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No quick fix for nuclear waste

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Features

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Gummer says no to Nirex

AS we go to press, the Environment Secretary, John Gummer, has rejected Nirex's plans for a rock characterisation facility (RFC) adjacent to the giant Sellafield nuclear complex, throwing the UK's nuclear waste management programme into chaos and dealing a heavy blow to the whole industry's private prospects.

In a letter to Nirex, Gummer could scarcely conceal his contempt: "... your company does not understand the regional hydrogeological system well enough." Further, Gummer "notes with some concern that your company's site selection process ... has singularly failed to impress the inspector in terms of its transparency and the rigours of its technical and scientific logic."

After over 15 years and around half a billion of the tax payer's money, Nirex must now accept failure and abandon the proposal entirely. While it can appeal the decision, it is difficult to see on what grounds. No part of its programme has survived a joint shredding from Gummer and the public inquiry inspector. It must surely now be dumped, consigned to a deep hole somewhere in Whitehall.

While the environment movement can claim a major victory, including Friends of the Earth, which, after spending considerable sums of money, stripped Nirex bare at the public inquiry into the proposal, it must remain vigilant over nuclear waste. The industry will now try to find the cheapest solution to the long-term storage problem.

Attention must now be turned to the problem of mounting stockpiles of nuclear waste. It exists and must be safely managed. For now that means above ground in monitored stores. Over the longer term no-one is really prepared to say, except that our current level of scientific knowledge excludes finding a perfect solution — we must simply wait and see.

As for the rest of the industry, from power stations to reprocessing plant, *Safe Energy* would once again like to remind the government - any government - of the words of Sir Brian Flowers, who in the 1976 Royal Commission on Environmental Pollution said, it is "irresponsible and morally wrong to commit future generations to the consequences of fission power unless it has been demonstrated beyond reasonable doubt that at least one method exists for the safe isolation of these wastes for the indefinite future."

"While the environment movement can claim a major victory ... it must remain vigilant over nuclear waste. The industry will now try to find the cheapest solution to the long-term storage problem."

The green vote

CASTING your vote isn't so easy this time. Comfy party distinctions have been shattered of late. The party for the status quo has instigated the world's biggest shake up of industry. The party of the worker has shed its trade union image, and the middle of the road party is, compared to the other two, way out on a limb on taxation and the environment.

"The Tories now have an enthusiastic champion in John Gummer. Labour, as yet, has no one," was said not by the association for hunting, shooting and fishing, but by the director of Friends of the Earth (England, Wales and Northern Ireland), while the leader of the opposition has an admirer in Maggie Thatcher.

Confused? If we no longer know the parties, the only option is examination of their policies.

Energy policy isn't just a stand alone single issue. UK originated acid rain continues to strain European relations a decade on from the 'dirty old man of Europe' tag, while global warming is increasingly straining international relations.

Recent 'industry restructuring' in the energy sector, or a haemorrhaging of the workforce, has cost an estimated 59% of total employment in the sector. And if renewables are not developed with haste, we have the choice of burning a lot more coal, building more nuclear stations or being dependent on Russia's gas.

Its clearly an election issue. So what's the response?

Real World, a coalition of environmental and human rights groups, has a check list of twelve policies by which to judge a party. Can your candidate promise a UK CO_2 reduction of at least 20% by 2005, a Bill of Rights and an ecological restructuring of taxation, for instance?

A simple comparison of the *Real World* manifesto with each party's pledges rates the Liberal Democrats as the party most in tune with the group's ideals. Labour isn't too far away, while there is little in the manifesto to interest the Tories.

John Major agrees with "very few" of Real World's proposals, arguing the economic proposals alone will "undermine Britain's economic competitiveness". Labour, for all its pledges, has yet to fully convince some on its green credentials — all we can do is wait and see. And while the environment is perhaps the only issue which will win Liberal Democrats the otherwise die-hard Labour vote, like Labour, we have no recent experience of their governance, and the first past the post system is not in their favour.

When 1 May comes, some will vote for the least worst candidate, others will vote for their first preference regardless of tactics, some will vote for the leader that looks most like their dad and a good many more won't vote at all.

Whoever wins, the job they are paid to do is reflect our best interests. As environmental problems increasingly encroach upon everyone's lives, the clamour to do something about it will intensify, and they will have to listen.

"Nirex case doesn't hold water," p14; "The energy for an election," p10

***The Safe Energy Journal* is the international magazine of Friends of the Earth Scotland's Safe Energy Unit. Views expressed are not necessarily those of FoE Scotland.**

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Dounreay: return to sender in 10 years

DOUNREAY'S plans to continue overseas research reactor reprocessing have been dealt a significant blow by the Scottish Environmental Protection Agency (Sepa).

In granting new radioactive discharge authorisations for the site — which could still see massive increases in discharges — Sepa is demanding that foreign waste from reprocessing should be returned "as soon as practicable and in any case not later than ten years."

While Sepa stressed that "authorised limits are, in general being substantially reduced" the actual discharges could increase by over 1000%. In applying for revised authorisations, in 1993, the UK Atomic Energy Authority (UKAEA), which operates Dounreay, gave a range of annual discharge figures covering the period 1989 to 1992 and stated a new need to discharge which could see total alpha radiation levels increase by 718% to the sea and 306% to the air, over the highest level between 1989 and 1992. Total beta emissions could jump by 654% to sea and 1,350% to air.

While the bulk of the new levels are for decommissioning work, considerable controversy surrounded UKAEA's plans to expand commercial reprocessing work for foreign clients. In a draft authorisation document, Sepa officials had concluded that the foreign work for the Dounreay research reprocessing plant was "justified". However, when this was put before the organisation's North Board, on 24 January, severe reservations were expressed over whether there was a clear economic justification for overseas reprocessing and that "there should be no stockpiling of waste from reprocessing."

The North Board was also concerned that "the timescale for decommissioning should not be unnecessarily extended to accommodate the reprocessing of imported spent fuel."

The matter then passed to the full Sepa board on 11 February. However, the Board failed to reach a decision, and instead called an extraordinary meeting to which interested parties would be invited to deliver ten minute presentations to help the Board reach a final decision.

Held in Inverness on 26 February, amidst considerable confusion over its exact status and regulatory basis, the meeting was addressed by 40 speakers. While the Board had stressed it wanted to hear from only one representative from individual organisations, the UKAEA put forward around 15 speakers by simply not informing SEPA that they were from Dounreay until they began to speak.

Dounreay reiterated its position as laid out in the application: that it had been carrying out such reprocessing work for over 30 years and that around 400 jobs on-site were dependent on it being allowed to continue.

Economics

Those opposing the continued reprocessing on site — including Highland Council, Highland Health Board, FoE Scotland, Greenpeace International and the Nuclear Free Local Authorities — pointed out that there had been significant "material changes" at Dounreay since the original application in 1993 and since the public consultation ended in February last year. In particular, Dounreay has halved its charges for research reactor reprocessing, substantially altering and undermining economic justification for the activity.

The economic justification for continued reprocessing of spent fuel from Dounreay's defunct Prototype Fast Reactor was also highlighted as a major cause for concern. The fast reactor reprocessing plant was closed in September following an accident and it has now been revealed that it will take at least three years and £11 million to bring it back into operation. In deciding to pursue reprocessing for the remaining fast reactor spent fuel, the UKAEA argued that it was around £30 million cheaper than dry storage followed by direct disposal. However, in 1994 the Department of Trade and Industry (DTI) calculated that: "The annual operating and maintenance cost of the mixed oxide reprocessing plant D1206 is in the range of £17 million to £19 million. Most of these costs are independent of throughput." Therefore the cost of the repair and delay will be around £60 million (17x3 plus 11), reversing the balance of economic advantage in favour of long-term storage and direct disposal.

Environmental groups believe that such changes have not been taken into account and therefore justification for the discharges, as required under European Atomic Law, has not been demonstrated. In support of their position they cite the minutes of the 11 February Sepa board meeting in which Sepa's chief executive is reported as saying "the economic justification for the reprocessing of foreign waste had not been particularly robust."

Sepa will now pass its recommendations onto the Secretary of State for Scotland, Michael Forsyth, who can accept, reject or alter them. Forsyth is believed to be under considerable pressure from the DTI, which is responsible for the Dounreay site, to reject Sepa's plan to have waste returned to client countries within ten years. The DTI is understood to be concerned about the setting of a precedent which could then be applied to BNFL at Sellafield. However, Forsyth was responsible for establishing Sepa as a tough new pollution watchdog and would face considerable political embarrassment if he was to over turn its first tough decision.

Hot spots

■ Meanwhile, further radioactive hot spots have been found on the Dounreay site in areas previously surveyed, implying that, despite Dounreay's attempts to put on-site contamination down to past practices, there is an ongoing source of contamination.

Shipments

■ Dounreay has received a third shipment of unirradiated fuel from the abandoned German KNK-II fast reactor. Despite the best efforts of Greenpeace to prevent the shipment of 40 fuel assemblies containing enough plutonium for around ten nuclear warheads from leaving Bremahaven, the ship arrived at Scrabster in February. ❑

In Japan

AS SEPA announced its decision, on 11 March, news was breaking of an explosion and fire at a Japanese experimental reprocessing plant at Tokaimaru.

While the plant's operators, Power Reactor and Nuclear Fuel Development Corporation (PNC) at first claimed there was no radiation leak, it later admitted 30 workers at the plant had been exposed to radioactive gas. PNC says the amounts involved are negligible, as the fire broke out in a building were low-level waste was being bituminized. The fire was quickly brought under control by the plant's sprinkler system.

Ten hours after the fire, an explosion in the same building blew out nine windows and white smoke was seen pouring out. PNC says around 2.1 x 10^6 Bq of iodine-129 were released and that this was well within the plant's discharge authorisations. ❑

German demos over nuclear transport

HOSTILITY to nuclear transportation intensified in Germany at the beginning of March. Around 30,000 riot police lined a twelve mile stretch of road leading to the Gorleben nuclear store, in Lower Saxony, to prevent some 15,000 demonstrators from blocking the progress of 6 lorries carrying spent nuclear fuel — two from the French reprocessing facility at Cap la Hague and four from power stations.

The latest in a series of massive public demonstrations opposing transports to Gorleben — Germany's only waste store for its 19 nuclear stations, which have seen anti-nuclear protesters become increasingly militant — is estimated to have cost £30 million. Last year 19,000 police were drafted in to deliver a convoy of spent fuel in an operation costing around £17 million.

In the weeks leading up to the transport, a number of rail lines and signal junction boxes were sabotaged, and tunnels dug under roads. Such "violent blockades against nuclear waste transport are an outrageous abuse of the right to demonstrate", said Peter Heinz, general secretary of Chancellor Kohl's Christian Democrats (CDU).

"Everyone is entitled to peaceful protest but no-one has the right to dig under roads, saw rails and throw grappling hooks onto overhead rail lines," he said.

Last year, in a number of secret reports, the German Federal criminal investigations agency, Bundesant fuer Varfassungschutz (BFV), claimed that the anti-nuclear movement has been infiltrated by terrorists.

The BFV says that "autonomous groups" who are linked to the German communist party can mobilise around 6,000 members and are motivated not by "green values" but by their desire to destroy the German state.

However, as the transport approached Gorleben most newspapers reported that only a few hundred protesters, from the 16,000 strong crowd, were involved in goading the police, while police water cannon were fired indiscriminantly at demonstrators, who according to German press reports were to be characterised more by their middle class origins than any resemblance to terrorists.

Concern about the safety of nuclear transports was given added impetus following two train derailments involving nuclear flasks earlier this year. On 15 January a carriage carrying spent fuel derailed in front of the Kruemmel nuclear station near Hamburg. And on 4 February a train carrying spent fuel from Germany, bound for Sellafield, was derailed on the French-German border. While the flasks remained intact — both accidents occurred during shunting at low speeds — Greenpeace Germany warned: "These two recent derailings show that such accidents are possible at any time."

Further, according to Dr Helmut Hirsch of Greenpeace, the Castor V/19 flasks used to transport nuclear material have never been adequately tested, despite claims by the Environment Ministry that "extensive tests are carried out prior to official approval of any cask type." The V/19 flask "has been tested neither mechanically in drop tests, nor thermally in fires, nor even as models or prototypes," said Hirsch. ❑

Sea of controversy

A number of countries have warned the British nuclear transport ship, Pacific Teal, which is carrying 20 tonnes of vitrified high level nuclear waste from reprocessing in France, to Japan, not to enter their coastal waters.

Strong statements opposing the shipments, the secrecy surrounding the route and the lack of detailed emergency plans have been issued by several nations, including: Argentina, Brazil, Chile, Uruguay, the Cook Islands, Ireland, Kiribati, Malaysia, Mauritius, Micronesia, Nauru, New Zealand, Papua New Guinea, South Africa, the Caribbean Community and the South Pacific Forum.

The shipment involving two large transport flasks containing a total of 40 glass high-level waste 'logs' left from Cherbourg, France, on 13 January and is expected to dock in Rokkasho, Japan, in mid-March.

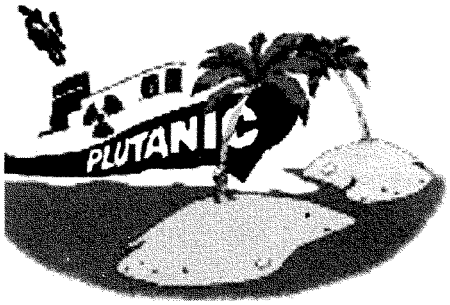
According to a French diplomatic note leaked to Greenpeace it is expected to follow a route down the western coasts of Europe and Africa, around the Cape of Good Hope, across the Indian Ocean, through the Tasman Sea between Australia and New Zealand and near a number of Pacific islands, before reaching Japan. Repeated demands to Japan by coastal states for advanced notification of the route and consultation on emergency response plans have been denied.

According to the Washington-based Nuclear Control Institute (NCI), each flask or container contains as much caesium-137 as was released during the Chernobyl accident. NCI warns that "there are serious deficiencies in the containment system used for packaging the nuclear waste."

A fire lasting more than a couple of hours would "cause simultaneous failure on three levels of the containment system": Rubber-like O-rings which seal on the flask lid would rupture at around 250 ºC; the stainless steel canisters which encase the vitrified waste will have already undergone "sensitisation" when the extremely hot molten glass is poured into the canister; and the glass itself would provide "very little containment, since it would soften and expand considerably, rupturing the ... canister and allowing Cs-137 to be released in gaseous form." Sensitisation also makes the steel vulnerable to cracking and rapid corrosion in sea water.

The US and Japan have already rejected the type of steel chosen by the French because of the sensitisation problems. However, France refuses to even acknowledge the problem.

Further, British Nuclear Transports Ltd, has provided no evidence that it



could mount a salvage operation if a flask was lost at sea. NCI comments: "The January 1997 shipwreck and oil spill off the west coast of Japan provides a graphic example of the practical difficulties that can be encountered in salvage attempts. The Japanese government assumed that it would be able to quickly salvage the wreck and stop the flow of oil, but was unable to do so because of rough seas. Consequently, the spill was much worse than had been anticipated."

Internal International Atomic Energy Agency documents obtained recently by Greenpeace reveal that beyond depths of 200m, no attempt to salvage a lost waste flask would be made.

The current transport is only the second such transport from European reprocessing facilities to France — the first, 28 waste canisters, left France a year ago. Ultimately, over 3,000 such canisters are to travel from France and Britain over the next 15 or so years, with each shipment carrying around 150 canisters. ❑

Sweden begins phase out

SWEDEN has announced the closure of two nuclear reactors, at Brasebeck, by July 2001, with the first shutting in July next year, as part of the country's plans for an eventual phase out of all 12 of its reactors.

Swedish Prime Minister, Goran Persson, leader of the minority Social Democrat government, said "more than two reactors will close by 2010." Adding: "What humans create is ravaged by time and I don't have that much faith in technology." Persson also announced that nuclear operators will now be expected to meet the full cost of insuring against accidents.

In a 1980 referendum Swedish voters backed a nuclear phase out by 2010. That deadline will not be met, as fierce opposition and party splits over the issue has led to a deadlock for the last seventeen years.

Nuclear power accounts for around 50% of the country's electricity production, and scant effort has so far been put into establishing alternatives. In the near term the shortfall is likely to be made up through increased imports from neighbouring Denmark and Norway. In the longer term nuclear losses will be covered by efficiency improvements and what the government calls "environmentally sustainable electricity and energy production."

However, the Swedish nuclear industry is not about to give up without a fight. Sydkraft, which owns Brasebeck, said it will strenuously oppose the closure, and that it will seek full compensation in the form of replacement generating capacity.

