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NUCLEAR RELAPSE GOES GLOBAL

The Bush administration's US$2.77 trillion fiscal year 2007 federal budget proposes cuts in environmental protections and social programs, while lowering taxes on the wealthy. (1) Instead it includes increased funding for nuclear energy initiatives.

(642.5746) NIRS - These include a proposed international expansion of nuclear power and a revival of domestic nuclear waste reprocessing called the "Global Nuclear Energy Partnership," or GNEP. The US$23.6 billion proposed budget for the U.S. Dept. of Energy (DOE), a US$124 million increase over last year's funding level, includes a US$250 million request to Congress for GNEP.

In his 2006 State of the Union speech delivered on January 31, Bush called for an "Advanced Energy Initiative," stating, "America is addicted to oil." But he still seems intent on trading one addiction for another, calling for increased investment in "clean, safe nuclear energy." GNEP, announced a week after the State of the Union, "[builds] on advances made to encourage more nuclear power in the U.S., including the Nuclear Power 2010 program and the Energy Policy Act of 2005." The Energy Policy Act authorizes US$13 billion in taxpayer subsidies aimed at promoting the building of the first new reactors in the U.S. in over 30 years. These subsidies were authorized despite the nuclear power industry already having been heavily subsidized for the past 50 years. (2)

Bush signed the Energy Policy Act on August 8, 2005 (in between the commemorations of the 60th anniversary of the Hiroshima and Nagasaki atomic bombings) at Sandia National Laboratory in New Mexico, immediately next door to one of the largest concentrations of stored nuclear warheads in the U.S. at Albuquerque's Kirtland Air Force Base. The state's two U.S. Senators, Republican Pete Domenici and Democrat Jeff Bingaman accompanied Bush. Domenici is Chair and Bingaman a Ranking Member of the Senate Energy and Natural Resources Committee - the first time in U.S. history that two Senators from the same state hold both top spots on any committee. Sandia performs a large amount of nuclear related research, and along with Los Alamos National Laboratory (birthplace of the atomic bomb), the two nuclear labs are the largest employers in the state. (3)

Although Bush did not mention reprocessing in his State of the Union speech, Energy Secretary Sam Bodman and Deputy Energy Secretary Clay Sell gave GNEP's unveiling a very high profile at the DOE budget "roll out" on February 6. (4) Reprocessing is at the heart of the Bush administration's proposed global nuclear power expansion, supposedly to "recycle" and

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"reduce" radioactive waste, as well as to prevent the proliferation of nuclear weapons to "terrorists" and "rogue states."

GNEP conjures memories reminiscent of President Eisenhower's "Atoms for Peace" heyday of the 1950s, and its fission fantasies of "too cheap to meter" by the U.S. Atomic Energy Commission's Chairman Lewis Strauss and "Our Friend the Atom" by Walt Disney. For example, Bodman said "GNEP brings the promise of virtually limitless energy to emerging economies around the globe, in an environmentally friendly manner while reducing the threat of nuclear proliferation. If we can make GNEP a reality, we can make the world a better, cleaner, safer place to live." Bodman's fanaticism for nuclear power and reprocessing runs deep: he went so far as to say that GNEP is "a program that we all believe has the potential to change the world - we believe that." But the question is, change it for the better, or worse?

Describing a global nuclear power expansion, combined with a revival of reprocessing, as a radioactive waste reduction and nuclear weapons non-proliferation initiative has to win some kind of prize for extraordinary recklessness, brashness and brazenness. Orwell must be rolling over in his grave so fast that he would qualify for electricity production tax credits under the energy bill! (5) Obviously, more reactors would mean more highly radioactive waste with nowhere to go. And reprocessing actually increases the volume of wastes requiring disposal, without lowering its temperature or radiotoxicity. (6)

Dr. Arjun Makhijani of the Institute for Energy and Environmental Research has pointed out that "…after accounting for the uranium, the intermediate [level] waste (which should be disposed of in a WIPP-like deep repository because of its high specific activity), and the vitrified waste, the volume of waste [due to reprocessing commercial irradiated nuclear fuel] destined for a repository ends up being far greater than the original spent fuel…" In addition, left over uranium (uranium comprises 94 percent of the weight of irradiated fuel) would be contaminated with plutonium and other high activity radionuclides, and would be radioactive enough to require disposal in a repository. Also, the MOX irradiated fuel associated with plutonium "recycling" is itself generally not suitable for reprocessing, is hotter in terms of radioactivity and temperature than regular irradiated fuel, and presents a bigger problem for disposal in a repository. (7)

Commercial nuclear waste reprocessing was banned by U.S. Presidents Ford (Republican) and Carter (Democrat) in the mid to late 1970s as part of a nuclear weapons non-proliferation policy after India had hidden its successful nuclear weapons development program behind an "atoms for peace" facade. Although President Reagan (Republican) overturned that ban, the practice has never been revived, as plutonium mixed oxide fuel derived from reprocessing is significantly more expensive than uranium fuel derived straight from the mines and mills.

It is also quite misleading to portray reprocessing as clean or green, given that it represents the dirtiest single step in the nuclear fuel chain. The history of worker and public radiation doses and environmental contamination at past and current reprocessing facilities shows this. West Valley, New York - the only commercial waste reprocessing facility ever to operate in the U.S., from 1966 to 1972 - suffered over US$5 billion worth of contamination, despite reprocessing only one year's worth of the projected waste inventory.

The emissions from Sellafield and La Hague account for an incredible 90% and 80%, respectively, of the U.K.'s and France's radioactive emissions from their entire nuclear industries. Plutonium has been found in children's teeth hundreds of miles away from Sellafield. Leukaemia and cancer clusters have been found in neighbouring communities near Sellafield and La Hague. Ireland and Scandinavian countries are in an uproar over liquid emissions into the ocean that have contaminated seafood as far away as the Arctic. (8)

The Union of Concerned Scientists has publicized DOE's own research, showing clearly that the reprocessing technologies advocated by GNEP are not proliferation-resistant. (9) The Bush administration's timing in unveiling GNEP could not be worse, given its supposed concern about alleged nuclear weapons proliferation in Iran via uranium enrichment, and acknowledged proliferation in North Korea via reprocessing. The United States is effectively saying to other countries "do as I say, not as I do."

Seemingly oblivious to the irony, given the Bush administration's proposed cuts to social programs at home and abroad, Bodman has even described GNEP as an international poverty alleviation program. He has stated "We can abandon the world's underdeveloped nations to poverty and squalor, and stand by while they struggle to meet their growing energy needs with fossil fuels. Or we can work in cooperation with other nuclear fuel-cycle states to provide these nations with commercially attractive, safe and proliferation-resistant sources of nuclear energy." (10) Is this an Atomic Age update on Marie Antoinette, "Let them eat plutonium"?

Perhaps most unbelievable in the GNEP proposal, considering the lack of any good solutions for what to do with the U.S.'s own wastes, is the DOE's offer to import irradiated fuel from other countries for reprocessing and ultimate disposal in this country (U.S.). Correspondingly, the Bush administration is formulating legislation that will override any remaining impediment to opening the dump targeted at Yucca Mountain, Nevada - such "minor inconveniences" as any remaining, meaningful public health or environmental protections that have survived the countless previous regulatory rollbacks and short cuts on safety. It will also attempt to greatly increase the amount of waste that can legally be buried at Yucca, thus forestalling the opening of several additional repositories in this century alone, according to Sell. This legislation will be introduced by Sen. Domenici in the near future, and could very well lead to a political "bloodbath" on the Senate floor, given the fact that stopping the Yucca dump is Senate

Democratic Leader Harry Reid's top priority. DOE went so far as to suggest that reprocessing could be carried out at Yucca Mountain, the first time it has publicly suggested such an idea. (11)

DOE's GNEP press conference ended on a most ironic note. Someone from the media asked, "What was wrong with GNEI as a name for this as I understand was the original working title? G-N-E-I." Global Nuclear Energy Initiative was the original name for the proposal, pronounced "genie." Sell responded "We have working titles then the communicators take over." The assembled press laughed. The questioner followed up with "Not something that should be kept in a bottle? Is that one of the advantages of GNEP?" Sell answered, "I guess. We do not intend to keep GNEP in a bottle." More laughter. But was it nervous laughter? "Genie" seems quite an appropriate name, as in "Oh foolish man, thou hast cleansed the magic lamp. But canst thou tame what's been unleashed?"

