Energy Efficiency Market Report 2016 and the Pathway to 2 degrees

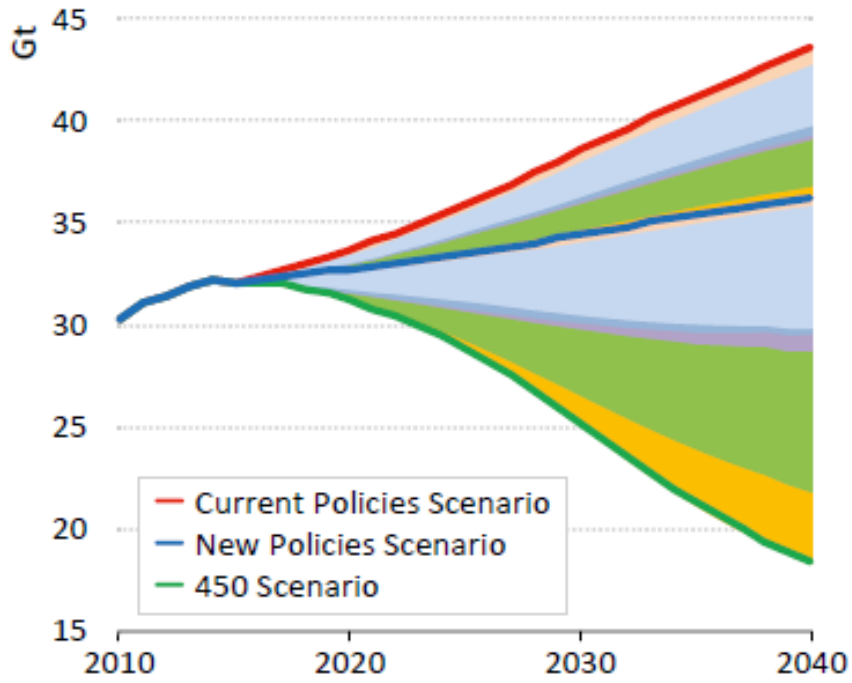
Tyler Bryant

Project Manager and Lead on Energy Efficiency Markets

Energy efficiency is key to the 2 degree scenario

International Energy Agency
Secure Sustainable Together

World energy-related CO2 abatement by scenario



CO_2 abatement in 2040	CPS to NPS	NPS to 450
Activity effect	12%	2%
End-use efficiency	39%	33%
Supply efficiency	6%	2%
Fuel and technology switching	3%	4%
Renewables	32%	39%
Nuclear and CCS	9%	19%
Total (Gt CO_2)	**7.4**	**17.9**

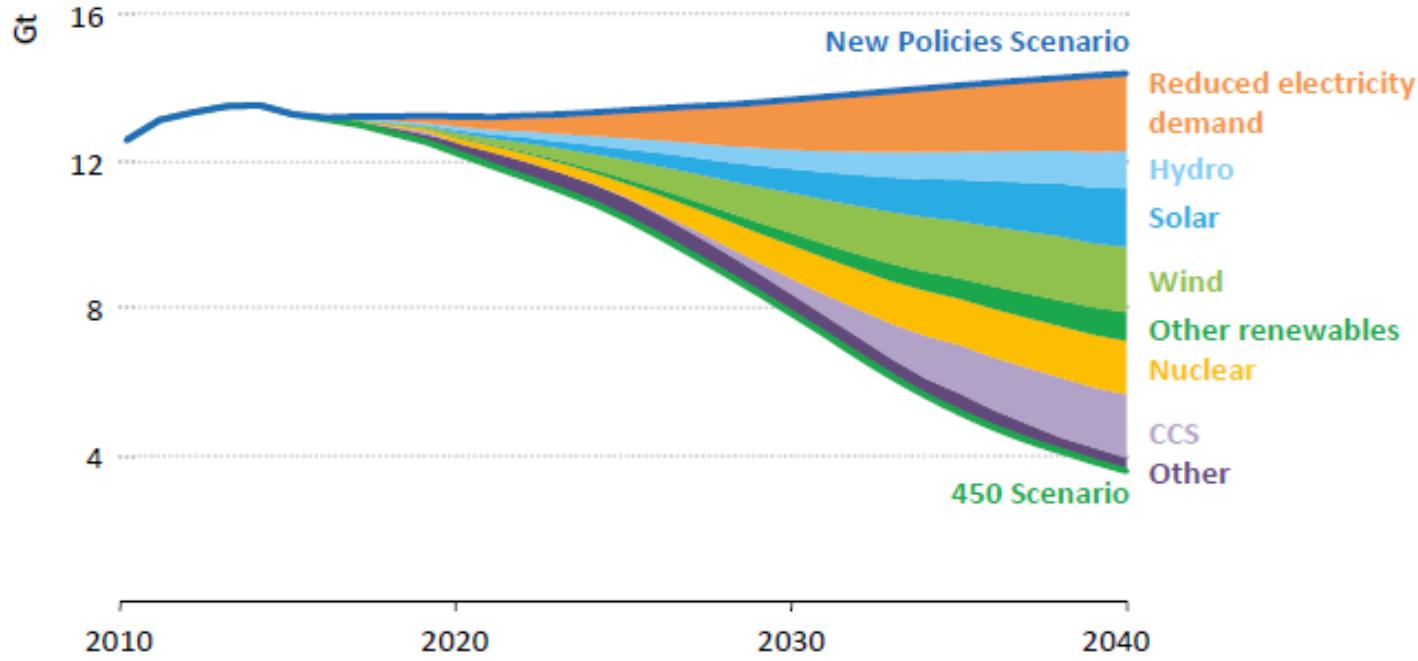
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Efficiency gains are one quarter of the decarbonization effort in power

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Global CO2 emissions savings in the power sector in the 450 Scenario relative to the New Policies

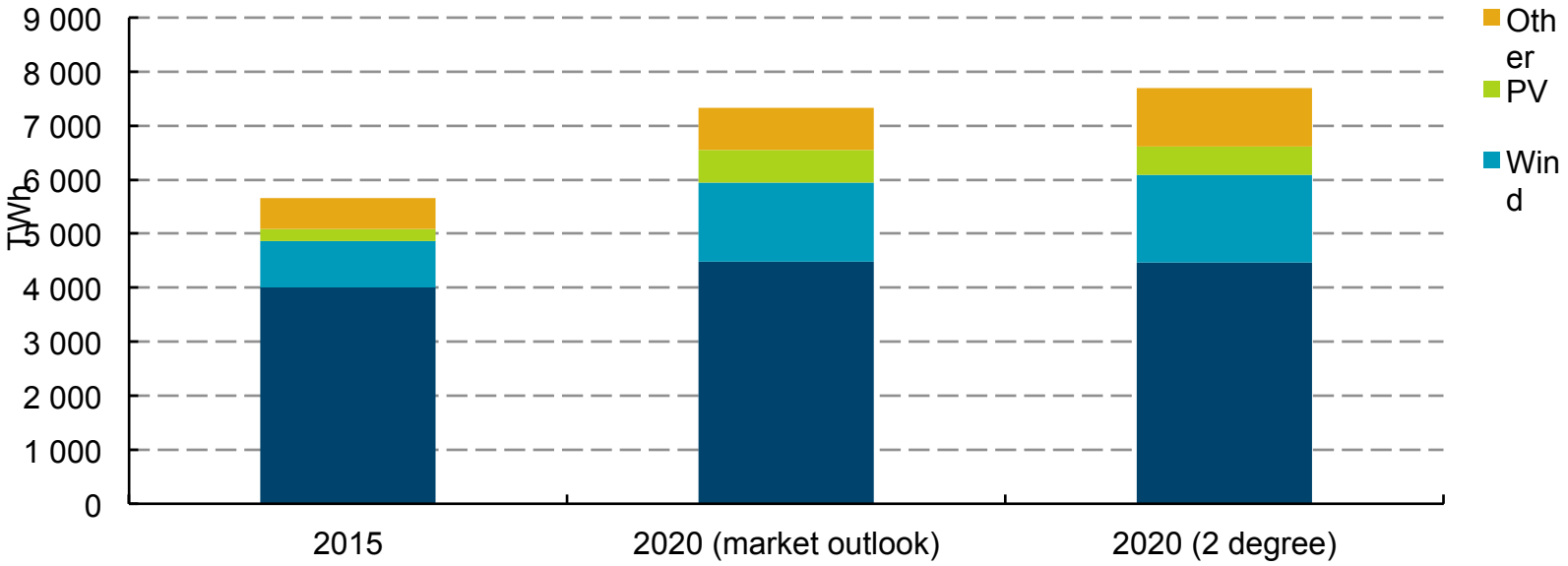


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Renewables are on track to 2020

Renewable electricity generation forecast in the Renewable Energy Market Report and 450 Scenario target

