Raphael MOISSIS*

NUCLEAR ENERGY PERSPECTIVES IN GREECE — A RENAISSANCE OR A DÉJÀ VU?

It is a pleasure and privilege to participate at this conference, in this place, on this topic at this time. *The conference* that has been organized in an implacable manner for which we all owe a vote of thanks to the organizing committee and their executive assistants. *The place,* the beautiful country of Montenegro which although not far from my own country, I have not had the opportunity to visit since a long time ago. *The topic* Nuclear Energy, Global Trends and Perspectives in South-East Europe, a subject which I believe will be of extreme importance for this region in the years to come, in consideration of either the Energy or the Climate Change perspectives. And finally *the time,* i. e. just as the events of Fukushima have started to settle down.

The Fukushima nuclear accident was an enormous event. It caused great discomfort and sufferings to the local population and raised serious concern and worries all over the world. It had immense financial consequences. It taught us and will still teach us many technical and management lessons because there were omissions, mistakes, even panic reactions. But, fortunately, Fukushima was not a public health disaster. I will repeat that: Fukushima was not a public health disaster. There has not been a single human casualty till now and, with a little lack, the long-term radiation casualties may be zero or, if not zero, very small in absolute numbers and certainly negligible compared to the real tragedy caused by the earthquake and tsunami. It is therefore my considered opinion that in spite of the enormity of the accident, concerns for climate change will ultimately prevail and that Fukushima will not be a new inflection point in the curve of the historic evolution of the nuclear reactor industry.

The historic evolution of the nuclear reactor industry has gone through three distinct periods which may be referred to as the age of great expectations, the age

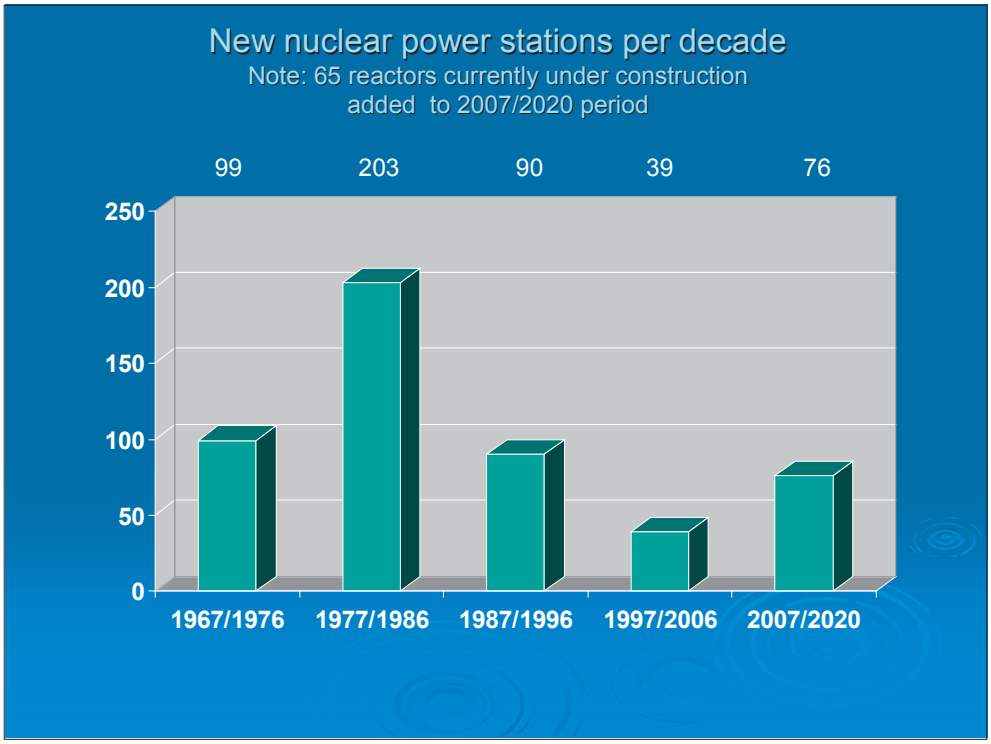
* Foundation for Economic & Industrial Research, National Energy Strategy Council, Greece

of suspension and the present period of anticipated renaissance. The time spans shown in Chart 1, have been selected purposely so that they illustrate the change of phase that took place in 1986, the year of the Chernobyl accident.

