



International
Energy Agency
Secure
Sustainable
Together

World Outlook Energy 2015

Brent Wanner, Senior Energy Analyst
Stockholm, 24 November 2015

The start of a new energy era?

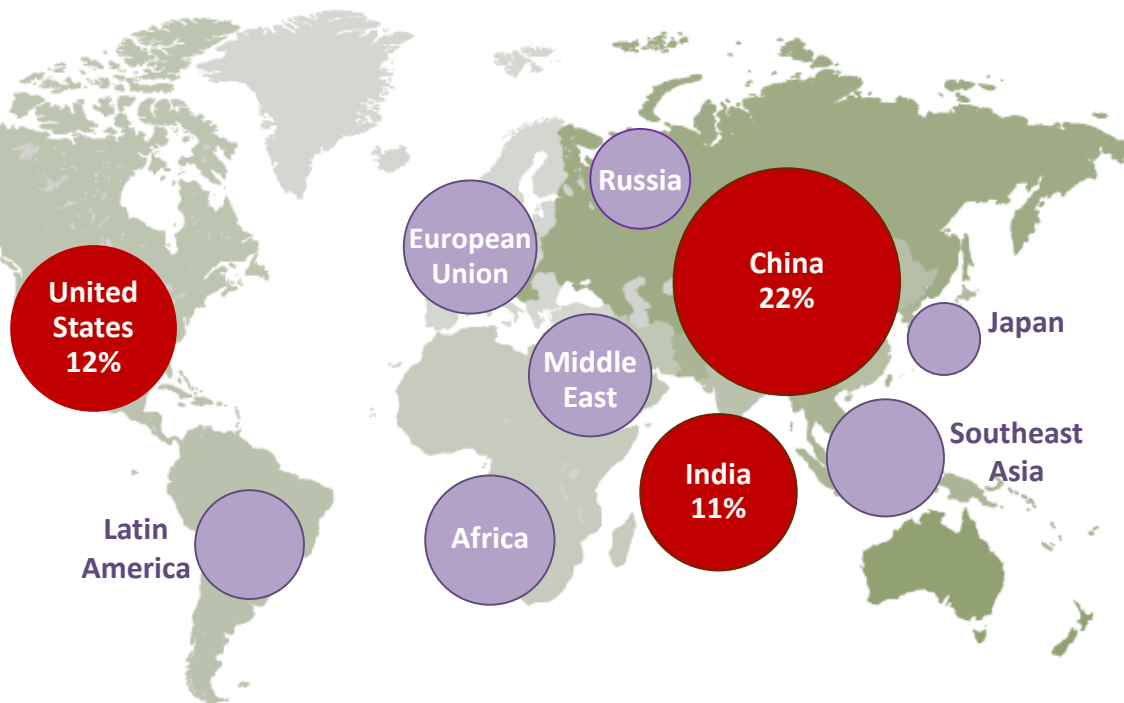
- **2015 has seen lower prices for all fossil fuels**
 - *Oil & gas could face second year of falling upstream investment in 2016*
 - *Coal prices remain at rock-bottom as demand slows in China*

- **Signals turn green ahead of key Paris climate summit**
 - *Pledges of 150+ countries account for 90% of energy-related emissions*
 - *Renewables capacity additions at a record-high of 130 GW in 2014*
 - *Fossil-fuel subsidy reform, led by India & Indonesia, reduces the global subsidy bill below \$500 billion in 2014*

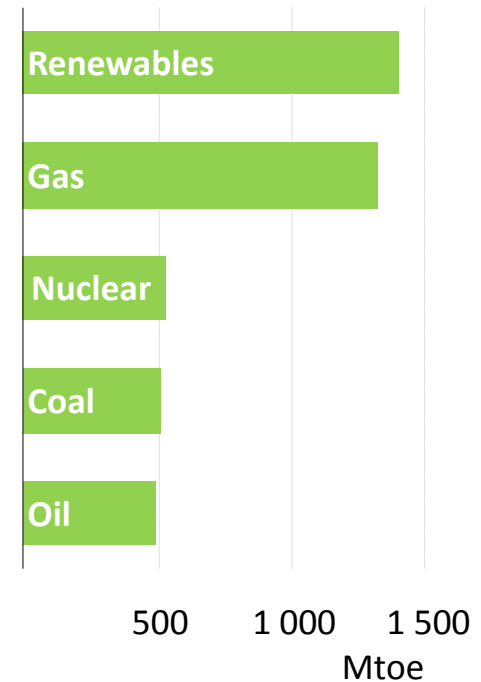
- **Multiple signs of change, but are they moving the energy system in the right direction?**

