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The Facts - A Reply to Bolwell's Against Nuclear Energy

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As Mr. Bolwell has so succinctly summed up his vision of nuclear power as "unacceptably dangerous, unreliable, unnecessary, destructive and horrendously expensive" I might as well make a similar effort, how about: "necessary, more reliable, less destructive, not as dangerous and cheaper". Unlike Mr. Bolwell, I don't intend hypocritically taking nuclear power out of context as if no alternative methods of energy production had problems associated with them.

Firstly, Mr. Bolwell's 'big one': he's quite correct in arguing that uranium mining has been fraught with dangers, but he's overlooking two very vital points: (1) because uranium is so much more concentrated an energy source (1gk of uranium = 3,000 tonnes of coal) far less has to be mined. Approximately 10 times more people die from accidents per billion megawatt hours (m.w.h.) worth of fuel produced,[1] from 20-50 times more coal miners die from mining related diseases (mainly black lung), and about 50-100 times more people a year die from transporting coal. (This is because for a 1,000 m.w. station the number of truckloads of fuel transported to the plant is: 6 for nuclear, 38,000 for coal.[2]) The number of truck loads of waste transported away is 60 for nuclear (though most of the volume is taken up by the re-usable lead caskets containing the fuel); 36,500 for coal.[3] (2) If, or when, breeder reactors become commonplace, the small quantity or uranium needed will increase the ratio of acres mined for coal to acres mined for uranium, from 14.7:1 to 4,420:1[4] for an equivalent amount of fuel.

His capacity for either ignoring, or glossing over, Mr. Vaughn's points (FL Vol.2 No.4) seems almost limitless so I'll reiterate them for him. The reactor vessel in a PWR is 4' thick and made of heavily reinforced steel lined concrete. It's built to withstand not only gales of more than 180mph, but even jet liners crashing into it at full speed. Even if the AGR's containment building isn't quite as strong as that of the PWR, it certainly could not be "easily disabled" - the pressure vessel itself is made of 5 metre thick pre-stressed concrete. Similarly, a MAGNOX reactor has welded steel pressure vessel like the PWR but is enclosed inside a concrete shield more than two metres thick.

In concentrating solely on nuclear power plants, he ignores the fact that large storage facilities of oil and natural gas are not only much more vulnerable, but would cause far more casualties. This is because they are located in or near centres of population unlike nuclear power stations which have to be located at least fifty miles away from such centres.

WASTE DISPOSAL

"Incredibly the fuel containers are only tested to withstand an impact of 30mph … and a fire of 3000C lasting only thirty minutes." In one test at Sandia laboratories in Albuquerque two pairs of rockets were used to fire a truck carrying a 22 ton (normal weight of fifty tonnes) fuel container into a concrete wall at *60mph*, another test dropped a truck onto spikes from a height of 30', in both cases the truck was totally demolished - in *neither* case did the container spill a single drop[5]. UK regulations state that a flask must withstand a temperature of 800°C for half an hour. Full-scale containers have often been tested, though I fail to see why a test involving a 1/4 or 1/2 scale model should invalidate the use of a full-scale container as they are made of identical materials and are of identical proportions.

It is possible to take such precautions with this waste because of the relatively small number of containers involved. In Britain over 250,000 wagons of dangerous products are forwarded by British Rail every year (including roughly 500 nuclear loads) and these are regularly derailed, occasionally necessitating an evacuation. This is because it is virtually impossible to take the same precautions for all dangerous wastes. I won't

deny the possibility that a one-eyed chimpanzee might one day solve *The Times* crossword and on the same ground I won't deny the possibility of an accident involving nuclear waste. But the probabilities of such an accident killing someone are much lower than those for a fatal accident involving a wagon load of chemicals. Even if a major release did occur the whole of London will not "have to be sealed off for a century." The radioactive gases in the container (after the more dangerous ones - for example, iodine 131 - have decayed in the cooling pond before transport) would be dispersed into the atmosphere within, at most, a few days if not immediately. Hot spent fuel is not volatile and would therefore take several hours to warm up enough to cause any serious evaporation of radioactive gases into the atmosphere allowing ample time to take action; hardly the case with such volatile chemicals as chlorine and ammonia which are more frequently and less securely transported. There have already been 6,000 journeys (3.5 million rail miles) of irradiated nuclear fuel since 1962 without any being spilt.

