Energy Efficiency First: global progress update

Kathleen Gaffney

C4E, 13 June 2018

IEA

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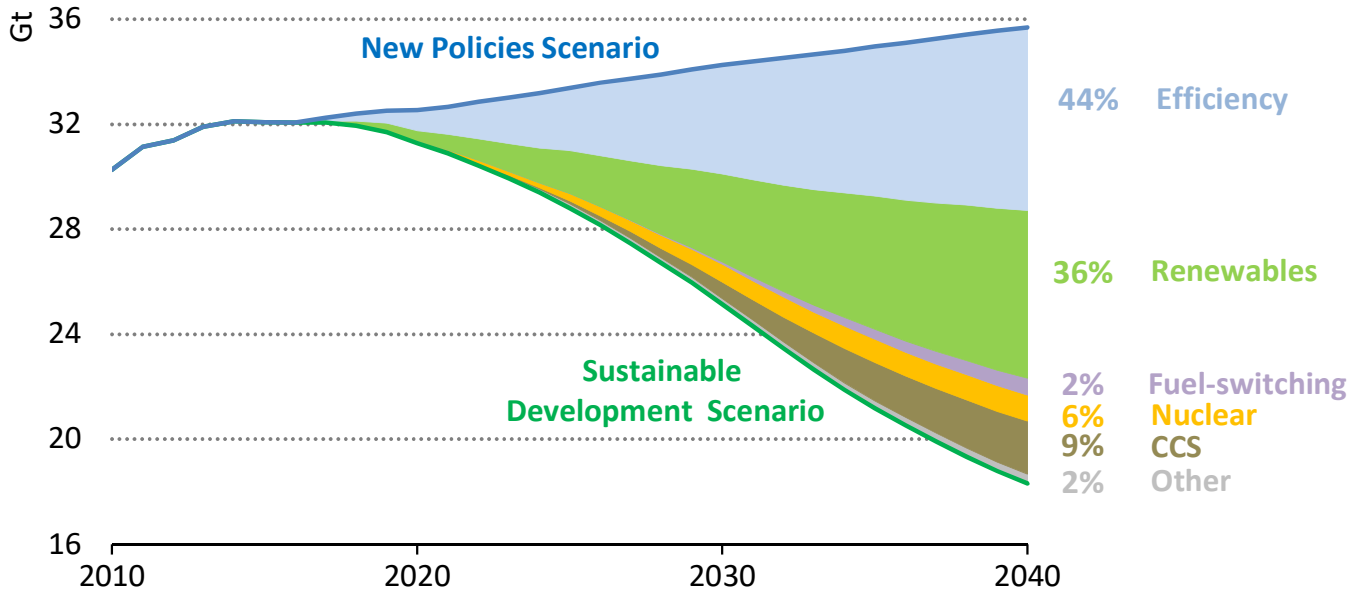
Energy efficiency is key to the global energy transition

Global CO_2 emissions reductions in the New Policies and Sustainable Development Scenarios



Energy efficiency and renewables account for nearly 80% of the cumulative CO2 emissions savings in the Sustainable Development Scenario

Source: World Energy Outlook 2017, IEA

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Good news and bad news

Global trends in energy intensity improvement and CO2 emissions reductions

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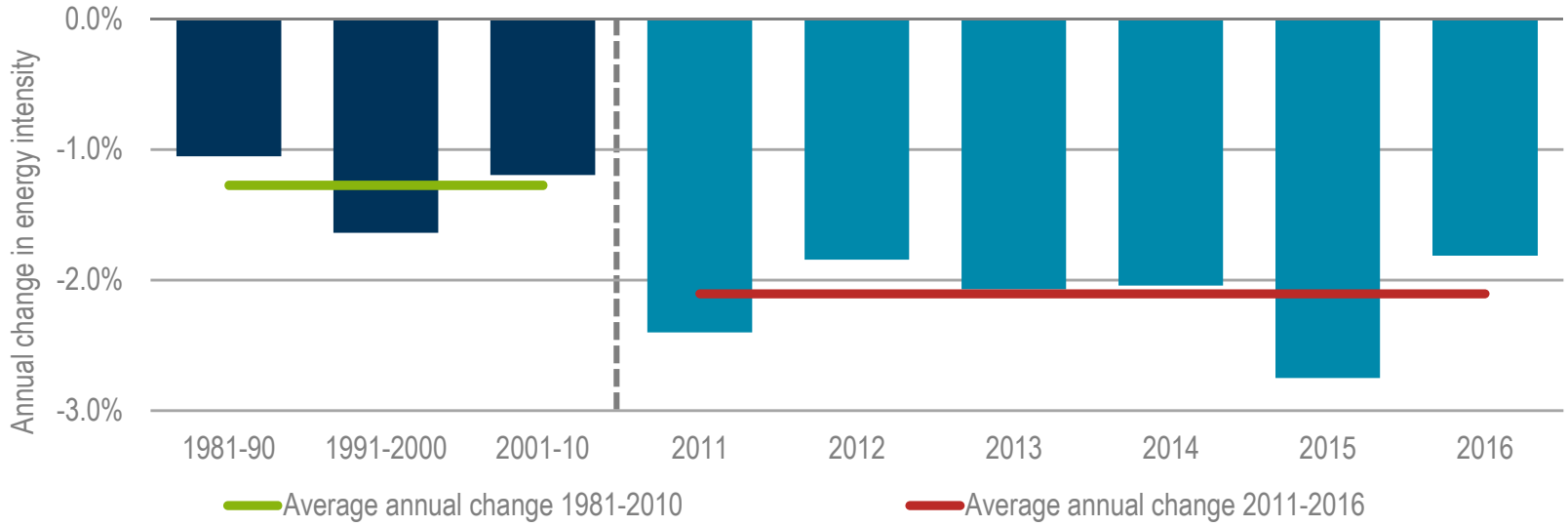
The good news: global energy intensity improvements

Changes in global energy intensity (energy in TPES per unit of GDP)



This decade has seen energy intensity improvement rates at almost double the historic average, suggesting that the world has entered a new era of faster intensity gains

Source: Energy Efficiency 2017, IEA

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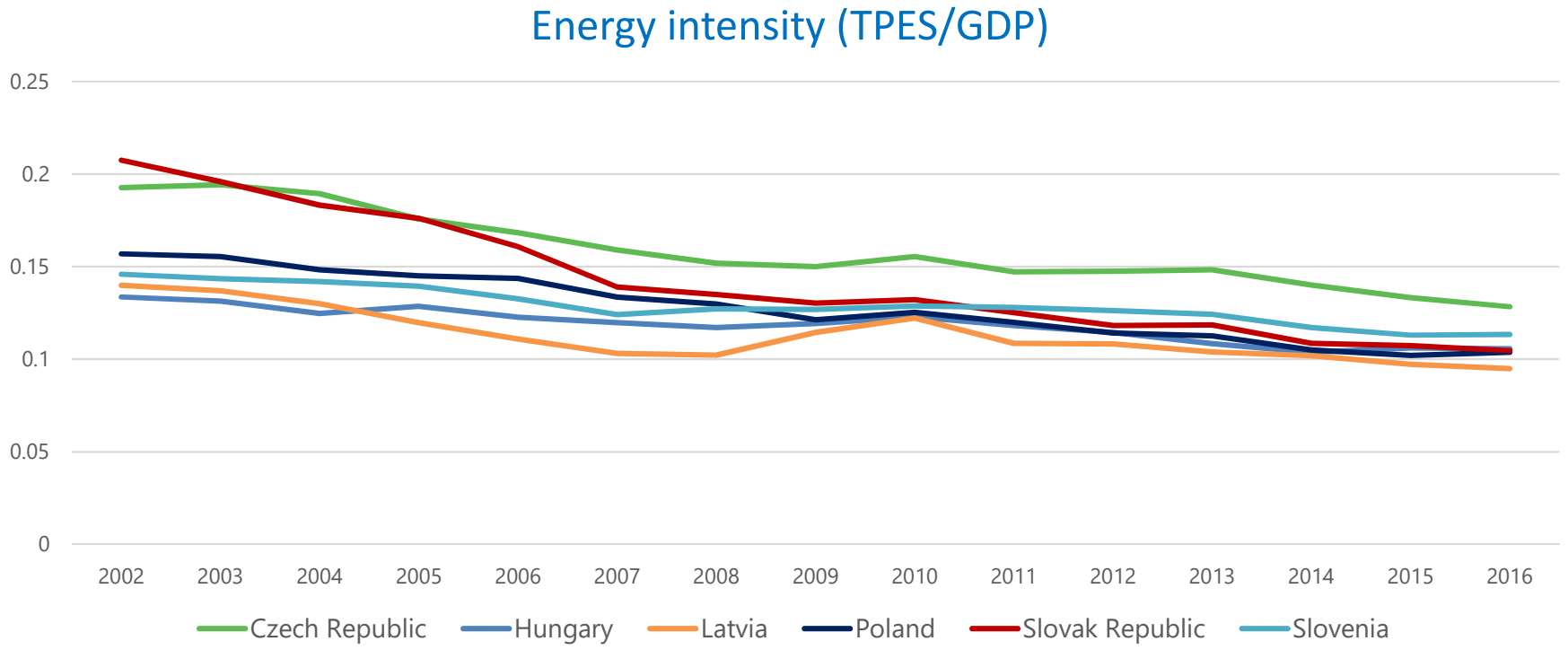
Consistent with regional trend