The global energy map in 2040

Share of primary energy demand, 2040



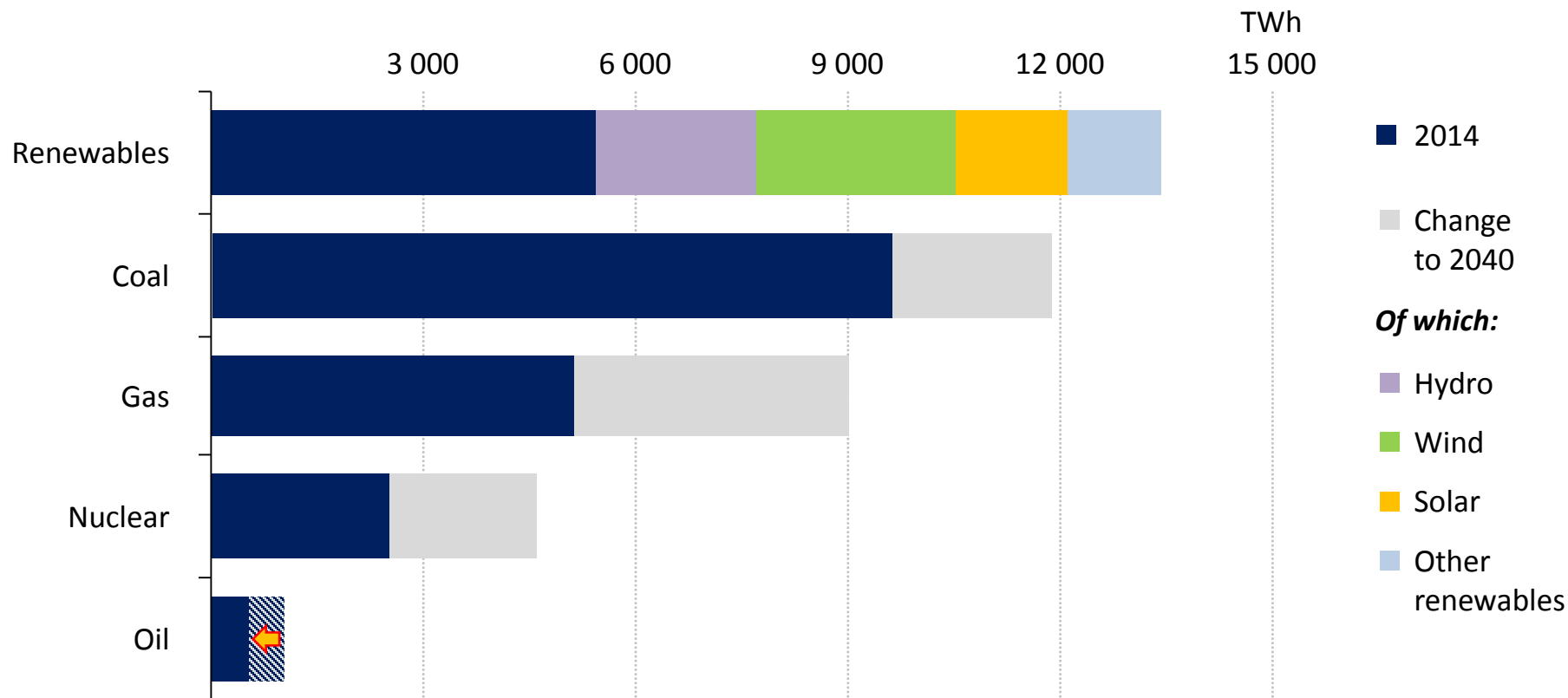
Change 2014-2040



Renewables see the highest share of growth to 2040; Asia absorbs an increasing share of global trade – 80% of coal, 75% of oil and 60% of gas in 2040

