



International
Energy Agency

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Fostering Long-Term Investment in Energy

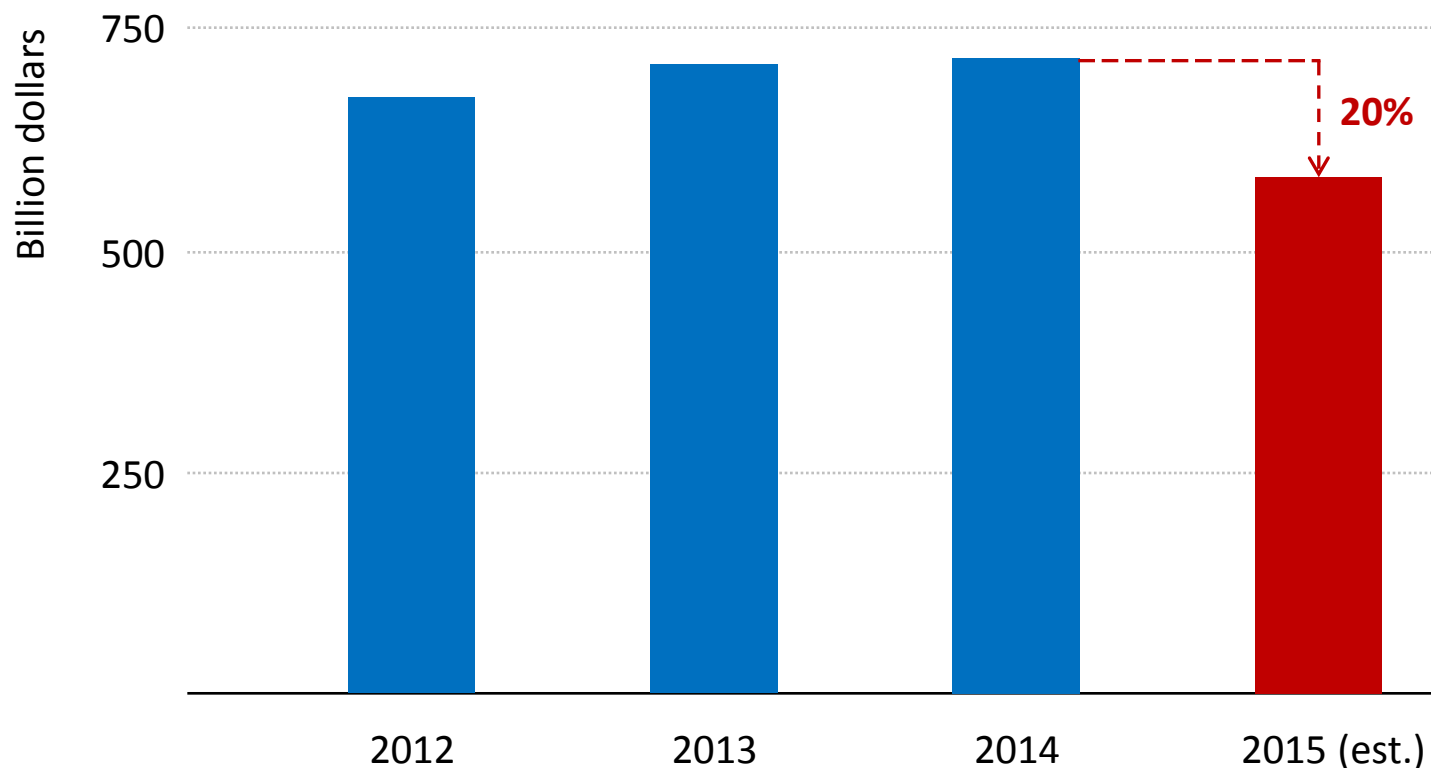
Dr. Paolo Frankl
Head of Renewable Energy Division
International Energy Agency

