



Contribution of nuclear French industry to the development of the national economy

International Forum ATOMEXPO 2010

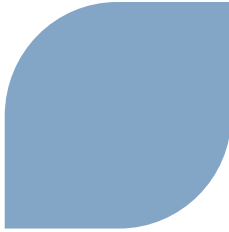
Luc Oursel

COO, in charge of Nuclear operations

Moscow, June 8th 2010



French nuclear industry key players are worldwide leaders



Leader of CO₂ free power generation solutions



Largest nuclear power plant operator with 58 units



State owned research center for Atomic and Alternatives Energies

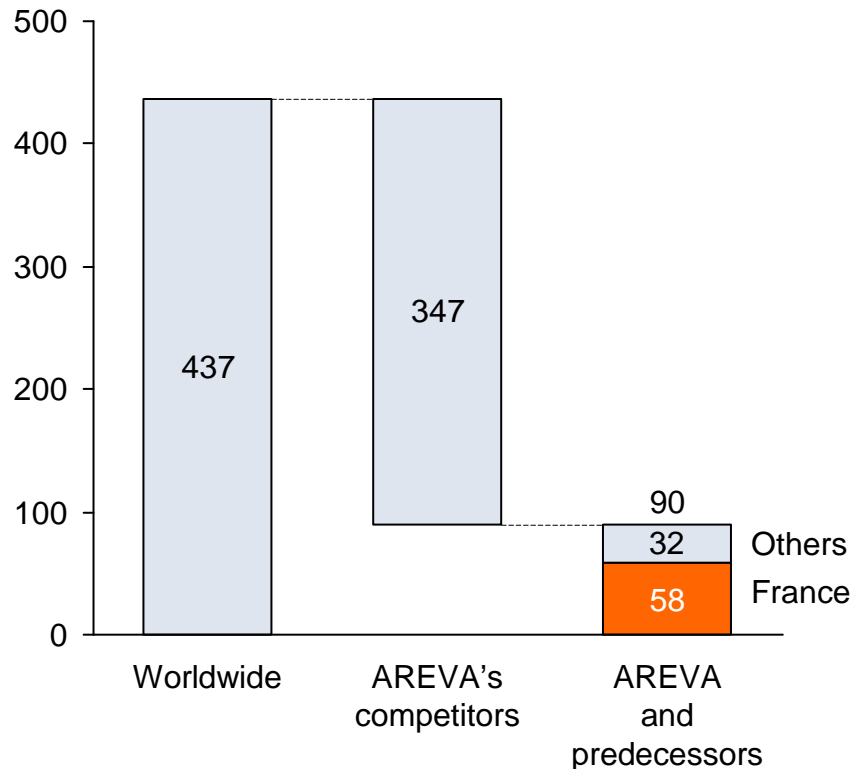


World's largest utility

AREVA has built 21% of nuclear fleet incl. 58 reactors in France generating 77% of French electricity

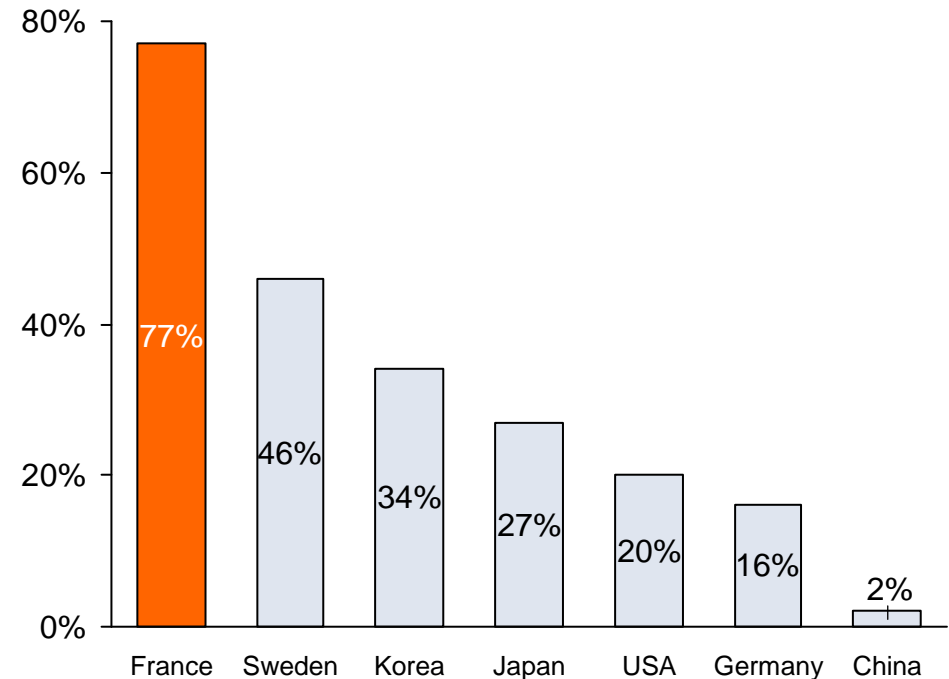
AREVA has built 21% of the 437 nuclear reactors in operation

