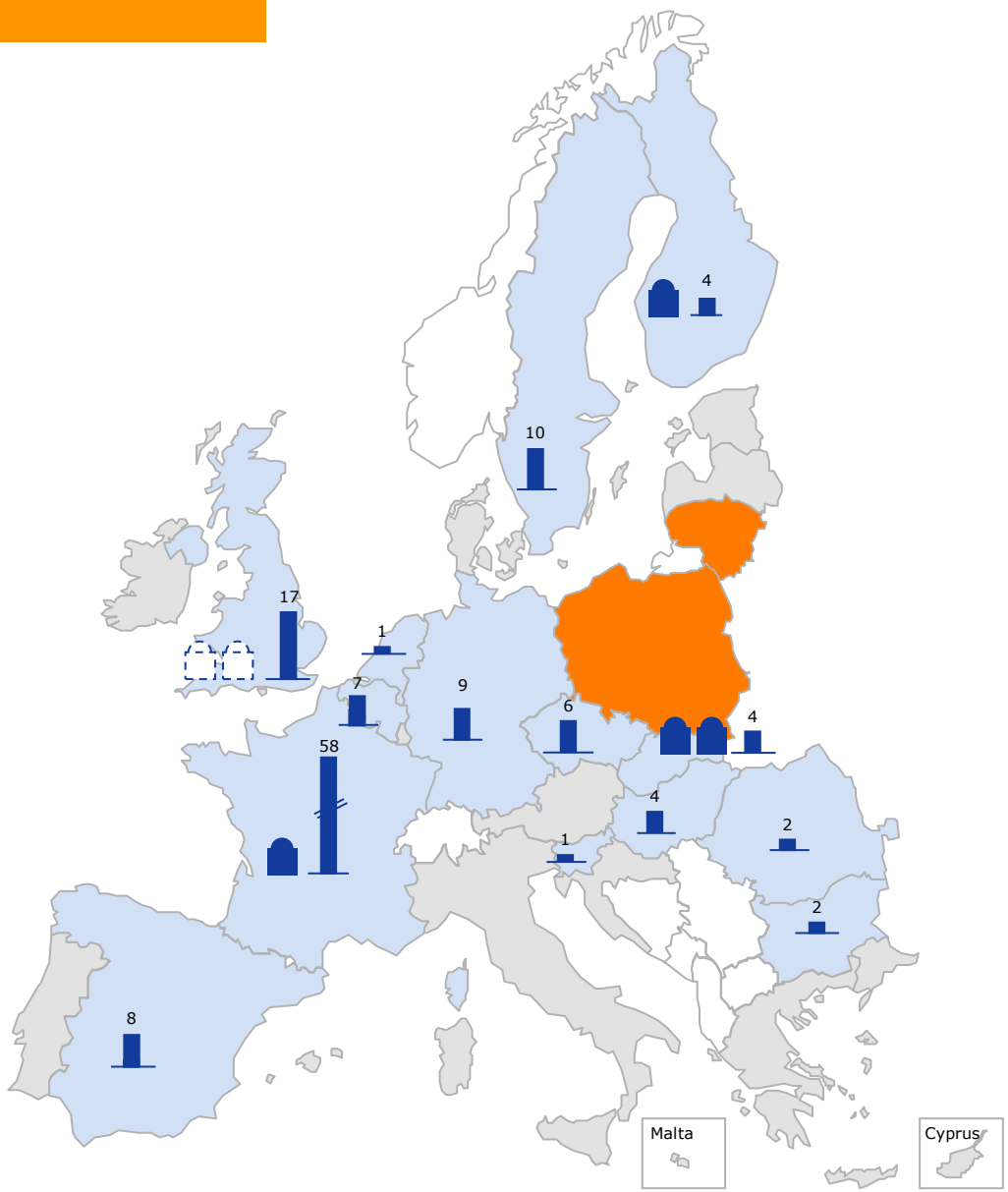
# Nuclear Energy in Central Europe

## Central European Energy Conference

Bratislava, 26 November 2013

# Role of Nuclear Energy in the EU




- 132 reactors are currently operating in the EU
- This represents ~30% of global nuclear capacity worldwide
- This represents a capacity of 122GWe and ~ 27% of EU electricity supply
- Average age of the existing nuclear fleet: 28 years