B20 Energy Forum, 2 October 2015

www.iea.org

Oil price drop and short-term investment climate

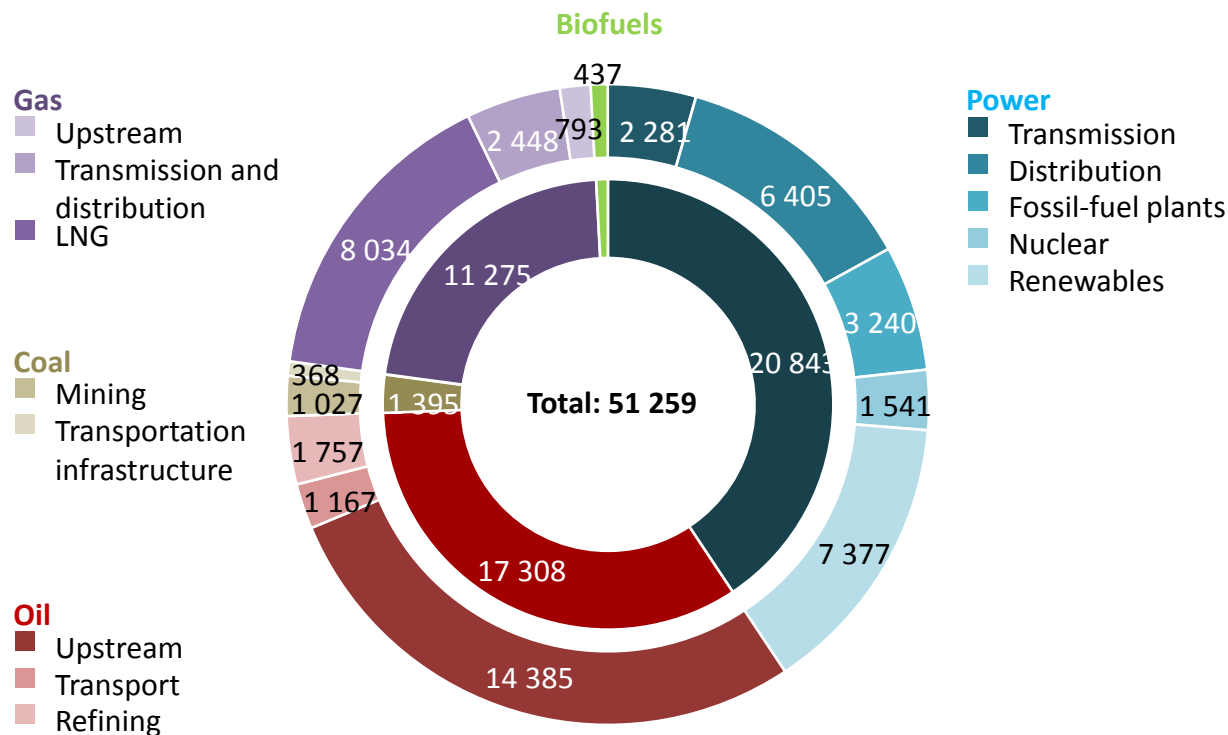
Global upstream oil and gas investment



Announced capex cuts for 2015 are highest (at up to 40%) in North America & Brazil; for tight oil, a decision to stop drilling feeds through quickly into production levels

Long-term investment needs

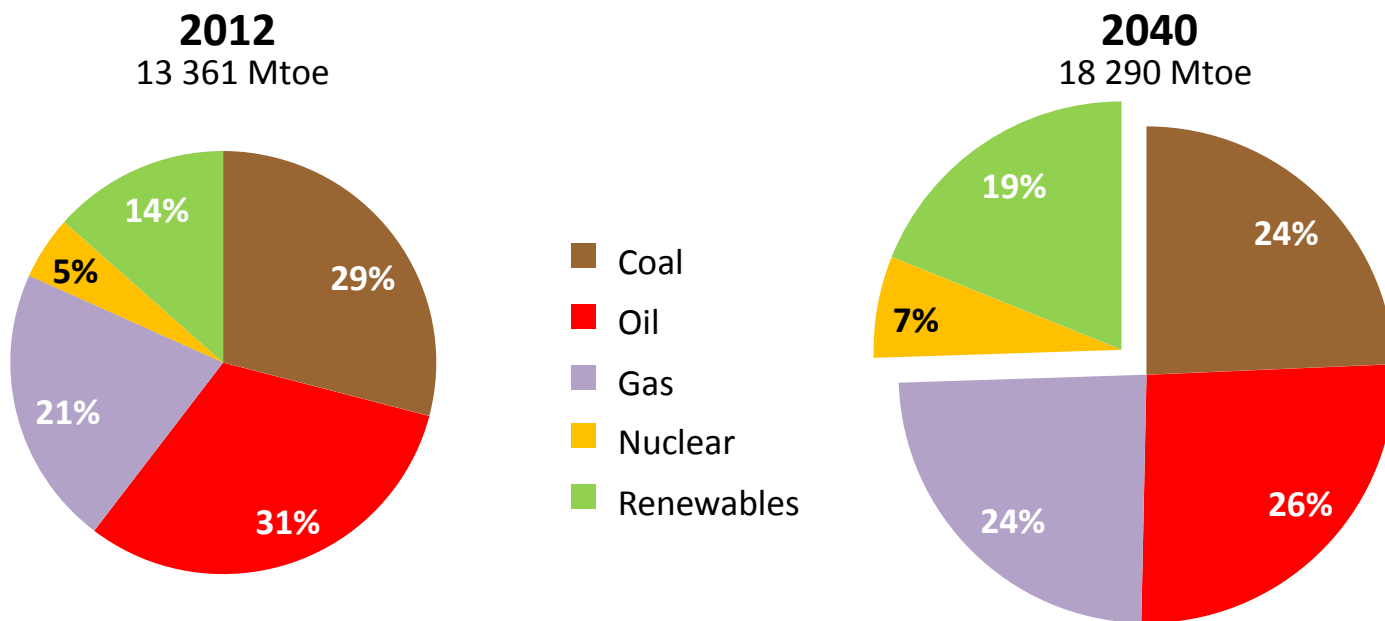
Cumulative global energy supply investment by fuel and type, 2014 – 2040 (\$billion)



