



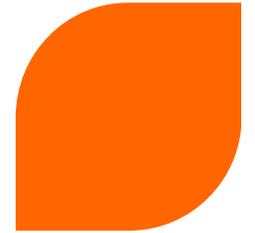
AREVA's Vision of Global Nuclear Market

Didier Beutier – ICO Marketing

16 March 2012



Table of Contents



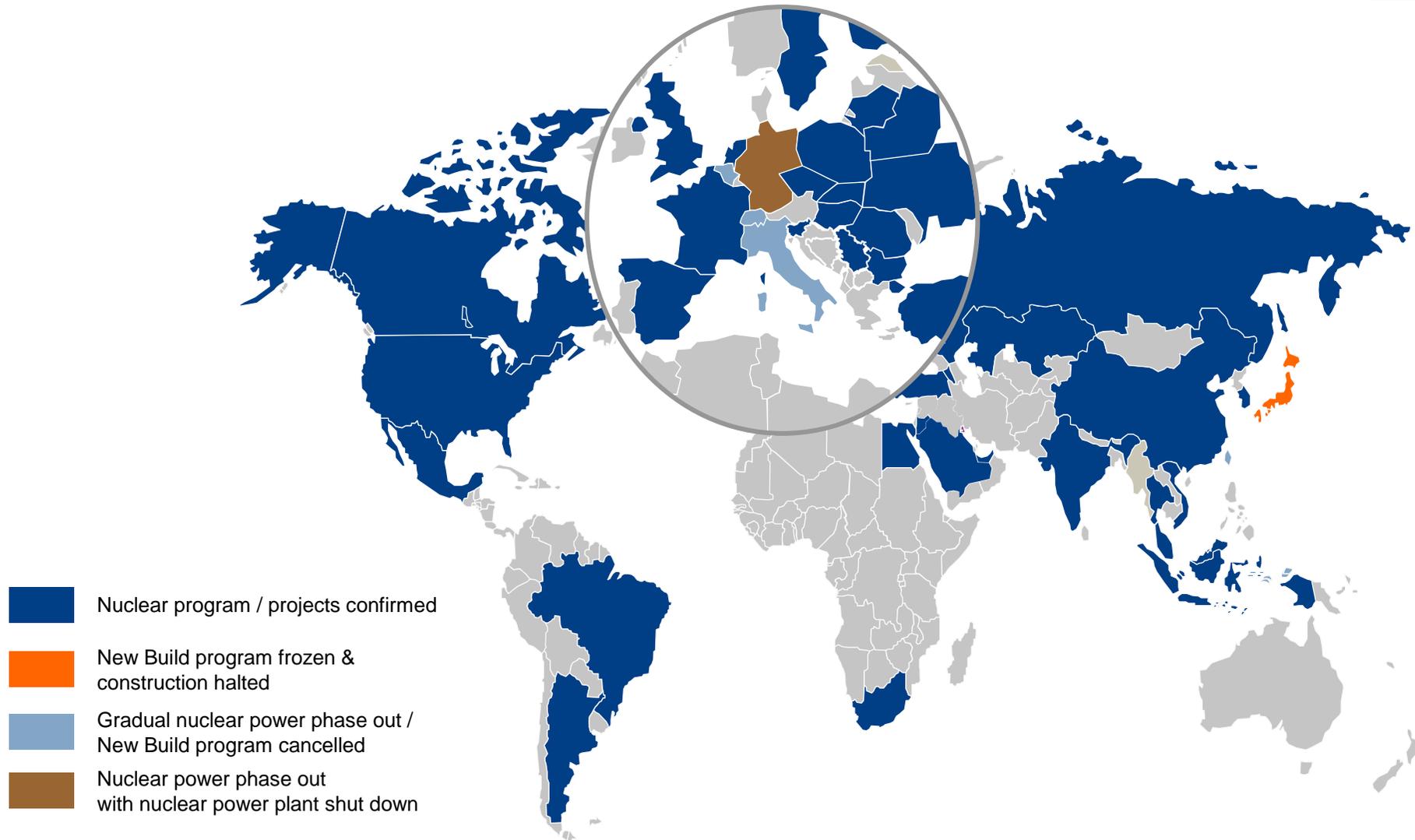
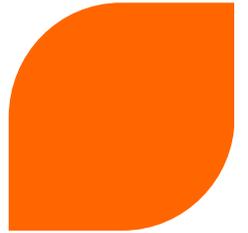
▶ Global Post Fukushima Outlook

▶ Safety imperative

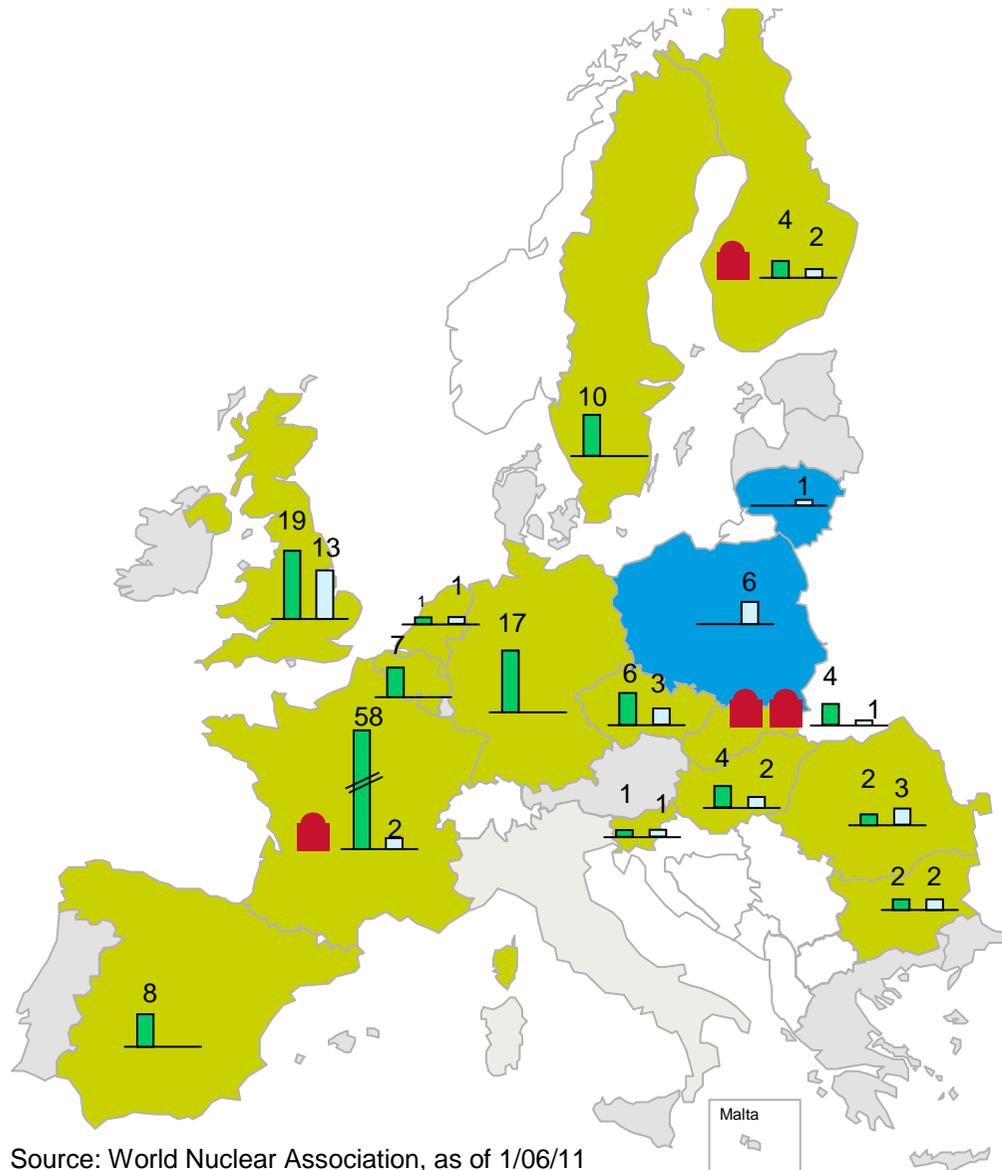
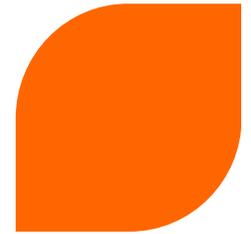
▶ AREVA position on the market

▶ Our prospects

Post Fukushima : Most countries have confirmed the importance of nuclear in their energy mix



Nuclear energy: 28% of the European Union electricity in 2010, how much in 2030?



