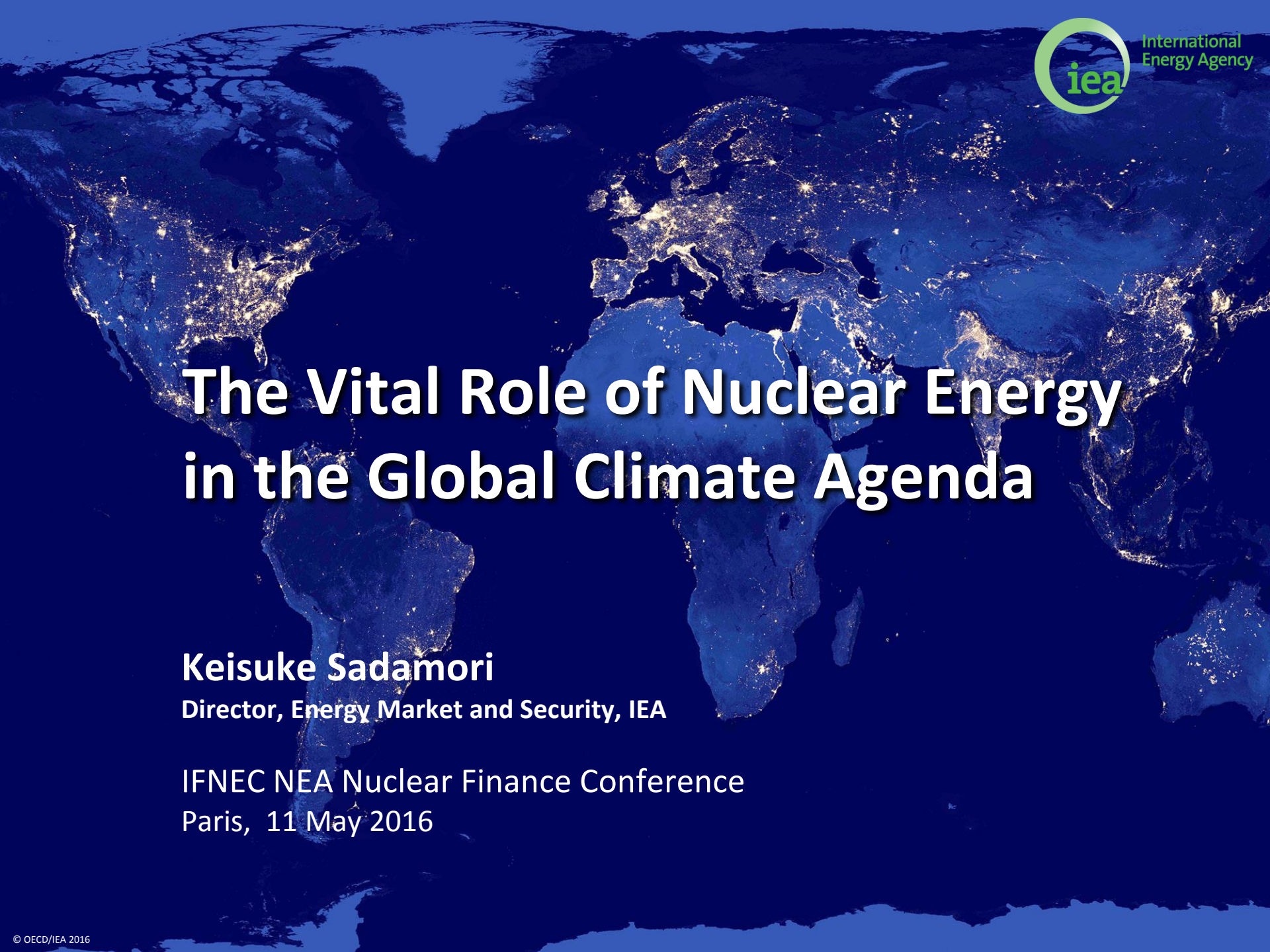


The Vital Role of Nuclear Energy in the Global Climate Agenda

Keisuke Sadamori
Director, Energy Market and Security, IEA

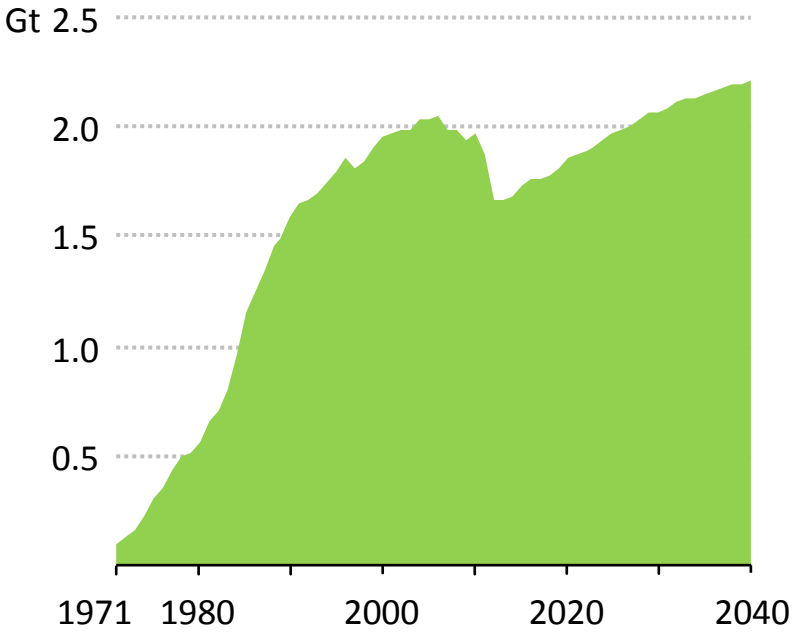
IFNEC NEA Nuclear Finance Conference
Paris, 11 May 2016

The vital role of nuclear in the Global Climate Agenda

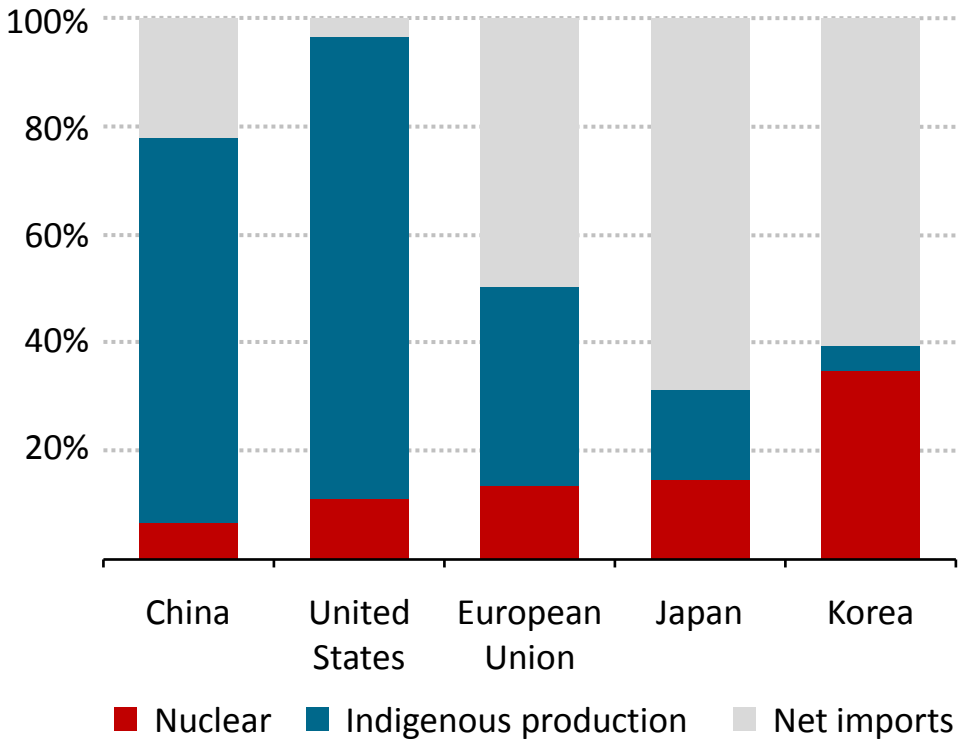
- **Maintaining momentum after Paris COP 21 agreement**
- **Tapping the full potential of nuclear**
- **Aligning the market framework for decarbonisation**
- **Outline:**
  - **Existing nuclear contribution**
  - **A key role in decarbonisaiton scenarios**
  - **Nuclear competitiveness**
  - **Nuclear in competitive electricity markets**
  - **Lifetime extension**
  - **RD&D**