Larger share of the investment is required to offset declining production from existing oil and gas fields and to replace power plants

A mix moving towards natural gas & low-carbon energy

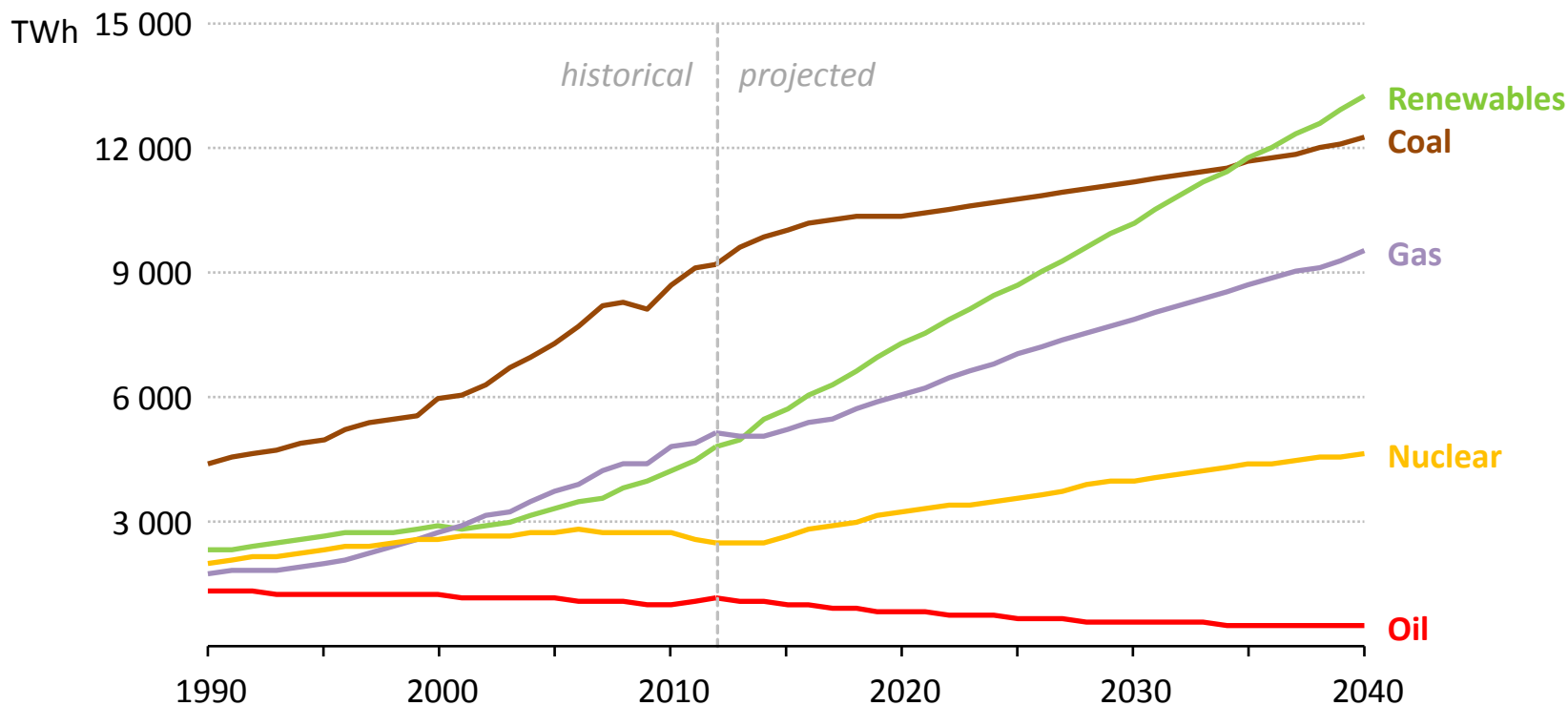
Fuel shares in world primary energy demand



Declining shares of oil & coal in the mix bring the overall share of fossil fuels down to just under three-quarters by 2040, with gas on the way to becoming first fuel – Renewable Energy grows the fastest!