Number of reactors in operation (#)



Nuclear energy represents 77% of French electricity mix

Share of Nuclear energy in electricity mix (%)

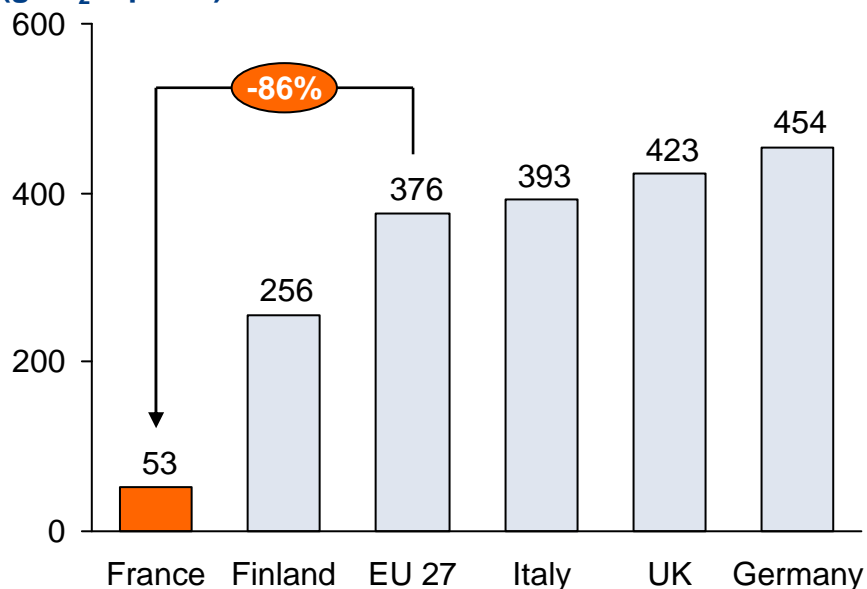


Source: CEA 2009, ENERDATA

Nuclear energy enables France to have the cleanest and cheapest electricity in the EU

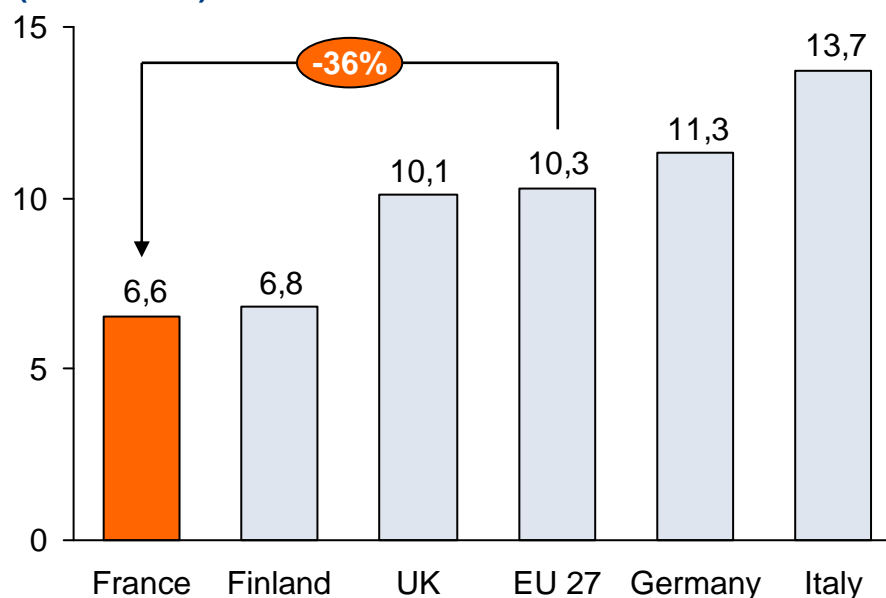
France emits 85% less CO₂ per kWh than European average...

GHG emissions from electricity generation in 2009
(gCO₂ eq/kWh)



... and French electricity price is 36% cheaper than European average

Price of industrial electricity in 2009
(€/100 kWh)

