

# Turkey: power schemes set to move ahead

TURKEY will need a massive increase in domestic generating capacity to meet the jump in demand expected by the end of the century: it is projected to rise to 200,000 million kWh, against the present 27,000 million-30,000 million kWh. As a result, energy schemes are taking priority among projects requiring substantial foreign credit financing and investment. Total external funding required for planned thermal and hydroelectric power schemes is about \$5,657 million, according to a list of projects issued to foreign bankers in May 1984 (Turkey, MEED Special Report, June 1984, page 18). Contracts to build several large-scale power plants — thermal and hydroelectric — are expected to be let in 1985.

Production of electricity has risen steadily since the dark days of economic and political chaos at the end of the 1970s, when both industry and commerce suffered badly from regular power cuts. Hydroelectric output has fluctuated, on a monthly average, between 853 million kWh in 1979 and a peak of 1,121 million kWh in first-half 1984; thermal output, calculated on the same basis, has varied between 1980's 993.9 million kWh and 1,334 million kWh in 1983. Total thermal output fell by 8.4 per cent, to 8,033 million kWh, in January-June 1984, compared with the corresponding period of the

previous year. At the same time, hydroelectric generation increased by 26 per cent, to 6,726 million kWh.

If available sources were fully exploited, the country could be self-sufficient in energy — in theory at least — rather than having to turn to neighbouring Comecon countries to top up domestic output. Imports from the Soviet Union and Bulgaria in 1984 are expected to have risen by 20 per cent, to 1,700 million kWh, compared with the previous year. According to a trade agreement signed with the Soviet Union in September 1984, plans are advanced for a second transmission line between the two countries, boosting the capacity of Soviet exports to Turkey to 1,320 million kWh.

Only 11 per cent of estimated potential hydroelectric capacity of 100,000 million kWh has been tapped, but several large projects are at the tender stage, or being built. Overshadowing them all is the giant, 2,400-MW Ataturk dam in the south-east. It is being built by the local ATA-Insat consortium, according to a contract awarded in autumn 1983. European banks have agreed to provide credits totalling about \$460 million for equipment purchases, and the first of eight 300-MW generating sets is due to start up in May 1991; the others will follow over a three-year period.

Work on the dam's sister project

in the southeast Anatolia development programme, the 1,800-MW Karakaya dam, is due for completion in 1989. Swiss banks have lent \$12 million towards the cost of the project, and the World Bank has provided a further \$120 million.

Japanese credits totalling \$60 million are financing construction of the 700-MW Altinkaya dam, near Samsun, which is due to start up in 1987, and West Germany is financing work on the 146-MW Kilickaya dam, due for completion in 1988, through a \$12 million credit. Austria and Norway have provided credits totalling \$9.8 million towards the costs of building the 90-MW Kokluce scheme, for completion later this year.

The World Bank looks likely to become deeply involved in financing the planned hydroelectricity generating drive, in both public and private sectors. Turkey has a large private electricity generating industry — the two largest companies, Cukurova Electric (CE) and Kepez, produced a combined 1,052 million kWh in the first half of 1984, 7 per cent of total thermal and hydroelectric output. World Bank officials say the bank broadly approves the government's energy policy.

The largest project on the bank's books that is scheduled to reach tender stage in 1985 is the Karyaraktepe hydroelectric scheme. Tenders

## Turkey: major power stations planned or being built



for the 410-MW project are likely to be called in May — the World Bank is due to decide whether to approve an estimated \$250 million funding share in April — and prequalification announcements will appear soon, say bank officials. Designed by Japan's Electric Power Development Consultants (EPDC), the \$570 million scheme is for completion by the early 1990s. The power plant is likely to incorporate three generating units, and the 196-metre-high rockfill dam will impound about 4,000 million cubic metres of water; it will also be used for flood control. Client is the State Hydraulics Agency (DSI).

Looking further ahead, EPDC is preparing designs for the 520-MW Boyabat-Kepec project, just upstream from the Altinkaya dam. According to estimates contained in a 1979 feasibility study, the scheme could cost up to \$600 million. Assuming World Bank loans are forthcoming, work could get under way in fiscal 1987.

The banks' most urgent private-sector project is the 273-MW Sir dam, on the Ceyhan river in the southeast; client is CE. The scheme is estimated at up to \$225 million, of which the World Bank may provide about \$150 million — the actual amount depends on adjustments to the original designs. They were done by Yugoslavia's Energoprojekt, and call for construction of a 200-metre high, concrete arch dam, using about 700,000 cubic metres of concrete.

A construction supervision consultant — France's Coyne & Bellier — has only recently been appointed, but CE is already evaluating prequalification applications; tender documents are due to be issued at the end of June. Up to 30 international firms with local partners have applied, industry observers say.

