



**NuClear News
No.5 April 2009**

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1. Gordon wants a new nuclear dump every three or four years

Gordon Brown says he wants to see 32 new nuclear power stations built every year around the world to halve global carbon emissions (1). Has he really thought about the implications of such a crazy plan?

The Massachusetts Institute of Technology (MIT) looked at a scenario with 1,000 new reactors by 2050, or 25 every year. But this tripling of installed capacity doesn't necessarily make much difference to carbon emissions. The MIT scenario shows nuclear power accounting for only 19.2% of the world's electricity in 2050 compared with 16.3% in 2000, due to increases in electricity demand. In the US, where the largest share of nuclear construction is assumed to take place, carbon emissions from electricity actually increase. (2)

Nuclear capacity on this scale would also require a new nuclear waste dump, the size of the proposed site at Yucca Mountain in Nevada, to open somewhere in the world every 3-4 years. The US has been working on Yucca Mountain for over 20 years, but has now effectively abandoned the proposal, and will have to go back to the drawing board. (3) Probabilistic Risk Assessment also suggests global growth on this scale would imply around 4 nuclear meltdown accidents by 2055.

The Prime Minister said Iran is a crucial "test case" for nuclear power. (4) If that is true then nuclear power has already failed the test. North Korea, India, Pakistan and Israel all obtained nuclear weapons by the use of nuclear power. Over the eight years Al Gore was in the White House, he says every proliferation problem was connected to a reactor programme. (5)

Clearly, restricting the spread of fissile material whilst promoting new reactors, doesn't work. The idea that conventional reactors can somehow be made proliferation resistant is false. Separating plutonium from spent fuel doesn't require a large reprocessing facility like Sellafield. A simple plutonium separation facility could be built in 4-6 months. The global expansion of nuclear power which Gordon Brown is proposing will also require an expansion of uranium enrichment capacity. The diffusion of knowledge and the increase in global trade of plutonium and enriched uranium will make it even more difficult to detect clandestine weapons programmes.

The spread of civil nuclear technology – there are at least 40 countries currently talking about going nuclear - threatens to open a Pandora's Box with multiple mini-Cold Wars springing up in trouble spots around the world. Nuclear physicist, Frank Barnaby warns this will lead to nuclear anarchy in a report for the Institute for Public Policy Research. (6) It will also inhibit the adoption of more cost effective solutions to climate change by diverting resources. As Al Gore say, the UK has enormous influence in the world, if Gordon Brown continues to tell the world nuclear power will solve the climate crisis, many countries will believe him. It is a danerous illusion.

The Liberal Democrat Shadow Energy and Climate Change Secretary, Simon Hughes, said: *“Britain needs to be prised away from Gordon Brown’s increasingly fervent belief that nuclear power is the only answer to the energy crisis. This is another example of short term, old-fashioned thinking and it undermines our security”*. (7)

(1) Morris, N. PM warns Iran over nuclear ambitions, Independent, March 17, 2009

<http://www.independent.co.uk/news/world/politics/pm-warns-iran-over-nuclear-ambitions-1646508.html>

(2) The MIT scenario is discussed in Smith, B. Insurmountable Risks, IEER 2006.

<http://www.no2nuclearpower.org.uk/reviews/review01.php>

(3) Tetreault, S. Official: Nuclear dump is out, Las Vegas Review Journal, March 6, 2009

<http://www.lvrj.com/news/40836552.html>

(4) Crichton, T. PM offers nuclear olive branch to Iran, The Herald, March 17, 2009.

http://www.theherald.co.uk/politics/news/display.var.2495920.0.PM_offers_nuclear_olive_branch_to_Iran.php

(5) Hickman, L. Gore on Lovelock, nuclear power and climate change sceptics. Guardian Environment Blog, March 16, 2009. <http://www.guardian.co.uk/environment/blog/2009/mar/16/climate-change-al-gore>

(6) Nuclear anarchy can only be avoided by urgent global action warns leading security expert. IPPR Press Release, March 16, 2009. <http://www.ippr.org/pressreleases/?id=3435>

(7) Nuclear power will not solve climate change – Hughes, Liberal Democrats, Press Release, March 17, 2009.