Sources:

(1) "Bush 2007 Budget Underwrites Nuclear, Cuts Environmental Programs," Environmental News Service, Feb. 6, 2006. See www.ens-newswire.com/ens/feb2006/2006-02-06-06.asp

(2) 2006 State of the Union, http://www.whitehouse.gov/news/releases/2006/01/20060131-10.html; DOE GNEP slide show overview, http://www.gnep.energy.gov/pdfs/gnepPresentationFinal020606.pdf; Public Citizen, "The Best Energy Bill Corporations Could Buy: Summary of Industry Giveaways in the 2005 Energy Bill," at http://www.citizen.org/cmep/energy_enviro_nuclear/electricity/energybill/2005/articles.cfm?ID=13980

(3) "President Signs Energy Policy Act," Office of the Press Secretary, The White House, Aug. 8, 2005, at http://www.whitehouse.gov/news/releases/2005/08/20050808-6.html

(4) "Department of Energy Announces New Nuclear Initiative: Global Nuclear Energy Partnership to expand safe, clean, reliable, affordable nuclear energy worldwide," Feb. 6, 2006 at http://www.gnep.energy.gov/gnepPublicInformation.html; also "Press Briefing by Deputy Secretary of Energy Clay Sell Announcing the Global Nuclear Energy Partnership," Feb. 6, 2006 at http://www.energy.gov/print/3171.htm

(5) At a recent anti-nuclear power summit sponsored by Friends of the Earth in Washington, D.C., U.S. Representative Ed Markey (Democrat, Massachusetts) described the huge taxpayer subsidies to the nuclear power industry as so outlandish that Adam Smith, author of "The Wealth of Nations" and philosophical founder of the "free market," must be spinning so fast in his grave that he'd qualify for energy production tax credits.

(6) "…Reprocessing does not reduce the need for storage and disposal of radioactive waste. Reprocessing merely converts one waste form --- spent fuel --- into a number of different waste forms, including contaminated uranium. In fact, the total volume of all the radioactive wastes requiring disposal increases by a factor of twenty or more. Reprocessing has little impact on the required repository capacity…," from Union of Concerned Scientists, "Reprocessing of Spent Fuel from Nuclear Reactors: An Expensive and Dangerous Road to Nowhere," Jan. 2006.

(7) "International experience with reprocessing and related technologies," Jan. 25, 2006, at http://www.ieer.org/fctsheet/repro-intl.html

(8) See NIRS factsheet "Just Say No to the Radioactive Waste Reprocessing Relapse," at http://www.nirs.org/factsheets/rwreprocessfactsheet.pdf

(9) UCS, "Department of Energy Research Contradicts Administration Claims of Proliferation-Resistant Reprocessing: New Initiative Would Make Nuclear Terrorism Easier," February 9, 2006 at http://www.ucsusa.org/news/press_release/doe-research-contradicts.html

(10) Tom Doggett, "Recycling nuke fuel may thwart terrorism: Bodman," Reuters, Feb. 13, 2006.

(11) "Domenici to promote Yucca Mt. bill," Inside Energy EXTRA, Jan. 9, 2006; Steve Tetrault, "Federal Budget: New front for Yucca argument," Las Vegas Review-Journal, Feb. 7, 2006, at http://www.reviewjournal.com/lvrj_home/2006/Feb-07-Tue-2006/news/5755804.html; Brian Allen, "DOE Wants Yucca to be The World's Nuclear Repository," KLAS-TV, Las Vegas, NV, Feb. 16, 2006, at http://www.klastv.com/Global/story.asp?S=4503276.

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PFS receives license

The Nuclear Regulatory Commission (NRC) has awarded Private Fuel Storage its first license to store nuclear waste at its proposed facility in Utah. The license does not however authorise the construction of the facility. PFS still has many hurdles to overcome, not least to secure funds to finance the build and also to conceive of another method of delivering the waste to the proposed site on the Skull Valley Goshute Indian Reservation after its preferred route was blocked by the creation of a wilderness area. (See also *WISE/NIRS Nuclear Monitor* 641.5743 "Utah Wilderness Victory Hinders Radioactive Waste Dump) ***The Salt Lake Tribune*, February 14, 2006**

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Apologies for the lateness of this issue!

The next issue (643) will be mailed out on (time) March 10, 2006.

RUSSIA'S REPROCESSING CONUNDRUM

Earlier this month, Vladimir Putin announced a new proposal for an international "partnership" between Russia and the U.S. to supply nuclear fuel to countries without uranium enrichment facilities, ostensibly to aid non-proliferation and apparently to help under developed countries meet energy requirements.

(642.5747) WISE Amsterdam - Almost simultaneously, the Environment Committee of Russia's State Duma (parliament) approved a resolution recommending the gradual reduction of spent nuclear fuel reprocessing at the Mayak facility in the Chelyabinsk region of the southern Urals.

The initial proposal came following meetings to discuss the environmental impacts of the reprocessing facility and called for all reprocessing activities to cease (with the exception of work required by international agreements). It also stipulated that the dumping of liquid radioactive wastes into the Techa reservoir system be stopped and called for the plant's reprocessing license to be revoked. Mayak, Russia's most radioactively contaminated spot, already escaped an attempt to revoke its license because it was dumping waste into local water systems in 2003 - the license was renewed and the head of the federal nuclear oversight agency responsible for trying to stop Mayak was removed from his position.

The chairperson of the environmental committee, Vladimir Grachev told Norwegian organization Bellona, "We have already managed to get the decision accepted by Rosatom". However, according to Bellona, Rosatom is actually making plans to increase reprocessing operations at Mayak with a plan to start reprocessing fuel from VVER-1000 reactors, something the plant does not currently have the technical capacity to do. In addition, there is also GNEP (see "Nuclear relapse goes global" in this issue), which would mean an increase in reprocessing in Russia as well as a vast increase in the amount of radioactive wastes stored in the country. Mayak currently reprocesses 120 tons of SNF a year but is capable of processing 400 tons.

Grachev argues that there is no conflict between the recommendations of the committee he led and the GNEP scheme as proposed by the Bush administration but it would seem to make the government's acceptance of the committee's resolution politically difficult, if not impossible.

Environmental groups within and outside Russia have been urging the cessation of reprocessing activities at Mayak for over a decade and have cautiously welcomed the committee's resolution. However, one of the country's leading environmentalists, Professor Alexei Yablokov warns that this could be a ploy by Rosatom to win more government funding - in the past, the agency has been known to make public announcements relating to its own failings and confessing to the poor state of facilities in order to obtain higher levels of funding from government. Ecodefense's Vladimir Slivyak says that he remains hopeful that on this occasion, that is not the case given that the committee was mostly made up of nuclear industry insiders who, in his opinion, would not approve such a resolution lightly.

One rather major factor that could ensure the failure of the GNEP scheme is the lack of existing technology to fulfil the latest nuclear fantasy envisaged in the proposal. The U.S. Department of Energy itself has acknowledged that the systems and technologies required to make such a proposal possible are not proven - in other words, it is offering a service without having the tools or the know-how to actually deliver.

Despite this small matter, DOE officials have been busy promoting GNEP during visits to the UK and other nuclear countries. One much talked about part of this 'initiative' is that it will be used to encourage and promote the construction of new nuclear power plants in under developed countries. Undoubtedly for highly altruistic reasons rather than to help the bankrupt nuclear industries of these western states profit by selling their ridiculously obsolete and highly dangerous technologies to poor countries.

Likely customers

Russia has already offered to provide Iran with a similar service (to GNEP) in an attempt to diffuse the current stalemate over the Tehran's alleged ambition to develop a nuclear weapons programme. Two-day talks were held between the two countries in Moscow this week and although senior Iranian officials called the negotiations "positive and constructive", Tehran is still insisting that it will not give up its enrichment programme. Russia's Foreign Minister Sergey Lavrov said that it was too early to declare the talks a failure but some Russian officials have suggested that Iran's seeming willingness to find a compromise is a ruse to avert the possible imposition of international sanctions. A Russian delegation has since travelled to Tehran for further negotiations.

Moscow has major economic interests in Iran and these would be seriously threatened by any international sanctions taken against the country. State-run AtomStroiExport Co. is building a US$800 million reactor at Bushehr - Iranian business is reportedly vital to keeping Russian's struggling nuclear industry afloat.

