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GERMAN STUDY: MORE CHILDHOOD CANCER NEAR NUCLEAR POWER PLANTS

A German study has found children under five are at 60% greater risk of getting cancer and 120% greater risk of getting leukemia if they live within five kilometersof a nuclear power station. The case-control study covers the 16 locations of German nuclear power stations over a period of 24 years.

(664.5848) IPPNW Germany - The study was initiated by the German section of International Physicians for the Prevention of Nuclear War (IPPNW) and carried out by the Office for Radiation Protection (BfS), which reports to the German environment ministry. The study shows that the closer children live to a nuke, the more they are at risk of contracting leukemia.

Researchers from the University of Mainz found that 37 children living within a radius of five kilometers from reactors developed leukemia, whereas only 17 new cases were to be anticipated on the basis of the statistical average for the study period from 1980 to 2003. Consequently, the analysis concludes that 20 additional leukemia cases are related to the fact that the children live so close to the nuclear power plants. "Our study confirms that in Germany a relationship is observable between the proximity of the home to the nearest nuclear power plant at the time of diagnosis and the risk of contracting cancer (respectively leukemia) before the child's fifth birthday," the researchers write.

One member of the expert commission that oversaw the study even considers the conclusions to be understated. According to him, the data indicate an increased risk of cancer for children in a radius of 50 kilometers.

It needed lobbying since 2001 by the local IPPNW section and more than 10,000 protest letters from the public authorities and ministries to get the BfS to commission the study. The campaign was triggered by a study initiated by the IPPNW and carried by Dr. Alfred Körblein (Environment Institute Munich), which found significantly higher child cancer incidence near Bavarian nuclear power stations. The BfS commissioned its study to the Mainzer Kinderkrebsregister (Mainz Child Cancer Register) in 2003.

"Now that the connection between increased cancer and leukemia rates and proximity of the residence to the nuclear power station has been established, the causes of this must be further clarified immediately," IPPNW says in a media release. "The population affected at nuclear power station locations must be examined by suitable screening methods fast and comprehensively."

"Given these massive findings at every German nuclear power station location, a radiation-linked cause is highly likely in every case. Anyone who now still talks of coincidence is making himself ridiculous," writes Dr. med. Angelika Claussen, chair of the German IPPNW. "The precautionary principle enshrined in European environment law now demands that the German nuclear power stations be switched off immediately."

"The IPPNW demands that the environment ministry now greatly reduce the obviously too lax upper limits for radioactive emissions from nuclear power stations. From now on the burden

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of proof of cause of illness should no longer have to be borne by parents, but conversely by the operators of the nuclear installations."

German Environment Minister Sigmar Gabriel said in a statement that he would examine the study. He said the BFS should also evaluate its findings. But according to IPPNW not the study but the current radiation dose-limits should be examined.

Sources: Press release IPPNW-Germany / Reuters, 8 December 2007
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THE ECONOMICS OF NUCLEAR POWER

From commercial nuclear power's beginnings, the promise of cheap power (infamously, 'power too cheap to meter') has been one of the main claims of the nuclear industry. As is amply demonstrated throughout this report, this promise of cheap power has seldom been kept. The nuclear industry continues to claim that a combination of learning from past mistakes and new, more cost-effective designs will, this time, allow the promise of cheap power to be fulfilled. What follows is a chapter from the new Greenpeace research report '*The economics of nuclear power*'.

(664.5849) Greenpeace International - Over the last two decades there has been a steep decline in orders for new nuclear reactors globally. Poor economics has been one of the driving forces behind this move away from nuclear power. The civilian nuclear power industry has been in operation for over fifty years. During such a long period, it would be usual for technological improvements and experience to result in learning, and subsequently to enhancements in economic efficiency. However, the nuclear industry has not followed this pattern.

In the first part, we examine the economics of nuclear power, in particular, identifying which are the most important factors in determining the cost of power from a nuclear power plant.
In the second, we examine how liberalization of electricity markets has adversely affected the prospects for nuclear power because, for the first time, the owners of the power plants will be financially responsible if power plants are not built to time and cost, or are not reliable. This increased risk raises the cost of capital to the detriment of nuclear power because of its high construction costs.
In the third section, we examine ways in which buyers are trying to cope with the extra risks they face, for example, by demanding fixed price ('turnkey ') terms from plant suppliers.
Finally, we examine approaches to forecasting variables over the very long periods of time a nuclear power plant is expected to operate.

1- Main determinants of nuclear power costs
There are several important determinants of the cost of electricity generated by a nuclear power plant. The usual rule-of-thumb in the past for nuclear power has always been that about two thirds of the generation cost is accounted for by fixed costs, that is, costs that will be incurred whether or not the plant is operated, and the rest by running costs. The main fixed costs are the cost of paying interest on the loans and repaying the capital, but the decommissioning cost is also included. The main running cost is the cost of operation, maintenance and repair, rather than the fuel cost. However, as is shown below, there is a huge degree of variance in the assumptions made for these parameters from forecast to forecast, so the broad split between fixed and variable cost should be seen as indicative.

A- Fixed costs
There are three main elements to the fixed cost per kilowatt hour: the construction cost; the cost of capital, which determines how much it costs to borrow the money to build the plant; and the plant's reliability, which determines how much saleable output there is over which to spread the fixed costs. Construction cost is the most widely debated parameter. The cost of borrowing was always assumed to be lower because of the monopoly status of electricity industries but liberalization of electricity industries has led to much greater debate on this variable.
Reliability has improved significantly in recent years with performance finally reaching the levels forecast in many countries. However, experience with the most recent French design, the N4, shows good reliability cannot automatically be assumed.

Construction cost and time
Forecasts of construction cost differ by a factor of two or even three. A number of factors explain why there are such disparate forecasts of construction cost. Many of the quoted construction cost forecasts should be treated with skepticism. The most reliable indicator of future costs has generally been past costs. However, most utilities are not required to publish properly audited construction costs, and have little incentive to present their performance in anything other than a good light. So utilities' reports of past costs must be treated with caution. Prices quoted by those with a vested interest in the technology, such as promotional bodies, plant vendors (when not tied to a specific order) and utilities committed to nuclear power, clearly must be viewed with skepticism. Bid prices by vendors are more realistic than forecasts by international agencies because the companies could be called on to back up these forecasts. However, equipment purchases may represent less than half of the total cost. Civil engineering and installation, often contracted from bodies other than the nuclear power plant vendors, are generally a larger proportion. Problems in controlling the cost of site work have been the cause of cost escalation more often than poor cost estimation of individual components. Contract prices may also be subject to escalation

clauses that mean the final price is significantly higher, so even bids cannot be taken as reliable indicators of the final cost unless the equipment is supplied under 'turnkey' terms (i e., the customer is guaranteed to pay only the contract price). As argued in Part 2, offering turnkey terms is a big risk for a vendor and genuine turnkey terms are rarely available.

