International Energy Agency

WORLD ENERGY OUTLOOK 2011

World Energy Outlook 2011

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The context: fresh challenges add to already worrying trends

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- **Economic concerns have diverted attention from energy policy and limited the means of intervention**
- **Post-Fukushima, nuclear is facing uncertainty**
- **MENA turmoil raised questions about region's investment plans**
- **Some key trends are pointing in worrying directions:**
  - ***CO_2 emissions rebounded to a record high***
  - ***energy efficiency of global economy worsened for 2nd straight year***
  - ***spending on oil imports is near record highs***

Emerging economies continue to drive global energy demand

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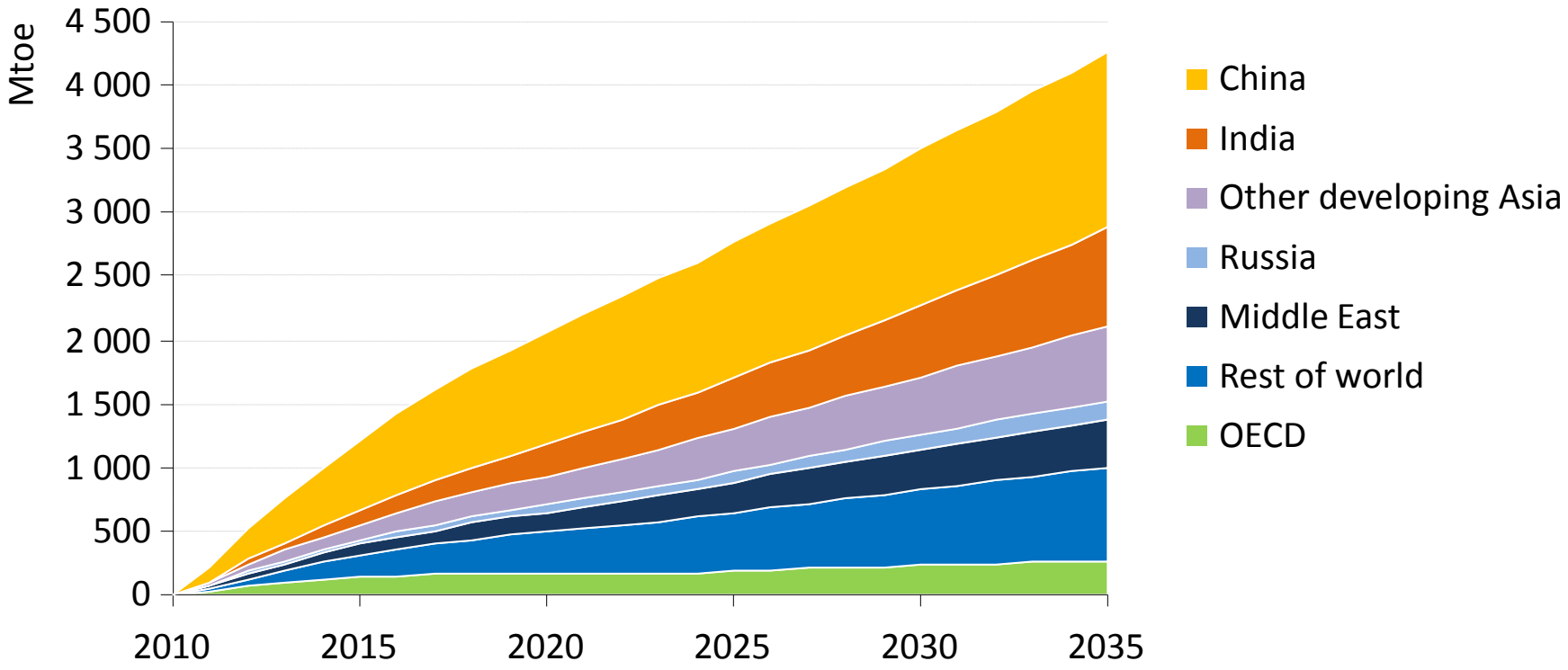
Growth in primary energy demand



Global energy demand increases by one-third from 2010 to 2035, with China & India accounting for 50% of the growth

