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Theme of the day: GAS TO POWER

Title of speech: THE RIGHT MIX

1. Introduction

It is a privilege and an honour to be invited to this conference, which I attended for many years as a representative of the gas industry.

The invitation is a testament to open-mindedness since I now represent EDF, which is well known as a champion of nuclear energy, and undoubtedly one of the lesser consumers of gas in the global electricity industry.

At least this new status allows me to speak with great freedom about my vision of the “right mix” for electricity generation, especially in Europe.

Demand for energy, and electricity in particular, is growing worldwide. The WEC estimates that global electricity consumption will double between now and 2050, driven by demographics and economic growth, which can range from 2% to 15% in the fastest-developing economies like China.

Electric companies were able to lower their investments for many years, but must today build new equipment to meet this growing demand.

While gas is at the heart of this trend, it is not the only option, and this is what I plan to discuss here.

2. Gas is key to the strategies of European electric companies

2.1. European electric companies are entering a new phase of investment

We will have to build 600 GW of new capacity in Europe over the next 30 years to

- replace the plants that are too old or do not meet environmental standards, and to
- keep up with increasing demand.

The corresponding investments will be gigantic, probably in excess of one trillion euros.

Industry consolidation is a reaction to this prospect, and European electric companies, traditionally regional players, are acquiring an international dimension.

2.2. They are seeking to gain international positions in core businesses

E.On is an energy giant today but did not exist ten years ago. Built up through a series of mergers and acquisitions, the group is currently seeking to take over Spain's Endesa. Recent merger attempts involving Suez and Gaz de France and Enel show that all players are focusing on developing in the large European markets.

EDF was a pioneer in this movement. Our Group is firmly established in the UK via EDF Energy, in Germany via EnBW, and in Italy via Edison. We also have strategic positions in Switzerland, the hub of European exchanges.

This is only the tip of the iceberg where industry restructuring is concerned.

2.3. Moves being made to establish positions on gas market are drawing less attention but equally important

The new focus on gas is demonstrated by Enel and Suez's efforts regarding Gaz de France, as well as by the way groups like E.On (merger with Ruhrgas) and RWE, now Germany's largest gas companies, were formed.

EDF too has plans for the gas market, and has begun to implement them. Already in 2005, the Group manipulated more than 28 Gm3.

One might even say that there was a bona fide "natural gas craze" in the industry between the late 1990s and 2004. Just five years ago, 70% of new turbines were gas powered, and a large number of facilities still run on gas.

Electric companies are also investing in gas resources to secure their investments. Edison has begun developing its regasification terminal in the province of Rovigo, set to go on

stream in 2008 and add six billion m^3 a year thanks to imports from Qatar.

3. What are the benefits of natural gas for electric companies?

3.1. The first is flexible usage for electricity generation and fast rollout

Gas facilities can be started up and shut down quickly. This flexibility is much appreciated when demand fluctuates, since as we all know, electricity cannot be stored.

In addition, gas-fired units can be built faster than coal-fired facilities, at half the cost.

3.2. The second advantage is environmental

Gas pollutes less than oil and coal, emits less greenhouse gas, and makes fossil-fired facilities cleaner, in line with the Kyoto objectives.

Moreover, combined-cycle gas turbines are simple and reliable, and afford much more energy efficiency than traditional plants. Gas is also the best adapted energy for co-generation. Edison already has a highly efficient fleet of co-generation plants that power greenhouses while generating electricity.

These advantages are both ecological and economic.

3.3. And finally, electricity companies are adapting their business to meet the expectations of customers looking for combined electricity and gas offers

Our customers want to buy different energies in one place. Gas and electricity are both competitors and complementary. Prices are a determining factor, but customers also place great emphasis on finding the most intelligent energy solutions while reducing their energy bills.

3.4. Gas is thus taking a leading role in European energy scenarios

Under the reference scenario in the European Commission's Green Paper, even assuming relatively high gas prices (based on a barrel price of $45 in 2030), gas use will continue to increase in Europe.

Gas-fired electricity generation would more than double between 2000 and 2030. The Green Paper suggests that by 2030, more than 40% of European electricity generation will be gas-powered, compared with less than 20% in 2000.

The question is whether we are moving toward the right mix: 40% gas, 10% coal, with nuclear power maintained at its present share or slightly decreased, and the balance coming from fast-growing renewable energies…

4. There is a need to look 50 years ahead to analyse current trends and availability of resources

The industry has a long investment cycle and must therefore look this far into the future.

As of today, two-thirds of world electricity generation relies on fossil fuel combustion.

By 2050, oil will no longer be used for electricity generation. What does the future hold for gas? As far as we can tell today, production should peak toward 2050.

