

**The
need for
nuclear
power**

**Your
questions
answered**

Nine nuclear power stations produce one eighth of the electricity used in England and Wales. Three more stations are in an advanced state of construction and work on another is to start shortly. When completed and in operation about one fifth of our electricity will be generated from nuclear power. This leaflet answers some of the questions which are being asked about the desirability of continuing to build nuclear power stations in this country.

Why build another nuclear power station now, when there is already a large surplus of generating capacity in England and Wales?

It takes about ten years from the start of site work to the full commissioning of a new power station. The latest station is not needed today, but it will be in the late 1980's because the demand for electricity is increasing and some of our older less efficient power stations will have to be taken out of service.

But what about the present surplus?

This is really a myth. We have little more than enough generating capacity to meet peak demands and allow for plant being out of service because of random breakdowns. At present, we have a 28 per cent planning margin which will be maintained up to 1985 by the generating plant now under construction.

How can you be sure the demand for electricity will increase?

No forecast for eight to ten years ahead can be precise. We study in detail developments in various sectors – domestic, industrial, commercial and

agricultural – and take note of Government's plans for economic growth. At the same time, we must be ready to meet any increase in demand which may result from a rapid upturn in the economy.

Why not build coal fired stations?

We are doing so. In fact, the electricity supply industry is the National Coal Board's biggest customer, taking about half its total output, some 70 million tonnes a year. We cannot generate all our electricity from coal, and our oil and gas resources are finite.

Then why not concentrate on natural renewable sources of energy such as solar, wind, waves and tides?

The natural renewable sources of energy are possible alternatives to fossil fuel or to nuclear power and the UK electricity industry is participating in studies and development of some of these sources. In general it can be said that the feasibility of solar heating, wind and tidal power has been established, but these are likely to contribute only a few per cent of the country's requirements by the end of the century.

But why nuclear power?

The only established technology capable of substituting for our failing resources of oil and gas is nuclear power. No credible alternative exists.

But is nuclear power safe? What if a nuclear power station explodes?

A nuclear power station is one of the most thoroughly engineered devices yet produced. Safety analyses are conducted in very great depth and it should be noted that no fatalities have occurred in the 25 years of nuclear power generation. It is simply not possible for a nuclear power station to explode like a nuclear bomb, although much of the public concern stems from the early military use of nuclear power and from the widespread confusion between nuclear weapons and nuclear electrical power.

What about radioactivity escaping from a nuclear power station? Isn't it dangerous to live near one?

The amounts of radioactivity emitted from nuclear power stations are extremely small, and certainly much less than you encounter in other ways. For example, the average background radiation level is about 100 radiation units a year, or 150 units a year if you live in a granite house in Aberdeen. Compared with these figures, the additional radiation received on average by a person living near a nuclear power station varies from less than one half to less than one-twentieth of the average background radiation level. So you can see that living near a nuclear power station is not very different from moving from one part of the country to another.

What if there is an accident at a nuclear power station with a resultant release of radioactivity?

Such an accident is extremely unlikely in Britain because of the numerous protective measures and safeguards embodied in the design, construction and operation of our nuclear plant. More than 200 reactor years of experience have been accumulated without observable injury to anyone. The chance of death from a nuclear accident has been estimated to be less than 1 in a million even to those living near a nuclear power station.

What happens to nuclear fuel after it has been used in a power station?

It is transported to a reprocessing plant at Windscale, in Cumbria, as it has been for the past twenty years.

How is spent fuel transported? Is it safe?

The fuel elements are radioactive but are completely safe if handled correctly. They are kept in water at the power station, to keep them cool, and then loaded into massive steel containers which can withstand high temperatures and severe impact without leakage. The steel containers are carefully transported by road and rail to Windscale.

Could terrorists make a nuclear bomb with radioactive fuel from nuclear power stations?

Immense technical problems make it virtually impossible to make a nuclear bomb from reactor fuel. It would need to be processed in a multi-million pound

highly specialised plant, which would be difficult to keep secret, and would involve substantial hazards to would-be terrorists.

What happens to the radioactive fuel at Windscale?

It is processed into three main parts.

Uranium	97 per cent
Plutonium	0.5 per cent
Fission Products	2.5 per cent

The uranium and plutonium can be used to manufacture fresh fuel. This is a particularly attractive proposition if plutonium is used as fuel in fast reactors where some sixty times as much energy can be extracted from the uranium compared to the reactors of today.

Reprocessing is therefore a necessary energy conservation measure and offers security of energy supplies in the future.

What about the highly radioactive fission products?

Perhaps the most important point is that the amounts involved are so small. For example, if a man's total energy requirements for his entire lifetime were met from nuclear energy then in glassified form the active nuclear waste would literally amount to a handful.

But what happens to this waste?

At present the waste is stored in liquid form in steel clad tanks at Windscale. Because the amounts involved are so small, there is no great rush to decide what to do with this waste in the long term. It seems likely that it will be glassified, placed in stainless steel

containers, and stored either deep underground or in the ocean depths.

Isn't this a threat to future generations? After all it's lethal for millions of years.

No. The major part of the active waste loses its radioactivity within 500 to 1,000 years. A very small proportion of highly active elements have longer lives, perhaps a million years or more. If this residual activity reached human environment it would be only a fraction of natural radiation levels. To get this question into perspective, look at other forms of poison such as arsenic, or mercury or cyanide. They never decay. They last for ever.

What happens to the radioactive parts of a nuclear power station when it finally closes down?

It is possible to demolish a disused nuclear power station completely and it has been done in the USA. A simpler way, reducing the exposure of the demolition workers to radiation, is to seal off the more active parts of the reactor for about 50 years, during which time most of the radioactivity would decay to a safe level.

Is nuclear power really economic?

Yes. Including capital charges and decommissioning costs, nuclear generation of electricity is cheaper than generation by coal or oil. It is expected that it will continue to be cheaper in the years ahead, and that the gap will widen as fuel prices increase.