The announcement has also been denounced by the Federation of Swedish Industries, while the leader of the powerful pulp and paper worker's union said it was a "black day for the environment and a black day for industry." ❑

Leukaemia cluster

FRENCH scientists studying leukaemia in the vicinity of the massive Cap la Hague reprocessing plant have warned that children playing on local beaches and eating locally caught fish have a dramatically increased risk of contracting the cancer.

In a report in January's British Medical Journal, the team from the Department of Public Health, Biostatistics and Epidemiology at Besancon, concluded, there is "some convincing evidence" of a link between the incidence of leukaemia and the reprocessing plant. Children playing on local beaches, it says, are three times more likely to contract the cancer.

They also warned of a higher risk from eating local fish and shellfish.

A similar Scottish Office study of the leukaemia cluster around Dounreay, published in 1991, also found a higher incidence of cancer in children who played on local beaches. At the press launch of the Scottish study, the statistician responsible, James Urquhart, said he wouldn't allow his children to play on Dounreay's beaches.

Dismissing the significance of the new finding, Dounreay said: "It's not possible to make a comparison between the two facilities." A spokesman for the site said Cap la Hague is much larger than Dounreay: "It is a huge big place, employing about 5,000 people.

"I understand the beaches around la Hague are used extensively for recreational purposes. At Dounreay, while radioactive particles have been found on the foreshore immediately adjacent to the site, it is inaccessible to members of the public."

Dr Tom Wheldon of the Government's Committee on Medical Aspects on Radiation in the Environment (COMARE), said the findings would be examined by the Committee, adding: "What they have got is an association which is not trivial. It adds weight to the previous findings and makes one wonder whether they were not an isolated fluke. It would suggest that they were not. But it still leaves us with the mystery of what the cause actually is."

■ Meanwhile, the Ministry of Agriculture has asked the European Commission to relax controls on radiation in foodstuffs, because contamination in shellfish around Sellafield, in Cumbria, have been found to be 14 times greater than the European Union's safety criteria permits.

Over the last three years, levels of technetium-99 (Tc-99) — with a half life of 100,000 years — found in lobsters, winkles, limpets, mussels and scampi, have steadily increased and have been found as far south as Dublin Bay, which has a world famous prawn fishery, and north to the Solway Firth.

This year Tc-99 levels found in lobster have reached 17,000 Bq/kg — the EU limit is 1,250 Bq/kg — as the operators of the Sellafield site, British Nuclear Fuels, discharged Tc-99 to its authorised maximum to clear a backlog stored on site. However, because the discharges are routine, and not the result of an accident, no action has been taken to halt sales of contaminated produce. ❑

US Mox

US plans to use plutonium from dismantled nuclear weapons to fuel power stations have been condemned by anti-proliferation groups, who believe they will undermine years of US opposition to reprocessing and the creation of a plutonium economy.

According to a coalition of groups, including the Natural Resources Defence Council, FoE, Greenpeace, the Nuclear Control Institute, and Physicians for Social Responsibility, far from reducing the threat of proliferation the plan will increase accessibility of weapons-grade plutonium to both rogue nations and terrorist groups.

In January the US energy department released the "Record of Decision on the Final Programmatic Environmental Impact Statement on the Disposition of Weapons Usable Fissile Materials", which outlined a strategy for burning around 70% of the US's 50 tonne plutonium surplus in reactors, with the remainder mixed with spent fuel and vitrified into glass or ceramic blocks.

To turn the weapons plutonium into fuel it must be oxidised and mixed with uranium oxide creating a so-called mixed oxide fuel (Mox). Critics say this will lead to increased trade in weapons usable material which could be separated from fresh fuel elements in any relatively unsophisticated chemistry lab.

As well as the added proliferation risk, Dr Frank Barnaby, former head of the Stockholm Peace Institute, warns: "The presence of Mox makes it hard to control the reactor core, and if there is a power excursion [as happened at Chernobyl] the reactor is more difficult to stabilise."

In the event of an accident the presence of Mox fuel would also increase the dangers from any fallout. ❑

Bubble trouble

SCOTTISH Nuclear Ltd (SNL) has been accused of trying to cover up an accident after the Scottish Secretary, Michael Forsyth, criticised the company for delays in reporting an incident which may have led to radioactivity from the Hunterston B advanced gas cooled reactor contaminating a number of fizzy drinks.

Late on March 4, Scottish Nuclear issued a press statement revealing that contamination in the site's CO_2 service tanks, which feed the reactor's cooling system, could have been transferred to three tankers operated by Messer UK, when deliveries of fresh CO_2 were being made to Hunterston. Messer also supplies CO_2, using the same tankers, to a number of prominent food and drinks companies. The service tanks are thought to have become contaminated when an isolator valve on the reactor cooling system failed, and contamination was then passed on to the tankers.

Classifying the incident as level zero on the International Nuclear Events Scale — the lowest possible — SNL said the amount of radioactivity involved was negligible. However, it failed to notify some of the drinks companies serviced by Messer of its suspicion over the contamination. It also failed to inform the Nuclear Installations Inspectorate (NII) of its fears when asked a direct question about incidents at the plant during one of the regular Hunterston local liaison committee meetings, on February 28, eight days after contamination was first discovered on the site.

Coming in the wake of two major food scares — BSE and E-coli — the Scottish Office reacted quickly, issuing a full list of drinks manufacturers supplied by the company, including: AG Barr (Irn Bru); Tennant Caledonian; United Distillers; and Coca Cola. An official Food Hazard Warning was issued and an emergency telephone line for concerned consumers was set up.

Follow-up surveys of the drinks companies have revealed carbon-14 contamination in CO_2 cylinders used to pour pints in 500 pubs, and Carlsberg Tetley, in Alloa, have recalled all cylinders in use in Scotland as a precaution. Seven other drinks manufacturers have so far been cleared of any contamination.

While the levels of radioactivity involved were very small, environmentalists warned that there is no threshold below which radioactivity can be considered safe, adding that the real issue was one of procedures and principles.

It was astounding, they said, that tankers being used to supply the nuclear industry were also used for supplying drinks manufacturers, and joined the Scottish Secretary in condemning SNL for failing to make the incident public sooner, despite having notified Messer on 27 February.

While SNL said this was a previously unforeseen route for radioactivity to leave the site, the NII is looking into a 1978 incident at Hunterston in which oxygen bottles belonging to British Oxygen were filled with slightly contaminated CO_2 after a non-return valve failed. The NII is also considering changes to the rules under which nuclear sites are run which would compel the operators to inform the regulatory authorities of any suspected leaks or contamination.

■ Hunterston B and Hinkley Point B have both been cleared to operate for an extra ten years by the Nuclear Installation Inspectorate. However, a report from the Inspectorate says that a number of improvements are needed at the nuclear stations.

For both, the operators, Nuclear Electric and Scottish Nuclear — who together make up British Energy — have been asked to improve the safety case for cracks in welds; introduce more structural analysis of the reactors' graphite cores, which degrade with operation; and provide more proof that the concrete pressure vessels will remain intact under all conditions.

Ironically, in a section on "human factors" the NII says there has been a generally thorough review in this area. ❑

Public relations takes a knock

Safety sacrifices

CUTS in nuclear research funding in Europe and North America could compromise the safety of nuclear plant, according to the Nuclear Energy Agency (NEA).

An offshoot of the Organisation for Economic Cooperation and Development (OECD), the NEA report represents the view of many of the world's leading nuclear safety specialists. It warns that dwindling budgets "may lead to the untimely shutdown of large research facilities and the breaking up of experienced research and analytical teams."

While France, Japan and Korea are maintaining their levels of expenditure, the head of the NEA's safety division, Tianna Frescura, is concerned about cuts in most of the other 11 OECD countries with nuclear programmes, including Britain, Germany and the US.

Michael Hayns, a former safety specialist with the UK Atomic Energy Authority and now based at Aston University in Birmingham, is editing a second report for the NEA on the safety implications of the budget cuts. With fewer being built, the world's nuclear reactors are getting collectively older. Hayns believes that without the facilities and expertise to test ageing materials, reactor operators may not be able to convince regulatory authorities that reactors should be kept open. "In ten years time" he warns " there could be problems we don't know about."

The UK Health and Safety Executive, which has seen its nuclear safety budget fall by 20% in 5 years, said it is aware of the NEA report and that it is "monitoring possible shortfalls in essential research capabilities." ❑

Newcastle powers into 2010

In 1992, Newcastle City Council prepared an energy use strategy with a view to the city's role in securing national pollution reduction targets. Five years on, *Adrian Smith* summarises progress, finishing with the council's energy New Year's list.

WITHIN the developed world, cities are typically responsible for at least 75% of national energy consumption. Such concentration offers obvious opportunities, and energy suppliers of all forms should be taking advantage of efficiencies there for the making.

Newcastle's successful application to European Commission DG17 under Action on Energy and the Urban Environment, made it possible for the council to prepare an Urban Energy Strategy in parallel with its Unitary Development Plan. Published in 1992, the city council's strategy for energy and the environment demonstrates that cities such as Newcastle can make a major contribution towards international climate protection programmes by saving energy and reducing greenhouse gas emissions. Proposals and projects were put forward and evaluated, along with their means of implementation.

The 1992 action plan

With 1990 as its base year, the strategy looked forward to 2010 using two scenarios — 'business as usual' and 'new initiatives'. Under the business as usual scenario, namely fitting catalytic converters to new cars, more use of gas for electricity generation and modest efficiency improvements, Newcastle would simply stand still on 1990 levels of pollution.

Building on and adding to initiatives already underway was identified as the only way Newcastle could contribute significantly to national reductions in harmful gases. The new initiatives scenario identifies three key action points: the introduction of large-scale gas fired Combined Heat and Power (CHP), significant traffic restraint and substantial improvements in domestic, commercial and industrial energy efficiency. Consequent reductions in polluting gases would be in the order of 45% for CO_2, 82% for CO, 89% for SO_2 and 76% for NOx, by 2010. These achievements require no new technological advancements, rather the application of policies driven by a serious commitment to reduce the environmental impact of energy use.

The five year review

Targets and plans need to be revisited and monitored to see how much, or little, is being achieved and to identify the barriers to progress. Undertaking a 1990-95 review of the Newcastle Strategy was agreed by the city council as a logical step towards establishing the energy component of its Local Agenda 21(LA21) Action Plan, as well as providing insight into achievements and outstanding opportunities.

In brief, the review's findings can be split into the good and the bad news. The good news is that progress has been made in installing small-scale CHP, upgrading the Byker district heating scheme to CHP operation, insulating homes, and developing a demonstration photovoltaics (PV) building facade ("Solar first for Newcastle", SEJ 106). Nationally, the Home Energy Conservation Act 1995 (Heca) is an important step in the right direction, and the UK is on target to meet and possibly exceed its greenhouse gas reduction commitments.

The bad news is that Newcastle is not yet on track to achieve the considerable improvements the 1990-based strategy showed to be possible. A number of significant proposals have not been implemented, notably large-scale city centre CHP, and traffic growth has been relentless in spite of improved public transport services and traffic calming measures — all energy savings achieved over five years have been wiped out by traffic growth. Furthermore, without adequate resources, Heca's level of success is very uncertain.

Despite present CO_2 commitments being met, the next century will see CO_2 emissions rising once again. Generally, there is a real cost involved in maintaining the current UK business as usual approach, in terms of missed opportunities for local economic development and job creation, as well as environmental improvements.

Tables 1-3 summarise changes in energy used in Newcastle and associated emissions. The data supports the conclusions set out in the 1990-based business as usual scenario — that reduced levels of emissions would be achieved without any new initiatives. However, much potential is still to be realised and is reconsidered in detail in the review.

Future scenarios & targets. Moving on from past trends and achievements, the review looks forward to the year 2010 and describes a business as usual scenario under which overall energy use could increase between 2-8% by the year 2010, depending upon the extent of increases in car use. A key message is that by the year 2010, after 20 years of effort and achievement in local energy

efficiency, Newcastle could be using at best about the same amount of energy as in 1990. On a more positive note, CO_2 emissions could be expected to fall by between 17-22%, due mainly to national fuel switching to gas rather than greater efficiency.

A new policy initiatives scenario then adds and tests a series of projects and targets which are achievable in a supportive policy context, for example:

- City centre scale CHP development.
- Implementation of Heca, saving 30% of domestic energy, together with a comparable programme in the commercial, institutional and industrial sectors.
- Renewables in the wider region to supply 5%, and PVs in the city 1%, of electricity; the city council to purchase a specified proportion of its electricity from renewable sources; solar collectors to provide 1% of Newcastle's domestic hot water.
- By 2010, road transport energy use to be returned to 1990 city average levels (this assumes an implicit 20% increase in traffic from 1990 levels — but still less than 1995 traffic levels; energy use remains the same because of improved vehicle efficiencies).

Under these circumstances, overall energy use could fall by 17% by the year 2010, and across all supply sectors except electricity. Reductions in CO_2 emissions of 34% could be achieved. Measures to assist in achieving the new initiatives tested could include changes in taxation to internalise the external cost of energy use, greater resources for energy efficiency and public transport, and CHP Enterprise Zones.

Recommendations Moving from business as usual to the improvements in the new policy initiatives scenario requires across-the-board action from all agencies with responsibilities touching on energy and the environment.

UK Government: Department of the Environment, Department of Transport, and the Department of Trade and Industry (through ETSU): In addition to noting the findings of this study, the government is recommended to consider and/or implement thirteen specific courses of action. CHP is strongly recommended as a way to prevent anticipated CO_2 increases. Expansion of the Home Energy Efficiency Scheme and a better resourced national strategy for energy efficiency would help in eradicating fuel poverty. Local authorities could be more pro active if given more leeway in certain areas: energy efficiency measures would be facilitated by allowing investment in energy efficiency (with a direct payback) to be placed outside normal capital control, and the basis of longer-term revenue savings, while greater integration and improvement of public transport would be achieved by reinstating local authority public transport regulatory powers.

Europe's largest PV clad building is in Newcastle, and the council would welcome an urban demonstration project for solar buildings. Research on the solar city, plus planning guidance on passive solar design would help city planners to incorporate solar, a suitable renewable energy choice for cities, into normal planning procedures. Energy planning also needs energy data, and the government should consider whether legislation or regulation is needed to ensure the availability of such data from the energy supply utilities.

The Government Office for the North East: In addition to continuing support for energy-based environmental initiatives, the North East Office is also asked to consider the scope for facilitating and supporting strategic energy and environmental initiatives within the region and to assist in disseminating the results of this review especially through LA21 activities.

Northern Electric plc and British Gas Transco: Three recommendations are: to consider how information systems can be developed and maintained to allow regular monitoring of energy consumption and pollution; to consider the development of new embedded generation, including CHP within the urban areas; for Northern Electric plc to undertake a trial programme on smart plugs as part of a demand side management strategy.

The Energy Saving Trust (EST): to work with the Local Energy Advice Centres to secure their future funding and use them to make the EST's other projects more successful, and to continue to support transportation projects which use alternative fuels.

The Local Government Management Board and the Association of Metropolitan Authorities: to consider the results of the Newcastle review and their bearing on the energy element of LA21 action plans, and the need for changes to national energy policy.

Newcastle City Council: simply, the council should work to turn the recommendations and action plan in this report into practical action in areas of council responsibility.

Table 1
Change in Energy Supply 1990-95 (GW hours)

Supply	*1990*	*1995*	*Change*	*%*
Electricity	1185	1250	+65	+5
Gas	2368	2400	+32	+1
Oil	453	272	-181	-4
Petrol/diesel	961	1180	+219	+23
Aviation fuel	92	147	+55	+6
Refuse Derived Fuel	75	53	-22	-29
Coal Derived Solid Fuel	450	300	-150	-33
Photovoltaics	-	(0.022)		
TOTAL	5584	5602	+18	+0.3

Table 2
Change in Energy Consumption 1990-95 (GW hours)

Sector	*1990*	*1995*	*Change*	*%*
Housing	2379	2399	+20	+1
Transport	1073	1347	+274	+26
Commerce	934	850	-84	-9
Industry	1198	1006	-192	-16

Table 3
Changes in Atmospheric Emissions 1990-95

Type	*1990*(Kt)*	*1995*(Kt)*	*Change*	*%*
Carbon Dioxide	2,172	2,113	-59	-2.7
Carbon Monoxide	15.5	19.4	+3.9	+25
Sulphur Dioxide	19.1	16.1	-3	-15.7
Oxides of Nitrogen	7.2	7	-0.2	-2.7
Methane	4.3	3.8	-0.5	-11.6

* Does not include emissions arising from the use of aviation fuel

Conclusion

The review was undertaken to provide targets for Newcastle's LA21 action plan, to see what has and hasn't been achieved and to contribute to a wider debate on national policy. It is clear that for cities such as Newcastle to succeed in this area, a supportive framework of national policy is essential. It is hoped that the review will contribute to the debate on how to implement an effective energy and environment strategy. ❑

Copies of the Newcastle Energy and the Urban Environment Review can be obtained from:

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The energy for an election

Its John Battle in the red corner, Matthew Taylor in the yellow corner and Tim Eggar (followed by Lord Fraser) in the blue corner. Taylor sets the pace, Battle ducks the punches and Eggar/ Fraser fight with a magic invisible hand. *Helen Snodin* **commentates.**

WHAT kind of an energy policy can we expect from the contenders to office? Judging from pre-election spats to date, certainly not a spot in the shop window. Education, health, crime and Europe dominate. President Clinton may have successfully played the green card to secure a second term, but UK mainstream politicians still see it as an added extra, at least when it comes to an election.