Source: World Nuclear Association, as of 1/06/11

13 Member States remain engaged. UK, France, Czech Republic, Poland, Finland & Netherlands share close position: Nuclear energy is still necessary. Lessons from Fukushima may affect requirements for New Build programs. New Build programs – especially with the closest CODs – may be delayed, BUT no question to cancel or stop current construction

Germany decided to take stringent measures:

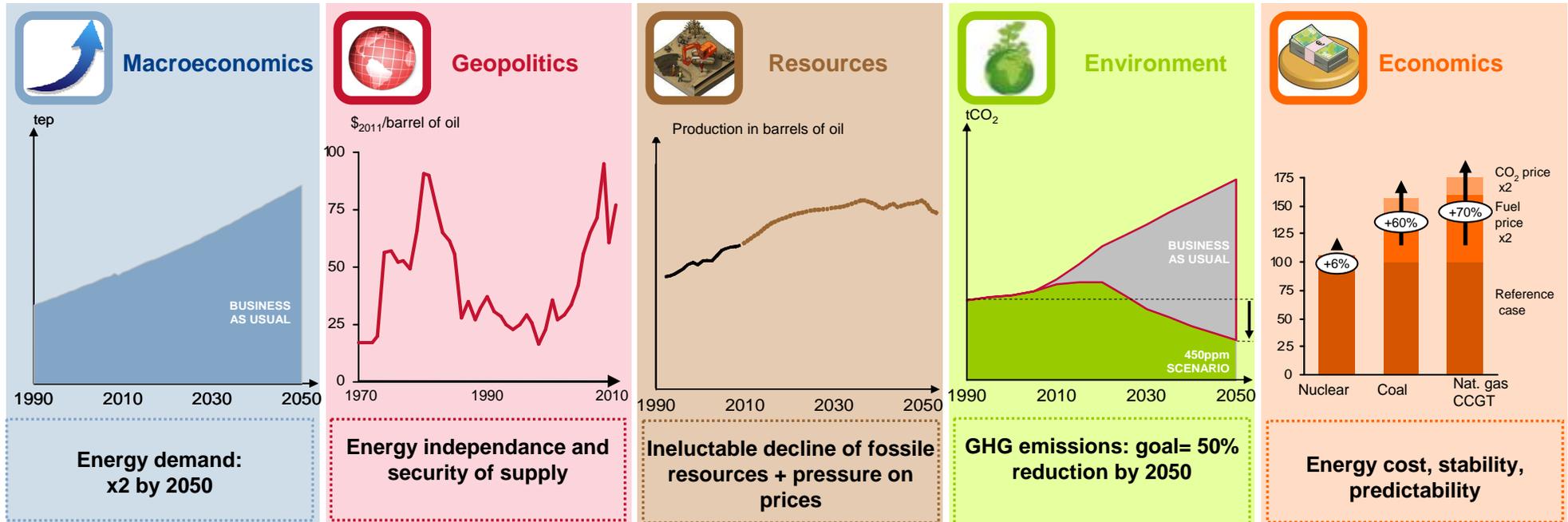
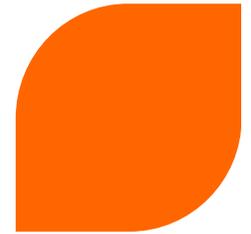
7 (+1) oldest plants shut down in Germany though first reports of safety checks issued by RSK in Germany state that plants are safe. Decision to close nuclear power plants by 2022

Belgium: political parties agreed to phase out nuclear provided alternative power sources are secured

Italy: a referendum led to cancellation of return to nuclear power



The drivers of nuclear energy demand have not changed

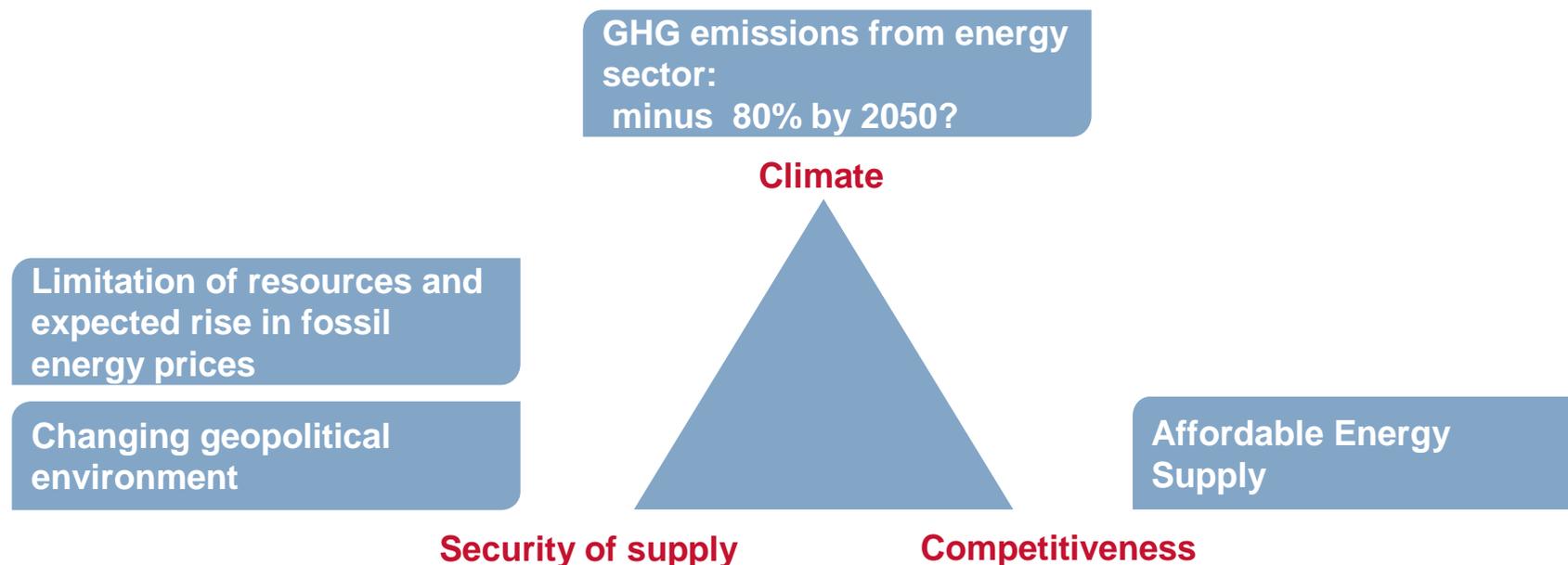


2011 WEO 2009 – 2035 Scenario	Global primary demand in energy*	+1.3% / year
	Demand in nuclear energy*	+2.1% / year
	Demand in renewable energies*	+2.5% / year