TERRORISM AND SECURITY

"I consider it only a matter of time before ... an IRA attack with a view to stealing fissile material." The problem with this is that the radioactive waste is about as much use to a terrorist group as a cap pistol, unless they intend to build a huge reprocessing plant to extract plutonium. To be fair I assume he suffered a temporary lapse and assume he meant to say there is a danger of plutonium being stolen *after* reprocessing.

Despite numerous horror stories the basic idea of terrorists stealing enough plutonium to manufacture an atomic bomb is fairly absurd. The only time they could get at it would be either during its transportation from the reprocessing plant to the fuel fabrication plant at Sellafield, or from Sellafield to the fast breeder reactor (in the form of, a plutonium oxide/uranium oxide mixture). During these journeys there are armed guards on an escort vehicle. In future, co-location (siting the fuel fabrication plant and reprocessing plant next to each other) will remove the need for plutonium transportation altogether. To prevent accidents the 20 ton containers have to undergo tests identical to those for irradiated fuel flasks. The sea journey to Sellafield from the prototype fast breeder reactor at Dounreay poses few security problems.

These measures hardly constitute a "police state", but if Bolwell disagrees I can think of situations where security arrangements are much more conspicuous - anti-hijacking. measures at airports, for example - which few people complain about. I'm also rather puzzled by his statement: "the Atomic Energy Authority controls the only legal private police force in the country." A large number of companies hire private guards, security vans, etc, and, as an anarcho-capitalist libertarian I favour the de-nationalisation of the police and abolition of gun laws. Employees at the "sensitive" installations would be security screened, as they are in any security conscious firm, but the notion that "informers, wire-tapping, checking on bank accounts and the opening of mail" would be carried out is ridiculous. I'm always cynically amused to hear ecologists, Friends of the Earth etc. talk about violation of civil liberties as an excuse for banning nuclear energy.

Back to terrorism: assuming our crafty terrorists had succeeded in surreptitiously acquiring the plutonium or mixed-oxide fuel, the operation of making a bomb would almost certainly be doomed to failure. Commercial reactor plutonium is a poorly suited material as it contains too much plutonium 240 - it can also be made dangerous by spiking it with radioactive poisons or by irradiating it for a short period. If a terrorist desperately required to kill a large number of people it would be easier to steal a tactical nuclear weapon or, easier still, blow up a dam; several US dams could kill more than 200,000 people each if sabotaged, though it's difficult to see what a terrorist group would have to gain by this; killing 50, or even 100 people, they can usually claim is a vengeance killing, but 200,000?

Furthermore, weapons-grade plutonium for the military has already been transported in large quantities without any being stolen and without a "police state" - even if nuclear power were banned in the civilian sector, the military aren't suddenly going to stop

building their weapons of mass destruction (unfortunately).

RADIATION - GOOD AND BAD

The "plutonium economy" is another anti-nuclear cliché. If all our energy was supplied by nuclear power, the total amount of plutonium transported would be less than l% of the amount of coal transported now, but we don't talk of a 'coal economy'

Before I put the "horrible, insidious nature of radiation" into perspective, I'll give a couple of examples of radiation use which are neither horrible nor insidious.

1) Grain, fruit and vegetables can be preserved by radiation which kills the bacteria, with absolutely no danger to the consumer.

2) Radiation is used to cure cancer; in one experiment 70% of rats recovered from breast tumours following radiation treatment - the remainder died. It's also commonly used to prevent hyperthyroid.

The total amount of radiation emitted by all nuclear power stations gives the average UK citizen 0.3 millirems (3/100,000 rem) and for someone living next to a nuclear power station the maximum they are likely to receive is 3-5 rems, following the tightening up in 1973 of the International Committee for Radiological Protection (ICRP) regulations. These are endorsed in the UK by the National Radiological Protection Board (NRPB). Compare these amounts with those from other sources. From cosmic rays we get 35m rem/year (this doubles for every mile of altitude); from the air, 5m rems/year; from building materials, 34m rems/year; from food, 25 m rems/year; from the ground, 11m rems/year; from watching colour TV, 1m rems/year; from a long distance jet flight, 5m rems; from one chest x-ray, 50m rems. Or put another way: natural background radiation gives us 67.6% of the total received in a year; medical irradiation, 30.7%; fallout, 0.6%; miscellaneous, 0.5%; occupational exposure, 0.45%; routine release, 0.15%.[6]