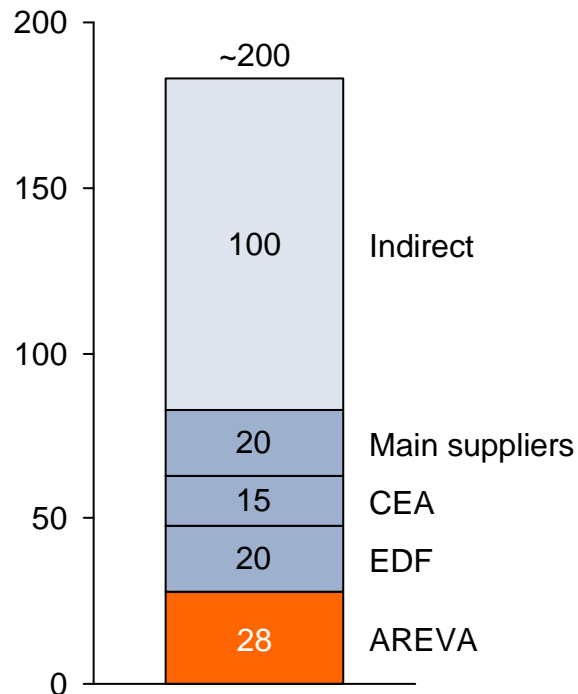


Source: ENERDATA

Nuclear industry impact on French economy

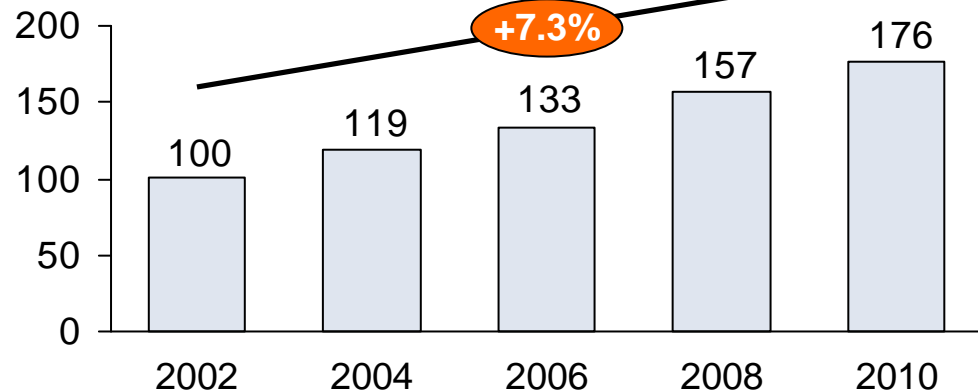
**~200 000 jobs
in the French nuclear industry**

Jobs in France
(thousands of jobs)



**+7.3 % annual growth
of French nuclear industry revenues since 2002**

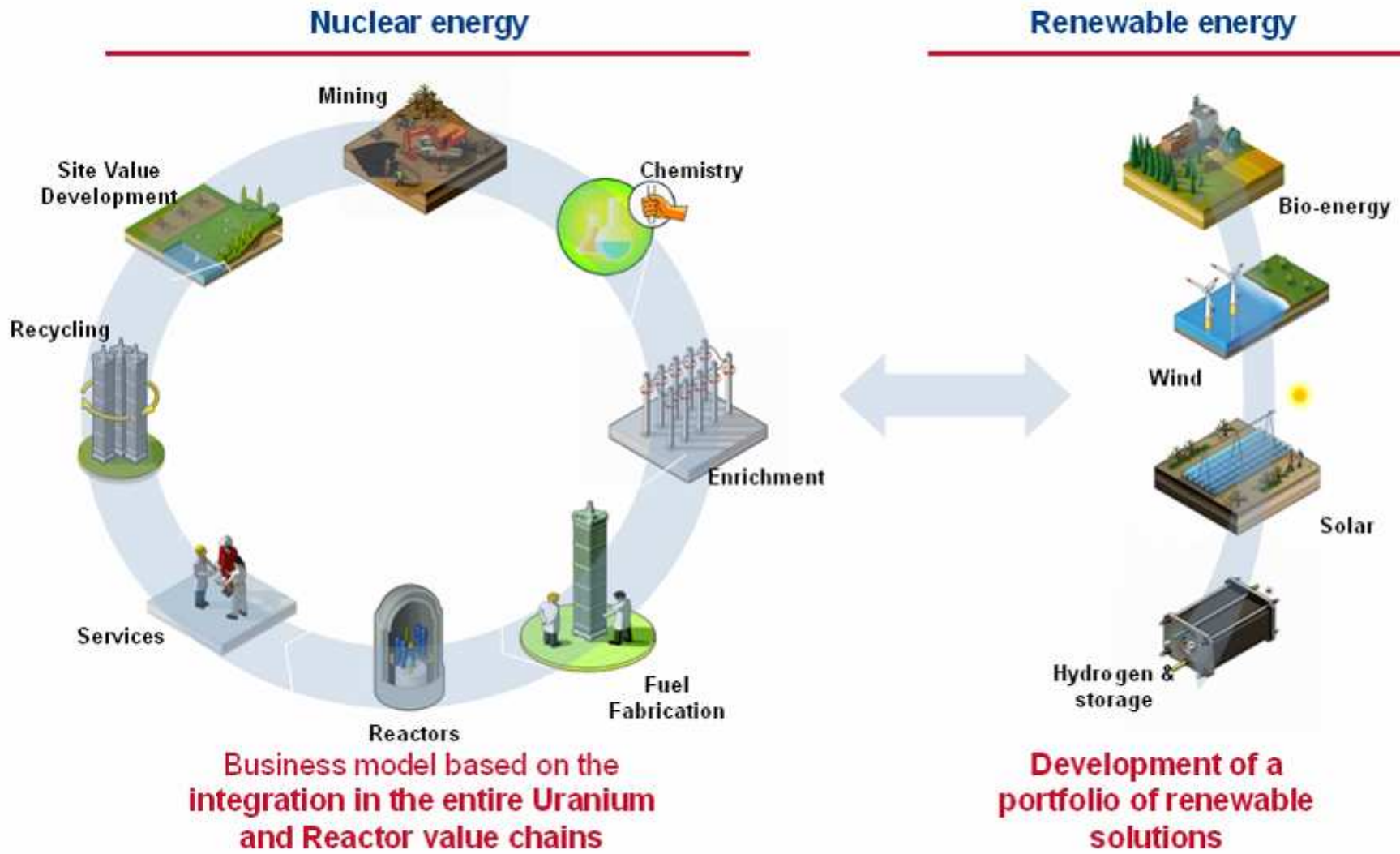
Revenue (base 100 in 2002)