Source: IEA ETP: reference scenario 2010 - UNFCC, CERA 2009

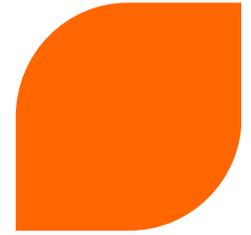
* Billions of toe

In Europe nuclear remains necessary to solve the energy-climate equation



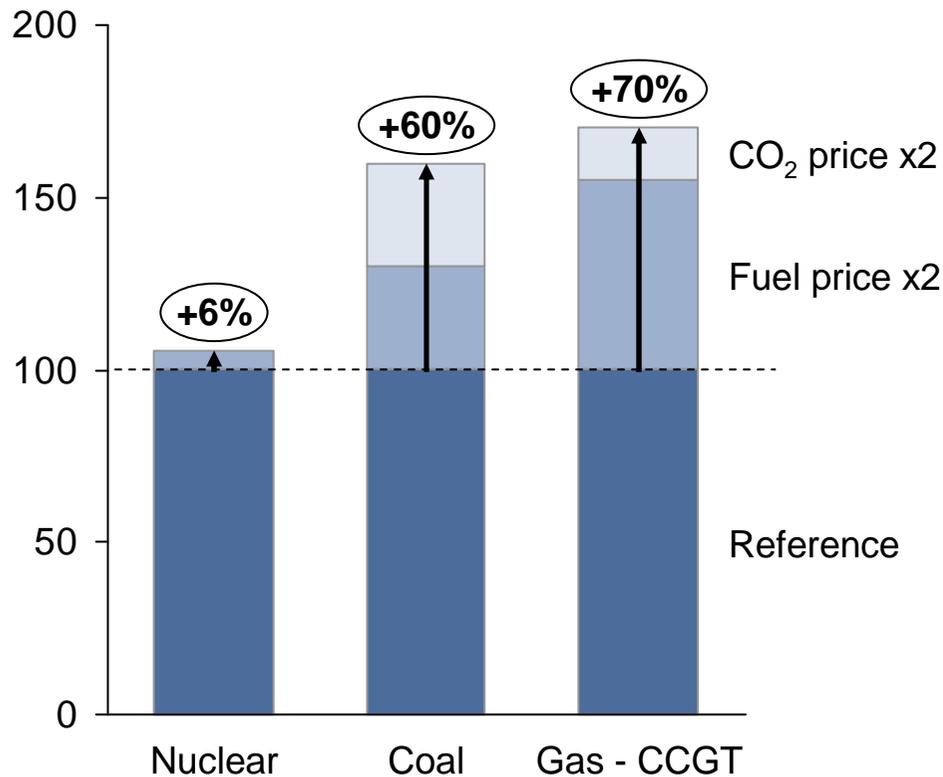
EU ambition on climate protection, as well as limitation of fossil resources and relatively high gas price, call for the development of both nuclear energy and renewables

The cost of installed nuclear power is structurally stable and predictable



Impact of doubling fuel and CO₂ prices

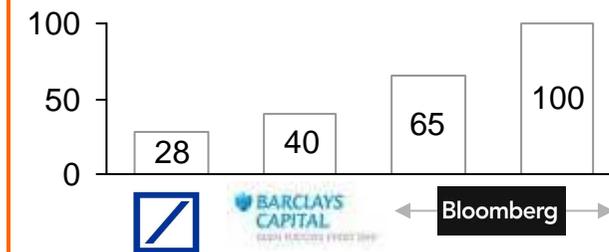
Normalized cost of electricity in 2020
(Base 100 for each technology)



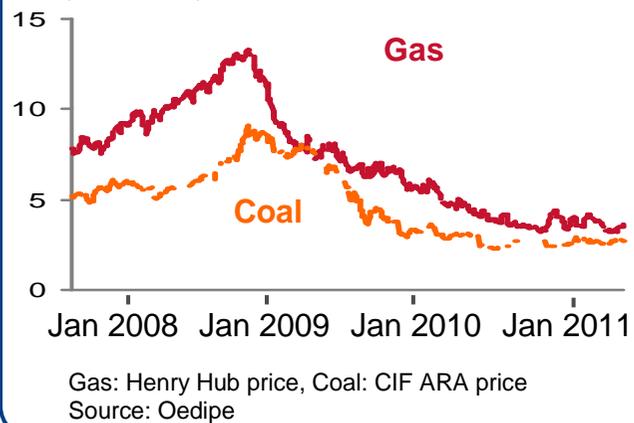
Source: AREVA analysis, brokers' reports (September 2010)

Uncertainty in CO₂ and fuel prices

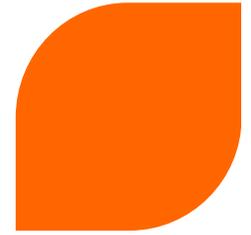
European CO₂ price estimates in 2020
(€/tCO₂)



Coal & Gas prices
(\$/mmbtu)



Assuming a utility invests €200m for safety upgrades on a plant, total nuclear cost of electricity over 30 years is only marginally affected

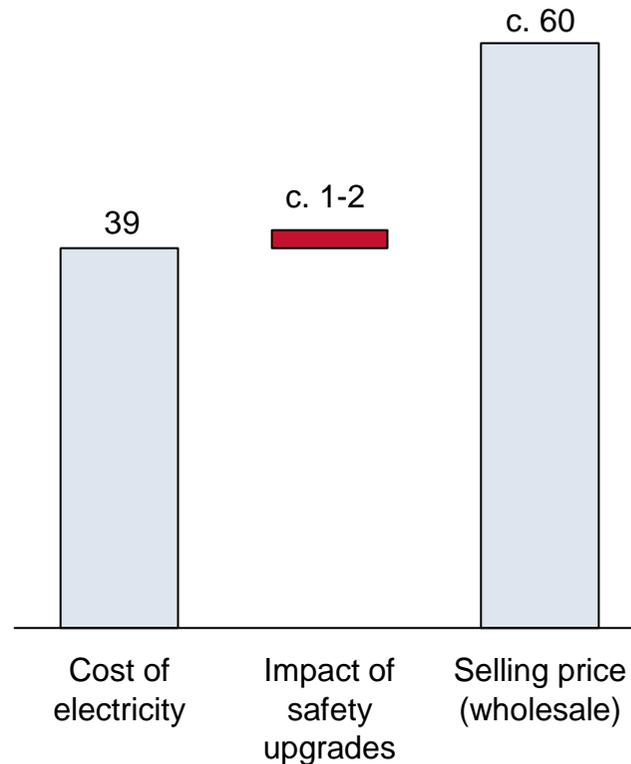


Main assumptions

Assumption	Value
Remaining plant lifetime	30 years
Nominal plant output	1,000 MWe
Time span of upgrade	5 years
Load factor	85%
WACC	8%

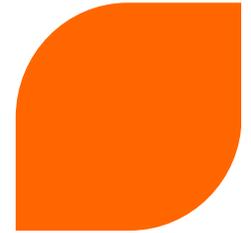
Impact on profit margin of safety upgrade investments (assumptions for France)

