After Fukushima: The six essential features of the revolution in the nuclear power decision-making process for the 2010-2020 decade

- Excerpt GEAB N°55 (May 16, 2011) -

For the sake of completeness, the title of this exercise in political anticipation applied to nuclear power should also include two other factors besides Fukushima, namely the Internet and the global energy crisis which is one of the elements of the global systemic crisis we are experiencing. In effect, it is the combination of these three factors which, according to LEAP/E2020, radically and permanently alters the whole decision-making process on nuclear power that we have known since this source of energy took its first steps after the Second World War. This decisional “revolution” will, during the course of the current decade, equally affect the methods to decide or, on the contrary, block the development of nuclear power, as the room for maneuver for national players in these decisions and, finally, the players themselves. Indeed, the “nuclear power policy makers”, historical pillars of the development of this energy from the 1950s, just like their fierce rivals the environmentalists who emerged in the 1970s, will quickly see that their monopoly of the debate on this subject is coming to end. Fukushima, the Internet and the crisis are in the course of shattering the nuclear debate’s traditional expertise, limited to mode "pro" or "anti". The implications of such an upheaval for the various industry players and policy makers faced with choices for national energy are on an unprecedented scale since they involve a whole segment of global energy production. According to LEAP/E2020, it is typically a situation where political anticipation, a tool for decision-making support, can provide useful insight.

Before discussing the revolutionary nature of the change under way, let’s go back to the situation which prevailed for about fifty years on nuclear power decisions. Basically, there was originally a single force, consisting of "technos" (engineers, scientists, large companies, states) which advocated the implementation and rapid development of a new energy source supposed to exempt humanity from the limitations (1) of fossil fuels (2).

Then in the 1970s, through the emergence of "Green" and liberal movements, we witnessed the emergence of a fundamental movement in opposition to nuclear power, scorning the dangerous and poorly managed nature of nuclear power and the very pyramidal and repressive model of society supposed to be attached to it. This event was coupled with the launch of extensive programmes to build new nuclear power plants following the 1973/1974 oil shock. This was the moment when, for example, France and Japan (3) covered their respective territories with new reactors.

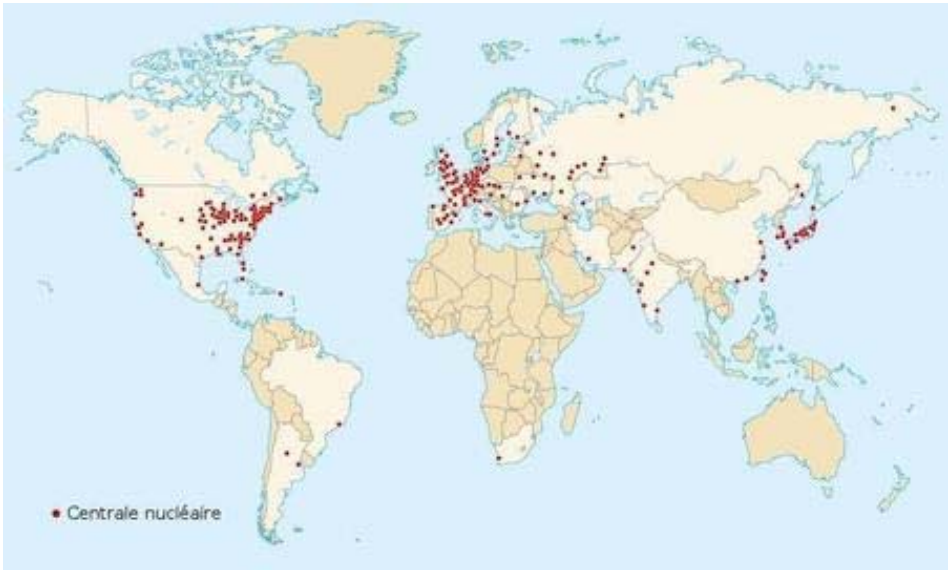
From the late 1980s, and after the Chernobyl (4) accident, the balance of power between these two groups experienced a very contrasting development, according to the country: in some countries, like France, Japan,... the "technos" prevailed and marginalized the "Greens" confining them to a level of noisy opposition but with little influence on the decision-making process.

In contrast, in other countries, like Germany, Finland, Italy,... the "Greens" were able to impose their views and block the development of any new nuclear power project.