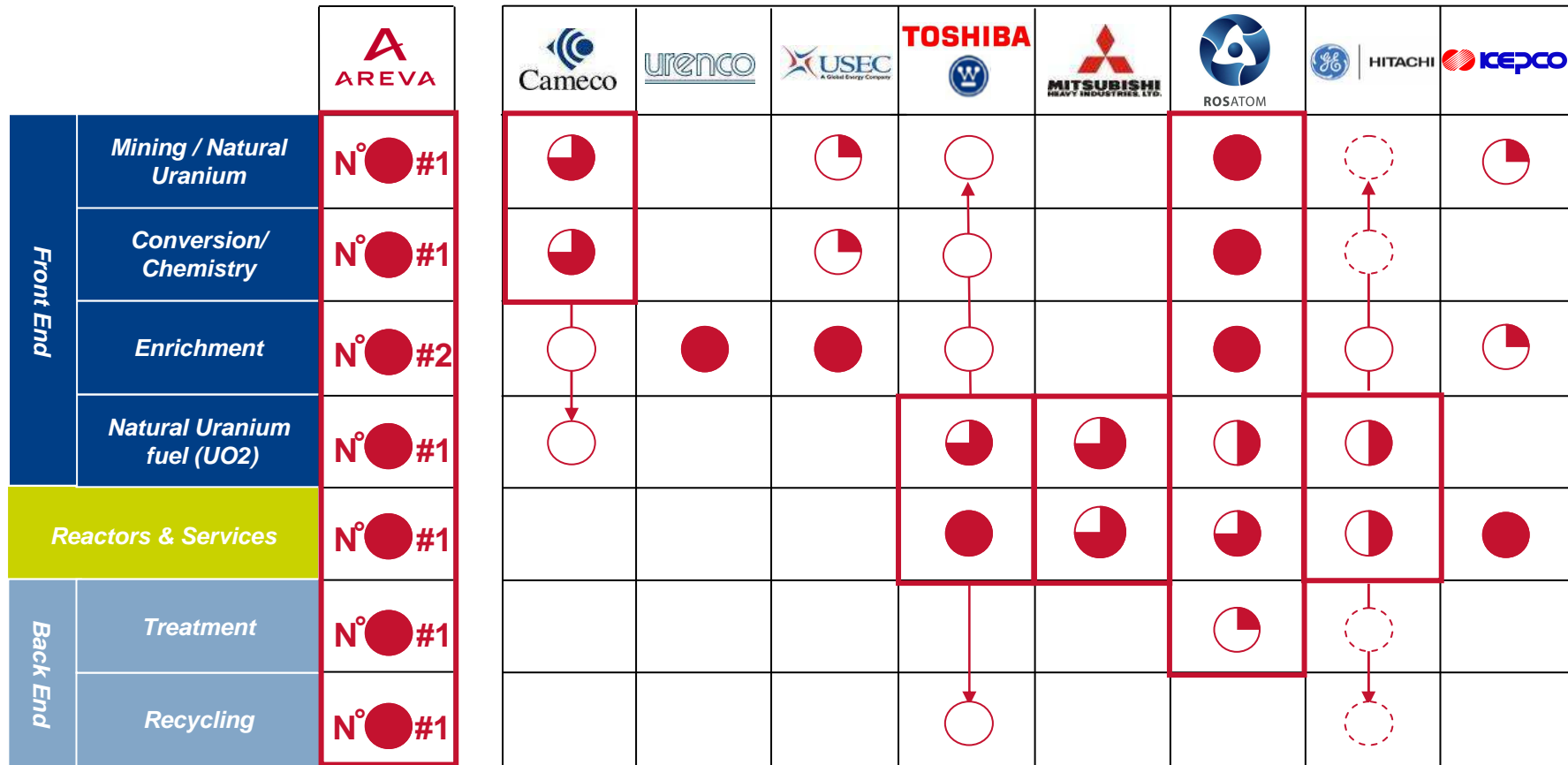
A ~12 billions € impact on the French trade balance