Radiation is also radiated out of the body. As Edward Teller once said: "In sleeping with a woman, one gets slightly less radioactivity than from a nuclear reactor, but to sleep with two women is very very dangerous." $1 billion has been spent on research into the effects of radiation, (the US government pays out $1 billion annually to the victims of black lung disease) so the risks can be accurately calculated: for every 1 rem of radiation absorbed by the body the probability of dying from cancer is increased from 16.8% to 16.818%. Extrapolating downwards and assuming there's no safety limit the total number of people who die in Britain every year due to routine releases is, on average, one over a total of 140,000. If Bolwell is so concerned about radiation why didn't he mention the radioactive isotopes in coal ash: radium 226, thorium, pollonium, uranium and other radio-nuclides. The first two are not only water-soluble, chemically active and a threat to bone structure, but the total radioactivity given off is 50 times more than that from a nuclear power plant.[7]

'NOT' A NUCLEAR DISASTER

Concerning Three Mile Island Bolwell says: "Within 10 miles of the reactor infant deaths had more than doubled... abnormalities among new-born babies were five times greater." He doesn't reveal his source, but only one person in America could come up with figures like that: the infamous Dr. Sternglass, who has had the dubious privilege of having his figures either rejected or condemned by the NRC (Nuclear Regulatory Council), the American Health Physics Society, the EPA (Environmental Protection Agency), the US Public Health Service, the Department of HEW (Health, Education and Welfare) and several state public health services and other institutes.

Numerous commissions were set up to study TMI and not one of them found any immediate effects (other than mental stress due to a falsely broadcast evacuation order), the only delayed effect being an increase of 1-2 expected cancer deaths. But since then TMI unit 1 has also been shut down - for no reason other than pandering to the hysteria generated by the mass media - the coal-fired power station which has to replace it is causing 62 deaths a year (based on the detailed Brookhaven report,[8] which estimated that in 1985 alone 49,543

Americans will die prematurely due to coal combustion.)

Mr. Bolwell then takes two isolated examples to prove that "it's morally and realistically obvious" plants cause leukaemia. I can play the same game: Colarado, with double the background radiation level of Florida, has half Florida's cancer mortality. By Mr Bolwell's standards, I've just proved radiation helps prevent cancer. Certain areas in India and Brazil with monazito sands, containing thonium and uranium, expose the population to 1500m rems, or 3 times the international permissible standard, yet studies have revealed no unusual effects. Many scientists have devoted their time trying to find out exactly what are the main causes of cancer, to little avail, but, fortunately for us, Mr. Bolwell's got it all worked out.

5% of new-born children have birth defects - the ICRP (International Committee for Radiological Protection) estimated that per 1,000,000 infants, 50,000 have genetic defects and a further 320 in all future generations will result per rem of radiation absorbed by their parents. From this, the radiation from a 11,000 mw plant will lead to one theoretical case of a hereditary defect every 10 years. I'll mention later the chemical mutagens which fossil-fired plants emit directly into the atmosphere.

Bolwell's question, "how many cancers and stillbirths do you set against one more unnecessary reactor?" is a fraud, as it presupposes that only nuclear power leads to cancers and still births: It is, as Bolwell says, difficult to prove where a particular cancer originated, but no more difficult than with coal.

Bolwell refers to the "now largely discredited" Rasmussen report[9] which puts the probability of an *uncontained* meltdown *killing 10 or more people* at 1:3,000,000 per year. Since neither occurred at TMI, why is it discredited? Bolwell is silent.

RISKS AND DANGERS OF CONVENTIONAL POWER GENERATION

Bolwell's statement "nuclear power... must at all costs be failsafe" is a colossal blunder. The Rasmussen report calculated that even if a core melt is followed by a release of radiation - the 'worst possible accident' - the chances of ten or more people dying as a result is less than 1%; 100 or more is 0.002%; 1,000 or more is one in a million or equal to the probability of 1,000 or more being killed by a meteorite.

This can be put into perspective by comparing it with the risks and dangers from other man-made structures. If a fully laden oil tanker with 200,000 tons of oil were to explode it would have the force of a 20 kiloton bomb, twice the size of the Hiroshima bomb. Natural gas is potentially even more dangerous, and accidents have already occurred in storage tanks. In Cleveland, Ohio, in 1944 133 people were killed by an explosion and fire. The tanks today are many times the size of the Cleveland tank. Dam failures have already occurred at regular intervals killing thousands of people. The probability of 1,000 or, more being killed is 1:80 (i.e. once in every 80 years), 10,000 times greater than a nuclear disaster of the same magnitude.