There are echoes of five years previous: "If environmental concern really has grown during the eighties, then ... energy policy should be high on the political agenda ... [but] with environmentalism excluded from the main parties battle plans, the question is, will their pre-election interest be revived when the dust settles?" (SEJ 87, "Party power lines"). Here we are again and the question is, election tactics aside, do the parties have sustainability at the heart of energy policy, or have they really looked no further than the ballot box?

Having instigated "one of the biggest industrial restructurings attempted in the developed world,"[1] the Conservatives are very much for a continuation of the capitalist free market approach to energy, with minimal to no national strategy and a little time-limited intervention. Nigel Lawson, as Secretary of State for Energy, said Britain didn't need an energy policy as the market would provide.

In the most recent white papers on energy policy, the government talks of ensuring "secure diverse and sustainable supplies of energy in the forms that people and businesses want and at a competitive price ... within a stable framework of law and regulation to protect health, safety and the environment."[2] In the event, the gas regulator has no duty in respect of the environment and the electricity regulator merely has to "take into account" environmental impacts. Levies for nuclear power, renewables and energy efficiency have been placed on electricity bills, but the government was powerless to overturn the gas regulator's stance against an energy efficiency levy. Government has also refused to intervene in either the 'fat cat' boardroom pay rises, the dash for gas or British Gas's problems with expensive take or pay contracts.

Being the only party which can be measured up against performance, the Tories will of course argue what they have been doing is best, whereas the opposition, as Andrew Warren — Director of the Association for the Conservation of Energy — points out,[3] has the luxury of decorating commitments with the same caveat the stage Irishman produces when asked travel directions: I really wouldn't start from here! On the last privatisation, Labour "would not have started to sell nuclear energy"[4]. Indeed it has opposed the entire Tory approach to privatisation. Yet there is no appetite for re-nationalisation, — "Labour fully supports the introduction of competition and it is not a process we want to hold up" — preferring instead "competition where possible and tough efficient regulation where necessary." Labour would "reform regulation to make it fairer and more efficient ... make protection of consumers a primary duty of the regulator ... prioritise protection of the environment."[5] John Battle's office told *Safe Energy* that no equivalent law change to the primary duty status proposed for protection of consumers was on the cards for the environment, although consistency between Ofgas and Offer is another of Battle's main aims.

Putting the final nail in the coffin for any re-nationalisation, the Liberal Democrats have "strongly supported the Government in introducing more competitiveness into the energy markets."[6] An energy policy mission statement for the Lib Dems centres on the correction of four main areas of market failure — environmental sustainability, social objectives, lack of competition and strategic security of supply. Proposals for regulation include a revision of duties "primarily, to promote environmentally sustainable development, particularly energy conservation."[7] A single Office of Utility Regulation is proposed for the two currently separate regulators, in view of the traditional industry distinctions becoming increasingly blurred.

In keeping with the Local Agenda 21 theme, both the Scottish National Party (SNP) and Plaid Cymru are a fair to dark shade of green, opposing nuclear and very much for renewables.

A new Scottish Parliament under Labour would have powers over "energy, including electricity generation and supply"[8] and, if realised, could require revision of all the main parties energy commitments. A Welsh Assembly would merely be a talking shop for such matters.

All the parties are united in recognition of climate change; targets separate them out. The government has just agreed to reduce CO_2 emissions to 10% less than 1990 levels by 2010. Labour wants a 20% reduction by 2010, the Lib Dems 30%. Plaid Cymru (in common with many environmental groups) proposes a 20% reduction on 1990 levels by 2005.

Beyond explicit CO_2 targets, nice statements on protecting the environment are indistinguishable between the parties. Figures, studies and sentiment are recycled across the board. Matthew Taylor says the Lib Dems would "implement a policy the government pledged" [but failed to deliver].[6] Just as the sustainability tag is attached to anything these days, politicians are rather loose with green concern. Picking out the policy from the puff is the only way to tell what might happen. Drawing blood would on occasion be easier.

Nuclear

The present government has stated its "commitment" to nuclear power.[9] Energy Minister Lord Fraser of Carmyllie told the industry "the government will continue to take a close interest in the safety, security and prosperity of the nuclear industry, and to help Britain as a whole be a successful and influential player in the international nuclear community."[10] For the prospects of any more nuclear stations in the UK, this pro-nuclear stance is largely academic post-privatisation — by ruling out public funding for new build, the Conservatives have effectively killed off the domestic market for the foreseeable future. Labour, the Lib Dems, the SNP, Plaid Cymru and the Greens would similarly not build any more nuclear power stations.

Above left, Matthew Taylor, from the LibDems prepares for the fight with an energy packed breakfast

Above, Labour's contender John Battle at the pre-fight weigh-in watched by Tory rival Richard Page

Any pro-nuclear stance will materially affect reprocessing and waste disposal. Public funds and legislation are required for waste management, but the tone can either be directed at safely winding down the nuclear industry or at an implicit continuation. Labour's policy on reprocessing is conspicuous by its absence. The Lib Dems are opposed to commercial reprocessing and will ban imports of foreign waste for reprocessing at the earliest possible date.[7] The Conservatives think reprocessing is a matter of "commercial judgement" and "spent fuel should not be categorised as waste". On foreign contracts, they "support BNFL's [British Nuclear Fuels plc] continuing drive to develop its overseas markets."[9] SNP policy, which covers Dounreay's activities, is for reprocessing to cease and for Dounreay to become a renewable energy research facility.

Coal

A "strike ridden" and "inefficient" coal industry has been transformed into a profitable enterprise, according to the government. For the future, the Tories propose a strictly non-interventionist policy, with funding for clean coal beyond 1998/99 under review. Certain restrictions on opencast were lifted at the time of coal privatisation. While all the other parties at least acknowledge coal's superior reserves in comparison with gas, the latest white paper on coal states "there is no reason to believe that the UK's economically recoverable gas reserves will run out much before its economically recoverable coal reserves."[11]

Labour is generally perceived as coal's saviour, and going by constituency representation and John Battle's latest speeches, probably will be. Even under Labour, coal is unlikely to return to its former glory, despite Dennis Skinner's belief that "a Labour government will re-nationalise coal"[12]. On paper, the Lib Dems and Labour are in agreement on three out of four principles — both support less open cast, facilitation of combined heat and power (CHP) and funding for clean coal technology. The Lib Dems do significantly depart from any of the other parties in their firm commitment to a carbon tax.

Gas

Again, the market is the Conservatives policy. Environmental considerations are let down by a lax regulatory approach. Measures such as a pipe replacement programme to reduce methane leakage are voluntary, as is any energy efficiency funding. Labour has stated its "opposition" to the dash for gas on the grounds of wasting a premium resource,[13] with John Battle recently spelling this out in saying that Labour would use the granting of section 36 consents, required by any gas-fired station, to curb the further rise of gas for electricity generation.[14]

Energy conservation

Energy efficiency is the most innocuous, politically acceptable measure for combating climate change. There is, for instance, consensus on the continuation of a levy for energy efficiency funds (the government is still reviewing this option but Offer has recommended in favour) and the Home Energy Conservation Act (Heca) passed through parliament unopposed. However, Heca's more ambitious predecessor, supported by the opposition, was sabotaged by 216 government amendments and a three-line whip. Both Labour and the Lib Dems agree on improvements to energy efficiency standards for new-build as well

"Picking out the policy from the puff is the only way to tell what might happen. Drawing blood would on occasion be easier."

as the introduction of some form of Integrated Resource Planning (IRP). Government has already raised standards a little and a European Union Directive will probably make IRP compulsory in any case (to-the-letter implementation is however not a foregone conclusion).

CHP

The Conservatives want 5,000 MW of CHP by 2000, Labour and the Lib Dems double that in four times the time (10,000 MW by 2010). CHP facilitation can be achieved by measures tc improve fuel efficiency and reward embedded generation and in this respect the Lib Dem's carbon tax, Labour's promise for planning guidance in CHP's favour, and a proposal to accept only CHP energy from waste schemes will help. The government's fourth non-fossil fuels order (Nffo-4) band for waste-fired CHP has also helped, but could be short lived.

Renewables

In quantity, the Lib Dems come first with a 20% of electricity generated from renewables by 2010 target, with Labour second at 10% andthe Conservatives trailing with about 2.5% (1,500 MW) of new renewables by 2000. In quality terms, the government has excluded wave and offshore wind from both renewables levy funding and Research and Development (R&D), and solar from the levy. The Lib Dems have promised to fund all three as well as storage techniques, while out of the three Labour has made a firm commitment to solar, promising levy funding.

Labour and Lib Dem plans for some form of a clean energy/renewables levy would ensure its continuation beyond 1998, while the government has as yet made no commitment beyond 1998. Any future orders under the Tories could at least be expected to meet any shortfalls from previous orders in securing their 1,500 MW target.

Labour's intention to add clean coal to levy-eligible bands has brought scorn from Matthew Taylor and concern from environmental groups. Clean coal in itself is not the bone of contention, rather the implication that its inclusion in Labour's "clean energy levy" will be to renewable's loss. Current Nffo and Scottish Renewables Order (SRO) levy rates will not be bettered, say Labour,[15] but maintained for a selection of 'clean' energies, including clean coal and photovoltaics. Normal levy fluctuations aside, taking this at face value implies an England and Wales/rest of the UK disparity in renewables allocation. As nuclear's Nffo share will be kept after 1998, currently-eligible renewables in England and Wales might expect no net loss. Premium payments to nuclear in Scotland, however, are hidden in the Nuclear Energy Agreement (NEA) — the SRO has never had a nuclear element — and Northern Ireland has no nuclear stations. Renewables in Scotland and Northern Ireland could thus see their share of levy funding reduced to make room for clean coal (despite the cessation of NEA premium payments in 1998).

SRO and (the renewables share of) Nffo rates are predicted to rise over the next decade just to meet the government's renewables target. Yet Labour's renewables commitment exceeds that of the government's.

Levy funding for secure contracts is the renewables developers' preferred choice in the highly price competitive market. Other measures such as improved environmental regulation, cost internalisation and R&D funding also help enormously in evening out the playing field. If Labour does win, it will need to think very carefully on just how it can meet even it's own modest renewables target.

In a nutshell then, the Tories justify a lack of any substantive energy policy with a finger pointed at the market. Scant attention is given to the starting point — overwhelmingly weighted to nuclear and fossil fuels — or to the inability of the market to cost social and environmental benefits. Labour is still heavily influenced by MPs in coal and nuclear-dominated constituencies fighting their corner, and any green influence is fighting an uphill battle. A 'we'll have to think about it' on reprocessing, on the outright banning of any further privately financed nuclear stations, and on funding for wave power, might be designed not to upset anyone, but its effect is to disappoint everyone.

Relatively shackle-free from vested interests, and perhaps with the luxury of not even attempting to win over more than half of the country, the Lib Dems have done their homework and are the most forthcoming on detail. SNP and Plaid Cymru don't have the resources of the Lib Dems, but their general intent is a green energy policy. Majority rule is going to be a two-party battle, but as Heca's success shows, policy influence from the smaller parties can be used to great effect. Energy under the control of Labour's and the Lib Dem's Scottish Parliament is an unknown quantity.

The consequences of failing to implement a sustainable energy policy will touch all social classes and all geographical areas. Perhaps this is why environmental concern has its protagonists in all the parties. It is to be hoped that future environment policy will be determined by the best of these individuals, rather than poor compromises of the lowest common denominator, which just chip away at the coal face. ❑

NOTES

1. From Energy Policy, brief prepared for 16 July 1996 debate on energy policy, Conservative Research Department.
2. DTI and Scottish Office. The Prospects for Nuclear Power in the UK. Cm2860. May 1995.
3. From an article in Energy in Buildings & Industry, 'Changing the politics of energy.' Nov/Dec 1996.
4. John Battle, Parliamentary Debate, Energy Policy, Tuesday 16 July 1996. Hansard Vol 281, No 136.
5. John Battle, speech to a London conference on competition in the gas industry, 19 Nov 1996.
6. Matthew Taylor, Parliamentary Debate. See note 4.
7. Conserving Tomorrow. Energy Policy for the Future. Policy Paper 22, Liberal Democrats, September 1996.
8. Scottish Constitutional Convention, 'Scotland's Parliament. Scotland's Right,' 1995.
9. From The Energy Report, Vol1, Change and Opportunity. DTI, 1996.
10. DTI press release. Nuclear's triple challenge — Lord Fraser. 4 Dec 1996.
11. DTI. The Prospects for coal. Cm2235. March 1993.
12. Dennis Skinner. Parliamentary debate. See note 4.
13. In trust for tomorrow. Report of the Labour Party policy commission on the environment. 1994.
14. Labour to block new gas plants. The Observer. 23 Feb 1997.
15. Personal communication, John Battle's office.

Green power choices, a Swedish experience

OVER the last decade a number of countries have instigated reform of electricity market regulations. Although somewhat different in scope and detail, they share one important feature: competition between electricity producers is introduced by letting at least some consumers choose who they pay for their electricity. For the green-minded, consumer influence over the type of electricity generation in use is the key — environmental impacts attributable to personal electricity consumption is now a matter of individual choice.

If this opportunity for influence is used, changes in the pattern of electricity production may be effected. And on the Swedish electricity market, such opportunities are starting to be used already. Sweden's electricity market was 're-regulated' on 1st January 1996. Electricity supply in the country is currently dominated by state-owned Vattenfall, controlling approximately 50% of supply, next is Sydkraft with 25% followed by some five companies with a few percent each.

Entirely self-initiated, companies have started to offer customers a choice of contracts. Electricity suppliers will commit themselves to annually balance the electricity consumption of a consumer using specified energy sources.

The national railway company SJ has a contract with Sydkraft specifying that the electricity consumed by a commuter line is balanced by purpose-built wind power plant. Similarly, two MacDonalds restaurants have a contract with Vattenfall specifying that Vattenfall shall deliver wind power to balance the annual electricity consumption of the restaurants.

Household customers are also offered pure windpower. Vattenfall offers wind power to households for an extra 7 öre/kWh (about 0.01 ECU or 0.7p/kWh). Göteborg Energy has gone further, offering consumers the chance to actually invest in wind farms — when the plant comes on line, investors get their share of production at delivery cost, a rather profitable arrangement, especially as investors are exempt from electricity tax. Göteborg Energy customers have financed four wind farms in this way.

Contracts may offer an annual balance agreement, but any contract on the competitive market also requires hourly balance, for grid stability. In cases where wind power is the specified source, alternatives are required to ensure balance on an hourly basis. Suppliers might use hydro power when there is no wind, and surplus wind power for other customers when there is more wind electricity produced than needed to satisfy the contracts.

Specified pure hydro power contracts however may meet hourly balance requirements with hydro alone, as production from hydro power systems is easily controlled and flexible. Stockholm Energi has offered consumers a choice of hydro power, nuclear power or a mix from some local power plant, while Skandinaviska Elverk guarantees all its customers that their entire deliveries are balanced by hydro.

Consumers are aided in choosing between delivery contracts by an environmental labelling scheme already successfully in use among consumer products. The Swedish Society for Nature Conservation administers the scheme, and is responsible for overseeing system balance on an annual basis for all labelled contracts. Environmental labelling criteria stipulate that deliveries must be balanced by electricity from renewable sources of energy with extra conditions on the renewables themselves (no new hydro built after market reform is allowed; ash from biomass stations must be returned to the soil where fuel grows).

Electricity delivered according to labelled contracts is offered at a premium price of about 10-20 percent more than the price paid by industrial customers.* So the normal electricity price to industry of around 20öre/kWh rises to 22öre/kWh for a labelled contract, a 10% increase. Meanwhile, a household consumer who normally pays about 60öre/kWh, will have to pay 62.5öre/kWh under a labelled contract, 2 öre extra to the supplier and an extra 0.5 öre as VAT. The relative difference to a domestic customer is very small, only a 4% increase.