Finally, in the United States, despite the accident at Three Mile Island (5) , it was in fact the oil lobby, not the "Greens", who organized the shutdown of nuclear power development.

In the late 2000s, with soaring fossil fuel prices, spurred partly by the massive appearance of China, India, Brazil and other emerging countries in the domain of "energyvorous wellfare" Western development model, with the beginning of the end of cheap oil (increasing fears of "peak oil", doubts over reserves, ...) and finally with the requirements limiting CO2 emissions, de facto encouraging nuclear power, we saw, in a context of global systemic crisis, a widespread rallying around nuclear power. All the countries that had frozen their programmes began to dust them off, whilst the emerging powers planned the construction of dozens of new plants. The world's stock of nuclear plants was getting ready to double in a decade (6), to the chagrin of the "Greens" who found themselves marginalized everywhere by the rise in oil prices and, ironically, the success of policies limiting carbon dioxide emissions (called for by these same environmentalists).

During this same period, fueled by the globalization and financialization of the world economy, we witnessed the development of a broad process of full or partial privatization of the nuclear power network on American or Japanese lines (7). This process also lead to a split within the "techno" group because many of them, even at the core of the nuclear industry, considered that nuclear power's safety and reliability requirements were not compatible with the private sector's short-term profit demands (8). Moreover, in the 1990/2010 period, Japan became a true "showcase" of drift in this area, resulting in the Japanese public's increasing criticism.



Nuclear power facilities throughout the world - Source: Wikipedia

So, at the beginning of 2011, almost everyone was in agreement (with varying degrees of enthusiasm) to cover the world with nuclear power plants (9), whilst the process of "deregulation" at work in most national electricity markets, nuclear included, weakened, day by day, the regulatory and operational ability of the public bodies required to monitor safety conditions. The nuclear industry thus saw its most significant period of deregulation, just like the financial markets for that matter (10).

And then suddenly the Japanese tragedy: the terrible sequence of an earthquake on a scale rarely seen, a tsunami of unimaginable height, and the shocking discovery that the Fukushima nuclear power facility was unable to cope with these two improbable, but nonetheless very real, events. And here, unlike Three Mile Island, there really is a very powerful media aftermath and, unlike Chernobyl, this didn't happen in a country in full disintegration (11), but in one of the most modern in the world where everyone believed (considering its tragic nuclear past) that its facilities were amongst the safest in the world. The media context surrounding the event is itself, of course, also completely different from the previous two disasters: the Internet is here to broadcast news, analyses, rumours, completely burying the "technos" abilities to manage the news and, to a large extent, exceeding the "Greens" flow of opinion.

Thus, in the days following the Fukushima disaster, there de facto emerged a nuclear aware global public opinion, that primarily sought to forge its own opinion about the disaster, and then rapidly tried to go beyond the rhetoric of the two traditional "pro" and "anti" nuclear camps. The context of the global crisis has changed many of the debate's parameters. Thus, for example, as the socio-economic crisis requires, and as had already been anticipated by our team more than two years ago, the major topic of global warming (and its corollary on limiting CO2 production) has now lost its appeal for public opinion. However, it was one of the factors that allowed the relative "peace of the brave" over a revival of nuclear power.

Aware that there is a new situation, but that they do not understand, policymakers worldwide are taking convoluted positions hesitating between the maintenance of pre-Fukushima nuclear policies, adapting these policies to a new context (but without really knowing which one) or even the sudden halt of planned projects (12).

The world is here today.

Operators, investors and opponents of nuclear power, as well as policymakers, are wondering what will be needed to be done tomorrow, what trends will prevail and the choices available to them. It is precisely what the LEAP/E2020 team modestly intends to anticipate in the second part of this analysis with the six essential features in the revolution of the nuclear power decision-making process for the 2010-2020 decade.

On a subject that often triggers the passions, we recall that, according to the principle of political anticipation, it's not for our team to portray what it wants (moreover, its members have different views on the subject), but to present what it believes will happen.