In New York, 1973, *oil* storage tanks caught fire on shore and major disaster (5,000+ people dying) was averted by the absence of an unfavourable wind direction and no heat inversion. In 1976, in New York, a worse accident happened - a 90,000 barrel oil storage complex caught fire and exploded. Again New York was saved by prevailing weather conditions. The Rasmussen Report puts the probability of 10 or more deaths to the public from an oil fire at 1:10,000 and this does not include accidents in tankers or transit storage.

The safety advantages of nuclear power (1) The time it takes for an accident to evolve - hours or even days, (2) nuclear power stations are located away from centres of population and (3) the defence in depth, which was proved itself on numerous occasions. For example, in the Browns Ferry Fire an inept electrician set fire to some cables with a candle (cables are now fireproof), the alarm wasn't sounded for 10 minutes and the fire raged for 7 hours before the fire-fighters were allowed to use water, when it was put out in twenty minutes. Despite all of this, neither of the two

emergency core cooling systems had to be used and the *first* line of defence against a radioactive release wasn't even breached. Try lighting a candle in an oil or gas storage facility and see how many hours it takes for an explosion to occur.

The great irony of the situation is that more people have been hurt in anti-nuclear demonstrations than by nuclear power itself: In 1977, in Brokdorf, W. Germany, a 3 hour battle between 15,000 anti-nuclear demonstrators and 30 police companies, led to 80 protesters and 237 policemen being wounded. In Spain guards at nuclear sites were machine-gunned, resulting in deaths, and in France, a demonstrator was killed in 1977 following a violent demonstration similar to that at Brokdorf. I'm relieved to say the majority of demonstrations in England and America have been peaceful.

"The chances are that uranium will run out even before oil". Uranium is a very common element found in shales, certain conglomerate rocks, granite, etc. Consumption in 1976 was 21,000 tonnes per year and the World Energy Conference *Survey of Energy Resources* commented. "At costs up to $200 per kg, the amounts of uranium available are in tens of hundreds of megatonnes (mt's); at costs up to $500 per kg in the 1,000's of mt's." Present cost is $25 per kg, with just under 1mt of recoverable resources. This is enough (at the present rate of increase of nuclear power stations) for 50 years, and if reserves went up to $39 per kg (or cheaper mining methods were discovered) there would be enough for 200 years. Despite gloomy forecasts for the imminent depletion of copper and lead, new reserves are continually found; the same is bound to happen with uranium and even if it doesn't, the price could double or even triple without making a substantial difference to the price of electricity (assuming the price of coal doesn't increase, which it will). Anyhow, I don't think companies are so stupid as to spend millions of dollars on building power stations if the fuel is going to run out in 20 years; if that were so they would all be building breeder reactors which greatly economise on uranium fuel. *Present* stocks of waste disposal uranium 238 in the UK are equivalent to 30-40 thousand million tonnes of coal.

Waste: Apart from the boron-silicate glass other methods have also been developed: 1) The waste is solidified and then enclosed in artificial corundrum (fully compatible with natural corundrum, the hardest naturally occurring material) or artificial rock (which will mesh with the cystalline structure of the waste immobilising it for up to 2 billion years). 2) The waste can be calcined into hard granules. Following this the solid waste is enclosed in a cylindrical stainless steel container.

Radiation cannot render glass "susceptible to chemical breakdown"; radiation is a nuclear phenomenon and has no effect on the chemical properties of a substance. The only problem involving solidification is the heat, which can he easily dealt with by an interim cooling period of 50 years or so, after which time only 0.01% of the original radioactivity will remain. Early vitrification will remove the problem of spills like those at Hanford or Windscale. Nor does nuclear waste remain dangerously radioactive for hundreds of thousands of years. After about six hundred years the radioactivity will have died down to below that of the pitchblende it came from. The fact that plutonium has a long half-life means it is only slightly radioactive, emitting alpha rays which are stopped by a few inches of air - Mr. Bolwell could sit on it quite happily with only a pair of jeans to provide the necessary protection.- It is simply not the ferocious poison it's made out to be - only ten times more dangerous than caffeine, and fifty times less poisonous than the insecticide arsenic trioxide (A503). This latter has not got a half-life of 24,000 years like plutonium, AS03 has an infinite half-life. It is not buried and monitored but is dispersed randomly on the earth, mainly where food is grown. The main danger from plutonium is inhaling dust particles or absorbing it into a cut.