2. Torness - 30 years of opposition

When the UK Energy Minister, Mike O’Brien visited Torness nuclear station just outside Edinburgh in February, he reminded some of us of one of the largest anti-nuclear demonstrations ever held in Britain 30 years ago this May.

The South of Scotland Electricity Board (SSEB) applied for permission to build Torness in 1973. An eight-day public inquiry was held in June 1974. The Inquiry Reporter recommended granting permission but noted: *“The wisdom of a nuclear generation policy was seriously questioned ... it is a matter of national policy and not one upon which recommendations can be made...”* This is presumably the expected outcome from any future inquiries in England and Wales under the new Planning Act.

Construction began, despite growing opposition, in September 1978, and was eventually completed in 1989. Five thousand protested at the site in May 1978, and ten thousand in May 1979, just two days after Margaret Thatcher was first elected Prime Minister.

Much of the opposition to its construction came from nearby Edinburgh. The late Robin Cook, an Edinburgh MP, was a leading opponent. Nigel Griffiths, MP for Edinburgh South, wound up in Court in 1981 for refusing to pay the nuclear portion of his electricity bill. Chancellor Alistair Darling too, as a councillor, helped organise funding for buses to a demonstration at Torness after Chernobyl in 1986, and climate change minister, Joan Ruddock, spoke at the rally.

Eventually the Scottish Office admitted that Torness was a £2.5bn mistake. (1) Bizarrely, it now looks as though the Government might be about to repeat that very expensive mistake.

(1) Young, A. Torness plant was ‘a £2,500m mistake’ Glasgow Herald, November 10, 1989.

3. Renewable Progress

Renewable energy could meet 40% of global electricity demand by 2050 as long as governments show the sector the same degree of support they provide the nuclear and traditional fossil fuel industries. That is the conclusion of new research from the Helsinki University of Technology unveiled at the climate conference in Copenhagen, which estimated that financial support of just €10bn (£9.3bn) to €20bn a year – a fraction of recent stimulus packages – would establish wind and solar energy as mainstream technologies over the coming decades. *“If wind and solar are treated as favourably as nuclear was in the 1970s and 80s and there is the necessary financial support then wind will break even [with the cost of grid electricity] by 2020-2025 and solar by 2030,”* said Peter Lund of the University’s Advanced Energy System Department. (1) Lund said *“previous notions that the potential for renewables was in some way limited to a negligible fraction of world demand were wrong.”* (2)

The study was released on the same day as new research from the International Institute for Applied Systems Analysis in Africa calculated that £50bn of government investment over the next decade would enable an ambitious plan to deliver solar power from giant solar thermal systems in the Sahara to Europe. Technological advances combined with falling costs have made it realistic to consider north Africa as Europe’s main source of imported energy. In the long term, the solar thermal systems combined with strings of windfarms along the north Africa coast, could *“supply Europe with all the energy it needs”*. Only a fraction of the Sahara,

probably the size of a small country, would need to be covered to produce enough energy to supply the whole of Europe. The scheme would use mirrors to focus the sun's rays onto a thin pipe containing either water or salt. The rays boil the water or melt the salt and the resulting energy is used to power turbines. Trials of concentrated solar power plants are planned for Egypt, Morocco, Algeria and Dubai, but Libya and Tunisia could also be considered. (3)

(1) Murray, J. Wind energy just 15 years from grid cost parity, Business Green, March 11, 2009

<http://www.businessgreen.com/business-green/news/2238320/renewables-supply-per-cent#>

(2) University of Copenhagen. New renewables to power 40 per cent of global electricity demand by 2050.

