International Energy Agency

REDRAWING THE ENERGY-CLIMATE MAP

San Antonio, 12 May 2014

World Energy Outlook Special Report

Context

- **Climate change is slipping down the policy agenda, even as the scientific evidence continues to accumulate**
- **Energy sector accounts for two-thirds of greenhouse gas emissions**
- **Mixed news on energy trends**
  - *Price dynamics between gas and coal support emissions reductions in some regions, but impede them in others*
  - *Renewables are on the rise, but investment slowed in 2012*
  - *Efficiency policies are gaining momentum in many countries*
  - *Nuclear is facing challenges and CCS still remains distant*

CO_2 emissions at record high in 2012

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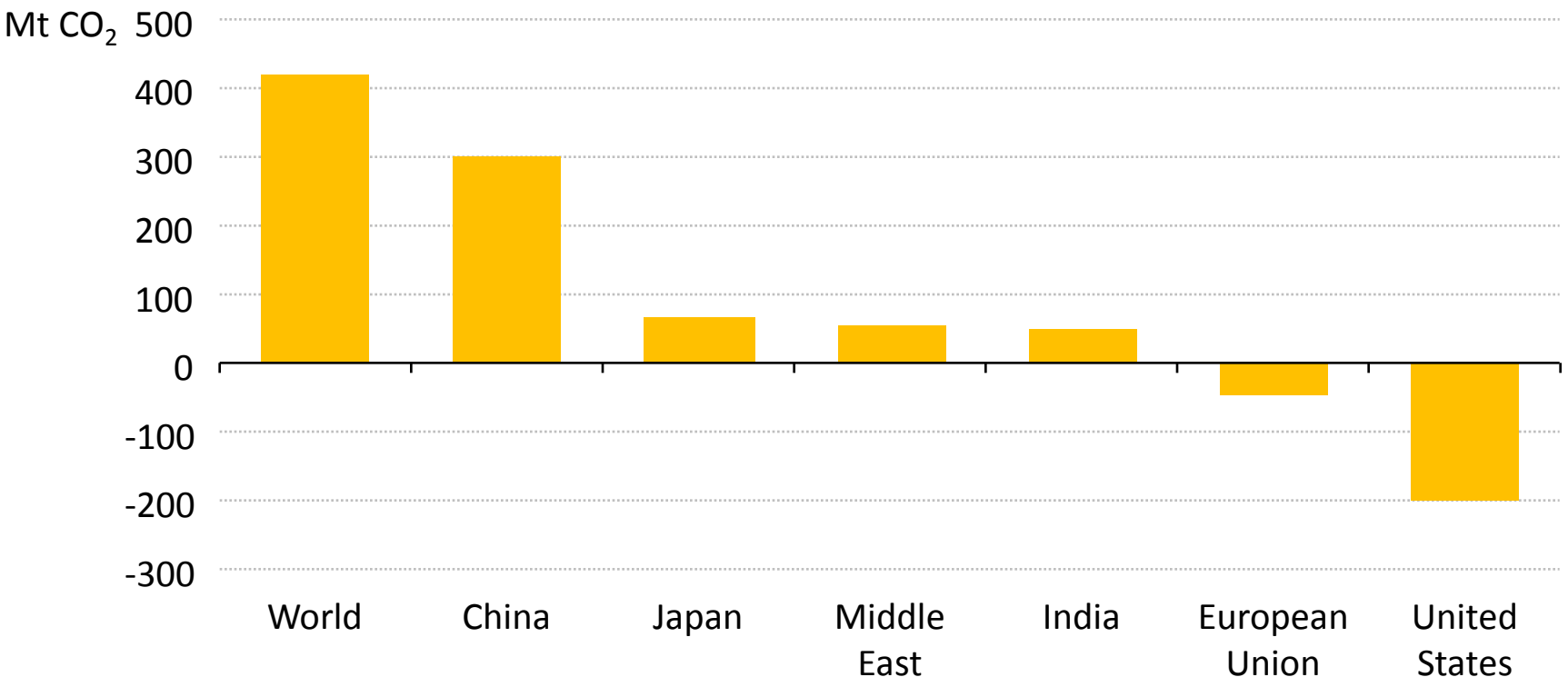
Change in energy-related CO_2 emissions, 2012