Cost of capital

The real (net of inflation) cost of capital varies from country to country and from utility to utility, according to the 'country risk' (how financially stable the country is) and the credit-rating of the company. There will also be a huge impact on the cost of capital from the way in which the electricity sector is organized. If the sector is a regulated monopoly, the real cost of capital could be as low as 5-8% but might be as high as 15% in a competitive electricity market, especially for nuclear power. Part 2, 'Impact of liberalization of electricity industries', discusses in detail how liberalization of electricity industries affects the cost of capital by shifting the risk from consumers to plant owners and builders.

Operating performance

Higher utilization improves the economics of nuclear power because the large fixed costs can be spread over more saleable units of output than if utilization is lower. In addition, nuclear power plants are physically inflexible. Frequent shutdowns or variations in output reduce both efficiency and the lifetime of components. As a result, nuclear power plants are operated on 'base-load ' (continuously at full power) except in the very few countries (e.g., France) where the nuclear capacity represents such a high proportion of overall generating capacity that this is not possible.

A good measure of the reliability of the plant and how effective it is at producing saleable output is the load factor (capacity factor in US parlance). The load factor is calculated as the output in a given period of time expressed as a percentage of the output that would have been produced if the unit had operated uninterrupted at its full design output level throughout the period concerned. Unlike construction cost, load factor can be precisely and unequivocally measured and load factor tables are regularly published by trade publications such as *Nucleonics Week and Nuclear Engineering International*.

As with construction cost, load factors of operating plants have been much poorer than forecast. The assumption by vendors and those promoting the technology has been that nuclear plants would be extremely reliable, with the only interruptions to service being for maintenance and refueling (some designs of plant such as the AGR and Candu are refueled continuously and need only shut down for maintenance) giving load factors of 85-95%. However, performance was poor and around 1980, the average load factor for all plants worldwide was about 60%. To illustrate the impact on the economics of nuclear power, if we assume fixed costs represent two thirds of the overall cost of power if the load factor is 90%, the overall cost would go up by a third if load factor was only 60%. To the extent that poor load factors are caused by equipment failures, the resulting additional cost would further increase the unit cost of power.

However, from the late 1980s onwards, the nuclear industry worldwide has made strenuous efforts to improve performance. Worldwide, load factors now average more than 80%. The USA has an annual average of about 90% compared to less than 60% in 1980, although the average lifetime load factor of America 's nuclear power plants is still only 70%. Only seven of the 414 operating reactors with at least a year's service and which have full performance records have a lifetime load factor in excess of 90%, and only the top 100 plants have a lifetime load factor of more than 80%. Interestingly, the top 13 plants are sited in only three countries, six in South Korea, five in Germany and two in Finland. This suggests that performance is not random but is determined more by the skills that are brought to bear and how well the plants are managed than by the technology and the supplier.

New reactor designs may emulate the level of reliability achieved by the top 2% of existing reactors, but, equally, they may suffer from 'teething problems ' like earlier generations. . The French experience in the late 1990s with the N4 design is particularly salutary. Note that in an economic analysis, the performance in the first years of operation, when teething problems are likely to emerge, will have much more weight than that of later years because of the discounting process (costs that occur in the early years weigh more heavily than those in later years, see Part 2, 'Fixed costs'). Performance may decline in the later years of operation as equipment wears out and has to be replaced, and improvements to the design are needed to bring the plant nearer current standards of safety. This decline in performance will probably not weigh very heavily in an economic analysis because of discounting. Overall, an assumption of reliability of 90% or more is hard to justify on the basis of historic experience.

Decommissioning cost and provisions

These are difficult to estimate because there is little experience with decommissioning commercial-scale plants. The cost of disposal of waste, especially intermediate or long-lived waste, which accounts for a high proportion of estimated decommissioning costs, is similarly uncertain. However, even schemes which provide a very high level of assurance that funds will be available when needed will not make a major difference to the overall economics. For example, if the owner was required to place the (discounted) sum forecast to be needed to carry out decommissioning at the start of the life of the plant, this would add only about 10% to the construction cost. The British Energy (the privatized UK nuclear power plant owner) segregated fund, which did not cover the first phase of decommissioning, required contributions of less than £20m (EUR 30m) per year equating to a cost of only about £0.3/MWh (EUR 0.45/MWh).

The problems come if the cost has been initially underestimated, if the funds are lost or if the company collapses before the plant completes its expected lifetime. All of these problems have been suffered in Britain. The

expected decommissioning cost of the UK 's first generation plants has gone up several-fold in real terms over the past couple of decades. In 1990, when the CEGB (the former nationally owned monopoly generation company that supplied England and Wales) was privatized, the accounting provisions made from contributions by consumers were not passed on to the successor company, Nuclear Electric. The subsidy that applied from 1990-96, described by Michael Heseltine as being to 'decommission old, unsafe nuclear plants' was in fact spent as cash flow by the company owning the plant, and the unspent portion has now been absorbed by the UK Treasury. The collapse of British Energy has meant that a significant proportion of the decommissioning costs of the old nuclear power plants will be paid by future taxpayers.

Insurance and liability

There are two international legal instruments contributing to an international regime on nuclear liability: The International Atomic Energy Agency on Civil Liability for Nuclear Damage of 1963 and the OECD 's Paris Convention on Third Party Liability in the Field of Nuclear Energy, from 1960 and the linked Brussels Supplementary Convention of 1963. These conventions are linked by the Joint Protocol, adopted in 1988. The main purposes of the conventions are to:

1- Limit liability to a certain amount and limit the period for making claims;
2- Require insurance or other surety by operators;
3- Channel liability exclusively to the operator of the nuclear installation;
4- Impose strict liability on the nuclear operator, regardless of fault, but subject to exceptions (sometimes incorrectly referred to as absolute liability); and
5- Grant exclusive jurisdiction to the courts of one country, normally the country in whose territory the incident occurs.

In 1997 a Protocol was adopted to amend the Vienna Convention, which entered into force in 2003, and in 2004 a Protocol was adopted on the Paris Conventions. These both changed the definition of nuclear damage and changed the scope. For the Brussels Convention new limits of liability were set as follows: Operators (insured) EUR 700m; Installation State (public funds) EUR 500m; and Collective State contribution EUR 300m; a total liability of EUR 1,500m. These new limits have to be ratified by all contracting parties and are currently not in force.

Not all countries that operate nuclear facilities are party to either of the Conventions, for example non-signatories include the USA, Switzerland, Canada, China and India. Furthermore, the Conventions only act to create a minimum level of insurance and many countries require operators or state cover to exceed the covers proposed. The scale of the costs caused by, for example, the Chernobyl disaster, which may be in the order of hundreds of billions of euros, means that conventional insurance cover would probably not be available and even if it was, its cover might not be credible because a major accident would bankrupt the insurance companies.