- ▶ Exportation of nuclear equipment and services: from 3 to 4,5 billions euros a year
- ▶ Exportation of electricity: 2,5 billions euros a year
- ▶ Savings realized from the non importation of fossil fuels: 6 billions euros a year

AREVA leader in CO₂ free power generation solutions



AREVA is the only fully integrated player on the nuclear power value chain



● Presence

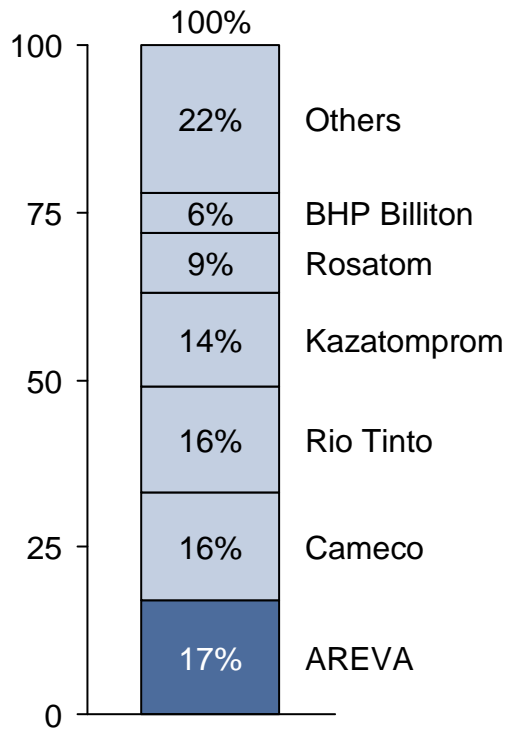
○ Recent strategic move / development

○ Potential move

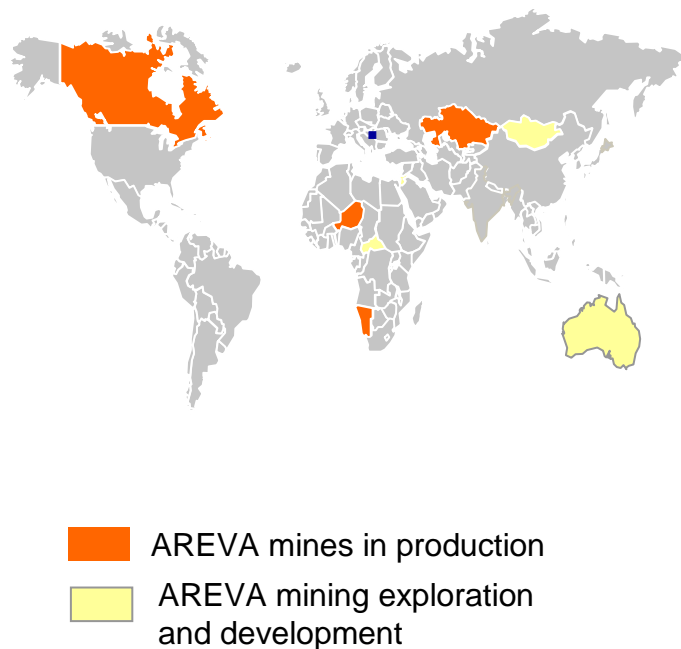
Source: AREVA estimates

AREVA first Uranium producer in 2009 with a well balanced mining portfolio

Uranium production in 2009 (tons)



AREVA mining portfolio



Bellezane (France) site before and after remediation



A security of uranium supply assured by a geographically balanced portfolio and pipeline of mines in different stages of development

Source: AREVA

AREVA is leading the way in new enrichment and conversion capacities with projects GBII and CXII

Enrichment: Georges Besse II, France



- ▶ A capacity of at least 7.5 MSWU (by 2016) and a modular capacity to meet market requirements
- ▶ The best existing available technology (ETC – TC12)
 - ◆ Design offering the best levels of cost efficiency, energy savings (50x less electricity needed), technical reliability and environmental impact

Comurhex II project

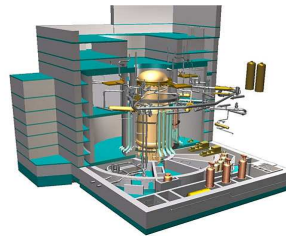


- ▶ A 15 000 tU yearly capacity, with a first production in 2012 and a possible extension to 21 000 tU
- ▶ AREVA is the first to invest in a brand new conversion facility
- ▶ This project will secure long-term conversion supply with technological innovations to respect stringent environmental and safety standards

AREVA has developed an array of different reactors to cover the needs of its clients

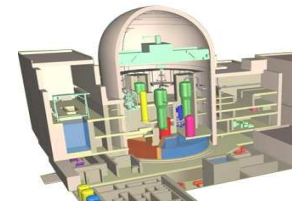
- ▶ An evolutionary design building on N4 and Konvoi achievements
- ▶ Providing the highest level of safety
- ▶ Being able to respond to market needs with an adapted offer