First Science News, March 11, 2009. http://www.firstscience.com/home/news/atmospheric-science/new-renewables-to-power-40-percent-of-global-electricity-demand-by-2050_60214.html

(3) Adam, D. £50bn of European investment needed to kick-start Saharan solar plan. Guardian, March 11, 2009

<http://www.guardian.co.uk/environment/2009/mar/11/sahara-solar-investment-copenhagen>

Smith, L. Solar panels in the Sahara 'could power the whole of Europe', Times 12th Mar 2009

<http://www.timesonline.co.uk/tol/news/environment/article5887597.ece>

For more info on Concentrated Solar Power see No2NuclearPower briefing: Climate solutions: Nuclear vs sustainable pathways, January 2007.

http://www.no2nuclearpower.org.uk/reports/Climate_solutions.pdf

4. American Energy [R]evolution

"We have in front of us the opportunity to create a new energy system for America and the world, to clean up the environment and create jobs. That is a pretty exciting opportunity"

U.S. Senator, Bernie Sanders at the launch of Energy [R]evolution on 11th March in Washington.

Off-the-shelf clean energy technology can cut U.S. carbon emissions by at least 23% by 2020 and 85% by 2050, at half the cost, with double the job-creation compared with dirty energy sources, according to the latest report in Greenpeace's Energy [R]evolution series. Commissioned from the German Aerospace Center, the report shows how the U.S. can meet its energy needs and achieve the necessary cuts in carbon emissions – without nuclear power or coal. (1)

"Every day that we don't deal with the crisis of global warming, it's only going to get worse, it's only going to get more costly, there's only going to be more damage to our environment," Sanders said. "This report shows that we can address climate change while improving our economy. The time is now to move forward aggressively on energy efficiency and creating new sustainable energy and millions of good-paying jobs in the process."

The report shows that by doing what climate scientists say is necessary won't just provide the planet a living future, it will also create far more jobs and save far more money than business as usual. To implement the Energy [R]evolution scenario, Greenpeace supports a strong cap on global warming pollution, an end to all fossil fuel and nuclear subsidies, mandatory efficiency standards for vehicles, buildings and appliances, binding targets for renewable energy generation and strong financial support for clean energy in developing countries.

America has vast, largely untapped renewable energy sources. The five states of North Dakota, South Dakota, Kansas, Montana, and Texas alone have enough wind energy potential to meet all of the country's electricity needs. Nevada could meet all US energy needs all by itself if just 9% of the state's land was covered in solar thermal plants. Off-shore wind resources could be tapped to produce all US electricity demand. If every rooftop in America installed solar panels, it could meet more than 70% of US electricity needs.

Investments in wind and solar power create 2.8 times as many jobs as the same investment in coal; mass transit and conservation would create 3.8 times as many jobs as coal. The Energy [R]evolution Scenario would create 14.5 million more new jobs by 2050 than would be created by meeting US energy needs with continued dependence on fossil fuels.

Arjun Makhijani, in a short briefing (2) - basically a summary of his book, Carbon-free and Nuclear-free (See NuClear News No.2) - says we are not lacking in low- or zero-CO2 energy sources; it is money and time that are limited. The latter dictated by the urgency of the climate crisis. Nuclear energy cannot be a significant help in overcoming the most pressing short-term CO2 issue in the US: urgent reduction of CO2 emissions from coal-fired electricity generation by obviating the need for new plants and by reducing the need for existing ones in the next ten years. While there are applications and expressions of interest for as many as 34 new nuclear reactors in the United States, the earliest time a reactor could come on line if there are no delays is

2016. Even if six could be built by 2019, the total expected cumulative generation of electricity would be too small to tackle the problem.

By contrast wind capacity equivalent to about two large new nuclear reactors was added in 2007. Annual additions to capacity could be double that amount within a few years. Concentrating solar thermal power and solar PV are much smaller industries than wind today, but they are growing rapidly and their costs are coming down. Generating ten times as much electricity cumulatively from renewables, compared with nuclear over the next ten years is well within the achievable range. Efficiency and smart grid elements can greatly increase the reduction of emissions.

Over the next decade an emphasis on nuclear will result in hundreds of millions of metric tons of additional CO₂ emissions compared to going ahead with efficiency and renewables. Nuclear energy would be too little, too late, too risky, and too costly to successfully address a significant fraction of the CO₂ problem.