Sources: The *Moscow Times*, February 22, 2006; BBC News, February 21, 2006; N-Base Briefing 486, February 11 2006; Bellona, February 9 & 13 2006; *The Christian Science Monitor*, February 7, 2006; WNA News Briefing 06.06, February 1-7 2006

Contact: WISE/NIRS Russia

TURKISH ACTIVISTS PROTEST AGAINST NUCLEAR FUTURE

The Turkish environmental group Anti-Nukleer Cephe (ANC - Anti-Nuclear Front) has launched a public campaign against government proposals to build three to five nuclear power plants with a total capacity of 5,000 megawatts on the Black Sea coast.

(642.5748) WISE Amsterdam - On February 18, ANC activists carrying banners and wearing gas masks marched on Galatasaray Square in Istanbul to hold a protest against plans to introduce nuclear power to Turkey. The group had started its campaigning effort the previous day by distributing pamphlets informing the public of the facts about nuclear power and warning them not to be scared into submission by government claims of an ensuing energy crisis.

The recent 'gas wars' between Russia and Ukraine involving Russia's giant gas utility Gazprom and the drop in Iranian gas exports to Turkey are blamed for the government's new willingness to build the country's first nuclear plant. Incidentally, Gazprom, through its ownership of Gazprombank, is considering participation in the Belene nuclear power plant project in Bulgaria and is also involved in the construction of Iran's reactor at Bushehr through Russia's nuclear reactor builder Atomstroiexport, of which Gazprom owns a 53% stake.

The Anti-Nuclear Front however alleges that the government is manipulating the electricity supply in order to convince the general public that nuclear power plants are necessary and cites examples in 1998 and 1999 when similar tactics were employed for the same purpose. To assist the government with its new nuclear drive, articles have been appearing in the country's mainstream media on a regular basis issuing warnings about Turkey's "energy need" and proclaiming nuclear power plants as the best option to provide for the country's electricity requirements.

ANC accuses the governing Justice and Development Party (AKP), with the media's collusion, of seeking to contrive public approval, especially in the northern part of the Black Sea region of Anatolia. This area was deeply affected by the Chernobyl disaster with

New deal for Iran?

IAEA Director General Mohamed ElBaradei is reportedly in the process of drafting a new compromise deal in a last ditch effort to settle the rapidly escalating international dispute over Iran's resumption of uranium enrichment activities.

An unnamed EU representative to the IAEA has revealed that ElBaradei is to offer an agreement that would allow Iran to continue limited uranium enrichment research in return for guarantees that it would not conduct large scale enrichment work.

Given that Iran continues to refuse any proposals that would result in the cessation of activities at its Natanz enrichment facility, and considering that both Russia and China are likely to veto any moves to impose sanctions because of their own commercial interests in the country, ElBaradei is seeking a solution that could be acceptable to all parties - or at least some because it has already been reported that 'western powers' (read Bush administration and friends) are opposed to any deal that would allow Iran to keep technology that could be diverted to military use.

Previous efforts, by the EU-3 of the UK, Germany and France, to broker a deal failed last year and Iran has since threatened to withdraw some 25 billion Euro (US$30 billion) from European banks. Germany would be seriously affected given that it also has to consider the annual exports of German companies to Iran - mostly financed by credit institutions - and worth over 4 billion Euro (US$4.8 billion), which would be halted should sanctions be imposed.

The Islamic Republic is said to view this latest proposal more favourable since it would not involve it giving up its "legitimate rights". Tehran remains defiant on the matter of sanctions and points out that it managed to achieve its current levels of nuclear knowledge while under past sanctions and without assistance so new sanctions would not have any adverse effects on its nuclear activities. The head of Iran's Atomic Energy Organisation also told the ISNA news service that "The Natanz facility is deep underground and no attack can damage it" but emphasised the country's willingness to allow other countries to participate in the project so that the international community could see that it was not working on nuclear bombs.

The IAEA Board is due to meet in Vienna on March 6 and ElBaradei's report on Iran will be circulated to member countries on February 26 but at this point, it seems doubtful that any further action (like referral to the UN Security Council) will be recommended although this, as with all other proposals before it, is being referred to as Iran's last chance.

Sources: BBC News & Reuters, February 21 2006; ITAR-TASS & AFP, February 19 2006; NuclearFuel Volume 31 Number 3, January 30 2006

incidents of cancer continuing to rise after 20 years (there is said to be one cancer incident in almost every home in the region) and the local communities are generally fearful of nuclear energy. (See also *WISE News Communique* 385.3760 "Chernobyl fallout: high rates of leukaemia in Turkey")

At the end of January, the Turkish Government announced that a preliminary study of eight potential sites, including seismic research and analysis of the environmental effects of nuclear power, had been completed. By mid February, it declared that the Prime Minister's office and the Energy Ministry had taken a joint decision to locate the country's first nuclear power plant at Sinop in the centre of Turkey's Black Sea coastline. Energy officials said that considerations over geological fault lines and access to cooling water had helped inform the decision. Turkey sits on seismic fault lines and has suffered several devastating earthquakes in recent years. Talks with nuclear producing countries such as the U.S., China, Japan and the UK have already been initiated on technological transfers and costs and energy ministry officials have projected that the nuclear plant would come into service in 2012. The country's National Security Council, which is comprised of Prime Minister Tayyip Erdogan, army generals and top ranking politicians, is due to meet again on February 28 to discuss the issue further.

Turkish governments since the 1960s have aspired to build nuclear power plants. The last notable attempt being in 1999 when anti-nuclear protests, competition between the political parties constituting the then governing coalition (each party had supported different consortiums in the tender process) and the small matter of cost led to the scrapping of the reactor project at Akkuyu. (See also *WISE News Communique* 533.5191 "Turkey cancels Akkuyu nuclear plant")

Today the political will to invest in nuclear power in Turkey seems more determined - as in many countries - but is also somewhat influenced by the "Iran crisis". Nationalists and militarists have argued that Turkey should also pursue nuclear power in order to leave open the option of developing nuclear weapons should the need arise. In addition, the nuclear power plants in Armenia, Turkey's "historical enemy", are also cited as an argument for the country to get on the nuclear bandwagon.

ANC fears that the reciprocal nuclear passion and competitiveness of regional governments could in future lead the region into an unnecessary nuclear standoff and accuses the government, and its international allies, of seeking nuclear plants in order to open up the possibility of using the Black Sea region as a military base from where attacks could be launched on the Middle East.

At the Istanbul protest, activists read out a declaration calling nuclear power plants "time A-bombs" and pledged to fight against the insertion of such weapons into the heart of the land. The group sent a message to Turkey's policy makers, accusing them of not caring for future generations and pointing out that they would not be around to suffer the effects of any potential future accident.

ANC has signalled its intention to fight for as long as necessary to ensure that no nuclear plants are built in Turkey. They said that nuclear plants are future bombs and responsible for deaths and serious illnesses in the youth and children of today as well as those yet to be born.

The group acknowledges the long struggle ahead but plans to hold more actions around the country and to continue distributing information to the public to inspire more people to join the fight. We wish them every success.

Sources: The Moscow Times, 22 February 2006; ANC press release, February 20, 2006, Reuters February 15 & January 27 2006; Hürriyet website, February 22, 2006

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Turkey to import Romanian nuclear power.
Romania's Economy and Trade Minister Ioan Codrut Seres has said that excess electricity from four planned nuclear power plants will be exported to Turkey as part of a joint project between the two countries. A 600-1,000 megawatt power line will be laid under the Black Sea to connect Istanbul with Constanta. Romania currently has one nuclear reactor, is in the process of constructing a second and plans to add two more by 2008.
Turkish Daily News, February 16, 2006

Bids for Belene. Two consortia, Russia's AtomStroiExport with Framatome ANP and Skoda Alliance led by Skoda Praha, have submitted bids to complete two reactors at Belene. Both have submitted two variants of turnkey project, one with existing VVER-1000 equipment on site and the other using components of a newer design - the AES-92. National Electricity Company (NEU) is expected to select a vendor by mid 2006 with a contract to be signed by the end of the year. The possible costs are estimated at around 2.7 billion Euro (US$3.2 billion).
WNA News Briefing 06.06, February 1-7, 2006

Nuclear firm back under state. After being acquired by Gazprom in October 2004, Russia's nuclear power station builder Atomstroiexport is back under the control of the Federal Atomic Energy Agency (Rosatom) according to its new (since November 2005) chief and former prime minister, Sergei Kiriyenko. The deal involves the agency buying four percent of Atomstroiexport's capital from Gazprombank. Gazprom still holds onto 53 percent of shares and Rosatom, 46 percent.