AREVAs' offer



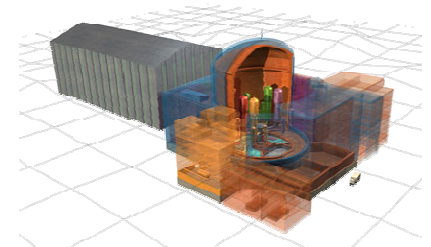
BWR 1250+ MWe

KERENA™
by AREVA



PWR 1100+ MWe

ATMEA



PWR 1600+ MWe

EPR™
by AREVA

Mid-size

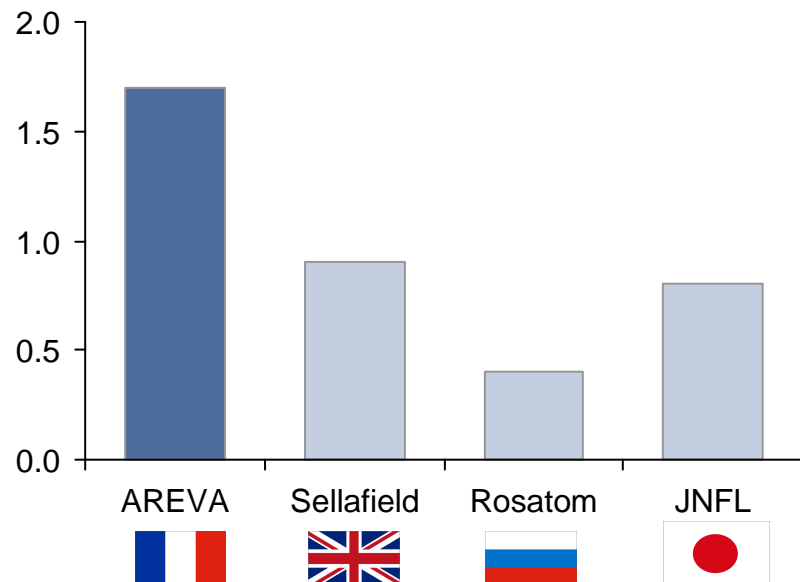
Large size

Boiling water reactor

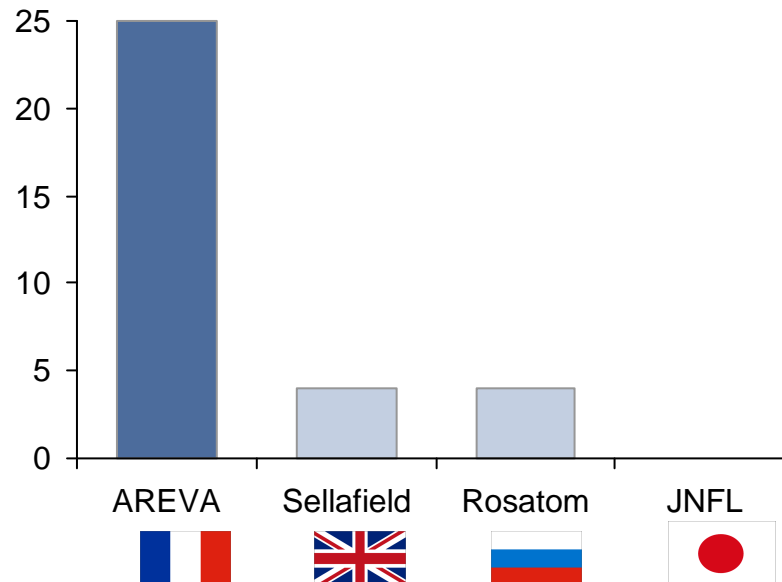
Pressurized water reactor

As of today, AREVA has treated in its French factory in La Hague ~75% of worldwide recycled fuel

Treatment capacity for light water reactors fuel (thousands of tons / year)



Cumulative production, as of Dec. 2008 (thousands of tons)