This difference in price between conventional and green electricity may increase. As demand for electricity from renewables increases, price is likely to increase until it is clearly profitable to increase supply by building new plant, an effect which may be a little special for Sweden as our electricity prices are below the marginal cost of new power plant. With falling demand and lower prices for electricity from non-renewables, old nuclear reactors and fossil fuelled plant will be less profitable and decommissioned earlier.

Stockholm Energi has sold more than 6,600 labelled contracts, totalling more than 40% of their production capacity already (one of their customers is the Royal Palace). However, total market share for green contracts has not as yet been estimated. Licences to deliver electricity via a labelled contract add up to a 15% share of the market (although only a fraction of these have actually been sold), but as well, many large electricity companies offer contracts outwith the labelling scheme. Only time will tell if the Swedish market approach is a success story for green power. ❑

* This price is lower than the wind only contracts. Deliveries under labelled contracts are balanced mainly from existing hydro power, and thus cheaper than wind power contracts which usually involve building new plant.

Tomas Kåberger **has just contracted his electricity company to generate green electricity on his behalf. In Sweden, this option is now open to both domestic and industrial customers.**

Tomas Kåberger works with the Physical Resource Theory Group at Chalmers University, Goteborg. He served as a member the Swedish government energy commission, 1994-95, and is on the board of the Swedish Society for Nature Conservation and the European Environmental Bureau.

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Nirex case didn't hold water

John Gummer has thrown out Nirex's appeal to build an RCF at Sellafield. *Rachel Western* **can take a large chunk of the credit. Here she outlines the case assembled by FoE, which was presented at the planning inquiry**

ON 17 March the environment secretary John Gummer dismissed the radioactive waste group Nirex's planning appeal against Cumbria County Council's refusal of planning permission for a Rock Characterisation Facility(RCF). It is the first time the nuclear industry in the UK has lost an application for planning permission. Justifying the refusal, Gummer remains "concerned about the scientific uncertainties and technical deficiencies in the proposals presented by Nirex [and] about the process of site selection and the broader issue of the scope and adequacy of the environmental statement."

Friends of the Earth (England, Wales and Northern Ireland) assembled a compelling technical case against the RCF. This decision has fully vindicated FoE's research programme, and delivered an historic victory for the environmental movement.

FoE's case

A safety case for a repository is largely dependent on the behaviour of local groundwater. Inevitably, groundwater will enter the repository and dissolve radionuclides, and water thus contaminated could subsequently find its way to the human environment. This is the most important risk posed by radioactive waste disposal, and its likelihood rests mostly on the nature and setting of the repository host rock. Careful site selection is therefore of critical importance to repository safety.

In 1985, Nirex, with the advice of the British Geological Survey (BGS), embarked upon a site selection procedure. An initial list of 500 potentially suitable sites was reduced by applying selection criteria based on geological and other criteria, such as planning considerations. The Borrowdale Volcanic Group (BVG) at Sellafield was later added to the list even though in 1980 the Institute of Geological Sciences (later the BGS) had previously concluded that Sellafield would be unsuitable for a nuclear waste repository.

Local characteristics at Sellafield suggest that contaminated water would tend to discharge on land above the repository rather than towards the sea. However, it may never be possible to make confident predictions of contaminated groundwater movements because of the variability of the host rock and because there is a likelihood of earthquakes along the fault zone at Sellafield. Nevertheless, in 1991 Nirex announced that it would concentrate further work on Sellafield and in 1992 publicly proposed to construct an underground RCF to investigate site suitability for construction of a repository.

Plans for the RCF progressed until, in December 1994, Nirex's application for planning permission was refused by Cumbria County Council. Nirex appealed to the Secretary of State for the Environment and, in February 1995, John Gummer announced that a planning appeal would be heard at a Public Planning Inquiry in September 1995 ("Nirex's nuclear waste dilemma", SEJ 106).

A peer review of the RCF proposal, put forward in 1993 by Her Majesty's Inspectorate of Pollution (HMIP), was scuppered by Nirex's withdrawal from a cost recovery programme. In the absence of any regulator's review programme, and in preparation for the planning inquiry, Friends of the Earth decided to commission independent scientific and technical experts to assess implications of the RCF. Our witnesses were international experts in their field, including an advisor to the European Community, a member of the Radioactive Waste Management Advisory Committee (Rwamac) and a Nirex contractor. A summary of technical proofs is given below[1]:

Dr Peter Kokelaar, Reader in Volcanology at Liverpool University, is an international expert and leading authority on the proposed site, the BVG. He concluded that due to the exceptional complexity of the BVG, it would prove to be extremely difficult to characterise to government standards required for a repository host rock.

Professor David Smythe, Chair of Geophysics at the University of Glasgow, was commissioned by Nirex to undertake geophysical rock characterisation. Professor Smythe reported major contradictions in Nirex's interpretations of rock structure, depending on the survey technique used, and surmised that the current geological interpretation would not provide a reliable foundation for hydrogeological modelling.

Mr George Reeves, a member of the Rwamac, is lecturer in engineering geology at Newcastle University. Mr Reeves was involved in the Canadian underground research laboratory programme, and his evidence considered the adequacy of the hydrogeological site investigation work carried out by Nirex. He concluded that their programme was inadequate and that the baseline flow regime had not been established.[2]

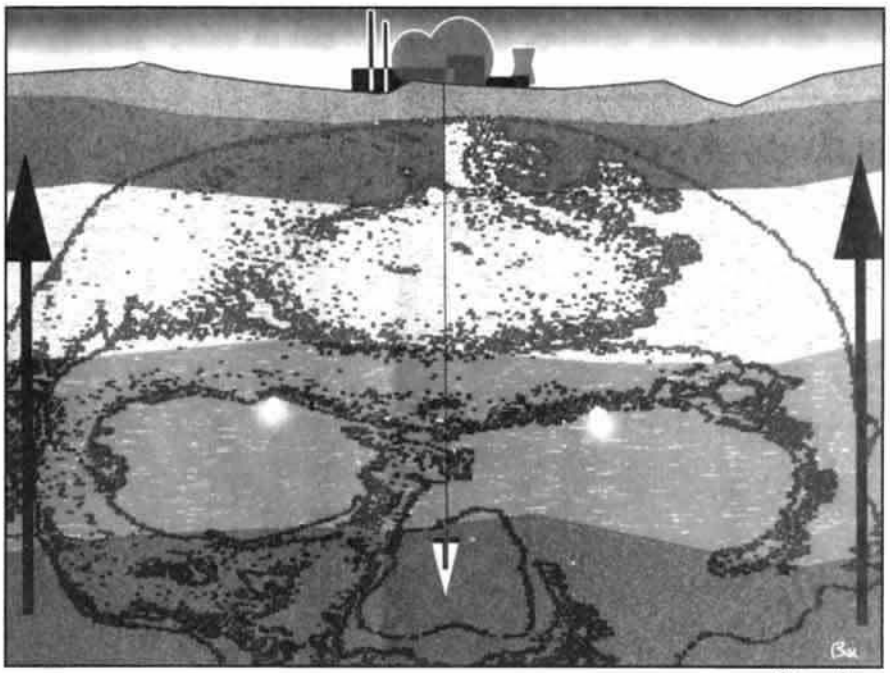
Dr Shaun Salmon is a Senior hydrogeologist at Aspinwall and Company. Dr Salmon has extensive experience of groundwater modelling issues and his evidence considered the reliability of the baseline computer model put forward by Nirex. He found the model to be a very poor representation of reality — it failed to replicate even observed groundwater responses and little attempt had been made to validate it for predictive purposes. Further work is required prior to RCF construction — work which would take at least nine years to complete.

Dr Stephen Hencher, Senior Lecturer in Engineering Geology at the University of Leeds, considered the issues related to fracture flow.[3] In particular Dr Hencher's evidence considered Nirex's claim that the proposed RCF would provide information that would allow fracture flow within the BVG to be quantified. On reviewing the international research work carried out in this area, Dr Hencher concluded that the Nirex RCF proposal is highly unlikely to provide data adequate for predicting flow. He showed that the software tools used by Nirex to predict fracture flow have not been validated. Furthermore, he argued that far from providing useful data, the Nirex RCF may generate misleading data that would jeopardise the possibility of ever providing a reliable assessment of the risks posed by repository development at Sellafield.

Dr John Allison is a partner in the engineering firm Bullen Consultants. Since 1980 he has been responsible for a number of studies on repository engineering issues and has also been a member of an EC task group on repository sealing. Dr Allison considered the engineering aspects of Nirex's proposal and demonstrated that, given the particular problems associated with Sellafield, the need for the creation of engineered barriers assumes a special significance. He showed that Nirex's research proposals do not meet the required standards of good science and good engineering. Nirex clearly had not designed the RCF as an integral part of a final repository, and the proposal for the creation of an underground laboratory could therefore create a redundant excavation within the host rock which could act as a short circuit for the return of radionuclides to the surface. Dr Allison therefore concluded that the RCF would jeopardise the safety case for a final repository at the Sellafield site.

Dr Roy Wogelius of the University of Manchester looked at the geochemical issues of the RCF proposal. Dr Wogelius has been a researcher in the US nuclear waste programme and a regulator of hazardous waste disposal at the US Environmental Protection Agency. His analysis of the available documentation indicated unacceptable error levels and highlighted the possibility that dose limits may be exceeded. Because the chemical perturbations caused by rock excavation are not understood, further generic research is required before *in situ* geochemical data gathering would be of value. Given these circumstances, the proposed RCF would only serve to increase the present levels of uncertainty.

The Public Inquiry lasted from September 1995 to 1 February 1996, with a decision originally expected by November 1996. At the close of the inquiry, Nirex promised to carry out further work in the intervening months, addressing points made by objectors. It was clear that Nirex hadn't presented a credible case at the Inquiry — but it seemed to feel confident that a slight extension to its work programme would sort out the problems.



The Herald

Rising dump

Not so. On 10 December, John Holmes, Director for Science at Nirex, realising that the company was struggling to make a case for the site, sent a memo to his staff:

"I have the feeling we may struggle to make a case for the site .... I was concerned that after £200 million the modellers are saying that we are short of datapoints by a factor of 10x or 100x. We need to get to the bottom of this — it seems more fundamental than just the number of hydrogeological units we are using. Options would seem to be more site characterisation, a different approach to modelling [or] we conclude that a BRUSC [Basement Rock Under Sedimentary Cover] type site is inherently not characterisable to the requisite level"

Leaked a month later, the memo prompted the Department of the Environment to request submission of any new evidence as a matter of urgency. Friends of the Earth immediately responded with two reports — one detailing how taxpayers stood to save millions if the project was delayed, and a second on the inadequacy of Nirex's new hydrogeological dataset.

Former chairman of Rwamac, Sir John Knill, also wrote to John Gummer on the matter: *"Dr Holmes's Proof of Evidence to the RCF Public Inquiry contains no inkling as to these profound reservations as to the adequacy of the safety assessment programme."* And arguing that further work was required which would take several years to carry out, Sir John then stated: *"If the RCF [were] to proceed without the matter being resolved, however that might be achieved, it would result in an unsafe situation which would require eventual resolution somehow"*.

On 5 February, following submission of all the new post-inquiry evidence, John Gummer formally invited supplementary comments, with a view to reopening the Inquiry. Friends of the Earth argued in its response that there was sufficient evidence for Nirex's application to be thrown out. ❑

Notes:

1. The proofs can also be found on the world wide web at: http://www.foe.co.uk/nirexrcf/index.html
2. It is essential to get a clear picture of groundwater flow before the RCF is built.
3. Hydrogeological conditions at Sellafield are predominantly controlled by flow through a network of interconnecting frac-tures such as joints and faults.

Dr Rachel Western is Senior Nuclear Research Officer at Friends of the Earth (England, Wales and Northern Ireland)

One hundred percent renewable

Gordon Proven **has a vision, 100% renewable energy. The head of one of the UK's most successful renewable energy companies thinks small systems and distributed storage is the (only) way ahead.**

Gordon Proven receives a Smart award for new Scottish technology from George Kynoch MP

SOME claim that the *only* energy option for the future is nuclear. I agree; but it must be nuclear fusion and we must use the existing giant fusion reactor already operating efficiently and safely at some distance from here — the sun.

The sun provides safe, reliable, everlasting (for our short time horizons) energy, arriving on Earth in a diffuse form. We therefore have to cast a wide net to collect this widely distributed bounty. Our uses of energy are also diffuse, and are spread over the earth, just like the incoming solar. Perversely, in developed countries at least, existing energy production tends to be distorted into very large central generation plants sitting at the apex of a vast spider's web, distributing the power to diffuse users — a pattern driven by a striving for thermodynamic efficiency supported with incomplete economics.

External costs of fossil fuel are for the most part outwith the formal market and barely admitted by generators and users, yet they are very real. Only now are the die-hard sceptics conceding the greenhouse effect, perhaps because insurance companies are now seeing the climate related monetary losses stack up. Let's hope it is not too late to stop a runaway greenhouse effect. And although earth-bound nuclear, in comparison to fossil fuels, won't push up the temperature quite so much, it has other insidious pollutants which we cannot see or feel, Chernobyl being one of many major disasters still reverberating. Essentially, I think that a payback period of 10,000 plus years is rather uneconomic; but even more I think it is morally indefensible to leave our descendants with a dangerous and costly long-term problem for the sake of our 30 years of electricity.

There is another way. Most countries on Earth have an abundance of solar energy, mainly unused. In my home country, Scotland, it tends to be available in secondary forms such as wind, hydro, wave, and tidal. More than enough energy from these sources exists to supply Scotland now and into the future. Current proposals say we may rise to 10% or even 20% of our energy needs from new renewable energy, particularly from wind power; I say we should be striving for 100%. By definition, in the long term, that is all we have. Earth-bound nuclear power and thermal power stations can be phased out as we build a diffuse infrastructure of small-scale wind, micro hydro, solar and others. Table 1 shows a comparison between present conventional generation and a possible mix of renewable energies. It is to be treated as illustrative, but nonetheless indicative of the possibilities. If a major wave power program were undertaken, it alone could supply our needs. The eventual mix will be determined by cost and practicality, but the sources are here.

Advancing Technology

Local renewable energy production will become the norm in the future. Every house, farm, school, factory and office will have appropriate solar (in the broad sense) energy collectors. By using small-scale wind turbines attached to existing buildings and connected to the grid through existing outlets, any perceived landscape intrusion is minimal and no extra grid infrastructure is needed. Combined output from mass-produced and installed small wind turbines can easily compete with 200 10MW wind farms; but they should not compete they are complementary.

Small wind turbines and other systems are becoming more and more reliable, easy to use and available to the general public. Proven wind turbines are now (at last) seeing a snowballing sales effect as people realise the technology works and is available. More and more sophisticated, but user friendly controls make the systems less demanding and more useful. New generations of quiet, reliable wind turbines are being developed. Buying and using a wind turbine (or other solar energy collector) must become as easy as buying and using a TV, and hopefully easier to use than a video recorder.

Rounding the circle is distributed, grid-connected energy storage — the final piece of the jigsaw, and a small problem to be overcome if we are to have large-scale deployment of renewable energy systems. Storage is needed with any energy system, but is more important with renewable energy because of its inherent intermittent nature. Pump storage schemes such as Loch Awe/ Cruachan do a little, but for serious national energy storage I again propose the diffuse answer — a 10 to 20 kW grid integrated energy store in every house, farm, factory, building, providing 50,000 MW of instantly available energy store. All forms of diffuse energy input to the grid can now be efficiently used; peak generation problems disappear; the system is extremely robust; the grid becomes a true energy exchange network, an energy internet. Of course there are things which will have to change — the 1998 so-called 'opening up' of the electricity market has so many obstacles to true market development that it will tend to act as a barrier to progress.

With a grid-integrated energy store and associated 'solar' energy collection system in every building, the Grid has a new role:

The Proven turbine

facilitating the trading of energy on a grand scale. Each store can buy and sell to the grid, the buying having a premium over the selling, like a stock exchange, and the premium paying for the Grid. Large power users can draw from many diffuse suppliers. The Grid and each building will become extremely reliable — since each house has a built in back-up system, supply cuts like the Scottish Borders problems this winter will be unknown.

Not only grid changes are needed — political, social, and economic attitudes have to adapt as well — but technical advances will certainly open up political choices. Proven World Friendly Energy, along with European partners, are making a small start, by starting research on just such an energy store device which can in the short term be used for off-grid storage, back-up systems, and electric vehicles, but at the same time can in the long term fulfil the grid integrated energy store technical requirements.

Political channels

Local Authorities now have an obligation to strategise how they would cut energy use in all their area's housing (council and private) by 30%, a target well within the means of a combination of conservation and small-scale renewables. Hopefully this will stimulate renewable energy growth further and help get us started on a virtuous circle of reducing fossil/nuclear energy needs and reducing renewable energy capital costs. Large-scale wind farms are already competitive against other sources at face value, and even more competitive when external costs are included.

