"Nuclear Power must be more than a rich country's option"

World Energy Congress
Rome, November 12, 2007

Excellencies, Ladies and Gentlemen,
It is a great honor for me to participate in this conference which provides a unique opportunity to talk about major energy issues in front of such a distinguished and diversified assembly.

One could be tempted indeed, when talking in front of people who, like you, represent the five continents, to tackle energy issues only in terms of diversity. For some of you, energy supply means abundance, for others, scarcity; for some, it means fossil resources, for others, hydroelectricity, biomass, for others, a mix made of nuclear energy, fossil and renewables.

Yes, in the energy field, diversity is a reality. For my company, AREVA, it is a daily reality, which we live in the 40 countries where we have industrial facilities and in the 100 countries where we are commercially present. This diversity is also at the heart of our business which consists in providing carbon-free energy solutions, as well as power transport and distribution systems.
[Third energy revolution]

But this diversity should not lead us to forget that all of us share a common energy future. **All of us indeed are currently going through a global energy revolution, the third one in our recent history**. The 1st one, in the XIXth century, featured coal and steam ; the second, which flourished in the XXth century, was dominated by oil and electricity. Today, the recipe of the third revolution is made of five elements:

- Limited fossil resources
- Strong economic growth in emerging countries
- Demographic growth, with an increase of the world population of 3 billion people by 2050
- And climate change. **Global warming is by nature a global issue**. It may be unfair but it is the truth, even though a hard one: whether you emit a lot of Carbon like industrialized countries or very little like very poor countries, you are at risk. Moreover, poor countries will be the first victims! Climate change is nowadays a subject of foreign policy, pitting North against South, developed countries against developing ones; and a major topic of multilateral negotiations as we will once more see it in Bali next month.

In revolutionary times, there is no room for routine, for "life as usual", neither for "business as usual"! The solution lies in one word: "**creativity**". A creativity designed to provide security of supply, competitiveness and environmental sustainability **for all**. Which means, in that field, resorting to all possible means: increasing energy efficiency; optimizing the use of energy; promoting R&D in new energy technologies; and developing CO2-free energy sources such as renewable and nuclear energy.

[The case for nuclear energy]

I am fully aware that, in Europe especially, nuclear energy is still a very "emotional issue", and that many European countries entertain a very ambiguous relationship to nuclear energy. But, dogmatism or not, prejudice or not, **facts are here**. And the fact is that **nuclear energy is Carbon free, competitive and available, therefore an inescapable part of the solution for our energy future.**

- Because, **first fact**, nuclear is a low Carbon energy; it has not been invented for avoiding Carbon emission, but it does. It already avoids as much Carbon as what all cars in Europe are emitting.

- **Second fact**: Nuclear is competitive, as shown by almost all recent studies in different part of the world. As well as by the nuclear choice made by major emerging countries (China, India, Brazil, South Africa,…). And this is very important because it is related to the price of electricity.
- And, **third fact,** once the power plant is built, the cost of generated electricity is extremely stable. And predictable for the next 40 to 60 years. Why? Because Uranium only accounts for about 5% of overall generation cost! There is basically no consequence even if the price of Uranium doubles or triples or quadruples.
- **Fourth fact**, not depending on fossils, but on uranium, Nuclear is assimilated to a "domestic energy". It is part of the energy security of a country. It is in order to boost their energy independence that Japan or France have developed major nuclear programs in the 70's, 80's and 90's. In France it was a 20 billion euro choice, which is the amount of money saved each year on the French energy bill compared to 1973! A choice which spares France from importing each year the equivalent of Kuwait's oil production, the French nuclear program producing the same amount of energy as this country's yearly oil production.

When I call nuclear "quasi domestic", I mean **uranium is available**, it is well distributed around the world, and current major mines are in very stable countries, such as Canada or Australia. Moreover, our supply is secured by long-term contracts. For instance, AREVA recently signed a contract with KEPCO in South Korea for supplies until 2029. Should I add that our unique know-how in recycling extends natural resources for several centuries, while optimizing waste management? It is clear now for all countries taking a long term view of nuclear energy that a closed fuel cycle is one the main conditions for its sustainability.

- **Fifth fact**: nuclear offers a large energy density: it is very easy to produce a substantial quantity within a small space area, and easy to stockpile several years of fuel, as our Japanese customers, for example, have well demonstrated.

- **Last fact**: already an energy solution for today, nuclear also is a multimodal solution for the future, with the development of new applications: hydrogen, desalinization, fuel cells, oil sands extraction… **Nuclear is not an old technology with little surprises to offer! It is a technological solution with a well-proven past, with a dynamic present and with a promising future.**

[Why is it a relevant solution for developing countries?]