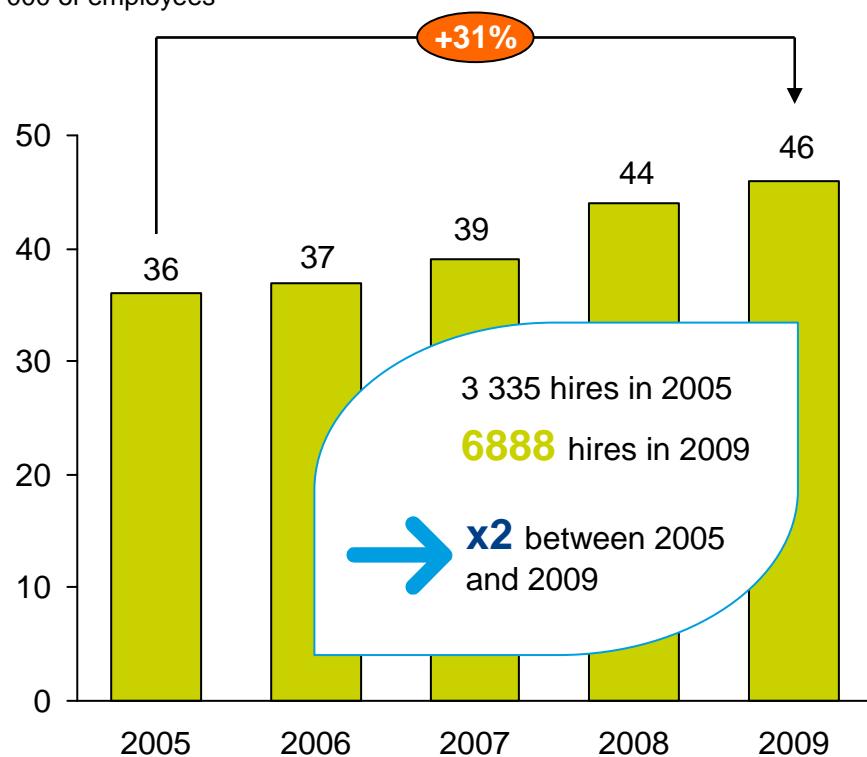


Source: AREVA, World Nuclear Association

AREVA invests in human capital to boost growth and our competitive advantage

AREVA's nuclear activities staff evolution¹

'000 of employees



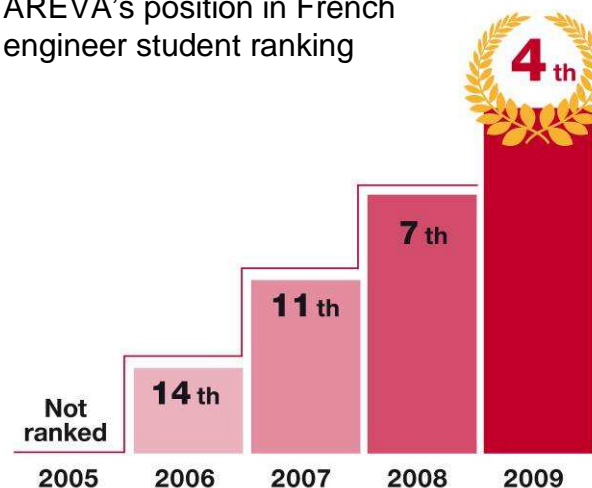
Source: Universum France
1. AREVA excluding T&D staff

AREVA's attractiveness on job markets has been continually growing



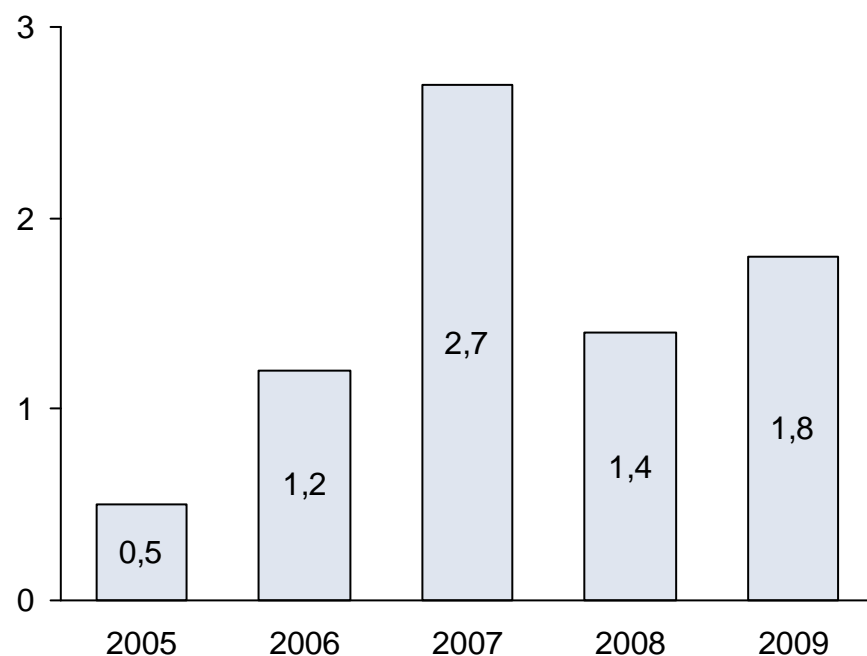
Multiple Awards in the “Employer of Choice” rankings in China, Germany, USA and France