It has been estimated that if Electricité de France (EdF), the main French electric utility, was required to fully insure its power plants with private insurance but using the current internationally agreed limit on liabilities of approximately EUR 420m, it would increase EdF 's insurance premiums from EUR c0.0017/kWh, to EUR c0.019/kWh, thus adding around 8% to the cost of generation. However, if there was no ceiling in place and an operator had to cover the full cost of a worst-case scenario accident, it would increase the insurance premiums to EUR c5/kWh, thus increasing the cost of generation by around 300%.

There have been proposals that 'catastrophe bonds' might provide a way for plant owners to provide credible cover against the financial cost of accidents. A catastrophe bond is a high-yield, insurance-backed bond containing a provision causing interest and/or principal payments to be delayed or lost in the event of loss due to a specified catastrophe, such as an earthquake. Whether these would provide a viable way to provide some insurance cover against nuclear accidents and what the impact on nuclear economics would be will be hard to determine until concrete proposals are made.

B- Variable costs

Non-fuel operations and maintenance cost

The non-fuel operations and maintenance (O&M) costs are seldom given much attention in studies of nuclear economics. As discussed below, the cost of fuel is relatively low and has been reasonably predictable. However, the assumption of low running costs was proved wrong in the late 1980s and early 1990s when a small number of US nuclear power plants were retired because the cost of operating them (not including repaying the fixed costs) was found to be greater than cost of building and operating a replacement gas-fired plant. It emerged that non-fuel O&M costs were on average in excess of $22/MWh (EUR 16.5/MWh) while fuel costs were then more than $12/MWh (EUR 9/MWh). Strenuous efforts were made to reduce non-fuel nuclear O&M costs and by the mid 1990s, average non-fuel O&M costs had fallen to about $12.5/MWh (EUR 9.4/MWh) and fuel costs to $4.5/MWh (EUR 3.40/MWh). However, it is important to note that these cost reductions were achieved mainly by improving the reliability of the plants rather than actually reducing costs. Many O&M costs are largely fixed - the cost of employing the staff and maintaining the plant - and vary little according to the level of output of the plant so the more power that is produced, the lower the O&M cost per MWh. The threat of early closure on grounds of economics has now generally been lifted in the USA because, on a marginal cost basis, the plants are low cost generators.

It is also worth noting that British Energy, which was essentially given its eight nuclear power plants when it was created in 1996, collapsed financially in 2002 because income from operation of the plants barely covered operating costs. This was in part due to high fuel costs, especially the cost of reprocessing spent fuel, an operation only carried out now in Britain and France. British Energy has subsequently acknowledged that expenditure in that time was not

sufficient to maintain the plants in good condition. Average O&M costs for British Energy's eight plants, including fuel, varied between about EUR 24.5-28.0/MWh from 1997-2004. However, in the first six months of fiscal year 2006/07, operating costs including fuel were EUR 35.5/MWh because of poor performance at some plants.

Fuel cost
Fuel costs have fallen, as the world uranium price has been low since the mid-1970s, although in recent years the price of uranium has risen, more than doubling in 2006. These higher uranium costs have yet to be reflected in fuel costs for reactors, although given that much of the cost of fuel relates to processing, such as enrichment, the effect will be limited.
US fuel costs average about $5/MWh (EUR 3.75/MWh) but these are arguably artificially low because the US Government assumes responsibility for disposal of spent fuel in return for a flat fee of $1/MWh (EUR 0.75/MWh). This is an arbitrary price set more than two decades ago and is not based on actual experience - no fuel disposal facilities exist in the USA or anywhere else - and all the US spent fuel remains in temporary store pending the construction of a spent fuel repository, expected to be at Yucca Mountain.

Fuel costs are a small part of the projected cost of nuclear power. The issue of spent fuel disposal is difficult to evaluate. Reprocessing is expensive and, it does little to help waste disposal. Reprocessing merely splits the spent fuel into different parts and does not reduce the
amount of radioactivity to be dealt with or the heat load. Indeed, reprocessing creates a large amount of low-and intermediate-level waste because all the equipment and material used in reprocessing becomes radioactive waste. The previous contract between BNFL and British Energy, before its collapse, was reported to be worth £300m (EUR 400m) per year, which equates to about £5/MWh (EUR 7.5/MWh). The new contract is expected to save British Energy about £150-200m (EUR 225-300m) per year, although this will be possible only because of underwriting of losses at BNFL by the Government. The cost of disposing of high-level waste is hard to estimate because no facilities have been built or are even under construction and any cost projections should have a very wide margin for error.

Accounting lifetime
One of the features of Generation III/III+ plants compared to their predecessors is that they are designed to have a life of about 60 years, while their predecessors generally had a design life of about half that. For a technology dominated by fixed costs, it might be expected that doubling the life would significantly reduce fixed costs per unit because there would be much longer to recover these costs. In practice, this does not apply. Commercial loans must be repaid over no more than 15-20 years and in a discounted cash flow calculation, costs and benefits more than 10-15 years forward have little weight.

There is a trend to life-extend existing plants and PWRs are now often expected to run for more than 40 years, compared to their design life of around 30 years. At present, life extension in the USA appears to be an economically sound decision. However, life extension may require significant new expenditure to replace worn out equipment and to bring the plant closer to current safety standards. Life extension is not always possible and, for example, Britain's AGRs which had a design life of 25 years are now expected to run for 35 years, but life extension beyond that is not expected to be possible because of problems with the graphite moderator blocks.

2- Impact of liberalisation of electricity industries
When the electricity industry was invariably a monopoly, utilities were normally guaranteed full recovery of costs found to be used and useful as well as prudent. This made any investment a very low risk to those providing the capital because consumers were bearing most of the risk. The cost of capital varied according to the country and whether the company was publicly or privately owned. Publicly owned companies in OECD countries generally have a high credit rating and often do not have to raise equity capital (which is more expensive than debt) therefore the cost of capital is lower than for a commercial company. The range was 5-8%.

Arguably, this low cost of capital was a distortion and led to utilities building more capital-intensive options than they should have done, because they were not being exposed to the economic risk they were taking. Building a power station of almost any type is a highly risky venture: fuel choice could prove wrong, construction costs could escalate and demand might not grow at the forecast rate. But because consumers or taxpayers usually 'picked up the tab' if things went wrong, this risk was ignored by utilities and financiers. If the risk had been borne by the utilities and if bad technology or fuel choices were directly reflected in their profits, utilities would have been much more cautious in their investment decisions, choosing low capital cost options and options that had a low risk of going seriously wrong.