The six new factors which will revolutionize the nuclear power debate in the next decade

We can identify two kinds of new factors in this revolution in the nuclear power decision-making process. First, there are three factors that characterize a radical change in the context in which decisions are taken: the profound changes in the nature of the debate, the

participants in the debate, and the "ultimate decision maker". Secondly, we can identify three factors that override the development of the debate and its conclusions: the significant changes in the collective perception of the nature of nuclear energy, the requirement level in terms of safety, and the appropriate level of regulation and supervision.

The magnitude of the Fukushima shock in the context of "Internet and crisis" creates a demand for rational international debate and the adoption of new tools for risk anticipation

The world of 2011 which suddenly received the shock of the Fukushima tragedy is no longer the technologically naive, ideologically divided and highly media supervised world of the 1950s-1980s, nor a world of the 1990s-2000s dominated by a West confident in its technological superiority. It is a world which has faced, almost non-stop, major natural disasters (tsunamis, earthquakes, ...) for a decade, blatant failures to prevent or repair industrial or semi-natural disasters (mad cow crisis, Katrina and New Orleans, Haiti and the earthquake ...), the huge failures and lies of the leaders of the world's major countries (9/11, the invasion of Iraq ...), etc... The frequency and size of these tragedies are magnified by the media sector, which now covers the whole planet and of which the Internet provides a growing share, beyond the control of the relevant authorities, allowing discussions which are already "extinguished" in the mainstream media to continue "slowly simmering" for years, fuelled by people of different regions in the world and creating a kind of "alarmist magma" at the heart of the Internet, mixing rational debate and delusional fantasies. It is on this changing and dynamic base that the Fukushima disaster has just been grafted and in which the future debate on nuclear power is rooted.

Moreover, this feature also determines one of its key factors which will be discussed later: it will be an international debate. Because of this Internet anchorage, Fukushima thus finally buries any attempt to keep the debate on nuclear power within a national framework. It's already a first revolution against the decision-making processes of the last fifty years. Content, ideas, analyses, anticipations ... on nuclear power are and will now be exchanged internationally, including by the moderately interested person. If nuclear power's traditional players attempt to keep the decision-making process to a purely national dimension, they will be quickly overwhelmed and discredited (whether "pros" or "antis") as too "provincial". And this internationalization will integrate new groups, especially coming from countries that are only now addressing the installation of nuclear facilities on their territory (as is the case in Asia, Latin America and the Arab world ...). It is, therefore, the end of the nuclear power debate as a discussion between Western powers.

And this "internationalization" of the debate will go hand in hand with an increasing risk of irrational discussion because it is now no longer rooted in post-World War II techno-scientific logic, but in the "alarmist magma" that silts up the heart of the Internet, reflecting the fears and anxieties of the time. The almost exponential increase in contributions to the debate will first naturally benefit the irrational, rumour, and manipulation. A second requirement will, therefore, immediately appear to ensure the integrity of decision-making process on the subject: create and maintain a rational framework for discussion, the only way of avoiding that these collective choices with serious consequences should be made on irrational grounds.

The credibility of such a framework for discussion, in an international context and with the Internet, will require the rapid development of anticipation methods and tools that they would be accepted by most stakeholders, including public opinion. In recent months we have seen how suddenly everyone, including the "official nuclear authorities", was seeking experts recognized as independent to counter the wildest fears.