The global power mix continues to evolve

World electricity generation by source

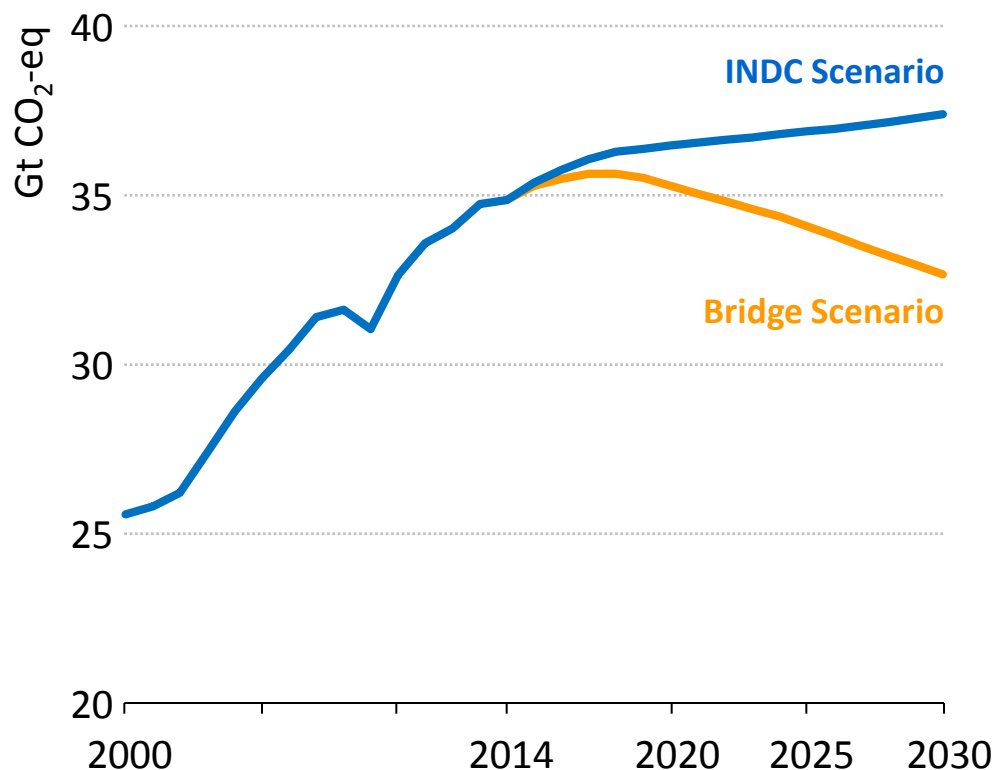


Renewables overtake coal as the largest source of power generation by around 2035; natural gas also sees an increase in market share

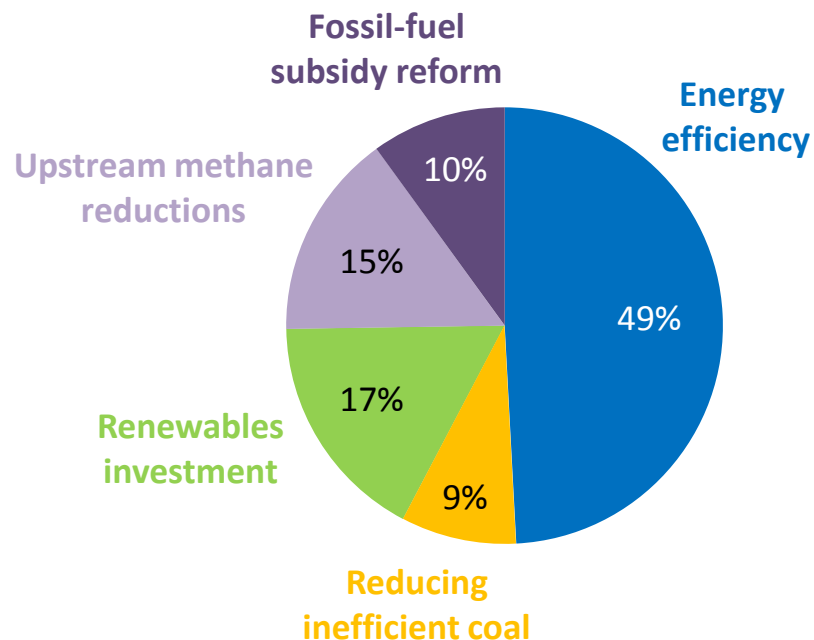
IEA strategy to raise climate ambition

Peaking emissions (*Bridge Scenario*)