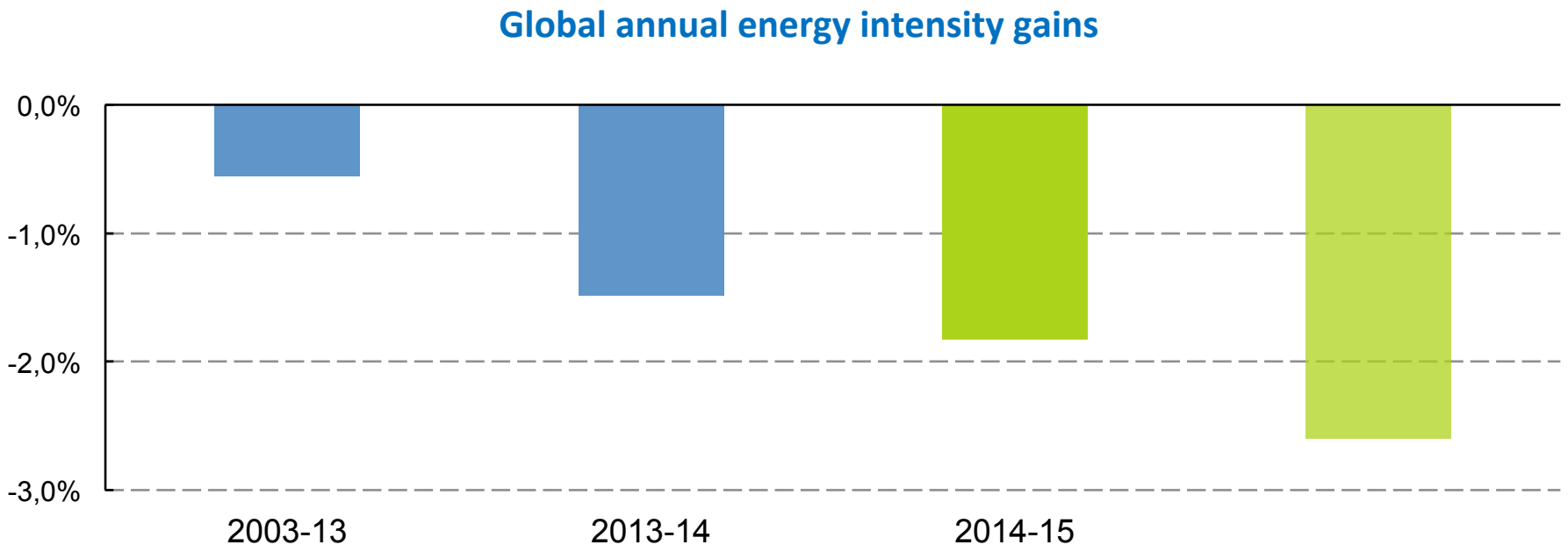


Out to 2020, renewables are on track with the 2 degree scenario though more policy and effort will be needed to 2030

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Efficiency is improving but is not on track

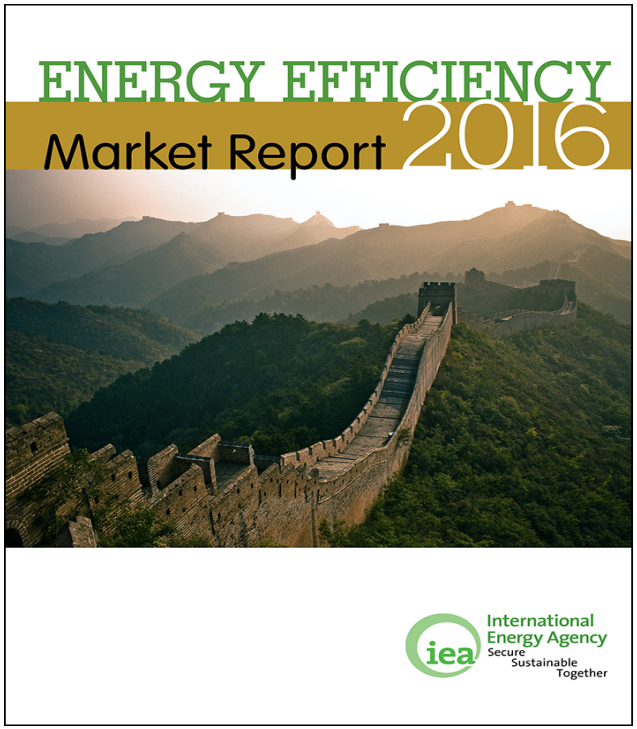
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In 2015, global intensity improved by three times the average of the last decade, despite a low price environment. Intensity gains need to increase to 2.6% to achieve our climate goals.

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Energy Efficiency Market Report 2016



Energy efficiency core indicators

Policy drivers of the efficiency market

The impact of changing energy prices

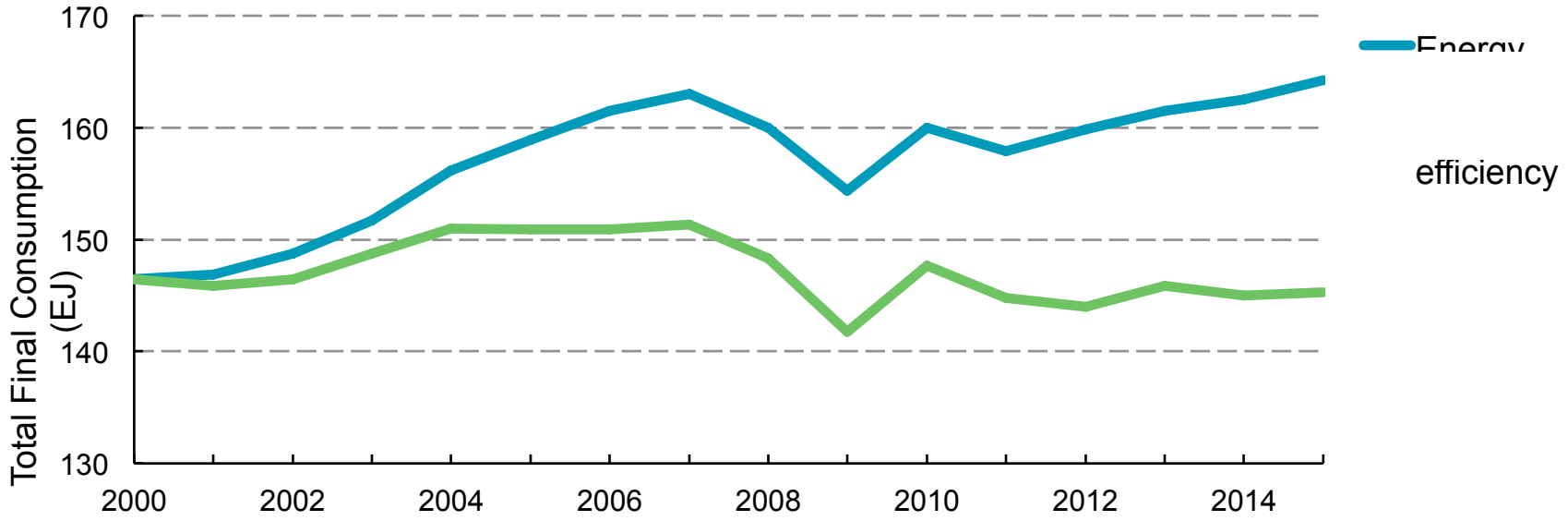
Investment and market development

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Energy efficiency is the main driver of intensity improvements

Final energy demand and energy demand if efficiency had not improved over 2000 levels in IEA countries



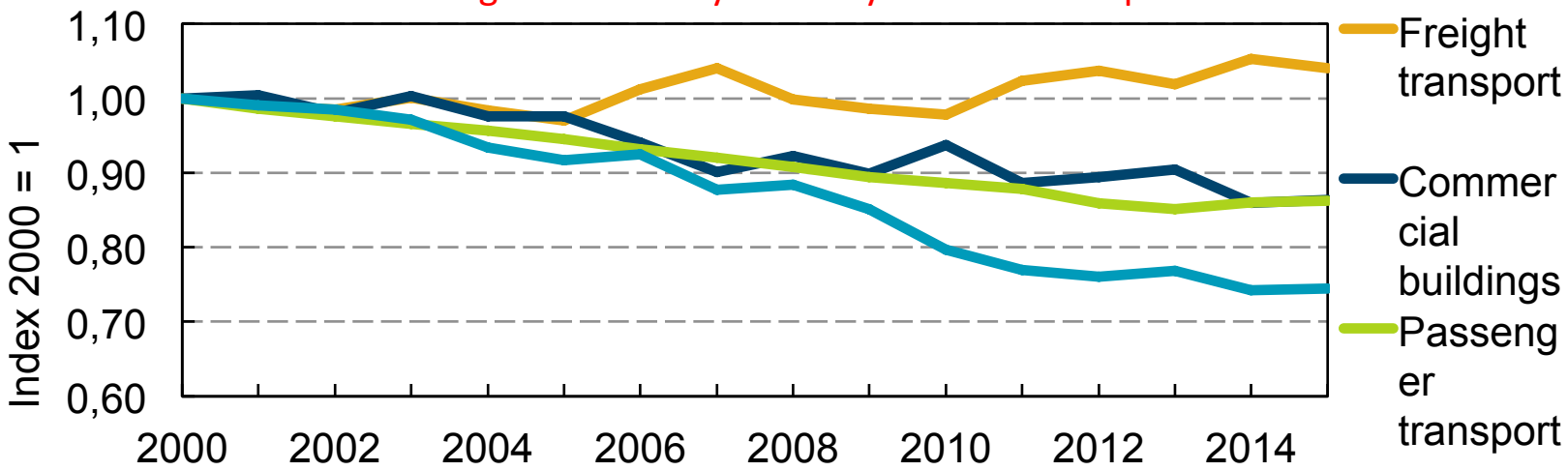
Without efficiency gains energy demand in 2015 in IEA countries would have grown by 1% and would have been higher than the 2007 peak. Instead, energy demand is 1% below 2000 levels.