Nuclear power can play a role in CO_2 abatement & energy security

CO_2 emissions avoided annually by nuclear power 1971-2040

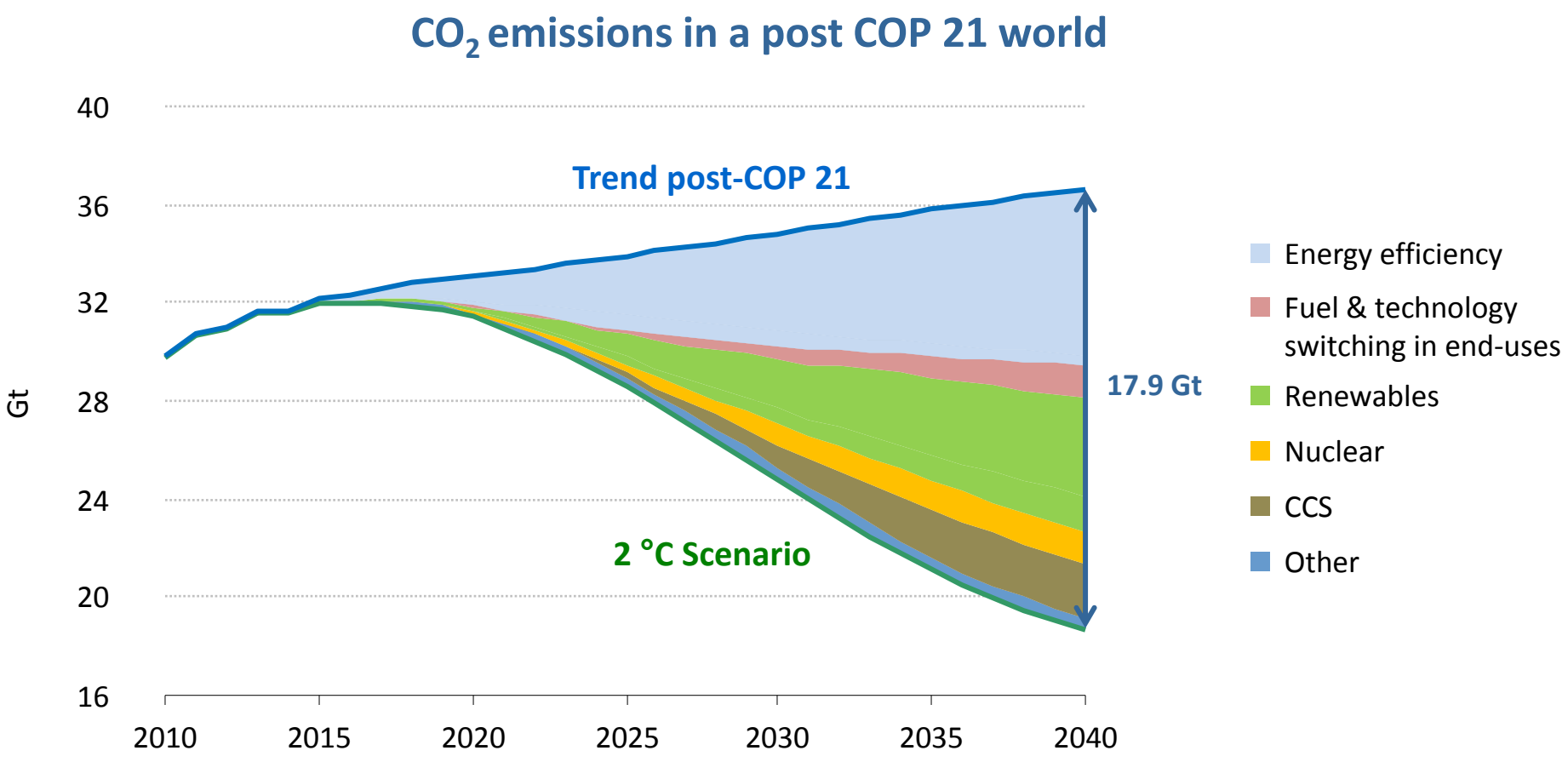


Share of energy demand met by domestic sources and nuclear power in 2040