Power is leading the transformation of the energy system

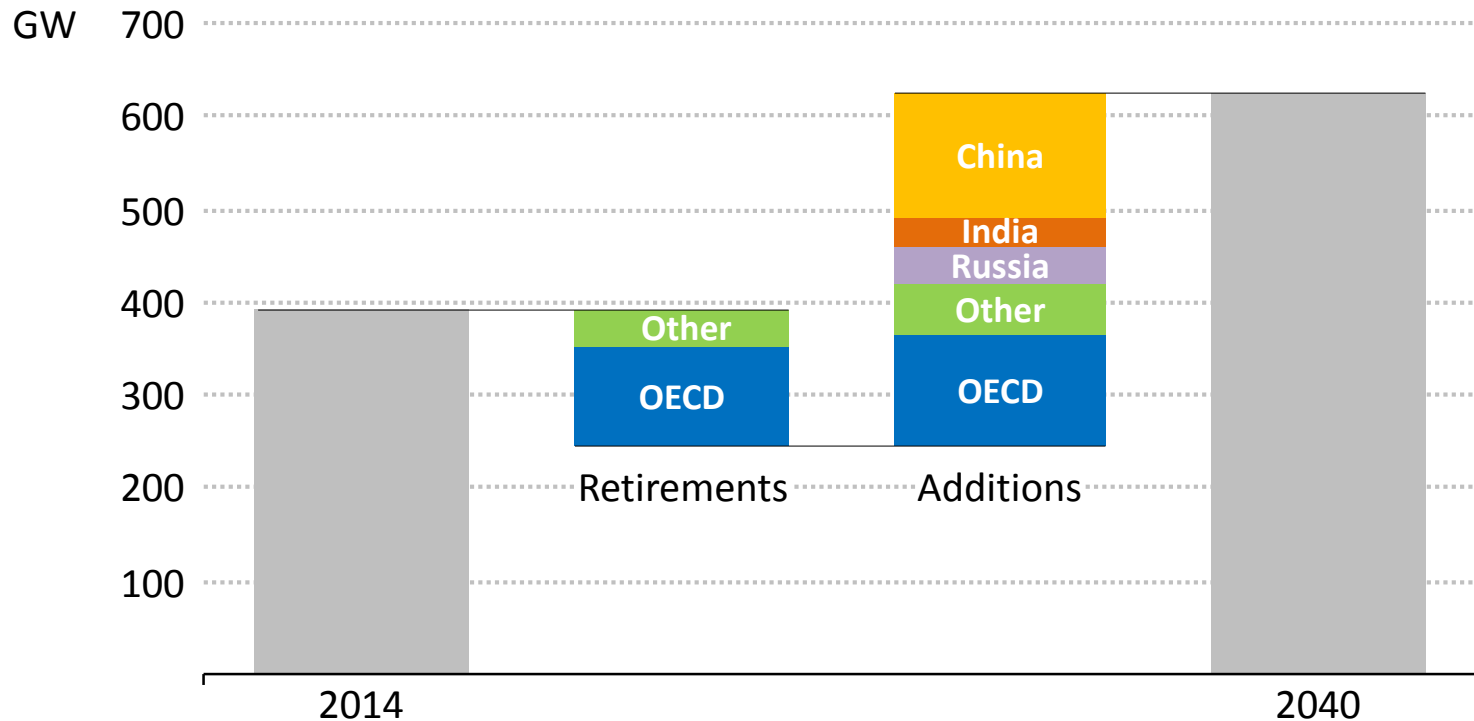
Global electricity generation by source



Driven by continued policy support, renewables account for half of additional global generation, overtaking coal around 2030 to become the largest power source