Countries operating nuclear power plants

Considering starting a civil nuclear program

Operated reactors

In construction

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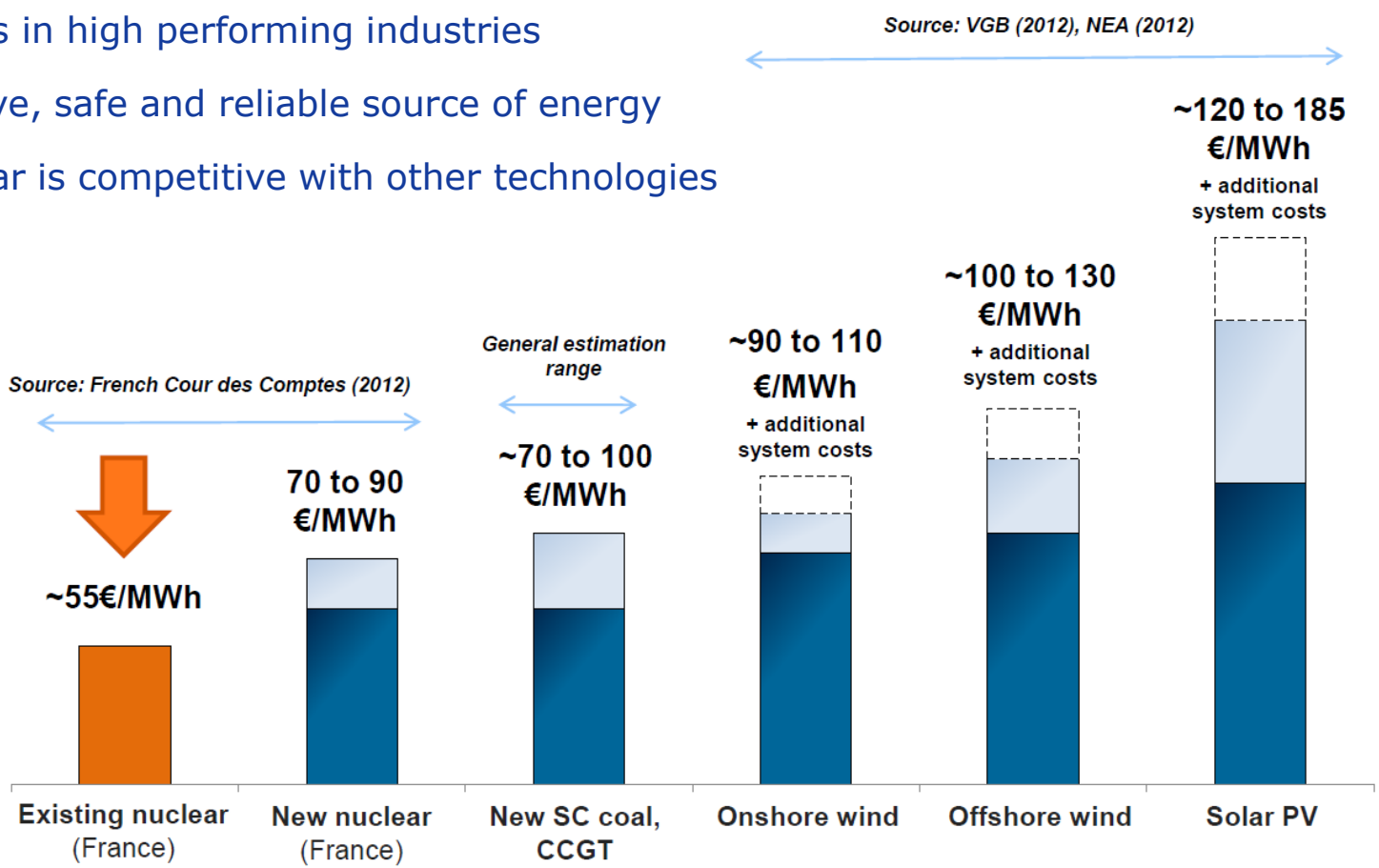
# Role of Nuclear Energy in the EU (cont. d)

- Critical technology for the future, estimated at providing 20+% on energy mix of the EU in 2050
- Cornerstone of the electricity sector decarbonization policies in many countries
- Improving energy independence and trade balance
- Creates jobs in high performing industries
- Cost effective, safe and reliable source of energy
  - Nuclear is competitive with other technologies