CO_2 emissions grew by 1.4% to reach 31.6 Gt in 2012, but trends vary by country

The two largest emitters make encouraging steps toward decarbonisation…

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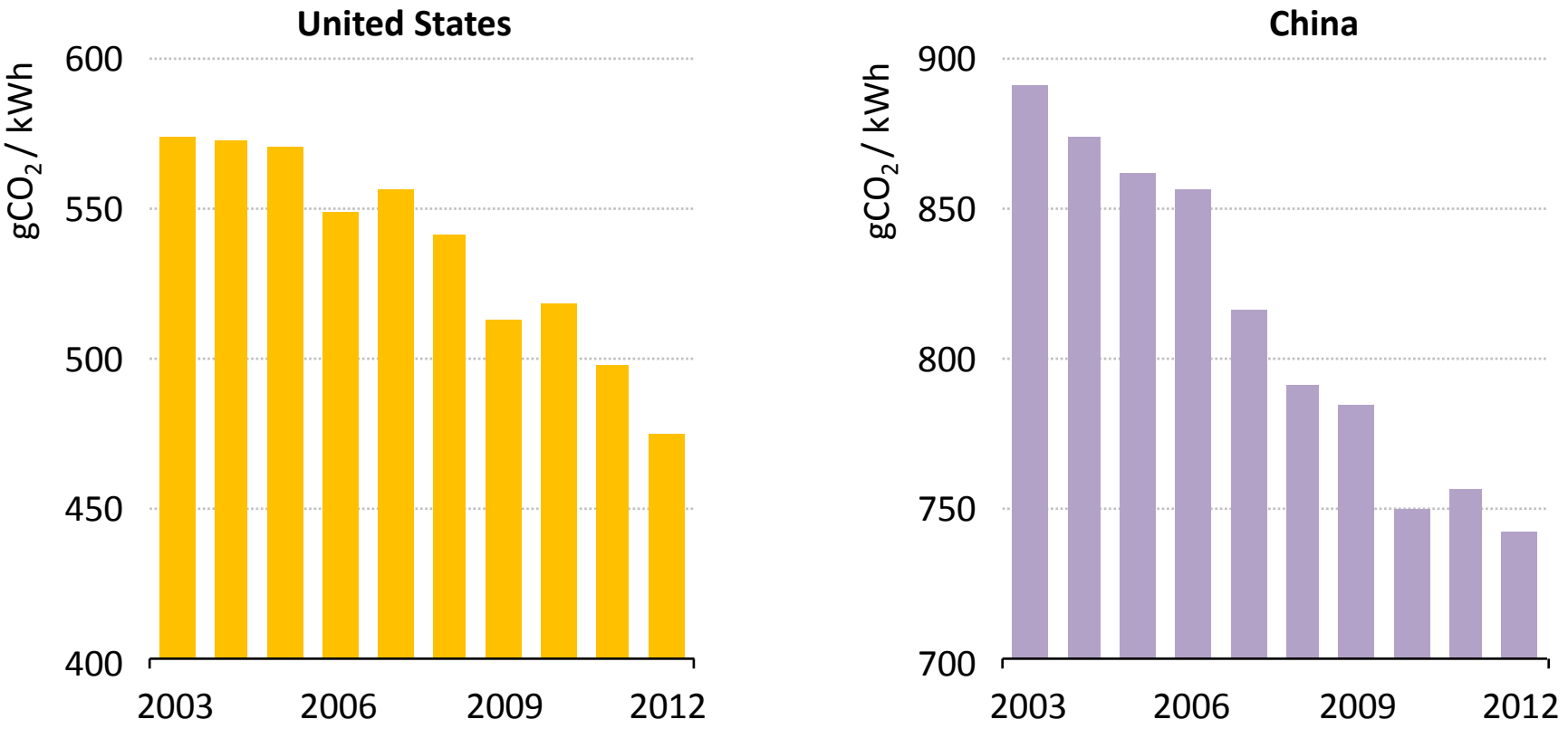
CO_2 emissions per unit of electricity generation