It will be noticed that the last column on this Chart continues to include 65 reactors that are currently in various stages of construction and has not been modified on account of the Fukushima accident for the reasons explained above.

The history of nuclear power in Greece has followed a path similar to that described above, with the important difference that changes of phase in Greece always consisted of changes in mood and positioning and never reached the point of "hardware" activity. Thus, very early in the age of great expectations, the nuclear option was considered as a means for achieving large scale desalination ("At-

Chart 1



oms for fresh water"). Activity was then limited at the level of paper studies, but a more concrete project followed later that got to the point of serious negotiations and even to a site selection. In this project, two British made reactors were to be installed very near the city of Athens (!!) and paid for with exports of Greek tobacco ("Atoms for tobacco").

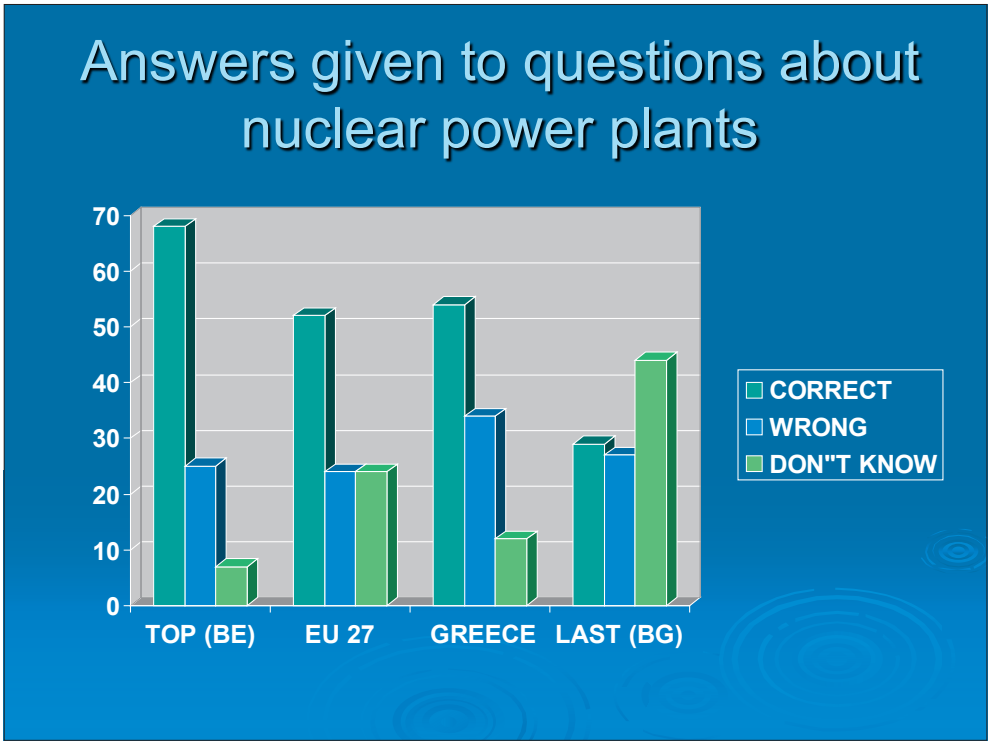
The Hellenic Public Power Corporation (ΔΕΗ) got to a more serious stage in the late seventies/early eighties and a nuclear power plant did in fact appear in the

official ten year plan of the Corporation. But even that project never got off the ground, because of the dawning of the age of suspension which happened to coincide with a change of government in Greece.

The nuclear option has been an anathema in Greek public opinion ever since. This position is not due to ignorance. As shown in Chart 2 from a Eurobarometer study, Greeks stand a little better than the EU 27 average on their knowledge of nuclear matters.