Source: EDF, 2013

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# The Way Forward for Nuclear

## The EU Energy Roadmap 2050

- 3 decarbonizing scenarios count on nuclear having a share of up to 20% of electricity produced
- The nuclear capacity in 2050 could be about the same as today (around 140 Gwe)
- These scenarios imply a need of roughly 100 new units to be built by 2050
- In the meantime the LTO programs will be required to bridge the gap

## New build projects face a complicated situation as a result of multiple factors:

- High up-front capital costs vs. difficult financing conditions after 2008
- Uncertain regulatory environment vs. the need for consistency over long, 60y operating time frames
- Long licensing and construction timeframes vs. minimal acceptance of construction risk by banks
- A need of public acceptance vs. the necessity to successfully manage social and environmental issues (a pre-condition for securing financing from banks and ECAs)
- Increasing cost-competitiveness of other generation technologies vs. unclear rules for subsidies and market distorting interventions by policymakers.

## Can this situation be improved by state interventions?

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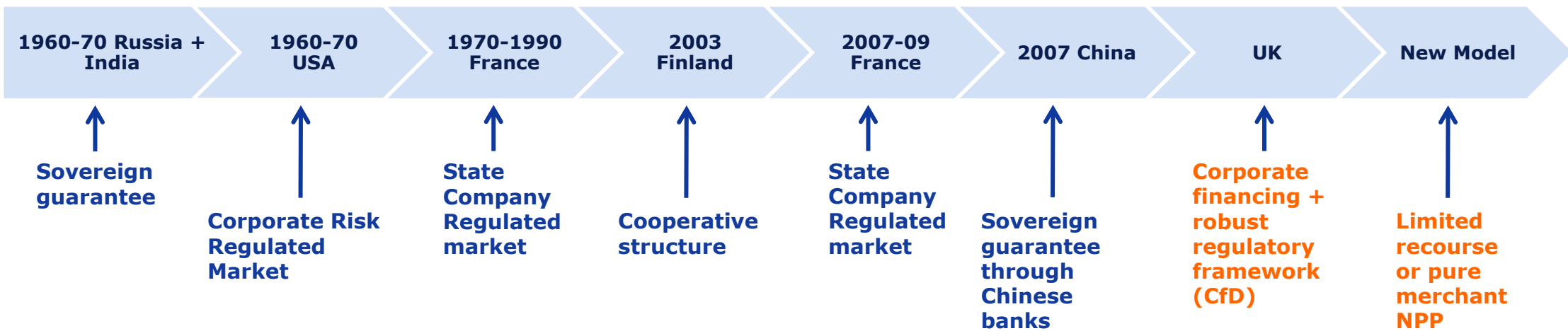
# Nuclear New Build

## Nuclear financing needs and business models have evolved

**Which way forward?**




**Historically, NPPs have been built with some form of public support, while SE is currently building NPP MO34 without one.**

- SE closely monitors the emergence of various market interventions
- SE is concerned about the resulting market distortions and the possible emergence of unfair market competition
- SE analyzes the impacts of these interventions on the market

**New partnerships are emerging:**

- EDF Energy and China General Nuclear Corporation (CGN) + China National Nuclear Corporation (CNNC), possibly sovereign wealth funds of Qatar and Kuwait
- Rosatom + Rolls-Royce + Fortum

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# Nuclear Long Term Operation Programs

The average lifetime of operated NPPs in the EU in 2020 will be up to 40 years, 50 years in 2030 and 60 years in 2040

- Investments in LTO make economic sense provided it allows lifetime extension between 10 and 20 years
- Extending the life of a power plant incurs a much lower capital investment than the building of a new NPP (below 1,000 euro/kW) thus it is much less risky than many other options (including alternative fuel plants)
- In total for approx. 100 existing plants the LTO would imply 90 billion euro investment by 2050 (including all investments for safety upgrades after Safety Assessments ("Stress Tests") and 50,000 highly qualified jobs

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# Closing remarks

**Nuclear will remain important within and outside the EU**

- Big wave of LTO between 2015-2035
- Big wave of New Build between 2030-2050
- There are/will be many opportunities with regard to international exports (outside of the EU)

**In nuclear, as in life, you will be tomorrow what you do today =>**

**Nuclear must deliver**

- Continue with safe and reliable operation
- New projects on time and within budgets

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