Changing oil import needs are set to shift concerns about oil security

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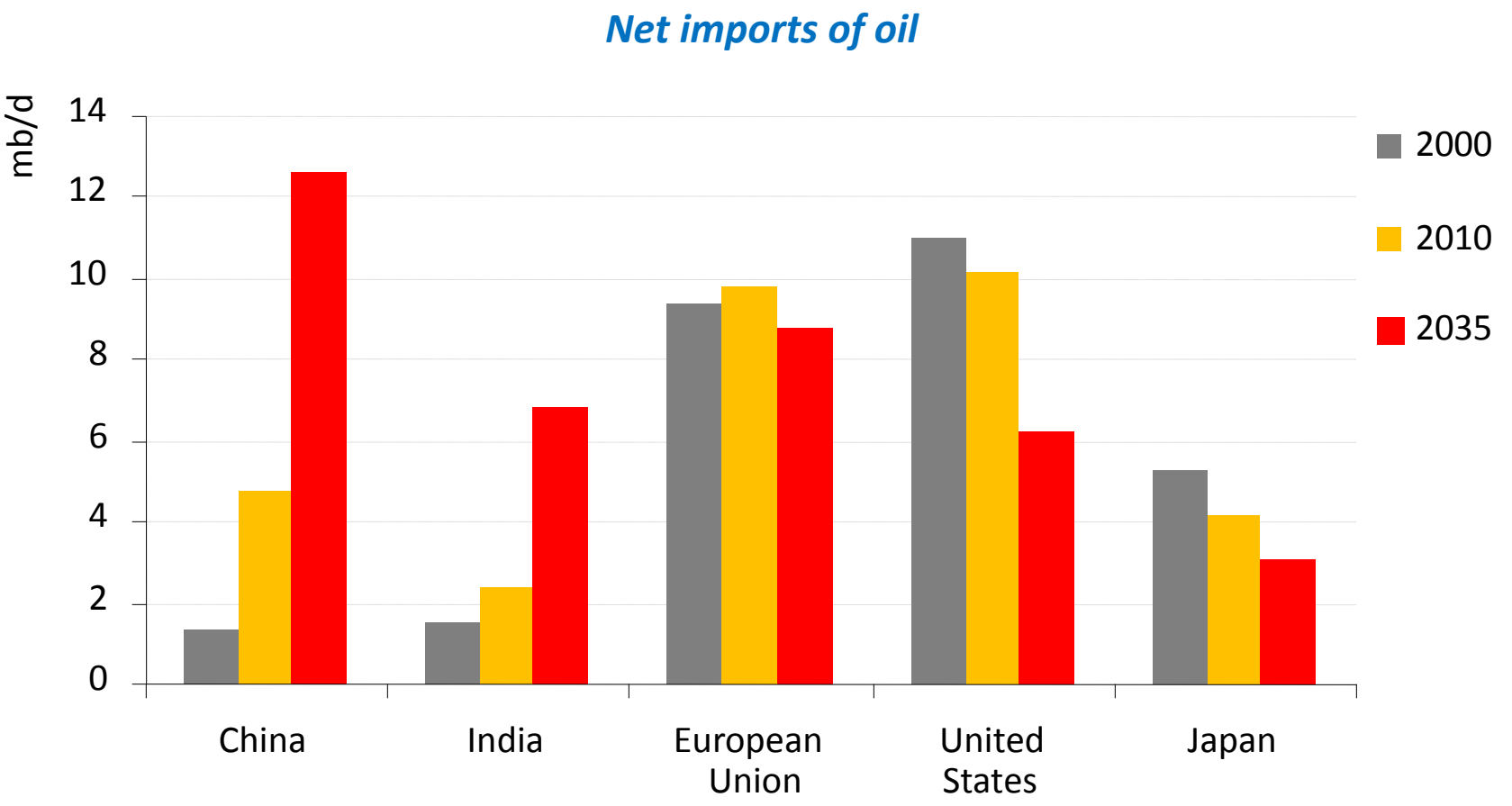

US oil imports drop due to rising domestic output & improved transport efficiency: EU imports overtake those of the US around 2015; China becomes the largest importer around 2020