Global energy-related GHG emissions



Savings by measure, 2030

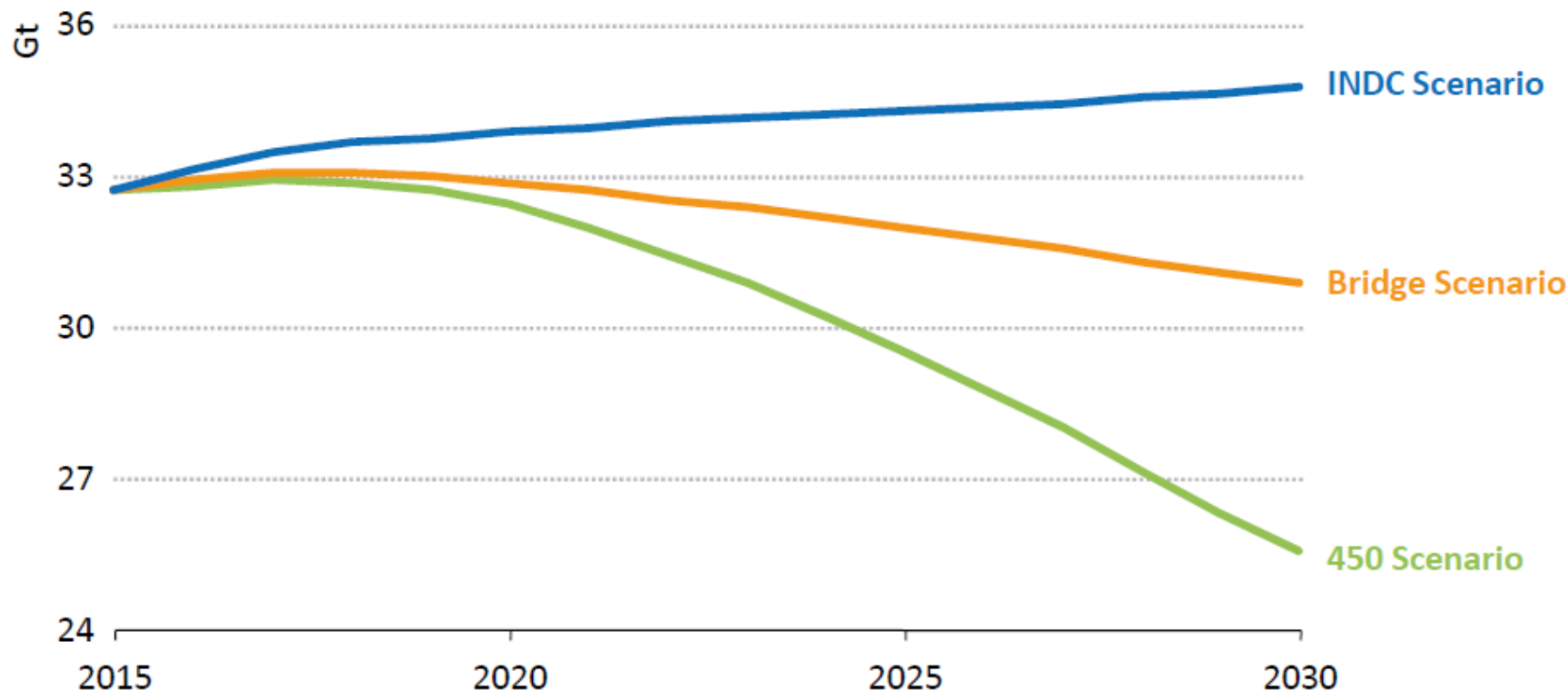


Five measures – shown in a “Bridge Scenario” – achieve a peak in emissions around 2020, using only proven technologies & without harming economic growth

IEA strategy to raise climate ambition

Staying below 2°C (450 Scenario)