Why would this promising future have to be the privilege of the few? On the contrary, I would say that it is *because* nuclear energy is an energy solution for the future that it must be a universal solution and not only a rich country's option.

Too many countries have been excluded from the first energy revolution in the nineteenth century; too many, have again missed the train of the second energy revolution. **Today we simply cannot afford leaving countries on the side of the road:**

- **Today 2 billion people still don't have access to electricity.** And living without it means having a life expectancy reduced to thirty-five or forty years!
- Moreover, most developing and emerging countries are severely affected by the current level of oil and gas. And there is a growing consensus that prices will remain high, as supply must keep up with accelerating demand. These higher prices have damaging consequences for the poorest countries.
- It is especially true in Africa: besides wood and other traditional biomass, which are still accounting for around 2/3rd of the energy mix, most African countries are relying on oil and gas for 75% to 90% of their electricity production.
- Also, developing countries will need to limit the growth of greenhouse gas emissions while their energy consumption increases dramatically.

In this prospect, **there is no option for developing and emerging countries but to be part of this third energy revolution**. Developing sustainable energy resources is a crucial issue for those countries.

- who will be the main contributors to the world demographic growth I mentioned earlier;
- who are and will be the contributors to world economic growth;
- in which massive urbanization favors the introduction of large base-load plants;
- And who will be the first to suffer from climate change.

[The dynamic has already been launched]

Not only considering nuclear energy makes sense for these countries, but **it would be a mistake to discard it a priori**.

In the past already, **nuclear energy has proven to be an efficient option for developing countries**. **China, India, Brazil, Romania, Mexico**, which had a very low level of GDP per capita when they made the choice of nuclear, are striking examples.

Current developments confirm that the idea of nuclear being a developed countries' privilege has more to do with prejudice. Turn your eyes to **Indonesia, Morocco or Vietnam** for example. Nuclear power may soon account for part of the dramatic increase in electricity supply called for in these countries.

Facts are here: a new geography of nuclear energy is currently standing out. If we look at a map with reactors in construction, it is clear that the traditional overrepresentation of OECD countries will soon be more balance.

[A long way to nuclear energy]

This is good news. Dynamics are positive for these countries and positive globally. But it is not endless. In the same way as I will never say that nuclear energy is ***The*** solution to build a sustainable and competitive energy future, in the same way, **I will not say that any country can immediately accede to nuclear energy**.

Why?

Because it is simply not true. Making the nuclear choice implies for any country to commit on the long-run – remember, a nuclear plant life duration will be forty to sixty years. **Making the choice of nuclear energy means beginning a long journey**. And it is a journey during which **you can never compromise either with safety, with security or with nonproliferation.**

This choice thus involves **articulating the appropriate legal, financial and regulating framework**. Before buying and operating a nuclear plant, one needs to put in place the proper institutional environment.

It includes the ratification of international treaties and conventions in the field, the setting up of a well-staffed and independent Safety Authority, the training of regulators and operators, and in some cases, upgrading power transmission networks. It is also necessary to define a clear process to get **approvals from local populations**.

For sure implementing each of these steps requires some time and a lot of political determination. It also requires money.

[And what about the cost?]

But, is it an issue? Undoubtedly, it is not the same thing to fund a nuclear plant and, let's say, a gas-fired plant. In the first case, initial capital costs are very important while operating costs are low; conversely, if you don't have to invest so much at the early stage for a gas plant, 75 % of its kWh cost will come from gas and will involve high operating costs, not predictable in the longer run.

Let me be clear: I am not minimizing the cost for any country to buy and build a nuclear plant. But **financing solutions do exist,** which drive me to even say that "new builds" today make good financial sense.

- Several recent studies in different parts of the world rank investment in new nuclear plants at a par or better than coal and gas, in most countries reviewed. And that was before the rise of oil prices and without taking into account any Carbon price. Research and analysis works by renowned banks are going in the same direction.
- There again, several utilities in the world, in Japan, China, India, Finland or France are building new power plants. And several others, in the United States, Brazil, Lithuania, South Africa, have firm plans to do the same in coming years; not to mention the UK, where 8 utilities have already demonstrated interest. From a financial point of view, a utility owning nuclear power plants is indeed a very good investment. It creates value. And that value is reflected in the share price of listed utilities operating nuclear fleets in Europe or in the United States.

So, financing solutions are available, as there are available for other non nuclear projects, wind energy or LNG terminals for instance. And there are different financial models, well adapted to each country.