Nuclear capacity increases, but no nuclear renaissance in sight

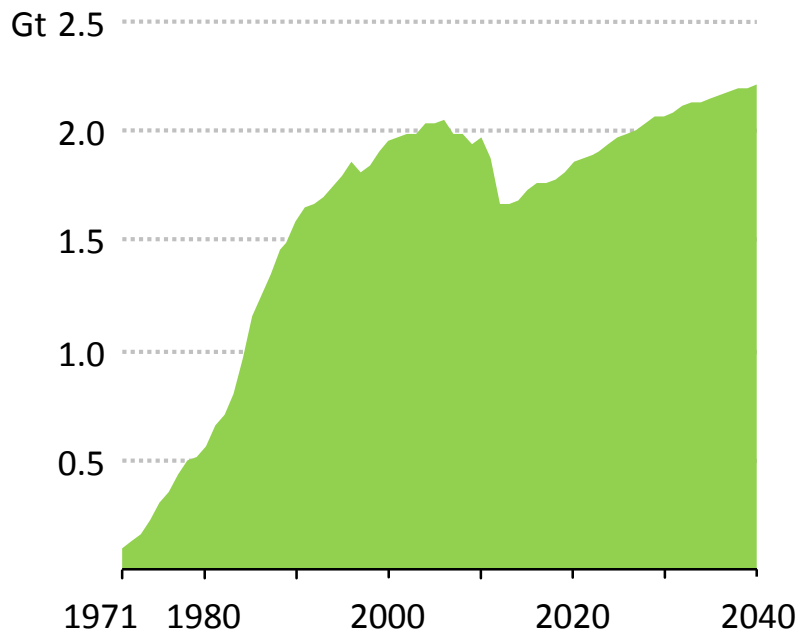
Nuclear capacity by selected region



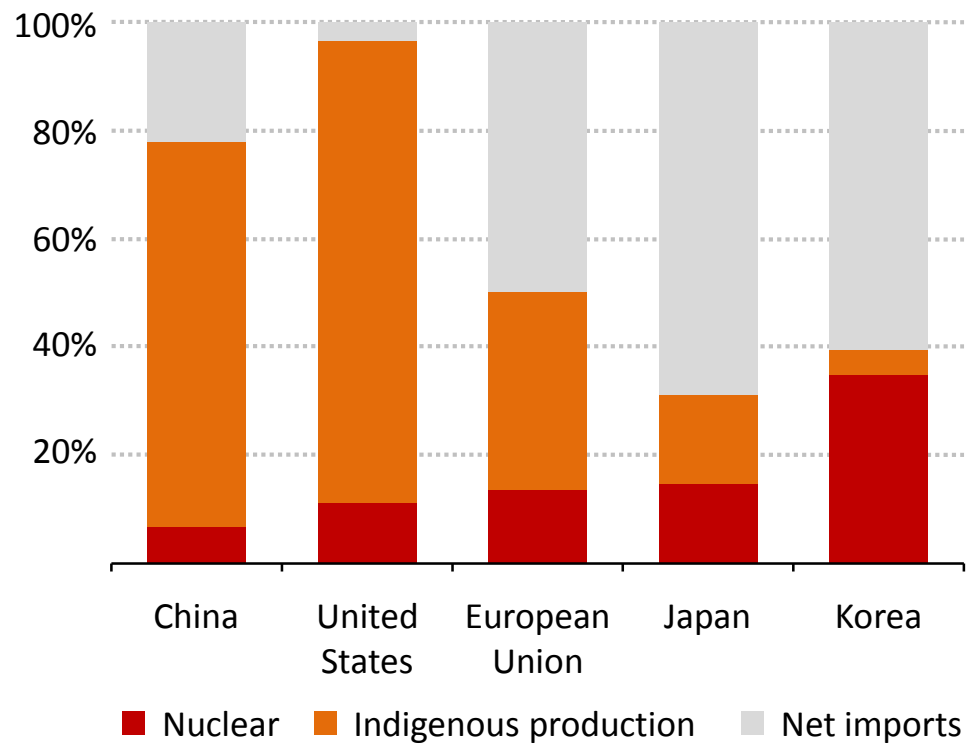
Capacity grows 55% to over 610 GW in 2040, led by non-OECD, notably China & India; yet the share of nuclear in the global power mix remains well-below its historic peak

