

# The Nuclear Debate at the Energy Crossroads

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**A**t the beginning of the 21st century, energy is at the top of governmental agendas, of primary importance for the international community, the world economy and for individual citizens, all of whom are affected at a basic level by energy concerns.

Energy is a vector of growth in advanced societies, and a key developmental factor for those still fighting to achieve social and economic progress.

We live in a society where oil remains the main source of the energy we consume. As such, it influences international politics, the terms and interpretations of economic globalisation, countries' levels of development and the material welfare of people in each community.

Energy, like water, is a common and universal concern. It is a matter of public policy and a component of citizenship, whose basic order must be known, interpreted and debated in accordance with the democratic spirit of social alternatives and economic options.

Reflecting on the construction of the European Union, energy must be regarded as an important theme for analysis. The double accomplishment of an internal and competitive energy market on one side, and the definition and real adoption of a common energy policy – a single energy voice – on the other, constitute the most finished expressions of this contributory role.

Consequently, the option of nuclear energy requires an awareness of the multiple factors and questions relating to the energy debate. There is no room here for isolated or partial assessments.

The first question to deal with is the quality and quantity of the resources available to efficiently meet the energy needs of a given society.

There are more than 400 nuclear reactors in the world, located in about 30 countries, with a total capacity of more than 368 GWe. Furthermore, there are 56 countries which operate a total of 284 research reactors for scientific purposes; a further 220 nuclear reactors are used to propel warships. And there are more than 50 new facilities in construction, or

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already planned, around the world. Among them, over 30 nuclear units are planned in China for the next few decades and almost 20 are envisaged in India as economic development continues in the coming years.

In the EU, the contribution of energy with a nuclear origin to electricity production stands at 20 per cent. There are 152 nuclear reactors working in 15 member states. The average age of nuclear power stations is around 25 years. Therefore, it is estimated that one third of these stations could be closed down by 2025, unless their lifetime is extended. France possesses the biggest group of nuclear reactors (59), which almost represents 80 per cent of its electricity production. Another important case is that of Lithuania, which with only one nuclear power station covers 69 per cent of the electricity production of the country. For the United Kingdom the equivalent figure is 18 per cent, Germany 32 per cent, Sweden 48 per cent and Belgium 54 per cent. The construction of the biggest nuclear group in Finland, of 1,600 MW, is another extraordinary development in northern Europe.

Spain has a high degree of energy dependency on oil, amounting to 55 per cent of its primary energy demand. The total installed power of nuclear energy in Spain is 7,727 MW, which represents 9 per cent of total installed capacity, and its contribution to electricity production is around 20 per cent. Five nuclear power stations will finish their operating life in the next two decades (Ascó, Trillo, Vandellós, Almaraz and Cofrentes).

As regards energy consumption in Europe: 41 per cent is covered by oil, 22 per cent by natural gas, 16 per cent by solid fuels (coal, lignite, and peat), 15 per cent by nuclear energy and 6 per cent by renewable energies. If current trends are maintained, in 2030 the energy balance will be: 38 per cent oil, 29 per cent natural gas, 19 per cent solid fuels, only 6 per cent nuclear energy and 8 per cent renewable energies.

Therefore, the first issue we must highlight in the EU is dependence on imports, an issue tied to debates about security, market effectiveness and strength and to the structural dependence of European energy supplies. If nothing changes, in the next 20 to 30 years 65 per cent of the energy needs of the Union (compared to the current 50 per cent), will be covered by imports, some coming from areas of doubtful political stability. Europe will thus be obliged to look into third countries' supplies and into its own ability to negotiate in those markets as a means of securing further contributions to its mixed energy sources.

In most cases this *energy negotiation* involves, on one side, powerful multinational – European – companies and, on the other, representatives of the states who own the energy resources, whether through state companies or those under direct or indirect public control, with all of the effects and complications such ownership mechanisms entail.

Adequately preparing the EU for these negotiations means, among other things, reducing its current energy dependence. This effort is now being

partially carried out through energy diversification policies and through efforts to reduce energy consumption. These policies, in the shape of energy saving and efficiency programs, not only cut down on wasteful energy use and decrease energy dependency, but also promise a savings of 60,000 million euros for the EU. Nevertheless, they are not enough to satisfy future European energy demands. The option of nuclear power seems to be quite a rational reinforcement in this period of energy transition, and could well provide valuable contributions to cover this breach.


Environmental protection is another angle of the energy equation. The international commitments acquired through the Kyoto Agreements are not the only important factors in the energy equation as it relates to environmental protection; also important are the many other factors that affect protection of the environment when energy activities are undertaken. We are compelled to make a very difficult and balanced energy choice, and if necessary change our policies to address the global climate threat.

The third axis to be considered is energy efficiency and the competitiveness of our economy. Energy is an essential input for industrial production. If European society needs to maintain or even increase its competitiveness in order to preserve its position among the world's leading economies, the competitive capacity of its energy markets must constantly improve the assignment of its resources and the efficiency of its energy, industrial, and commercial outputs.