Kiriyenko also said that Russian regions would be encouraged to build new nuclear power plants under a US$1.5 billion investment plan, adding that two units per year should be constructed to maintain the nuclear share of the country's electricity output.
***The Moscow Times*, February 22, 2006; RIA Novosti, February 21, 2006**

ENEL TUSSLE WITH SLOVAK GOVERNMENT CONTINUES

The giant Italian utility ENEL now a key player in the Slovak energy market following its acquisition of state-owned electricity utility Slovenske Elektrarne (SE) is seeking to secure state aid to compensate it for the likely financial losses related to the completion of blocks 3 and 4 at Mochovce NPP. Meanwhile the government will have to find a way to avoid censure for breaking strict EU legislation on state aid.

(642.5749) WISE Brno - The bidding process for privatization was concluded in December 2004 when the Slovak government selected ENEL as its preferred bidder. It sold 66% of SE to the Italian (51%) state-owned company for 840 million Euros (around US$1 billion). (See also *WISE/NIRS Nuclear Monitor* 615.5639 "Slovakia: Privatization of Slovenske Elektrarne")

The preliminary contract was consequently signed in February 2005, but the whole transaction remains pending until sixteen additional conditions are fulfilled. Although the process was expected to be concluded during 2005 - first in the summer, then by the end of the year - recent reports suggest April as the earliest possible date for a settlement.

One of the most controversial conditions delaying the process is the adoption of new Slovak legislation regarding the Nuclear Waste Decommissioning Fund. Another is the dismantling of old nuclear reactors (a gas-cooled A-1 reactor damaged during a serious accident in 1977, and old V-1 twin VVER-230 reactors that need to be closed by 2006 and 2008 respectively), which presents a significant additional financial burden.

SE currently operates nuclear reactors (2,640 MWe), hydro (2,399 MWe) and coal-powered (1,838 MWe) plants with a total installed capacity of 6,877 MWe. In 2004, SE produced 25.6 TWh of electricity, which covered 84% of domestic production. In the same year, SE's net exports amounted to 5.9 TWh of electricity. Its total income was 55.1 billion SKK (1.45 billion Euro or US$1.7 billion) and its net profit was 1.651 billion SKK (43.4 million Euro or US$52 million). However, the company's total liabilities in 2004 were calculated to be 61.5 billion SKK (1.6 billion Euro or US$1.9 billion).

Nuclear Policy

Historically, there has always been strong political advocacy for nuclear power in Slovakia. As a result, SE operates six reactors (two VVER 230s and two VVER 213s at Jaslovske Bohunice NPP and two VVER 213s at Mochovce NPP) and owns one damaged A-1 reactor at Jaslovske Bohunice (a gas-cooled 110 MWe prototype, shut down after a serious accident resulted in a partial melt-down in 1977). Energy from nuclear reactors accounts for 66.6 % of the electricity generated within SE's portfolio in 2004.

Since the two oldest reactors V-1 (two VVER 230s) at Jaslovske Bohunice are to be shut down in 2006 (first unit) and in 2008 (second unit) as a result of the EU Accession Treaty, there has been a lot of pressure from the industry and politicians to build two "replacement" reactors at Mochovce (blocks 3 and 4), where construction was initiated but then suspended at an early stage in 1993 due to a lack of financing. During the 1990s, several economics studies were prepared to assess the feasibility of continuing the construction of Mochovce 3 & 4, including one by the European Bank for Reconstruction and Development (EBRD) confirming the project to be unprofitable. (See also *WISE/NIRS Nuclear Monitor* 433/34.4283 "Western financing for Mochovce stopped")

Additionally, an official calculation, included in the State Energy Policy adopted in 2000, concluded that finishing reactors 3 and 4 would be overly risky economically even if optimistic cost assumptions were made. The official analysis found that even if all the electricity produced by Mochovce was sold for prices higher than generally achieved on the market, and excluding all costs related to ending the fuel cycle, the return rate would be 17 years, which according to the State Energy Policy, "presents a high risk that… the project would result in loss. It can be concluded that despite overoptimistic input parameters, economic calculations are not positive."

However, the pressure to go ahead with the construction of Mochovce 3 & 4 continued with the Minister of Economy Pavel Rusko pushing hard, both for a change in energy policy towards nuclear and demanding that potential buyers of SE pledge to invest in the project.

The construction costs for the two units was estimated, by SE management in 2005, to be around 45 billion SKK (1.2 billion Euro or US$1.4 billion), while ENEL itself calculated the costs at 1.6 billion Euro (US$1.9 billion).

Furthermore, there were also the huge unresolved costs at the end of fuel cycle to consider - while the Jaslovske Bohunice VVER reactors were commissioned between 1978 and 1985, it was only in 1994 that its operator began to allocate money towards decommissioning and waste disposal. Even then the payments were largely inadequate, which, combined with the need for decommissioning funds for another damaged A-1 reactor, resulted in the current (official) deficit of 15 to 25 billion SKK (400-660 million Euros or US$480-792 million) in the State's decommissioning funds.

ENEL recoils from Government's Nuclear Vision

During negotiations with the Slovak Government in August 2005, ENEL presented an investment plan for the coming decade, which pledged an investment of almost 1.9 billion Euros (US$2.3 billion) towards SE's development. This proposal was said to include the completion of Mochovce 3 & 4, the up-rating of Bohunice V-2 (two VVER 213 units) and Mochovce 1 & 2, the modernization of the Vojaky coal plant, the construction of new hydro plants and the development of a wind farm project.

Committing to the up-rating of existing reactors was an easy decision for ENEL given the profit to be generated - and of course the output represented only about 5% of the total investment plan. However Mochovce 3 & 4 was another matter entirely as the estimated 1.6 billion Euro (US$1.9 billion) outlay, represents 85% of ENEL's entire investment plan.

It is quite clear that pressure from Slovak politicians forced ENEL's hand on Mochovce - during privatization negotiations, the Minister of Economy even stated that providing the financing for units 3 & 4 would be a must for the new owner of SE. It was also made clear that if ENEL did not include it in the investment plan, it would not be approved and the government would cancel the privatization.

In the face of such pressure, ENEL made the following statements:

- In August 2005, Roberta Vivenzio, spokesperson for ENEL said **"We believe that the investment plan we just submitted to the government will fulfill all its expectations, so that the government will approve it. Finishing Mochovce 3 & 4 is included in the plan."** (1)
- Fulvio Conti, executive director of ENEL, **confirmed this revealing to the *Financial Times* in October 2005 that ENEL would invest 1.6 billion Euro for the construction of Mochovce 3 & 4** (2)
- Marco Arcelli, ENEL's regional manager in Slovakia, said in October 2005, **"The investment in Mochovce 3 & 4 is certainly an attractive option for ENEL"**, adding that the reactors could be finished in 2011 (3).

However, after the investment plan was approved later in October 2005, ENEL began softening its statements, calling for additional economic studies to be done and stressing that the completion of Mochovce 3 & 4 was not specifically mentioned in the privatization contract - that it was only part of the investment plan requiring government approval but was not entirely binding.

- Marco Arcelli told reporters at a press conference in October 2005 that, **"The construction of Mochovce 3 & 4 may not start earlier than in 2008. The investment plan, including its time schedule, is not binding. However, I do not have information that ENEL is going to change its attitude to Mochovce"** (4)
- Then during an interview in the same month, Arcelli reveals that **"Mochovce 3 & 4 are definitely interesting, but we will make our final decision on this project only after a detailed feasibility study conducted in 2006"** (5)
- Within a month, Arcelli had adjusted ENEL's position again stating, **"When the privatization is finished and we fully enter to SE, we need to make a study to assess whether our decision to finish Mochovce 3 & 4 is final and valid. The recent situation on the market indicates that the project would be feasible."** (6)

Awaiting Better Conditions

It has been reported that in earlier versions of the investment plan, ENEL clearly cast doubt on the economic viability of the Mochovce project. The daily newspaper *Pravda* reported in August 2005 that ENEL had revealed that the completion of the project would result in financial losses.

