

ELECTRICITY SUPPLY IN ABU DHABI

Abu Dhabi is the largest of the six Emirates forming the United Arab Emirates, but although it has 65,000 sq.km of territory most of it is barren desert. The construction boom has petered out and there is virtually no new residential and office blocks being started. Even other building has been affected by the ban on starting Government projects in 1978. As a result, the demand for electricity should not increase very much in the next few years and current and planned capacity should be adequate until 1981/2. WED have gone out to tender on a survey to determine requirements of electricity for next 10 years and best way of meeting those. WED are planning a new power station for 1981/82 to cope with an anticipated increased load demand of 30-40%. This has been revised downwards from 50% and may go even lower if the construction industry remains depressed.

However, The Abu Dhabi Water and Electricity Department is currently engaged on a major programme, not only to increase generating capacity, but also to extend the 132 KV cable system and erect a 220 KV transmission link to give scope for central control of the system which, by 1985, is expected to have a maximum demand of 1.25 GW.

Two power stations are currently in an advance stage of construction at Umm Al Nar and last year the Abu Dhabi steam station was completed. Umm Al Nar East is running and almost completely finished. Procco Cardow & Ryder are the consultants with Brown Boveri the main contractor. This is a turnkey job with 2 x 64 MW capacity Gas turbines which have been commissioned.

Umm Al Nar West, for which Lehmyer are the consultants, will be completed in 1981. This will be a steam station with Babcock Skoda boilers, and VWF Stock sets each rated 65 MW. CCI of Lebanon are the main civil contractors with Deutsche Babcock doing the mechanical and electrical. The capacity when completed will be 390 MW (6 x 65). Commissioned during 1976-77 was the Abu Dhabi steam station with six AEG sets. The first and last sets commissioned are condensing sets rated 30 MW. The other four sets are of the back-pressure type operating with distillation plant. The Abu Dhabi steam station has a capacity of 300 MW. In 1969-70 five John Brown 13.5 MW Gas turbines were installed at the Abu Dhabi Gas turbine station complementing a diesel capacity of 8 MW. Subsequently, with demand rising rapidly, in 1972, an 18.5 MW John Brown packaged Gas turbine wet was added. Another seven gas turbines each rated 18.5 MW were then added, the first three being supplied by American General Electric, and the last four units by John Brown Engineering.

Abu Dhabi's generating capacity is currently 406 MW. At Al Ain on the mainland the generating capacity is 130 MW with a firm capacity of 115 MW. By 1980, the combined generating capacity of the interconnected system will be 1,005 MW, giving a firm capacity of 836 MW to meet an estimated d.d. of 750 MW.

The Department operates a further diesel station at Journ Yafoor on the mainland near the 220 kV/11kV substation intended site at Wathba. In 1976 five 2 MW gas turbine sets were commissioned, a further six sets have subsequently been added, and in August 1977 five additional 2 MW sets were scheduled, all by General Motors. The Department is currently operating two stations and a smaller diesel station on the island which, by 1979, will have a capacity with the Umm Al Nar station nearby on the mainland, of 665 MW.

#### AL AIN

Al Ain power station is about 100 km inland from Abu Dhabi island and comprises a 10 MW diesel 'A' section commissioned 1966-74, a 'B' section with four 7.5 MW diesels commissioned in 1976-77, and a gas turbine section with two General Electric units and two John Brown units, each rated 17 MW. Recently a 'C' diesel station with four 16 MW Sulzer 125 rev/min sets with a total capacity of 64 MW was commissioned.

The Abu Dhabi to Al Ain transmission line was originally scheduled to be in service by April 1979. The contract for the line was placed in June 1977 and it was to be completed in 22 months. However, the Turkish firm who were awarded the contract have not performed well and someone else may be invited to finish the job. It will certainly not be ready by April 1979. Pollution is a severe problem, especially near the coast, and insulator greasing may be used, possibly on one circuit only, to evaluate the benefits. It will comprise a twin-circuit double conductor line of 0.4 sq. in cross section a.c.s.r. conductors with a rating of 200-250 MW. Partly as a result of the delay in the execution of this project Aelstrom (France) have been awarded the contract to supply two frame 5 turbines to be commissioned in June 1979 for extra power generation in Al Ain.

Primary distribution on the island is by 132 kV cables supplied by Cables de Lyons, and forming a ring on which there are six 132/11kV 500 MVA substations. Two further substations may be added.

A major extension to the 132 kV cable system is currently under construction and scheduled for completion in 1979, which will link the island to the mainland through four submarine cable circuits to Umm Al Nar power station and the industrial area of Musafah. Cables for the extension are being supplied by Toyo Menka Kaisha.

Future plans provide for a 132 kV overhead line from the Umm Al Nar power station to the site of the new international airport, which is some 18 km to the East. The anticipated demand for the airport is expected to be 10-12 MW and a 132 kV link is the most practicable method of transmission. This contract will issue shortly.

A similar load is taken at present by a salt and chloride plant near Umm Al Nar power station.

The 275 kV transmission line to Al Ain will include two 33/11 kV substations to supply local communities. When it is completed, the 132 kV cable system will be substantial and will supplement a small existing radial primary distribution system at 33 kV.

The system has, of course, a very high air-conditioning load, and electricity is currently very cheap as a matter of policy. The charge to domestic consumers for example in 1977 was 2 fils/kWh. System power factor is about 0.85, rising to 0.91 at night. The load factor in Summer is 80-85 per cent, falling in Winter to about 75 percent. Plant load factor in Summer is very high, but in Winter it falls to as low as 25 percent, so that little plant runs.

No transmission line is planned from Abu Dhabi to Ruweis. Both the Gas Plant and the Refinery will have their own independent power supply.

Boiler plant is being supplied by Wagner Biro, and desalination plant by the French company Sider. In addition to the constructors mentioned, switchgear is being supplied by Merlin Gerin and Brown Boveri.