Coal, with its 240 years of reserves, is the only fossil fuel that is likely to still be abundant. However, this prospect raises the question of CO2.

Proved uranium reserves would suffice (*even at three times present cost*) to operate a fleet three times larger than the current one for 60 years. The coming on stream of the fourth-generation nuclear reactor in 2040 would suffice to ensure operation for thousands of years thereafter.

Among the inexhaustible renewable energies, hydro is the leading option for electricity generation. Wind power, solar energy and biomass have much ground to cover, and there is scope for improvement.

The energy landscape is thus increasingly diverse: fossil fuels, and notably gas, will not be able to maintain their share

of electricity generation, and we will need to rely increasingly on renewables and nuclear.

5. Taking the long-term view helps to make decisions for the short term

5.1. The settings will inevitably be adjusted as the "right mix" is constantly redefined

For the time being—and this is not about to change—, thermal plants, including nuclear, are the only ones that take up little space but deliver maximum power when we want and where we want.

Thermal plants today account for close to 90% of electricity generation in Europe and worldwide. This percentage will decrease as renewable energies gather momentum; meanwhile, energy efficiency will allow us to keep a portion of demand in check.

Nonetheless, even if the share of thermal power fell to 75%, taking into account the significant additional capacity that cannot be avoided, the primary energy requirements for this type of generation will remain huge.

5.2. Choices will be between nuclear, gas and coal

The differential between development costs for different types of thermal power has narrowed, now standing at:

- About €50/MWh for new CCGTs, with CO2 at €15/tonne and oil at $40/barrel.
- Roughly the same amount for new coal-fired plants (coal around $50/t).
- Less than €50/MWh for developing new nuclear stations.

Options will vary from one country to the next, depending in part on public opinion on coal and nuclear. But as we can see, gas, roughly comparable at $40/bbl is no longer competitive with coal and nuclear at today's prices.

Until CO2 capture and sequestration has reached industrial maturity, probably around 2030, coal will be slow to develop, while gas, easy to use, will account for a significant share of generation in Europe. The 40% of gas-powered electricity generation called for in the Green Paper may appear ambitious.

In these conditions, nuclear will not only be maintained but its share may increase.

Moreover, these trends should begin to reverse starting in 2030, by which time renewable energies will be competitive and CO2-free coal a possibility. There is likely to be a change in public opinion on nuclear once the proof that ultimate waste can be stored safely has been widely accepted, and that nuclear is as competitive as ever-more expensive fossil energy.

More importantly, natural gas will increasingly be used for direct applications after 2030, allowing us to avoid wasting this precious resource on electricity generation.

5.3. How must we prepare for and keep up with trends

The first priority is to focus on energy efficiency

It is in building comfort that the most progress can be made, with potential gains of 30-40% compared with current consumption.

We at EDF have made energy efficiency a key focus both of our sales and marketing approach, and our research.

The second priority is to develop renewable energies: hydro, biomass, solar and wind power. For instance, by 2010, the EDF Group will have invested 3 billion euros in wind power, or as much as in nuclear energy.

Most of the potential for new hydro facilities is situated outside Europe. We are contributing to this development, notably with the Nam Theun dam in Laos. Solar and wind power will only really be able to get off the ground once we find solutions for storing electricity that are safe, economical and efficient. This is another key focus of our R&D efforts.

The third priority is to find better ways to use nuclear and coal, two technologies that will be indispensable in the years ahead.

As I mentioned before, transparency, safety and competitiveness have to be demonstrated to guarantee a favourable public opinion on nuclear.

For coal, we can prepare the future by developing CO2 capture and storage solutions.

In sum, gas will be a key ingredient of the “right” energy mix throughout this period, and for some time to come. During the first quarter of the century, it will even be a vital resource for electricity generation, until other technologies have gained ground.

5.4. This assumes that gas markets will function efficiently

Proper market functioning will hinge on two prerequisites that are perfectly within our power in Europe:

The first is that significant investments in infrastructures will have to be made in order for additional imports to reach and to move easily within Europe.

The second is the drafting of “Third Party Access” rules that are consistent throughout Europe, thus paving the way for transparent and easy access to networks, and for the emergence of a true European gas market with its own dynamic, increasingly independent of oil.

6. Conclusion

While we are definitely at a turning point in terms of investment, there is no doubt that gas will remain a key element of the European energy mix, and even the leading primary energy in the electricity mix during the first quarter of the century.

Nonetheless gas will over time increasingly be used directly and we will need to rely increasingly on coal, renewables and nuclear for electricity generation.

I am also convinced that, going forward, energy will become an increasingly scarce and precious commodity, and that energy efficiency will become a key aspect of energy groups' offers and innovations.

We are on the eve of a new and interesting era. Boundaries are shifting. Our entire industry can thus prepare to make a fresh start!