Global energy-related GHG emissions by scenario

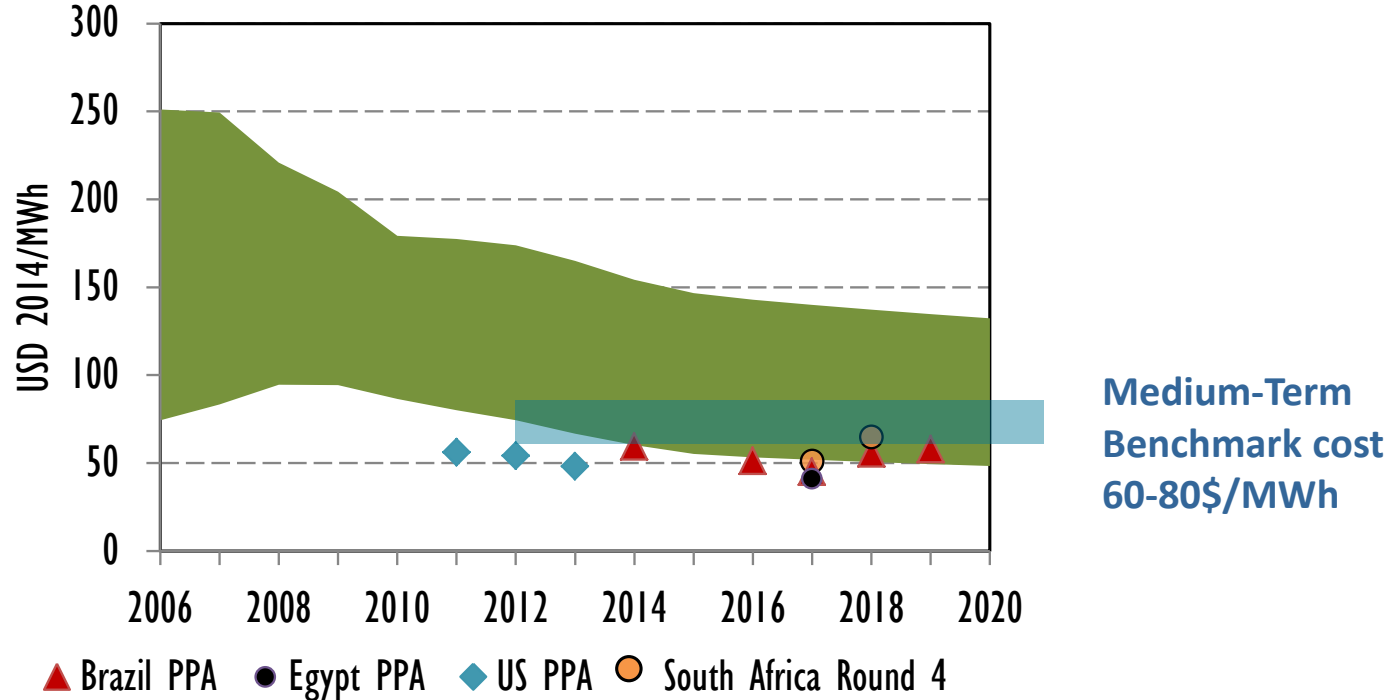


**Investments in Renewables should reach \$400 bn/y by 2030 in the Bridge scenario.
In the 450 scenario, the \$400 bn/y should be reached by 2025 already,
then reach \$470 bn/y on average over 2026-2040**

How quickly can RE costs converge towards best world benchmarks?

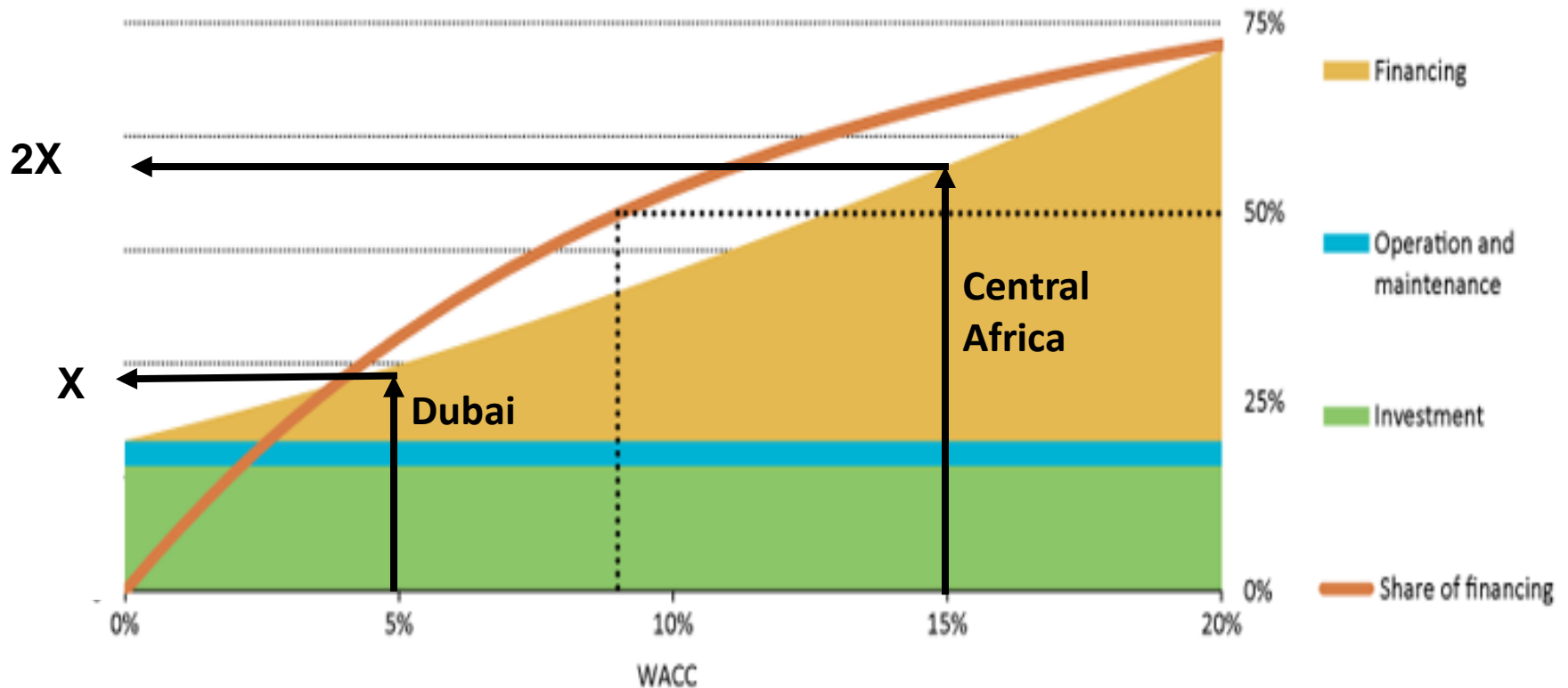
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Typical onshore wind levelised costs of electricity generation (2006-2020)