Similar trends in select European countries

Source: IEA analysis, 2018

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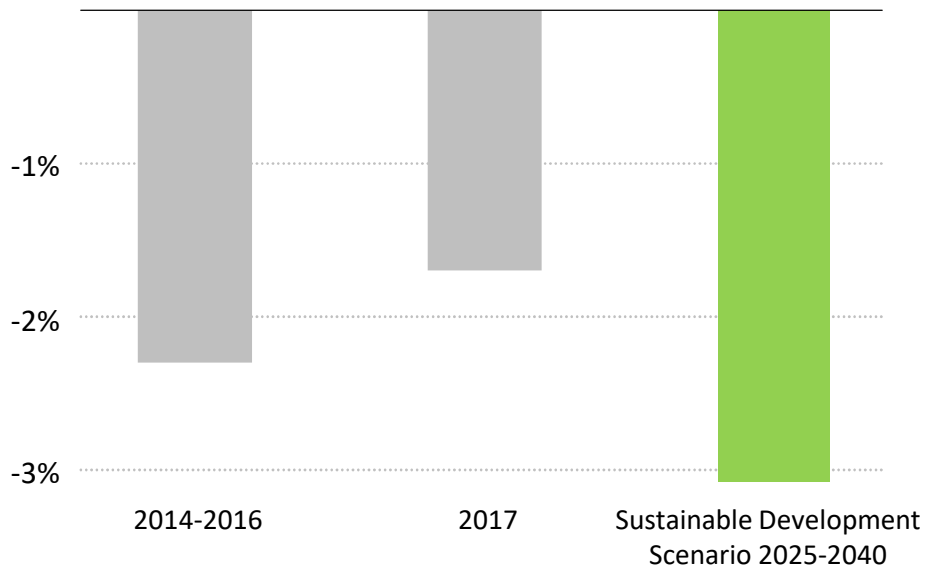
The bad news: energy intensity improvements are slowing

Average annual change in global energy intensity



Achieving the IEA's Sustainable Development Scenario requires a rate of energy intensity improvement double the current rates, and recent trends are moving in the opposite direction

Source: World Energy Outlook 2017, IEA

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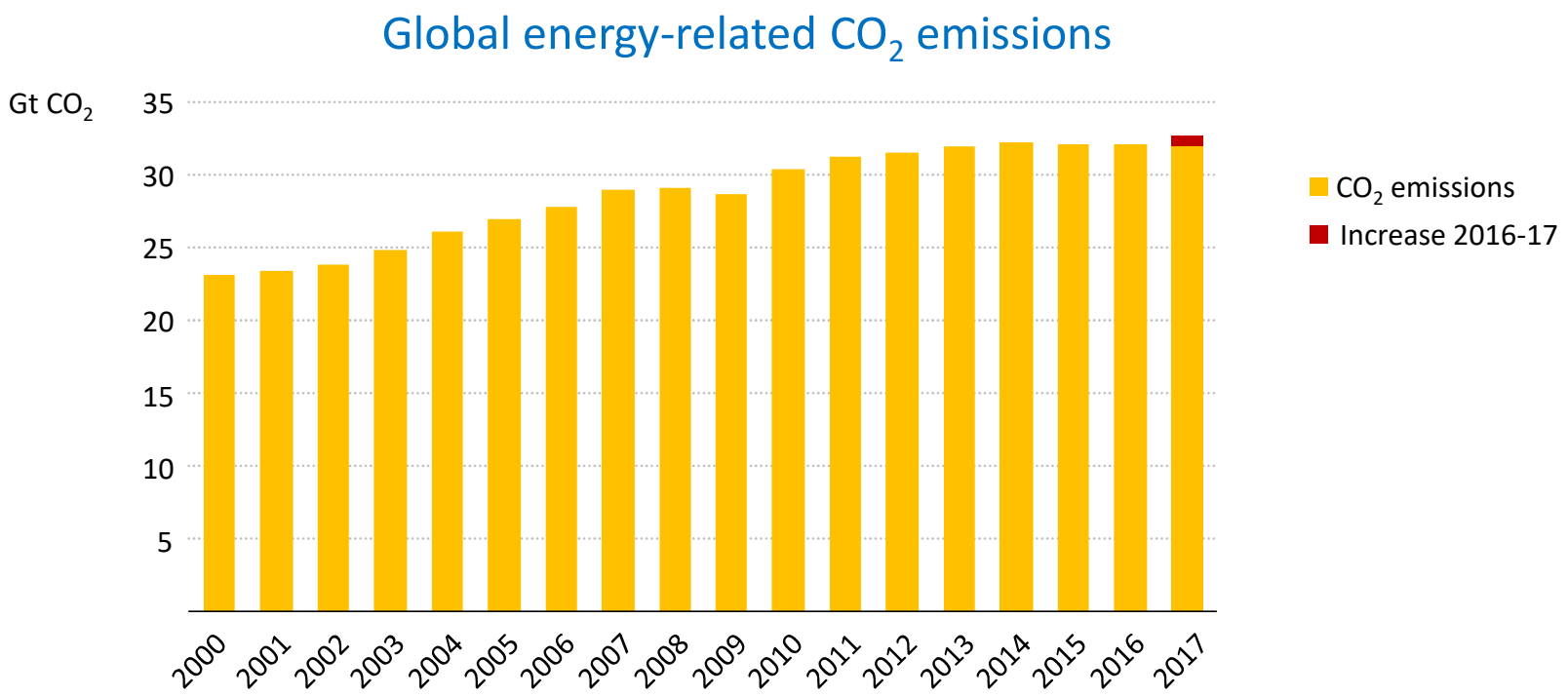
More bad news: global CO2 emissions increase again



After years of plateau, IEA current estimates show that global energy-related CO_2 emissions reached a historic high in 2017