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Concerted progress on energy efficiency in the EU in some sectors

- Efficiency levels in residential buildings improved by 25% since 2000
- Lack of policy in freight sector has coincided with worsening efficiency

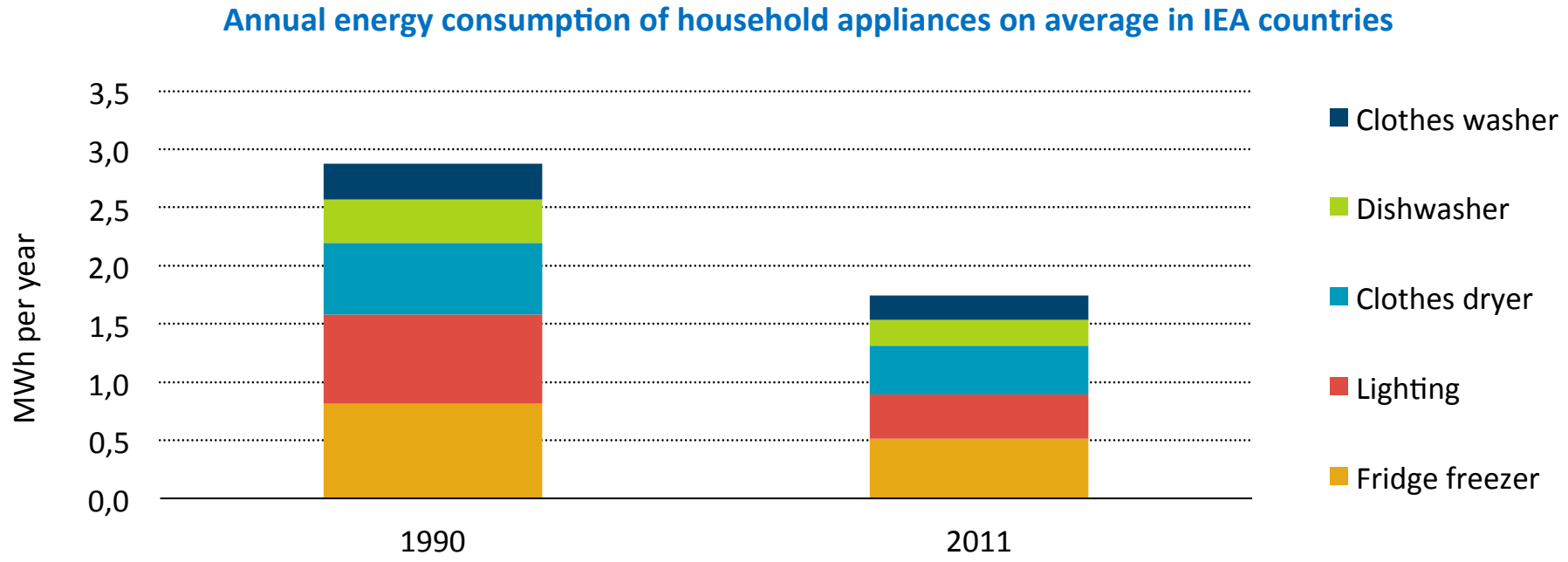
Change in efficiency levels by sector in Europe



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Small efficiency gains, when stacked together, have a large effect over time



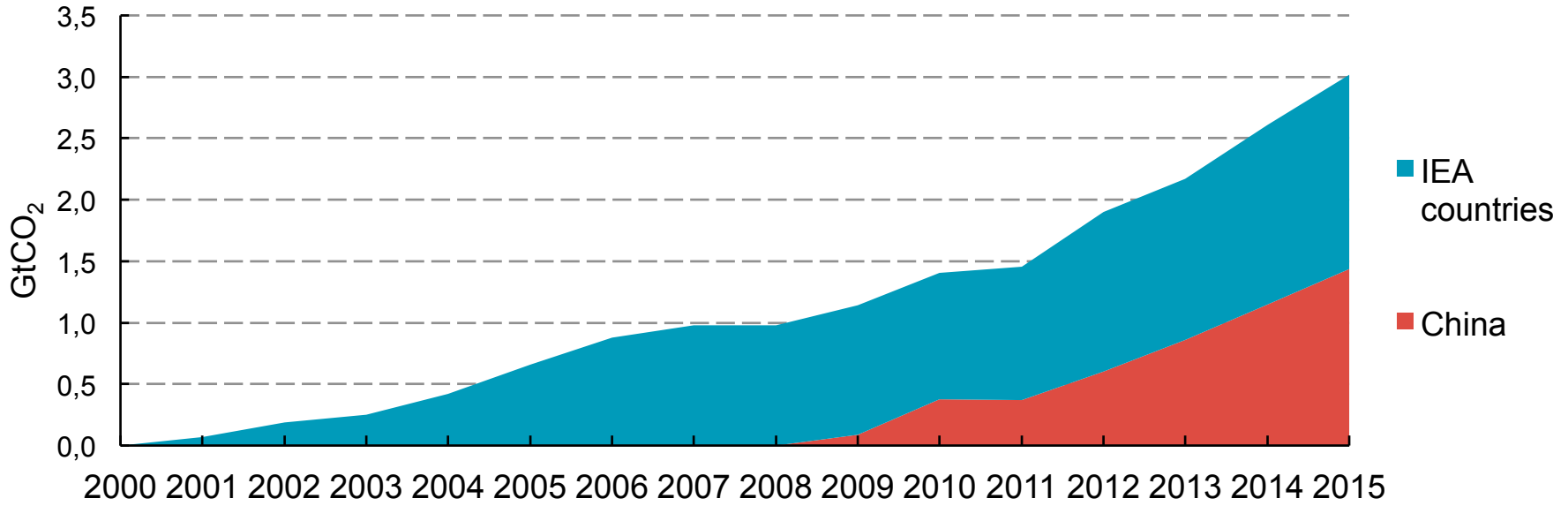
Appliances alone are consuming more that 1 MWh per household less over the last 20 years

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Energy efficiency is saving CO_2 emissions

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CO_2 emissions savings from efficiency improvements since 2000 in IEA countries and China



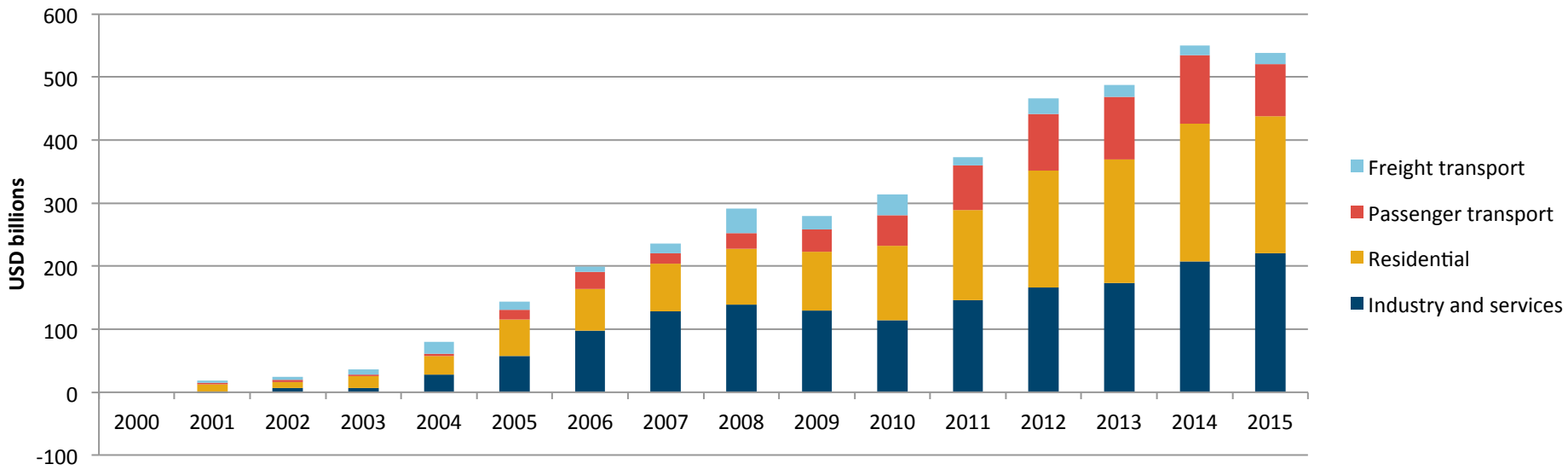
In 2015, efficiency gains in IEA and China reduced their combined emissions by 15%. Efficiency policy in China has become one of the most important global actions to reduce emissions.

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Energy efficiency reducing energy bills

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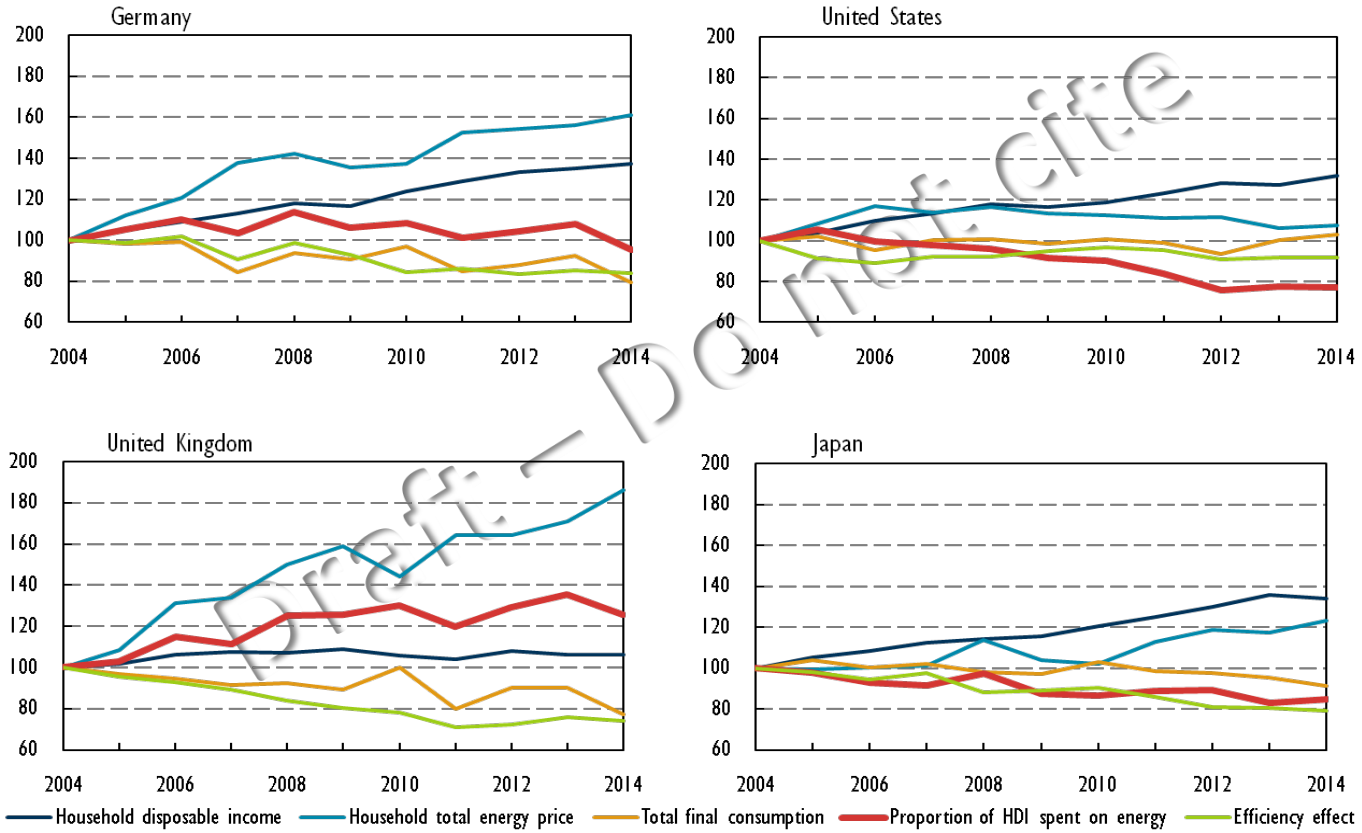
Avoided expenditure on energy from energy efficiency improvements in IEA countries



