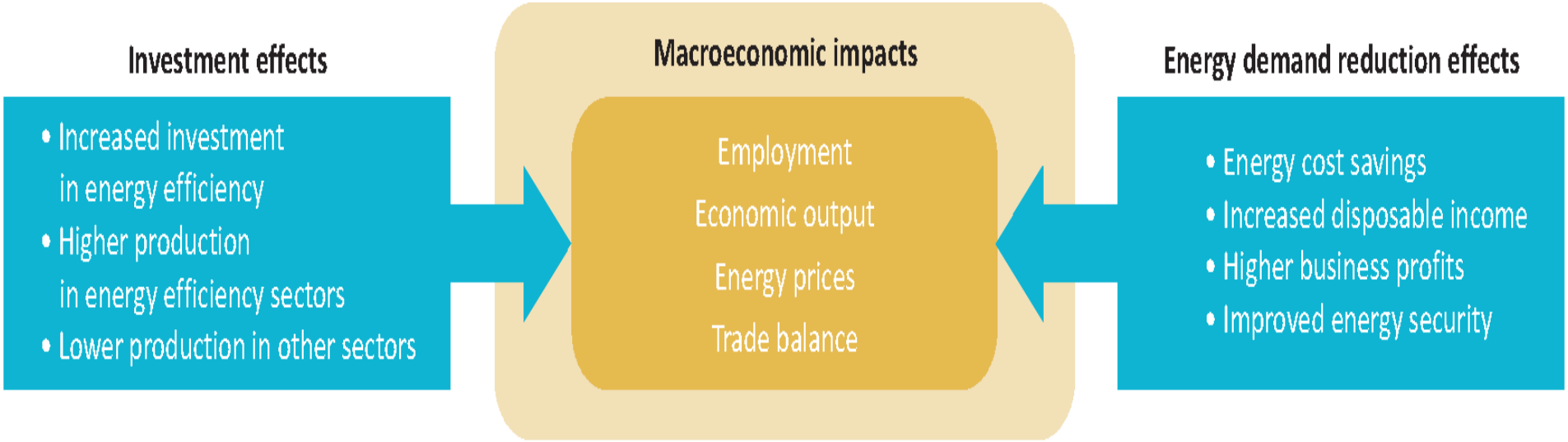
GHG abatement

Air Quality Measure	Potential GHG Impact at Plant Level
Retrofitting: Additional pollution control installations	
Retrofitting: Improved operation of existing controls and improved efficiency	
Fuel switching: Switching from coal to gas, blending of coal, co-firing with biomass	Depends
Closure of old plants, shift towards higher efficiency and lower emitting fleet	

