Technological forecasting

Rush programme

The European Commission's FAST project, a five-year programme in science and technology forecasting set up in 1979, is up to its eyes in applications for funds. Invitations to tender for part of the £1.35 million budget were sent out early this year; and by the deadline of 10 April some 224 applications had been received from 176 institutions. Research projects relating to Europe 10, 20 and 30 years ahead must be completed by mid-1982, although the 30-40 successful applicants will be officially notified only in September.

FAST's director, Ricardo Petrella, says this compression of the timetable is inevitable, given that the programme was funded for only five years by a decision of the Council of Research Ministers on 25 July 1978. The FAST team of six scientists and four assistants spent most of 1979 defining the nature of the programme. The research phase of the programme now beginning must end during 1982 and early 1983 with the specification of research and development priorities for Europe the ultimate object of the exercise.

For the participating universities and research institutes, there will be little time to come to grips with what are complex issues — "microelectronics innovations in the context of the international division of labour", for example, and "social acceptability of biotechnology-based activities". This may account for what one observer outside the commission has called the unimaginative nature of most of the applications.

The applications are also biased to short-term issues. Petrella's team distinguished three broad sectors of problems — work and employment, the role of information technologies and the role of biotechnology — which Petrella identifies as of greatest importance over periods of 10, 20 and 30 years respectively. Some 100 applications were received for research in the first sector, 70 in the second but only 35 in the third. The final selection of projects will, however, be more uniformly divided.

The short perspective of the FAST applications might have mattered less if a parallel proposal within the European Science Foundation had come to fruition. The plan had been that the ESF, an independent body uniting national research councils throughout Europe, should have mounted an "additional activity" on "the socio-economic consequences of technical development", paid for by those among its members wishing to participate. This proposal, which would have been concerned with more basic and less policy-orientated objectives than is FAST, was thrown out by the ESF's social science committee last year.

One of the objectives of FAST, defined by the 1978 European Council decision, is

"to establish an *ad hoc* system of collaboration between specialized research groups within the community and so create a series of community forecasting networks". All very well — but what can be done on a European scale that is not already being done nationally? ("Send me the answer on a postcard", one UK government science adviser asked one of the FAST team.) It is a question of scale and regionality, according to Mark Cantley, head of the FAST biotechnology programme. Investigation of the manpower and training implications of biotechnology-based industries, for example, requires consideration of international transfers and coordination. The distribution of benefits and risks associated with microelectronics and its applications is similarly a regional matter.

FAST itself is also under test, however. The earlier, small-scale "Europe plus 30" study recommended the establishment of a Community Forecasting Institute. The council rejected that in 1978 and instead set up FAST for a provisional five years. Petrella and his team naturally hope that the experiment will be continued.

Robert Walgate

Soviet energy

No shortage?

The Soviet Union and its socialist allies have no energy crisis ahead, according to Petr Neporozhnyi, the Soviet Minister of Energy and Electrification. This confidence, he said, was based on estimates of the Soviet Union's fuel reserves — more than 50 per cent of the world reserves of coal and more than 33 per cent of the world reserves of oil and gas. Furthermore, the Soviet Union's hydroelectric capacity is potentially larger than that of the United States, Canada and Japan taken together.

The minister was speaking on the English-language service of Moscow Radio beamed to North America. Inevitably, he compared Soviet energy policy with that of the United States. The latter, he said, has in its oil shales "more than several Saudi Arabias" — but the "American monopolies" find it more profitable to import oil and raise retail prices of oil products than to develop new deposits. The minister glossed over the fact that one of the main barriers to the use of shale is environmental pollution. Estonia, which burns much shale in thermal power stations, is a major source of pollution in the Baltic area.

Neporozhnyi's confidence is to a large extent supported by the latest figures from PetroStudies (Malmo). This independent team monitors Soviet oil and energy exports on the basis of trade figures with individual countries. According to the report for 1979, published last week, the Soviet Union is now the second largest oil exporter in the world (next to Saudi Arabia), exporting 164 million tonnes in

1979, and for the past six years has been the world's leading oil producer, with an annual target for 1980 of 606 million tonnes. The same confidence was shown by Dr Mikhail Tolkachev of the Soviet Academy of the National Economy, reporting to a meeting of the International Institute of Applied Systems Analysis earlier this month. This year, said Tolkachev, Soviet natural gas production is expected to reach 4.2 million m³ per day, an increase of more than half a million m³ since last year.

Soviet claims to energy sufficiency are not new. Neporozhnyi's talk, however, is interesting in that it virtually ignored nuclear power, except for a passing mention of plans for integrating the Soviet grid with those of the various Comecon countries and the construction of the new ETL-750 transmission line to connect Rzeszow in Poland with the Khmel'nitskaya atomic power station in the Ukrainian SSR. This is the more surprising since Neporozhnyi put considerable stress on the Soviet planners' "concern for the future" — as exemplified in the long-range energy plan launched 20 years ago with the construction of the Bratsk power station in Siberia. The same concern, said the minister, has led to long-term plans for the production of synthetic liquid fuel, the use of solar and geothermal energy and even "the heat of ordinary sea water".

To most Soviet energy planners, however, nuclear power is usually a key topic in any speech on energy prospects. In April 1979, Academician Anatolii Aleksandrov, president of the Soviet Academy of Sciences, and himself formerly a leading figure in the nuclear energy programme, stressed that it was atomic energy and coal which would help the Soviet Union to avoid what he called the "imminent energy crisis". The Soviet nuclear programme does not, however, appear to be keeping up with the demand.

Last month, at an All-Union conference on nuclear power held, appropriately, at Energodar, Sapozhnikov, one of Neporozhnyi's deputy ministers, stated that the construction of nuclear power stations must be doubled and new commissioned capacity raised to 7,000-10,000 MW per year. The target is an overall nuclear generating capacity of 100,000 MW within the next 10-12 years.

According to Fedor Ovchinnikov, another deputy minister of energy, the short-term programme is for water-moderated water-cooled reactors of up to 1,500 MW capacity. Officially at least, there are no anxieties on environmental grounds. Yurii Markov, a spokesman for the Ministry of Energy and Electrification, wrote recently in *Sovetskaya Rossiya* that Soviet nuclear power stations are so safe that their surroundings "are used as recreation areas, where families come and picnic, gather mushrooms and berries and go fishing in the cooling ponds".

Vera Rich