Energy efficiency led to average per capita savings of $500 and $4 trillion cumulatively since 2000, improving industrial productivity and reducing household energy bills in IEA. Savings in EU-19 were EUR 280 billion or 600 per capita.

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Efficiency working to dampen the impact of energy price increases



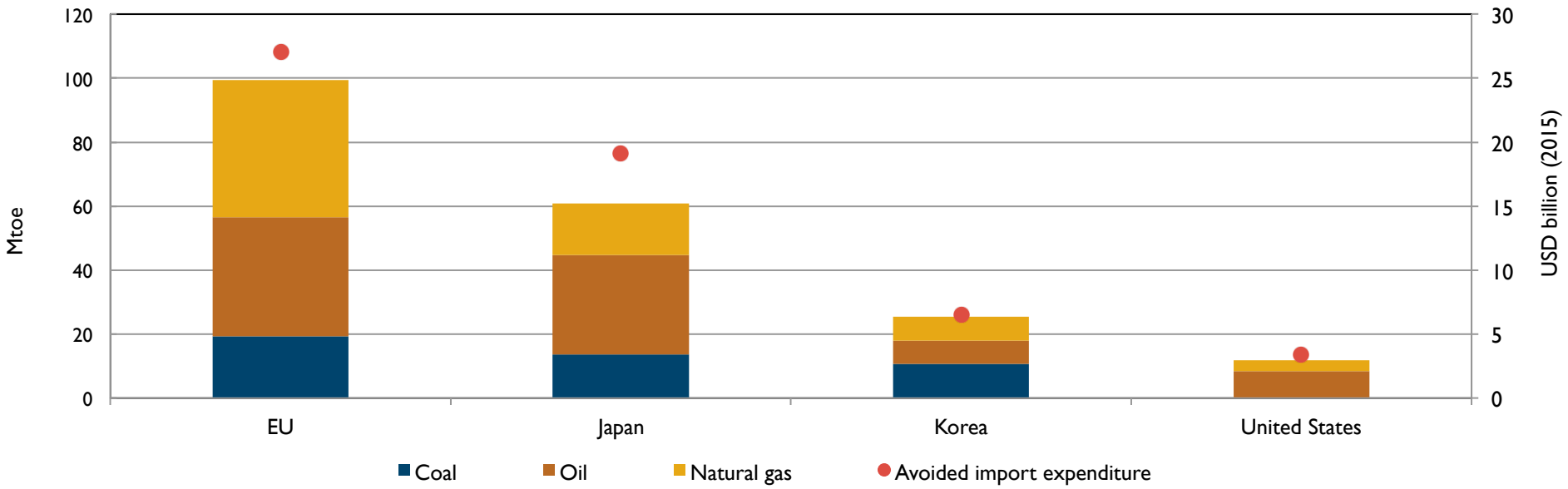
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Energy efficiency is improving energy security

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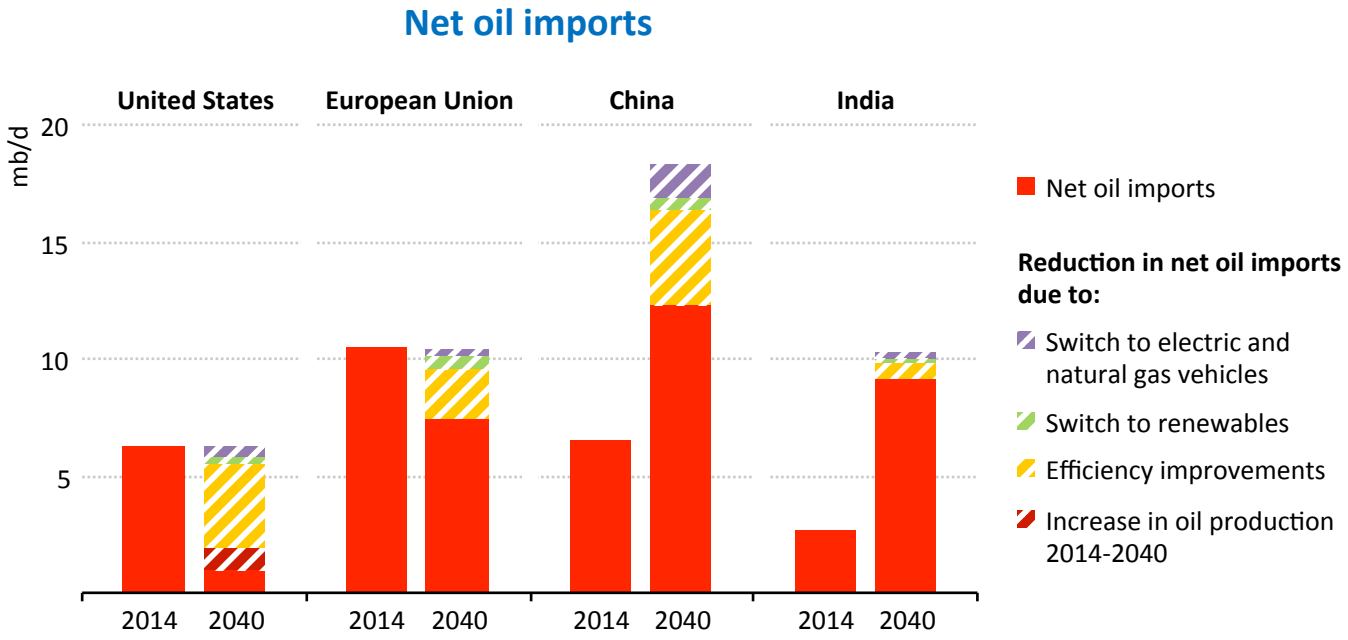
Avoided imports for IEA members from efficiency gains, 2015



The EU made up half of all IEA import savings and reduced imports bills by $27 billion (10% of its total energy import bill)

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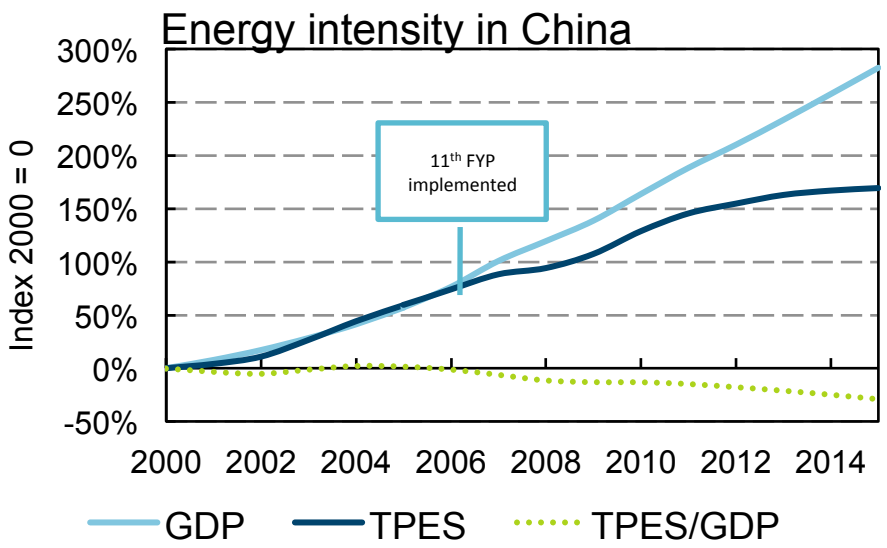
The critical role of energy efficiency to address energy security