Golden prospects for natural gas

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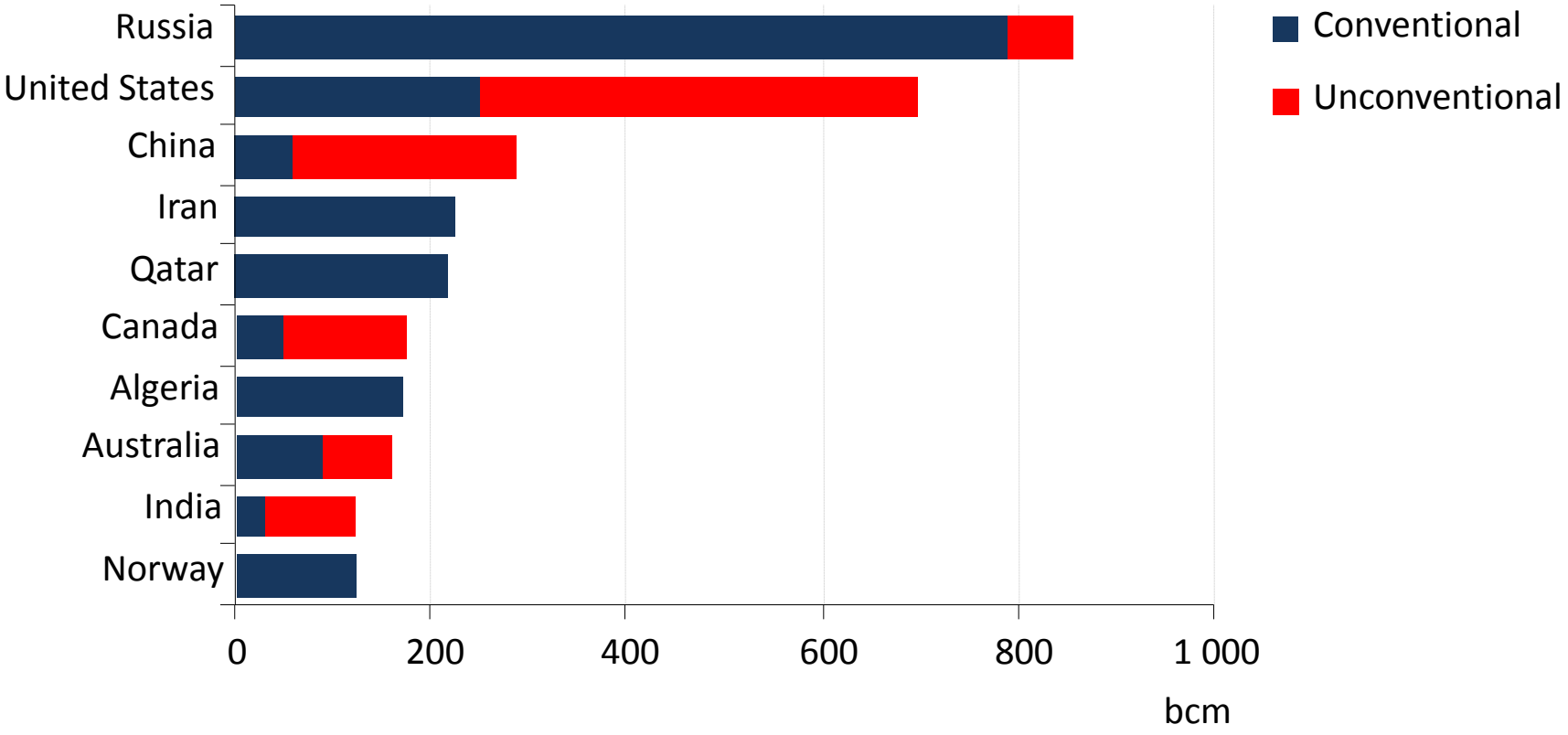
Largest natural gas producers in 2035



Unconventional natural gas supplies 40% of the 1.7 tcm increase in global supply, but best practices are essential to successfully address environmental challenges