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

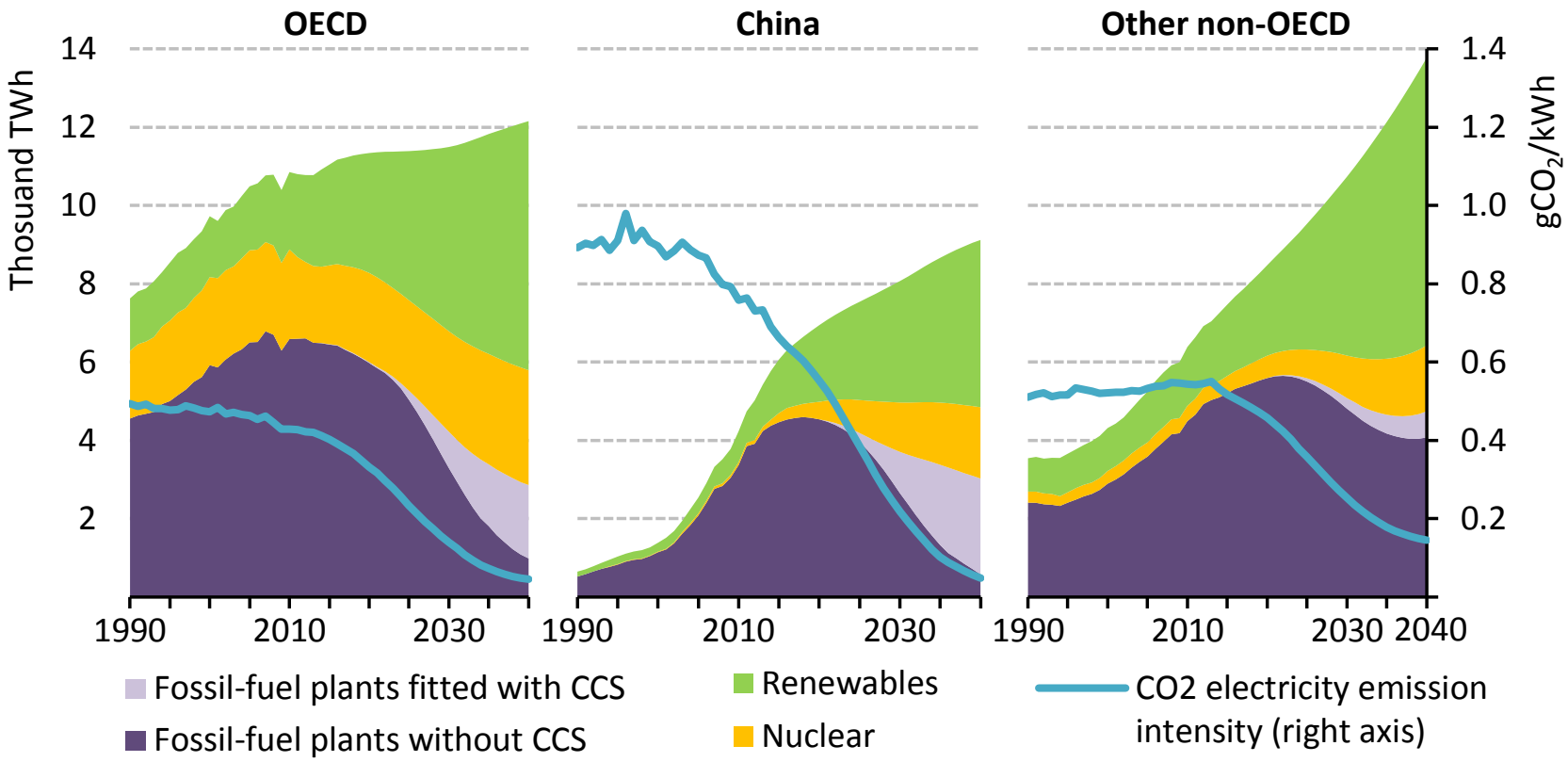
A 2 °C pathway requires more technological innovation, investment & policy ambition



