Nuclear Electricity

Central Electricity Generating Board

Our Energy Needs

Energy is essential to the life we live – our jobs, our homes and our recreation. But more than half the energy used in Britain today comes from oil and gas. The reserves of these fuels are limited. On present prospects, supplies of North Sea oil and gas will be declining in the 1990s and many experts predict an energy gap.

We must therefore:

* fully exploit our coal reserves
* make major energy savings
* harness renewable energy sources such as the sun, wind and waves.

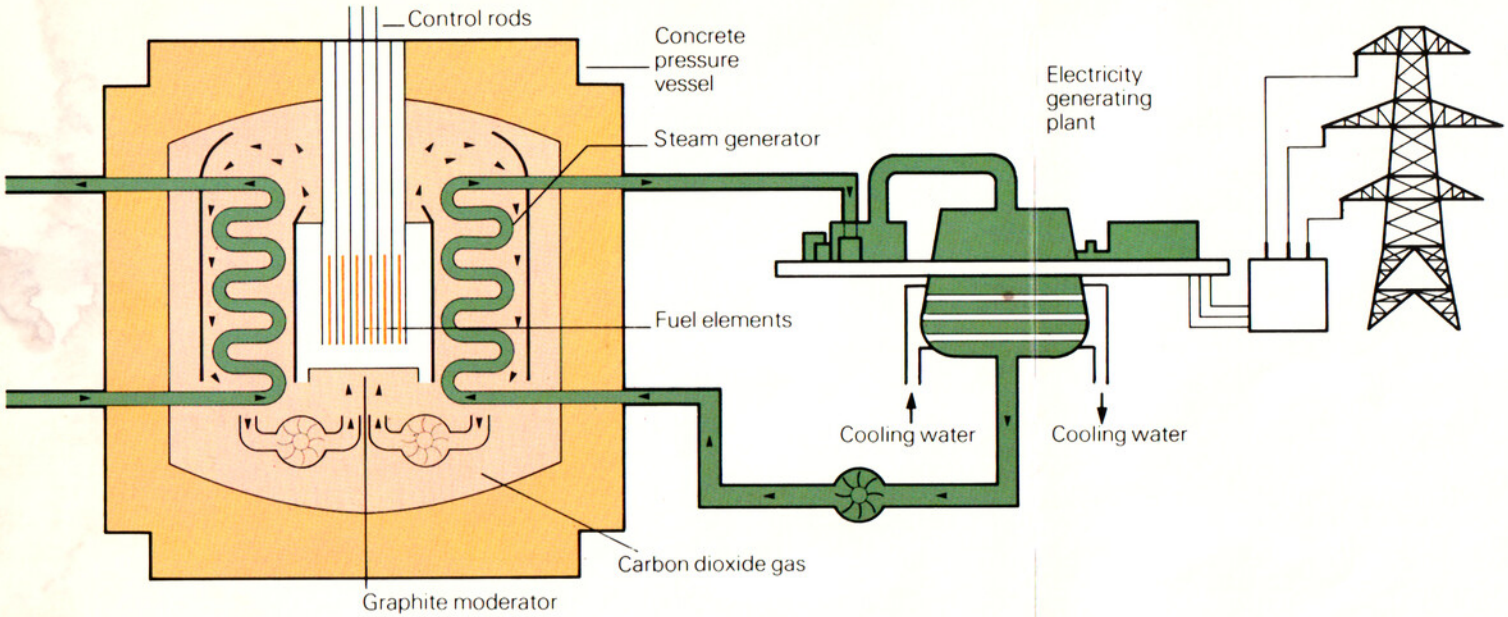
But even so, it will be increasingly difficult, if not impossible, to meet our energy needs without a sizeable contribution from nuclear power.

A Story of Success

Nuclear power has been producing electricity in Britain for more than 20 years. It has done so safely, efficiently and economically. Today it supplies about one-eighth of the electricity we use – and does so more cheaply than any other fuel.
Britain's first commercial nuclear power programme was based on the Magnox gas-cooled reactor. Nine Magnox power stations were built – eight in England and Wales for the Central Electricity Generating Board (CEGB) and one for the South of Scotland Electricity Board (SSEB). These reactors are the workhorses of the electricity system but are ageing, the first having been brought into operation in 1962.
For its second nuclear programme, Britain adopted the advanced gas-cooled reactor (AGR), a development of the Magnox reactor. The programme consisted of five power stations, each one capable of producing more electricity than the largest station in the Magnox programme. Two AGR stations – one for the CEGB and one for the SSEB – are in service and three more are being built for the CEGB. The AGRs are expected to repeat the operating successes of the Magnox stations.
All Britain's nuclear power stations have an excellent safety record. They are built and operated under nuclear site licences issued by the Health and Safety Executive, the independent Government licensing authority, on the recommendations of the Nuclear Installations Inspectorate (NII).