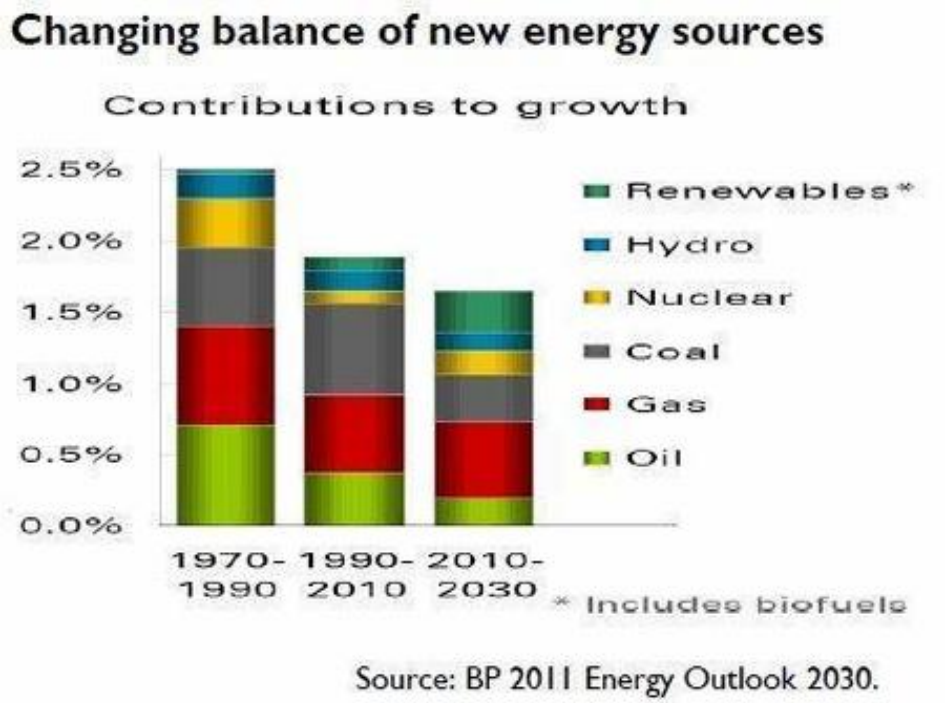
In France, it was quite ironic to see how CRIIRAD, long perceived as a dangerous opponent by the powerful "pro-nuclear" lobby, found itself cited and repeated by those same people who, not long ago, exposed it to public contempt. Their problem was that, as "officials" themselves they were not deemed credible by the general public whilst, because of its independence, CRIIRAD was. You can find the same public mistrust in the United States vis-à-vis the Nuclear Regulatory Commission (13). In Japan, people complain incessantly of the lack of national alternative sources to the information disseminated by TEPCO and the Japanese government, forcing them as much as possible, to search for news outside the country (14). Far from being exceptional situations, it embodies the new standard of debate on nuclear power for years to come.

Meanwhile this independence is also required in relation to the "antis"' discussions, too often radical and too often ideological. Large segments of the public are aware that nuclear power is really here (like it or not) and that the unresolved issues in terms of decommissioning reactors, reprocessing of waste, etc... prevent any quick fix. Just as the short and medium term requirements for energy, CO2 emissions ... do not offer effective alternatives. There again the emergence of independent players in both the "pro" and "anti" camps will help to streamline the discussion, the only way to lead to lasting collective choices.

These new, independent (15) players will bring new methodologies with them. Some will be new in the innovative sense, while others will only be "new" due to the fact that they will be taken out of the cupboard where the deregulation and financialization of nuclear power had shut them.

And that describes one of the key aspects of the "revolution" under way: the initiative no longer belongs to the traditional players in the nuclear debate. It's now public opinion that has grabbed the subject, and it will not let it be taken over by the "pro" or "anti" lobbies. Until then the great mass of citizens has played a simple role of refereeing the nuclear power debate supporting, according to the moment, according to the country, one or other of the two factions present. This is classic "low-level democracy": the players ask questions and the people reply. This period is over. With Fukushima, the coming decade will see a global public opinion which begins to ask the questions itself: first in its midst, via the Internet and other social news networks; then it will rapidly make its way to the leaders and elite of different countries.

These questions will be simple: To what extent is safety guaranteed? (16) Can we trust private enterprise to manage nuclear risk? (17) Can we relocate facilities outside densely populated areas? How can one permanently get rid of nuclear waste? When and under what conditions can one do without nuclear power? When will the energy that replaces it become available? What investment is being made to achieve it? ... The answers are complex, requiring even more a rational and credible framework for debate. But, from now on, the "makers" of nuclear power policy is public opinion and not the lobbyists (18).



% contributions to world growth by different energy sources (comparison between three generations: 1970-1990; 1990-2010; 2010-2030 (light green: oil; red: gas; grey: coal; yellow: nuclear; blue: hydro-electricity; dark green: renewables) - Source: BP, 2011