Nuclear power can play a role in CO₂ abatement & energy security

CO₂ emissions avoided annually by nuclear power 1971-2040



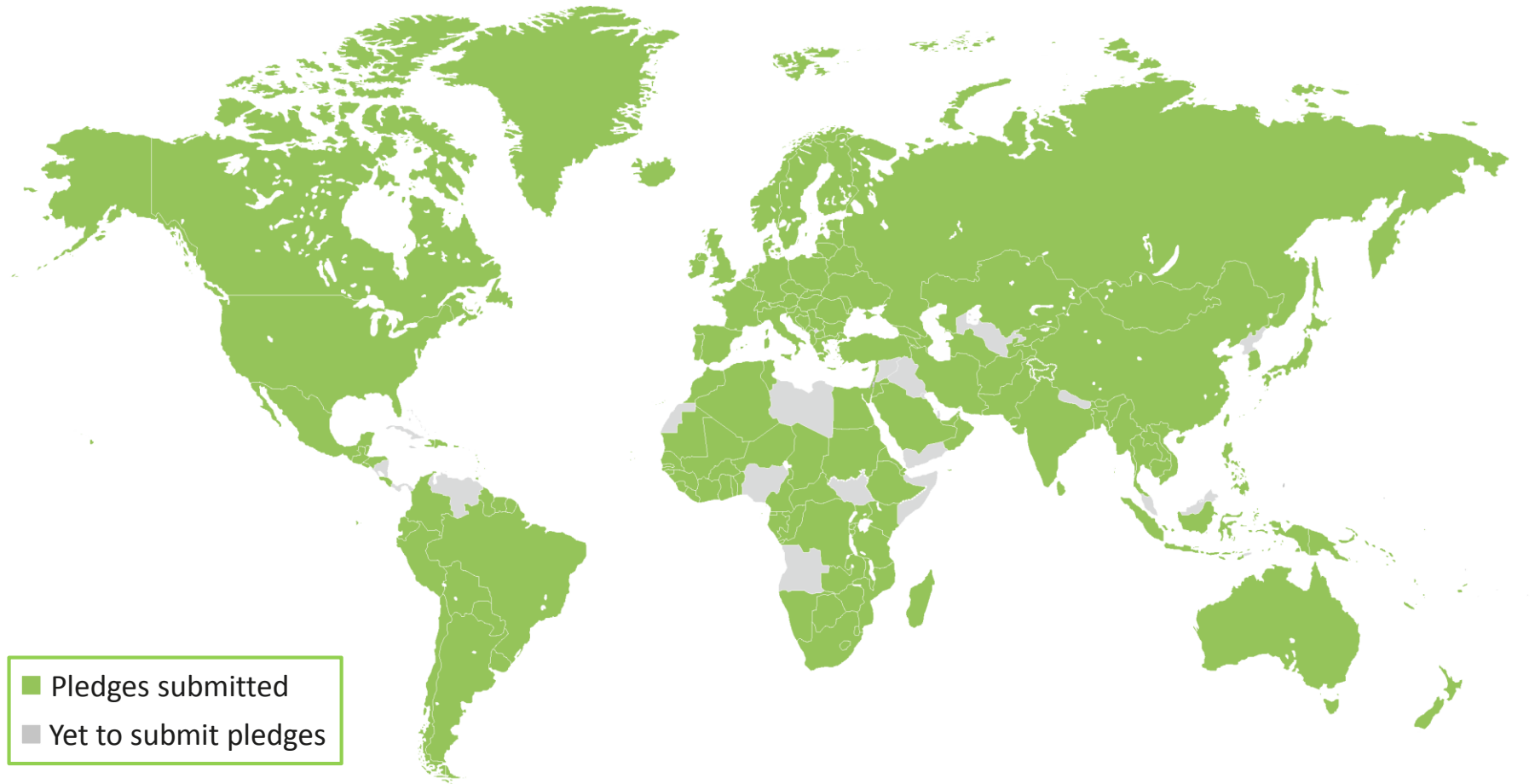
Share of energy demand met by domestic sources and nuclear power in 2040



By 2040, almost 4 years of current emissions have been avoided by nuclear power; it cuts dependence on foreign fuel supplies & lowers import bills for some countries