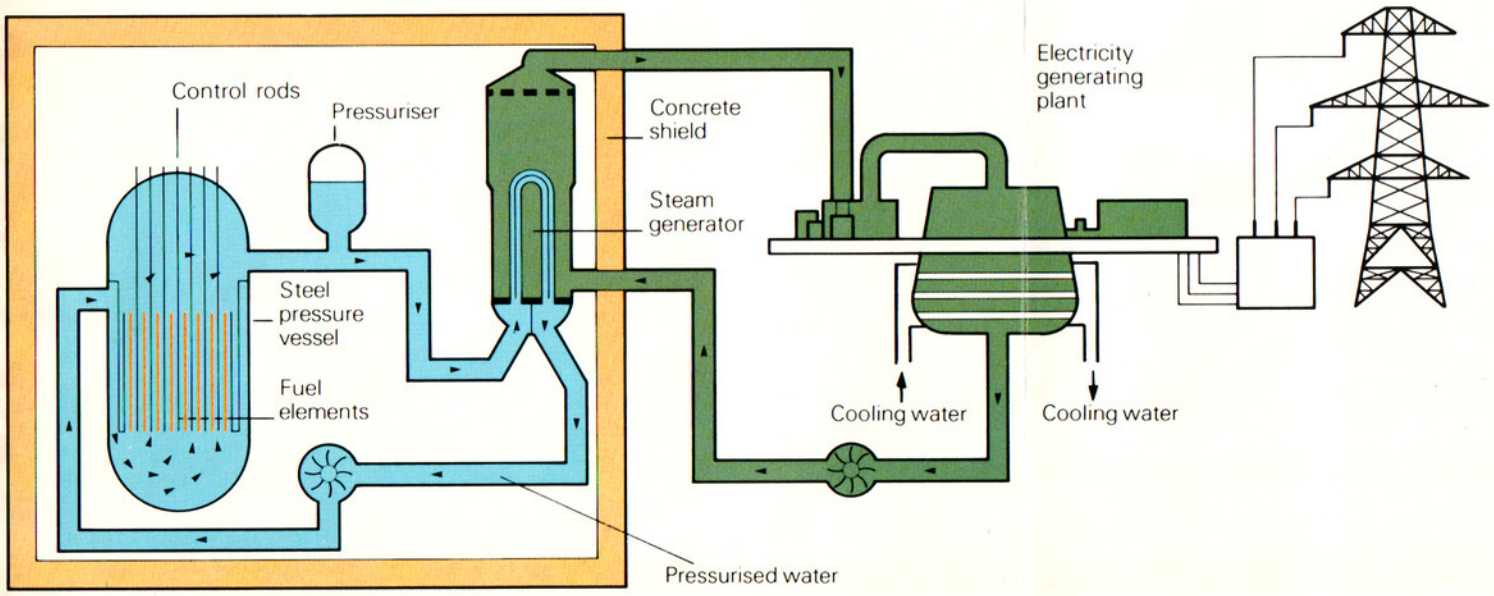
A Policy for the Future

It is 10 years since a nuclear power station was ordered in Britain and the need for orders to be resumed has been recognised by the Government. It has endorsed the policy of the previous Government and has asked the Electricity Boards to establish the basis for a new nuclear programme. A lot of decisions have still to be taken – the choice of reactor for a new programme; where the stations will be sited; and when they will be ordered. The immediate objective is to provide a basis for future choice.



Advanced Gas-cooled Reactor (AGR)

The 1955 nuclear power programme was based on the Magnox gas-cooled reactor, so called because the natural uranium fuel is enclosed in cladding made from a magnesium alloy called Magnox.
A development of the Magnox reactor was adopted for construction in the 1960s. This, the advanced gas-cooled reactor (AGR) uses enriched uranium dioxide fuel enclosed in stainless steel cladding. It takes up less space for a given power output than the Magnox design.



Pressurised Water Reactor (PWR)

The PWR is the predominant reactor system being installed throughout the world. More than 90 PWR s have been built and operated in 16 countries and over 130 PWR s are under construction. PWR s account for 60% of reactors being built throughout the world and nearly 80% of those planned.
The PWR is fuelled by enriched uranium dioxide held in zirconium alloy cladding. It is cooled by water maintained at high pressure to prevent boiling.

The Next Steps

First the Government has recently authorised the construction of two more AGR stations — one for the CEGB at Heysham and one for the SSEB at Torness. In addition, the nuclear and electricity supply industries have been asked to proceed with a PWR station based on the American designed pressurised water reactor (PWR), the world's most successful reactor system used in many countries and backed by a wealth of operating experience. If the design can be proved to meet British safety standards, and planning permission and other authorisations obtained, a PWR will be the next nuclear station to be ordered.