EE generates multiple benefits



Overarching macroeconomic development



Balancing public budgets

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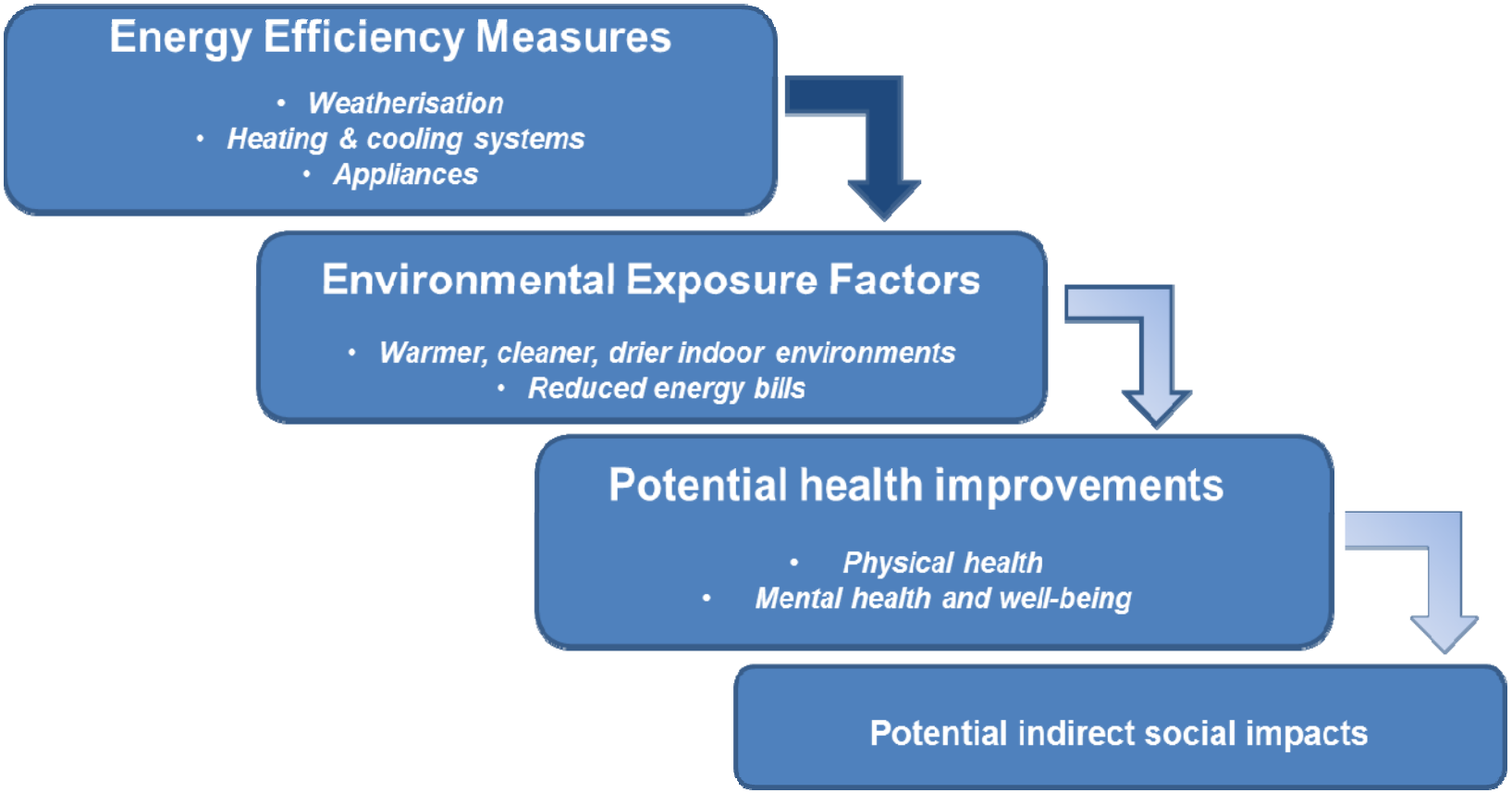
Integrating multiple benefits into the calculation more than doubles the return on public investment in energy efficiency

Investment effects	
Sales tax revenue from sales of energy efficiency products and services	↑
Sales tax revenue from other goods when crowded out by Energy Efficiency	↓
Initial costs of public investment in energy efficiency products and services	↑
Social welfare and unemployment benefits expenditures	↓
Real estate transaction revenues if properties become more valuable	↓

Energy savings effects	
Public expenditure on public sector energy	↓
Energy subsidies to final consumers	↓
Energy excise duty, emissions trading, and carbon tax revenues	↓
Sales and income tax revenues from sales of goods and services	↑
Public health or social welfare expenditure	↓
Public investment in energy supply infrastructure and subsidies	↓

Improving health & well-being



Addressing fuel poverty

Fuel poverty often occurs at the nexus of three factors:

Residential energy efficiency measures could help lift more than 150 million people out of fuel poverty in the EU