Coal won the energy race in the first decade of the 21st century

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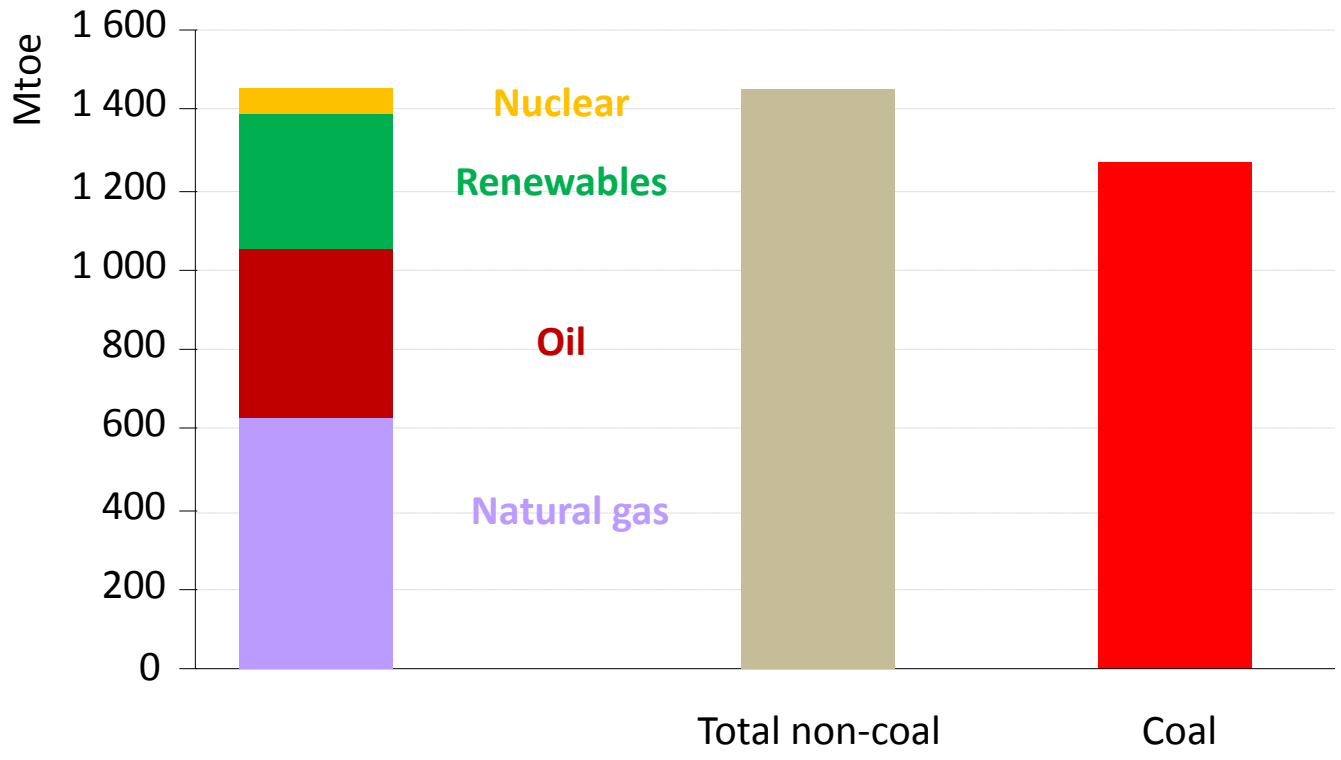
Growth in global energy demand, 2000-2010



Coal accounted for nearly half of the increase in global energy use over the past decade, with the bulk of the growth coming from the power sector in emerging economies

