

## NUCLEAR ENERGY AND POWER GRID SFEN Jeune Génération

- Welcome everybody. I'm very pleased to introduce this congress "Atoms for the future" here in Paris. What better title with this morning announcement by EDF that we are putting Hinkley point project on the rails. Just to avoid any believe that we are particularly clever and wise To choose this date. No we didn't choose on purpose. No it's pure chance, but which chance !

So welcome once again for those 2 days of work, around a particular topic ! Nuclear Energy and Power grid.

- To understand this choice, we have to look to the future, and not a long term future.

### Access to Electricity: a Global and Sustainable Challenge

- While in 2007, the energy demand of OECD and non-OECD countries was equal; in 2040, the energy demand in non-OECD countries will be double of the demand in OECD countries. The average annual consumption growth of non-OECD countries is 2.3% against 0.6% for the OECD countries. The poles of the world's energy consumption change.
  - The economic growth of China and India will pair with a doubling of their combined energy consumption and account for nearly half of the growth in energy demand. In 2035, India and China will consume nearly 31% of global energy against 21% in 2008.
  - Be it in Asia, or in Latin America, emerging countries have to address the double challenge of answering a rapidly increasing demand especially in the urban areas, while still consolidating the electrification rate, which remains below average in most rural areas.
  - Africa is a topic in itself, as overall electrification rate remains below 50%.
- Among all sources of energy, electricity is clearly recognized as a major stake to achieve sustainable development, as it is a commodity necessary to economical development and social progress. As per the *World Energy Outlook 2012*, 1.3 billion people are without access to electricity and 2.6 billion people still rely on the traditional use of biomass for cooking, which causes harmful indoor air pollution. In the Asia-Pacific region, 750 million people, out of 3 billion, live without any access to electricity.
- For the emerging countries, access to electricity is not a philanthropic question, it is a development issue. The stake for these countries is not to distribute eco lamp bulbs in remote areas but to have a State industrial vision according to which their energy plan, including electricity, will serve and benefit national development goals. Became electricity comes with development : It enables children to study, citizens to live better in cities, with tramways train, metro, tomorrow electrical cars. It will enable large cities to be good cities.

- The three layers that co-exist in emerging countries have to be taken into account:
  - extreme poverty, as energy is a major element to consider when talking about health system, education and food supply;
  - areas under-development, that need financing, international cooperation and governance progress;
  - and finally industries, urban centers and social groups that have already access to development and who need, to remain at this level and to keep going further, innovation, advanced technologies and efficient regulations.
- But sustainable electricity for all is not only a question for emerging countries but also very much a question for developed countries. The French energy transition for example translates into the stabilization of the French energy mix.
- Addressing these issues requires taking into account two dimensions :
  - First access to reliable, affordable and clean energy for the individuals.
  - Secondly, access to reliable, affordable and clean energy at the scale of a country, for it to ensure its development.

## So with Energy Transformation Challenge tomorrow

- The global electricity industry is on the frontline
  - A transformation that affects consumption, uses, generation and networks
  - An electricity system that needs to be both global and local
  - With three imperatives: control costs, save energy and cut CO<sub>2</sub> emissions.

Of course, with these three imperatives

- Nuclear has an important part to play in reaching this goal of access to sustainable electricity everywhere in the world, as it provides competitive, safe and CO<sub>2</sub> free electricity, on a long-term, 40 to 60 years basis.
- But renewable energy also has an important part to play.
  - Its development is fast. In 2011, Europe was leading, since its 80.6 billion euros of investments exceed the cumulative investment in the United States (€ 39 billion) and China (€ 37 billion) in the same year.
  - However, adding capacity powered by renewable sources can not be an end in itself.
    - It can be important where it can contribute to base generation given the local weather situations, as may be the case in the United States.
    - Plus, this intermittent power must be considered in an integrated manner, taking into account the local context and with the objective of overall effectiveness of regional systems of power generation. It is extremely useful when backed by storage, which can be achieved through several

means already available, such as pumping, water heating, charging batteries. But has to be developed on an industrial scale.

- However, in the coming decades, the development of energy consumption in emerging countries will continue to rely heavily on fossil fuels, increasing pressure on these resources as oil reserves diminish and making necessary the development of advanced coal-technologies and a stronger emphasis on gas-fired facilities.
- In this perspective, distributed energy is meant to become an important part of the future global energy mix.

## Networks : Adapting to New Circumstances

**Networks, especially transmission networks, keep the system in balance** by adjusting to the complementary properties of the energy mix and ensuring solidarity between the system's actors. The spread of intermittent renewable energies is throwing this organization into question as their supply cuts in even if there is no demand. It is also usually connected directly to the distribution network, which did not until now need to incorporate smart control systems. This is one of the biggest challenges we currently face.

Other countries asked themselves the same kind of questions. But worldwide, those questions can only be addressed through the scope of competences and capacity building. They will require intense international cooperation. When we operated only coal fired plants it was easy because the fuel supply was there, but also because we had people who knew how to build and operate the technology. Today the technologies are more complex and the integration of fuel supply security, infrastructures development, networks optimization, and regulatory framework design, require more knowledge and more diverse skills.

## Conclusion

These are a few topics we will address during those 2-days seminar. But I'm convinced that nuclear energy and power grid reconciliation can only be achieved through a comprehensive, holistic approach; defined by a State long-term industrial vision; integrating fuel supply security and development of infrastructures; and relying on effective dialogue with the stakeholders to ensure that the answers proposed accurately address the specific needs of the territories.

As a cherry on the cake, As french nuclear energy society president, I'm pleased to give you today the information of the creation of a specific SFEN section, "Nuclear and renewable". This section will focus on this complementary of nuclear and renewable, how to get them on the grid and will address this question Scientifically, in cooperation with the other sections. Thanks to Stephane, in this room, to have accepted the presidency of this section. Stephane was previously Cattenom NPP site VP and in his charge now of renewable strategy in EDF. I gave him the floor to present this new section.