Source: IEA analysis, 2018

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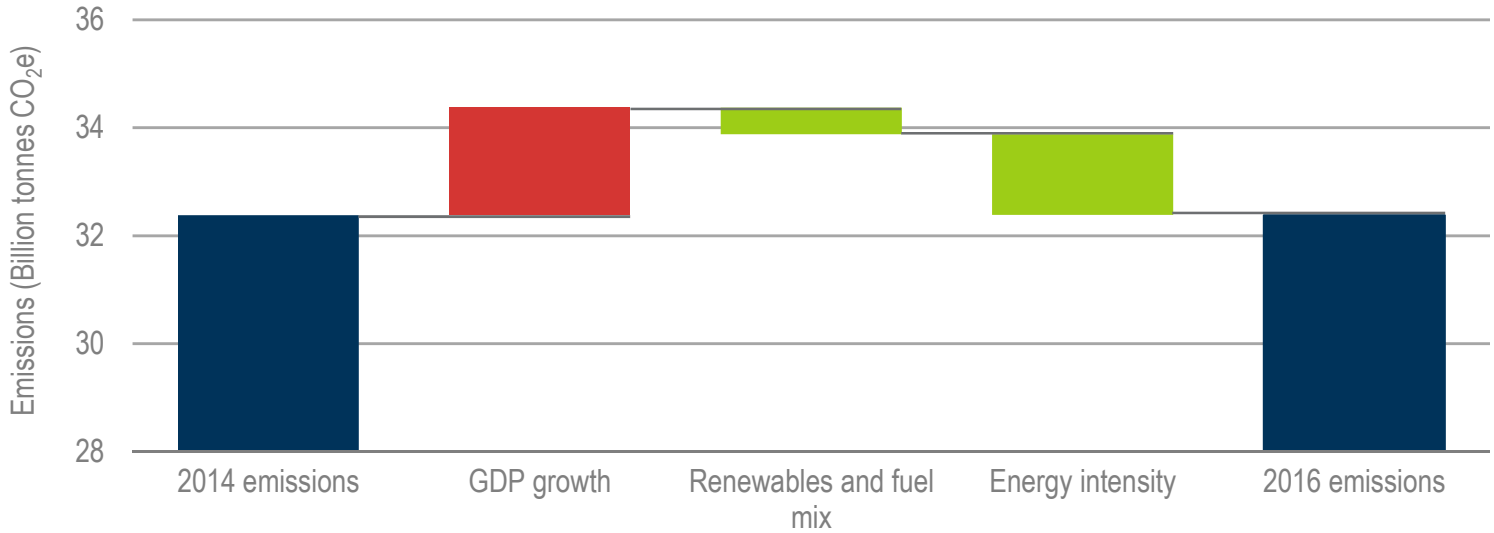
But, it could have been worse…

Factors influencing greenhouse gas emissions, 2014-16



The combination of energy efficiency improvement and the move towards renewables and cleaner fuels has been key to avoiding 2 billion tonnes of additional greenhouse gas emissions

Source: Energy Efficiency 2017, IEA

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Why the slow down?

Significant cost-effective potential for energy efficiency improvement & investment, but policies are slow or non-existent

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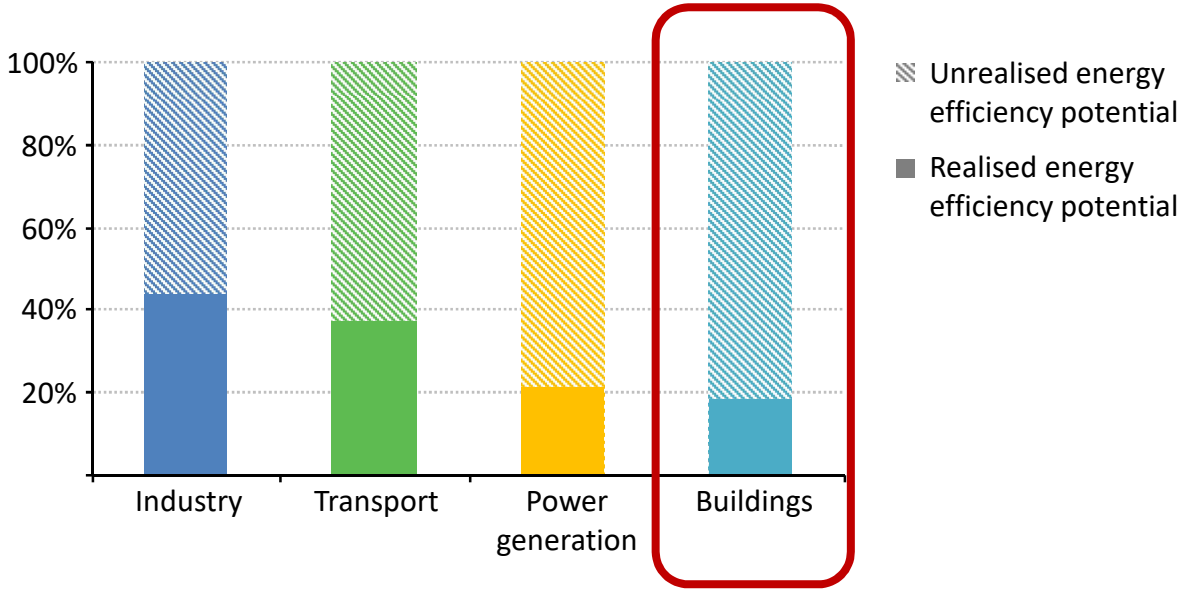
Buildings offer largest energy efficiency potential globally

Energy efficiency potential by sector



80% of the economic potential to improve energy efficiency in buildings remains untapped

Source: World Energy Outlook 2012, IEA

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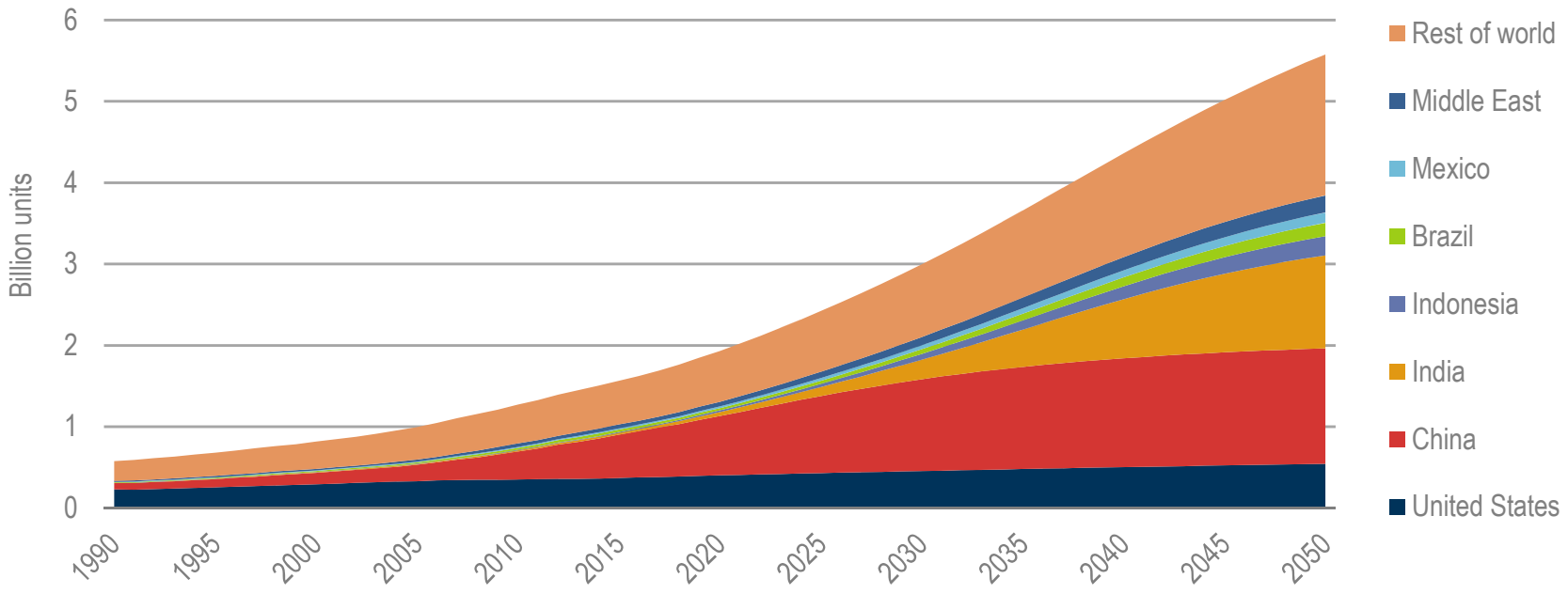
Especially in the area of cooling, e.g. air conditioners

Global air conditioner stock



By 2050, around 2/3 of the world's households could have an air conditioner. China, India and Indonesia will together account for half of the total number.