In an efficient electricity generation market, the risk of investment would fall on the investors in the power plants not the consumers, for it is the investors who have the best information as well as control over the project managers. The cost of capital would reflect the risks. For example, in 2002 in Britain (by then a fully liberalized electricity market) , about 40% of the generating capacity was owned by financially distressed companies (about half of this was the nuclear capacity) and several companies and banks lost billions of pounds on investments in power stations that they had made or financed. In these circumstances, a real

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cost of capital of up to 15% seems justified. If the risks were reduced, for example, by government guarantees, the cost of capital would be lower, but this would represent a government subsidy (state aid). It would distort the efficient resource allocation function of market prices by providing a resource (capital) at less than its true cost, and it is not clear if this form of 'state aid ' would be acceptable under European Union law. .

US experience
Competitive power supply markets came into being largely as a result of US nuclear power experience in the 1970s. As nuclear plants came on line at prices far above their cost estimates and customer bills tripled between 1970 and 1980, public outrage resulted in the passage of legislation (the 1978 Public Utilities Regulatory Policies Act) requiring US utilities to buy power from any supplier offering it at prices below the utility's own projected cost of supplying it.

Initial projections that little such power would be available proved wildly inaccurate. By the mid-1980s many utilities were using competitive power procurement auctions in which companies could bid to supply a forecast need for additional power. For example, if it was forecast that demand would grow by, say, 500MW, an open contest to supply this power would be held and the company that bid the lowest price would be awarded a contract to supply the quantity of power offered at the price it had bid. Between 1980 and 2002, the percentage of US power supplied by independent companies (i.e., not the local electric utility) rose from 2.2% to 35%.

In the US during the period when some 120 nuclear plants were built and as many again were ordered and later cancelled, most of the risk was borne by the customers. In some cases, where regulators found 'imprudence', they required the plant owner to bear any additional costs resulting from that imprudence rather than recovering them from consumers. In addition, customers were often protected from paying for the costs of cancelled plants. Generally, however, regulators approved the substantial rate increases needed to pay for nuclear cost overruns and for many of the cancelled plants, often in the belief that rising oil prices would mean that the leading alternative sources would be equally expensive.

The development of competitive power procurement meant that winning bids contained guaranteed volumes and guaranteed prices or price formulas. This meant that the amount and price paid for electricity was predictable. However, the economic risk that the plant would cost more than the guaranteed price was transferred to the power plant developers. Builders of non-nuclear power plants were willing to take these risks, as were vendors of energy efficiency services. Consequently, nuclear power, combining uncompetitively high prices with a need to have the risks of cost overruns and poor operating records borne by the customers, had no chance in the USA or in other countries that moved to genuinely competitive power procurement.

Electricity reforms elsewhere
During the 1990s, following reforms in Chile and Great Britain, many of the vertically integrated utilities in the US were broken up into separate generation, transmission and distribution companies, a process known as restructuring. Restructuring has now largely halted in the US as a result of the California power crisis of 2000-01, leaving the country divided between areas that offer forms of retail customer choice and those that do not. However, transforming electricity generation from a monopoly to some form of market-which does not necessarily involve customer choice at the retail level -remains the rule rather than the exception, and competitive power supply procurement has spread widely in Europe and Latin America as well as sporadically in Asia and Africa.

In many cases, these reforms have been accompanied by the introduction of competitive day-to-day power markets. If these markets are effective, this will add further to the risks faced by power plant owners. In such a market, the owners will not only face the risk of having to bear additional costs if the plant does not perform to expectations, they also bear the risk because they will not know how much power they will be able to sell and at what cost.

No new nuclear unit has ever won a competitive solicitation anywhere. Indeed, a new nuclear unit has never even been bid. Two interconnected factors explain this result. First, new nuclear power plants have been more expensive than fossil fuel alternatives. Second, competitive markets put the financial risks of failure on investors, and investors have been unwilling to bear the risk of a nuclear plant.

In countries still building nuclear power plants, the risk that the units will cost too much or perform badly is borne by someone other than private investors. Sometimes risks are borne by the government and by taxpayers; sometimes they are borne by the electricity consumers.

3- Dealing with risks in competitive electricity markets
The difficulty of attracting capital to build a nuclear power plant (or any other capital intensive or technologically risky option) to operate in a competitive electricity market has long been recognized. Other technology options with lower construction costs and a lower level of technical risk, especially the combined cycle gas turbine or CCGT, are able to survive in competitive electricity markets. This is because equipment suppliers, financiers and sometimes fuel suppliers are willing to bear some of the risk that would otherwise fall solely on the plant owner. But how feasible is it to try to apply such measures to new nuclear power plants?

Construction time
Guarantees on construction time for a nuclear plant will be highly risky. In November 2006, Nucleonics Week reported that for the Olkiluoto contract: *"According to industry sources, the contractual penalty for Areva is 0.2% per week of delay past the May 1, 2009 commercial operation target for the first 26 weeks, and 0.1% beyond that. The contract limits the penalty to 10% of the total contract value, or about EUR*

300m, these sources said."

If we assume the contract was signed for EUR 3bn and the expected delay is now 18 months, the EUR 300m limit will be reached after about 17 months and any further delays will be uncompensated. By November 2006, the expected delay at Olkiluoto was indeed 17 months. In this context, the existing losses for Areva by end 2006 of EUR 700m seem likely to be an underestimate, the penalties for late completion accounting for 60% of this figure. If the costs over-run, by, say, 20%, a modest over-run by nuclear industry standards, Areva will end up losing EUR 900m on this order.

Reliability
Poor performance can be particularly costly for a utility. Take the example of a 1, 000MW plant, that operates at a load factor of 80% rather than 90% and the wholesale price of power is EUR 50/MWh. The lost income from electricity sales alone will be EUR 44m per year. The overall losses could be much higher if the poorer reliability increases operations and maintenance cost and the cost of buying the replacement power from the market is high.

One of the most impressive achievements of the nuclear industry has been the improvement in reliability of nuclear plants so that the world average load factor has increased from about 60% in 1980 to about 85% in 2005. However, this level of performance is no more than has always been forecast.

Experience with the most recent Framatome design, N4 (predecessor to EPR), shows that reliability is still not assured, especially for new, untested designs. Until all new plants operate from the start of service at levels of 85-90% load factor, it will be too great a risk for the nuclear vendors to offer a guarantee of performance. A particular problem for nuclear plants is that generally no one company controls the whole of the plant. For example, at the projected Flamanville plant in France, Areva will supply the nuclear island, Alstom the turbine generator, Bouygues the civil works and EdF itself the architect engineering. It is hard to see how one company would gamble on the performance of all the other contractors by offering a performance guarantee.

The problems with the ABWRs in Japan show that it is not just the nuclear island that causes problems. Here, problems with the conventional part of a nuclear plant, the turbine generator, at only two units have significantly affected Hitachi 's profits and potentially its credit rating, because of the cost of repairs and replacement it will have to face as well as compensation to the plant buyer.