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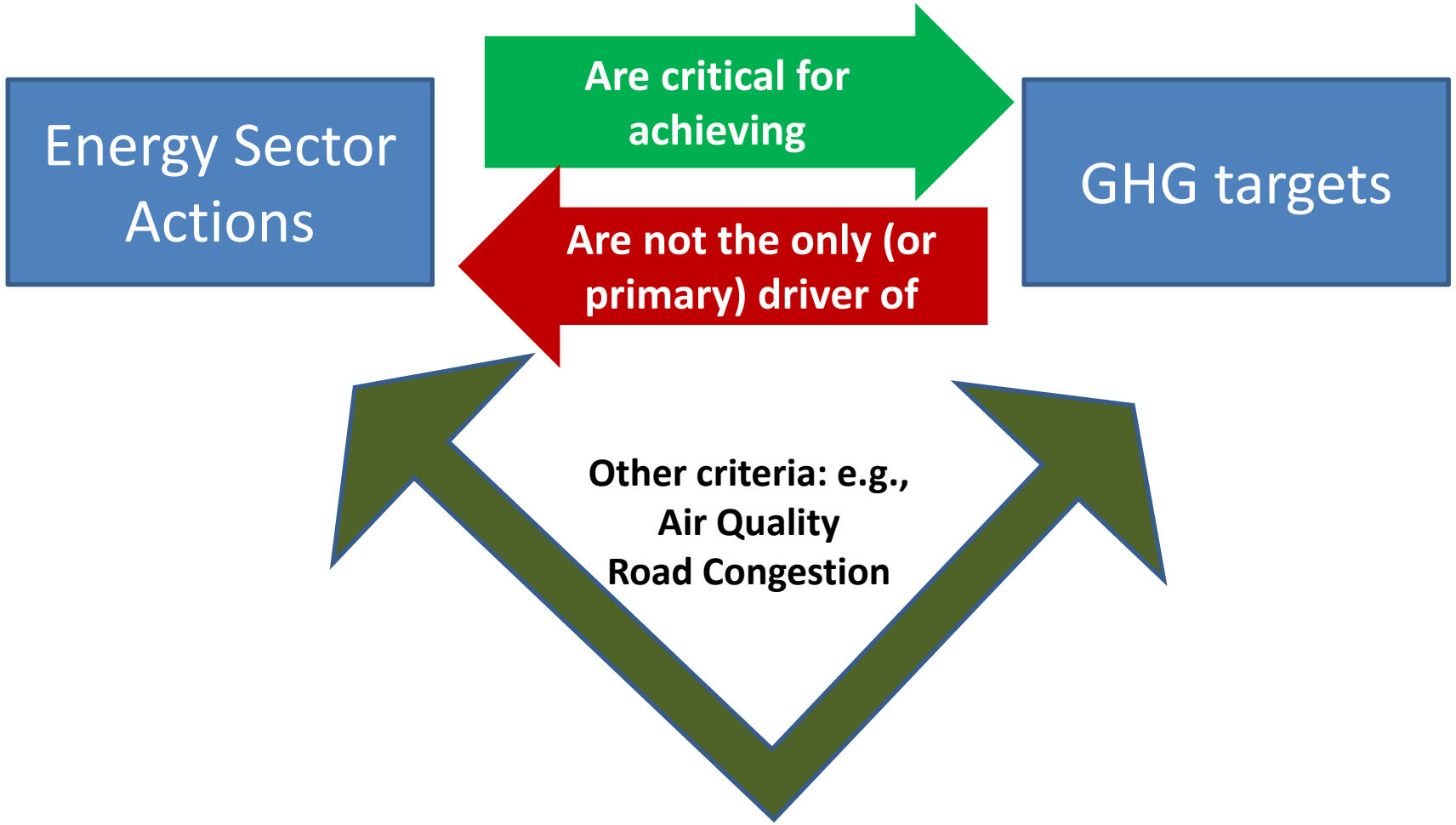
1. Timeframes