Coal is now at a crossroads

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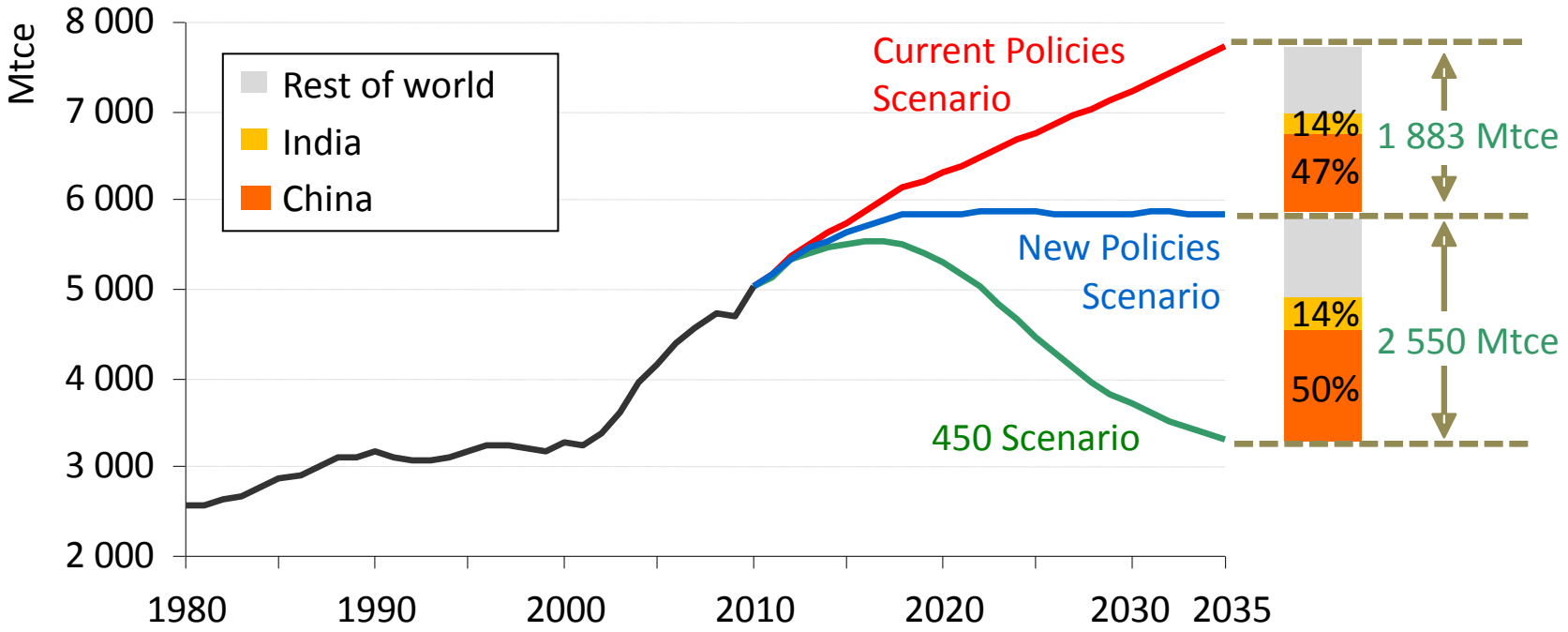
World primary coal demand by region and scenario



Coal demand prospects depend critically on government energy and environmental policies, especially in China and India

Asia: the arena of future coal trade

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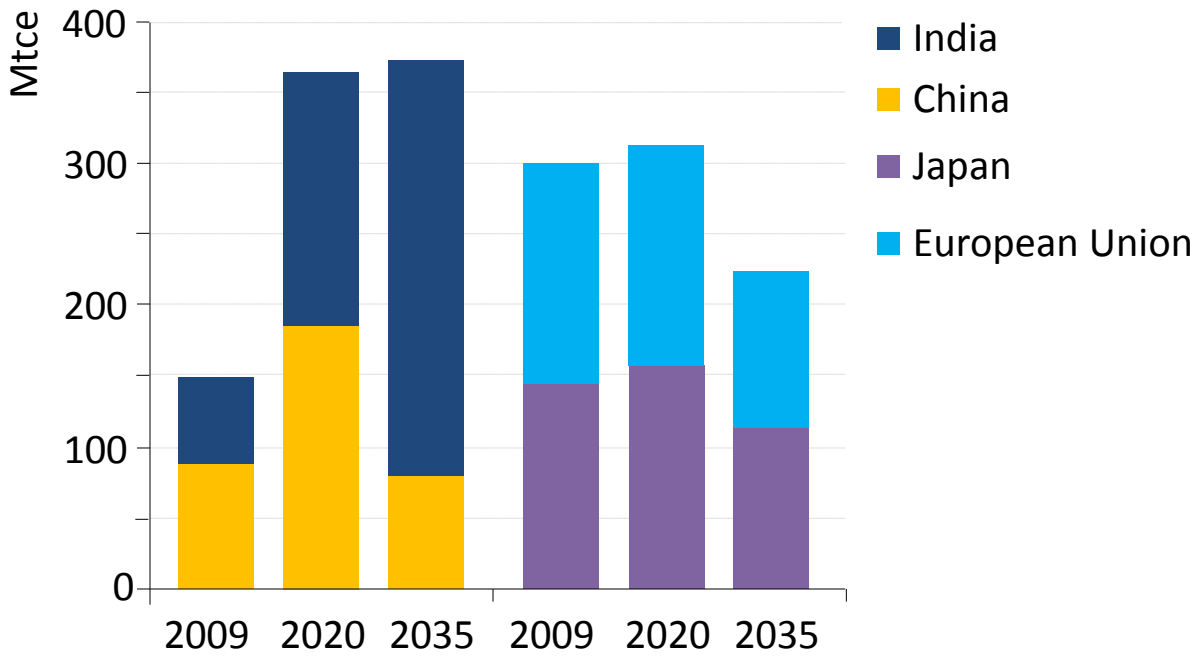
Major coal net importers