I would like to welcome the **new interest showed by the World Bank for nuclear energy**, as well as the one expressed by regional investment banks such as the European Investment Bank or the Asian Development Bank. Their interest is still at an early stage, but no doubt they will be a very precious resource to help building the non-CO2 energy model the world needs in the coming decades!

[Be ready for debating!]

International treaties, laws and regulations, money: but what about public opinion? What about those who will finally enjoy the electricity generated by nuclear plants? I will be clear in this: like for any large infrastructure projects, **nuclear energy does raise debates and will certainly continue to do so!** Well, again, this is good news! It is good news because there is nothing which cannot be said about nuclear energy and because debating it is sound! **Debating on what?**

- **First, the proliferation issue**. Does nuclear energy facilitate nuclear weapon proliferation? In this regard, let me remind you of the fact that light water reactors, such as AREVA's EPR, present absolutely no risk in themselves as far as proliferation is concerned. As for the nuclear material needed to operate such reactors, it may become sensitive only when associated with the mastering of highly sophisticated dual-use technologies, namely uranium enrichment and spent-fuel treatment. But most countries do enjoy the benefits of nuclear energy without having to master those technologies : thanks to a well-functioning fuel-cycle market, with suppliers like AREVA that provide enrichment and spent fuel management services at competitive prices, they simply do not need it.

- **Second, safety**. I already mentioned this key point, but let me insist on it again. Safety is not only a question of regulations and procedures. Safety is first a question of mindset and culture. And this is why it can always be improved.

  However, it is only fair to recognize that in the past twenty years *[since Chernobyl]*, the safety and environmental track-record of operating nuclear power plants is very high. As it is also fair to recognize that safety improvements are regularly implemented, at both design and operations levels.

- Let us come to the **third issue** of concern: **waste management and decommissioning**. This is more a public acceptance issue than, strictly speaking, a technical issue. Geological disposal of waste is becoming a reality: Finland has already got acceptance and started underground works. And France has passed a bill in June 2006 which defines steps to proceed with the underground laboratory. What I mean with those two examples is that solutions, efficient ones, do exist: the nuclear waste issue is manageable.

But, whatever the technical answer is, public concerns must be taken seriously and addressed honestly. Governments must show leadership, the nuclear industry must be open to public debate. And indeed, we are open to dialogue with all stakeholders, including opponents, in a transparent manner. I am convinced that, through genuine dialogue and public debate, any legitimate concern can be overcome.

[A long journey but you will not make it alone]

I said it earlier: for any country turning to nuclear energy is a long journey. A long… but manageable one. So many countries, large and small, rich or not so rich, have already made it! It is certainly worth the effort. And **countries are not alone on the road**. The **IAEA** is offering road-maps and assistance to move on. And it plays in this regard an indispensable role.

We, industrialists, are also here to accompany the process. As I said earlier, my company, AREVA, does not only provide energy, it provides energy *solutions*, including solutions at a very early stage, when it is about choosing a site or studying the business and financing model.

As early as 2001, AREVA puts all its strength to prepare and **get ready for the new energy revolution**. A strategy supported by huge investments. This **pioneer mindset,** which I tirelessly promote within AREVA, has led my company to be very supportive of the nuclear renaissance in Asia, in Europe or in the US. We **constantly adapt ourselves** because we consider that, as a company, we have a **specific responsibility in promoting and developing non-CO2 sources of energy, a responsibility based on our decades-long experience**.

In practical terms, what does adapting mean? Let me focus on one, but very telling example. Different sizes of reactors are requested by customer countries, according to the size of their population, to their needs, to the capacity of their power grid. We therefore concluded a partnership with Mitsubishi Heavy Industries, and our joint venture, ATMEA, is going to develop a new reactor to answer those new needs.

Excellencies, Ladies and Gentlemen,

In a world enjoying a growing energy thirst, **we have in our hands, with nuclear energy, a formidable asset to build an energy sustainable future**. It means that **one of the answers** to the issue of achieving security of supply, competitiveness and the fight against climate change **is already available.**

New comers to nuclear energy, most of them being in the developing world, certainly have much to receive from countries that already have decades of experience in this field and from the companies that built their nuclear plants.

As it did in the past in Brazil, in China, in South Africa, AREVA is fully committed to share its know-how and experience.

But it is **not a one-way process**. Those new countries coming to nuclear energy also have indeed much to teach others on what is a serene approach of nuclear energy, without taboo or prejudice. **In Asia, in Africa, in America, many countries have developed a pragmatic approach of nuclear energy,** based on an objective assessment of the advantages they can enjoy from it. In conclusion, I wish some European countries, which have turned their back to nuclear for purely ideological reasons, could learn from this pragmatism.

I thank you for your attention.