Power purchase agreements
If electricity markets are not a sham, long-term power purchase agreements at prices not related to the market will not be feasible unless the cost offered is very low. If the wholesale market for power is efficient, most power will be bought and sold at spot-or spot-related prices. If retail markets are effective, consumers will switch regularly to obtain the cheapest available price. A long-term power purchase contract to buy the output of the plant at pre-determined prices will either be a huge risk, or will not be worth the paper it is printed on. If retail markets are well-used, no retailer will know from one year to the next what their market will be and the risk of company failure will be significant.

The circumstances of the Olkiluoto contract are very particular. The buyer, TVO, is a not-for-profit consortium of electric-intensive industries that have contracted for the output of the plant at cost-related prices, over its whole life. Such a consortium probably is a credible buyer, but if the operating costs of the plant are higher than forecast, or the price of power in the NordPool, the wholesale market covering the four Nordic countries, is lower than forecast, the competitiveness of these companies (for which electricity may account for up to 50% of their costs) will be heavily impaired. It is hard to see how or why it would be possible for electric-intensive industry to form consortia in other countries, effectively gambling the competitiveness of their companies on the ability of the nuclear industry to control cost and achieve high reliability.

While the moves towards liberalization are now experiencing difficulties and may be halted in some places, it seems unlikely that even where generation remains a regulated monopoly that regulators will allow generators to pass on imprudently incurred costs to consumers. If the terms of a power purchase agreement are fixed, this will be a big risk to the generator, who will have to absorb additional costs if things go wrong. If the terms are more flexible, the buyer will take the risk that they will not be allowed to recover their costs from consumers.

Long-term liabilities
From an economic appraisal perspective, long-term liabilities such as waste disposal and decommissioning should have little impact on the economics of nuclear power. At the start of the life of the plant, decommissioning will be 60 or more years away and final disposal of spent fuel will also be many decades away. In the type of discounted cash flow calculation used in project appraisal, costs and income are 'discounted' to a 'net present value'. In other words, if there is a cost of, say, EUR 100m in 10 years' time, and it was assumed the discount rate was 5%, the discounted value of this cost would be EUR 61.3m.

The rationale is that a sum of EUR 61.3m was invested today at a real (net of inflation) interest rate of 5%, after 10 years, it would have grown to EUR 100m. By the same logic, income of EUR 100m earned in 10 years would be worth only EUR 61. 3m today. While this has an intuitive logic, over longer periods and at higher discount rates, the effect is alarming and seems to trivialize huge long-term liabilities. For example, if it was assumed that decommissioning would cost EUR 1bn and the discount rate was 15% (reflecting the high risk of investing in nuclear power stations), a sum of only EUR 3m would grow sufficiently at this rate to produce a sum of EUR 1bn in 60 years.

The fault in the logic is that if the 'polluter is going to pay' the assumption that a real interest rate of 15% will be available for 60 years is untenable. The discount rate applied to

construction costs is a 'rationing' device to ensure that limited funds are channeled to the most profitable use. The discount rate applied to decommissioning funds is a minimum expected rate of return on investment chosen to reduce the risk that funds will not be available.

To provide assurance that funds will not be lost, they are, in most countries, invested in very low risk investments paying correspondingly low interest rates, perhaps 2-3%. At a discount rate of 2%, EUR 1bn discounted over 60 years falls to EUR 300m.

If, as seems likely to be the case, countries move towards systems of providing funds for long term liabilities that minimize the risk of a funding shortfall, for example, by requiring the plant owner to deposit the full discounted liability for decommissioning on the day the plant starts, this will make a noticeable difference to the initial cost. For example, if it was assumed that Olkiluoto would cost EUR 1bn to decommission, the EUR 3bn capital cost would increase by 10%.

However, costs of decommissioning have been escalating rapidly and, for example, the expected cost of decommissioning Britain 's first generation plants has increased by a factor of 6 in the past 15 years. This represents a major risk to plant owners.

For example, if it is assumed decommissioning will cost EUR 1bn and will take place 60 years after the plant starts up, at a discount rate of 2%, the company will be required to deposit EUR 300m at the start of operation. However, if it is discovered that, after 30 years, the plant will only operate for 40 years and the decommissioning cost is EUR 2bn, the utility will have to find another EUR 1.2bn, likely to be enough to bankrupt many utilities. On past experience, such shocks would be by no means unusual. Insurance companies would be unlikely to be prepared to insure against such a risk (or would require a huge premium) and plant owners would probably look to government to offer guarantees to prevent the exposure to risks from waste disposal and decommissioning liabilities.

4- Long-term forecasting

The large construction costs and long operating times make nuclear power uniquely vulnerable to changes in markets. UBS Investment Research undertook an assessment of the European market for equity investors, which concluded that endorsing new nuclear investment is 'a potentially courageous 60-year bet on fuel prices, discount rates and promised efficiency gains Other economic forecasters agree with the importance of these parameters and would include the price of carbon as an additional important factor.

Fuel prices

In the time of the oil shocks in the 1970s and 1980s the world was much more dependent on oil than is currently the case. This is partly the reason why the oil price increase from 1998-2005, where the price of oil has increased five fold, has not had the same economic impact as a similar price spike had during the 1970s. In the 1970s and 1980s oil had a much wider application and was, for example, used to generate electricity, which is much less the case today.

However, there is still a close price correlation between the price of oil and the price of electricity, as the price of oil is linked to that of natural gas, and to a lesser extent that of coal. As natural gas is increasingly used in the production of electricity, oil and electricity price movements have a causal linkage.

The period of higher oil prices from the mid 1970s to mid 1980s was also one of optimism for the nuclear industry, with orders still being made in the United States (before Three Mile Island) and in Europe before the orders tailed off following Chernobyl.

The European Commission has undertaken analysis on the impact of higher oil and gas prices on the use of different energy technologies. In their base case scenario the price of oil in 2030 in 2005 dollars is US$63/barrel, but under a high price scenario it reaches US$99/barrel. In the high oil and gas price scenario the use of nuclear increases, but only by 6.5%, compared to the increased use of renewables of 12.5%.

The future price of oil is uncertain, with significantly differing views. The International Energy Agency 's World Energy Outlook for 2006 estimates in its base-case scenario that the price of oil in 2030 will be - in 2005 dollars - US$55/barrel.

Interest rates

The large construction costs of nuclear power make it susceptible to changes in interest rates, and in fact more susceptible than other energy sources that have lower construction costs and times. The amount of interest that a utility has to pay for borrowing the necessary finance to construct a nuclear power plant impacts significantly upon expected costs of the electricity produced. In economic models the effect of changing interest rates is defined as the discount rate (which is the sum of the initial investment plus the interest accumulated, divided by the length of time the loan is taken out for). This has a significant impact on the economics of nuclear electricity. Based on the economic data put forward by the Nuclear Energy Agency, it is possible to see that increasing the discount rate from 5% to 10% in the economic models increases by 50% the cost of nuclear electricity.