International coal markets & prices become increasingly sensitive to developments in Asia; India surpasses China as the biggest coal importer soon after 2020

Global second thoughts on nuclear would have far-reaching consequences

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- **"Low Nuclear Case" examines impact of nuclear component of future energy supply being cut in half**
- **Gives a boost to renewables, but increases import bills, reduces diversity & makes it harder to combat climate change**
- **By 2035, compared with the New Policies Scenario:**
  - ***coal demand increases by twice Australia's steam coal exports***
  - ***natural gas demand increases by two-thirds Russia's natural gas net exports***
  - ***power- sector CO_2 emissions increase by 6.2%***
- **Biggest implications are for countries with limited energy resources that planned to rely on nuclear power**

The overall value of subsidies to renewables is set to rise

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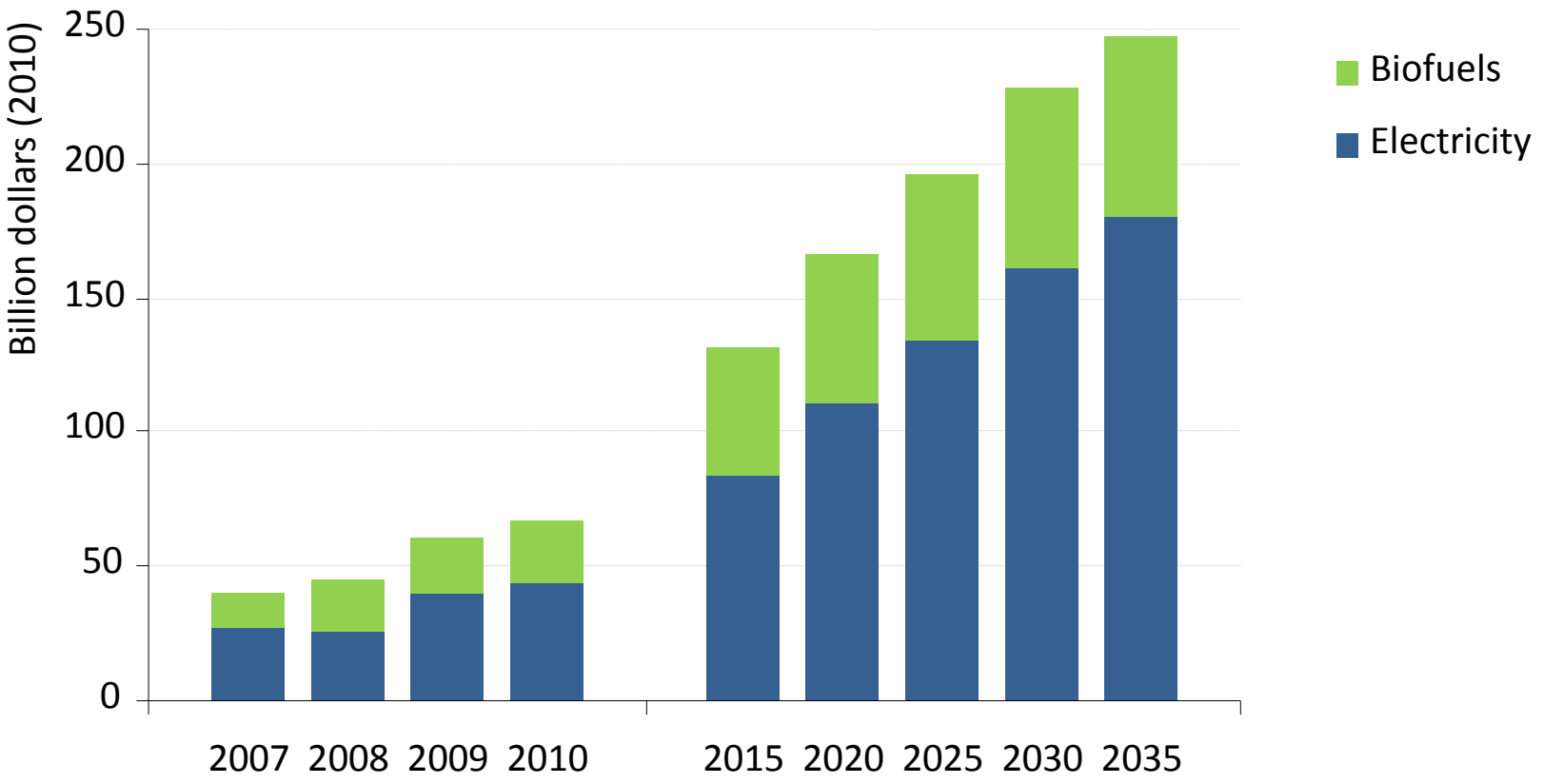