A combination of price competition, long-term contracts, good resources and financial de-risking measures is creating deployment opportunities in newer markets and at lower costs

Impact of cost of capital on the levelised generation cost of solar PV



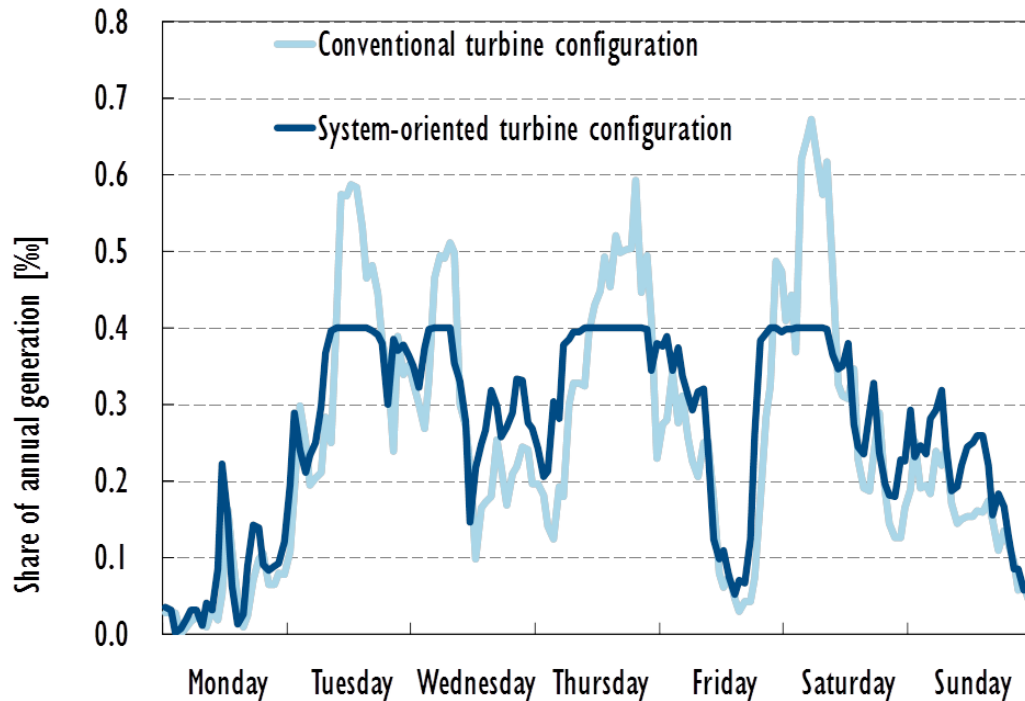
Market and regulatory risks can increase weighted average cost of capital and undermine competitiveness of PV and Wind power