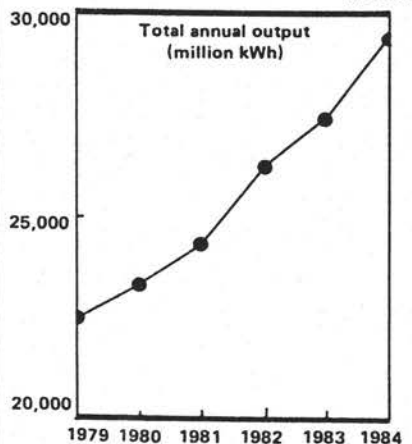
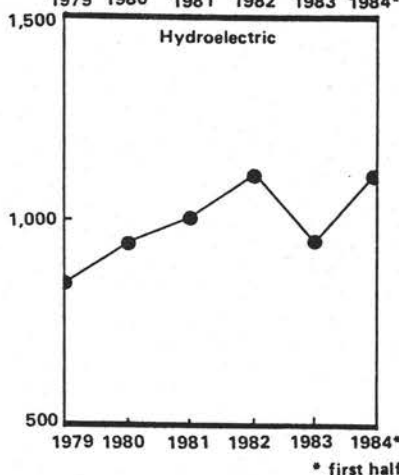
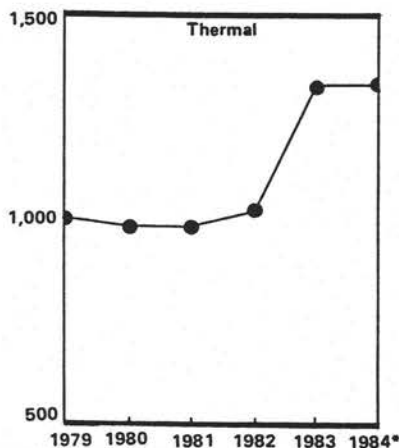
The World Bank is also considering funding the Duzkezme-Berked dam, downstream from the Sir dam, which will provide 180-MW of capacity and cost about \$200 million. However, work is unlikely to start before 1988 at the earliest — the Sir dam's effect on river flows needs to be studied, and CE's ability to finance both these large schemes will have to be reviewed at a later date. The original Yugoslav designs will have to be revised in the light of fresh geological data before tendering can start, but bank officials say it is too early to consider the appointment of a consultant.

The bank will also continue to be closely involved in funding electricity distribution schemes. Loans of up to

## The rise of Turkish power

Thermal power output rose sharply in the first half of 1984, after holding steady in the previous four years, reflecting Turkey's efforts to increase local production. Meanwhile, output of hydroelectric power has been rising steadily — exceeding thermal power supplies in 1982. Nevertheless, supplies from the Soviet Union and Bulgaria are estimated to have risen by 20 per cent in 1984, meeting almost 7 per cent of local needs

Average monthly output (million kWh)



\$130 million towards the costs of the \$170 million fourth-phase expansion of the Turkish Electricity Board's (TEK's) 380-kV network, including construction of several substations, may be approved in June. At the same time, the bank's board is likely to give the go-ahead for a \$130 million loan to support a \$200 million programme to repair and maintain existing power plants. Bidding for both projects is due to start in the second half of 1985, assuming financing is available.

Turkey has also turned to the Eastern bloc for financial and technical assistance with power projects. The Soviet Union is involved in several large schemes; and, according to an economic co-operation protocol signed in October 1984, Romania will help to build a thermal power plant at Adiyaman, as well as assisting with the Kralkizi, Derbent and Yenice hydroelectric projects. In summer 1984, Poland's Elektrim was awarded a \$250 million-plus contract, backed by government credits, to build a 210-MW thermal power station in Kemer; client is TEK.

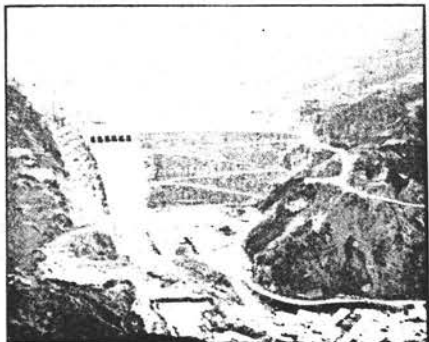
A total \$1,545 million is needed for the government's thermal power plant construction programme; of this, \$1,086 million has been pledged. If carried through in its entirety, the programme will require a fourfold increase in output from Turkey's notoriously inefficient lignite (brown coal) and hard coal mines. It is hardly surprising that most of the schemes being considered for foreign financing, and inputs of overseas contracting and technological expertise, call for the upgrading or development of an associated coal mine.

The thermal power station construction programme was boosted by TEK's late-December award of a \$150 million contract to build a combined-cycle gas and steam power plant at Hamitabat, in the Thrace region. Work will be done by the local Enka Construction & Industry, with West Germany's Brown, Boveri & Compagnie (BBC).