We must aim to make renewable energy lower in cost than any of the polluting sources. This is happening gradually through technical advances, but will be helped by 'polluter pays' taxes such as the carbon tax. There is no need for this to be an extra tax burden, rather a shifting of the tax weighting. This is, after all, what governments should do — use their tax powers to discourage harmful activity and encourage beneficial activity for the good of people and country.

Governments of course have other concerns than energy, but avoiding the destruction of our world should have some priority. Major social problems like unemployment are arguably a political choice and not an economic necessity. We are now more wealthy than we have ever been, thanks to vast increases in people productivity which in turn is the result of technological progress and good education. How this wealth is distributed is a political decision. There is no reason why more people could not be employed with fewer hours — the reduction in hours would probably result in even higher productivity. Production, installation and maintenance of large numbers of small-scale renewable energy systems will create many new jobs, far more than equivalent conventional large-scale energy projects, and more integrated into society.

One of the elusive goals of government is 'the feel good factor'. How can people feel good when they are reduced to serfs on an economic treadmill? As well as reducing polluting energy use, the widespread use of small-scale renewable energy empowers and enriches people's self-sufficiency and self esteem and reduces the 'big brother' feeling of being at the mercy of big business. People need to build some feeling of security and self determination before the feel good factor has any chance of returning; quite apart from the fact that it is difficult to feel good if you know your everyday activity is destroying our environment. Although there is a good deal of technical R&D required, it may be that social and political developments are in greatest need of some innovative development. ❑

table 1

Conventional Generation

Station	No. Units	Peak, MW(each)	Peak, MW
Hunterston B	2	600	1,200
Torness	2	600	1,200
Longannet	4	600	2,400
Peterhead	2	600	1,200
Cockenzie	4	500	2,000
Total peak power			8,000

Renewables

Type	No.	Capacity, MW	Average*, MW
Windfarms	50	10	200
Wave	50	10	250
Tide flow	50	20	500
Wind turbines			
Farms	50,000	0.04	500
Country houses	200,000	0.006	300
Urban houses	240,000	0.002	86.4
Micro hydro			
Farms	2,000	0.02	40
Hotels	1,000	0.02	20
Houses	10,000	0.005	50
Solar			
Houses	1,200,000	0.005	750
CHP			
Houses	800,000	0.001	800
Total average power, peaking in winter (1)			3496.4

* Wind, wave, tide and solar are all multiplied down by a production factor

(1) Peak winter demand about 5,500 MW

Storage

Each house uses about 3 MWhr/yr or 0.000342 MW/hr

For 2,400,000 houses in Scotland, this represents 822 MW hourly supply

A two-day energy store at each house would therefore add up to 39,452 MWh, or 0.016 MWh/house

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Fourth non-fossil fuel order

AS expected, the fourth Non Fossil Fuel Obligation order (Nffo-4) was announced in February. The largest order yet, waste and wind have the lion's share, in the case of the latter to the disgruntlement of the Council for the Protection of Rural England (CPRE). Waste-fired combined heat and power and anaerobic digestion of agricultural waste make a new entrance, while chicken litter exits.

Junior energy minister Richard Page laid the Nffo-4 order in Parliament on 6 February. Bid prices were lower than originally envisaged, allowing around 340MW extra to be contracted. 195 projects were successful, totalling 843MW declared net capacity.

Landfill gas and waste incineration together cornered 44% of the contracts, wind 33% and small-scale hydro 16%, with the remainder taken up by wood and slurry-based schemes. And at 49% (waste) and 40% (wind) of the order's contracted capacity, waste utilisation and wind power dominate the order (biomass has 9% of total capacity, hydro 2%).

Separate bands for waste-fired CHP and anaerobic digestion of agricultural wastes are both new additions. Six slurry based schemes make up the new anaerobic digestion band and wood-fuelled schemes have superseded chicken litter's Nffo-3 showing.

Quick on the offensive, CPRE press released 'Green light for wind turbines blows ill for the countryside.' Energy campaigner Lili Matson says of the 65 wind contracts: "the government is in danger of failing to promote a sufficiently diverse range of renewable energy technologies — some of which may be less environmentally damaging ... Rather than swamping the countryside in wind turbines, the Government should be supporting a range of less damaging renewable energy technologies and acting vigorously to reduce the amount of energy we waste." ❑

Second 'renewables' order

A little later than expected, the second Scottish Renewables Obligation order (SRO-2) was finally announced mid-March. An eighth the size of the Nffo, it mirrors its southern counterpart in its near-half allocation to waste. Meanwhile, controversy over the reference price used and the very low bid prices, perhaps the reason for the order's belated Parliamentary appearance, is set to continue in the run up to 1998 market liberalisation.

A footnote to the 6 February Nffo-4 press release said the SRO-2 was expected "within the next few weeks." Five weeks and at least two rumoured announcements later, George Kynoch MP put everyone out of their agony on the afternoon of 13 March.

At 112MW, the Order is larger than the 70-80MW predicted by the Office of Electricity Regulation (Offer). Waste to energy is the clear winner, up 477% in its share of contracts and 880% on capacity, compared to SRO-1. Nine waste to energy contracts totalling 55MW — 49% of the order's capacity — cover landfill gas, tyre incineration and municipal waste incineration. Wind and hydro are down on SRO-1 — 7 wind contracts (previously 12) totalling 44MW (45.6MW) and 9 hydro contracts (15) totalling 11MW (17.25). One biomass contract was awarded for 2MW.

George Kynoch, in announcing the order, referred to "concerns about ... the visual impact of windfarms" and "concerns ... about the potential impact of new hydro schemes," while the "environmental benefits" of waste to energy projects got a mention (but no concern).

Behind the scenes, a spanner in the works for the SRO is the Scottish Office's decision to use the marginal cost of coal-fired generation, 1.1-1.3p/kWh, as the reference price. This is lower than the Nffo reference price, the pool selling price of 2.2-2.5p/kWh. The reference price is supposed to reflect the price a supplier would otherwise have incurred in the absence of any renewables obligation.

With the utilities Scottish Power and Hydro Electric already contractually committed to take Scottish Nuclear's entire output and the gas for Peterhead power station, new renewables are considered to displace electricity generated by coal-fired stations, which have a very low cost for generation when fixed costs are excluded.

In England and Wales, all generators bid in to the pool, with the highest bid price accepted being paid to all successful bidders. New renewables are judged against the pool price, regardless of any must-take contracts.

Suppliers are paid the difference between the SRO/Nffo contract price and the reference price as compensation. A low reference price for the SRO means that for a set budget, money which could have been used to pay a larger number of generators will instead go to Scottish Power and Scottish Hydro Electric. A reference price of around 2.2p/kWh would double the number of schemes contracted.

Offer, in its SRO-2 publication, describes the lowest bid prices of around 2.7p as "a reasonable proxy for the market price of generation in Scotland." However there is no market in Scotland.

Renewables developers in Scotland want the reference price raised, to reflect the market cost of conventional generation, a request which was put to the Scottish Office earlier this year. Accepting that it will take time to change the reference price, developers hoped SRO-2 would be laid in the expectation of it being raised. Detailed discussion could then ensue in the run up to market liberalisation in 1998, and by the time SRO-2 projects came on line, a new reference price would be in operation.

With just seven wind contracts awarded, developers believe this has clearly not happened. Adrian Lloyd of the Scottish branch of the British Wind Energy Association said of the SRO-2: "We are very, very disappointed."

To top this, *Safe Energy* understands from several sources that there is "disquiet in the industry" over the "impossibly low" prices of 2.74 - 2.95p/kWh bid for wind. Officials have been informed by at least one large developer that any price below 3p is simply not feasible. Under 3p, developers will be at the very least assuming low construction costs, favourable (inexpensive) planning outcomes and a strong pound. And such low prices could also disqualify all but the heavyweights in the industry.

Some in the wind industry fear contracts are being given to questionable projects, which could come unstuck at a later date. Offer is supposed to guard against this by vetting projects in a 'will secure' test. However, a leading wind energy professional told *Safe Energy* the will secure test was "an absolute joke."

Similar concerns have been expressed over Nffo-4. The latest editorial in *Wind Power Monthly*, on Nffo-4, suggests that rapidly diminishing profit margins in Britain are stifling research and frightening off domestic manufacturing, "yet the British Government wonders about the dearth of wind turbine manufacturers". ❑

Climate negotiations

POOR compromise and procrastination is the writing on the wall for the Kyoto conference this December — the most important climate change negotiations since the Rio earth summit. Expectation is such that a European Union (EU) agreement on a desirable greenhouse gas reduction target — which falls short of what is required to limit climate change, and towards which countries could only promise measures to go two thirds of the way — was hailed as a victory.

"We'll be lucky to get past Kyoto with the convention intact," is one disparaging comment on the upcoming third Conference of Parties to the Climate Change Convention, from a European ministerial adviser speaking to the *New Scientist*. He's not alone in his scepticism. Followers of the climate change convention think any targets that do happen to make it through the negotiations at Kyoto will not be sufficient to control global warming. "Kyoto will deliver nothing worth having," said Tim O'Riordan, an environmental scientist at the University of East Anglia.

Nevertheless, Europe has been busy thrashing out a common negotiating position on climate change, and on the evening of 2 March ministers reached an agreement: emissions of a basket of three greenhouse gases, CO_2, N_2O (nitrous oxide) and CH_4 (methane), should be cut by 15% from 1990 levels by 2010. This position was taken to the latest intersessional (a meeting to precede the showpiece meeting — Kyoto — where much of the legwork is done) in Bonn.

EU ministers surpassed all expectations with their agreement. Unidentified European officials hailed the turnaround from a "pretty good risk" of failure, as "historic". Yet the target was a considerable compromise on what was put on the table by the new Dutch EU presidency. Proposals for a 10% reduction by 2005 were scrapped (it is hoped that a 2005 target will be agreed at the next Environment council meeting in June), as were three of six greenhouse gases originally earmarked for inclusion in the basket. Most worryingly, despite agreement on a European 15% objective, countries could only commit to targets resulting in a total 10% reduction. Environmentalists line up with the small Island states, who stand to be partially submerged if climate change is not kept in check, in asking for a 20% reduction by industrialised countries, by 2005.

Five years after the Rio earth summit, and just months after its five-year assessment, representatives from almost every country in the world are due to meet in Kyoto, Japan, in December, to set legally binding greenhouse gas reduction targets for beyond 2000. Industrialised countries have previously agreed to stabilise greenhouse gases at 1990 levels by 2000.

Since Rio, nations have been unable to agree on any further targets. The first post-Rio meeting on climate change, or Conference of Parties (COP) to the Climate Change Convention, agreed that climate change should be subject to further discussion. COP-2 ended with majority belief that there was a discernible human influence on climate change (SEJ 110, "Climate change — concern grows") and recognition that procrastination over setting targets would not be acceptable, but no targets were set.

Only a few industrialised nations, including the UK, are likely to meet the Rio-agreed target. Developing nations have no targets and are reluctant to set any, while the US is averse to targets until at the very least, countries like Turkey, Korea and Mexico accept targets. The US has also back-tracked somewhat on a much lauded COP-2 commitment to binding targets.

Even if consensus is reached on the principle of worldwide target setting, allocation of responsibility between nations, with accompanying realistic time-scales, is a whole new hurdle. The US is vigorously in favour of sophisticated environmental economic tools designed to allow 'flexibility' in meeting targets, such as tradable CO_2 permits. In suggesting countries be allowed to build up CO_2 debt by borrowing from future allowances, and that permits should be allocated according to existing emissions (rather than some equal per capita allocation), the US is alienating other nations.

On submitting the UK's latest climate change report to the UN, environment secretary John Gummer accused the US of talking "in vague terms" of targets. However, in a letter to *The Independent*, Greenpeace points out that for all John Gummer's words, his government's actions speak louder: "the Government plan to approve oil exploration licences to over 22,000 square miles of the Atlantic ... despite the fact that the science tells us that 90% of all oil resources will have to stay in the ground if we are to avoid climate change. Until the Government takes action to address the contradiction between its climate commitments and its headlong dash into oil, Mr Gummer's bark will be very much louder than his bite at this year's international climate negotiations." ❑

Flying against the wind

THE Ministry of Defence(MoD) has won its first case against a wind farm. Five turbines proposed for Blinkbonny Height in the Scottish Borders, and in range of RAF Spadeadam, have been turned down at Public Inquiry.

Border Wind, the developer behind the site told *The Scotsman* "It's a case of the establishment looking after the establishment, a decision we totally expected.."

Developers and Friends of the Earth Scotland (FoES) are concerned the decision will set an unwarranted precedent, pointing out several major gaps in the MoD's evidence which remain unaddressed (SEJ 111, "Planning for wind"). "Contradictions and inconsistencies in the MoD's arguments ... cannot be allowed to pass when Scotland's energy policy and issues like climate change are at stake," said FoES, adding "the onus should now be on the MoD to clearly justify their objections and answer all the points put to them."❑

■ A proposed Northumberland 130-turbine wind farm, in RAF Spadeadam's range, is the largest wind development to win a contract under Nffo-4. Developer EcoGen had an initial OK from staff at Spadeadam overturned by the MoD.

VAT Backtrack

JUST a week after Labour's energy spokesman re-iterated his support for a reduction of VAT on energy efficient goods, an initiative to do just that got a parliamentary knock-back — with the help of Labour's shadow chancellor. This blow to energy efficiency came on the same day a new bill aimed at eliminating fuel poverty, through obliging the Government to improve home thermal efficiencies, was published.

In interviews with Radio 4's James Naughtie, carried out on behalf of the energy action charity NEA, party energy representatives spell out policies for energy efficiency. On reducing VAT on energy saving materials from 17.5% to 8% (making it equal to VAT on domestic fuel), Labour's energy spokesman John Battle said "we actually supported the amendment to the last Budget to equalise VAT rates for energy saving materials so I think our intention is plainly staked out there." The interviews were published on 4 March.

On 11 March, the Conservatives imposed a three line whip against an amendment to the Finance Bill calling for the reduction. But with three conservatives willing to defy the whip, and the support of the Ulster Unionists, the amendment could have been won. However, on Gordon Brown's say, at least 22 Labour MPs withdrew their support for the amendment. Instead, Tony Blair and Brown offered an alternative amendment, calling for a report on the effects of the VAT cut, which was approved.

Shadow financial secretary to the Treasury Alastair Darling said: "We have made it clear that although we support the principle of reducing VAT on this area, we cannot support any additional spending commitment unless it can be financed." This isn't enough for those working to get the VAT reduction through. Andrew Warren of the Association for the Conservation of Energy (ACE), quoting Labour's Dawn Primarolo at a similar Commons vote last March, told *Safe Energy*: "Last year Labour supported the move 'in the name of justice, jobs, democracy and energy efficiency.' It would be helpful if Labour could explain which of these still interest them at all."

Ironically, 11 March was also the day *The Warm Homes and Energy Conservation (15 Year Programme) Bill 1997*, was published. It requires the Government to ensure funding for a 15-year programme of home insulation and installation of energy efficiency measures, in households suffering fuel poverty. Sponsors of the bill include ACE, Age Concern, and the Child Poverty Action Group while its promoters comprise an all-party group of MPs lead by two conservatives and one each from Labour, the SNP, the Lib Dems and Plaid Cymru.

■ A multi-media campaign was launched in January by the Energy Saving Trust (EST), to promote the financial benefits of saving energy.

Advertising moguls Saatchi and Saatchi prepared the campaign, which aims "to stimulate the uptake of energy efficient goods and measures, and generate 10% spontaneous awareness of the energy efficiency brand within the first year." The target audience is ABC1 homeowners aged 25-54.

Television adverts, newspapers, magazines, leaflets, mobiles, shelf wobblers, tent cards, posters and the internet carry messages from famous scientists to reinforce the campaign slogan — 'energy efficiency, it's clever stuff'. One poster proclaims "If Faraday's missus complained of a draughty passage, he wouldn't get a doctor. He'd get our insulation."

The total cost of the campaign was £7 million, over a quarter of the EST's 1996-7 budget. ❑

The energy efficiency advice hotline number is 0345 277 200

Green electricity shopping

PREPARATORY groundwork is underway for a green electricity market in 1998. Would-be green electricity suppliers, generators, consultancies and environmental groups are all investigating potential outlets for renewables in the fully liberalised market.

Trials for over-100 kW users indicate such schemes are feasible, and, according to market research, domestic consumers are quite willing to pay a little more for non-polluting energy.

Two thirds of the British public is supportive of retaining a renewables levy on bills, according to a recent MORI poll, and 21% are willing to pay an average £64 extra for guaranteed green supply.