"The financial loss of Mochovce 3 & 4 would amount to several billion SKK, if Kyoto protocol and emission trading continue beyond 2012. If not, the loss would reach about 20 billion SKK… The rentability of such a project would require numerous interventions of the government and energy regulator… Therefore, ENEL demands a 10-year tax exemption for its daughter company that would cover Mochovce 3 & 4… in case of Kyoto failure, ENEL demands to get a special additional charge for electricity generated in new Mochovce reactors at the level of 0,90 SKK per kWh [= 23 per MWh], which would increase final consumer price by 0,17 SKK per kWh on average… Slovak government should also bind the state not to adopt any legislation that might negatively influence the project… also ENEL demands that it does not pay more that 1.3 billion SKK [34 million Euro] annually to the Decommissioning Fund…" (7)

More updated information was revealed on January 17, 2006, when daily *Pravda* published an article stating that ENEL, as incoming investor, would receive a package of benefits from the government. The Ministry of Economy recently decided that the state-owned Transmission Grid Company would cover 10% of the losses from the fixed price contracts between SE and the Slovalco factory - a large metal processing factory. According to the long-term fixed-price contract signed in 1994, the utility has to deliver electricity at a price below its production costs until 2013.

The compensation provided by Transmission Grid Company would total up to half a billion SKK (13 million Euro or US$15.6 million), however, SE's losses on electricity supplies to Slovalco amounted to 2.3 billion SKK (60 million Euro or US$72 million) last year.

News of this compensation has been greeted with criticism by the other companies that had participated in the bidding process with ENEL because their offers had already included the anticipated losses from the Slovalco contracts. CEZ's negotiator was especially upset because while ENEL offered 31.5 billion SKK, the CEZ proposal had been 26 billion SKK.

The Slovak Government has also revealed that it would not take its dividends from SE for the next decade, providing ENEL with another indirect subsidy. In addition, ENEL has requested that the government allow tax exemption on Mochovce for a decade, which would have an additional value of some 5 billion SKK (179 million Euro or US$214.8 million).

This indicates that different forms of state aid are on offer, however, as key

papers and contract conditions are classified, it is not possible to learn exactly what was agreed or promised. Despite this, we can be sure of one thing, that the newly proposed Law on National Decommissioning Fund (approved on January 11 and delivered to parliament for adoption on January 13) will manipulate conditions to benefit ENEL.

Decommissioning Fund
Slovak nuclear plant operators only started paying into the Decommissioning Fund for reactor dismantling and the final disposal radioactive waste in 1994. The law has been updated several times since then, but the situation remains alarming. Even according to official figures, there is now a 15 to 25 billion SKK (401-668 million Euro or US$481-802 million) deficit in the Fund.
It is obvious that the money collected will not cover the costs related to decommissioning in Slovakia and in June 2004, the government approved a plan to restructure the Fund and define new conditions, including on payments. The proposal called for annual payments of 2.6 billion SKK (68.5 million Euro or US$82 million) in order to accumulate sufficient funds. (8)

Independent calculations carried out by CEE Bankwatch in November 2005 warned that the payments needed to be significantly higher - at level of 3.9 billion SKK per year (103 million Euro or US$123.6 million) - in order to prevent the growth of a severe deficit in future but even its calculations were based on official figures likely to have been underestimated. An alternative calculation based on more realistic assumptions gave the required level of annual payments at 6 billion SKK (158 million Euro or US$189.6 million). Despite this, following the autumn 2005 negotiations with ENEL, the government approved a proposal of the law that in fact decreases the current level of payments and leads to annual payments of only 1.6 billion SKK (42.1 million Euro or US$50.5 million). This would eventually result in an accumulated deficit of dozens of billions of Slovak Koruna - money that would be paid by taxpayers in future, not by the operator and polluter ENEL.

ENEL sought to have annual payments set at a maximum level of 1.3 billion SKK (34 million Euro or US$40.8 million) to be further reduced by 2010 - dozens of billions more to be paid by state in order to make ENEL comfortable with pursuing the Mochovce project.

Further, the new draft law on State Decommissioning Funds establishes a special flat fee to be applied on all electricity consumers to cover past Fund deficits. This is again another hidden and forbidden method of state subsidy and has already been challenged by Friends of the Earth Europe and other NGOs at the European Commission in 2005. (See also *WISE/NIRS Nuclear Monitor* 632.5704 "EU to probe Slovak nuclear plan")

ENEL and the Minister of Economy Jirko Malcharek announced on January 31 that the feasibility study on Mochovce 3 & 4 would be finished in May 2007 so there is still an opportunity to influence the process and stop this ill-fated project. Watch this space.

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(3) TASR, October 20 2005
(4) SME, October 18 2005
(5) TREND, October 26 2005
(6) TREND, November 2005
(7) TREND, August 24 2005
(8) "The Proposal To Restructure State Decommissioning Fund", approved on June 23, 2004, p7.
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PBMR IS NOT THE ANSWER

Global warming and climate change pose a serious threat to the societies of today and finding cleaner energy sources is a big challenge. It is evident that South Africa needs to move away from coal-fired power, but the Government's move towards nuclear power as an alternative continues to spark controversy.

(642.5750) Earthlife Africa - Eskom plans to build a Pebble Bed Modular Reactor (PBMR), a version of a group of reactors termed high temperature gas-cooled reactors (HTGCR). These types of reactors were never successfully commercialised and have been abandoned. The demonstration plant will be built at Koeberg, and if successful, at least another ten reactors will be built around South Africa. Eskom plans to construct, operate and sell these reactors to create a potential export business.

Here are ten excellent reasons why the PBMR is not a solution for our country (South Africa).

1. Health Impacts
There is no such thing as a "safe" dose of radiation (See also *WISE/NIRS Nuclear Monitor* 632.5701 "U.S. radiation panel: no radiation dose safe"). There is a growing body of evidence suggesting that low doses may actually be more dangerous, as they may mutate cells more easily than high doses, which can kill cells. There is no need for debate as to whether radiation kills, maims, causes mutations, is cumulative, causes leukaemia, cancers, respiratory illnesses and attacks the immune system (with children, pregnant women and the elderly most vulnerable) because we already know that it does. (1) The only disagreement concerns what is legally considered an allowable dose.

Between 1940 and 1950 scientists laid down the first 'safe' levels of radiation:

150mSv per annum. The 'safe' level of exposure has continually been adjusted downwards as more research into the dangers is carried out. By 1990, the annual acceptable level of exposure in South Africa was reduced to 20mSv for occupational exposure and 1mSv for the general public. This limit is ten times higher than the limit laid down by the European Committee on Radiation Risk. (2)

It has been claimed with respect to the PBMR that nuclear meltdown would be impossible. However in October 2001, Mr D.A. Powers, a member of the U.S. Nuclear Regulatory Commission's (NRC) Advisory Committee on Nuclear Safeguards, stated that the PBMR was seriously flawed, since the chaotic and unpredictable movements of the fuel balls inside the reactor vessel were a prescription for core instability. (3)

Uranium mining is responsible for the greatest proportion of the health-related damages of the nuclear power industry. There seems little doubt that communities living near nuclear plants are at risk. Before South Africa begins to build new reactors, epidemiological (health) studies of communities around Koeberg, Vaalputs and Pelindaba need to be undertaken.

2. Waste

There is no responsible way to "dispose" of radioactive waste and it can remain dangerous for hundreds of thousands of years, equivalent to 10,000 generations. There is no plan in place for the long-term storage of, or any final disposal site for, radioactive waste anywhere in the world. How can the nuclear industry expand without having resolved this problem or even finding a 'safe' place to store its wastes? It would be like developers building a high-rise without toilets!

Low-level nuclear waste storage sites tend to be built in rural areas far away from densely populated areas. But is it fair to expose people to such risks simply because they live in rural areas that are generally not well represented and without political influence? Nuclear waste is a responsibility for hundreds of thousands of years and it will be future generations that bear much of the health, environmental and financial costs. The best solution would be not to produce any radioactive wastes in the first place; the next best is to stop producing more now.