(1) German Aerospace Center, Energy [R]evolution: A Sustainable USA energy outlook, Greenpeace USA and European Renewable Energy Council, 2009. <http://www.greenpeace.org/usa/press-center/reports4/energy-r-evolution-a-sustain>

(2) Makhijani A, The Technical and Economic Feasibility of a Carbon-Free and Nuclear-Free Energy System in the United States, IEER, March 4, 2009. http://www.ieer.org/reports/Renewable_electric_system-Makhijani2009.pdf

5. Solar Surge

World solar photovoltaic (PV) installations reached a record high of 5.95 gigawatts (GW) in 2008, representing growth of 110% over the previous year. Of this 2.46GW was installed in Spain and 1.86GW in Germany. (1) This compared with a 19% growth in 2006 and 62% in 2007. (2)

There's more confirmation this month that the price of solar panels is coming down rapidly. (See [NuClear News No.3 Solar Revolution](#)). Business Green reports that the price of solar panels could fall by as much as 40% by the end of this year as huge increases in polysilicon supplies lead to a sizable fall in production costs for solar panel manufacturers. (3) The US website, Climate Progress, says if this price drop does materialize, it will help keep demand on its staggering growth rate with PV becoming one of the largest job-creating industries of the century, projected to grow from a \$20 billion two years ago to a \$74 billion industry by 2017. (4)

Meanwhile, Gainesville Florida has become the first city in the United States to introduce higher payments for solar power. City leaders, who control the electric utility, unanimously approved the policy after studying Germany's solar-power expansion. (5) Hawaii hopes to have a similar policy in place before the end of the year. The mayor of Los Angeles also wants to introduce higher payouts. California is considering a stronger policy as well, and bills have also been introduced in other states, including Washington and Oregon.

The surge of interest in feed-in tariffs is a recognition that despite generous state and federal incentives, the US still lags far behind Europe in solar power. Germany, where feed-in tariffs have been in place since 1991, has about five times as many photovoltaic panels installed as the US, though they still account for only 0.5 percent of electricity in that country.

Currently, solar-power advocates do not believe they have the votes in Congress to adopt a national feed-in tariff system like the ones in Germany and Spain. They are putting their hopes, instead, on proposals in Congress to mandate that a certain percentage of electricity comes from renewables. (6) Colorado ranks fourth in the nation in solar production thanks to a renewable portfolio standard, or RPS, established in 2004, which requires large utilities to generate a set percentage of their power—10 percent by the year 2015—from renewable sources such as wind, solar, or geothermal. Xcel Energy, Colorado's largest utility, quickly found it could meet that standard about eight years early, so in 2007 the state legislature doubled the RPS to 20 percent by 2020. Today, 28 states and the District of Columbia have some form of RPS on the books. (7)

The International Energy Agency has concluded that feed-in tariffs are both more effective at developing renewable energy and less costly to consumers than a quota system such as the UK's Renewable Obligation scheme. For a full discussion about the introduction of feed-in tariffs in the UK, and to keep up with renewable developments generally see the Open University's *Renew* magazine:

http://eeru.open.ac.uk/renew_online.htm

(1) World PV Industry Report Summary, Solarbuzz, Marketbuzz, March 16, 2009

<http://www.solarbuzz.com/Marketbuzz2009-intro.htm>

(2) Climate Progress, March 17, 2009

<http://climateprogress.org/2009/03/17/world-solar-photovoltaic-pv-market-installations-capacity->

production-solarbuzz/

(3) Murray, J. Solar panel prices to fall by up to 40 per cent by year end. Business Green, February 23, 2009
<http://www.businessgreen.com/business-green/news/2236953/solar-panel-prices-fall-per>

(4) Climate Progress, February 24, 2009. <http://climateprogress.org/2009/02/24/solar-panel-prices-to-fall-by-up-to-40-per-cent-by-year-end/>

(5) Blake M, The Rooftop Revolution, Washington Monthly, March 2009
<http://www.washingtonmonthly.com/features/2009/0903.blake.html>