€ / MWh

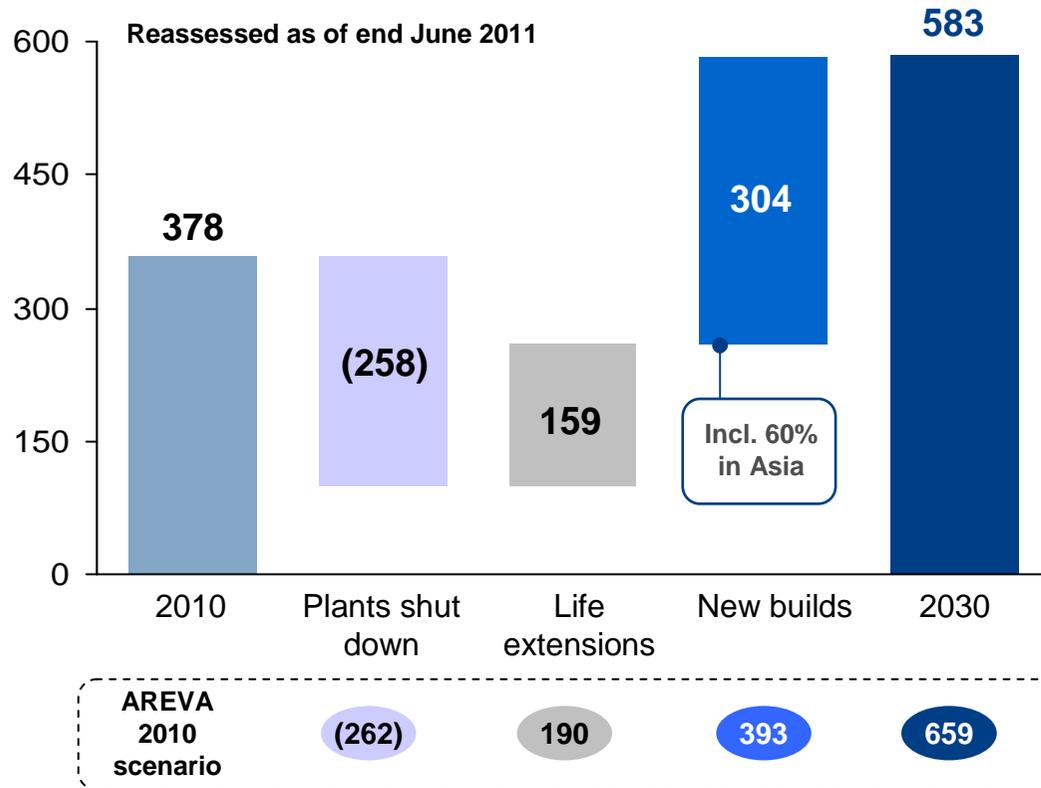


- ▶ Investment for a safety upgrade package is taken here between **€100m and €200m**
- ▶ Such safety upgrades would only increase cost of electricity between **1 and 2 euros by MWh**
- ▶ As an illustration, with a cost of electricity of €39 per MWh, such safety upgrades would only represent **between 2% and 5%** of the total production cost of electricity
- ▶ In some more unusual cases, safety upgrades could reach €250m or €300m, which would increase cost of electricity by 6 to 7%

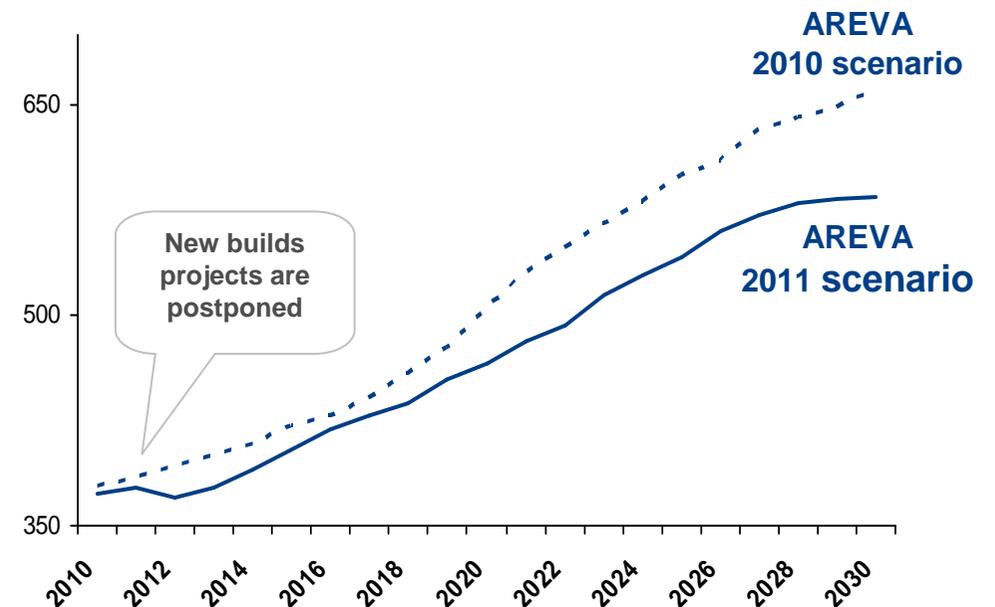
AREVA nuclear scenario: installed capacity growth will be delayed



AREVA 2011 scenario (GWe)

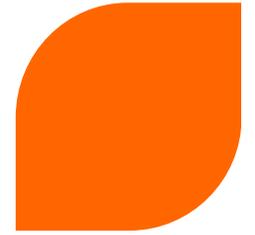


Change in global installed base (GWe)



» Growth in installed capacity: **+2.2% per year on average until 2030**

Prerequisites

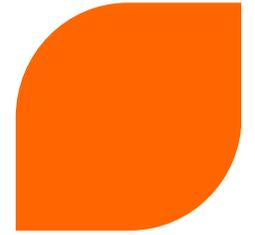


- ▶ **Safety Demonstration and Upgrades where necessary**
 - ◆ Institutional upgrade: independent Safety Authority
 - ◆ Design and equipment upgrade: protection against BDB accidents
 - ◆ Severe Accident Management upgrade

- ▶ **Public Confidence**
 - ◆ Risks/Benefits balance
 - ◆ Trust

- ▶ **Financing Capabilities**
 - ◆ Credit crunch in OECD countries
 - ◆ Risk reward requested by Shareholders and Banks

Table of Contents



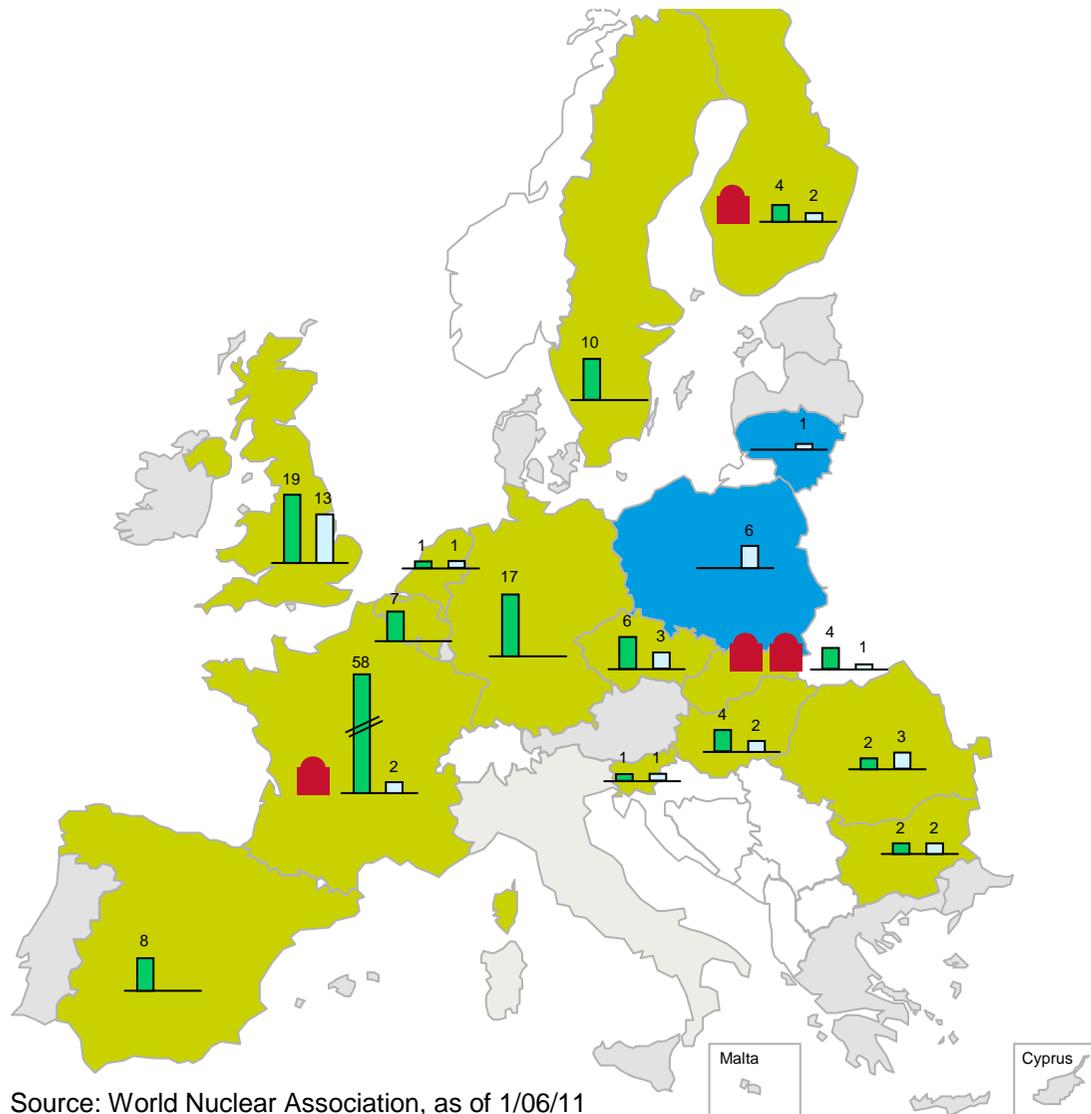
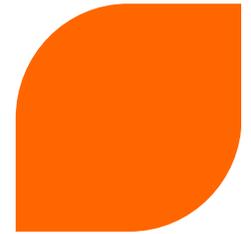
▶ Global Post Fukushima Outlook

