

INTERVIEW WITH PHILIPPE SAMAMA

Executive Vice President, AREVA Installed Base Business Unit



Question 1: Could you describe your career path, and the reasons and circumstances that have led you to work at AREVA?

Before joining the AREVA Group, I occupied various management positions at Saint-Gobain and Valeo, and was subsequently appointed CEO of ECL, a P echiney/Alcan subsidiary.

I then joined AREVA T&D as Vice-President of its Service Product Line, where I supervised the high and medium voltage electrical equipment installation, maintenance, repair and upgrade activities. Since May 2010 I have headed up the Installed Base business unit within the Reactors & Services Business Group, which includes the activities associated with reactors in operations.

The common thread guiding the whole of my career path is a strong interest in industry and the management of people. Over time I have also become increasingly attracted to the services business areas.

Question 2: Could you describe the mission and the main activities of the Installed Base business unit?

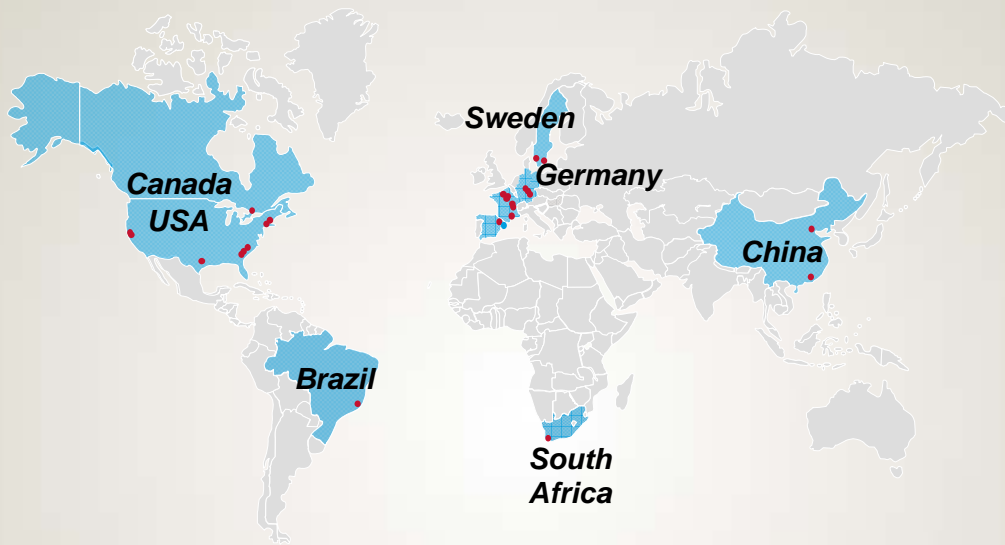
How many employees work in the BU and how is it organized (site locations, etc.)?

The Installed Base BU has set itself three main priorities:

- increase the performance and the safety level of nuclear power plants (maintenance, plants modernization),
- extend and optimize their operating time,
- reduce operating and maintenance costs.

4,700 employees work in the business unit, most of them in three countries (France, Germany, and the United States), but others on some twenty sites in nine countries around the world, including Spain, Sweden, South Africa, Brazil, and China.

Installed Base BU Footprint Servicing 250+ all designs reactors worldwide



Major Customers

- France: EDF, CEA
- USA: TVA, Duke Energy, Exelon, SCE, Dominion, Entergy
- Germany: E-ON, RWE, EnBW, VENE
- China: CGNPC, CNNC
- South Korea: KHNP, Kepco
- ROW: Eskom, Electrabel, Vattenfall, ETN, OPG

We offer a complete range of services and solutions for operating reactors, managing both recurring activities:

- engineering services (e.g. safety analyses),
- plant unit maintenance and outages,
- non-destructive examinations and tests,

and activities that we manage in project mode:

- repair and replacement of heavy components (e.g. steam generators),
- plants upgrade,
- I&C and electrical systems modernization.

Question 3: The Installed Base BU provides products and services to the various nuclear operators around the world. What are the key elements to bear in mind for the Installed Base BU in terms of current offers or projects?

What are the current flagship projects of the BU?

The Installed Base business unit has strong project management competencies, necessary since all our services are managed in project mode. To give an order of

magnitude, we have 6,000 projects in progress at the moment. Their very large diversity—from a few tens of thousands of euros for basic safety analyses to almost a billion euros for some plant completion projects for example—demands flexibility and expertise in our teams in order to be able to supply integrated and innovative solutions meeting the requirements of our customers.

Examples include: power uprate of the Ringhals plant in Sweden by replacement of two steam generators and the pressurizer; life extension of EDF plants in France with replacement of the steam generators, such as the project under way at the Chinon 2 plant; modernization of the instrumentation & control systems of EDF's 1300 MW fleet; the first installation of a digital safety instrumentation & control system in the United States. These are all significant projects that demonstrate the range of the technical and commercial competencies of the business unit.