Source: The Future of Cooling 2018, IEA

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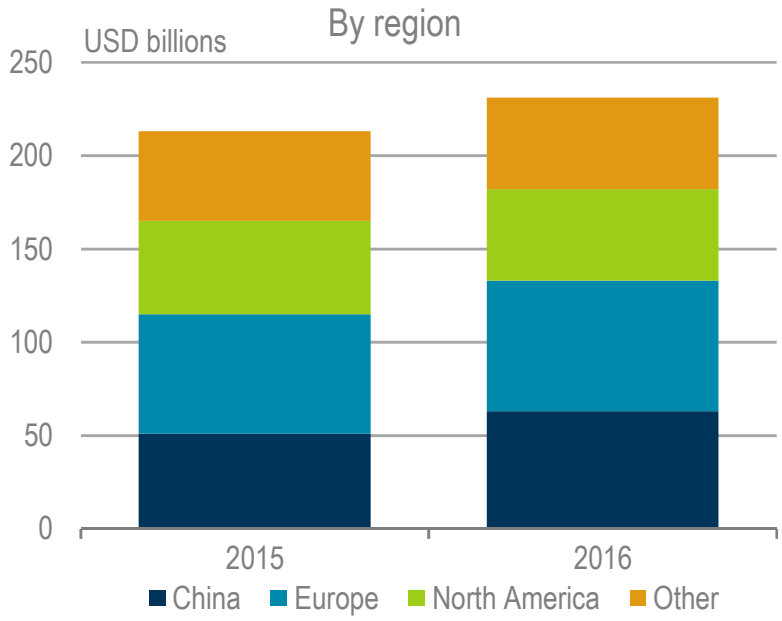
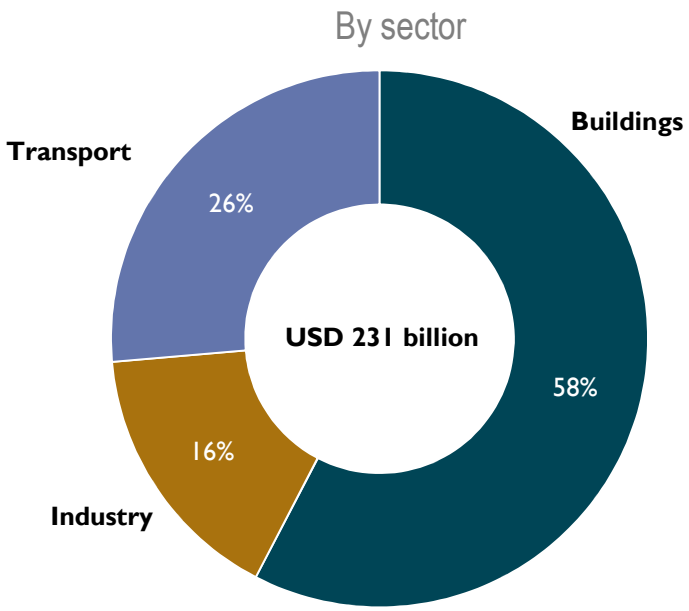
Energy efficiency investment is growing

Energy efficiency investment by region and sector





Energy efficiency investment grew 9% in 2016, with growth strongest in China.
The buildings sector continues to dominate global investment.

Source: Energy Efficiency 2017, IEA

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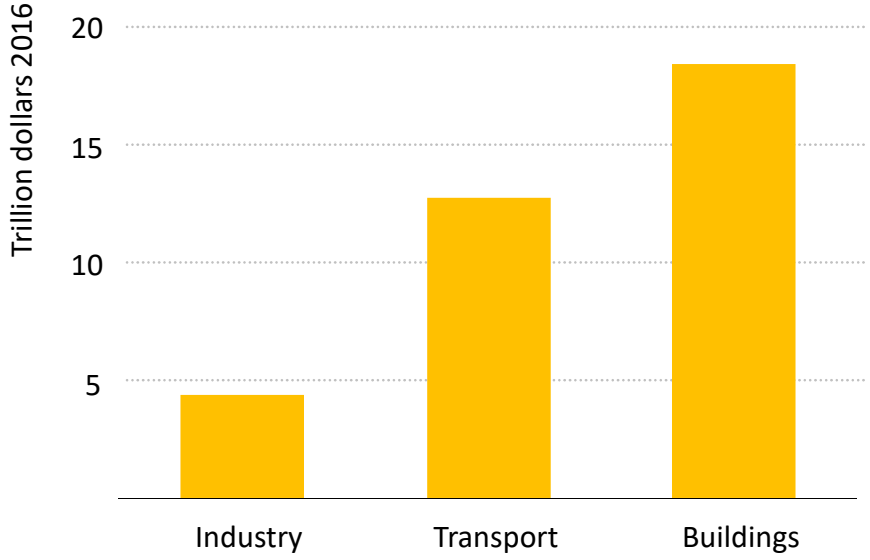
… But only 25% of what's needed

Cumulative investments needs in energy efficiency in clean energy transition scenario, 2017-2050



Energy efficiency investments need to reach USD 1 trillion per year through 2050 to achieve climate targets

Source: Berlin Energy Transition Dialogue 2018, IEA

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Energy efficiency investments pay back

"Each dollar we have to spend through 2050 to make our cars, trucks, houses, fridges, computers, light bulbs, heaters, electric motors and other industrial equipment more efficient pays back on average by a factor of three through lower fuel bill expenditures."

- Fatih Birol, Berlin Energy Transition Dialogue 2018

Passenger cars	2.5
Trucks	4.0
Buildings	2.4
Industry	7.0

Energy efficiency investment requirements are significant, but are outweighed by fuel cost savings; on average, each dollar invested saves three dollars over technology lifetimes

Source: IEA analysis, 2018

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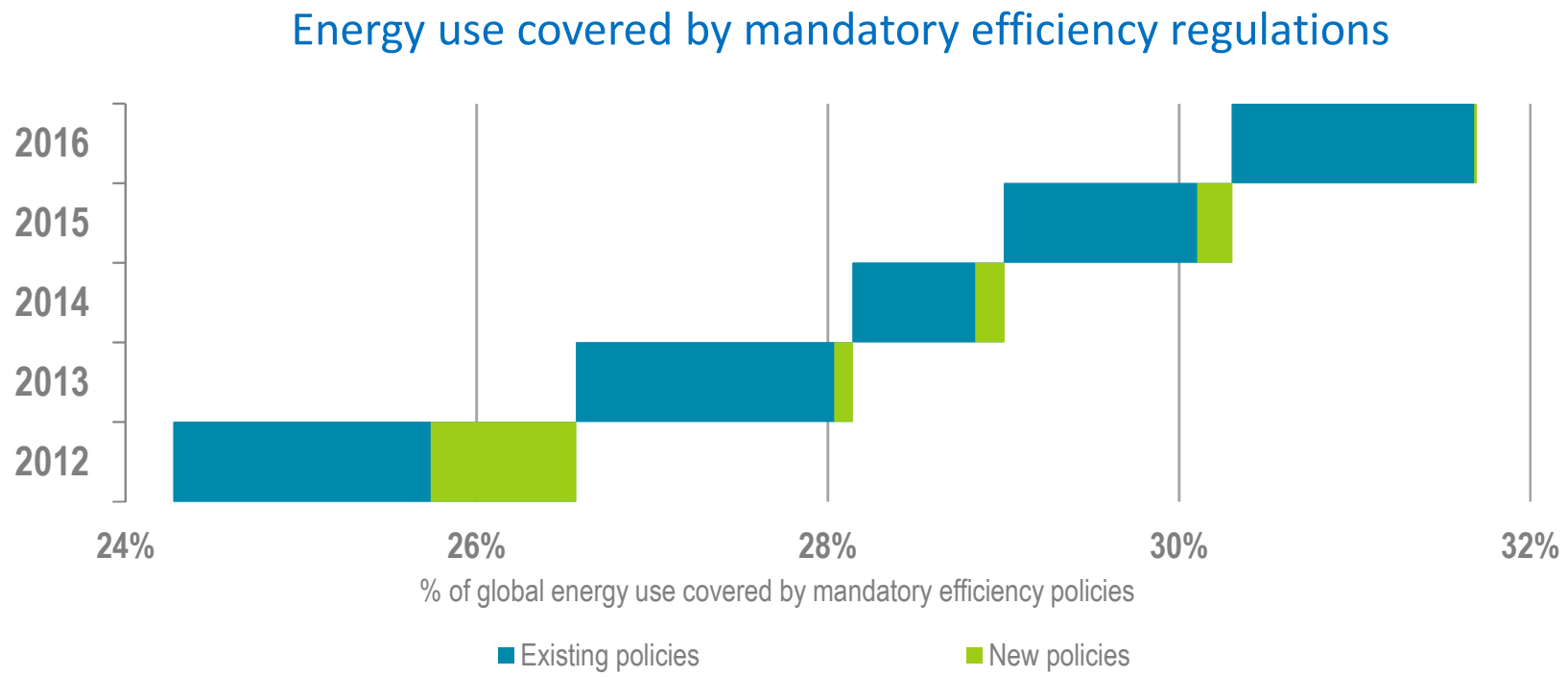
Policies of the past drive progress of today



The amount of global energy use covered by mandatory efficiency policies grew in 2016, but 68% of energy use remains uncovered. We owe the efficiency gains of today to the policies of the past.