Green Electron plc, sponsor of the MORI poll, is one of at least three initiatives underway to promote renewables post 1998. Intending to act as an "independent trading company" between the generator and supplier, Green Electron is a South Western Power (a South Western Electricity subsidiary) and SC Banks (biomass specialists) joint venture company. It has already tested the water in matching two run-of-the-river hydro and a landfill gas scheme with Stroud District Council's electricity bill.

Meanwhile, around 40 generators met in February to discuss the potential of a jointly operated green pool. Acting as a second tier supplier, the pool will cut out the middle man and supply direct to targeted domestic and some non-domestic consumers.

1998 demand for green electricity will be met in the first instance by generators whose contracts under Nffo-1 and 2 run out in 1998, and then hopefully later, by new capacity.

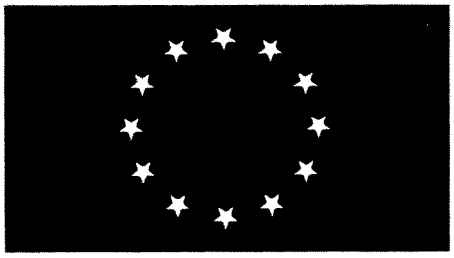
To guarantee best practice, an independent certification scheme is being developed by the World Wide Fund for Nature and consultants ETSU. Selection criteria are presently being discussed, with the eventual aim of certification being available to any green generator satisfying the criteria.

■ Northern Ireland electricity and gas regulator Douglas McIldoon's plans for a green electricity tariff will go ahead from April this year (SEJ 111, "Northern Ireland Nffo"), although the compensatory payment to Northern Ireland Electricity (NIE) remains uncertain.

NIE has rejected McIldoon's price proposals, which are due for revision for April, and while the proposals bounce between NIE, the Northern Ireland Office of Electricity Regulation and the Monopolies and Mergers Commission, prices cannot be fixed. Whatever the outcome though, customers will definitely have a green choice come April.

The regulator's proposals are to offer all NIE's customers green electricity at a premium price, with an incentive payment to NIE of 0.35p for every kWh of green electricity supplied. ❑

Liberal electricity shopping



EUROPEAN Member States (MSs) are now required by law to allow EU-wide access to specified chunks of their electricity sector — apportioned in incrementally widening eligible consumption bands — following the European Parliament's passing of a draft directive on electricity liberalisation. Formally issued at the start of this year, the Directive has to be translated into government policy in up to two years.

Top level discord over public service provisions and environmental considerations dogged the draft directive's passage right up to its last reading, but the prospect of sending it down a snake some 11 years on from its initiation apparently determined MEPs to usher it through. However, the buck stops at the door of each national government, and arguments already aired in Brussels are replaying on the domestic front. The UK, well ahead on privatisation and with the miners quashed over a decade ago, has set the pace. In the absence of tighter EU rules on social and environmental standards, others look set to follow.

On 11 December last year, the European Parliament voted 406 to 76 against any new amendments to a long-negotiated agreement on the electricity liberalisation directive, reached at a meeting the previous June of the energy Council of Ministers (SEJ 110, "EU policy"). The European Parliament's Committee on Energy, Research and Technology had tabled ten amendments, covering the right of MSs to protect vulnerable groups against excessive tariff increases and an insistence that liberalisation be linked to harmonisation of fiscal, environmental and safety standards. Another 12 amendments were put by diverse groups including the Greens, Communists and Socialists.

Gradual phasing in of the Directive, allowing cross-border shopping for electricity can now go ahead, starting at the top end of consumption (greater than 100GWh/yr consumers) and working down. MSs are allowed to either authorise or tender for new generation capacity, and can choose between negotiated third party access or a single buyer model for access to transmission and distribution networks. Public service obligations and environmental standards have largely been left to subsidiarity, within the rules of competition set out in the Treaty of Rome.

Most countries have already initiated liberalisation, and, as in the UK, it is proving a painful process.

The Netherlands: a proposed merger of the four main generators, with EU competitive clout in mind, is unpopular with both workers (there would be job losses) and distributors (who may be obliged to buy exlusively from the new generator for its first four years).

Spain: In negotiating a pre-liberalisation protocol between utilities and government, the industry minister was vilified from all sides — by the utilities who want to use no more than 15% expensive Spanish coal, by miners wanting no less than 25% and by almost everyone including fellow ministers for his proposed phase-out of coal subsidies.

France: Electricité de France (EdF) slashed prices to IBM, thus persuading the firm to abandon plans for on-site cogeneration. Strikes at EdF and Gaz de France have been over changes introduced in anticipation of the liberalisation directive.

Germany: Draft liberalisation plans cannot be agreed upon. The Bonn government wants to protect new plant dependent on local brown coal.

Austria: Battles over reorganisation of the energy sector ensue. Present proposals are under attack for allowing price reductions to large users to be subsidised by everyone else.

Switzerland: Mountain cantons, paid royalties for the use of their water in hydropower, may have to "kiss goodbye to any hope they may have had of winning further increase in their royalties," reported *Power in Europe* Moreover, if public service obligations exit as the open market enters, remote areas may be paying extra for electricity.

Sweden: Government has mooted plans to temporarily ban electricity exports in the difficult transition period between phasing out nuclear and bringing in replacement renewables. The legality of such a move under the new EU rules is not clear.

For sustainable energies, the fear is that the liberalisation process will accelerate 'eco-dumping'. Even if the Directive allows for environmental criteria in government authorisation of generators, and specifically mentions renewables in Articles 8 and 11, it just takes one country to drop environmental responsibility for the price sensitive market to follow suit A January survey of Europe's major electricity users carried out by consultants Price Waterhouse found 61% to view price as the only reason to change supplier, 14% regarding both price and service as equally good reasons to swap, with the remaining 25% lumping the environment in with price, service and security of supply, a combination of which would be incentive enough to shop around.

Other EU business

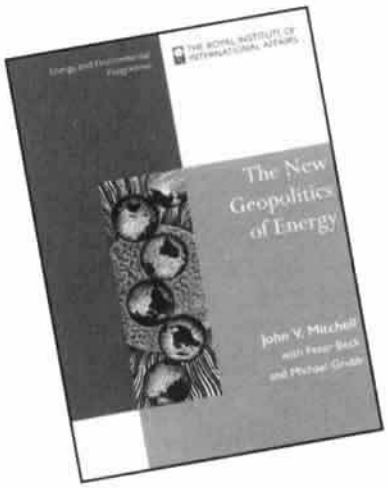
WITH the Dutch having taken over the EU presidency seat, vacated by the Irish at the end of 1996, climate change is a priority, with several initiatives earmarked for extra effort in 1997.

- On the heels of failure to agree on a CO_2 tax, EU leaders have asked for a directive on raising minimum taxation on motor and heating fuels, plus an extension to levy tax on electricity and natural gas. Taxation would be fiscally neutral, with a compensatory drop on labour-related taxes. (Nevertheless, agreement cannot be reached on this thorny issue and it was taken off the agenda of the 5/3 weekly EC meeting.)
- The Commission issued a renewable energy Green Paper in November, *Energy for the future; renewable sources of energy — green paper for a community strategy.* Energy Ministers meet on May 26 this year, when the paper's proposal to double the EU's renewable energy use to 12% by 2010 will be up for discussion. Suggested Commission policy actions to achieve this increase include a larger Altener II programme, a reappraisal of fund allocation to nuclear power and a system of tradable obligations requiring electricity suppliers to contract for a certain amount of renewables.
- EU Environment Commissioner Ritt Bjerregaard has set out in a communication, the conditions under which environmental taxes can be levied. Such taxes must be used in the spirit of the polluter pays principle as opposed to an anti-competitive measure. Just days after the communication was formally discussed at the EC, the Union of Industrial and Employers' Confederations of Europe questioned the justification for environmental liability when notions of environmental damage are ill-defined. The group goes on to allege that the "intensive" use of legal proceedings by ecological groups (who, it implies, are not bound by the same principles of fairness incumbent upon the State) would result in an arbitrary targeting of cases on a small number of wealthy, high profile companies. ❑

Energy not what it used to be

The New Geopolitics of Energy by John V Mitchell with Peter Beck and Michael Grubb.

The Royal Institute of International Affairs, 1996, 196pp, £14.95



ENERGY policy has always been a geopolitical issue. Energy, not money, makes the world go round. The international dynamics shaping energy policy and use have changed dramatically since the early seventies and the domination of the Middle Eastern oil cartels.

No longer do governments perceive any form of crisis and many, if not most, have moved away from state-dictated supply systems. In *The New Geopolitics of Energy*, the authors believe there is a need to "define a new international dimension to energy policy that takes account of the dramatic political changes since the oil crisis of the 1970s." They argue: "This new geopolitics of energy is creative rather than defensive, aligned to market orientated development rather than state management."

Focusing mainly on petroleum and the rise of natural gas, the authors also comment on nuclear power and climate change. While oil prices have fallen to below the level preceding the 1979 oil shock, "there is no perception of near- or medium-term shortage. The market has become both more open and competitive." The end of the Cold war has given the US a greater freedom to take action in the Middle East — as witnessed during the Gulf War — and will lead to a massive expansion in Russian gas exports to Europe.

No longer are international energy prices set through negotiations between the western Organisation for Economic Co-operation and Development and the Organisation of Petroleum Producing Countries: East Asia has overtaken Europe as an energy consumer and its continued economic growth means that it will soon consume more energy than the US.

Nuclear power is set to grow in many developing countries, especially in East Asia, "however, there is a chance that the West, headed by the US, may impede trade in technology in order to limit the trade in plutonium-containing fuel for civil use, a potential weapons proliferation risk."

"In most of the rest of the world" comment the authors "the challenge to the [nuclear] industry is how to escape from the dilemma of being too uneconomic and too suspect in the public's eyes to expand." Peter Beck observes that although the nuclear industry's future looks bleak in the West, many countries are still pursuing the nuclear option, especially the dynamic economies of Asia and South America which "are proposing to make nuclear energy one of the cornerstones of their power generation strategy." We may "therefore still see an expansion of the industry, though with its future less under the control of the West."

Beck believes "major expansion of nuclear power should still be able to help the battle against climate change." He concedes it is doubtful that present technology could be used for such an expansion — instead, he promotes greater international co-operation in developing safe reactors and a more secure fuel cycle. What he misses is that the optimistic plans of East Asian governments are no different to those which were pursued in the West during the seventies. And in the West, as safety assurances and economic promises began to fail, so too did public support. Already the cracks are beginning to appear in Asia — disputes over waste storage deals and accidents have prompted the emergence of anti-nuclear groups in typically protest-free nations like South Korea, Taiwan and Japan.

Climate change represents the biggest change since the seventies, only really taken seriously on an international level since the late eighties, Michael Grubb comments, and "if and as the pressures and actions to limit CO_2 emissions do combine to have a substantial impact, they will directly influence the other geopolitical issues set out in this study."

Grubb concludes, "climate change concerns represent a new global rationale for nuclear power, but the signs are that this only further highlights the need to find forms of nuclear technology and organisation that are publicly acceptable, and more generally the need for coherent international collaboration in the development of both better and renewable energy technologies."

Sometimes confused, and often confusing, *The New Geopolitics of Energy* raises some interesting ideas and places the debate firmly where it belongs, in the late 1990s.

Mike Townsley

Vital

Vital Signs, 1996-1997. The trends that are shaping our future by Lester R Brown, Christopher Flavin, Hal Kane. Linda Starke (ed)

WorldWatch Institute, 1996, 169pp, £12.95

A standard reference publication these days, and just the fifth edition. It's the kind of book you want if you're stuck for an introduction or lead-in. "Global sales of compact fluorescent lamps rose to 240 million in 1995," *thanks in no small measure to a practice called Demand Side Management* ... "Wind power is now the world's fastest growing energy source", *and, madam speaker, the UK should be spearheading this advance.*

Impress your friends/boss with snippets like 'if all the world's turbines were spinning simultaneously, they could light 122 million 40-watt light bulbs' or 'the greatest surge in bicycle use in modern times is under way in Cuba — in three years the number of bicycles used in Havana rose tenfold.'

For those of us who get wrapped up in the domestic, or if you just can't see the wood for the trees, this book is a sobering bigger picture. In 1995: world

Private records

The British electricity experiment: privatisation: the record, the issues, the lessons. John Surrey (Ed)

Earthscan, 1996, 329p, £17.95p

WELL researched, this book provides an excellent account — with interesting analysis — of events before, during and after the privatisation of the electricity supply industry (excluding the nuclear stations) in 1990/91. It has been written by eight academics from the Energy Programme of the renowned Science and Policy Research Unit at Sussex University.

Privatisation, as it affected England and Wales, was truly radical, involving restructuring and liberalisation as part of the process, and the introduction of a new regulatory system.

The relative success so far of the privatisation has been helped greatly by circumstances. Low fuel costs have brought a reduction in electricity costs and prices, though the balance of benefit to date has been in favour of the shareholder rather than the customer. And the dash for cheap gas has for the time being lessened the fear that the removal of an obligation to ensure sufficient generating capacity would lead to shortages and power cuts.

The authors question whether the benefits in operating efficiency which have resulted from privatisation could not have been achieved without wholesale privatisation and rightly express concern at the instability of the new structure and the limitations on government involvement: "If the need for strategic intervention by government does become important, these changes will make such interventions more difficult as structural change in the industry increasingly means that the elements of the electricity supply industry are fragmented amongst diversified, internationally based companies."

As with so many books looking at energy in the UK, it deals predominantly with England and Wales. In mitigation, as the late Andrew Holmes once observed: "Compared with the amount of work which went in to the new English system, the Scottish system was evolved on the back of an envelope." This justification does not, however, justify the failure in many chapters, most glaringly in that on renewables, even to acknowledge that the system being described applies only to England and Wales.

It is also unfortunate that the book was written just before the partial privatisation of the nuclear generators in mid-1996 — which left the authors speculating about a possible sell-off rather than detailing and analysing what actually happened.

In its conclusions, the authors caution against the "UK model" of privatisation being used in other countries. The UK approach was driven by political circumstances and constrained by the existing structure of the industry. Its replicability is therefore limited. Furthermore, it has been a huge experiment with the country's most vital industry, an experiment which is not yet complete; not until at the earliest 1998, with the opening up of the domestic supply business to competition, will the winners and losers, the success or failure of the undertaking, be known.

Graham Stein

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coal use rose, with China's use accounting for more than one quarter of the total; world shipments of photovoltaic cells jumped 17%; world bicycle manufacture outstripped that of automobiles by a factor of 3.2; global carbon emissions broke a new record, with most nations failing to meet the goal of the Framework Convention on Climate Change while the average temperature of the atmosphere at the Earth's surface rose to a record high.

There's something here for the optimists and the pessimists. If you want to illustrate a point, get this book.

Helen Snodin

Letter to the editor

Mr Guthrie was moved enough by a book review (SEJ 111, "A review of nuclear disarmament) to contact Safe Energy. *We are happy to give him space in the interests of open discussion, although letters are not a regular* Safe Energy *feature. If anyone feels a regular letters page would add to their enjoyment of* Safe Energy, *please tell us.*

Dear SEJ

It is sad to see a respected publication like *Safe Energy* reinforce certain myths about the 1995 Review and Extension Conference of the nuclear Non-Proliferation Treaty (NPT).

Certainly it is true that the five nuclear-weapon states wanted indefinite extension; but it is also true that the real efforts for indefinite extension came from South Africa and Canada. Neither were puppets of the nuclear states. In the South African case, the decision to actively pursue this policy was taken at the highest level of government and was one of the key foreign policy decisions taken by President Mandela in his first year in office.

The package that was achieved — indefinite extension combined with a set of principles and objectives and a strengthened review process — was far better than most observers had dared hope for. The prospect of a Preparatory Committee (prepCom) in each year between now and the Review Conference in 2000 has focused minds on nuclear issues in governments around the world.

Here is the nub of the problem. At a key moment when NGOs should be looking forward and planning their input into the PrepCom process, most NGOs still seem to be looking backwards and debating the pros and cons of what happened in 1995. Progress on nuclear issues is perhaps not as fast as may be desired, but it is still moving, with new voices joining the debate — such as the statement by 61 admirals and generals in December in support of nuclear disarmament.

There is a world of opportunity ahead, but it needs NGOs to look forwards rather than backwards. It also requires maintaining a positive attitude and remembering that the NPT, for all its faults, is the only treaty requiring the nuclear-weapon states to disarm. As a senior African statesman put it when declaring he was in favour of indefinite extension: a nuclear-weapon-free world should be a basic human right — and you can't put time limits on human rights.