The coverage of climate pledges is impressive

World
Outlook Energy
2015

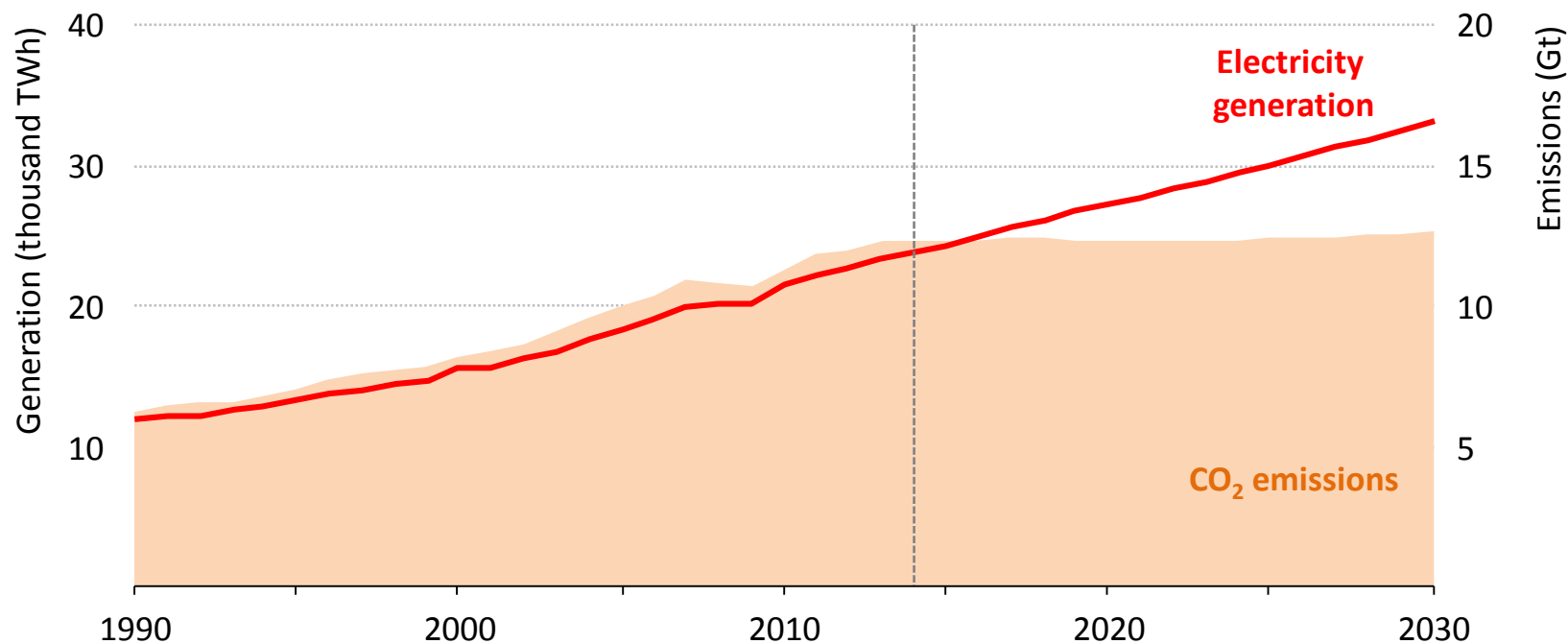


Climate pledges for COP21 are consistent with a temperature rise of 2.7 °C, with investment needs of \$13.5 trillion in low-carbon technologies & efficiency to 2030

