three times as much power per unit of weight as did the generators of the early 1950s.

The first important step was the introduction of hydrogen gas as a coolant, which made possible the building of machines up to 100 MW. There have been no explosions in turboalternators in Britain, although they are not unknown in installations in the United States. The next development was to pump hydrogen through hollow tubular conductors, taking the limit up to 275 MW. But it became clear that for larger units, water cooling would be better than hydrogen cooling, at least for the stator, and a prototype 120 MW unit was built in 1961. Turbogenerators with water cooled stators and hydrogen cooled rotors are now operating up to 500 MW, and this design is being used for the 800 and 1,100 MW units which are on order. The next step-the water cooled rotor-has already been developed by English Electric, and the problems of designing watertight inlet and outlet connexions to the rotor have been overcome. The rotor which has been built is designed to be interchangeable with the rotors of the 500 MW units supplied to the power stations at



Final stages in the completion of the 500 MW turbogenerator for the West Burton power station.

West Burton, Cottam and Fiddlers Ferry; it is expected to be fitted into a turboalternator at West Burton in 1969. It is true that the Russians are said to be building a large water cooled rotor, but nobody seems to have seen it.

English Electric hopes that they will have gained operating experience with water cooled rotors before having to use them in the units of 1,500 MW which may soon be built. And what will come after that ? English Electric is talking of obtaining higher voltages and reduced currents, with savings in size thrown in, by enclosing the stator and its winding in an oil bath. But the prospect of using cryogenic techniques in turboalternators seems as far away as ever.

FUEL POLICY

Two More Views on Coal

THE impact of North Sea gas on British fuel strategy is analysed in two reports that have just come out. An appraisal, carried out for the Coal Board by the Economist Intelligence Unit, of the likely financial and social repercussions of emphasizing different combinations of four main fuel sources—coal, gas, oil and nuclear power—has coincided with the publication of a report by the Select Committee on Nationalized Industries on the various methods of exploiting natural gas (HMSO, 34s.).

Although both surveys make several useful and incisive inroads into the problems of introducing a new and abundant source of power into an economy that has often been found sadly ill-equipped to absorb change and innovation, one obvious conclusion is that the imponderables involved in this type of forecasting are so numerous as to make any reasonable balance between the four fuels acceptable. It is not startling, therefore, that the EIU report lands firmly and coherently on the side of a compromise in which the run-down of the coal industry and the parallel increase in the use of natural gas are tempered by the need to alleviate the social consequences of these changes and to maintain as healthy a balance of payments as possible. The main surprise is the extent to which the increase in the use of North Sea gas should be subdued in favour of capitalizing on the continued potential of the coal industry.

In a recent speech to the Institute of Fuel conference at Eastbourne, the Minister of Power, Mr Roy Mason, referred to the contradictions apparent between the Brookings Institute Report carlier this year, the EIU report and the Government's actual fuel policy. The figures discussed in the EIU report add some credibility to these differences by emphasizing the small size of any financial saving by adopting one fuel policy rather than another, but the report claims that, when cost, capital outlay, social upheaval and the contribution to the balance of payments are taken into account, the slightly less optimistic case for North Sea gas stands out as more realistic.

The report by the Select Committee on Nationalized Industries deals specifically with accommodating the supply of North Sea gas in the present structure of the industrial and consumer markets, and sets out to examine how the cost of electricity, coal and rail is linked with the cost and supply of natural gas. The large capital expenditure involved in supply lines and in converting appliances to burn natural gas is deemed to be justifiable in the light of the large sums that would anyway have to be spent on new equipment, but some of the arguments presented in the report smack of the conviction that what is needed is a justification for using natural gas on a large scale rather than an appraisal of the merits of incorporating it in varying measure into the national scene.

This may be a viable strategy, since the point at which policy decisions are injected into an investigation can easily be delayed too long, but the publication of two independent reports on fuel policy, each with a different emphasis, draws attention yet again to the difficulties with which the Ministry of Power will have to wrestle in the long winter ahead.

SPONSORED RESEARCH Dividends for Societies

THE Fulmer Research Institute in Sussex will have a new director in 1969—Dr W. E. Duckworth, who is at present the assistant director of BISRA (British Iron and Steel Research Association). Meanwhile the insti-