Substantial delays are expected in the tender competition for the 300-MW Saray power station and associated coal mine, also in Thrace. The scheme is expected to cost up to \$250 million because top soil levels at the planned open-cast mine may be deeper than previously thought. Six international consortia pre-qualified for the contract in 1984, but the scheme will now be included in the 1986 investment programme (MEED 7:9:84).

Turnkey bids for another thermal power station and associated coal mine, at Beysehir, will be submitted soon by a consortium of three US firms — provided a feasibility study is satisfactory. They are Babcock & Wilcox, General Electric and Dravo Corporation, with the local Gama Endustri. Dravo is doing the feasibility study. The planned 340-MW plant and the mine will cost about TL 162,000 million (\$360 million), according to local press reports.

The consortium has held a letter of intent for the scheme for some time; it was awarded according to special legislation which allows TEK to speed up tender evaluation and eliminate doubtful bids by selective prequalification. But a definite go-ahead for the project depends on Dravo's report on the commercial viability of the coal deposits, which



Hydroelectric schemes get priority

lie beneath a lake bed. If the studies are encouraging, a contract could be signed in the autumn, after evaluation by TEK of the commercial and technical aspects of the offer. Gama Endustri will do civil works, and supply and install all locally provided materials, including mechanical and electrical equipment; the US firms will be responsible for the remainder of the contract.

In July 1984, West Germany agreed to fund Deutsche Babcock's long-delayed contract to install a fourth generating unit at the lignite-fired Seyitomer power station. Completion of the \$139 million turnkey contract in 1988 will increase the plant's output to 600 MW (MEED 12:10:84).

Prime Minister Turgut Ozal opened the first of three generating units at the Afsin-Elbistan thermal power station, in the southeast, in October 1984. The unit was installed at a cost of about \$650 million; the plant's total estimated cost is \$1,453 million. On completion, total output will be 8,100 million kWh.

Plans for smaller public or private sector electricity schemes abound. For example, the local Sezai Turkes Feyzi Akkaya (STFA) submitted the lowest bid for the civils for the \$12 million Orhaneli thermal power plant near Bursa, on 12 February, followed by two other locals, Gama Endustri and Intes. Client is TEK.

Work on the medium-size Manavgat hydroelectric dam, in the south, is also under way. A \$10.9 million contract for supply of turbines, generators and ancillary equipment was awarded in early summer 1984 to West Germany's AEG Telefunken, the local Temsan and an unidentified Swiss company — construction will be done by two local contractors, Eksiler Insaat and Guris. Client is the privately owned Kepez & Antalya Havalisi Elektrik Santralleri.

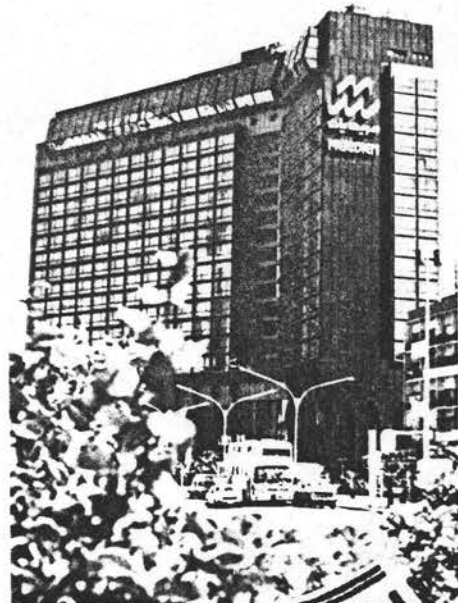
Low bidder for a contract to build the Yenice hydroelectric dam on the Sakarya river, in the north-west, is the local Mebok, at TL 4,800 million (\$10.3 million). Client for the earthfill scheme is DSI.

Meanwhile, the slow process of awarding a contract to one of three western-led consortia bidding to build Turkey's first nuclear plant, at Akkuyu, drags on. Promoted by the pre-December 1983 military government as a \$3,000 million solution to the country's energy problems, the three plants initially proposed — two at Akkuyu, and one at Sinop, on the Black Sea coast — are regarded with less favour by Ozal's cabinet, which is committed to a programme of stringent fiscal austerity.

Only the Akkuyu scheme is likely to go ahead — with only one plant for the time being. Bidding for the deal has been complicated and prolonged: one suggestion is that the successful company should run the station for a limited period to recoup construction costs. But for one bidder at least — a group led by West Germany's Kraftwerk Union (KWU) — all the financing options have been exhausted, and it has made a final, make-or-break offer (MEED 14:12:84).

If the discussions about Akkuyu do eventually collapse, the government may opt instead for more thermal plants, burning imported hard coal. As a solution to Turkey's energy problems, such an approach may prove more attractive to government planners than the prospect of several decades of highly priced electricity supplies to pay for costly nuclear schemes — despite the likelihood of a sharp increase in the already exorbitant bill for imported fuels.

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