▶ **Safety imperative**

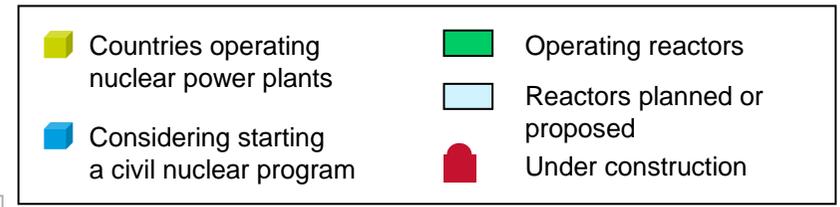
▶ AREVA position on the market

▶ Our prospects

Nuclear safety review of the European Union nuclear fleet

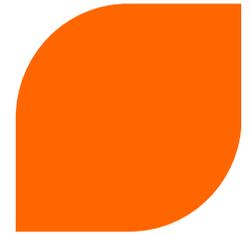


- ▶ National safety authorities and the European commission to produce comprehensive and transparent mapping of the EU fleet safety
- ▶ Lessons learned from Fukushima accident with regards to:
 - Extreme events
 - Loss of power and heat sink
 - Emergency preparedness
- ▶ Conclusions drawn from peer-reviewed national regulators' report of operators' assessment



Source: World Nuclear Association, as of 1/06/11

Safety is the Cornerstone of our Strategy



Safety of our Customers

Supporting utilities in demonstrating and upgrading the safety of their fleet



AREVA
Safety Alliance

30+ solutions in Safety Analysis, Safety Upgrades and Safety Procedures

Safety of our Operations

Maintaining the highest level of safety throughout the lifecycle of our nuclear facilities



Nuclear safety
& radiation protection

Reduced accident frequency rate (number of accidents / million hours worked) from 6.6 in 2004 to 1.7 in 2011

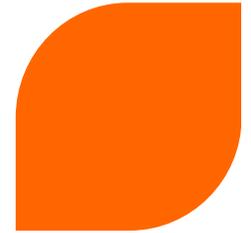
Safety of our Products

A wide new-generation reactor portfolio that offers the highest safety features

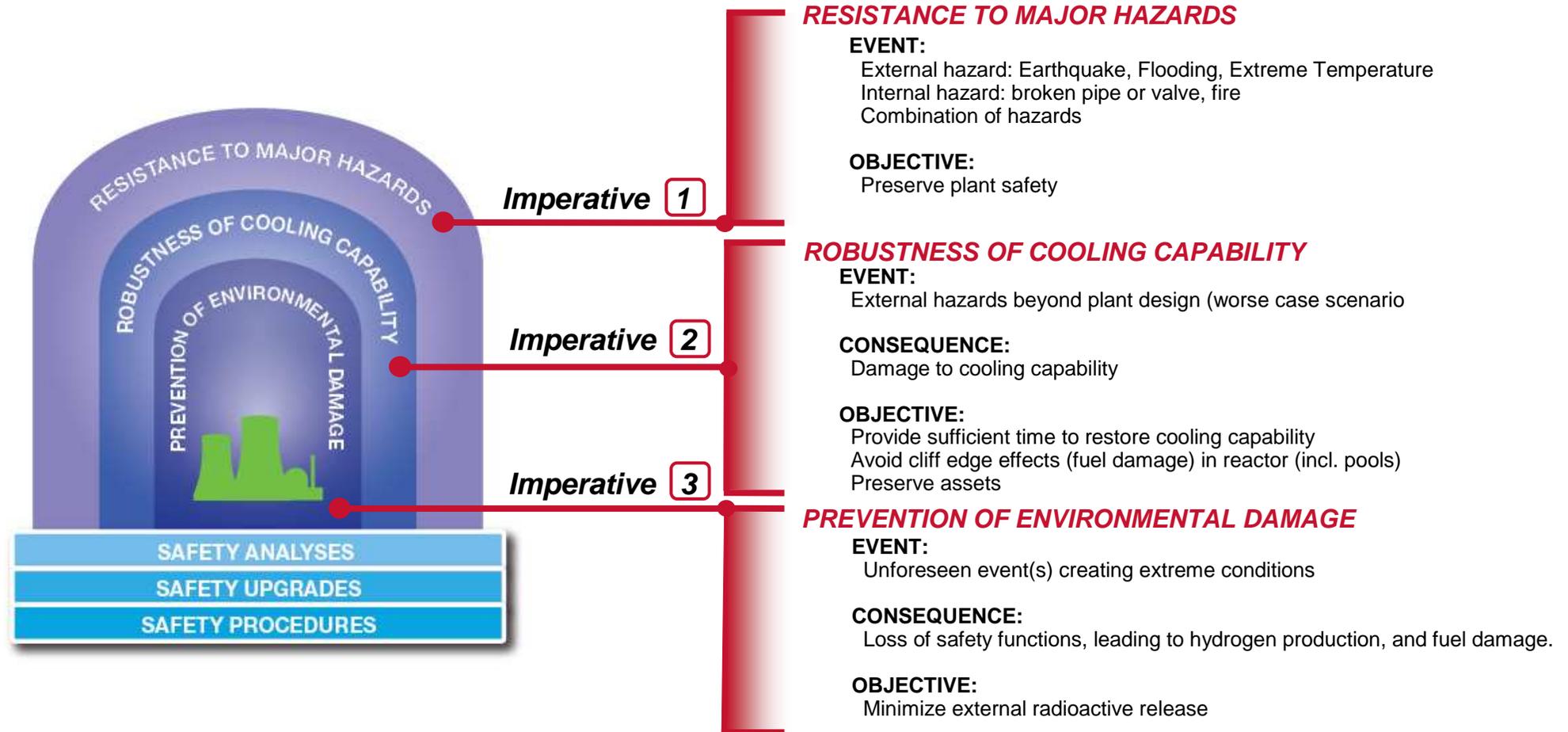
EPR
by AREVA

HERENA
by AREVA

ATMEA



AREVA Safety Alliance framework

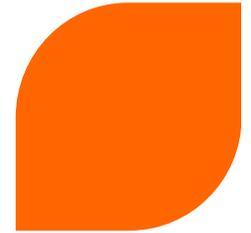




AREVA
Safety Alliance

3

Release Prevention



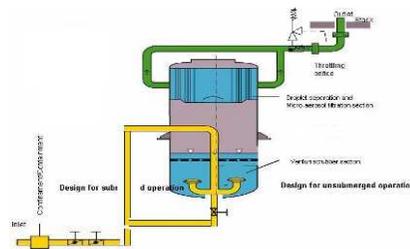
Protect the public and the Environment

Preparing a combination of Safety Upgrades:

- ▶ Containment Integrity Protection (Venting)
- ▶ Radioactive release prevention (Filtering)
- ▶ Monitoring of Severe Accident Conditions
- ▶ Prevention of Hydrogen explosions



Passive Autocatalytic Recombiner (PAR)



Containment Filtered Venting System

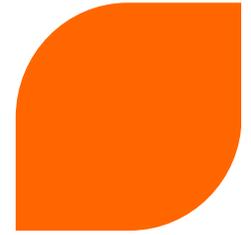
Safety Upgrade Example :

- ▶ Filtered Containment Venting Systems largest references worldwide for PWRs (including VVERs), CANDUs, BWRs
- ▶ Backfitting PARs to existing Operating Plants

R&D Project Example :