Carbon pricing

The recognition of the environmental and economic consequences of climate change has increased the pressure to reduce CO_2 emissions. Through the Kyoto Protocol many countries have agreed to put a limit on their CO_2 emissions. However, the Protocol effectively excludes nuclear energy as an operation from its flexible mechanisms that Annex I parties to the Convention can use to meet their reductions targets. Specifically, nuclear power is excluded from the Clean Development Mechanisms (CDM, Article 12) and projects implemented jointly (Article 6). Nuclear power was not directly excluded from emissions trading schemes.

In order to meet this target signatories have had to put in place mechanisms

to reduce emissions, particularly from the power sector. In Europe this has resulted in the introduction of an Emissions Trading System which puts a ceiling on the amount of CO_2 fixed sources can emit and has resulted in the establishment of a carbon market, as CO_2 producers trade their emissions permits.

Over the last two years, since the establishment of the European carbon market, the price has fluctuated in the range of EUR 2-30/ton carbon, due to changes in energy prices, actual or anticipated availability of emissions permits and market speculations.

Nuclear power does not receive emissions permits within the framework of the European Emissions Trading Scheme (unlike existing fossil fuel electricity generators) as it does not produce CO_2 during electricity generation. However, despite the fact that during the first round of the ETS there was considerable over-allocation of emissions permits and these were largely given for free to the electricity utilities, the establishment of the scheme has resulted in the general increase in electricity prices. As a result it has been said that the main economic winners of the current scheme have been the coal and nuclear utilities.
Many see the introduction of a long term carbon price as an important future issue for the nuclear industry and absolutely necessary for the construction of nuclear reactors. The chief executive of EdF has stated 'To make a commitment of billions of pounds to a project with a time-scale of half a century, investors above all need predictability about price. They must know the value society will place on carbon reduction not just tomorrow, but 10, 20, 30, 40 years from now.' This would require a significant change in the current emissions trading schemes.

Not only does there need to be a long term guarantee for the price of carbon, but, according to some, also a price which is significantly above the current market price. The MIT study calculated that 'With carbon taxes in the US$50/ton Carbon(t/C) range, nuclear is not economical under the base case assumptions'. The study went on to assess that nuclear will only break even under its base case assumptions, when carbon prices are in excess of US$100/tC (EUR 71/tC).

Source: The research report "*The economics of nucle r power*" (November 2007) written by Stephen Thomas, Peter Bradford, Antony Froggatt and David Milborrow. It can be found at: http://www.greenpeace.org/international/press/reports/the-economics-of-nuclear-power
Or can be obtained from: Greenpeace International,
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DON'T NUKE THE CLIMATE

Although not officially on the agenda (as it all was about hammering out a roadmap to start real talks in 2009, Denmark) the climate negotiations that took part in Bali, Indonesia, where full with nuke-speak. Of course the nuclear industry was massively attending the side-events and all public meetings where they could spread there message.

(664.5850) WISE Amsterdam -
Hilarious was the side-event of the IAEA where they wanted to do some PR on the benefits of nuclear energy for developing countries which are supposed to be taking up their share of bringing down CO_2-emissions, as Indonesia itself. The venue was crowded, but all with anti-nuclear people and critical scientists. Main message heard; nuclear is too late, too dirty, too expensive and too dangerous.

In our two-week visit to Indonesia we also made a field-trip to the two proposed sites for nuclear power stations in Indonesia; Muria and Jepara, at the northern coast of Java.
We talked to local ngo's, joined in a rally, spoke with the Muslim organizations who have announced a Fatwa over the plans to build an nuclear power plant (meaning that every Muslim is obliged to actively resist any attempt to build a nuclear power station) and we did some local media work.

At the negotiations itself we staged some small protest actions, spoke at side-events and facilitated a representative of WISE Russia to attend the negotiations. We made sure the EU-block actively spoke out against nuclear as part of the solution for a post-Kyoto agreement (to be decided upon in Denmark, in 2009) and we supported the local and national Indonesian ngo's in their fight against the - somewhat unclear yet - nuclear power plans.

It was good to see that, despite the huge pressure to come with solutions, a vast majority of the environmental community, does not accept nuclear as part of the solution to combat global warming. This was not only very clear in Bali but has been underlined in the past months with the results of the petition NIRS has launched on the Internet;

More than 500 organizations from every corner of the U.S. and across the world have signed a statement explicitly rejecting the use of nuclear power as a means of addressing the climate crisis. The signers include many of the world's largest and most influential environmental organizations, such as Greenpeace, Friends of the Earth International, Sierra Club, Clean Water Action, Rainforest Action Network and many others, along with major peace groups like Code Pink, Peace Action, and Nuclear Age Peace Foundation, and hundreds of grassroots environmental, sustainable energy, religious, peace and other groups and businesses large and small from 46 states and 38 countries on six continents

The statement says; *We do not support construction of new nuclear reactors as a means of addressing the climate crisis. Available renewable energy and*

energy efficiency technologies are faster, cheaper, safer and cleaner strategies for reducing greenhouse emissions than nuclear power.

We know the industry will do whatever it can to get more support in the next round of a climate agreement. So we will keep the petition up for endorsement We hope you and your organization will join us and sign on. See www.nirs.org

We will follow the international climate negotiations closely in the coming two years and will intervene whenever necessary.
Source and contact: WISE Amsterdam

IN BRIEF

European Commission gives positive opinion on Belene. On December 7, the European Commission has given a positive opinion under Euratom art. 41 to 44 of the Euratom Treaty to the proposed Belene nuclear power plant project. Bulgaria wants to build a Russian designed AES-92 nuclear power station with two VVER 1000/466B reactors. The AES-92 design has more passive safety features than the VVER 1000/320 design. The Commission was also convinced it would withstand aircraft impacts. The Commission obviously did not take into account the Environmental Impact Assessment, although on the basis of the required documentation for art. 41 - 44 assessments it could have done so. The Commission furthermore accepted obviously without critique a recent report from the Bulgarian Geophysical Institute that states that no seismic activity is possible in Belene that would damage buildings. This in flagrant contradiction to the fact that a 1977 earthquake killed 120 people on 14 km distance in the town of Svishtov and destroyed houses in the town of Belene and Nikopol. It also contradicts the promise the Commission made towards us that it would submit the seismic report from Bulgaria to a solid peer-review. The Commission furthermore accepted the complete lack of transparency from the side of the Bulgarian authorities that have structurally blocked access to any kind of documentation concerning the AES-92 design. We therefore believe that the Commission has fallen short in its role to properly assess this proposal for a new nuclear power station and include the population it represents in forming its opinion.
European Commission press release IP/07/1874, 7 December 2007