Massive additional investments in efficiency, renewables, nuclear power and other low carbon technologies are required to reach a 2 °C pathway

The power sector is central to a low-carbon world

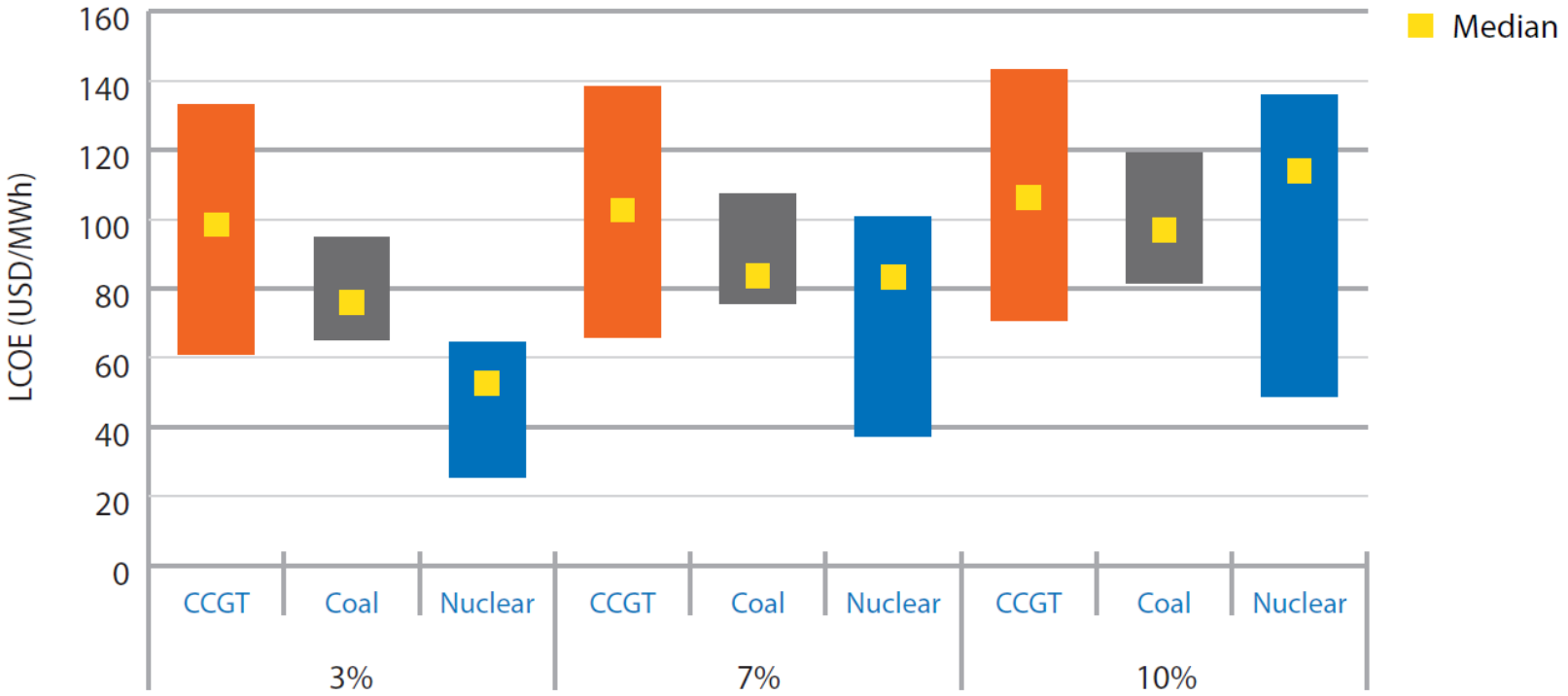
Electricity generation by technology and CO_2 intensity in the 450 Scenario