Electricity shortages

Earthlife Africa would like to draw attention to the important lesson that can be learned from Eskom's recent failure to provide sufficient electricity to the people of the Western Cape. The message is clear - reliance on a centralized power supplier is not a recipe for success. Installation of a solar water heater can reduce peak household electricity demand by 40%. This is just one example of the way that renewable energies can lessen the pressure on a central distributor and allow people to take the 'power' into their own hands. But what is the Government's position on this issue? To invest a further half a billion Rand (US$82.8 million) into the pie-in-the-sky PBMR Project while dragging its feet on the implementation of renewable energy technologies. Energy efficiency is the phrase of the day but policy and regulation around this issue has been a long time coming and electricity consumers continue to subsidise cheap energy for industry. Earthlife Africa says, "Power to the people".

Earthlife Africa press release, February 22, 2006

3. Economics

PBMR (Pty) Ltd has recently confirmed newly revised project costs of R15.9 billion (US$2.6 billion), which is said to include "historical costs" incurred up to March 2004 when control of the project was transferred from Eskom to the government. (4) These "historical costs" are said to be R2 billion (around US$330 million). This could increase to as much as R25 billion (over US$4 billion) if decommissioning costs are included. (5) South African taxpayers and electricity consumers will bear these costs and overall, the demonstration plant is not expected to make any profit. The cost of electricity can only be brought down to competitive levels following the construction of 32 reactors - a very unlikely scenario given that not a single order has been placed to date. (6)

The PBMR business plan is largely based around the economies of scale requiring many customers and many reactors. The estimated costs of the demonstration plant increased fivefold from R2 billion (around US$330 million) in 1999 to R10 billion (US$1.6 billion) in 2004. Media reports now estimate the costs to be in the region of R14 billion (around US$2.3 billion). (7) The costs of the project continue to escalate and the proposed delivery schedule is continually being postponed. Due to time delays, the first commercial unit will only be completed by 2014. This technology will not be available to help meet South Africa's short-term electricity needs and will do nothing to solve our current shortages.

Nuclear power is expensive electricity. Customers in all U.S. states with nuclear power are generally charged 25% more for their electricity on average. (8) The costs of nuclear power do not stop once plant construction is completed. Nuclear plants need to be decommissioned after an approximate life span of 40 years. The radioactive spent fuel produced by nuclear reactors needs to be stored safely for thousands of years before it loses potency, which has enormous cost, health, environmental and social implications.

Nuclear power subsidies takes money away from clean alternatives and consumes funding that should be used to develop proven clean, renewable sources of energy like wind, water and solar.

4. Design Success

In theory HTGC reactors have several advantages over other types of reactors but historically these have not materialized in practice. An HTGC reactor at St Vrain in the United States was eventually closed down in 1989 after it experienced a number of problems. During its operating lifespan of ten years, it attained an average load factor (percentage of maximum power) of 15%. Reference has been made to a German plant with a similar design to the PBMR that ran for 21 years,

however, this plant was a small prototype AVR plant that produced no electricity so could not be called a power plant. Its thermal output was 15MW compared to the proposed 400MW for the PBMR, making comparisons between the two unhelpful.

5. Climate change
The global nuclear industry is exploiting concerns over global warming by misrepresenting nuclear power as a carbon-free electricity source and global climate saviour. However, the complete nuclear fuel chain is extremely energy intensive and dirty. The nuclear fuel cycle releases CO_2 during mining, fuel production, transport, plant construction and decommissioning, as well as for waste management far into the future. Uranium enrichment is one of the most energy intensive industrial operations and as demand for uranium grows and lower grade ores are used, so CO_2 emissions are expected to rise. (9)

The Kyoto Protocol has excluded nuclear energy, choosing not to recognize it as a clean alternative to fossil fuels and new nuclear energy projects would not be able to provide an offset mechanism for carbon emissions.

Climate change may alter the market for nuclear energy, but it will not make uneconomic technology economic. Promoting one environmental disaster to solve another catastrophe is illogical to say the least.

6. World Market
The PBMR business plan is based around the economies of scale and requires high volumes of export but the question remains, who is going to buy this technology?

Internationally respected analysts have shown that the worldwide market for nuclear power grew by less than 1% per annum over the last decade. (10) The market for Renewable Energy, however, is growing at a rapid rate of between 25% and 45% per annum. (11) It is also strange that such supposedly cutting edge technology as the PBMR is still failing to attract foreign investment.

7. Public input
Public money is being spent without public accountability. The High Court found the Environmental Impact Assessment process to be fatally flawed when Earthlife Africa took the Department of Environmental Affairs and Tourism to court (See also *WISE/NIRS Nuclear Monitor* 623.5663 "Earthlife victory in court on PBMR EIA"). The submissions made by Earthlife Africa and other appellants were not even looked at by the decision-maker. PBMR is being substantially funded by public money, yet an economic feasibility study commissioned by government and completed by a panel of international experts is not in the public domain. Even the World Bank no longer funds nuclear programmes but yet the public purse is expected to bear this burden. Why should taxpayers fund the project when they are not even given the chance to comment on the Feasibility Report?

8. Transport of radioactive materials
If ten PBMR's were built there would be approximately one vehicle carrying radioactive materials every second day and approximately seven carrying chemicals every working day, for 40 years between Durban, Cape Town and Pelindaba. This could grow to nine radioactive, and 145 chemical trucks, every day at full production. (12)

9. Jobs
Eskom's job estimates for the PBMR are based on achieving a substantial number of export sales - about 20 reactors per year - and are highly speculative and unlikely to generate permanent jobs in South Africa, not even in the construction sector. Many of these jobs can be attributed to the second round effect whereby jobs already in existence, in for example the steel industry, are included in the total. (13) The amount of local people eligible for the PBMR jobs would, in reality, also be quite low. Furthermore, South Africa has just signed a contract with Spanish manufacturer Equipos Nucleares. The group will design and manufacture the main power system pressure boundary, the steel backbone for the proposed demonstration plant and it likely that much of that work will be carried out in Spain, which would result in even fewer jobs for locals.

Renewable Energy can create about 27 times as many jobs as nuclear energy and workforces in RE generation sectors, like wind power, already have local people making up about 60% of their personnel with numbers increasing. (14)

10. Renewable Energy (RE)
South Africa is rich in wind, solar and ocean RE resources and in the USA, for example, wind is already cheaper than coal, especially when the health impacts are taken into account. In addition to wind, there are many other RE options, including wave, photovoltaic, solar thermal, biomass, micro-hydro, etc. A mix of these technologies could easily provide for all of South Africa's energy requirements. Studies have shown clear evidence that there are sufficient RE resources in South Africa to provide for 13% of the electricity demand by 2020, and easily 70% or more by 2050. (15) RE is clean, sustainable, efficient and safe. South Africa's short-term electricity needs cannot be fulfilled by PBMR due to the numerous and continuing delays; the first commercial unit would only be completed by 2014.

Immediate action is needed to address climate change and greenhouse gas emissions from the energy sector. Demand side management (utilities introducing programs to reduce consumption among customers), RE and energy efficient technologies are proven and viable solutions, not nuclear. Africa should not be a dumping site for nuclear waste or a testing ground for unsafe nuclear technology. The use of public funds to sponsor nuclear plants that are a threat to the environment and to people is unjustifiable. South Africa needs environmentally responsible development that will lead to an improvement in the quality of people's lives and will lead to truly sustainable development - economically, socially and environmentally.

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NUCLEAR POWER'S GREENHOUSE GAS EMISSIONS

In January, the German Öko-Institut (Institute for Applied Ecology) released an updated version of its November 1997 paper, "Comparison of Greenhouse-Gas Emissions and Abatement Cost of Nuclear and Alternative Energy Options from a Life-Cycle Perspective", first presented at the CNIC Conference on Nuclear Energy and Greenhouse-Gas Emissions held in Tokyo.

(642.5751) WISE Amsterdam - The paper addresses the two main arguments currently being used to good effect in much of the international mainstream media by the nuclear industry's publicists and government spin doctors - that it is supposedly 'free' of CO_2 and inexpensive - by presenting the results of life-cycle cost and emission analyses of the various energy systems of currently available technologies. The results are compared to other published findings and also demonstrate the cost-effectiveness of CO_2 abatement (reduction) in the electricity sector.