In 2012, total CO_2 emissions in the US were back at the level of the mid-1990s, while total CO_2 emissions growth in China was one of the lowest in the last decade

…but the world is still moving in the wrong direction

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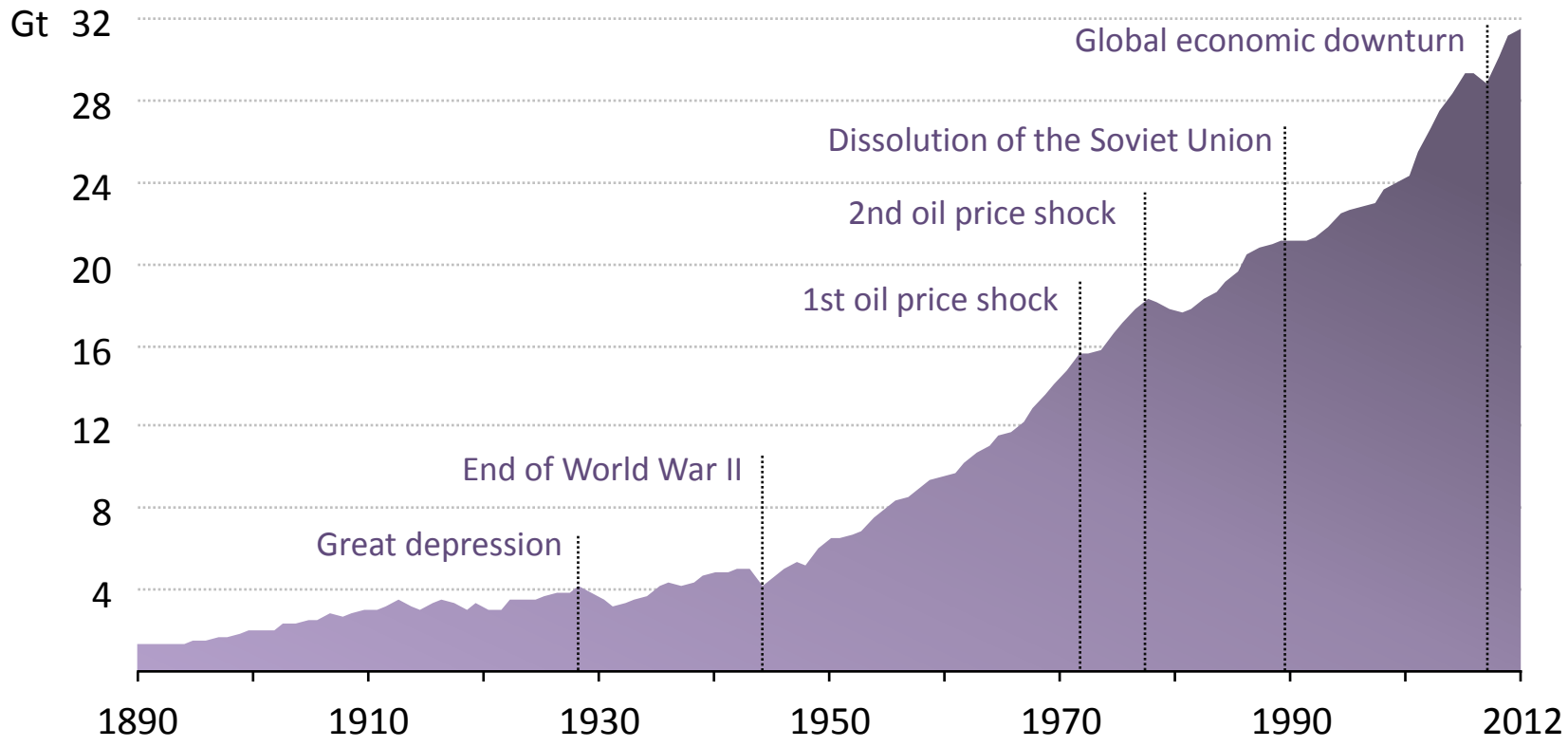
Global energy-related CO_2 emissions