In the energy debate there are several key points it is essential to take into consideration. In effect, they are a measurement of the axes already referred to: energy dependency and resources, security and markets, environment and competition. We have to properly balance all of these factors in order to create a reliable energy policy and regulatory framework and to decide on the best course of action for the future.

It is thus, in carefully comparing the pros and cons of nuclear energy facilities in relation to the above-mentioned factors, that we find several positive and conclusive arguments in favour of increased investment in nuclear energy. In discussing these arguments we must remember that, to substitute the capacity of obsolete energy generation and to satisfy new demand, the EU will have to undertake extensive investments over the next 20 years. We will need to secure sufficient energy reserves as a way of complementing an increased investment in renewable energy.

In terms of questions concerning dependence, security and strategic positions, then, we only have to highlight the occurrence of various oil



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crises. This latest crisis has raised oil prices above 100 dollars per barrel, an increase that could potentially cause a slowdown of economic growth. It is clear that the impact of this situation is less significant in countries that have access to alternate energy sources, such as renewable or nuclear energy. Indeed, one of the clear advantages of the introduction of additional nuclear capacity in the base load energy curve will be the reduction of energy dependence on foreign countries, be it from natural gas, coal or oil. The introduction of more nuclear capacity would provide the EU, and particularly Spain, with greater diversification and balance between the different primary energy and electricity sources, and thus offer improved stability to the production mix as well as to the variable cost structure.

In terms of environmental factors: there has recently been increased interest in new third and fourth generation nuclear plants due to their potential to provide large quantities of power with no direct carbon emissions. Nuclear energy seems to be one of the best replacements for coal generated energy. The energy produced by nuclear plants in Europe prevents the emission of 600 million tonnes of CO<sub>2</sub> every year; in Spain alone it prevents the emission of 40 million tonnes.

The substitution of nuclear energy for fossil fuels would mean a considerable reduction in the greenhouse gases released into the atmosphere, most probably equivalent to the level achievable given a maximum penetration of renewable energy but with an additional advantage: a major portion of the installed capacity of nuclear energy can be guaranteed as fixed power output.

Finally, from the economic point of view, nuclear energy is a mature technology undergoing constant improvement. It has a low variable cost and high investment cost per KW, but is moderately priced in terms of production (KWh), especially in periods of low financing cost. It is practically admitted by all international generation cost analysis that the production cost of a nuclear energy plant, including the management and storage of radioactive waste, is the lowest of all technology so far developed, and that substantial changes in this respect are not foreseen in the coming years.

However, when discussing investment in nuclear energy, there are several side issues to be taken into consideration. One such issue relates to the length of time needed to construct nuclear facilities and, therefore, to the length of time required to shift from investment to output and the risk linked to it. This issue must be considered in order to promote a legal framework for the public-private partnerships that see European states form alliances with energy companies.

Regulation issues are also relevant here. In this sense, the stability of regulation in relation to the award of licences and permits for the construction and further operation of a nuclear power plant could be a dissuasive

factor for investors as neither the sponsor nor the financial supporter should bear the risk of a stoppage in the project caused by changes in the political decision-making process.

In this context we must also highlight the important role played by the framework developed in the Euratom Treaty (in effect since the beginning of the European Community) on nuclear R&D, investment and security control. Progress should be made in these areas and in those relating to waste and to the coordinated dismantling of nuclear facilities within the EU. First and foremost a new and real European energy policy must be forged to address these issues.

On the other hand, we cannot forget that nuclear power fell out of favour and lost public support in many areas of the world in the mid-1980s due to critical concerns over the adequacy of safety levels as a consequence of the major accidents at Three Mile Island and Chernobyl.

In any case, the nuclear debate seems inevitable in current energy analysis. Many important countries have already started it, among them China, India, Indonesia, Japan, South Korea, England, Russia, and Argentina. Even the United States, which has not opened any facility for thirty years, has reopened the debate. The Nuclear Regulatory Commission has approved and certified new designs for new third generation nuclear power plants. In the EU, France and the United Kingdom have recently made a commitment to move forward in this area. Since 1997, notice has been given to the European Commission of 19 new investment projects related to the nuclear fuel cycle. In Spain, in my view, this subject should be treated with urgency if we really want to deal with the “energy question”.

We cannot go back. Life moves on. Advancing and reforming. We cannot go back, either in Spain and in Europe, in terms of market liberalization, of the promotion of non-polluting technologies, of efficiency programs or of adequate consumption policies. But we also have need to be forward-thinking, by stimulating open debates on the need for (and future of) nuclear energy, on Europe’s ability to negotiate its supplies, and on the probability of R&D programs’ success in areas such as nuclear fusion, hydrogen fuel cells, and the capture and storage of carbon. In this context, it is important to mention the work of the ITER Project and its effects in the medium and long term. In future, nuclear fusion could be a great source of energy self-sufficiency without the current risks (as there would be energy for more than 1.000 million years, even given a consumption of energy one hundred times higher than at present).

Europe’s main goal for the next few years is to ensure security of energy supply in the medium and long term. Security of supply should be based on a wider and more balanced internal market dynamism and a sound respect for the environment.