Where the claims on nuclear power's ozone friendliness are concerned, the Institute's scientists looked not only at what happens at the end point, the nuclear power plant, but have also considered the processes that go into the production of nuclear electricity - ore mining and processing, uranium enrichment, fuel fabrication etc. - and which represent the upstream fuel cycle. The downstream fuel cycle, which involves post-plant activities like the processing and storage of nuclear wastes, is also considered in addition to the energy used in the production of the necessary materials - steel, concrete and other materials required for the construction of nuclear power plants - for use in both the up and downstream fuel cycles. Energy used for up and downstream cycles is partly produced by fossil fuel energy causing greenhouse gas emissions, other gases are also released as a result of the chemical reactions during the processing of construction materials for example. The inclusion of all these elements means that the analysis comprises of the whole life cycle, which provides a more complete picture.

The paper does also point out that nuclear is not the only energy source that requires up and downstream activities before electricity can be generated in a plant - fossil fuels and biomass need to be extracted, processed, converted and transported as well.

Comparisons

In order to provide an accurate comparison of GHG emissions from different energy processes, the Institute's researchers tracked each step in the life-cycle of energy technologies and all activities that directly or indirectly emit GHGs given that emissions and other environmental impacts can occur during any of the steps in the processes making up the cycle. The three levels of impacts considered are direct impacts from the operation of processes, indirect impacts from auxiliary input to these processes (including transports), and indirect impacts from manufacturing materials used during the construction of all processes. Since the levels are interlinked, the life-cycle analysis also considers the interactions between all processes.

The Öko-Institut used the GEMIS (Global Emission Model for Integrated Systems) computer model, which is continuously updated and expanded, to compile the huge variety of data that has been collected.

Nuclear Results
The GEMIS model compiled data on nuclear plants, and their whole life cycles as described previously and according to that data calculated around 31 grams of CO_2 per kilowatt hour (kWh) of electricity (el) generated in Germany. The other GHGs emitted along the nuclear life cycle contribute a further 33 grams of CO_2 equivalents per kWhel. For a standard sized nuclear plant (1250 MW) in Germany, the indirect emissions total around 250,000 tons per year. Other international studies have shown higher figures, up to 120 g/kWhel.

In comparison with the other ten energy sources whose life-cycle emissions were calculated by GEMIS, nuclear had the fifth highest level of CO_2 emissions per kilowatt-hour of electricity generated. The highest was standard coal at around 900 g/kWhel; coal cogeneration (combined heat and power) was next at around 460 g/kWhel, then gas combined cycle cogeneration and then photovoltaic (solar) with around 120 g/kWhel. Solar power comes in at such a high level because of its upstream cycle.

The net CO_2 emissions from electricity generated from gas-fired ICE (internal combustion engine) cogeneration is actually lower than that of electricity from nuclear plants, as is electricity efficiency and electricity from other renewable sources.

Where other GHGs are concerned (mostly nitrogen oxide and methane), the life-cycle emissions of nuclear remains relatively unchanged but increases are seen with coal and natural gas systems.

Overall, renewable electricity and efficiency have lower GHG gas emissions than nuclear electricity. Small-scale gas cogeneration plants have similar levels or emissions to nuclear while biogas-fired cogeneration has far lower emissions than nuclear.

Costs
There are two types of costs to consider: generation costs and CO_2/GHG reduction costs.
Generation costs are the specific costs associated with generating one kWh of electricity (without taking into account external costs). GEMIS considered a broad range of data including investment, operating and decommissioning costs, operating time and lifetimes. Depending on the various parameters, the costs of generating nuclear electricity ranges from 4.6 to 6.5 Euro cents (year 2000 values) per kilowatt-hour for current reactor designs, with GEMIS data for Germany at 5.3 Euro cents per kilowatt-hour of electricity. Electricity efficiency, gas CC (combined cycle) cogeneration, coal cogeneration and standard coal cost less per KWh of electricity.

More relevant to the discussion is how much CO_2 or GHG reduction or avoided emissions can be reached per Euro cent invested. Taking a standard coal plant as reference point, electricity efficiency, biogas-fired ICE, gas CC cogeneration and coal cogeneration, score better than nuclear power. Therefore the use of an intelligent mix of efficiency measures, renewable energy sources and fossil (cogeneration) alternatives would in fact reduce GHG reduction costs by three to four times compared to nuclear power.

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Netherlands to join nuclear revivalists

The February 19 announcement by the Dutch Minister for the Environment, Van Geel, that "It is good and necessary to build new nuclear power stations in the Netherlands", came as a surprise to most but had been predicted by some analysts. It represents the first occasion since Chernobyl that a representative of any Dutch government dared to express enthusiasm for new build. The government had already decided early in January to extend the lifetime of Borssele NPP by 20 years. Parliament is expected to rubberstamp the decision on March 22. The plant would then close in 2033, at the age of 60.

During the ensuing parliamentary debate requested by the opposition, the Minister of Economic Affairs attempted to restore calm, stating that he did not expect the government to take any initiative on new nuclear in the coming decade.

When asked what type of NPP was under consideration, the environmental minister, citing the need to meet Kyoto and post-Kyoto targets, said that the urgency of the situation led him to favour the EPR. Van Geel then back-tracked adding that, for safety reasons, he would prefer to wait for 'fourth-generation' plants to become available.

In March and April, parliament will debate new nuclear legislation being prepared by the Environment Ministry. To date the Netherlands operates under nuclear legislation, drafted in the late 1950s, that allows every nuclear installation to operate on an open-ended license, which was one reason why the former, more progressive, government failed to close Borssele, the last Dutch nuclear power station, four years ago.

In the newly proposed legislation, two major differences will be discussed; allowing licenses (for new stations) to run for 40 years, and enabling parliament to take political decisions on the question of whether a nuclear power station should reprocess its own waste. During the often tense and highly politicised debates on the reprocessing of Borssele's waste at La Hague (France) over the past decades, parliament was forced to accept its inability to block new reprocessing contracts on more than one occasion.

In the Dutch energy market (one of the EU's most liberalized), the government cannot make decisions about what type of energy stations are built. Most of the energy providers have reacted to the latest news with reluctance but one relatively small utility, Delta, has proclaimed itself willing to develop an investment plan for new nuclear. The licensing process is expected to start within the next few years. It is also thought that within that period, most Dutch utilities would have be taken over by European giants like E.On, EDF, Electrabel or Endesa.

Source and Contact:
WISE Amsterdam

IN BRIEF

UK firm fined for radioactive leak. AEA Technology has been fined GBP250, 000 (US$436,000) and asked to pay over GBP150, 000 (US$261,000) in costs to the Health and Safety Executive after admitting six violations of health and safety and radioactive material regulations. A deadly beam of radiation was emitted during a 130-mile road journey as a flask of radioactive waste was transported to the Windscale nuclear plant in Cumbria on March 11 2002. The quantity of radiation was said to be "in the order of 100 to 1,000 times above what would normally be considered a very high dose rate" according to the Health and Safety Executive and it was "pure good fortune" that no one was dangerously contaminated during the transport. Anyone exposed would have received a lethal dose of cobalt-60, high enough to kill within two hours. The Leeds crown court heard that AEA workers had failed to fit a plug on a 2.5 tonne container holding the waste in a safety flask and that full safety checks were not completed although a list was ticked to indicate that they had been carried out. Training in the use and operation of the flask had been offered to the firm but was never taken up.
***The Guardian*, February 21 & 18, 2006; *Yorkshire Evening Post* & UPI, February 18, 2006**

Toshiba's Westinghouse purchase. After bidding US$5.4 billion for Westinghouse Electric, the sale of the U.S. based nuclear engineering group remains in doubt. The deal needs to be approved by the Committee on Foreign Investments, a U.S. Treasury Department panel. The Japanese press has been speculating that given Toshiba's history with the U.S. government - in 1988 it banned procurement of Toshiba products after the firm sold high tech equipment with military uses to the Soviet Union in violation of an international agreement - the deal may not be approved with the U.S. instead preferring to see Westinghouse owned by American General Electric Co., which was outbid during the auction for the BNFL subsidiary. Toshiba has announced that it plans to sell up to 49% of Westinghouse and it is thought that GE could be interested. Many analysts also believe that Toshiba paid over the odds for the company, which had a guide price of between US$1.5-2 billion - BNFL bought it in 1999 for US$1.2 billion. Toshiba insists that it will recoup its investment in 15 to 20 years and hopes to profit from China's planned nuclear expansion.
Centredaily.com, February 21, 2006; Nucleonics Week February 9, 2006; *The Guardian*, February 7, 2006