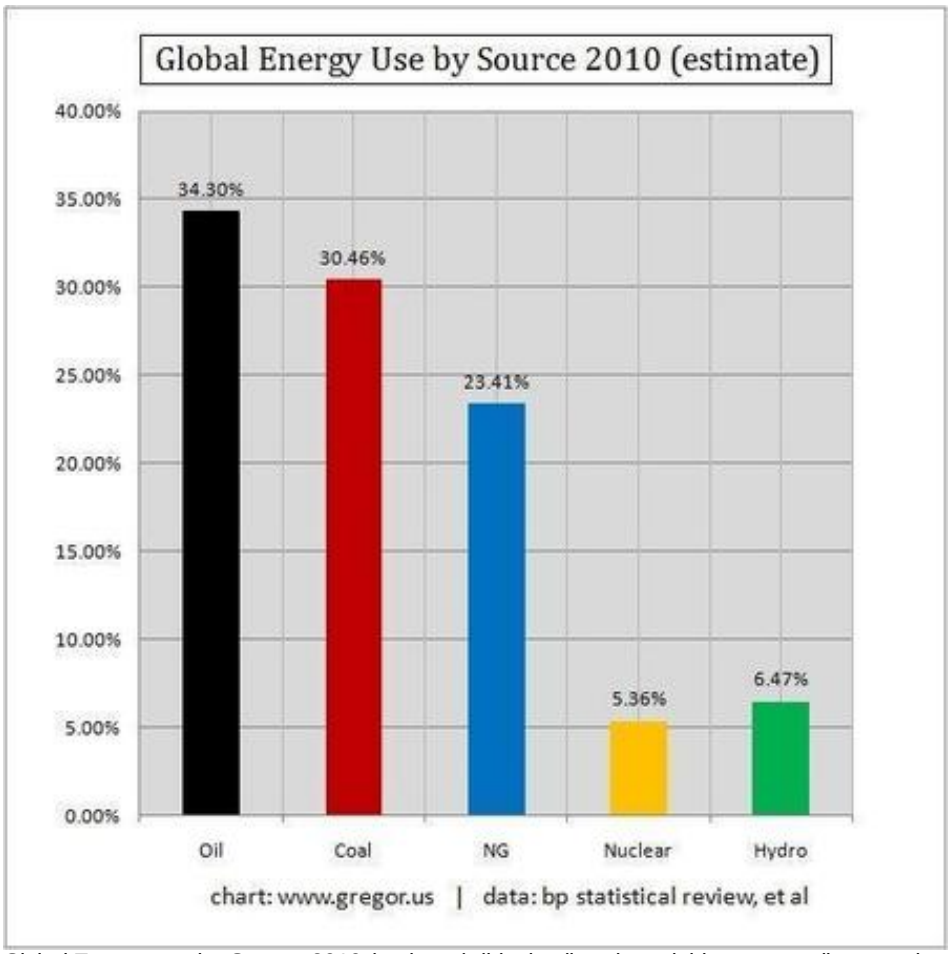
A new trend should help to facilitate the emergence of such a framework: the "pros" and "antis" are no longer blocs. The issue of privatization in the 1990s/2000s has broken the "pros" camp and the issues of global warming, CO2 emissions and hopes of government positions have split the "antis" (19). This crumbling of the two, historically opposed, camps on the subject of nuclear power is a good thing because it will help diversify the various standpoints, analyses, anticipations and thus rationalize a very passionate debate: an essential condition for it to sign up to a long-term democratic decision-making process.

The Fukushima shock also revolutionizes the collective perception of the nature of nuclear energy, the level of safety requirements and appropriate levels of regulation and supervision

One thing seems certain, even if it strongly displeases the present nuclear industry and those that finance it: the collective notion of nuclear risk has changed and become much wider. Images from Tokyo under the fear of radiation had a profound impact on people. Since risk assessment is relative to an objective event (the probability of an event) and a subjective consideration (the seriousness of the consequences of this event), Fukushima has just propelled nuclear power risk assessment to the heights, because now all urban dwellers worldwide living within a 200 km radius of a nuclear facility have suddenly felt “Tokyoites” (20). The politicians will quickly realize this through polls and elections.

Another factor, that of the lifespan of nuclear power, has also just been altered. If nuclear power is a long-term industry, in fact its existence as a leading industry has just experienced a very significant shortening of its lifespan. Following Fukushima and the highlighting of the risks and limitations inherent in nuclear fission technology presently used in nuclear power reactors, a new question is born in the public’s mind: when will we be able to do without this technology? Political leaders will have no other choice in the years to come than to pass this legitimate question to the decisional level. Because, according to our team, it’s a fair question: in fact, to compare it with micro processing, nuclear power in 2011 is as if we continued to use MS-DOS (21) to run our computers, with sketchy improvements but basically we are continuing to use 1950s technology.