Climate pledges decouple power sector emissions from electricity demand

World Energy Outlook 2015

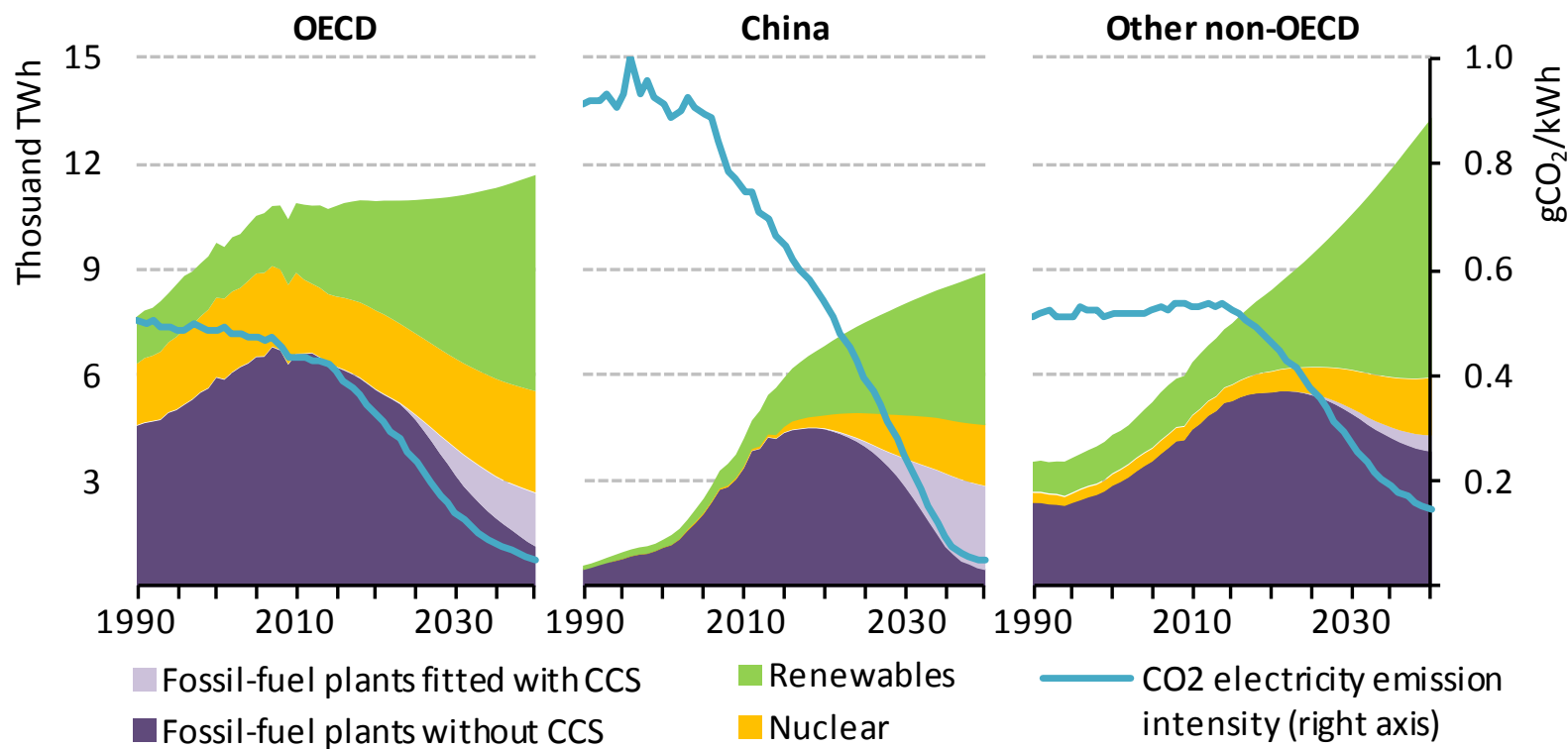
World electricity generation and related CO₂ emissions



The share of low-carbon power generation grows to almost 45% in 2030 so that power emissions remain flat, while electricity demand grows by more than 40%

The power sector is central to a low-carbon world

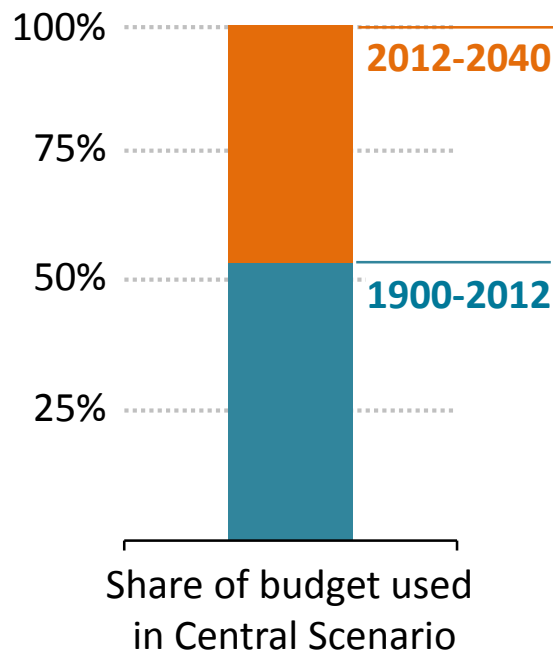
Electricity generation by technology and CO₂ intensity in the 450 Scenario