Source: Energy Efficiency 2017, IEA

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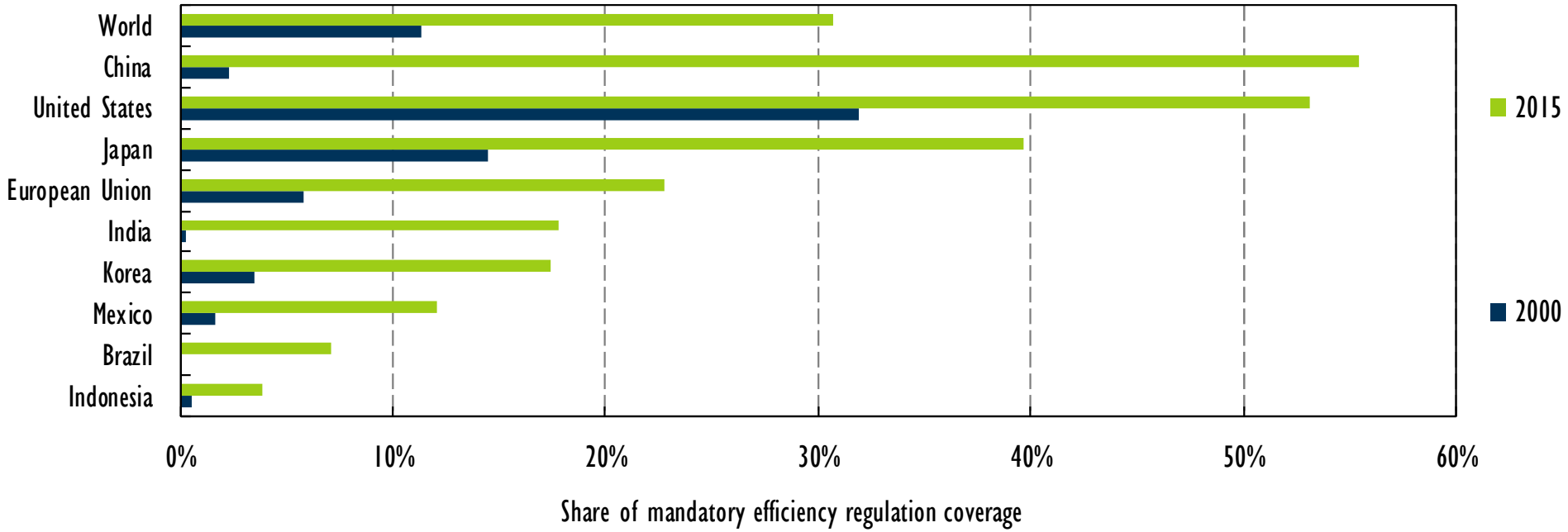
Mandatory regulations have been important policy drivers

Energy use covered by mandatory efficiency regulations



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

Source: Energy Efficiency 2016, IEA

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Policies work… when they exist

Some examples

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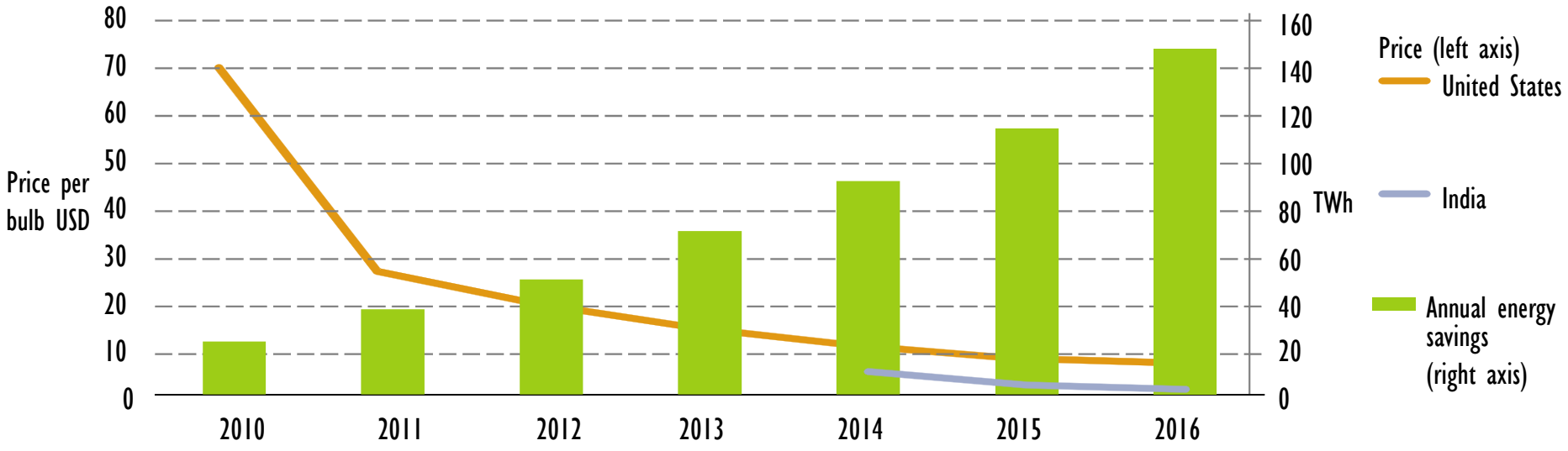
Energy efficiency can drive markets for new products

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.

Source: Energy Efficiency 2016, IEA

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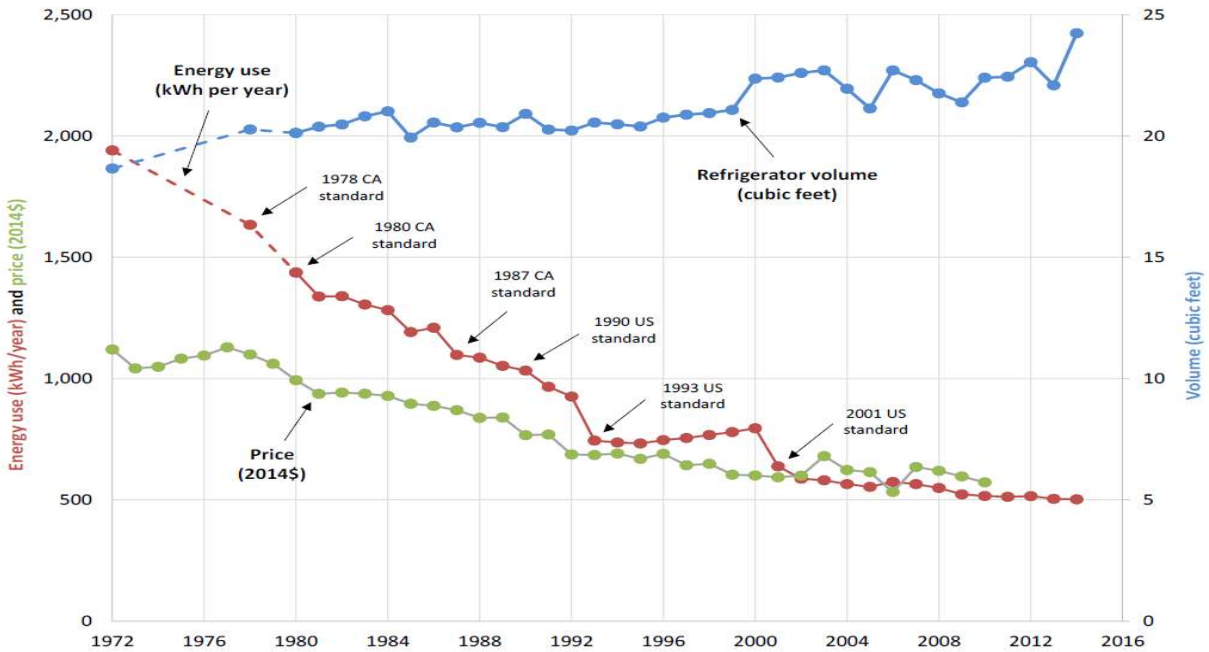
Standards force down appliance energy use