Japanese firm raided. On February 12, Japanese police raided the offices of Mitutoyo Corp, a company suspected of exporting precision measuring equipment, which could be used to make nuclear weapons, to China and Thailand in 2001 and 2002 without the required government permission. Three-dimensional measuring machines, such as those made by Mitutoyo, can be used to measure centrifuges used in uranium enrichment. Japanese police revealed that a precision instrument made by Mitutoyo was found by the IAEA at a nuclear facility in Libya between December 2003 and March 2004 and are investigating how the equipment found its way there. According to Japanese media reports, a Malaysian company called Scomi, which has been linked to the international nuclear trafficking network, shipped Mitutoyo's instruments to Libya.
BBC News, February 13, 2006

France upgrades nuclear arsenal. One reason behind France's President Jacques Chirac bizarre compulsion to issue a warning of nuclear retaliation to any country threatening it has now become a little clearer. The Libération newspaper has reported comments made by a military official that France had upgraded its nuclear weapons. Instead of moving towards disarmament as France has pledged to do, it has instead improved its most deadly of weapons. The numbers of warheads have been reduced but only in order to make the weapons lighter and thus able to travel longer ranges and hit targets with more accuracy. The move could also be an attempt to justify some 3.5 billion Euro (US$4.2 billion) spent every year on maintaining 300-350 nuclear weapons.
***The Guardian*, February 10, 2006**

UK's first Magnox closing. The world's first facility to produce nuclear fuel for commercial power stations is closing its magnox fuel making operations at Springfields. All magnox fuel fabrication is to end in 2007 although, Wylfa in Wales (the youngest magnox station) will not close until 2010. Eight UK reactors still use magnox fuel. The Springfields site, owned by the Nuclear Decommissioning Authority, is operated at a cost of GBP6 million (US$10.5 million) per year, by Westinghouse and is expected to continue fuel fabrication operations for AGR reactors and Canada's Cameco and possibly also for AP-1000, EPR and PBMR in future.
NuclearFuel, February 13, 2006; WNA News Briefing 06.06, February 1-7, 2006

Weapons-grade HEU missing. The UK's annual MUF (Materials Unaccounted For) figures have revealed that the whereabouts of 283kg of weapons-grade highly enriched uranium from Dounreay are unknown.
N-Base Briefing 486, February 11, 2006

EDF reassures islanders. Officials from French state-owned nuclear company EDF attended a public meeting on the island of Jersey in an attempt to offer reassurances for the safety of the proposed new reactor (EPR) at Flamanville in France, just 30 miles from the island. EDF told the meeting that in the worst case, a leakage of radioactivity could not spread beyond a radius of five to ten kilometres from the plant. This is an amazing reassurance to give considering that the EPR has never been built or tested

anywhere in the world as yet. Neither is it much of a comfort considering how in the immediate wake of the Chernobyl disaster, France, instead of taking precautions like other European countries, had its state television stations issue weather reports indicating that the cloud of radioactivity from Chernobyl had miraculously stopped short at the Franco-German border.
N-Base Briefing 483, January 28, 2006; Reuters, April 26, 1996

Drigg u-turn. After initially voting against a BNFL proposal to extend temporary storage at Drigg (UK) low-level waste facility, Cumbria County Council has granted the scheme permission in a new vote favoring the extension by 9-6.
N-Base Briefing 484, February 4, 2006

Uranium prices to skyrocket. A research analyst for money management firm, Sprott Asset Management has predicted a major crisis ahead for U.S. utilities hoping to obtain fuel for their nuclear reactors, especially for those proposing new reactors. U.S. utilities import over 80% of their uranium supplies. In an interview with StockInterview.com, Kevin Bambrough warns of a supply deficit peaking in 2015 that could drive uranium prices to an "unsustainable" and "unbelievable" high "north of US$500/pound". Various analysts predict short term price targets for spot uranium of over US$40. Canadian Augen Capital Corp's managing director David Mason speculated, "$100 (US) a pound is within reason within the next year or two." However, Sydney-based Resource Capital Research forecast $50/pound by 2007, explaining that another 40% jump in spot uranium prices would be driven by end users trying to secure future supply.
www.stockinterview.com, January 4, 2006

Swedish plant to be up-rated. Oskarshamn-3 will be up-rated from 1200 MWe to 1450 MWe.
WNA News Briefing 06.04, January 18-25, 2006

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The NUCLEAR MONITOR

.The Nuclear Information & Resource Service was founded in 1978 and is based in Washington, DC. The World Information Service on Energy was set up the same year and is housed 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.

The 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, a Ukrainian version is published by WISE Ukraine and a Japanese edition is published by WISE Japan (latter two available at www.nirs.org). Back issues are available through the WISE Amsterdam homepage: www.antenna.nl/wise and at www.nirs.org.

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NIRS IS MOVING!

Mark your calendars, change your address books! NIRS is moving! On March 11, 2006, NIRS new address will become NIRS, 6930 Carroll Avenue, Suite 340, Takoma Park, MD 20912. Our new phone number will be 301-270-NIRS (6477). New fax number will be 301-270-4291. E-mail addresses and website (www.nirs.org) will remain the same.

To prepare for this move, NIRS will be closed the week of March 6-10, 2006. Please, contact us only for emergencies that week (unless you want to stop by and help us pack....)..

THE NUCLEAR MONITOR
Nuclear Information and Resource Service
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Chernobyl +20

Brief summary of known events - for more information please contact event organisers

WHEN	WHERE	WHAT	CONTACT
March to May	Europe, US & Asia	"Chernobyl 20 years - 20 lives". Travelling photo exhibition.	wiseamster@antenna.nl www.20lives.info +31 20 6126368
March 9-12	Feldkirch, Austria	International conference: 20 years of living with Chernobyl	Coalition of environmental NGOs and medical organisations tschernobyl2006@gmx.net +41 71 931 51 56
April 23-25	Kyiv, Ukraine	International Conference Chornobyl+20: Remembrance For The Future	Tetyana Murza, Ecoclub (NIRS/WISE Ukraine) tanyam@nirs.org www.ch20.org +380-362-237024
April	Kiev, Ukraine	International Conference "Twenty years after the Chernobyl accident. Future Outlook"	tesec@mipk.kiev.ua
April 1-14	South India	Tour featuring anti-nuclear plays and music, with speakers and symbolic action Koodankulam NPP site.	WISE India drspudayakumar@yahoo.com
April 15-26	Belgium - Tihange NPP to Doel NPP	Weeklong walk from Tihange NPP (Namur) via Brussels to Doel NPP (Antwerp). Arrival scheduled for April 26th 2006.	For Mother Earth pol@motherearth.org http://www.motherearth.org/tour/ +32-9-242 87 04
April 15-16	Flamanville, France	Demonstration against EPR and Chernobyl commemoration	stephane.lhomme@wanadoo.fr www.stop-epr.org
April 23-25	Berlin, Germany	Symposium of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and the Environmental Policy Research Centre of the Free University of Berlin	contact@tschernobyl2006.de
April 16	Tokyo, Japan	Symposium and mini-concert: Chernobyl Nuclear Accident, 20 years on	Philip White, CNIC +81-3-5330-9520 cnic@nifty.com http://cnic.jp/english/
March 23	London, UK	8th Irish & UK Local Authorities Standing Conference on Nuclear Hazards - Chernobyl 20 Years on: Nuclear Costs & Energy Futures	Nuclear Free Local Authorities Secretariatoffice@nuclearpolicy.info www.nuclearpolicy.info +44 161 234 3244
April 7-9	Bonn, Germany	International IPPNW Congress "The Nuclear Power Time Bomb -20 Years after Chernobyl".	IPPNW Germany uhe@ippnw.de www.tschernobylkongress.de +49 30 6980740
April 22	London, UK	International Conference 20th Anniversary of Chernobyl - The True Health & Environmental Legacy	Medact info@medact.org www.medact/org +44 20 7324 4739
April 3-5	Berlin, Germany	International Congress Chernobyl - 20 Years Later: Experiences and Lessons for the Future	Thomas Dersee, German Society for Radiation Protection thomasdersee@strahlentelex.de +49 30 4352840