Richard Guthrie,
Bradford on Avon, Wiltshire

Rabbits drawn by Wilf Plum

Steely knights

They like 'em "ramrod-straight" in the yankie Air Force. British-owned, US-occupied Ascension Island Brooks Air Force Base, home to a radar station, has a new set of wind turbines. "They tower almost 100 feet into the sky, standing like ramrod-straight white knights on watch over the small island in the South Atlantic," reports *Air Force News*, 9 December 1996.

But the RAF back at home prefer their turbines out of sight, out of radar range. The erection of five wind turbines in the Scottish Borders has been stopped in its tracks by a Scottish Office Reporter — he accepts that pilots can't be expected to cope with the turbines and radar can't be expected to tell them from a helipcopter.

Reassurances 1

BNFL is free to fly Mox fuel to Japan thanks to relaxed air transport safety rules. Containers built to withstand crashes at up to 30mph have been authorised by the International Atomic Eenergy Authority. Tighter rules would make the flights uneconomic.

Could BNFL please state the landing speed of the aircraft it proposes to use?

No is the short answer to Professor Hesketh's question, asked in the letters page of *The Guardian*. The long answer, from BNFL's public affairs officer, in response to this and a number of other questions on the matter posed by Hesketh, includes the gems "Having demonstrated the material itself when subjected to the same test regime as the packaging would have been the material is said to possess 'Low Dispersability' characteristics" [punctuation left as it was] and "It is ... not appropriate to infer that aircraft speed is the single function by which packaging response should be judged, especially if one considers that during the landing phase the airframe is near horizontal and the pilot has a vested interest in keeping it that way.".

Coupled with a helpful reassurance from an International Atomic Energy Association spokesperson on the adequacy of criteria — the 30mph test is adequate because it is on to a hard concrete surface, but crashes on to earth or water would cushion the blow — just who are they trying to kid?

Reassurances 2

According to one Dounreay supporter at a recent public meeting in Inverness, the very least we can do for the Australians is keep a hold of their waste — after all we did blow up all those bombs in their desert (yes he did really say that!)

Independent

The paper trying hardest to capture the environmental readership is *The Independent*, but it sometimes has a strange way of doing it. In February, it printed news of a windfarm planned to be four miles out at sea off Clacton, Essex. It called it the "end of the pier show" and printed an artist's impression of it. A reader wrote in to point out that the pier at Clacton is 1,180 feet long while the windfarm will be 21,120 feet from shore — an exaggeration by a factor of 17. As to the drawing, the reader explained that it was showing the wind turbines about double the size they would actually appear.

Did the paper good-naturedly admit that it had been using journalistic licence and that it did not wish to suggest that a windfarm four miles from the shore was an eyesore at the end of the pier? Well they must have forgotten, so in the interests of balance, little black rabbit has stepped in.

Concerned, of Billericay

John Gummer continues to impress little black rabbit, reaching new heights on 17 March with his refusal of Nirex's planning appeal for an investigatory Rock Characterisation Facility. However, the issue LBR knows and loves him for is global warming. He's given some rousing performances. At the second Conference of Parties to the Climate Change Convention he ranked failure to act on global warming on a par with the League of Nations' failure to act to prevent the Second World War. On the basis of the latest scientific research "the alarm bells ought to be ringing out in every capital throughout the world," he said.

So how do his fellow members line up on the issue?

In a letter passed on to LBR, written by Teresa Gorman MP to Frank Cook MP, (Chair of the Parliamentary Renewable and Sustainable Energy Group), Ms Gorman is moved to: "tell you that this stuff about the dangers of carbon emissions is crap." Conceding "there is a good reason for reducing exhaust emissions — they're unpleasant" she chastises Cook for "suggesting that we are on the brink of disaster as you energy freaks seem to do." It is all "just plain daft."

So we can all go home. Or we can put it down to the ramblings of a confused woman hailing from Billericay, Essex.

Only asking

Compare and contrast the following replies.

On the possibility of a legal challenge to the windfall tax, Alastair Darling is satisfied there is "no possibility of a successful legal challenge" and on the same subject Tony Blair says "we have had legal advice on the subject which is very, very clear."

On the possibility of a an EU legal challenge to Labour's plan to cut VAT on domestic fuel, a spokesman for Mr Brown's office told *The Guardian* he did not "give a monkey's f***" what the Commission said.

the EASE newsletter

Issue 4 Energy Alternatives for a Sustainable Europe March 1997

'Shifting the Balance of Power'

Forthcoming seminar in London on liberalisation and sustainability

Profound transformations are afoot in the UK energy sector, with companies now gearing up to take advantage of the full liberalisation of UK energy markets in April 1998. The country presently finds itself at the vanguard of international change.

At the same time, climate change is fast becoming the greatest environmental challenge being faced in the world today. It is being realised that if we are to avoid the terrible risks threatened by climate change, we must radically rethink both our energy sector policies and the role which energy plays in our economic activities and lifestyle choices. The window of opportunity offered by liberalisation can be used to deliver environmental and social, as well as economic goals, by pushing forward the development of renewable energy sources and energy efficiency, rather than fossil fuels, in order to help make energy use more sustainable.

On 2nd June 1997 Friends of the Earth is running a one day event in London to address this imperative: How can we deliver sustainability through the mechanism of a liberalised energy market? And what are the risks and benefits for all the involved players?

We will be running three separate roundtable seminars for high level participants from the political, industrial and consumer sectors to discuss the role each could play in promoting the transition towards the development of a sustainable energy system. Each group will address such issues as:

- the potential for moving from energy supply to energy services;
- opportunities and threats for the conventional power sector and the new renewables industry;
- the challenges facing investors in a world increasingly dominated by climate change;
- the policy, regulatory, and fiscal measures that would enable the renewables sector to operate on a fair, level playing field;
- how to achieve a market framework that ensures liberalisation delivers environmental and social objectives, as well as economic ones.

In the afternoon, delegates will come together for a plenary session with keynote speeches and discussion of the outcomes of the roundtables. This session will seek consensus on how best to advance the sustainable energy agenda.

To date, the liberalisation debate has focused on economic benefits. In the early weeks of a new government 'Shifting the Balance of Power' will be the first major conference to look at this debate from the perspective of sustainability.

The seminars will take place on June 2nd 1997 at Church House, Deans Yard, Westminster, London SW1. For further information and a booking form, please contact Joanna Watson or Claire Bower at Friends of the Earth.

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A climate change

The events of the last few weeks will have begun to focus the minds of policy makers across Europe on the options available to achieve reductions in greenhouse gas emissions post-2000. Recent events have seen Ministers at the recent EU's Environment Council meeting agreeing on a negotiating position for Kyoto comprising of a 15% reduction in a basket of greenhouse gas emissions by 2010; Sweden deciding to close down one of its operating nuclear reactors by 1998; thousands of ordinary people demonstrating against the transport of nuclear waste to Gorleben in Germany; Dounreay in Scotland being forced to return nuclear waste to the country of origin within 10 years; the explosion at the Tokaimura reprocessing plant in Japan; and the refusal of planning permission for Nirex's Rock Characterisation Facility in Cumbria. The nuclear industry will hope to benefit from the climate change negotiations, but costs and the growing public opinion against the industry will count heavily against it. This edition of the newsletter highlights some of EASE's attempts to find popular alternatives.

Contents

'Energy 21' Conference

Sustainable energy opportunities and the implementation of Agenda 21 in Europe was the focus for the EASE conference, held over two days in North Berwick, Scotland, at the end of November last year. A wide array of international delegates and speakers attended from across Europe - from Estonia to Italy, and from Ukraine to the UK.

The conference began with a session discussing local energy planning and Agenda 21. **Fritz Schlingemann, Director of the UNEP in Europe**, began the proceedings. Energy, he declared, was one of two critical issues for sustainable development (the other being water), with worldwide energy demand continuing to grow and, as he noted, "the enhanced greenhouse effect, leading to rapid global climate change, is perhaps one of the most serious man-made environmental threats ever faced." Mr Schlingemann stated that it is the UNEP's overall aim to encourage and promote a sustainable future, by enabling countries to fully assess the consequences of the energy options open to them. The UNEP, he said, is also seeking to promote environmental citizenship - "a dynamic partnership involving government, private industry, academia, NGOs and individual citizens." An important development given that traditionally energy planning has tended to a top-down approach.

"... seeking to promote environmental citizenship - a dynamic partnership involving government, private industry, academia, NGOs and individual citizens."

Mr. Schlingemann then went on to say that with the full cost of energy options rarely being considered in energy investment decisions, what may appear to be cheap options may bring about excessive long-term costs to society. External costs, such as loss of human life, health bills, damage to material goods including buildings, damage to ecosystems and biodiversity, which can be comparable with the present cost of energy are, he said, not being taken into account. One of the priorities of the UNEP's new energy programme will be to encourage integrated resource planning (IRP) in developing countries.

'Sustainable energy strategies and Local Agenda 21' was the focus of the talk given by **Chris Church of UNED UK**, the body coordinating efforts on Local Agenda 21. He asked how energy issues fit in with Local Agenda 21 - answering "practically everywhere", with energy being crucial to stakeholders in the Agenda 21 process, and to its decisions and outcomes. He cited the problems surrounding transport as being a good example, it being salient in any strategy to reduce energy consumption and to effectively tackle problems such as global warming and air pollution. Nottinghamshire Country Council has been one of the first UK authorities to develop a 'Green Commuter Plan', which includes workplace based car sharing, pooled bicycles for local use and a target of 30% reduction in car commuter trips within three years. However, transport is an extremely personal issue, and talk of reducing the level of road transport can be perceived as an attack on an individual's way of life. Mr. Church said that it would be interesting to see the reaction of the public to plans by local authorities targeting car use, and that participation in creating strategies for sustainable energy use was vital in developing acceptable ways forward.

Mr. Church suggested that, "if we get the people right, then we may just get the environment right. Trying to do it the other way round is a non-starter." One of the criteria for sustainable development, which is the objective of Agenda 21, is, he said, the fulfilment of basic needs, of which affordable warmth must be considered one, and he repeated comments by Chris Patten, ex-Secretary of State for the Environment in the UK, that "poverty is the most environmentally damaging substance in the world."

The Agenda 21 process intrinsically involves public participation and will be an important step in developing a truly sustainable energy strategy. He said that it was essential that any authority looking at sustainability, needs to consider the contribution which can be made by renewables. A survey carried out by Dyfed County Council a few years ago suggested that the Dyfed region could generate more than twice its own electricity demand from renewables, and in so doing develop 400 new jobs.

With buildings being major consumers of energy, **Professor Phillip Jones of the University of Wales** stressed the important ways in which models are being used to understand the energy performance of buildings. Complex dynamic models are now being made user-friendly in order to take them from the research domain into general use by the design community. Where reduction of carbon dioxide emissions are being considered on an urban scale, he stressed that it is important to be able to integrate buildings with other energy use sectors, such as transport and industry, and to predict their

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combined energy use and environmental impact. Professor Jones went on to describe the Building Environmental Assessment Method which has been developed to set criteria for good environmental performance in buildings, with certificates being awarded to office buildings stating clearly the environmental performance of the building design. The scheme uses a building energy model which can also predict the energy supplied by renewable energy sources, such as photovoltaics and wind turbines, comparing hourly demand with the renewable supply.

Energy Efficiency and Conservation

Linda Taylor, Deputy Director of the Association for the Conservation of Energy was the first to speak in the afternoon session on energy efficiency and conservation. She outlined the progress being made in England under the first year of the Home Energy Conservation Act. Implementation of the Act in Scotland, which was just coming into force on 1st December, was the focus of the presentation from **Dave Bonar of East Lothian Council**, who expressed his concerns about the Act and the lack of available support. On the international level **Clive Bates of the International Institute for Energy Conservation (IIEC)** spoke about the need for new initiatives from international finance institutions required in order to help promote energy efficiency [also see p4 and p5].

National and European Perspectives

The second day opened with an address by **Lord Lindsay, the Scottish Office Minister for the Environment**, who stressed that sustainable development was not something that the government alone could deliver, and that participation by all sectors of society was required.

The main morning programme, under the banner of European Perspectives, began with a presentation by **Peter Horrocks, Member of the Global Environment and Climate Change Team, European Commission**. He suggested that the scientific assessment implies that if we are to limit global climate change to what is scientifically seen as sustainable, global reductions in CO_2 emissions of the order of 60% are required. He believed that the removal of barriers to improving energy efficiency in the industrial, domestic and tertiary sector as well as the transport sector, combined with innovative technologies, "could make the greatest contribution to limiting CO_2 emissions as well as saving billions of ECUs throughout the economy." Progress in limiting CO_2 emissions in the transport sector has been disappointing, he said, although there are options available for tackling the problem by improving vehicle efficiency, changing market structures and in long-term fostering behavioural changes. He went on to describe the existing European Union initiatives, such as ALTENER, SAVE II and JOULE-THERMIE, being used to promote both energy efficiency and renewable energy, and the Commission's view that there is considerable scope for measures such as energy taxes, Demand Side Management and Integrated Resource Planning.

Giusepe Tomassetti of ENEA in Italy explored the Italian experiences in applying incentives in the energy markets, with some impressive case results. For example, 7,000 MW of Combined Heat and Power (CHP) plant are currently being planned, with a further 7,000 MW of proposals on the waiting list.

Igor Iliinski, Director of the EC Energy Centre in Ukraine discussed the problems his country has faced since gaining independence and outlined a potential programme for the future. He believed that the most pressing tasks over the next two years will be to set up a national programme of energy efficiency through training and education, and to set up demonstration programmes for alternative energy generation. Emphasis must also be placed on improving industrial efficiency by updating manufacturing equipment, and with investment in renewable energy.

The afternoon of the last day began with **Dr John Green**, coordinator of the EASE project outlining the Friends of the Earth (FoE) position on the way forward for the energy sector: namely a reduction in CO_2 emissions, the elimination of fuel poverty and the phasing out of nuclear power. The previous day **Dr Richard Dixon of FoE Scotland** had launched the Climate Resolution as a practical step forward, committing local authorities who sign up to reducing CO_2 emissions in their area by 30% over 1990 levels by 2005. The scheme, which had already been launched in England & Wales, has so far had 32 local authorities sign up to the 30% reduction.

The afternoon session continued with presentations from the three main opposition parties in Scotland, followed by a wide ranging and lively question and answer session. Given the impending UK General Election, this provided an opportunity for those present to probe the parties on their respective policies. It was apparent that there was broad agreement between the opposition parties over the general direction that was required for a sustainable energy path in Scotland and the UK. All three agreed that more was needed to be done to support both renewables and energy conservation. **Michael Meacher MP, Shadow Secretary of State for Environmental Protection**, outlined a number of specific targets that the Labour Party was committed to: 10% of electricity in the UK from renewable sources by 2010, expanding to 20% by 2025; 10,000MW of CHP by 2010; and a strategy to tackle the estimated eight million households which suffer from fuel poverty. This, he stated, in addition to reducing CO_2 emissions and reducing the incidence of cold-related illnesses, would create in the region of 50,000 jobs. **Jim Wallace MP of the Liberal Democrats** made a number of similar points, however, he also stressed the contribution that could be made by some form of ecological tax system, which would go beyond the introduction of a carbon tax to a broader shifting of the tax burden on to resource use and pollution. The representative of the **Scottish National Party, John Hargreaves**, also recognised the importance for Scotland of renewables and energy efficiency, due he said to the considerable potential available and the benefits that such investment would bring.

Papers from the conference are available from Friends of the Earth Scotland priced £50.

Nuclear industry looks East for survival

The panel of experts chosen by the European Bank for Reconstruction and Development (EBRD) to consider the economics of replacing the remaining operating reactors at Chernobyl with two new reactors, Khmelnitsky 2 and Rovno 4, concluded last month that the option would not meet the bank's least-cost lending policy.

"A situation may develop whereby western countries buy tradable permits in exchange for building nuclear power plant using western technology."

These findings echo the situation arising across Western Europe and the USA, where privatised utilities and governments are realising that nuclear power is uneconomic. The industry is now finding it increasingly difficult to obtain financial support for new construction and the future for the western nuclear industry is looking bleak. With the only construction likely to be but a few schemes in France, the West's nuclear industry is turning to central and eastern Europe, and Asia, for its future, and in so doing are being given support from the European Commission. The EC was in fact authorised in 1994 to help in the construction of nuclear power plant outside the European Union, as long as an organisation from an EU member state had a major role in the development. Companies such as Electricité de France and Siemens are at present eagerly pursuing contracts in Ukraine and other parts of eastern and central Europe.

With this support there is concern that central and eastern Europe could be become the nuclear generating centre for Europe, providing electricity to the rest of Europe. With lower safety standards and less public opposition to nuclear power in eastern Europe, combined with support provided by the western nuclear industry to develop capacity in the region, nuclear power could be produced at a cheaper rate than elsewhere in Europe. This situation would also allow the western nuclear power industry to retain its labour force and keep its options open for the future in case nuclear power were to become more publicly acceptable and economically viable in western Europe.