AREVA's position in French engineer student ranking

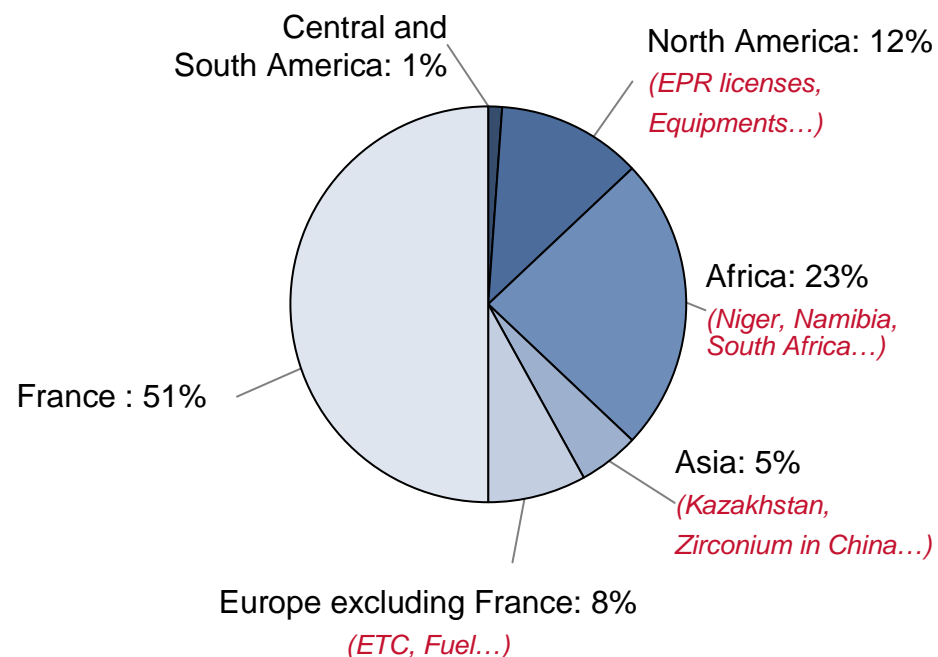


In preparation of nuclear revival, AREVA has invested more than €7 bn over 5 years, half in France

AREVA's investment over 2005-2009
(in billions of €)



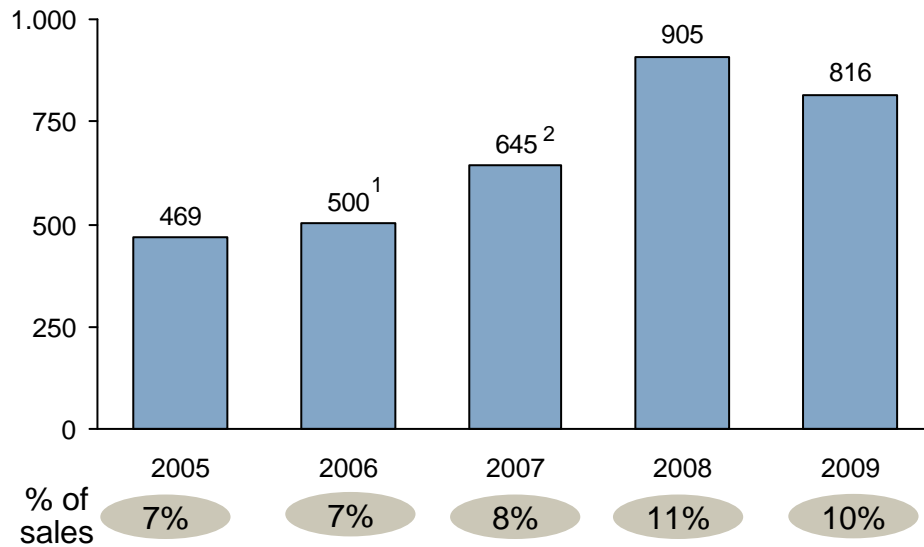
AREVA's investments geographical footprint (2009)



Source: AREVA 2009 excluding T&D

AREVA is committed to a sustained R&D effort in partnership especially with French CEA

R&D effort (M€, excluding FCI)



>> A sustained increase of R&D efforts from 7 to 10% of AREVA sales

New reactors

- ▶ Development of the **ATMEA1** pressurized water reactor with MHI
- ▶ Development of the **KERENA** boiling water reactor
- ▶ Relaunching of the development of sodium-cooled **fast neutron reactors**

Nuclear fuel cycle optimization

- ▶ Improvement of **mining and ore processing**
- ▶ Optimization of **uranium resources** utilization
- ▶ Development of new **conversion** technology
- ▶ Development of a new generation of **spent fuel** processing and **recycling** plant

Emerging technologies

- ▶ Large scale **hydrogen production** by nuclear powered electrolysis
- ▶ New generation of **I&C** for fast neutron reactors

1. Excluding the acquisition of the ultra-centrifugation technology 2. Excluding R&D projects acquired through UraMin

A long-lasting and successful culture of partnerships

Consolidation in the fuel cycle



Since 2004, long-lasting partnerships to develop mines in Canada



Cooperation in the supply of fuel assemblies



Equity stakes in GBII new enrichment plant



JV in fuel (Mitsubishi Nuclear Fuel)

Strengthening of industrial and engineering capacities



Heavy component manufacturing site in the US



JV in engineering (in negotiation)

Reactor development



1250 MWe boiling water reactor



1100 MWe pressurized water reactor