However, influenced by a "green leaning" press and politicians covering almost the entire spectrum of the political scene, the Greek public opinion has consistently occupied one of the last positions in all local and international surveys on the acceptance of nuclear power. Chart 3, dated already in the period of renaissance, is

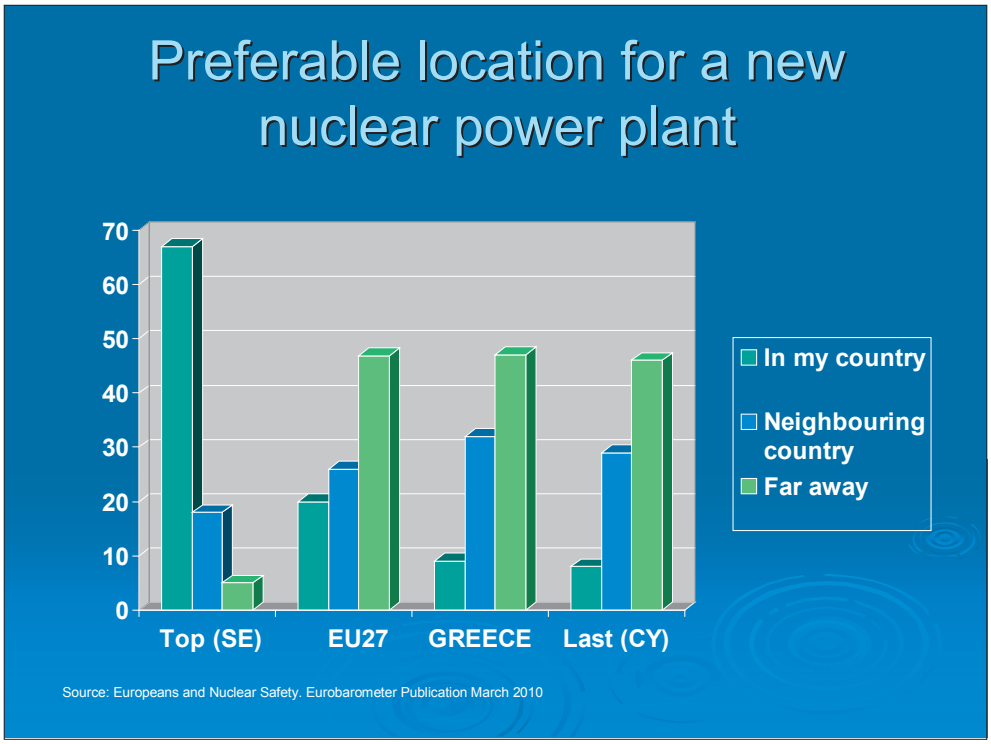
Chart 2



just one of many similar ones that could be presented in evidence.

The Council for National Energy Strategy, established in the mid–2000's, tried to take advantage of renaissance developments in the European Union and elsewhere. Being aware of public opinion and the sensitivity of the (new) government, the issue was brought up cautiously but clearly enough, pointing out that a country that does not possess abundant and continuously available indigenous energy sources cannot afford the luxury to exclude dogmatically the use of any primary

Chart 3



energy source. The argument seemed to be gaining support among some institutions that were few in number but important as opinion makers.