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

Nuclear remains competitive

Comparison of LCOEs of different generation technologies

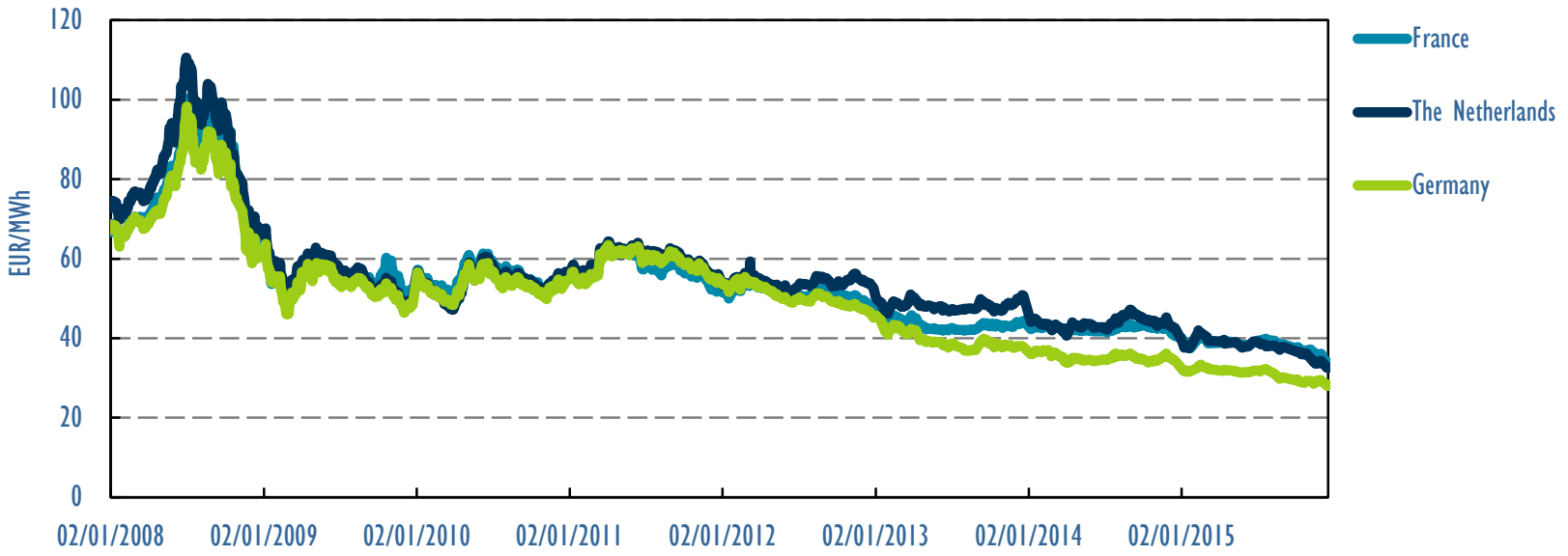


Note: Assumes region-specific fuel prices for US, Europe, Asia; 85% load factor; CO_2 price of 30 USD/tonne. (Source: Projected Costs of Generating Electricity 2015 Edition NEA&IEA)

Despite declining costs of renewables, the IEA NEA projected cost study found that nuclear can remain in the competitive range

Is nuclear investable in competitive markets?

Year-ahead forward market prices (Real price 2015), 2008-15



Under current market circumstance and without a carbon price, market-based nuclear investments are unlikely