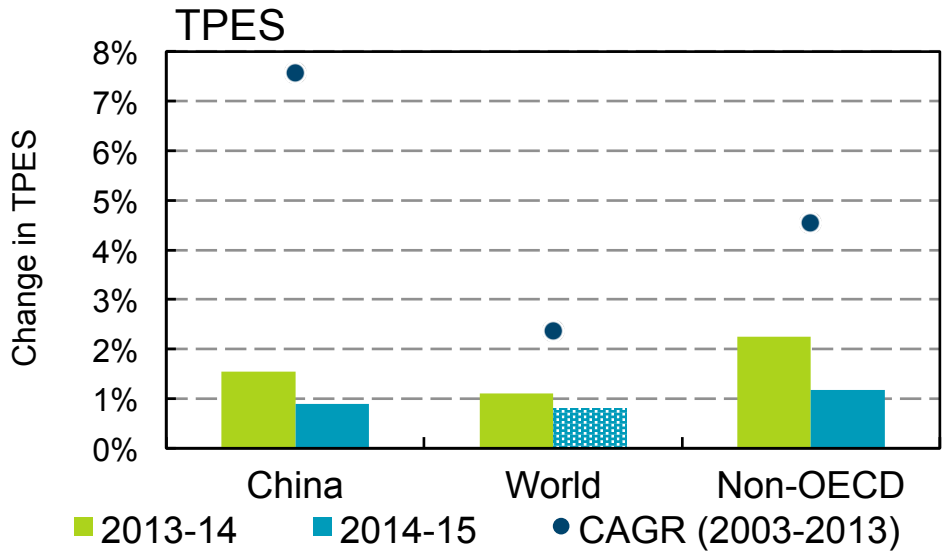


Energy efficiency responsible for over 2/3rds of the reduction in imports in the US and EU, 70% in China and 90% in India

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In China, policy is leading the decoupling of energy demand from economic growth





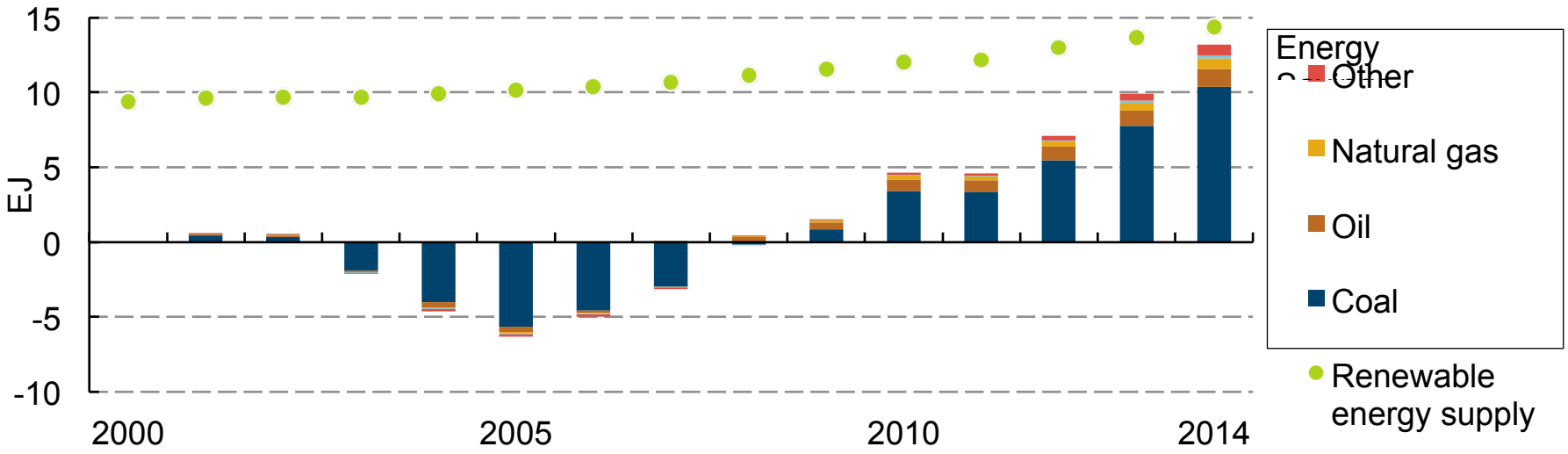
Efficiency policy has had significant impact over the last decade, and structural change in China is critical to maintain this trend

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China - an energy efficiency heavyweight

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Primary energy savings from efficiency gains since 2000 and renewable energy supply in China



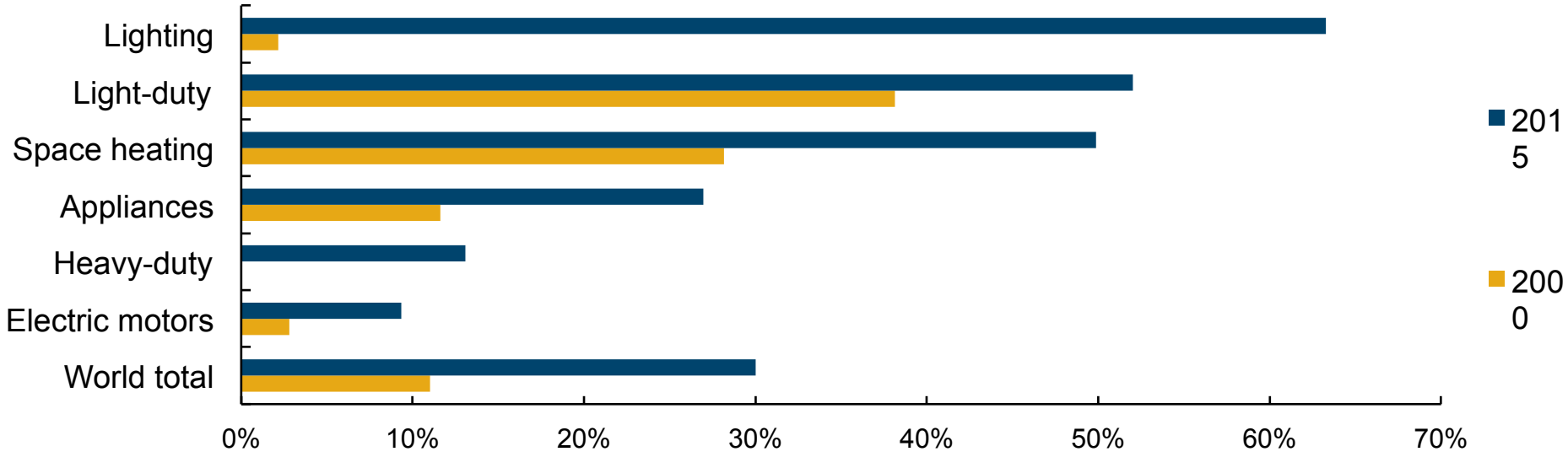
Dramatic progress on energy efficiency since 2006 saved 350 million tonnes of coal in 2014. Energy savings are as large as China's renewable energy supply.

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Gains are driven by the expansion of policy

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Share of global energy use covered by mandatory standards and regulations

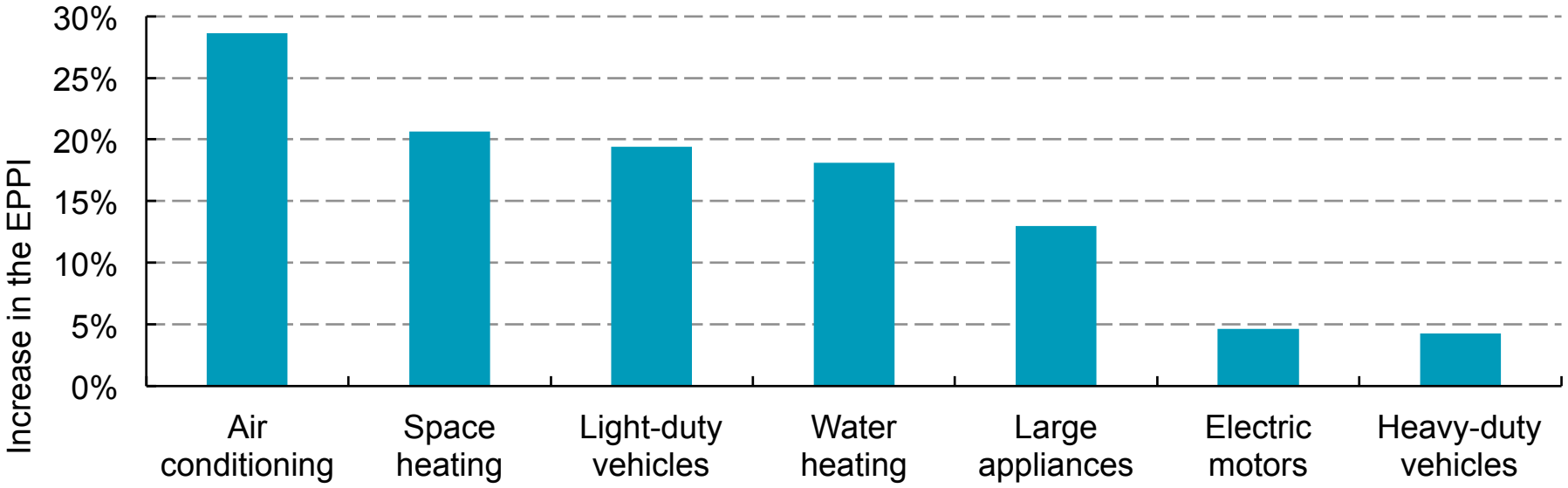


30% of the world's energy consumption is now covered by mandatory standards and regulations, up from 11% in 2000.