(6) Galbraith, K. Europe's way of encouraging solar power arrives in the US. New York Times, March 12, 2009. http://www.nytimes.com/2009/03/13/business/energy-environment/13solar.html?_r=1&ref=business

(7) Kenworthy, T. It's easy being green: Solar surge in Colorado, Centre for American Progress, March 11, 2009. http://www.americanprogress.org/issues/2009/03/ebg_solar_surge.html

6. Nuclear's carbon emissions

Energy Policy journal has published a paper by Benjamin Sovakool from the National University of Singapore on the CO₂ emissions of nuclear power. (1) It assessed 103 lifecycle studies of the nuclear fuel cycle. While the plants themselves produce no direct carbon dioxide emissions, the fuel cycle does (especially mining, milling, and fuel enrichment). The industry often claims the lifecycle emissions from nuclear plants, including ancillary fuel fabrication and (in some studies) waste disposal, is 1-3 grams of CO₂e/kWh, making them better than renewables and other alternatives; opponents retort that emissions are much higher, often in the 100 to 150 gCO₂e/kWh range. Sovakool says, the quality of most lifecycle estimates is very poor, with a majority obscuring their assumptions. When one selects only the most methodologically rigorous studies, typical lifecycle emissions from nuclear plants appear to be about 66 gCO₂e/kWh. Although that's less than the estimate of 112–166 g CO₂e/kWh produced by Storm van Leeuwen and Smith (see www.stormsmith.nl), it is more than 10 times industry estimates, and worse than all the renewable alternatives, including solar PV.

(1) Energy Policy 36 (2008) pp2940-2953.

Thanks to Renew On-Line No.77 Jan/Feb 2009 for highlighting this article.

http://eeru.open.ac.uk/renew_online.htm

7. Nuclear Sites

The Office for Nuclear Development has launched a website to enable the public to have a say on the proposed sites for new nuclear power stations, help to explain the process for choosing sites, and give people the opportunity to comment on sites once they are nominated.

See: <http://www.nuclearpowersiting.decc.gov.uk>

The Government is currently undertaking a Strategic Siting Assessment (SSA) to identify sites which are suitable for new nuclear power stations. The opportunity to nominate sites closed on March 31st 2009. A list of nominated sites will be published on April 15th 2009 and the public will have just a month to comment up to May 14th 2009.

Two unexpected site nominations emerged when RWE announced it had options to buy two coastal, green-field, sites in Cumbria. One is at Braystones, about 3.5km from Sellafield near Egremont, and the other is 23km from Sellafield at Kirksanton, near Millom. (1) A series of village meetings was held in the area in the last week in March along with exhibitions of RWE's plans. (2) As well as these two sites for two reactors, there is land at Sellafield itself which the Nuclear Decommissioning Authority (NDA) is planning to nominate for a further two reactors. There have also been discussions about the possibility of a Cumbrian sea transmission cable carry the electricity generated to avoid any visible detriment to the landscape of the Lake District National Park from pylons. (3)

Meanwhile the eBay-style auction of NDA land suitable for perhaps as many as six new nuclear reactors was launched later than expected in mid-March. At least two consortia of European power companies are expected to bid for the sites at Wylfa on Anglesey, Bradwell in Essex, and Oldbury, South Gloucestershire. German energy giants Eon and RWE Npower have come together to form one bidding group, while GDF-Suez, Iberdrola and Scottish & Southern have teamed up in a second consortium. The electronic bidding process, similar to the 2000 government auction of mobile-phone licenses was expected to net several hundred million pounds for the government. (4)

The auction will end once 24 hours have passed without a bid on any of the three lots. It was expected to last seven days at most – but was reported to be into its third week by the end of March with total bids having topped the £200m mark. (5) Meanwhile the Justification consultation closed on 25th March. A draft response by the Government is now not expected until the autumn, with another consultation period before a final decision is made early next year.