Iran: no decisive proof of weapons-program before 2003! In November the US NEI (National Intelligence Estimate) concluded that Iran halted its nuclear weapons program in 2003 and that the threat of international sanctions has worked in compelling the Islamic republic to back away from its pursuit of the bomb. The report also concludes that Iran "does not currently have a nuclear weapon," and that the country is unlikely to be capable of producing enough highly enriched uranium to make a bomb before 2009 at the earliest.
The danger of this report is that it states as undisputed that Iran did in fact have a nuclear weapon program before 2003. However, no decisive proof has been produced indicating that Iran has nuclear weapons, or even the means of deploying them (see: Nuclear Monitor 625, April 8, 2005) Foreign Minister Sergey Lavrov says Russia has never seen proof that Tehran ever had a nuclear weapons program. "The data possessed by our American partners, or at least the data shown to us, gives no reason to assume Iran has ever pursued a military nuclear program," he said.
If this 'finding' is not challenged, it will be far easier in the future to claim that the program has been taken off hold at the slightest glitch in Iran's cooperation with the IAEA.
Meanwhile, more than 500 Iranian women calling themselves "mothers of peace" have signed a letter to senior officials expressing their fear that there will be a war over Iran's nuclear program. The letter warns the Iranian authorities that the signatories are not willing to support the government in its insistence on continuing its nuclear program. The group announced its formation in November as a movement seeking peace and freedom.
Although it could mean a lot of things, and is not necessarily an expression of anti-nuclear feelings, it is a remarkable move and not without danger. It is highly unusual for an Iranian citizens' group to question publicly the country's nuclear policy and acknowledge the effects of the economic sanctions imposed by the United Nations on people's lives. President Ahmadinejad has repeatedly called senior officials who have criticized his nuclear policies "traitors."
LA Times, 3 December/ New York Times, 4 December / Russia Today, 7 December 2007

Nuclear lobby shamed for worst greenwashing in Europe. On December 4, German car manufacturers BMW, Daimler and Porsche were disgraced when they were named winners of a public poll for the 'Worst EU Lobbying' Award 2007 at a ceremony in Brussels hosted by the award organisers Corporate Europe Observatory, Friends of the Earth Europe, LobbyControl and SpinWatch.
The special greenwash prize for the most audacious attempts to gain unjustifiable Green credentials was awarded to the German Atomic Forum, which received more than a third of votes cast. It was nominated for its campaign aimed at improving the image of nuclear energy. Under the slogan "Germany's unloved climate protectionists" it featured images of nuclear power plants placed in unpolluted and unspoilt natural environments. "The German Atomic Forum took advantage of the public's concern about climate change to promote nuclear energy," says Ulrich Mueller from LobbyControl. "The one-sided ads use idyllic pictures of nature to gain public acceptance of longer lifespans for old nuclear power plants, ignoring the associated risks. The victory of the German Atomic Forum for worst greenwash shows that the public will not be conned by these

attempts to gain unwarranted green credentials." A short report, pictures and a short video clip are available at: http://www.worstlobby.eu/2007/awardsceremony
www.worstlobby.eu , 4 December 2007

Ireland: No to uraniummining! Prospectors have been banned from mining the hills of Donegal for uranium The Irish Minister for Natural Resources Eamon Ryan (Green Party) refused to grant exploration licenses to two companies with their eyes set on some of the county's most wild and scenic areas.
The Green Party TD said he declined the recent applications as part of a wider stance against nuclear power in Ireland and in the UK. "It would be hypocritical to permit the extraction of uranium for use in nuclear reactors in other countries, while the nuclear generation of electricity is not allowed in Ireland," he said. "And particularly while the Irish Government continues to object to the operation of nuclear power generation at Sellafield and other locations."
Environmental groups are welcoming the decision by the Energy Minister Eamon Ryan to effectively ban uranium mining here.
Ireland.com & Belfast Telegraph, 2 December 2007

US GAO: Too little progress. On November 5, the Government Accountability Office (GAO) released it's congressional-requested audit of the Dept. of energy's (DOE) progress in securing nuclear materials that are housed at numerous sites across the country. The GAO report title tells the story: "DOE Has Made Little Progress Consolidating and Disposing of Special Nuclear Materials". The GAO found that while the DOE told Congress in 2005 that it would complete plans within one year to consolidate and better secure special nuclear material (principally plutonium and highly enriched uranium), as of November 2007 only 2 out of 8 plans were in place. The other 6 are lagging; still in GAO termed "early stages of development". Further, GAO found significant deficiencies in the 2 plans that DOE had completed.
Among the six plans left undone is the proposal to remove all weapons usable quantities of plutonium and highly enriched uranium from Livermore Lab. As has been noted by both the local group CARE (Communities Against Radioactive Environment) and government agencies, the bomb grade material at Livermore Lab is vulnerable to theft, terrorist attack or release in a catastrophic event such as an earthquake. Nearby communities and some Members of Congress have wisely been pressuring DOE to remove the nuclear material. Yet, DOE has no tangible plan to do so. According to the GAO, simply attempting to secure Livermore Lab's plutonium in place will cost nearly half a billion dollars of the next seven years.
Tri-Valleys CARE's Citizen's Watch, November 2007

South-Africa: Regulator annual report "horror reading". The National Nuclear Regulator (NNR) of South Africa will not be able to cope with the government's proposed nuclear program. In a meeting of the Minerals and Energy Portfolio Committee on 21 November, the NNR admitted it is completely understaffed and overwhelmed by the government's proposed nuclear energy plan. The NNR is battling to keep employees, has fallen behind on equity targets, and risks its requests for increased funding being turned down by the Treasury because of its "extremely problematic" underspending. Its report for 2006/07 - described by the Coalition Against Nuclear Energy as "horror reading" - also highlighted security at nuclear facilities as "a major concern".
According to the NNR there were up to fifty three "contaminated sites" in South Africa. They were "discontinuing" proposed rehabilitation of four sites in the Karoo that were "contaminated .with radiological hazard to members of public and to future generations" because the DME (Department of Minerals and Energy) had issued uranium prospecting permits to new companies in that region. The NNR said there had been inadequate compliance with maintenance procedures and "operating technical specifications" at Koeberg nuclear power plant. There were also problems with incompetence and "sufficiency" of Eskom's workforce to work safely. They mentioned the "suspected loss of a small quantity" of Highly Enriched Uranium at a building at Pelindaba.
The NNR has come under great scrutiny for many years for its allegiance to the nuclear industry, falling as it does under Minerals and Energy and not Environmental Affairs and more recently because of its inept and denialist handling of the far-reaching radioactive pollution of the West Rand's water supplies from years of mining despite repeated warnings over decades.
Coalition Against Nuclear Energy, 28 November 2007