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Measuring growth in policy effectiveness: The EPPI

IEA **Efficiency Policy Progress Index** (EPPI) increase by end use, 2005-15



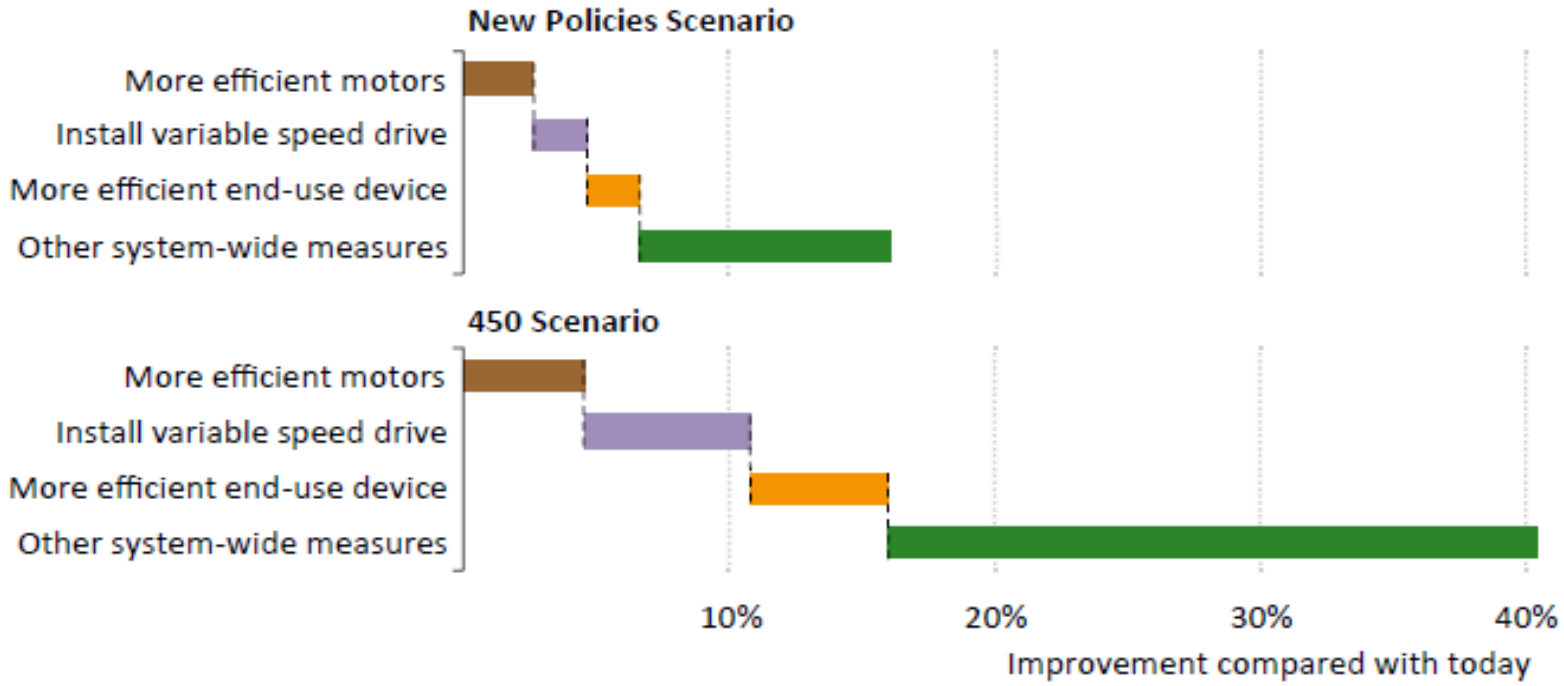
The EPPI tracks combined progress of policy coverage and strength. The most progress was in the buildings sector and the largest potential for improvement is in the freight and industrial sectors.

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Electric motors need policies to achieve system change

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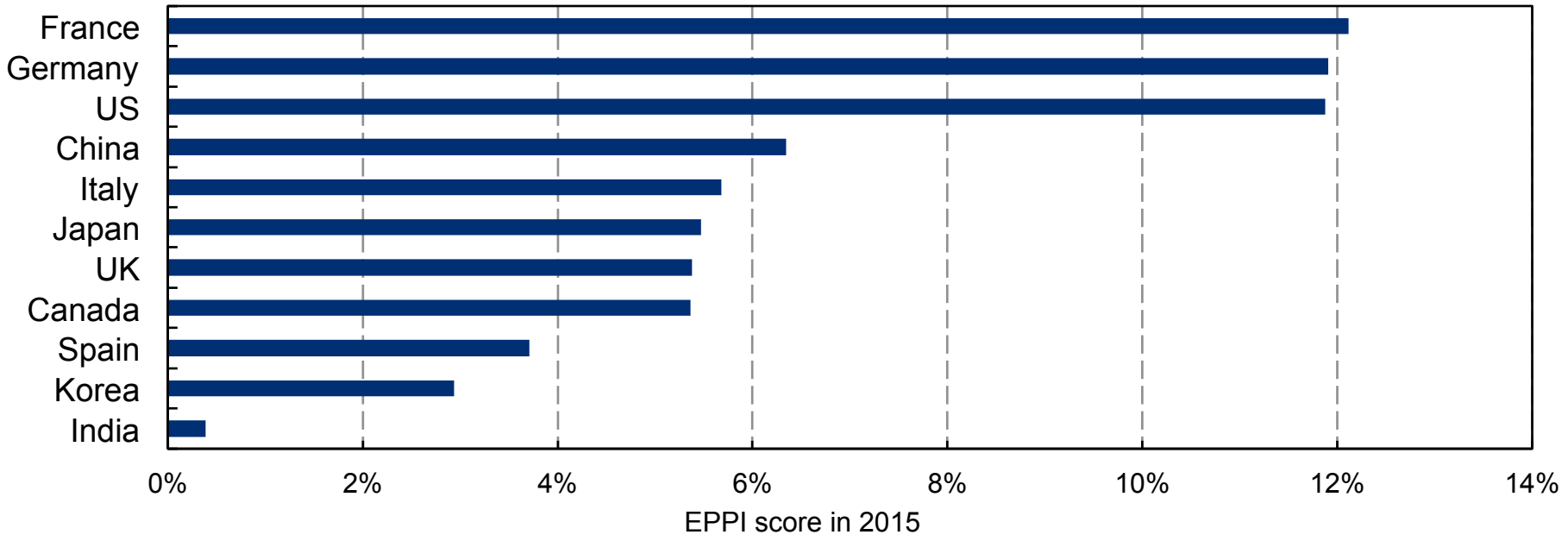
Efficiency improvements in global electric industrial motor systems in 2040 compared to today



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EPPI shows large EU members as leaders:



France, Germany leading in our EPPI score driven almost exclusively by standards for residential heating systems and building code improvements

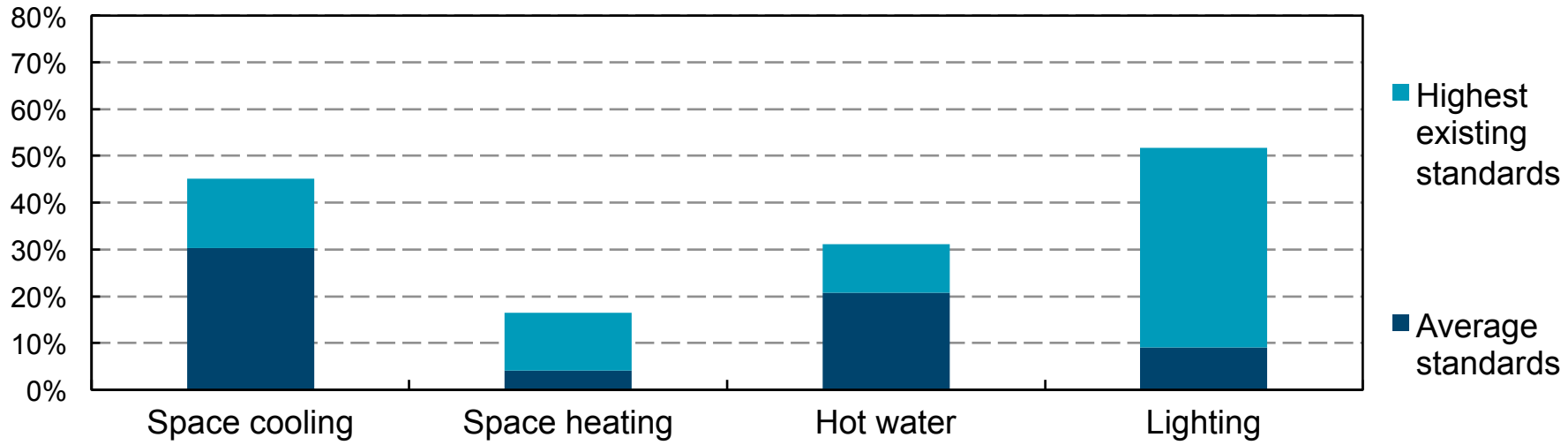
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Still significant potential to save energy

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Energy savings potential of standards as a share of global end-use energy, 2015



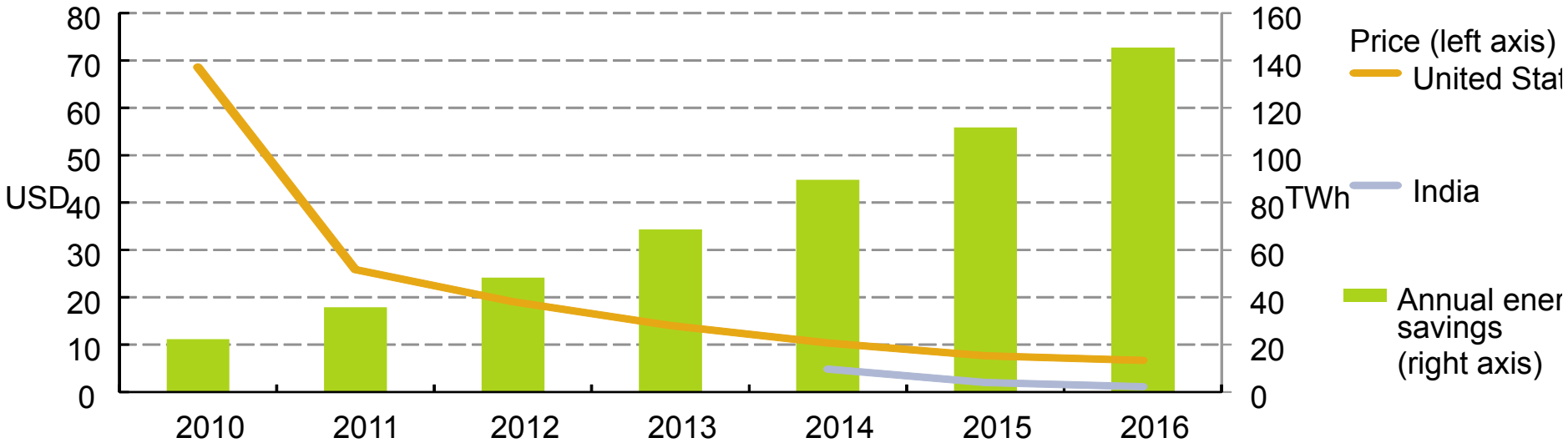
If all standards matched the best standards, total savings could be up to 50%