CO_2 emissions trends point to a long-term temperature increase of up to 5.3 °C

Four measures to keep the 2 °C target alive

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- **National efforts in this decade need to buy time for an international agreement, expected to come into force in 2020**
- **Measures to 2020 should meet key criteria:**
  - *Significant near-term emissions reductions*
  - *No harm to countries' economic growth*
  - *Reliance only on existing technologies and proven policies*
  - *Significant national benefits other than climate change mitigation*
- **Our 4-for-2 °C Scenario proposes four measures that meet these criteria**

Four measures can stop emissions growth by 2020

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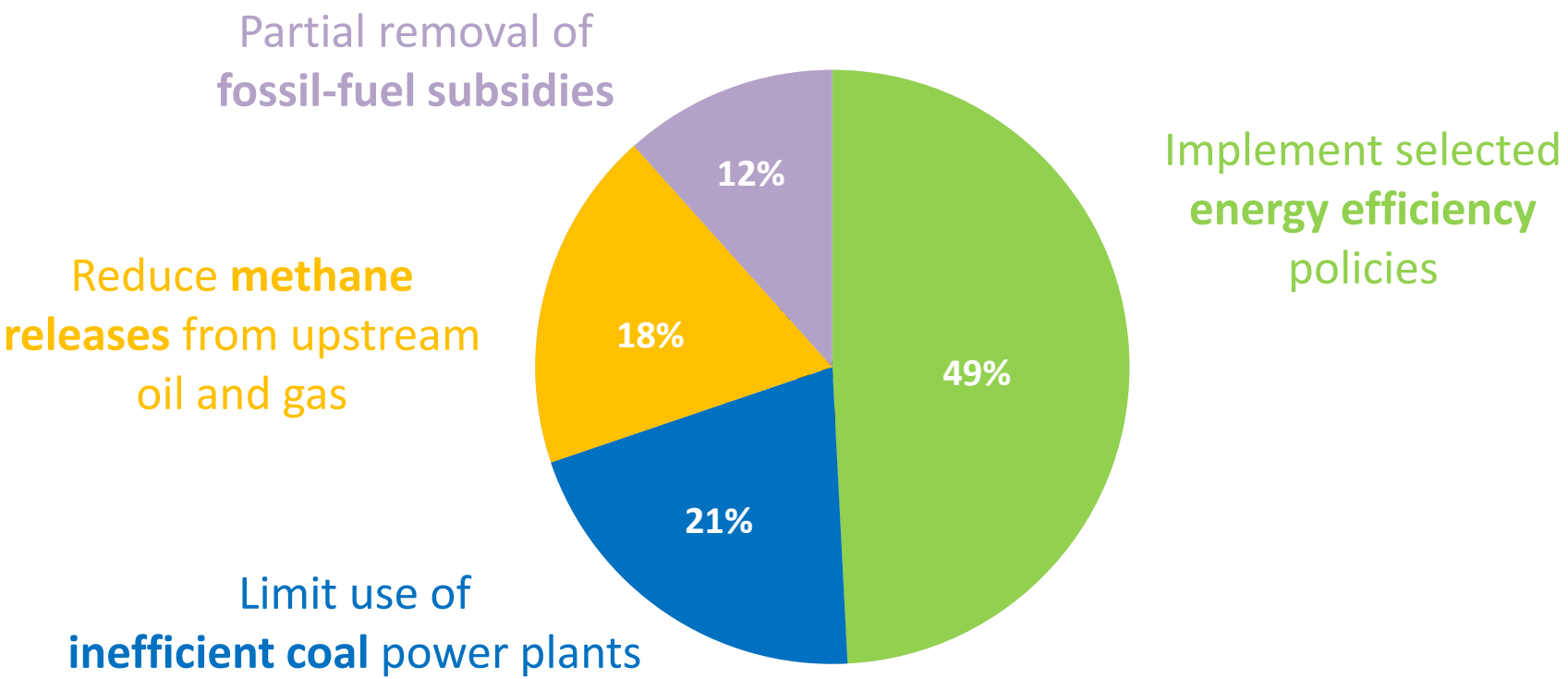
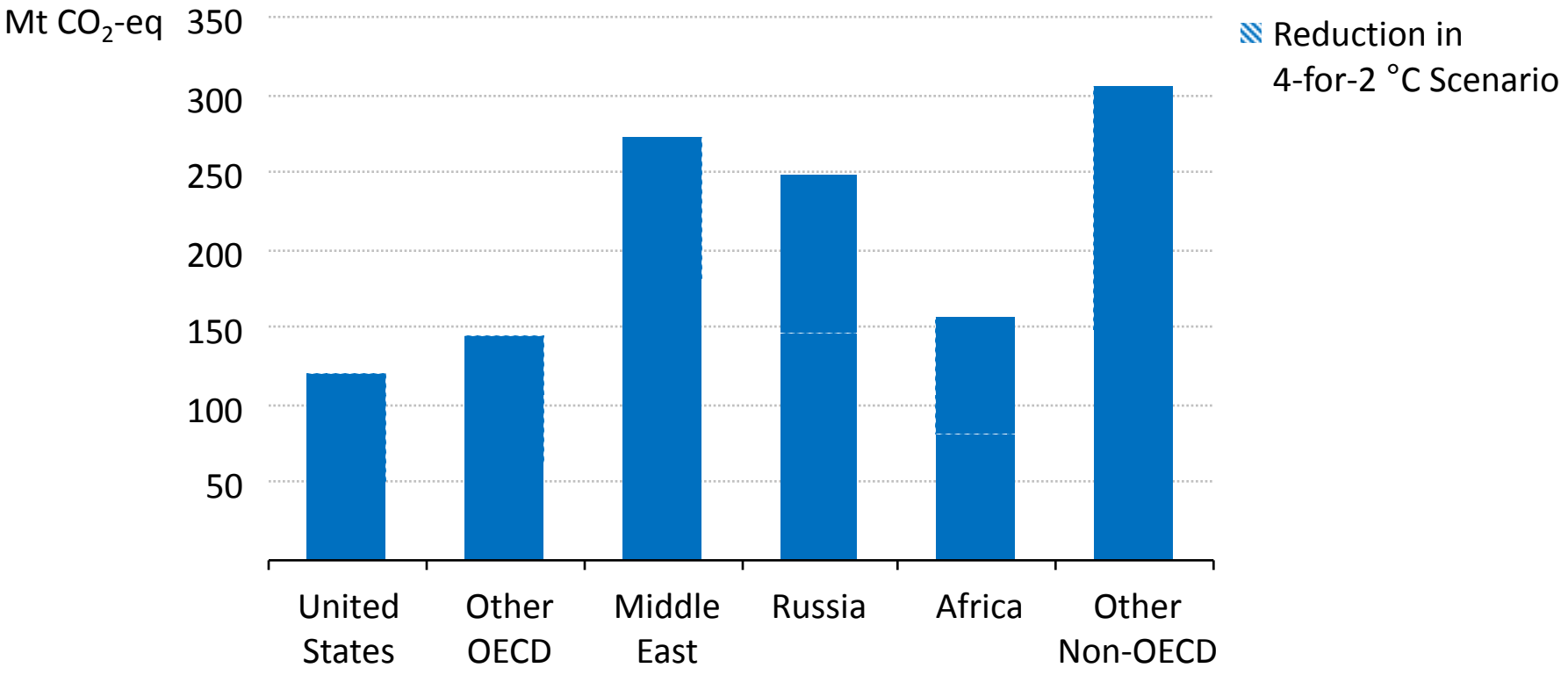
Emissions savings in the 4-for-2 °C Scenario, 2020



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

Measure 3: Reduce methane releases into the atmosphere

Methane emissions from the upstream oil and gas industry, 2020



In 2010, methane releases were 1.1 Gt CO_2-eq; halving the level in 2020 would save twice the gas production of Nigeria today

Global methane emissions (2010)