Progress on the “*generic design assessment*” has been slow and insiders are concerned about the regulator's

resources. *"We are close to halfway through the time, but nowhere near halfway through the work,"* a source told The Independent. *"The Health and Safety Executive is boosting pay and recruiting hard, but two years into a four-year process it still either hasn't got enough people or doesn't have them trained up."*

One industry veteran said: *"Not only is everything interlinked so if any one bit gets delayed the whole thing goes bad, but if we don't get the justification, the site assessment and the policy statement before a general election, then there'll be a real problem."*

(1) Irving, A Hamlet named as possible N-site Whitehaven News, March 4, 2009, http://www.whitehaven-news.co.uk/news/hamlet_named_as_possible_n_site_1_521914?referrerPath=news

Wood, J. New build nuclear proposal for two sites near Sellafield. Utility Week, February 27, 2009. <http://www.utilityweek.co.uk/news/uk/electricity/new-build-nuclear-proposal-for.php>

(2) Nuclear power stations open days in West Cumbria, Carlisle News and Star, March 11, 2009. http://www.newsandstar.co.uk/news/nuclear_power_stations_open_days_in_west_cumbria_1_524674?referrerPath=news_round-up_1_50001

(3) Irving A, Undersea plan to carry electricity from new N-plants and windfarms. Whitehaven News, March 11, 2009. http://www.whitehaven-news.co.uk/news/undersea_plan_to_carry_electricity_from_new_n_plants_and_windfarms_1_525077?referrerPath=news

(4) Bidding begins on potential UK reactors site, Platts, March 16, 2009.

<http://www.platts.com/Nuclear/News/7737711.xml?sub=Nuclear&p=Nuclear/News&?undefined&undefined> and Wood, J. Nuclear site auction underway, Utility Week, March 16, 2009.

<http://www.utilityweek.co.uk/news/uk/electricity/nuclear-site-auction-under-way.php>

(5) Arnott, S. The Nuclear Option: UK's multibillion pound renaissance moves up a gear, Independent, March 31, 2009 <http://www.independent.co.uk/news/business/analysis-and-features/the-nuclear-option-uks-multibillionpound-renaissance-moves-up-a-gear-1658059.html>

8. EDF: renewables vs Nukes.

EDF – the world's largest nuclear operator with 58 plants – is calling on the Government to lower its proposed renewable electricity target from 35% of supply in 2020 to just 20%. It says the development of new nuclear plant could be prevented if the government allows too much windpower to be built. EDF's views were revealed when the Department of Energy and Climate Change (DECC) published a summary of responses to its consultation on its renewables strategy. The company says building the wind capacity needed to hit a 35% target is "not realistic or indeed desirable" due to the problem of intermittency.

EDF's response says that at times of high wind, output from wind and nuclear could exceed demand, which could mean the nuclear plant is instructed not to generate. If nuclear plants have to be regularly turned off, this *"damages the economics of these projects, meaning that less will be built."* The UK can still meet its EU target with a lower level of renewable electricity by doing more on renewable heat, it says. EDF's views are partially supported by Eon, which says any curtailment of nuclear *"raises the question of whether it will be possible to recover the fixed costs of... plant over its operational life"*. Curtailment could become an issue once wind provides 20-25% of UK electricity, it says. (1)

The Renewable Energy Association says our electricity network can cope with at least ten times' the amount of wind we currently have. Greenpeace said *"we've always said that nuclear power will undermine renewable energy and will damage the UK's efforts to tackle climate change – now EDF agrees."* (2)

Dave Elliot, Professor of Technology Policy at the Open University says the UK's baseload, the low level of energy generation capacity required at night and at other low demand periods, is 20GW. There is talk of nuclear being expanded to provide much if not all of this. At present it's only at about 10GW. And yet there are also proposals for 25GW of wind power. In the absence of significant storage capacity or export potential, much of this would therefore be in excess of requirements. We only have about 2GW of pumped storage capacity and a 2 GW in cross channel grid link. Nuclear plants can't easily vary their output and are usually run flat out 24/7, which, given that they are very capital intensive, also helps their economics. However this means they can't be used to back-up variable renewables like wind. (3)