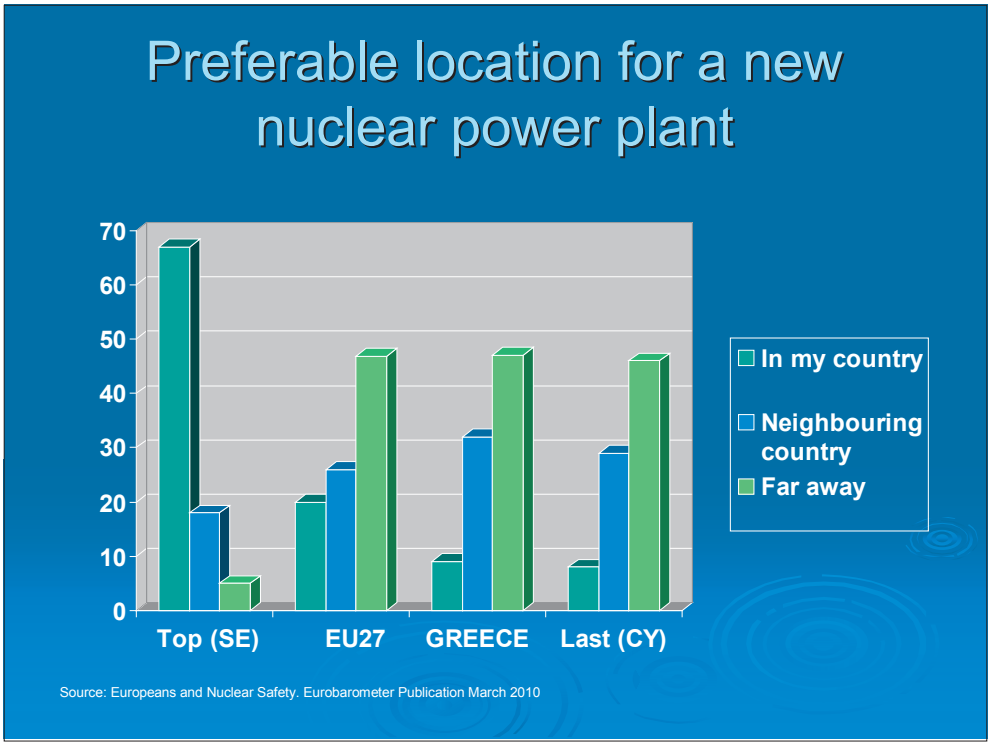
Again coinciding with another change of government but in actuality because of the financial crisis, the nuclear option became a Déjà Vu" and any idea in its support became out of place and untimely.

As undoubtedly all participants in this Conference have been reading, forecasts and analyses for the Greek Economy, presently cover a wide spectrum of possible future developments that extend all the way from deep and prolonged depression on the pessimistic end, to rapid and accelerated growth on the optimist side. (Chart 4).

Energy planning, no matter where and at which time, always had to deal with uncertainty. But the present degree of uncertainty for the Greek economy far exceeds the traditional norms, leading to formidable implications for the Greek National Energy Planner. Such implications extend to the method of analysis as well as to the fundamental axes of the energy strategy.

Regarding the method of analysis, economic forecasts can no longer be taken as a "given input" in the process of preparing energy plans, but must be integrated as a variable element in that process. Since the control of public debt has become the most profound requirement of all Greek economic plans, the effects of each en-

Chart 4



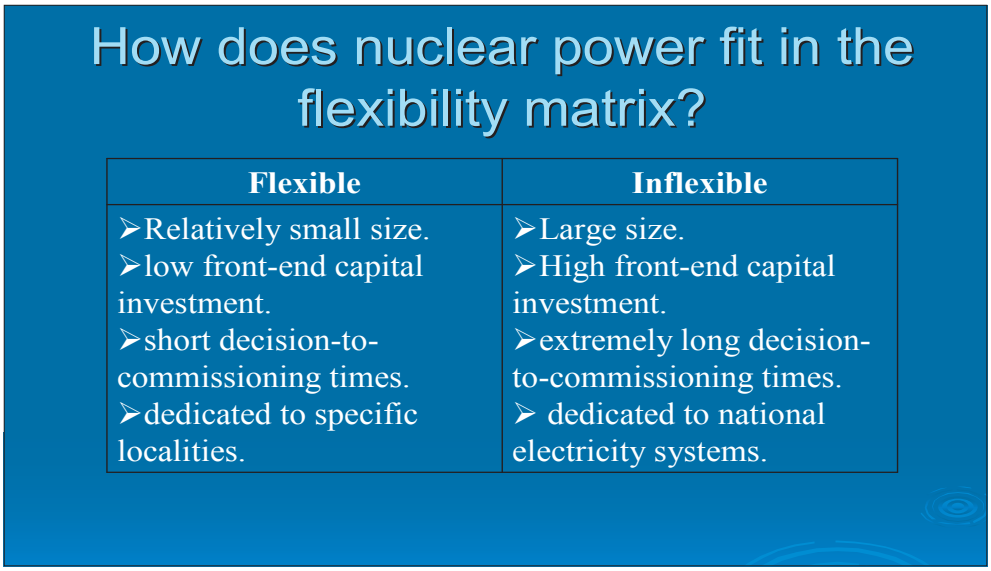
ergy option on the public debt and the national economy as a whole, need to be evaluated. This in turn implies the need to develop and adopt more sophisticated analytical tools and models with the capacity to carry out such evaluations.