Question 4: Who are your main customers? EDF in France, but internationally? Are there partnership agreements with other nuclear suppliers in certain markets?

EDF is our biggest customer, but we generate the majority of our sales revenue internationally. We are contributing to AREVA's objective to develop and propose integrated solutions to customers operating power plants using all technologies: Pressurized Water Reactor (PWR), Boiling Water Reactor (BWR), CANDU, VVER, etc. AREVA has worked on more than 360 of the world's 440 reactors.

In the United States, AREVA has developed a partnership system (alliances) with a number of utilities. This business model is widespread and defines a preferential partnership. In this model, our teams have greater continuity and familiarity with a particular site, which reinforces the reactivity and the effectiveness of our responses. The direct and permanent link this establishes enables us to provide the most suitable and most pertinent solutions.

The alliances can cover engineering services, outage-related services, or plants modernization.

The Installed Base business unit has established strengthened industrial partnerships in France with companies including SPIE, ORYS, Eifel, and Kaefer Wanner.

Question 5: China appears to be one of the keys to the development of nuclear energy in the coming years, at least as far as new build is concerned. Is this reasoning also valid for the installed base market? What is the strategy of the Installed Base business unit for this essential market?

China has a relatively young fleet of reactors, with an average age of eight years. In 2020, only 10 reactors will have accumulated more than 10 years of operation. China is consequently a growing market for services in the medium term. It is nevertheless important for the AREVA Group and the Installed Base BU to position themselves now in this strategic market.

In this regard, as part of our Safety Alliance program, we propose solutions enabling Chinese electricity utilities to improve the safety of their plants, as in the case of the emergency diesel generators that we are going to install soon at the Tianwan plant.

Lastly, the development of strategic and industrial alliances with local partners is indispensable in order to penetrate this huge market and propose solutions matching the needs of our customers.

Question 6: What are the main post-Fukushima technical actions and solutions developed and proposed by the Installed Base BU, through the Safety Alliance program, to further improve the safety of the installed base, i.e. the second-generation reactors?

Our safety improvement solutions focus on three aspects: resistance to external hazards, reliability of the cooling system, and prevention of consequences on the environment. On this last point, the protection of the environment, the on-site personnel, and the surrounding population is an absolute priority, reinforced following the events related to Fukushima.

These solutions include engineering studies on earthquake and flood risks, training and procedures for post-accident operation in the event of a severe accident, development and installation of technical products such as containment venting systems and passive autocatalytic hydrogen recombiners, and roll-out of additional ultimate emergency diesel generators...

Question 7: AREVA has long experience of PWR designs.

What is AREVA's current strategy, and in particular that of the Installed Base BU, regarding the development (innovation, R&D, target market share, etc.) of the other types of reactor (BWR, CANDU, VVER) and the associated competencies?

It is true that, historically, we have placed the emphasis on the PWR technology, but our strategy today is to also propose solutions and services for the other technologies: BWR, CANDU, VVER.

For example, we have installed instrumentation & control systems on VVER technology reactors in China, and containment venting systems on the CANDU technology plant at Cernadova, Romania. The latter project illustrates our capacity to mobilize in-house teams: supply and installation were handled by our German teams, while project management was implemented by a Canadian team.

This diversification is a major development priority, the ultimate objective being to work on the majority of the reactors in operation world-wide.

Question 8: What is the current stage of thinking in the AREVA Group with regard to the development of new projects (New Builds, KERENA, ASTRID)?

Nuclear development is by its nature a strategic project for each country concerned and depends on its energy policy. A country that wants to develop civil nuclear energy must reach a compromise with its own constraints in terms of energy demand, spatial planning, quality of infrastructure, electricity grid capacities, industrial competencies, etc.

AREVA must consequently adapt its product portfolio in order to meet the specific needs of its customers. We consider that the development of reactors other than the EPR™, through the ATMEA1, KERENA and Generation IV designs, is essential for us in order to meet the diverse requirements of the market.

We are continuing to invest in Generation IV, because we refuse to leave leadership in Gen IV to China, Russia or India. This is the ASTRID project.

Question 9: A last word for the young generation interested in a career in the nuclear industry?

Seen from Europe, the future of the nuclear industry may appear to be somewhat uncertain, but that is a local view. In other regions of the world, nuclear energy will be called upon to undergo very active growth: for example, in 2025, 60% of new-build plants will be in Asia.

In Europe itself, some countries have launched new plant construction programs (including United Kingdom, Finland, France, Sweden, etc).

All this offers great opportunities for French engineers to participate in the development of tomorrow's balanced energy model.

After the understandable natural emotion aroused by the Fukushima event, which is tending to fade, public opinion is returning to more rational and pragmatic considerations when it thinks about the place of nuclear power in the energy mix. The issue of greenhouse gas emissions will inevitably return to dominate center stage, and nuclear energy will again be viewed as an indispensable component of a balanced energy mix and accepted as such a component.

So the nuclear industry still promises a bright future and French industry, which possesses the complete range of competencies in this area, must continue to hold on to its place.