US refrigerator capacity and standards impact 1972 - 2016



New refrigerators in the US use 75% less electricity than ones sold in 1972, but offer more capacity
Modern refrigerators also cost 50% less (on average) than older, more inefficient ones

Source: ACEEE, 2017

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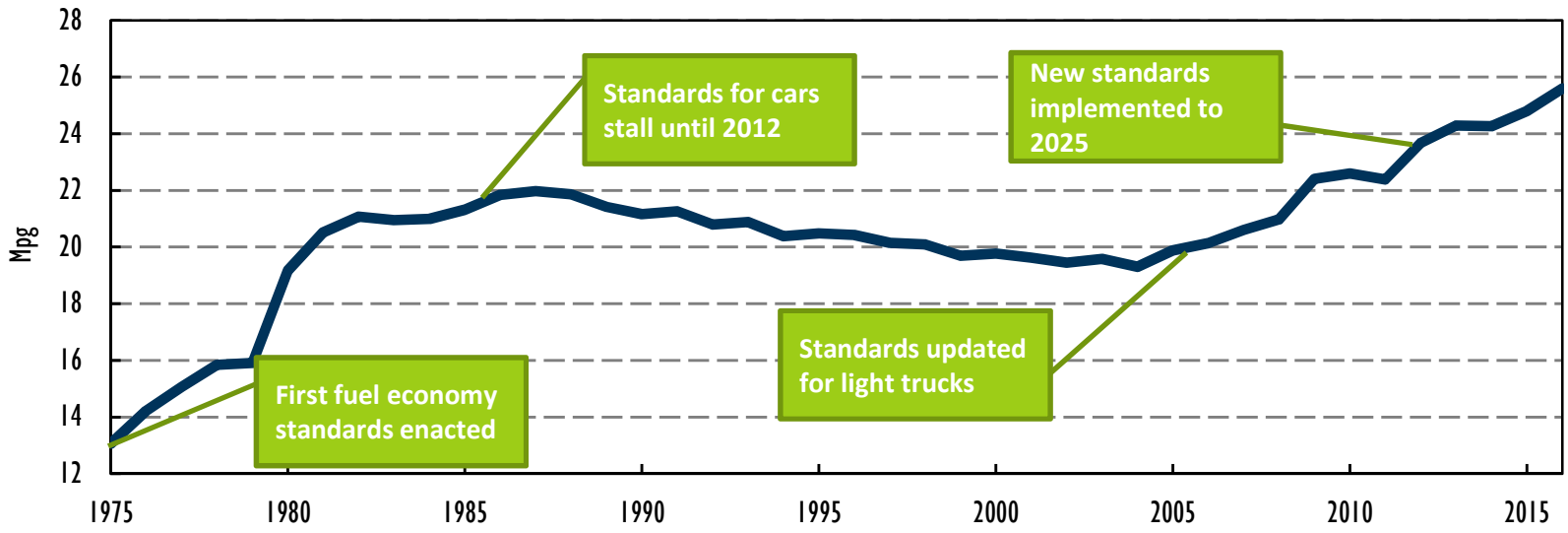
Stalling policy development hinders efficiency progress

Average fuel economy of passenger vehicles sold in the United States



Average vehicle fuel economy in the US fell by 10% from 1985 to 2005 when standards stalled

Source: Energy Efficiency 2016, IEA

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Efficiency has many benefits

Some examples

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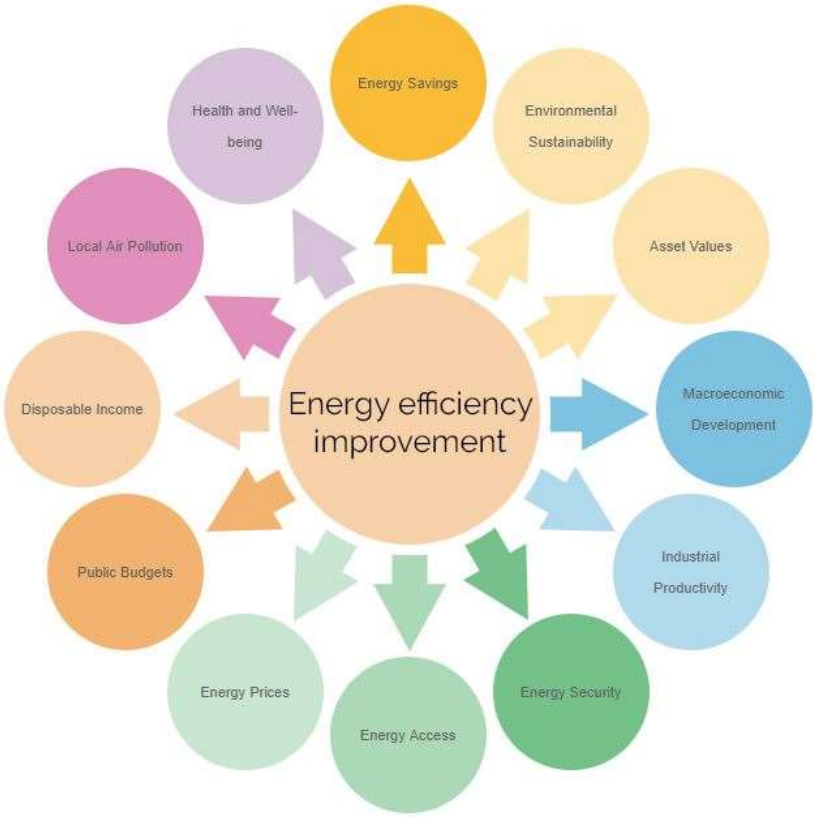
The multiple benefits of energy efficiency



Source: Multiple Benefits of Energy Efficiency 2014, IEA

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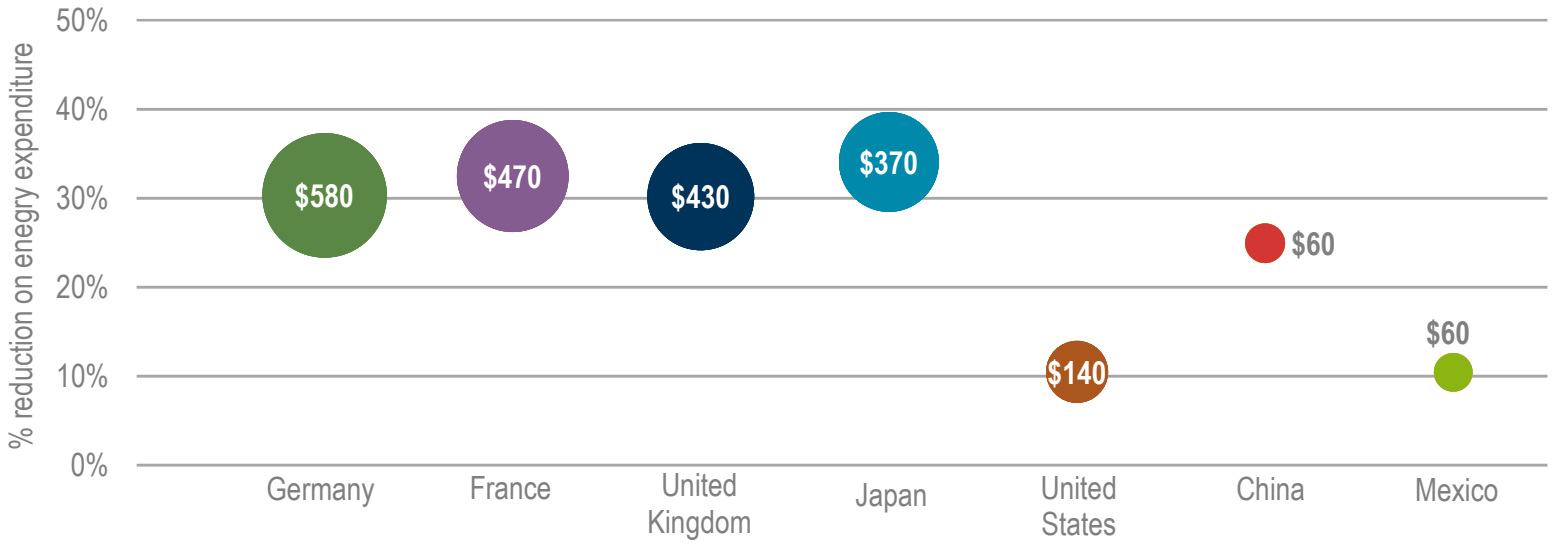
Energy consumers are making big savings

Per capita household energy expenditure savings due to efficiency (2000-16)



Efficiency improvements have reduced household energy spending from 2000-2016. German consumers saved nearly USD 50 billion on their annual home and travel energy costs.