So design work is going ahead. The independent Nuclear Installations Inspectorate (NII) have already cleared the design of the two new AGRs. They have taken a preliminary look at the PWR and see no reason why it cannot be safely introduced into Britain. But the CEGB will have to submit a detailed design to the NII before they can make a final decision, and that will take until 1982.

Information about the safety of the AGR and the PWR will be made available to the public.

Second, the CEGB needs to find a site for the first PWR station and on 1st October announced the proposed location at Sizewell in Suffolk. Sites for other new stations, whether AGR or PWR, will have to be found.

Full public consultation takes place wherever new sites are being studied, with public meetings and exhibitions.

Before any site can be developed, the consent of the Secretary of State for Energy and other statutory approvals must be sought and obtained.

Third, a public inquiry will be held to consider an application from the CEGB to build the first PWR. If all the necessary consents are given, the first PWR can then be ordered and work begin on site.

A Sound Basis

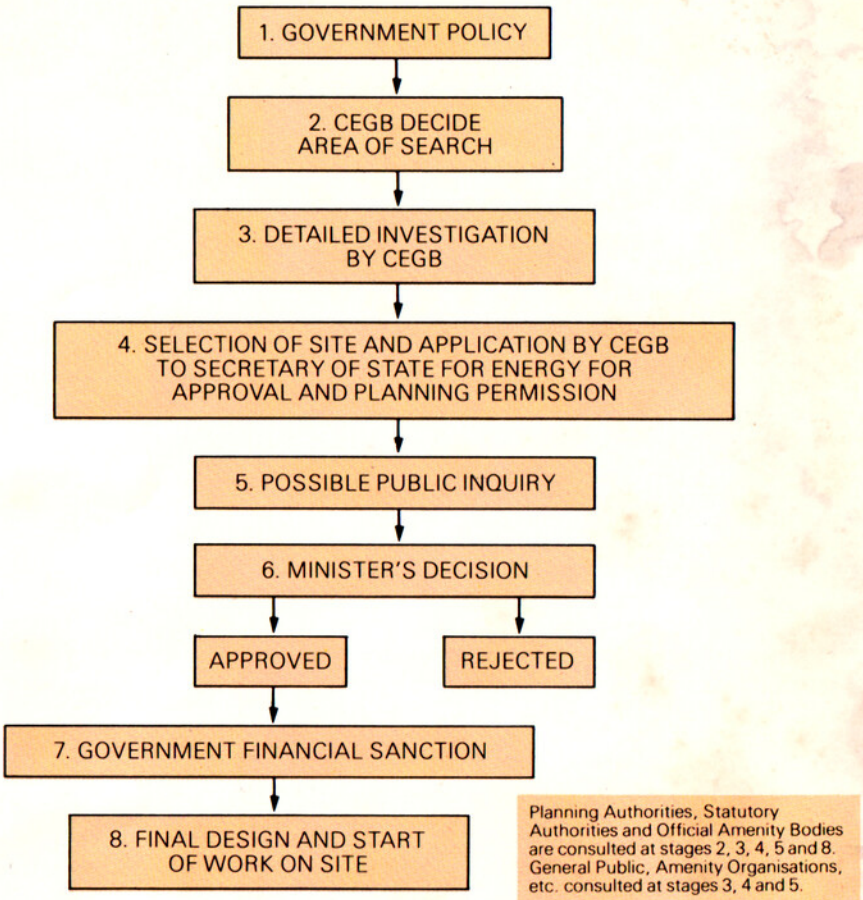
Whilst all these steps are being taken, the existing nuclear stations continue to generate our cheapest electricity. The CEGB's experience of existing stations and the steps now being taken together provide a sound basis to build for the future.

The electricity industry welcomes the Government's strategy, involving both the AGR and PWR. The diagrams help to show the basic technical characteristics of each reactor system, and the flow chart shows the sequence of events for planning a new station.

Consultations

Widespread consultations are held with planning and statutory authorities, amenity organisations and the public during the procedures and negotiations required for each new station. They start when the area of search is defined and continue until after a decision on the site, and work has started.

Steps for planning new power stations



Further information

Talks service. The CEGB has set up a free talks service on energy and nuclear power in which the speakers include experienced scientists and engineers. Requests for talks are invited from clubs, societies, schools, colleges and other groups of people anywhere in England and Wales.

Visits. Arrangements can be made for parties of adults and children (over 14 years old) to visit CEGB nuclear power stations.

Publications and films. CEGB publications have been prepared on a wide range of topics. Copies of CEGB 16 and 35 mm films are available on free loan.
For these services or for further information, please telephone 01-248 1202 (Ext. 3454 for publications, Ext. 3657 for films) or write to the address below.

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London EC1A 7AU.

Designed by Main Titles Ltd
Printed by Martins Press Ltd
G969 Reprinted October 1980