Elliot warns we are heading for a *"crazy competition between sensible sustainable energy options and the dead end option of nuclear power"*. As wind expands and other renewables are added to the mix, including wave and tidal power, the need to curtail nuclear to make way, will grow, unless we decide to keep nuclear running at full power and dump increasing amounts of renewable power at low demand times. Or invest in energy storage which is an expensive option.(4)

Meanwhile, investigators from the European Commission raided EDF's offices seeking evidence of price-fixing in the French electricity market. Commission officials were joined by inspectors from the French Competition Authority in a raid on the utility's headquarters in Paris. The Commission said that it suspected that EDF was engaged in activity that abused its dominant position in the market. (5)

- (1) Slash renewables target to protect nuclear, says EDF, ENDS report, 12 March 2009 <http://www.endsreport.com/index.cfm?action=bulletin.issue>
- (2) Macilister, T. Green lobby and nuclear groups clash over role of renewable energy. Guardian, March 16, 2009. <http://www.guardian.co.uk/business/2009/mar/16/nuclear-power-renewables-edf>
- (3) Elliot, D. Nuclear vs Wind, March 8, 2009. <http://delliott6.blogspot.com/>
- (4) Elliot, D. Energy storage: developments and opportunities. Clean Energy Insight, November 6, 2008. <http://www.innovationobservatory.com/cei/nov0801>
- (5) Mortished, C and Pagnamenta, R. European Commission raids EDF in price-fixing investigation. Times March 12, 2009. http://business.timesonline.co.uk/tol/business/industry_sectors/utilities/article5891070.ece

9. Sustainable industries struggle to survive

Whether it's the Government's over enthusiastic support for nuclear or just the credit crunch and the fact that bailout money seems to be reserved for banks, there is growing concern that the struggling renewables industry will not be able to meet the government's targets without more financial assistance.

There was a major setback when the world's biggest investor in wind power, Iberdrola Renewables, announced it was cutting its investment in Britain by more than 40%, or £300 million — enough to build a wind farm powering 200,000 homes. Wind energy investments have collapsed as funding dries up in the credit crunch and the price of fossil fuels has fallen. Delays obtaining access to the national grid and planning permission have compounded the industry's woes. (1)

The renewables sector has seen share prices hit much harder than others because it is still seen as relatively risky. Wind and solar projects still rely on government subsidies to keep afloat but the credit crunch and recession have made a difficult situation much worse. Some companies are in trouble, while others are postponing projects, saying they need more subsidies or other changes in legislation to make them more viable. (2)

Britain must revert to greater state control of energy markets to hit ambitious targets according to the former head of BP, Lord Browne, because market mechanisms are failing to deliver the necessary growth in clean energy. Crucial offshore wind projects could be cancelled unless there is an urgent rethink, he says, because of high costs, falling power prices and more expensive credit. His words echo the concerns of others in the industry. Browne says the UK risks being left behind in the global race to develop a low-carbon industry if ministers rely on market mechanisms such as carbon trading to drive change. (3)

National Grid's chief executive, Steve Holliday, says the government must draw up a masterplan to meet the UK's ambitious targets of providing 15% of the country's power from renewables by 2020. Investment is drying up, so there will need to be more subsidies to make sure enough wind farms and other renewables are built in time. There is a lack of joined-up thinking and urgency displayed by the government over the 2020 targets. (4)

It seems clear that renewable energy companies are heading for "crisis" unless the Government steps in soon. During one week in March alone Shell decided to stop building wind and solar schemes worldwide. (6) In addition, a group of more than 40 businesses has taken the unique step of writing collectively to Joan Ruddock, the energy and climate change minister, warning her of the threats to a host of projects unless something is done. (7)

Now concern is growing that the latest round of offshore wind development has stalled, and that Britain is increasingly seen as an unfavourable investment for foreign wind energy companies. Despite official optimism, government insiders now seem to be privately admitting that the task of meeting 15% of our energy requirements from renewables by 2020 is hopeless. We will find out in June when the Government publishes its finalized strategy for meeting the 2020 target. (8)