- ▶ Improve Capture Efficiency of Organic Iodine

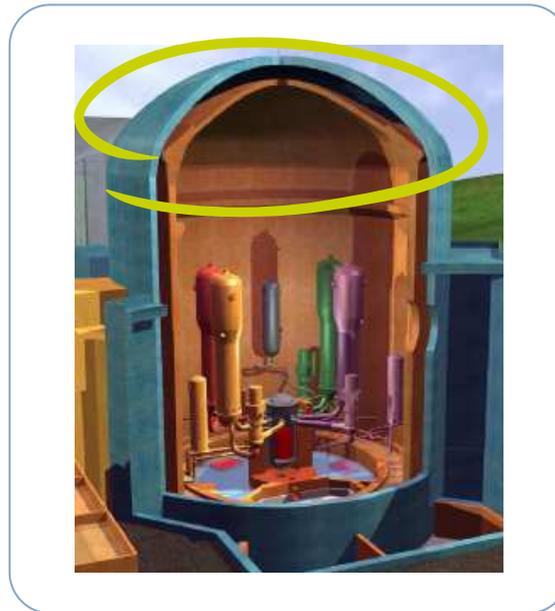
EPR design allows for preventing from any external radioactive release in case of an extreme event



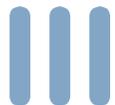
A core catcher to cool the corium in the long-term



A double containment to prevent radiological release

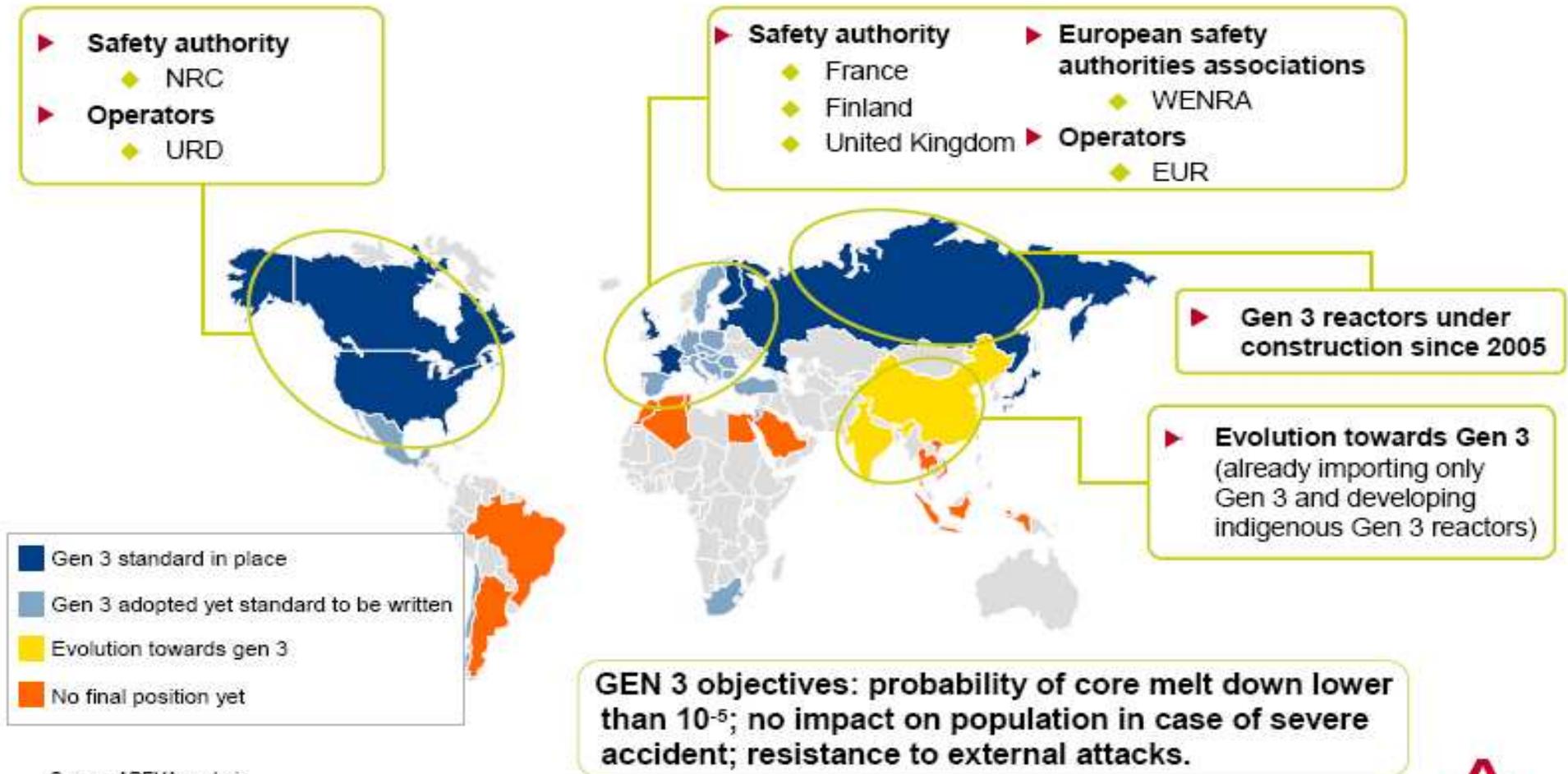
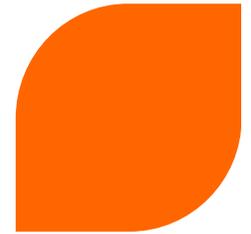


Hydrogen recombiners to prevent hydrogen explosion



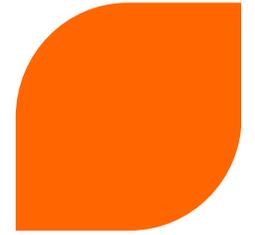
Despite the low probability of severe accident, a deterministic approach was adopted when designing the EPR

Importance to promote GEN 3 safety standards



Source: AREVA analysis

Table of Contents



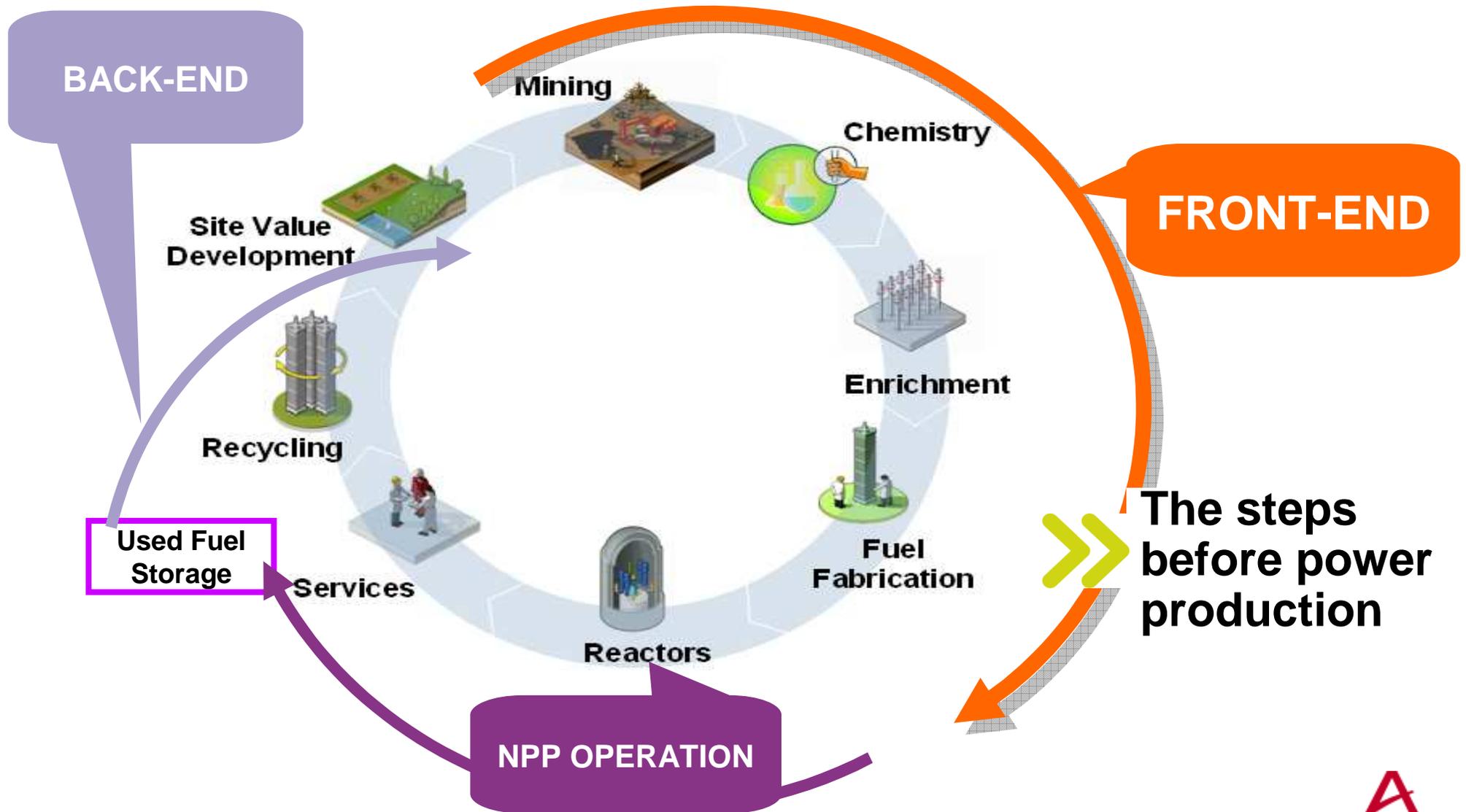
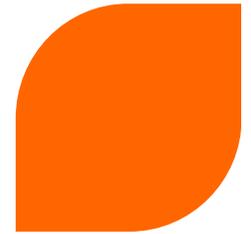
▶ Global Post Fukushima Outlook