Increasing variable RE will require more system flexibility

1) Foster System-friendly RE

2) Better market design & operation

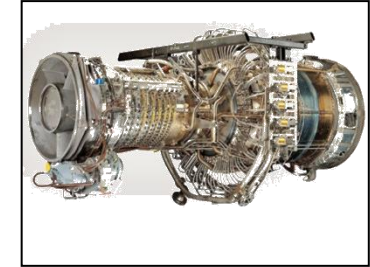
3) Increase flexibility of other power system components



Grids



Generation



Storage

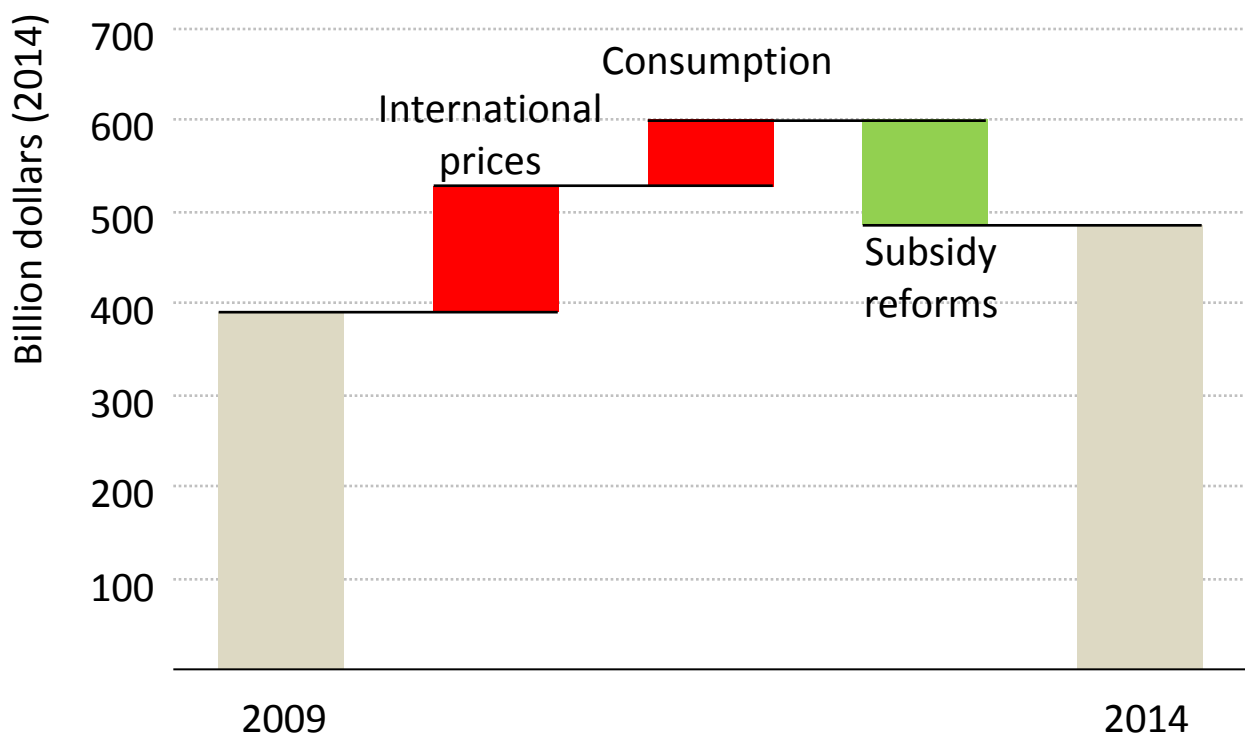


Demand Side



Fossil-fuels subsidies remain persistent, but reforms make a difference

Contributing factors to the change in the value of subsidies between 2009 and 2014



In the absence of the reforms that have been taken since the G20 in 2009, fossil fuel consumption subsidies would have been 24% higher in 2014 at \$610 billion

- **Emergence of G20 as forum for global energy collaboration**
- **Modernisation of IEA with strong bilateral cooperation with emerging economies and international organisations, incl. G20**
- **IEA high-quality data and analysis across all fuels and countries**
 - *Energy access* – IEA role in global tracking framework (WEO 2014 energy access in SSA, WEO 2015 energy access in India and South East Asia) support to SE4ALL
 - *Renewable energy* – IEA grid integration work, cost analysis, RE policies database and assessment, benchmarking, cooperation with IRENA
 - *Energy efficiency* – data and policies (JEUDI, E4)
 - Outreach partner for global *technology and innovation* collaboration (IEA Implementing Agreements)
 - *Energy security* – beyond oil, to gas and electricity



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- ***Energy Security***
- ***Environmental Protection***
- ***Economic Growth***
- ***Engagement Worldwide***