Source: Energy Efficiency 2017, IEA

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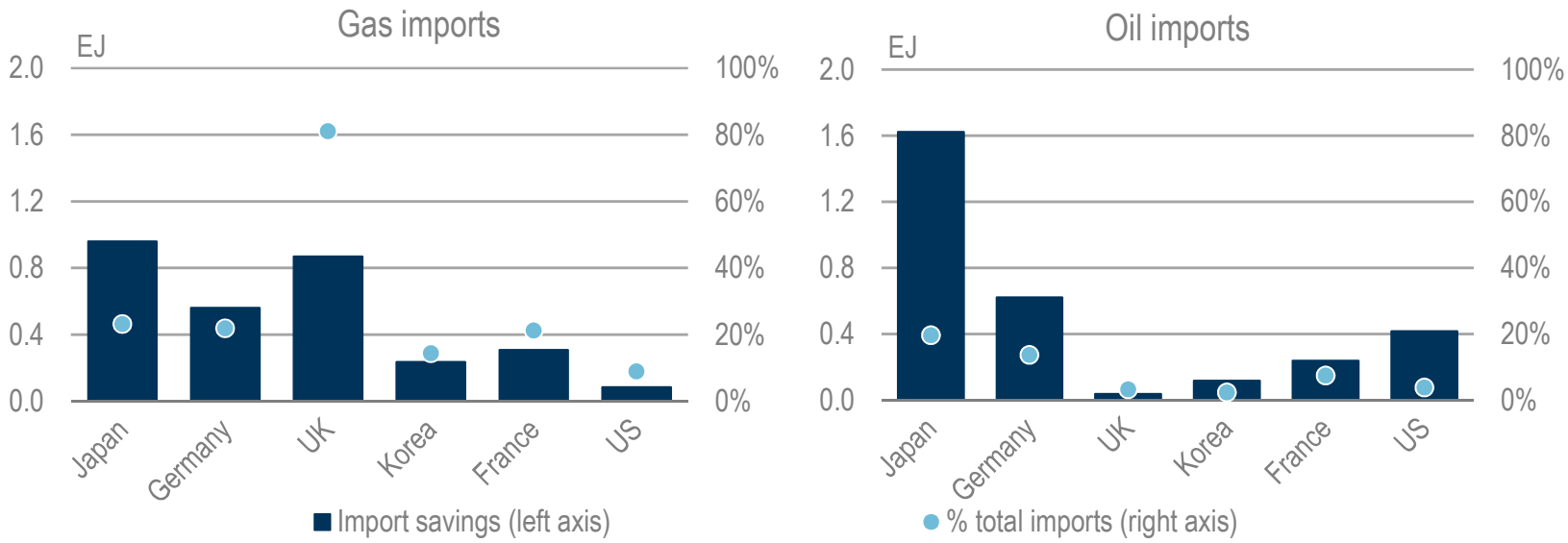
Energy import savings from improved efficiency

Reductions in energy imports from efficiency improvements (2000-16)



Overall, energy efficiency improvements have reduced energy imports by nearly USD 50 billion

Source: Energy Efficiency 2017, IEA

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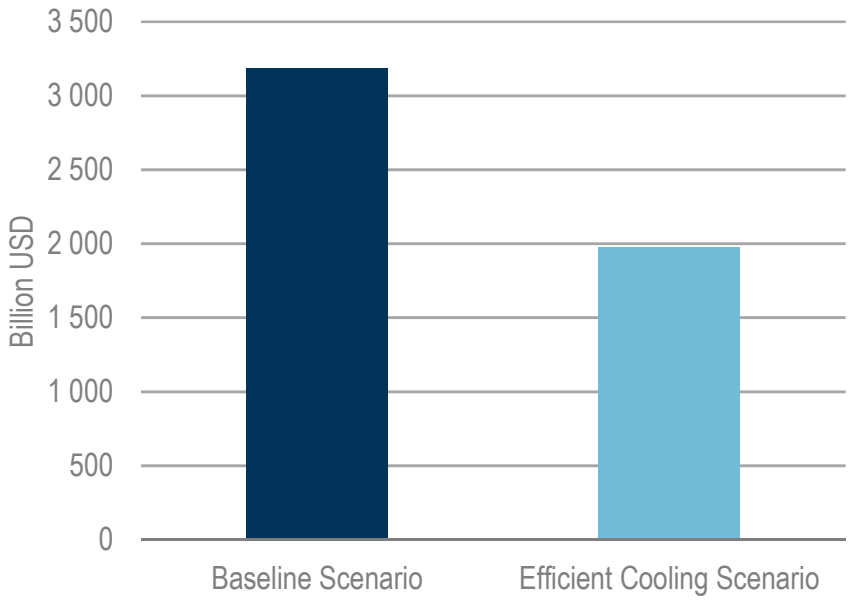
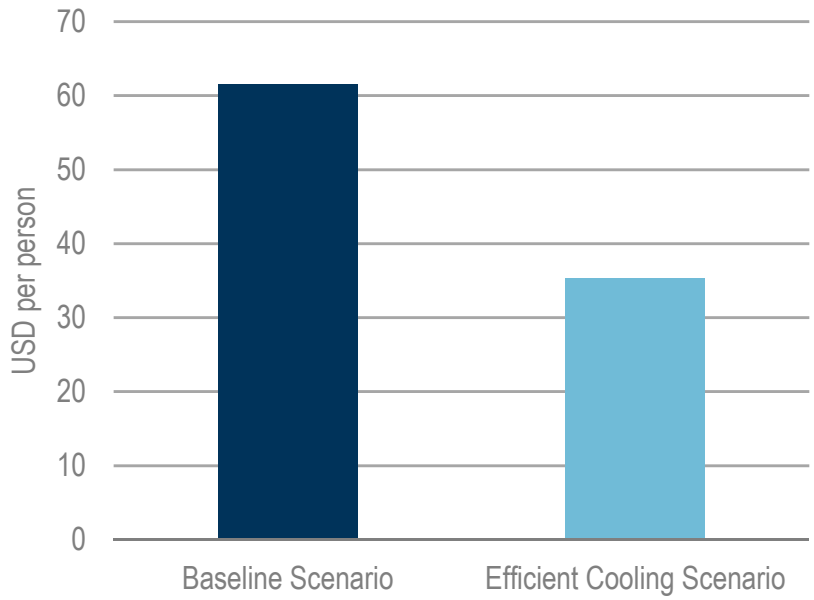
Avoided investments in new power generation

Cumulative investments in power generation for space cooling to 2050



Global average electricity costs per capita for space cooling in 2050



Strengthening cooling efficiency would reduce investment and running costs by USD 3 trillion between now and 2050. Average cooling energy costs would be almost halved.

Source: The Future of Cooling 2018, IEA

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Reduced subsidies (and local jobs!)