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It's not just about policy, reducing the price of efficiency is key

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Global annual energy savings from efficient lighting and LED bulb prices



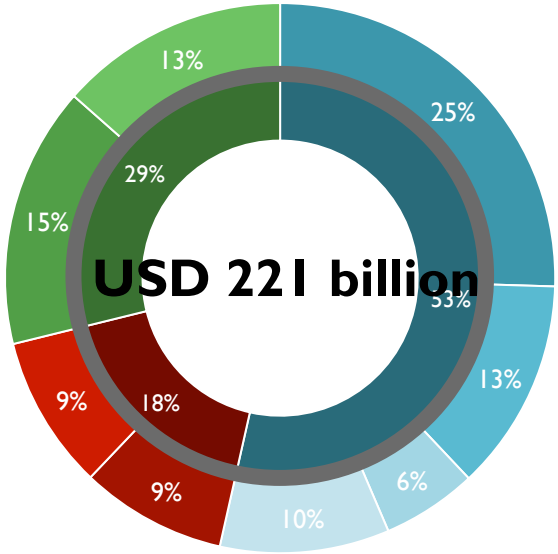
Falling LED prices boosted global investment to $6 billion and generated incremental annual savings of 140 TWh.

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Investment growing in response to policy

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Global investment in energy efficiency by sector, 2015



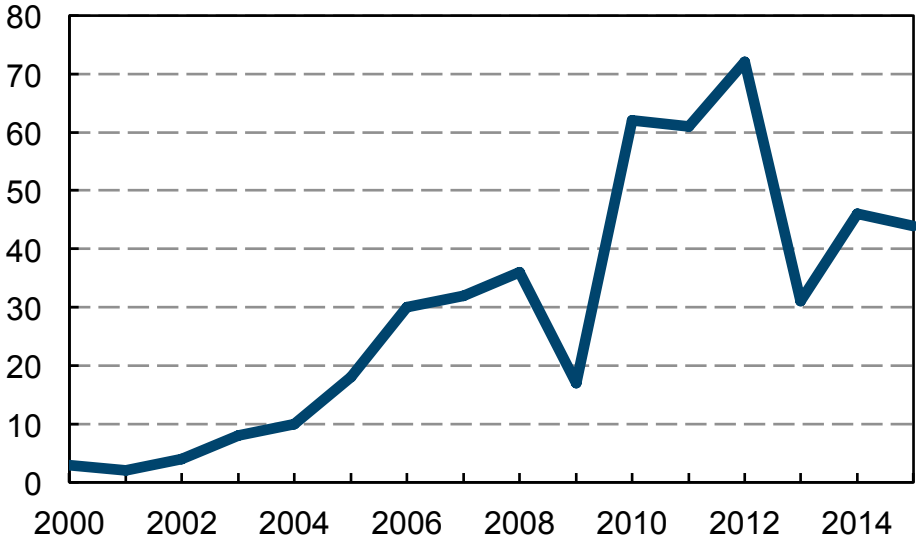
Investment in energy efficiency increased by 6% in 2015, led by growth in the buildings sector.

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The market for energy efficiency services appears poised for growth

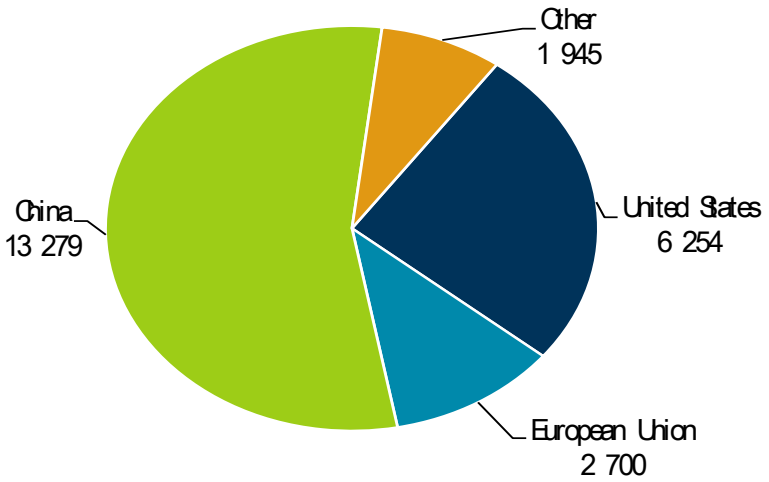
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Number of mergers and acquisitions for energy efficiency services firms



Source: Bloomberg

ESCO Market Share
(Total market size: USD 24 billion)



Mergers and acquisitions for energy service firms is up since 2000 with their revenues growing to USD 24 billion globally in 2015.

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Policy delivers the benefits of energy efficiency

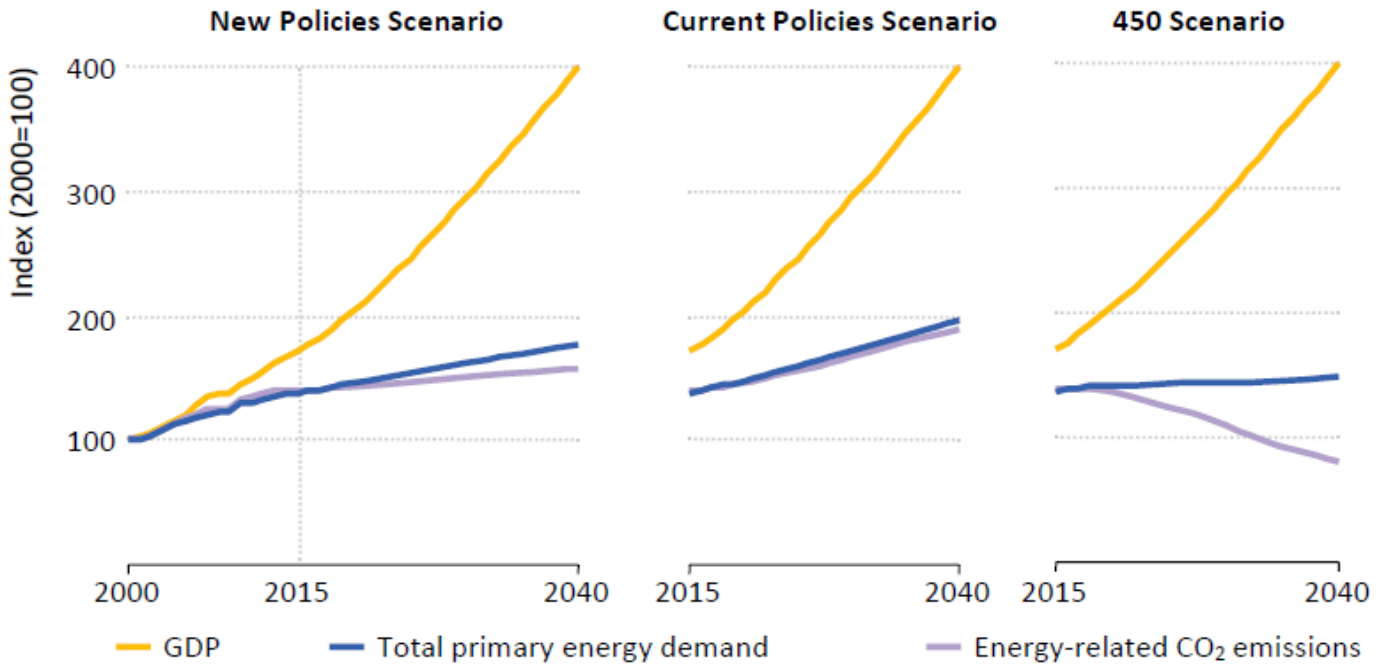
- Energy efficiency is the one energy resource all countries possess in abundance, and is an essential part of delivering all energy goals.
- Global energy efficiency gains are accelerating, even in the current low price environment.
- 2015 saw global investment in energy efficiency grow 6% to $221 billion.
- Energy efficiency is now at a scale to influence global energy markets, and is becoming more central in climate change responses.
- Policy delivers, but stronger policy is required: Still 70% of global energy use is outside of any mandatory efficiency requirements.