However there are numerous options: in the nuclear domain (thorium plants which seem to be favored by the Chinese (22), thermonuclear fusion that the ITER project is meant to bring to maturity), but also of course in the field of energy savings (the most promising short to medium term "source") and renewable energy (wind, solar, …). Finally, the arrival of new global powers at the forefront of technology (China, India, Brazil) is likely to stimulate new ambitions (23) (it is for that especially that a change of “leadership” “comes in useful”) like the Indo-US Kalam-NSS project of direct harnessing of solar energy from satellites or the discharge of nuclear waste in outer space (24).



Global Energy use by Source 2010 (estimate) (black: oil; red: coal; blue: gas; yellow: nuclear; green: hydroelectricity) - Source: Gregor.us, 2011

The last characteristic element of this ongoing revolution will be the gradual strengthening of the international supervision of nuclear power, which is non-existent today (25). This strengthening will be both on the control of the spread of nuclear power (26) and on safety standards. In fact Fukushima illustrates the degree of scientific, technological, financial and legal rigour needed to ensure that such disasters are avoided. States will have to accept many new restrictions in order to build nuclear facilities (27), and this is especially true where it appertains to densely populated areas. Their neighbours will take care to exert the necessary pressure. And nuclear facility manufacturers will have to revise their prices upwards, just like the security and reliability of their plants. Such a development is in the interests of those involved in the nuclear field because, according to our team, another Fukushima or its equivalent in the coming decade would be the death of the whole nuclear power industry (28).

Don't forget that if existing plants, in developed countries able to ensure their proper maintenance, are designed for a major risk of 1/10000. Global risk was 5/10000 in 1965, 0.0005%, when there were five reactors. Due to the expansion of the nuclear field worldwide, it has risen to nearly 500/10000 in 2011, i.e. 5% (not counting the inevitable deterioration due to the aging of the nuclear stock). If policymakers don't quickly infer that we must therefore increase security levels to keep this rate at least at 1965 levels of 1 /10000, there's no doubt that, by the many ways described above, public opinion will manage to find leaders better educated in calculating statistics.

Notes:

(1) Limited reserves, very unequally distributed between the different countries of the world.

(2) Between 1965 and 2011 the number of nuclear power plants in the world increased from five to 443, in 31 countries. Currently, five are in the process of being closed and 64 are under construction. At the moment 90% of these plants are sited in Western Europe, the United States and Japan. Source: IAEA, 05/11/2011

(3) The World Nuclear Association presents a detailed history of French and Japanese nuclear programmes, and of other countries involved with this form of energy. Sources: WNA, WNA, 2011

(4) Chernobyl is undoubtedly an event that has greatly increased the public's awareness of the dangers of nuclear power. It has also instilled for the first time, large-scale mistrust vis-à-vis the official line on the risks of nuclear power. But, the fact that it occurred within a Soviet system in its death throes has kept this accident, for the vast majority of people, in the realm of "things that happen to others", to those who are "less rich, less modern, and less reliable than us".

(5) An accident that, for the first time, made the Western public at large question nuclear safety, but which ultimately didn't create any major disruption in public opinion because the accident didn't have any newsworthy tragic consequences.

(6) France in particular, rubbed its hands because it relied heavily on nuclear power and really hoped to be one of the big winners in this new world order.

(7) The Japanese electricity market model (nuclear production included) developed in 1951 under US occupation, and was only a transplant of the US model characterized by a State regulatory framework and a privatization of facilities. Source: Sharon Beder, 2006

(8) Outwardly perceived as fighting a rearguard action at the time, we will see later that this “pro-nuclear” division over the issue of privatization will weigh heavily on the balance of power that will shape the decision-making process during the 2010-2020 period. The Fukushima tragedy in fact highlights this issue of incompatibility as shown by the title of this CNBC article of 04/01/2011: "General Electric (manufacturer of the No. 1 reactor containment chamber) likely to avoid liability in Japan nuke crisis".

(9) Barely a few months ago, for example, Nicolas Sarkozy, always a great visionary, wanted to sell a nuclear facility to his great friend, Gaddafi. It just goes to show that history has an endless supply of sharp, far-reaching and ironic reversals.