- Replacing 1.6 million inefficient refrigerators among Mexico's low-income households led to…

$22.4 million / year in avoided energy subsidies

>1500 permanent jobs in manufacturing and inefficient refrigerator destruction

Source: IEA workshop on multiple benefits, March 2018

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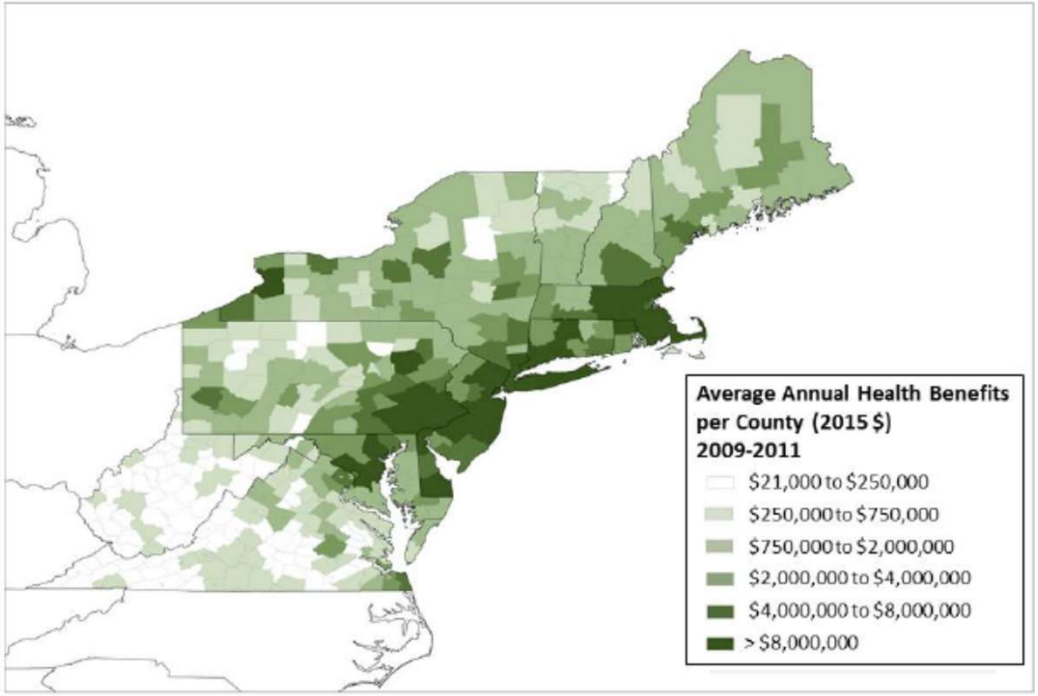
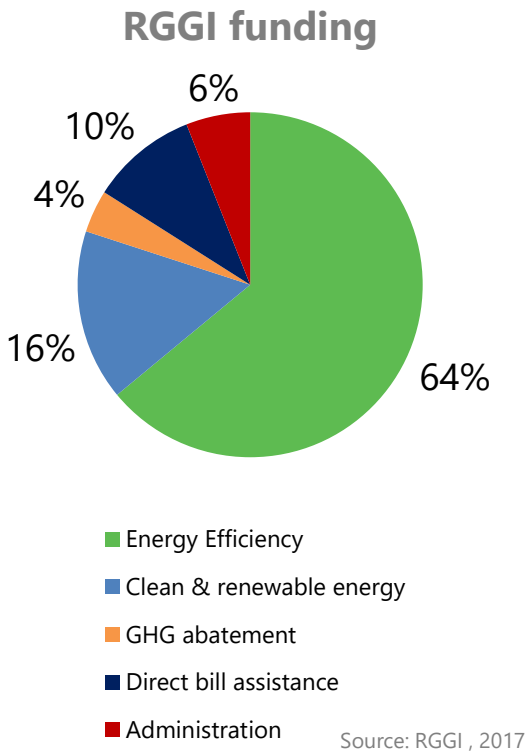
Reduced health care costs



Source: Abt Associates analysis (2017).



Source: RGGI , 2017

In some US states, energy efficiency is resulting in millions of dollars in avoided health costs.

Source: IEA workshop on multiple benefits, March 2018

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Our work with policy makers

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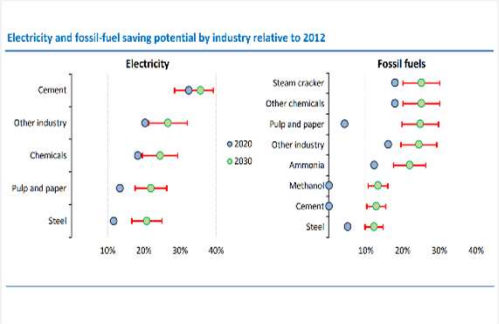
Energy Efficiency in Emerging Economies (E4) Programme

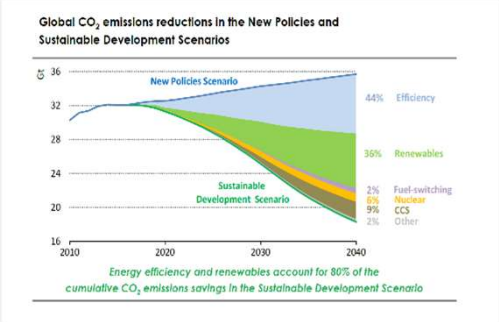


Analysis of the Potential for Energy Efficiency

E4 leverages IEA expertise in data and policy analysis to help governments quantify the opportunities for energy efficiency

Tracking Progress

E4 works with governments to developing Energy Efficiency Indicators and evaluate energy efficiency policies to help strengthen the evidence base for energy efficiency and track progress against targets



Bridging the Gap

E4 helps partner countries identify, adapt and implement energy efficiency measures to help meet their economic and social development goals

E4 countries: Brazil, China, India, Indonesia, Mexico and South Africa + regional work in LA & SEA

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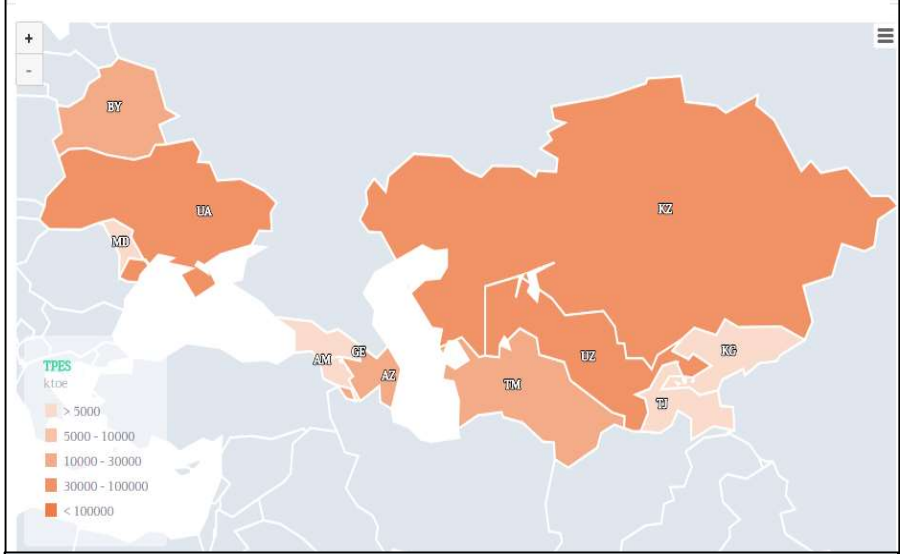
Working with EU Eastern Partner Countries and Central Asia

EU4Energy Countries



Armenia, Azerbaijan, Belarus, Georgia, Moldova, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Ukraine and Uzbekistan

- Interactive web portal: energy data management and policy dialogue for energy security, sustainable development, markets & energy efficiency
- Delegates from region attend regular energy efficiency training weeks featuring sectoral deep dives e.g. buildings, transport, appliances & lighting (most recently in Paris, May 2018)
- Regionally focussed energy efficiency training week in Georgia in 2017
- Upcoming energy subsidy forum in Kyrgyzstan, 120 delegates from across the region

IEA works to raise awareness and drive policy outcomes for efficiency in the region

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Concluding points

- There has been a step up in efficiency gains in recent years, despite lower energy prices, and this is having many positive impacts, however progress is stalling.
- Governments must renew their focus on policy implementation and attacking the 68% of energy use that is not covered by mandatory efficiency policies.
- Energy efficiency is cost-effective and has many multiple or ancillary benefits; making efficiency a central part of energy policy and planning delivers economy wide returns.
- The IEA is helping countries realise energy efficiency potential by training policy makers, facilitating knowledge sharing, and providing policy analysis & advice.
- Energy efficiency alone can stabilise CO_2 emissions … but there's no time to waste!

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