When the waste material has been solidified it is first put into air or water cooled vaults encased in three feet thick concrete casks built to withstand sabotage and aircraft crashes. After cooling, these steel containers will then he buried one thousand feet down in stable geological formations such as salt, shale, clay or granite. There is no lack of salt or granite formations in the USA or in Britain. There are already thirty *trillion*

cancer doses of uranium under the surface of the USA and these 'reserves' kill approximately twelve people per year.[10] The nuclear power programme is simply replacing the radioactivity taken out, putting it in safer places and in a more concentrated form so that it is easier to monitor and control The amount of nuclear waste produced is dwarfed by the five million tons of toxic chemical wastes disposed of in the UK every year - a much more dangerous phenomenon.

The liquid waste discharged by Windscale is carefully monitored by the Ministry of Agriculture as well as by Windscale themselves. The total radiation given off is probably considerably less than that given off by sewage (which contains carbon 14) and other wastes. The waste from whisky, for example, contains 1.2 nanocuries per litre, which quickly works its way into the sea.

KILLER COAL

"At least coal once it is mined, is not dangerous." Please, Mr. Bolwell, think again. A 1,000 megawatt nuclear station produces two cubic metres of high level waste a year, a 1,000 megawatt coal station produces: 30 1bs of sold waste a second which includes 19 toxic metals (such as arsenic), carcinogens (such as benzopyrene), and also some mutagens and radionuclides.[11] This is not securely buried 1000 feet down and constantly monitored, but dumped in landfills. *This* waste has an infinite half-life. So "let our children and grandchildren curse us for the greedy, short-sighted imbeciles we are" for this waste and not the nuclear waste.
This is only a part of the problem. The total waste sludge from the scrubbers in the smoke stacks of the UK power stations alone will take up about 50,000 acres at a depth of around six feet by the end of the century. There have already been accidents with these slag heaps when in 1966 at Abervan in Wales they collapsed and 144 people, mainly school-children, were killed.

The most serious health hazards are wastes disgorged into the atmosphere via the stack. For each 1,000 mw station they include: 600 lbs. of $C0_2$ per second, possibly responsible for climatic changes; 30lbs of $S0_2$ per second, causing lung, heart and bronchial diseases, and the horrific problem of acid rain, as many nitrous oxides as 200,000 cars running simultaneously - probably causing cancer; and 18lbs of particulates per minute (assuming 99% precipitator efficiency) causing bronchial and lung disease.

SOME PROBLEMS INEVITABLE

Accidents: Yes, there have been several industrial-type accidents in nuclear power stations which have killed technicians. Since 1962 one CEGB worker has died from scalding by steam and by the laws of probability a similar accident will occur sooner or later, but this hardly constitutes damning evidence for banning nuclear power stations. After all, most industries lose lives through accident. About 2,500 people are killed every year in British industry as a whole - in 28 years of operation the nuclear industry has only produced five deaths, by any criteria an extremely impressive safety record.

I can't find any mention of Aldermaston workers dying, and if they did, I don't know what from. Of 17,000 plutonium workers in World War II who were exposed to much greater levels of plutonium (up to 25 times more) than is permissible now, not one has died of plutonium related diseases, and in a recent study of 224 plutonium workers the cancer rate was lower than the national average due to frequent health checks.[12]

Edward Gleason and Joe Harding were both isolated "freak" events. The reason Mr. Bolwell can only "turn to specific cases" is because there are no more cases like them. I've already dealt with plutonium toxicity.

Mr. Bolwell seems to take a morbid pleasure in giving gruesome details of the accidents: "Their bodies were so radioactive they had to be cut in half . . . he developed horrible malformations. . . after amputation of one arm... parts of them were buried in leadlined coffins... the rest incinerated inside the reactor." It's an interesting psychological trait, mixture of fascination and fear of new technologies. Isaac Asimov labelled it the "Frankenstein complex".

The reactor certainly does not need to be "guarded for ever." When a reactor is decommissioned, usually after about 40 years, it will either be dismantled by remote control, entombed (buried under a hill of earth) or mothballed (the entrances blocked with concrete and other security measures). Economic considerations will dictate the choice, but if it's mothballed, a hundred years later the radioactivity will have died down to a level where straightforward dismantling and removal will be carried out (at 2% of the cost of the plant).