Renewable subsidies of $66 billion in 2010 (compared with $409 billion for fossil fuels), need to climb to $250 billion in 2035 as rising deployment outweighs improved competitiveness

The door to 2°C is closing, but will we be "locked-in" ?

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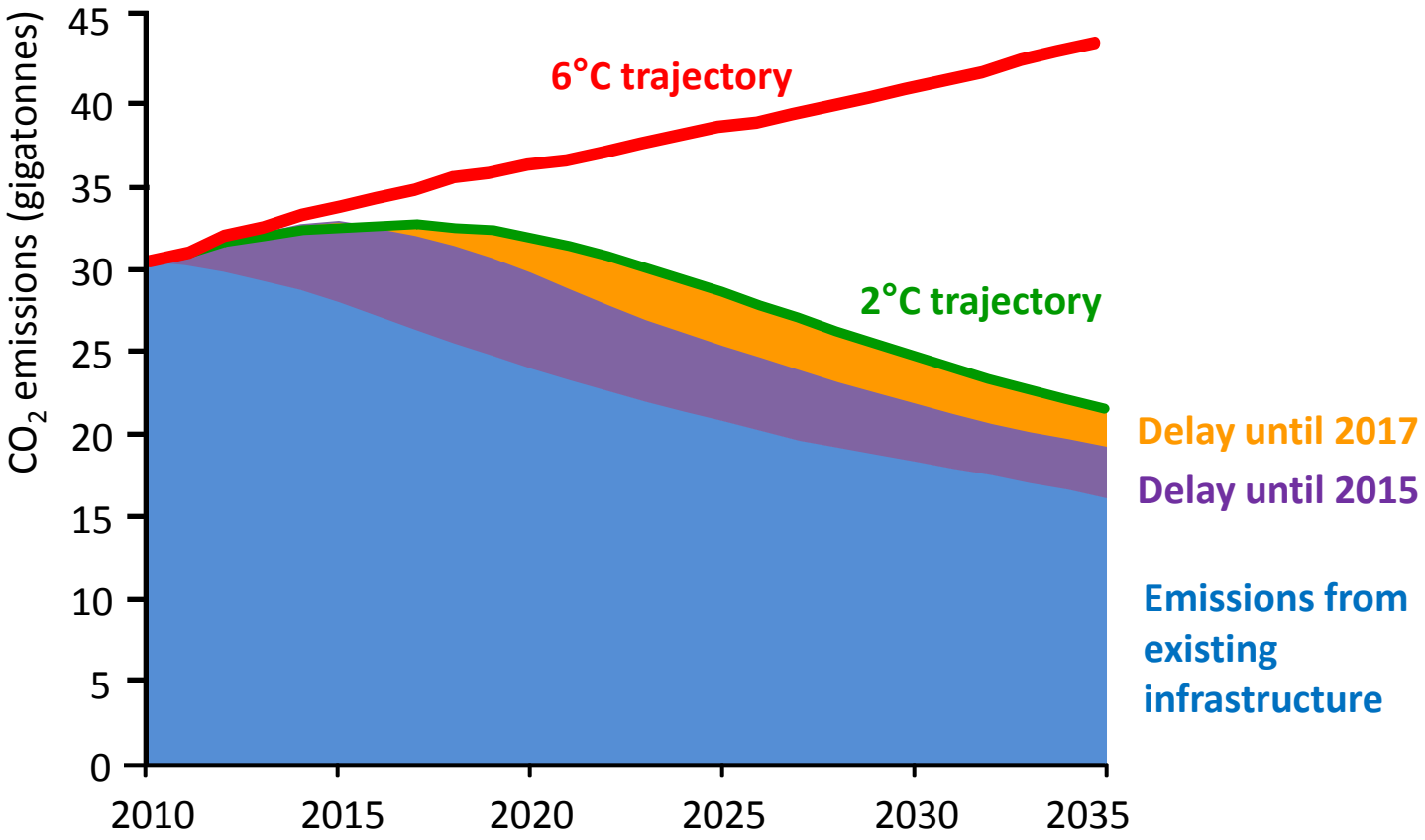
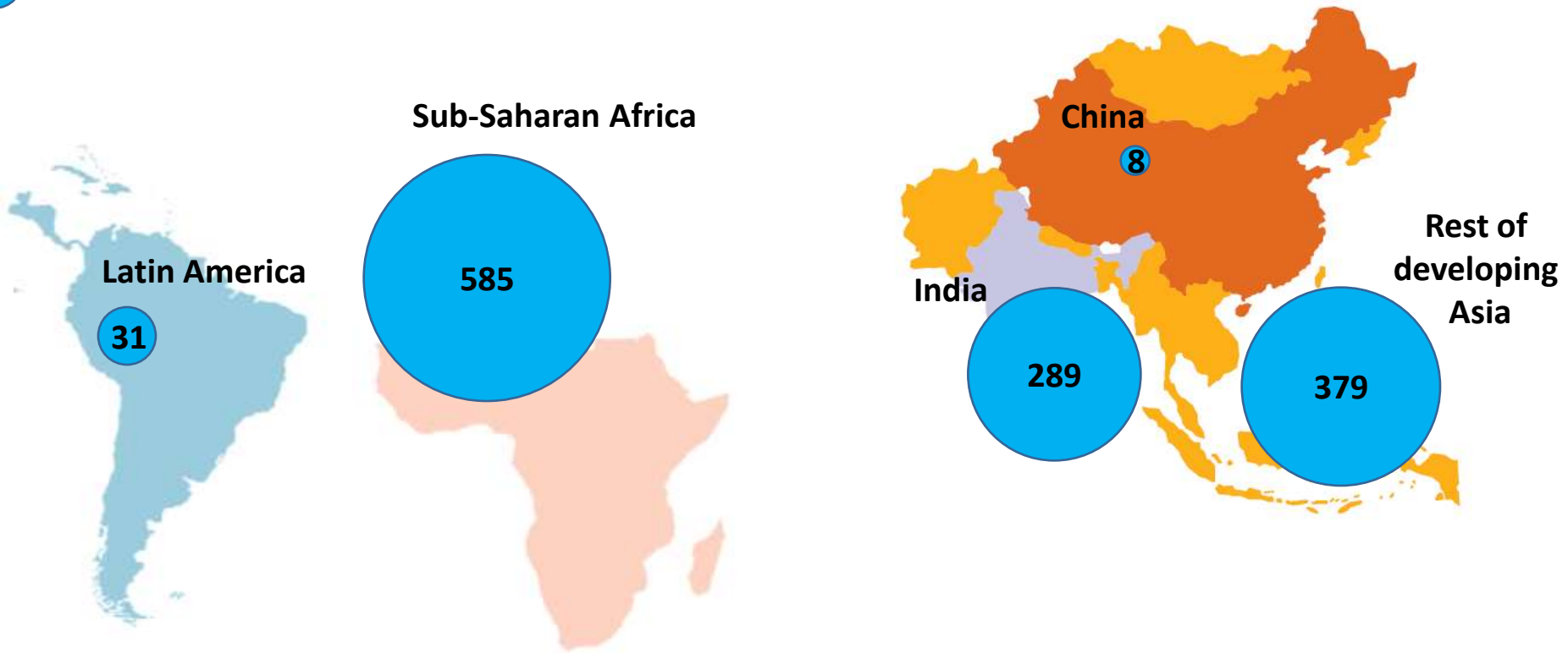


Without further action, by 2017 all CO_2 emissions permitted in the 450 Scenario will be "locked-in" by existing power plants, factories, buildings, etc

Energy poverty is widespread

Million people without electricity



1.3 billion people in the world live without electricity

If we don't change direction soon, we'll end up where we're heading

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- In a world full of uncertainty, one thing is sure: rising incomes & population will push energy needs higher
- Oil supply diversity is diminishing, while new options are opening up for natural gas
- Coal – the "forgotten fuel" – has underpinned growth, but its future will be shaped by uptake of efficient power plants & CCS
- Power sector investment will become increasingly capital intensive with the rising share of renewables
- The world needs Russian energy, while Russia needs to use less
- Despite steps in the right direction, the door to 2°C is closing