(10) The parallel between the two is no coincidence: the same ideology, same quest for profits in the short term, the same investors, and the same policy makers at work in both cases.

(11) We will come back to this point because the global systemic crisis is properly characterized by the collapse of the United States and the countries that are structurally related to it with, justifiably, Japan first and foremost.

(12) On this subject, it is worthwhile reading the article in NuclearEnergyInsider du 14/04/2011 which gives a detailed overview of the world’s nuclear facility projects.

(13) Source: New York Times, 05/07/2011

(14) The need for independent bodies for nuclear power is, moreover, the subject of the comments column published in the Asahi Shimbun of 03/26/2011 by Hirohiko Izumida, governor of the prefecture of Niigata.

(15) Without these independent players, the debate on nuclear power will not lead anywhere, preventing the establishment of any long-term policy necessary, however, to address the issues of nuclear power.

(16) The bank-style "stress tests" that the European or other authorities want to establish will not suffice to meet this requirement. In effect, nobody gives any credence to the results of investigations conducted by the States which are stakeholders in nuclear power themselves. The politicians will quickly recognize this. In the European case, it is ironic that two countries, the UK and France, whose leaders are obsessed with terrorism, oppose terrorism risks being included in nuclear facility stress tests. Do they think they have eliminated this risk by attacking Libya? Sources: EUObserver, 05/13/2011; Le Figaro, 05/12/2011

(17) LEAP/E2020 believes it is unlikely that in Europe, Asia or Latin America, the nuclear power industry will escape a wave of (re) nationalization by the middle of the decade. The failure of the Japanese nuclear model (where the state is preparing to take direct control of nuclear power) is also the failure of the US model, deregulated and private, which tried to impose itself on the world over the last two decades. Within two years at the most, once the last "Baby Bushes", like Nicolas Sarkozy who wants to continue a forced privatization of the French nuclear industry despite its obvious failure, have disappeared, the trend to (re) nationalization will prevail. The European Union (or more likely Euroland) is going to have to rapidly innovate to invent a concept of "European public nuclear network" that allows it to combine public ownership and European regulation: an Airbus-style "EuroNuke" could be a good basis for discussion. Source: Marianne, 03/31/2011

(18) There is nothing naive in this anticipation. It doesn’t assume that the lobbies will cease operations. It simply emphasizes that this is an area in which citizens and their intermediaries will generally now be on alert, much more watchful than before.

(19) The German case is symbolic and the likely government of a Green/SPD coalition in 2010/2013 should illustrate this fragmentation. Source: Spiegel, 04/13/2011

(20) Because it’s really Tokyo which was "felt" as being affected by the disaster at the Fukushima nuclear power facility. For the first time in nuclear power’s very brief history one of the largest metropolis on the planet was exposed, and not isolated villages in a remote countryside as in previous tragedies. The recognition by billions of urban dwellers has thus strongly stepped in. Source: Asahi Shimbun, 04/10/2011

(21) MS-DOS is the operating system developed by Microsoft at its start-up in 1981. Source: Wikipedia

(22) Source: The Age, 04/23/2011

(23) The Western nuclear power club is indeed well ossified: debates, players, ideas ... going round in circles for decades and the traditional methods are often inadequate. Source: USAToday, 04/12/2011

(24) Source: Space Review, 08/22/2005

(25) Source: Le Monde, 04/01/2011

(26) This process could also meet Franck Biancheri’s hopes over the future development of the nuclear Non-Proliferation Treaty which,

in his opinion, will gradually treat nuclear weapons and nuclear power as a whole, and move towards the concept of "controlled dissemination". Source: « The World Crisis: The Path to the World Afterwards », Editions Anticipolis

(27) And climate change is part of the developments to be taken into account. In any case, if sitting near the sea is problematic since Fukushima, drought in France is beginning to seriously worry tenants with land adjoining rivers. At the same time, with 32 reactors under construction, mostly along the coast, Asia seems to have made no special provision to prevent 32 new Fukushimas in the event of tsunamis, though common in the region. Sources: 20Minutes, 05/13/2011; Korea Herald, 04/19/2011

(28) Like Japan, which has cancelled all future nuclear facility projects, causing a serious market problem for the Sellafield nuclear plant. Sources: New York Times, 05/10/2011; PressTV, 05/10/2011

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