Israel battled early Khan suppliers, reporters say. In their book 'Deception', investigative journalists Adrian Levy and Catherine Scott-Clark claim Israel's intelligence agency ran a secret campaign in the early 1980s to assassinate people who assisted the efforts of then-top Pakistani nuclear scientist Abdul Qadeer Khan to build a nuclear weapon for Pakistan. In the book they discuss a letter bombing in West Germany outside the home of Khan associate Heinz Mebus, who was said to have assisted Pakistan in its construction of fluoride and uranium conversion plants in 1979. The book says that European law enforcement officials linked the unsuccessful attack to a February 1981 bombing outside the Berne, Switzerland home of Eduard German, the managing director of an engineering firm credited with supplying gasification and purification equipment to Pakistan in 1979. A third bomb also exploded in West Germany outside the headquarters of a company that had provided

nuclear technology to Pakistan since 1976.
Global Security Newswire, 28 November 2007

Italy buys into new French nuclear plants. At the time first concrete was poured at the construction-site of the EPR at Flamanville, a long-delayed agreement was reaffirmed. ENEL, Italy's largest utility, will take a 12.5% stake in Electricite de France's 1650MW EPR. The agreement fulfils a 2005 cooperation agreement and commits ENEL to pay its share of construction and operating costs, as well as decommissioning and waste disposal. ENEL has the option to take a similar share in five future EPRs in France - a total of another 1000 MWe, and gains the right to use EPR technology. In exchange, EdF can participate in construction and operation of future ENEL nuclear power plants in Italy or elsewhere in Europe and the Mediterranean. ENEL's subsidiary Slovenske Elektrarne is building two 1000 MWe VVER reactors at Mochovce in Slovakia.
AUA Weekly Digest, 7 December 2007

Dounreay: "Significant" spill unreported. Regulators only found out about a spillage at the Dounreay Cementation Plant (Scotland, UK) earlier 2007 when they received an anonymous tip-off. The Nuclear Installations Inspectorate (NII) received the anonymous complaint and found out 400 liters of clean water had leaked into the plant's already highly contaminated main handling cell. In its report for 1 July to 30 September the NII said that while no-one was put at risk "this was a significant incident and will result in two additional drums of encapsulated intermediate level waste. NII views reporting of events as important and has asked UKAEA to ensure that events are reported as required by their arrangements."
N-Base Briefing, 551, 12 December 2007

Canada's parliament overrules nuclear regulator on safety. Canada's Prime Minister Harper has rammed through a special law to over-ride a decision of the Canadian Nuclear Safety Commission. The CNSC was upset to learn that AECL (Atomic Energy of Canada Limited) had failed to install an important safety feature two years ago -- a back-up pump to prevent a core meltdown under certain accident conditions -- which was an explicit requirement of AECL's license to operate the NRU reactor. As a result the fifty-year old NRU reactor, which has been operating in violation of its license, was facing a month-long shutdown while the necessary safety equipment would be installed.
But Stephen Harper introduced an emergency piece of legislation to re-start the NRU isotope-production reactor at Chalk River, despite the objections of the CNSC. In fact Harper spoke derisively of the "Liberal-appointed" commission as being obstructionist in preventing the reactor from operating when its isotope production capacity is needed. (The Liberal Party is the chief opposition party.) He also stated that CNSC's inflexibility "will jeopardize the health and safety and lives of tens of thousands of Canadians. It is in the public interest to get this reactor back online and get these medical radioisotopes produced. There is no threat to nuclear safety at all. There is a threat to human life." The owner and operator, Atomic Energy of Canada Ltd, had told parliament that following substantial work in recent weeks, "NRU is safe to start up and operate in this mode." The remaining upgrade will be undertaken in 2008. Harper stated in the House of Commons that there was no legitimate safety concern, that there would be no accident, because he had consulted an independent nuclear expert. This independent expert turned out to be someone from Bruce Power, who is also an active member of the Conservative Party (Harper's party), and who only read some relevant documents about the NRU situation the morning before.
World Nuclear News, 14 December 2007 / CCNR, 13 December 2007

U.K: Sites for new reactors. British Energy has announced the four sites where it wants to build new reactors. The sites, which already have reactors, are Sizewell in Suffolk, Dungeness in Kent, Hinkley in Somerset and Bradwell in Essex. BE said studies showed these were the more suitable sites. Work to combat rising sea levels could be undertaken there and the National Grid has agreed to install additional transmission networks if the new reactors are built. Prime Minister Gordon Brown repeated his commitment to nuclear power late November in a speak to the Confederation of British Industry (CBI) in London. Mr Brown said: "We must - and will - take the right long-term decisions to invest now for the next generation of sustainable and secure energy supplies. We have said that new nuclear power stations potentially have a role to play in tackling climate change and improving energy security."
N-Base Briefing 549, 28 November 2007

Stop nuclear power in Belarus!
As reported several times this year, Belarus is on the brink of deciding the construction of a first nuclear power plant. Recently Belarussian president Lukashenko announced again such a plan. Conditions for opposition are very hard in Belarus political environment, see for instance the story in the Nuclear Monitor 654 (April 20, 2007) 'Belarus: Activists focus on fight against nuclear power' in which the first Belarus Social Forum was announced and repression against anti-nuclear activists during the annual Chernobyl commemoration was described.

Late November, members of a Protestant group in Horki, Mahilyou region decided to start an initiative to stage a local referendum against the construction of the nuclear power plant. One of the proposed sites is located just 15 km off Horki.

International solidarity is needed!
Now, an online petition is created to protest against the dangerous plans
Please, take a minute to visit the website and sign the petition.
Petition in English -
http://www.stopatom.com/en/appeal/sign
In Russian
http://www.stopatom.com/ru/appeal/sign

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WISE/NIRS NUCLEAR MONITOR

The Nuclear Information & Resource Service was founded in 1978 and is based in Washington, US. The World Information Service on Energy was set up in the same year and houses in Amsterdam, Netherlands. NIRS and WISE Amsterdam joined forces in 2000, creating a worldwide network of information and resource centers for citizens and environmental organizations concerned about nuclear power, radioactive waste, radiation, and sustainable energy issues.

The WISE/NIRS Nuclear Monitor publishes international information in English 20 times a year. A Spanish translation of this newsletter is available on the WISE Amsterdam website (www.antenna.nl/wise/esp). A Russian version is published by WISE Russia and a Ukrainian version is published by WISE Ukraine. The WISE/NIRS Nuclear Monitor can be obtained both on paper and in an email version (pdf format). Old issues are (after two months) available through the WISE Amsterdam homepage: www.antenna.nl/wise.

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