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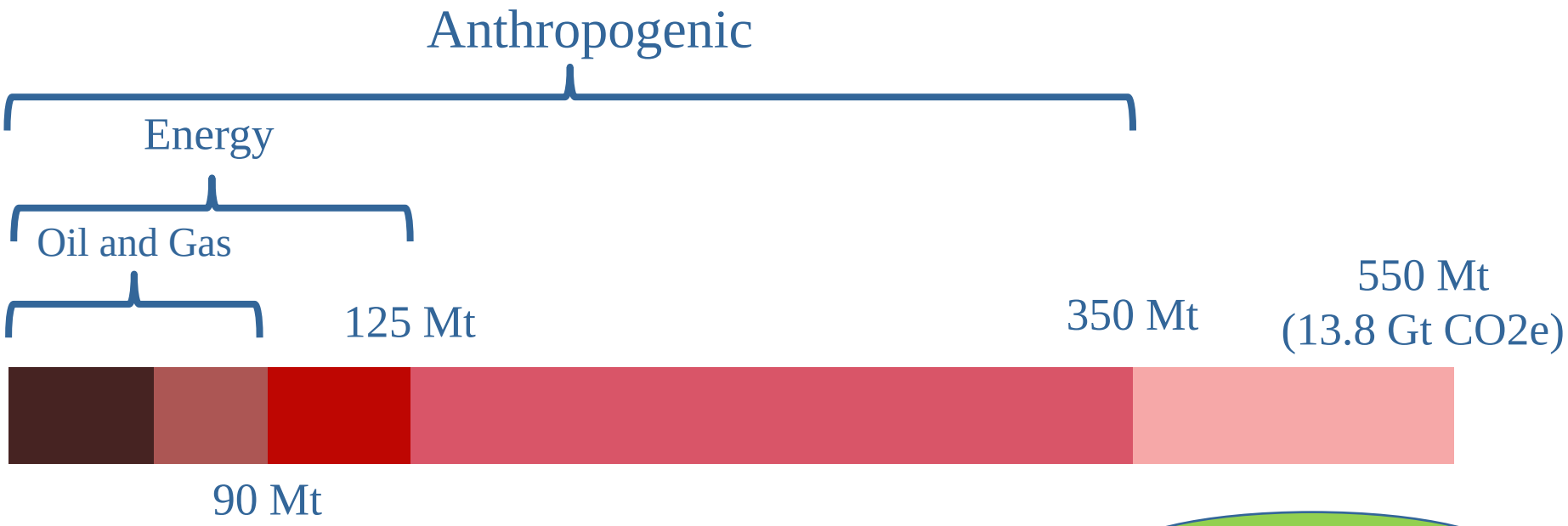

Upstream O & G 45 Mt (1.1 Gt CO2e at GWP 25)

Estimate by country by source

US EPA data

Production data

Industry knowledge

Gas fields 17 Mt, Oil fields 27 Mt (3Mt from incomplete flaring)

Methane emissions Reduction measures

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Increased inspections/repairs
Reduce frequency of start-ups/blowdowns
Improved dehydrators
Pneumatic devices → mechanical
Electronic flare ignition
Best practices

Compressors replacement
Vapor recovery units on tanks
Reduced emission completions
Improved flare design
Gas reinjection
Gas to market

Low cost
100% implemented by 2020
Contributes 50% of reduction

Medium to large cost
Takes more time
Partial implementation to 2020

Industry voluntary actions
New regulations / Enforcement / Measurements
Carbon tax/trading
Focus on large, concentrated operations

Oil fields reduce by 40% (300 Mt CO2e),
Gas fields by 55% (280Mt CO2e), in 2020

Key messages

- Despite encouraging steps in some countries, global emissions keep rising and the scientific evidence of climate change increases
- Early national action is required while negotiating towards a global deal in Paris in 2015 that then comes into force by 2020
- Four measures can stop emissions growth by 2020 and keep the 2°C target alive, without harming economic growth. The 4 measures were subsequently endorsed at the 2013 IEA ministerial meeting.
- Reduction of methane emissions in upstream oil and gas operations has to play a key part in this program
- There is a need for parallel action to deploy critical low-carbon technologies at scale after 2020, including CCS. The energy sector must adapt to climate change, both in the resilience of its existing assets and in future investment decisions.

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www.worldenergyoutlook.org/energyclimatemap

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