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Deintensifying and decarbonizing the energy sector

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Global GDP, energy demand and energy-related CO2 emissions trajectories by scenario

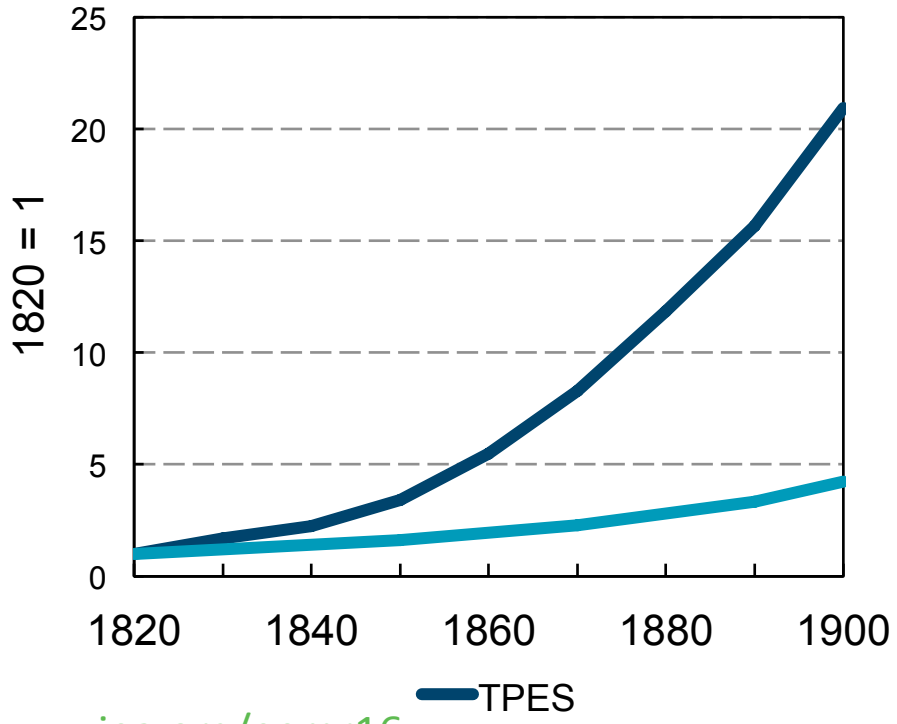


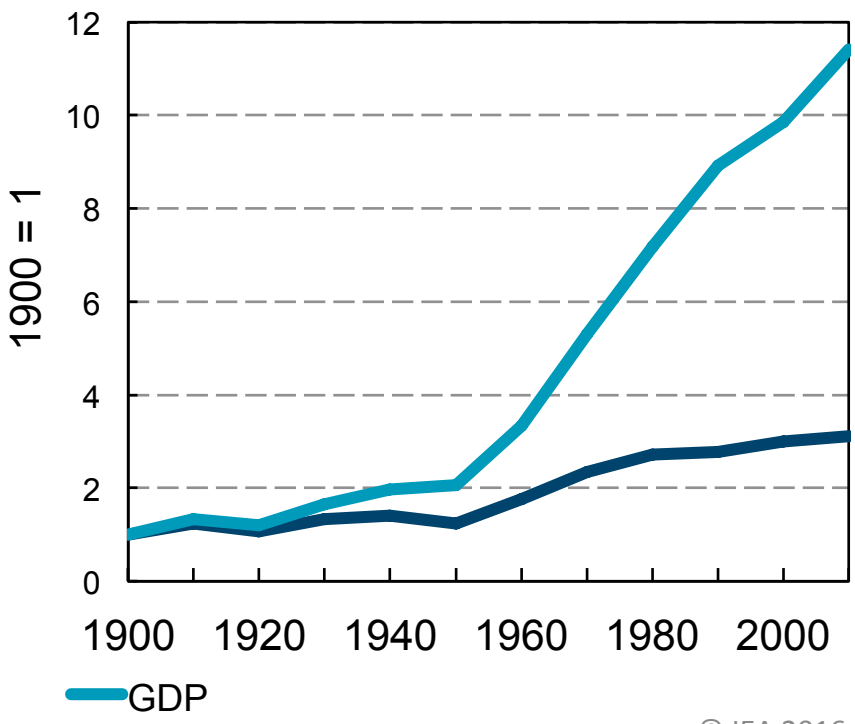
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History indicates that different paths are possible

- A tale of two centuries: OECD Europe



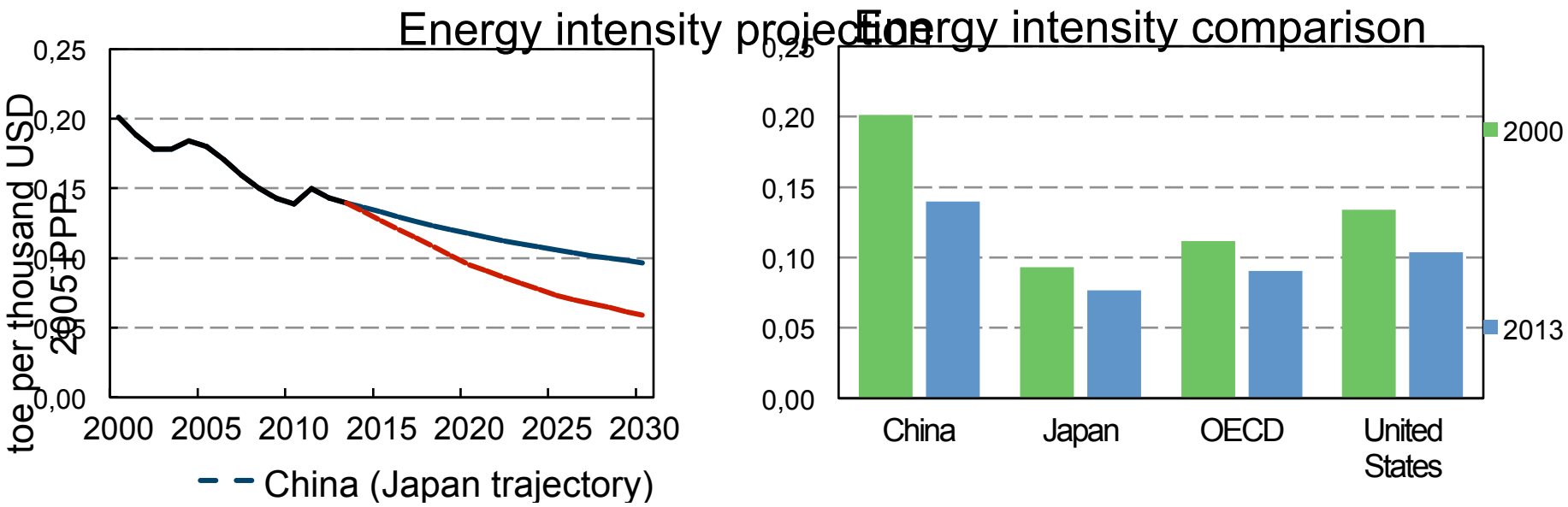


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But the scale of the challenge should not be underestimated

Energy intensity scenarios for China and comparison to current intensity



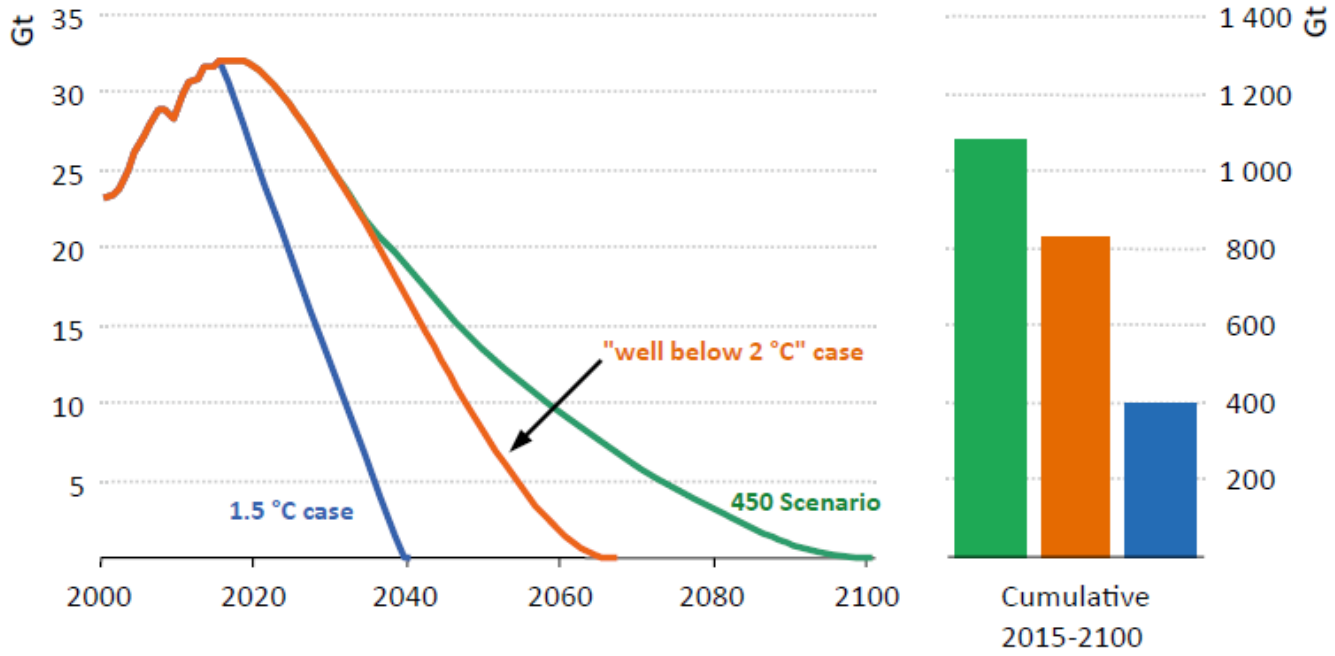
In the 450 scenario China becomes less energy intensive in 2030 than Japan is today

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The energy transition: Below 2 degrees is a question of when

International Energy Agency
Secure Sustainable Together

Indicative global energy sector emissions budgets and trajectories for different decarbonization pathways
WORLD ENERGY OUTLOOK 2016



All low carbon pathways drive to zero emissions, the issue is how quickly this can be achieved

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What is the energy efficiency transition?

"It is tempting to write the history of technology through products: the wheel; the microscope; the airplane; the Internet. But it is more illuminating to write the history of technology through transitions: linear motion to circular motion; visual space to subvisual space; motion on land to motion on air; physical connectivity to virtual connectivity." Siddhartha Muhkerjee, The Gene

- For energy efficiency and energy productivity:
  - Are we in a transition? If so, from where to where?

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Thank you

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