Keeping existing low-carbon capacity

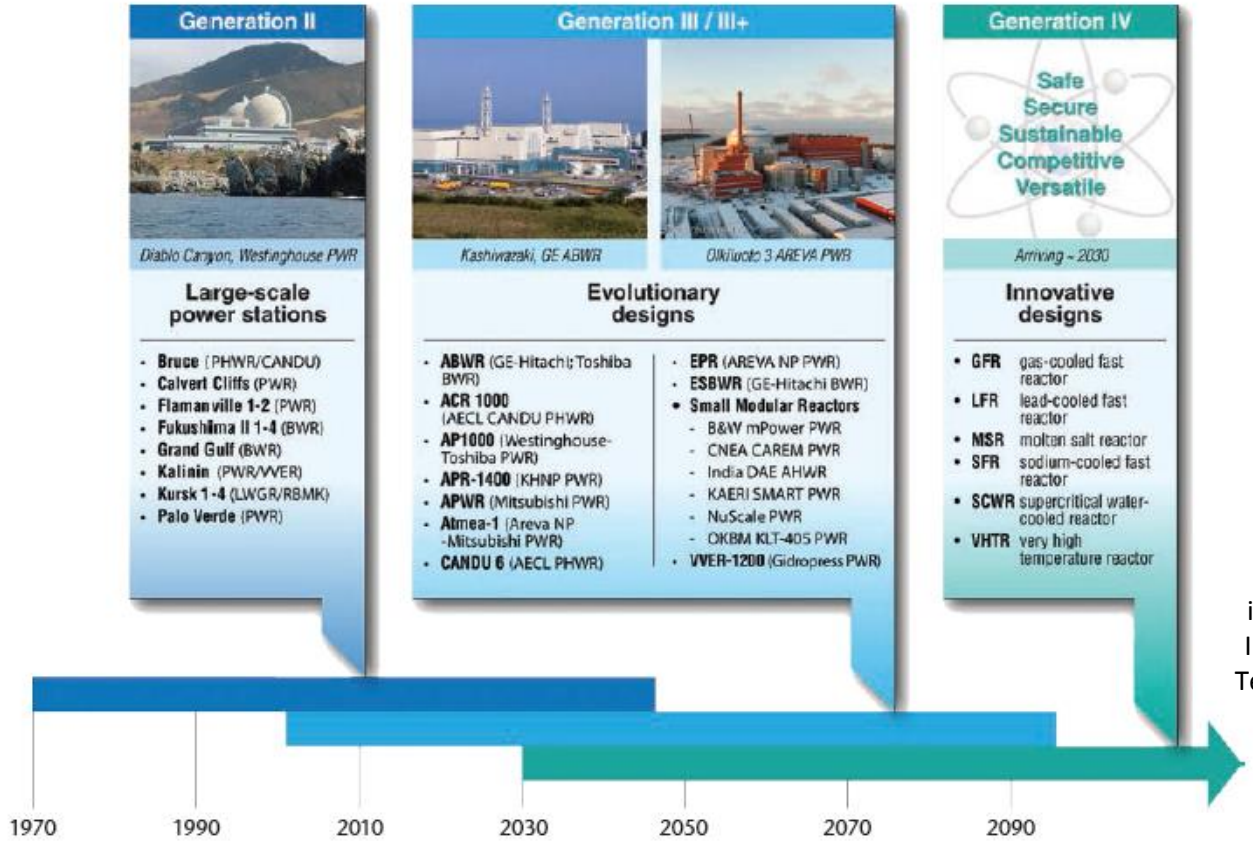
- **Several nuclear reactors have been or will close:**
  - **Germany**
  - **Japan**
- **Risk of closure for economic reasons**
  - **14 reactors in the USA**
  - **Sweden**

Pilgrim Nuclear Generating Station, Entergy Corporation

Extending the operating lifetime of reactors to enable them to operate safely is essential to maintaining low-carbon generation capacity.

The future of nuclear

Evolution of fission reactor technologies



Source: in GEN IV international forum IEA and NEA (2015), Technology roadmap, Nuclear energy

Financing RD&D will be needed to develop new technologies in order for nuclear to be able to compete with renewables technologies

Conclusion: nuclear at the cross road

- **Decarbonisation of the power sector relies on a portfolio of low-carbon generation technologies, including nuclear**
- **Nuclear has to compete with other low-carbon technologies on a level playing field**
- **When technically and politically possible, keeping existing nuclear capacity is a low-cost low carbon option**
- **Future competitiveness of nuclear will depend on the capability to increase safety while decreasing costs**
- **Long term support schemes are necessary to secure financing for nuclear projects**