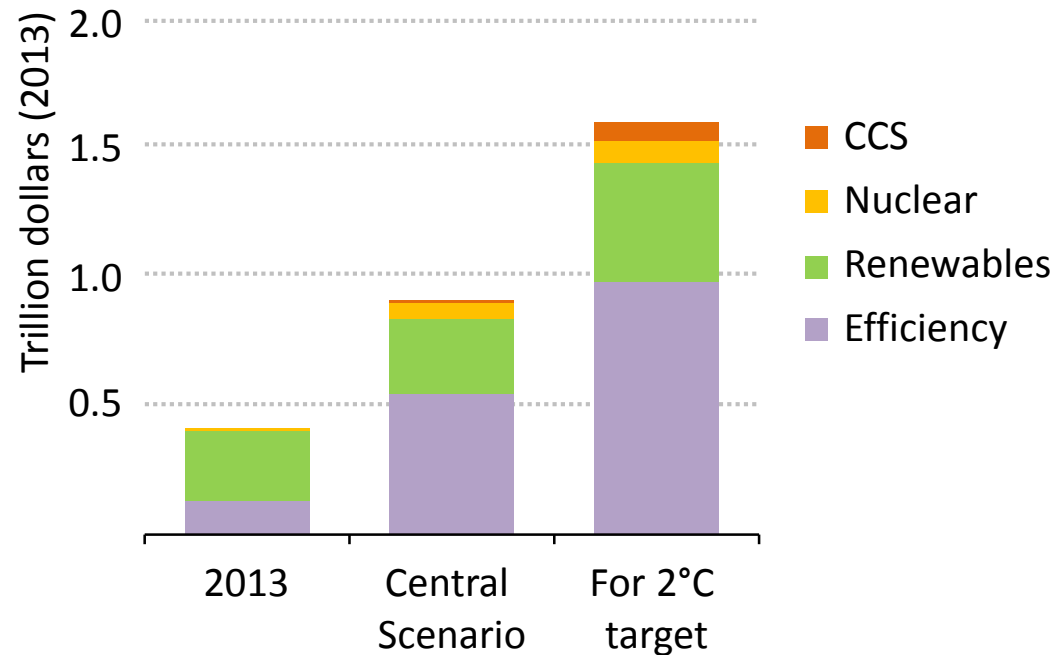
Low-carbon power generation needs to quadruple with respect to today, with renewables reaching half of the global power mix in 2040

The 2 °C goal – last chance in Paris?

World CO₂ budget for 2 °C ~2300 Gt



Average annual low-carbon investment, 2014-2040



The entire global CO₂ budget to 2100 is used up by 2040 – Paris must send a strong signal for increasing low-carbon investment four times beyond current levels

IEA Ministers issue statement on energy and climate change

■ IEA's 29 member countries issue a collective statement stating that they:

- *Welcome INDCs and endorse IEA view that INDCs should be a first step upon which to build ever-increasing ambition.*
- *Welcome the IEA's five key opportunities to reduce energy sector emissions:*
 - 1.** *Increasing energy efficiency in industry, buildings and transport*
 - 2.** *Phasing out the use of least efficient coal fired power plants*
 - 3.** *Increasing investment in renewables, including hydro*
 - 4.** *Gradual phasing out of inefficient fossil fuel subsidies*
 - 5.** *Reducing methane emissions from oil and gas production*
- *Call on the IEA to: advise how to enhance the environmental sustainability of the energy sector (including the reduction of local pollution), expand tracking of the energy sector transformation and increase international collaboration.*

- **Low prices bring gains to consumers in the short term, but can lead to greater reliance on fossil fuels**
- **India and China are the leading actors in the future energy growth story, with far-reaching impacts on energy markets**
- **The energy transition is underway in the power sector, led by renewables, with a role to play for nuclear**
- **More action is needed to put the world on a path to 2° Celsius, tapping the full suite of existing and emerging low carbon options**
- **International cooperation on energy has never been more vital as we look to COP to set up a virtuous cycle of increasing ambition**



International
Energy Agency
Secure
Sustainable
Together

World Energy Outlook 2015

www.worldenergyoutlook.org