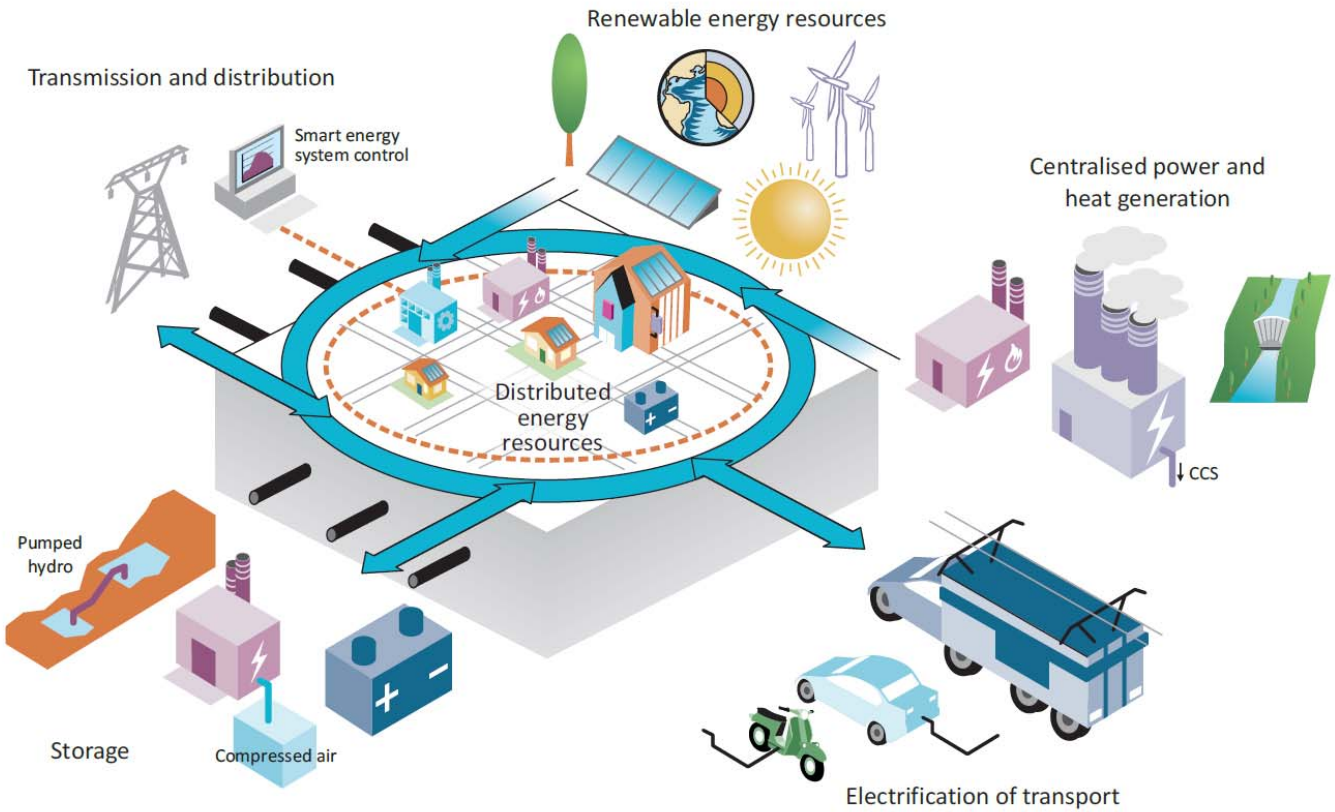
- Short-term actions should consider implications for longer-term decarbonisation
- Technologies needed for long-term decarbonisation need early action to be developed “on time”

e.g.	Pre-2020	2020-2030	Post-2030
Natural gas for power generation	Reduces emissions if replaces coal	Need to move to lower-emissions than gas	Phase-down use, or apply CCS
Carbon capture and storage	RD&D	Commercial application	Widespread deployment

2. Metrics



3. Systems thinking



A sustainable electricity system is a smarter, multidirectional and integrated energy system that requires long-term planning for services delivery

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THANK YOU

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