To help Bolwell plead his case. In 1977 Zhores Medvedev put forward fairly good evidence for a disastrous radioactive release at a waste disposal plant in the Urals in 1957 or 1958[13]. The most likely cause is either that the plutonium production reactor suffered an uncontained meltdown, or that nuclear waste was spread over a large area by water seeping onto it. Anyhow, Russian safeguards are so appalling (until recently civilian reactors had neither an ECCS nor a containment building, and hot radio-active waste is often buried in shallow landfills) it's a miracle they haven't had more. Nobody ever said nuclear power should not be treated with respect.

Of course nuclear power is highly technical - so are calculators, quartz watches and microcomputers; "ban the lot of them!" Of course it's suitable only for large scale energy production - larger central power stations have reduced the cost of electricity in real terms by nearly 75% since 1922 - large systems waste less energy. It is certainly not unbelievably expensive, elitist (what does that mean anyway?) - or elusive of democratic control (i.e. Mr. Bolwell's having trouble in banning it) and if it enhances the power of central government the solution is to denationalise the CEGB and have private companies build and run nuclear reactors. Bolwell's comment that "it tends to bolster up industrial agglomerations" is reminiscent of the paranoia of most ecologists who cry out slogans like 'safety before profits' and offer as their answer, running Britain on windmills, solar power and cow manure.

CHEAP POWER - NUCLEAR POWER

As for economy - from 1979-80, in Britain, nuclear power was 1.30 pence per kwh, compared to 1.93 pence per kwh for oil-fired station and 1.56 pence for coal-fired stations. These figures include complete fuel costs, interest charges, research and development, eventual decommissioning and the full costs of operation, training and construction. Certain reactors (especially the AGR as Mr. Bolwell noted) have been plagued with problems, but overall the reliabilities of nuclear and fossil plants are approximately the same,[14] and if coal-fired plants were shut down for the same faults that nuclear plants are their reliability would be considerably less. Although a nuclear plant has a much higher capital cost and takes longer to build, the percentage of its lifetime needed to build and operate a reactor is lower: 6% compared with 7-8% for a Coal plant of similar capacity.[15] Though the first AGR, Dungeness 'B', has had an unfortunate history (primarily due to the weakness of the consortium that built it and the mistake the nuclear industry made of scaling up 20 times from Magnox without building a full-size prototype - due to over-confidence) both Hinkley Point 'B' and Hunterston 'B' have been in operation for seven years and now produce the cheapest electricity in the country (despite some delays in building them). They are certainly not a "wash out". The main reasons for increasing capital costs are delays engendered by long inquiries and disproportionate safety regulations, both due to groups like the Ecology Party.

Enough PWR's have been built. in the USA to give a good indication of the overall cost - the Magnox have given Britain an excellent run for its money, but need replacing. Bolwell doesn't want the PWR - which distinguished itself at TMI as being the first ever major disaster with no-one left dead or injured (I don't think Bolwell meant it was distinguished for this reason) - nor does he want the AGR, so what does he want? Please write in and tell me Mr. Bolwell.

The CEGB has a habit of getting the, energy forecast wrong, but even if demand was static (it increased between 1977 and 1979 at 3½ % a year) we would still need nuclear energy as a cheaper and safer alternative to

existing forms of energy production. The CEGBs over-capacity is often misinterpreted - it is primarily to cope with bad weather, and the occasional failure of the older power stations, both of which can put excessive strain on the system.

To say, as Bolwell does, that we just can't afford to have nuclear electricity is just fine if you are not concerned about the lives which could be saved through the replacement of nuclear for coal-fired power stations, nor about the poorer countries continuing to live at subsistence levels through lack of cheap energy, nor that oil and gas are likely to run out in the next half century or so, nor about the countryside ravaged by coal mining. I think Mr. Bolwell is worried about these things so perhaps he will now change his mind.

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A NUCLEAR ENERGY READING LIST

Petr Beckmann - *The Hazards of Not Going Nuclear*
Petr Beckmann - *The Radiation Bogey*
Petr Beckmann - *The Non-Problem of Nuclear Wastes*
Petr Beckmann - *Small is Beautiful: Economics as if some people mattered*
Walter Patterson - *Nuclear Power*
Gerald Foley - *The Energy Question*

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