▶ Safety imperative

▶ **AREVA position on the global market**

▶ Our prospects

AREVA supplies fuel and services to the “installed base” of operating Nuclear Power Plants (NPP)

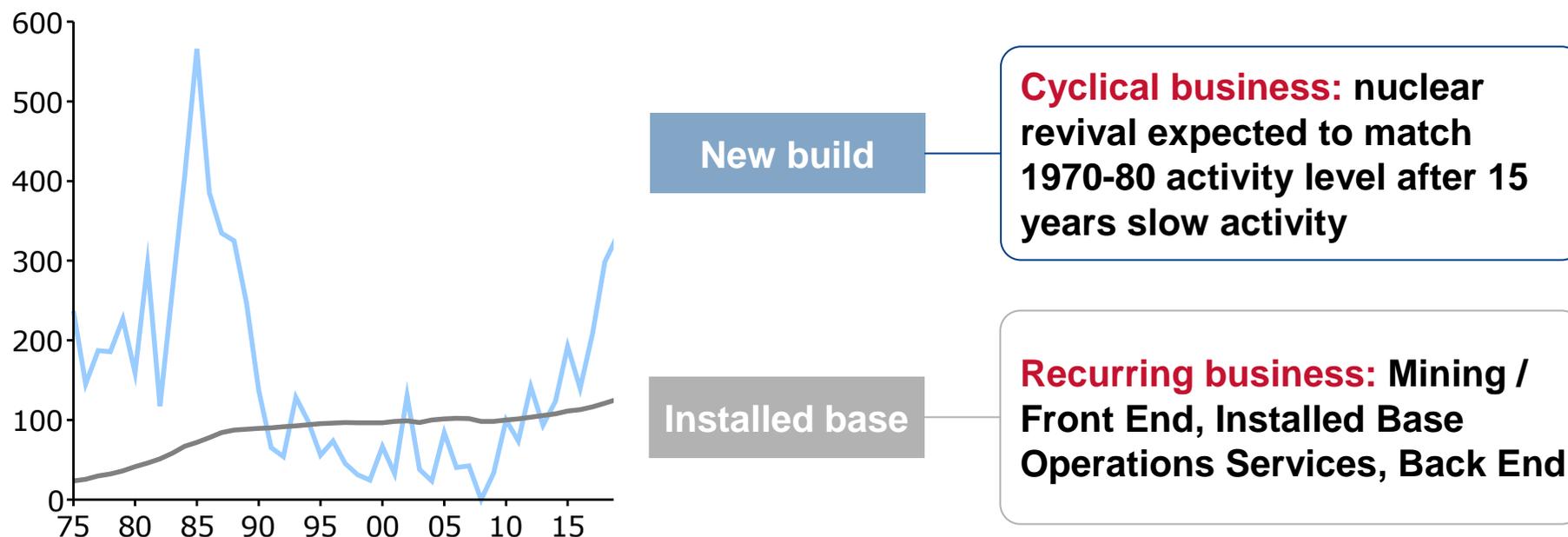




Financial synergies

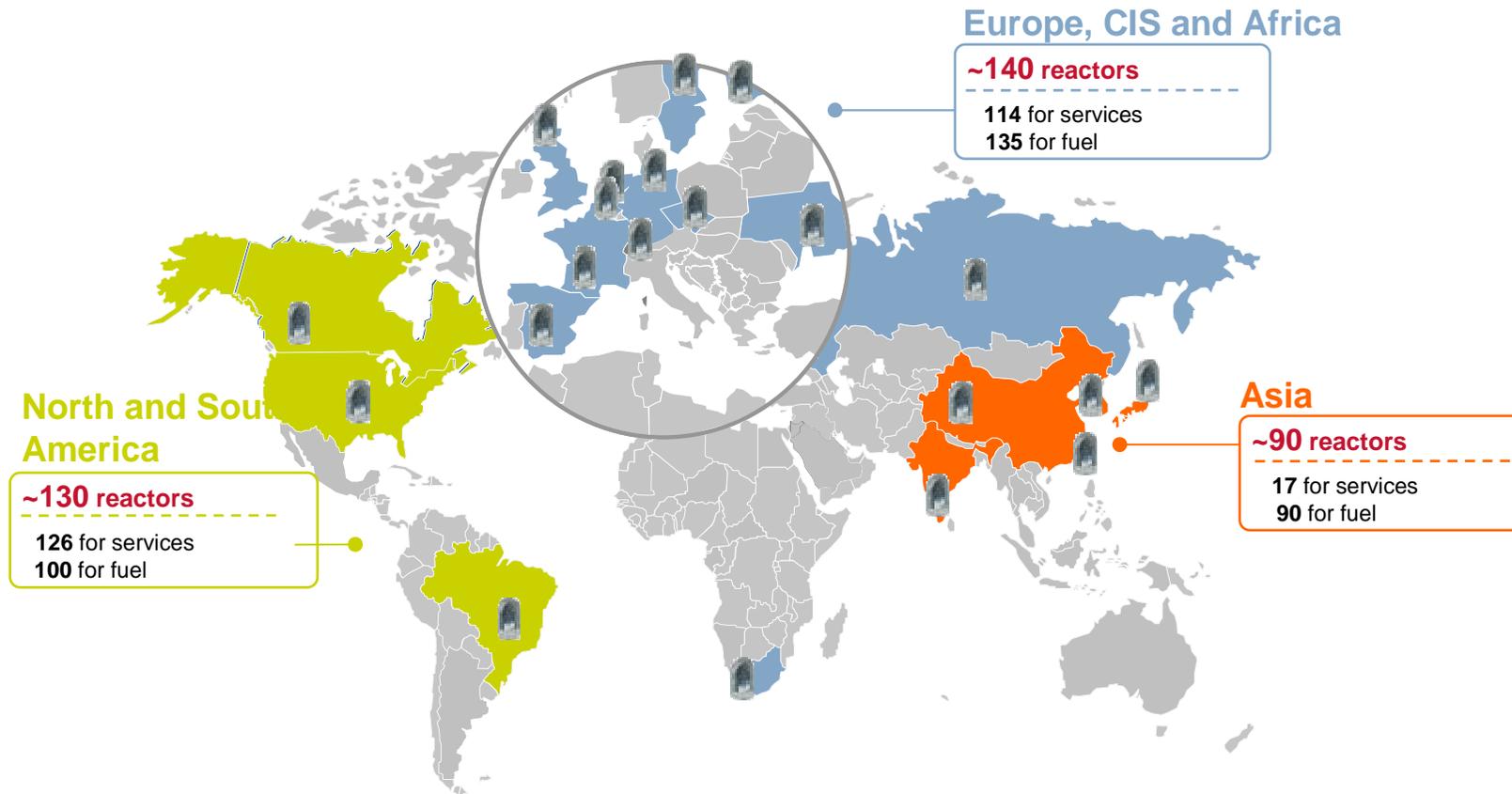
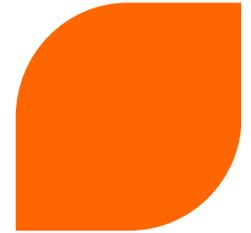
Illustration : Complementary financial profiles