As to the fundamentals of Greek energy strategy, a fifth axis needs to be added to the four traditional ones,[1] namely flexibility and counter cyclicity. This is to address the strategy planner's predicament who must ascertain that no valuable funds are applied on energy investments that will prove to be useless under the negative scenaria for the economy, but also that economic growth must not be hindered because of energy shortage if the positive prospects should come to be achieved.

There are several examples of flexible and more inflexible energy options, perhaps the most characteristic one being the preference for a floating LNG Terminal rather than for a fixed one. Chart 5, which is an addendum to the relative Chart shown in the presentation with various examples of flexible VS inflexible options, speaks for itself as to where the nuclear option would be listed.

[1] a) Contribution of the energy sector to the productivity and competitiveness of the national economy; b) security of energy supply; c) saving and rational use of energy; d) environmental protection and sustainable development.

Chart 5



Notwithstanding all these limitations, the Foundation for Industrial & Economic Research (IOBE) has tried to draw a possible profile for the Greek energy sector, assuming difficult but not catastrophic developments in the economy. This profile anticipates unprecedented energy efficiency gains in buildings, electrification in transportation and low-carbon power generation.

Regarding low Carbon Power Generation, three Scenaria have been considered. In the first, power generation is heavily dependent on renewable sources (RES) with complete phase-out of lignite units. The second foresees a somewhat slower development of RES with maintenance of some lignite power but with application of Carbon Capture and Storage. Finally, the third considers RES combined with nuclear. In all cases it is clear that Gas generation will play an increasingly important role. The same IOBE study further concludes that huge investments will be required in both the demand and the supply sides, that with public deficit financing being excluded, raising private capital financing will require new approaches and last but not least that considerable upward pressure on electricity prices is unavoidable.

Each of the three scenaria has its strengths and weaknesses. The Renewables (RES) scenario has the cleanness and local availability among its strengths but on the weakness side that it poses big challenges on the grid and system operation, that it demands very large thermal power as stand-by and that it therefore results in high costs and prices. The CCS scenario combined with RES, provides for continuity in lignite exploitation, leads to a more reliable system with lower costs but the reliability of CO_2 storage remains questionable. Finally, the nuclear combined with RES scenario, with modular designs used on the nuclear side in order to alle-

viate the high front-end investment problem, would result, according to the study, to the lowest costs and prices, provided that Greece's antinuclear heritage does not result in large cost over-runs.

Before closing-in on Greece's antinuclear heritage, the following statement regarding the wider area of SE Europe is very appropriate for our Conference:

"I think that without nuclear, it is going to be effectively impossible to achieve the goals set for carbon emission reductions. Even with large increases, as we will need to have, in solar, wind, geothermal, other low carbon sources, and also much greater rate of improvement in energy efficiency, even will all of those things, if we are not able to include new nuclear power plants, our chances of achieving our carbon reduction rates, will be unfortunately much reduced".

The statement was made recently by Professor Richard Lester, Head of the Nuclear Sciences Department at MIT. It was made concerning the USA, but I fully agree with it and believe we must make our environmentalist friends in SE Europe understand it.

Finally, I have named Greece's anti-nuclear position a matter stemming from heritage, as is the case in Greece for many other issues. "In the land of Apollo and Aeolus", says the heritage, "it is only natural that people favor energy sourced from the sun and wind and not from alien sources such as nuclear".

With a small reminder which is equally appropriate: "In the land of Socrates and Plato, no one should be dogmatic and oppose a dialogue".

The presentation ends with what was added almost as a post script:

"…someday, the latter may apply in Greece even for nuclear energy!"