Ever since the Chernobyl catastrophe in 1986, public opposition to nuclear power has been steadily increasing across Europe, as can be seen by the increasing number of activists opposing nuclear waste transportation and storage in Germany, and by several countries opting to close operating nuclear power plant due to public opposition. However, based on a history of limited participation in the media, public opposition to nuclear power has not been as vocal in central and eastern Europe. This situation is now changing, with NGOs growing stronger and people beginning to realise the potential influence which they can exert over policy makers. In order that investment decisions are made for the long-term benefit of the country, publicly acceptable and economic technologies will need to be chosen.

NGO involvement

Over the last year, round-table discussions on energy issues have been held in Kiev, Dnipropetrovsk, Donetsk, Odessa, Kryvyi and Rih, involving Government officers, NGO activists, scientists and business leaders. This has allowed collaboration between a number of diverse sectors with the aim of determining ways in which to overcome the barriers being faced. The meetings have been the basis for an EASE report on a publicly acceptable way forward for the energy sector. Preparation of this report, which will be open for free discussion, is therefore something of a landmark given that much of the data on energy in Ukraine, including Government plans, is either confidential, inaccessible or inaccurate. It will be used as an initial discussion point for NGOs in further promoting and publicising sustainable energy options within Ukraine. Participation of a wide range of organisations in the debate is seen to be very important, enabling policies to be developed which have wide public support. This process is enabling citizens to become better informed and is also strengthening the position of advocate groups. The recent EASE conference, for example, roused great interest, with the proceedings being discussed not only by Ukrainian NGOs, but at the National Academy of Science of Ukraine.

Energy Saving and Efficiency Opportunities

Ukraine's energy intensity has been estimated to be over seven times that of the OECD average. Realising that energy efficiency improvements are desperately needed in order for the country's

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economy to grow and for industries to be able to compete in the international market place, the Government has established a separate ministry to deal with energy efficiency, and development agencies are being encouraged to establish energy efficiency programmes.

The State Committee on Energy Saving, in its energy-saving policy, has suggested that:

- technological and structural changes would be able to reduce primary energy consumption by 30%; and
- the capital investments required for new installed power capacity are two-to-three times higher than those for equivalent energy saving activities.

Ukraine is however facing serious obstacles to its attempts to modernise its energy sector due to an economic crisis; a rigid industrial structure; entrenched corporate interests; the lack of political will; and limited public awareness. On the one hand it appears that politicians are very concerned with the heavy dependence upon fuel imports, whilst on the other precious resources are being squandered due to abysmally poor efficiency standards.

The main barriers to investment in energy efficiency measures in Ukraine are not due to the lack of available cost effective projects, but due to uncertainty over the financial solvency of industrial enterprises and their ability to pay their energy bills. The up-front costs involved are preventing many enterprises from making the investment which, in many cases, will be their only chance of survival. The rehabilitation of the Donetsk steel works, for example, will not only completely modernise the plant and secure its future, but will reduce electricity consumption by half and natural gas consumption by 90%, allowing it to drastically reduce its energy bills.

However, this ability to invest in the future is not seen as a viable option by the majority of enterprises in Ukraine. Worryingly, after the collapse of the industrial sector in the early 1990s, which has seen energy consumption fall by a third since 1990, per capita energy consumption is now showing signs of growth, principally due to:

- inefficient industrial, transport, power generation, residential and communal facilities;
- run-down equipment and networks; and
- the use of low-tech, high energy-consuming production technology increasing, or at best being maintained, rather than new high-tech, energy efficient processes being installed.

At the same time the competitive ability of the coal, oil and gas industries has been decreasing due to:

- the low quality of coal (31-38% average ash content and approximately 2.5% sulphur content) and oil (2.4% sulphur content and low octane values);
- high production costs, in particular due to low labour productivity in the mining sector where productivity is three-to-four times lower than in the coal mines of the EU-12;
- the acute lack of financial resources to invest into the sector due to a deepening economic crisis; and
- the lack of a clear national energy policy.

A way forward

Present plans by the Ukrainian Government anticipate the share of renewables to grow to only 2.7% of energy consumption by 2020. They also envisage that within the next 20 years the proportion of electricity being generated by nuclear power stations will increase from 50% to 70%; the contribution of thermal power stations will decrease from 45% to 25%; and hydro-electric generation will be maintained at 5%. Energy consumption is expected to fall by 19% over the period.

However, it is being widely acknowledged that it would be best for Ukrainian industry to invest in technologies for which there is a future for its home as well as export markets. Wind power, for example, which is recognised as being cheaper than nuclear power in western Europe, is seen to offer significant potential in the Ukraine according to both the European Union and the US Department of Energy. If agreement is reached in Kyoto for industrialised countries to reduce greenhouse gas emissions post-2000, it would add to the momentum for the rapid growth in the world-wide market for renewables over the coming decades. It has been estimated by the International Institute for Energy Conservation (IIEC) that by 2010, carbon dioxide emissions in Ukraine can be reduced by 40% over 1990 levels by 2010, even with emissions from private cars projected to rise steeply.

There is no doubt that the nuclear industry will try to benefit from the climate change agreements. Joint Implementation and tradable permits are options preferred by many industrialised countries and perhaps a situation may develop whereby western countries buy tradable permits in exchange for building nuclear power plant in eastern countries, using western technology.

Conclusions

It is clear that developing new nuclear power plant would not be in the best economic interests of Ukraine. However, since the EBRD decision, the bank has come under enormous pressure to revise its findings, although doing so would severely damage the bank's credibility as well as being extremely damaging to the economy of Ukraine.

The energy problems which the country is facing are, however, acute and a relief programme is urgently required. In order to improve the situation, the EBRD and other international financial institutions need to progress with the energy efficiency and non-nuclear portions of the Chernobyl aid package as quickly as possible. However, propping up the West's nuclear industry would neither be a benefit to the West's tax payers, nor central and eastern European economies.

Wooden promises

Wood is a valuable energy resource - using wood as a fuel not only has the advantage of no net CO_2 emissions, but the additional advantage of low emissions of SO_2, NO_x and particulates. Emissions of CO and CH_4 can also be avoided if up-to-date combustion technologies are used.

In many European countries there is considerable potential for increasing the use of wood as a fuel. In France, for example, cropped wood and waste from harvesting, when added to wood from industrial waste, provide an economically viable resource equivalent to approximately 12 million tonnes of oil equivalent (Mtoe) per year. At present only 8.8 Mtoe per year are being utilised. A conservative estimate shows that if a further 2 Mtoe were used for electricity generation this would produce approximately 10 TWh, which is 3% of the electricity consumed in France. Using wood as a fuel makes economic sense, particularly when used in conjunction with cogeneration and/or district heating. For example, it has been estimated that if 40,000 houses per year were linked into district heating systems, 1 Mtoe per year could be being saved in the country by the year 2015.

"... if a further 2 Mtoe were used for electricity generation this would produce approximately 10 TWh, which is 3% of the electricity consumed in France."

The area of France under forest grew from 11 million to 14 million hectares between the years 1950-1994 and it is expected that this area will continue to increase. Although the quantity of wood burnt as a fuel in France has increased since 1973, wood used as a household fuel actually fell over the same period, although there have been signs of an increase over recent years in line with increases in the cost of electric heating. The bulk of the forests are sited to the south-east of the line between Bordeaux and Lille, and indeed one-third of the country has almost no forestry reserves. The fact that ownership of 75% of forested land is in the hands of 3.8 million people, in many ways presents difficulties as far as commercial exploitation is concerned, although it is a positive benefit to those people who want to use wood for their own domestic consumption.

Unlike Austria, which has a well developed plan for utilising it's resources of wood, there is no assistance given by the French Government which continues to support the use of conventional fuels and to allow oil prices to remain low. If France were to maximise it's use of the available wood resource, a number of problems must be overcome in order to help develop the market for woodfuel, including:

- revision of the price paid by Electricité de France to independent producers;
- some form environmental tax being levied; and
- increasing the investment being made into wood processing, as well as generating infrastructure.

Such investment would be economically justified in France and many other countries across Europe. Lithuania, for example, is also in a position to make greater use of wood as a fuel, in order to help reduce its dependence on conventional fuels. At present, 10% of the timber felled in Lithuania is used as fuel, and it has been estimated that one-third of the waste wood can be economically collected for energy production. In Lithuania there is ample scope for converting existing boiler plant which would help to reduce costs, with the cost of conversion being around 70% of the price of a new boiler. Table 1 shows the generating efficiency of small to medium scale plant used for wood burning.

Locating wood chopping equipment at the point of felling helps to reduce transportation costs, which, in France, represent between 24% and 30% of the overall fuel costs for a plant with a capacity in the range 20 MWe to 50 MWe. Indeed, wood is generally only considered to be cost effective when combustion plant is within 200km of the forestry resource.

To make full use of this valuable, renewable energy resource will require considerable investment, and will require the active involvement of many groups, including the wood and gas industries, and local and regional authorities. The benefits of doing so would be seen in terms of lower environmental impact and a reduction in the demand for imported fuels.

Table 1: Efficiency of different types of generating equipment

Type of plant	% efficiency
Direct combustion	18-25
Steam injection gas turbine	30-35
Integrated gas combined cycle	35-43

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CHP shows clear advantages over CCGT

Following the referendum in Italy in 1987 which led to the cancellation of the nuclear power option, there were initially bureaucratic barriers which hindered the development of renewable energy sources and cogeneration. These were eased, however, following the adoption of measures known as "CIP 6" (see "Italian energy conservation reform threatened", Safe Energy Journal issue 111). This allowed independent producers to deliver electricity to the public grid; established a fair price; and set incentives corresponding both to the level of environmental and energy related benefits, and to the costs of the different kind of plants.

The national electric utility, ENEL, with its monopoly position, retained the final say in decisions on whether to accept applications from independent power producers (IPP). ENEL, which is soon to be privatised following reorganisation of the energy sector, was apparently threatened by the implementation of CIP 6 and refused to accept more than half of the IPP proposals. Incentives for the development of Combined Heat and Power (CHP) are presently granted on the condition that such plants consume less fuel than would be consumed by two separate plants (one producing electricity and one heat) with the same output and that use be made of the best available technologies. A total capacity of 8,000 MW is planned to be developed by the year 2000, of which CHP accounts for 3,700 MW. However, the promotion of CHP, is now at risk due to the CIP 6 having been suspended. Although the Government has pledged to adopt new measures in the near future, there are fears that these will consider only the financial and commercial aspects, overlooking the social and environmental costs of the various technologies.

Preliminary research has been carried out as part of the EASE project, with the support of UNAPACE (the Association of Independent Power Producers), in order to quantify in financial terms the advantages of cogeneration to the country by comparing two realistic scenarios. The first one considers the external costs of a number of new CHP schemes (equal to the applications that ENEL has refused) with a total capacity of 4,000 MWe. The second scenario considers the externalities of new ENEL Combined Cycle Gas Turbine (CCGT) plants with the same capacity (corresponding to proposals within a development plan recently presented by ENEL). Natural gas is used in both scenarios.

Table 1 shows the results from the research. As can be seen the CHP option shows clear advantages of between 271 million ECU (495 billion Lira) and 629 million ECU (1,160 billion Lira). The output in both scenarios is 28 TWh/yr, with CHP providing benefits of no less than 0.011-0.022 ECU (20-40 Lira) per kWh.

The methodology is based upon a top-down approach and considers the external costs related to both electricity production and all other fuel cycle phases. It also accounts for the major non-environmental external costs due to uncertainty of supply and to the effect of fuel consumption on GNP. The monetary allocations used are based on the best existing international literature, calculating for each impact factor a minimum and maximum range of the most probable values. The methodology used was designed to avoid giving any special advantage to CHP, with only very conservative estimates and hypotheses being used, which underestimated the advantages of co-generation. Best available technologies were used for both scenarios. The CHP plants were compared with plants which ENEL says it intends to build, designed according to efficiency criteria dramatically higher than in average existing ENEL plants.

Whilst the research is at a preliminary stage, and there have been some necessary simplifications, its results are striking nonetheless. With CHP developments showing such clear advantages it is vital that the impact of externalities are fully appreciated so that informed decision can be made to promote the best available technologies. CHP would then be assurred of having a long and beneficial role to play in the development of Italy's power sector.

"With CHP developments showing such clear advantages it is vital that the impact of externalities are fully appreciated"

Pierluigi Lombard

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Table 1: Comparison of CHP and CCGT external costs

	Annual costs (million ECU)		CHP advantage
	CHP	CCGT	(million ECU)
Environmental External Costs			
Electricity phase CO_2 & other emissions	212 - 1,136	397 - 1,630	185 - 494
Other phases CO_2 & other emissions	5.6 - 25.0	12.1 - 38.2	6.5 - 13.2
Other phases accidents & sea spillages	2.1 - 0.3	3.4 - 5.0	1.3 - 4.7
Sub total	***220 - 1,161***	***412 - 1,673***	***192 - 512***
Non-Environmental External Costs			
Uncertainty in supply	-7.8	10.5	18.3
Effect of fuel imports on GNP	194 - 182	239 - 251	45 - 69
Sub total	***186 - 174***	***250 - 262***	***64 - 88***
Grand total	**406 - 1,335**	**662 - 1,935**	**256 - 600**

'Third Party Financing' symposium

As a result of EASE-Austria's recent conference entitled, "Energy Contracting" (see December issue of the EASE newsletter) an encouraging development has taken place. Two organisations, the Energy Utilisation Agency (Energieverwertungsagentur EVA) and the Center for Building and Environment from Danube-University (Donau-Universität Krems), are now collaborating with political and economic organisations to arrange a one-day symposium entitled, "Third Party Financing - possibilities and suppositions in Austria", for the 20th March 1997. The aim of the symposium is to disseminate information on thermal building renovation, energy management in buildings and power-heat coupling to different groups, from builders and building contractors, to politicians and administrators.

Passive Annual Heat Storage

Passive Annual Heat Storage (PAHS) is another area which is being actively developed in Austria. First described by J. Hait (Rocky Mountain Research Center), Passive Annual Heat Storage is a residential building technique combining two "conventional" systems: earth shelter housing and seasonal energy storage in the soil. With high quality, south-facing glazing, the building works like a thermal collector and, given the higher indoor temperatures during the warm season, raises the energy-content of the surrounding soil. As well as being south-facing, the building is fully earth covered and is top-insulated against external conditions. During the winter, the thermal mass itself warms the building. When compared to a similar building above ground, calculations have shown that the reduction of heating demand is as much as 35%.

EASE-Austria is now in contact with a local builders' initiative in Austria which is developing an earth-covered terraced housing scheme. PAHS technology represents a viable and promising approach for passively heating dwellings, thereby reducing annual heating demand, in many European regions. The system is an especially useful building strategy in mountainous areas, where seasonal storage can be achieved relatively easily and with minimum cost. Given the novel nature of this approach within Europe and its suitability to many parts of the region, EASE-Austria will begin an information campaign on this project and on the building technique in general.

A round-table discussion is being planned for June or July 1997. For further information, please contact Friends of the Earth Austria.

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EASE Seminars

Austria

• Sustainable architecture	28th Sept - 4th Oct
• Energy contracting	January '97
• 'Third Party Financing - possibilities and suppositions'	20th March '97
• Passive Annual Heat Storage	June or July '97

England, Wales and N.Ireland

•'Shifting the Balance of Power' liberalisation & sustainability seminar	2nd June '97

France

• Social and environmental costs of electricity generation	To be decided

Georgia

•"Limiting environmental impacts of hydropower in Caucasian Region"	26th June '96

Italy

• Working group on marginal fuels	June '96
• Energy plan for the City of Florence	December '96

Lithuania

•"Energy efficiency and saving - Identifying problems and solutions in the implementation of an energy efficiency policy"	18th October '96
•"Development of alternative & renewable energy sources in Lithuania"	10th April '97

Scotland

• Renewable Energy Seminar	12th September '96
•"How can the effect of energy taxes on the poor be minimised?"	26th September '96
• 'Energy 21' conference	28th-29th Nov '96
• Renewables Guidelines Seminar	20th March '97

Ukraine

• Conception of Sustainable Development in Ukraine	17th Jul & 29th Oct
• Problems of town development - sustainability and energy saving	22nd-23rd Oct '96
• Energy Alternatives in context of Sustainable Development,Donetsk	31st January '97
• Perspectives of Sustainable Energy in Ukraine, Kiev	13th-14th March '97
• Energy Round Table, Dnipropetrovsk	21st March '97

Acknowledgements

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