Evolution of new build / installed base market activity (Indexed on 2010 activity)



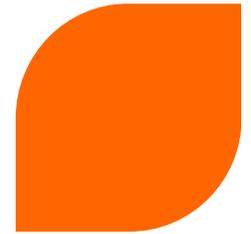
Above 80% of AREVA revenues coming from recurring business

95% of all nuclear utilities are AREVA customers

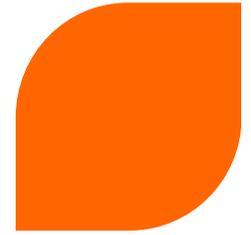


» AREVA provides services to 360 reactors worldwide

Global market, global competitors



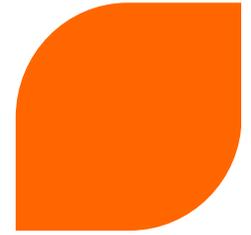
Olkiluoto 3 - Finland



	Turnkey power plant
First concrete	October 2005
Net electric output	1 600 MWe
Nuclear operations	End 2013
Project Status	Primary loop: all components installed TI I&C cabinets commissioned



Flamanville 3 - France



Nuclear Steam Supply System

First concrete

December 2007

Net electric output

1 630 MWe

Nuclear operations

2015*

Project Status

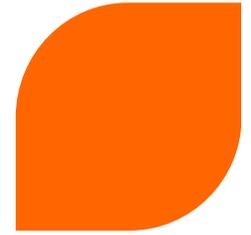
Installation of Safety systems: ongoing



December 2011

* 1st commercial electricity in 2016, Fuel Load planned in 2015

Taishan 1&2 - China



2 Nuclear islands

First concrete	October 2009 (unit 1)
Net electric output	1 660 MWe (per unit)
Nuclear operations	2013 (unit 1)
Project Status	Dome lifting done RPV delivery ongoing

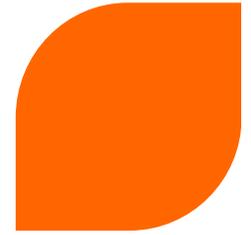


January 2012



Taishan

Dome lifting completed



September 2011

Polar crane Installation (Unit 1)

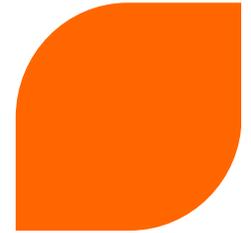


October 2011

Dome lifting (Unit 1)



Global leadership for the construction of Gen III+ reactors



Percentage of completion in %
(AREVA scope)

Olkiluoto 3

82% complete
(Supply of a turnkey power plant)



Flamanville 3

56% complete
(Supply of a Nuclear Steam Supply System)

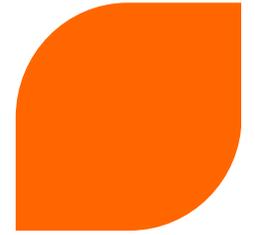


Taishan 1 & 2

63% complete
(Supply of 2 nuclear islands)



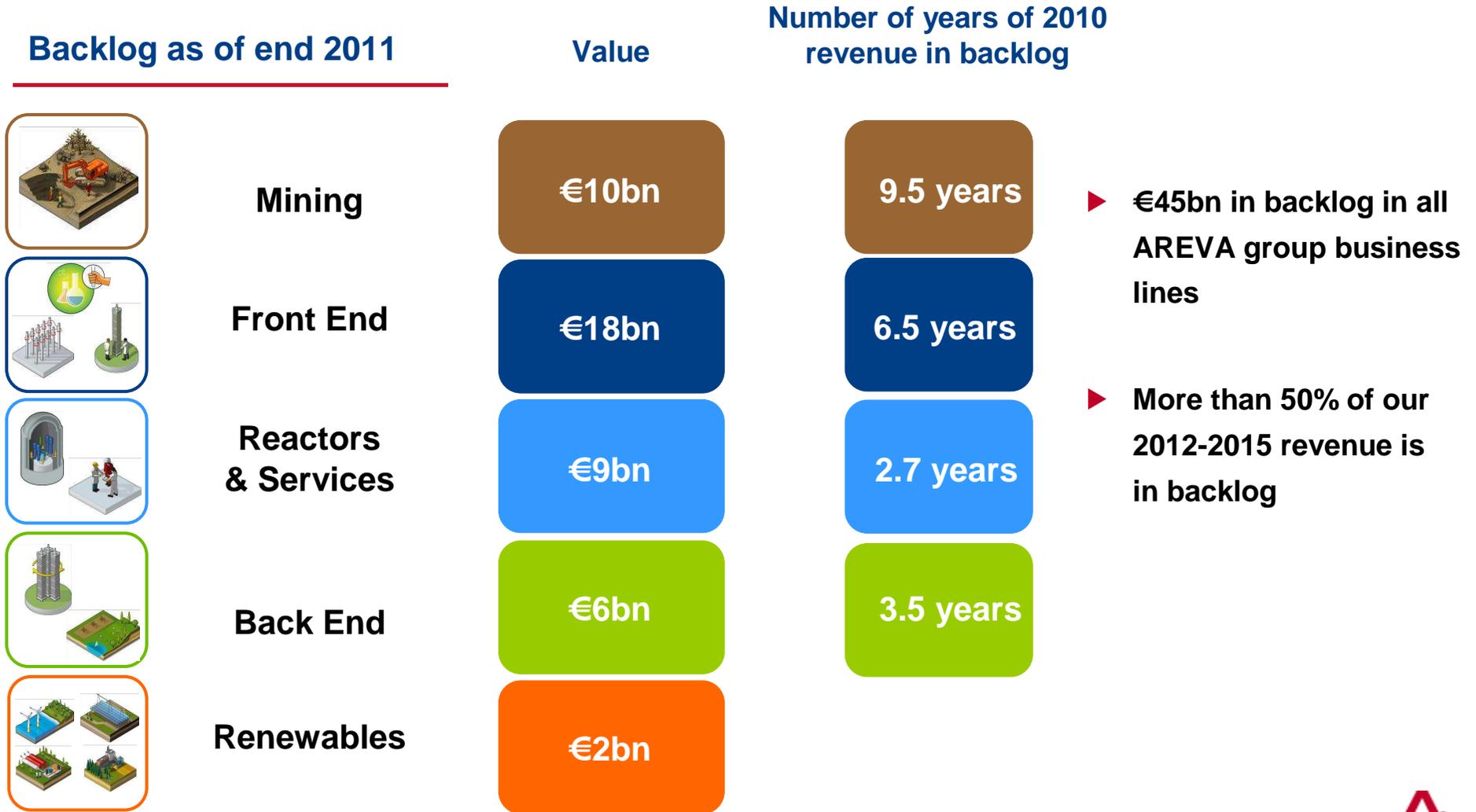
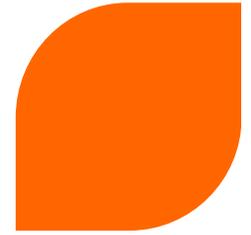
Table of Contents



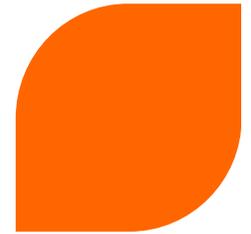
- ▶ Global Post Fukushima Outlook
- ▶ Safety imperative
- ▶ AREVA position on the market

▶ **Our prospects**

Orders: 45 billion Euros, 5 years of revenue in backlog



Our Ambition: AREVA's portfolio of energy solutions to cover a wide range of sizes and lead times





**THANK YOU
FOR YOUR ATTENTION**