Scotland's First Minister, Alex Salmond, refused to let pessimism take hold. Offshore renewables could give Scotland as big an economic boost as North Sea oil, he said. He highlighted some of the progress being made in the sector including the granting of consent for the one of the world's largest commercial wave farms off the Western Isles. In addition, more than 40 companies have registered an interest with the Crown Estate to develop wave and tidal energy projects in the Pentland Firth and surrounding waters. And the Scottish Government's of £10m for innovation in renewable marine energy has attracted 94 registrations of interest from 23 countries. (9)

Meanwhile the UK government ran into a storm of criticism after quietly closing its grant programme for solar energy. The low-carbon buildings programme is a grant system aimed at boosting renewable energies including wind, biomass and solar. It was due to close this summer but last week the Department of Energy and Climate Change (DECC) put an announcement on its website saying that applications for solar photovoltaic (PV) projects on public buildings such as schools and hospitals were running at such high levels that they had used up their allocated share of half of the £50m grant pot ahead of time. (10) Unless the Government tops up the money available for grants there will a funding gap over well over a year for the solar industry before feed-in tariffs are introduced. (11)

Cost of nuclear decommissioning	£75bn
Replacing Trident	£25bn
London Olympics	£9bn
UK annual tax revenue from tobacco	£8bn
Heathrow Terminal 5	£4.3bn
Widening M1 Motorway	£1.9bn
UK annual renewable subsidies	£1bn
UK annual renewable R&D	£0.012bn

The Guardian puts spending on renewables into perspective.

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10. Greenfurbs

If we are to hit our climate-change targets we must tackle existing houses - 80% of the houses we'll be living in 40 years already exist. We have to bring these up to standard to cut emissions and eliminate fuel poverty. More than a quarter of the UK's CO₂ emissions come from housing. If the government's pledge of an 80% cut by 2050 is to be met, emissions must be virtually eliminated from our homes. Ambitious targets exist for new homes, which in England must be zero-carbon by 2016. Yet action on Britain's 25 million older homes has been slower to materialise. (1)

The government has just unveiled new plans for existing homes – 7 million homes will receive an energy upgrade over the next 10 years. Every single home will have been overhauled by 2030. (2) The social housing sector is expected to take a lead. But what resources will they need to meet the challenge? Peabody, one of the largest housing associations in London, has 18,000 homes, many of them dating back to Victorian times. It is committed to doing everything it can to meet the Greater London Authority's target of cutting carbon emissions by 60% by 2025. The estimated costs to Peabody of meeting this target could be £100m to £150m. This is over and above our existing planned expenditure on home improvements to 2030.

Peabody's research shows that solid wall insulation is easily the most effective thing that can be done to reduce home emissions. A grant roll-out to support solid wall insulation looks unlikely until 2015. But if we could bring this forward and introduce feed-in tariffs early in 2010, we would not only speed up the delivery of carbon reductions, but also create jobs. (3)

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11. Sea-level rises likely to be worse than predicted.

Climarte scientists have warned that rising sea levels pose a far greater danger than previously estimated. There is now a major risk that many coastal areas will be inundated by the end of the century because Antarctic and Greenland ice sheets are melting faster than previously estimated. The International Panel on Climate Change (IPCC) - when it presented its most up-to-date report on the likely impact of global warming in 2007 - concluded that sea-level would rise between 20 and 60 centimetres by 2100. Revisions now suggest the figure could easily top a metre with the US Geological Survey saying it could reach as much as 1.5 metres. (1)

The implications of this could be severe with 10% of the world's population – 600 million people – living in areas vulnerable to flooding. (2) Scientists have also warned that a failure to cut emissions will lead to a global average temperature increase of 5 – 7 degrees centigrade. (3)

All UK nuclear sites are on the coast and will certainly be affected by rising sea levels. Engineers say they can build concrete walls that will keep out the water throughout the working lives of these new plants. But that is not enough. Nuclear plants may operate for 60 years, but it could take hundreds of years to decommission them. By that time, who knows what sea-level rises and what kinds of inundations the country will be experiencing? (4)

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