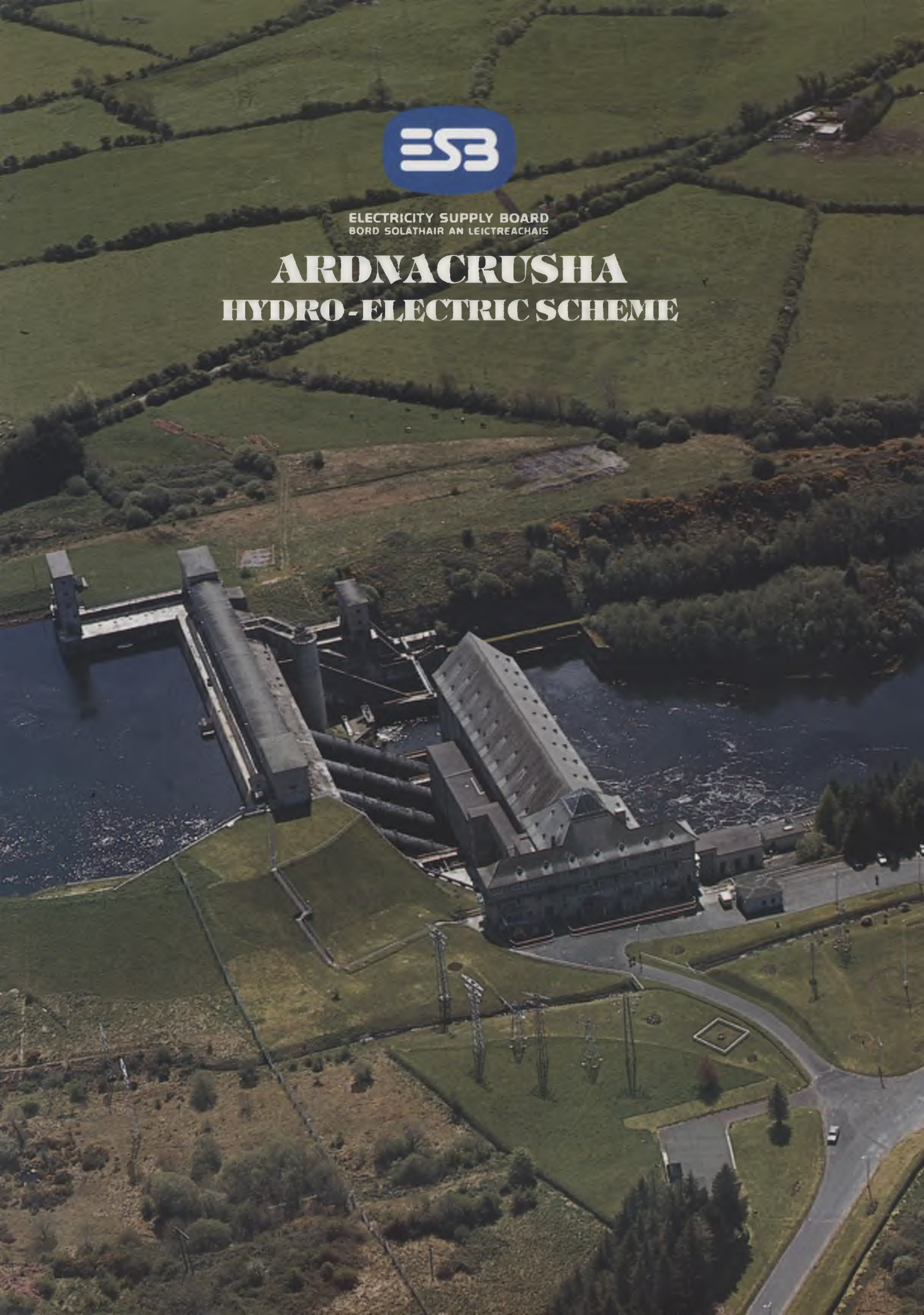


ESB

ELECTRICITY SUPPLY BOARD
BORD SOLATHAIR AN LEICTREACHAIS

ARDNACRUSHA
HYDRO-ELECTRIC SCHEME

ARDNACRUSHA HYDRO-ELECTRIC SCHEME

The hydro-electric development of the River Shannon was undertaken by the Irish Government in 1925 and on completion in 1929 was handed over to the Electricity Supply Board.

The River Shannon, approximately 340 km long, is the longest Irish river. From its source in the Cuilcagh Mountains, Co. Cavan, it flows through Lough Allen, Lough Ree and Lough Derg to enter the sea near Kilrush. It is a remarkably flat river, the only significant fall occuring on the 24 km stretch between Killaloe and Limerick.

The total storage of the Shannon river and lakes is approximately 600 million tonnes (or cubic metres). The average flow of the river at Killaloe is 180 tonnes per second but this can vary from 10 to 15 tonnes per second in dry summers to over 700 tonnes per second in a major flood.

In the building of the Shannon Scheme a dam was constructed across the river at Parteen Weir, just below Killaloe, to divert the river into a headrace, a 12.6 km channel which terminates at Ardnacrusha Power Station. The headrace and power station can discharge 400 tonnes of water per second at maximum load.

A tailrace, 2.4 km long, returns the discharge from the power station to the river above Limerick City.

POWER STATION

The generating plant at Ardnacrusha is comprised of three vertical-shaft Francis turbo-generators (installed in 1929) and one vertical-shaft Kaplan turbo-generator (installed in 1934) operating under an average head of 28.5 metres.

The 85 MW of generating plant in Ardnacrusha was adequate to meet the electricity demand of the entire country in the early years. Sometimes, especially at night in winter, water had to be wasted because the total system demand was so small. Since about 1950 it has been possible to avail of the full ouput of Ardnacrusha and in recent years over 330 million units per annum have been generated.

Ardnacrusha generates at 10.5 kilovolts (kV) but this is transformed to 40 kV for local distribution and to 110 kV for long-distance transmission.

PARTEEN WEIR

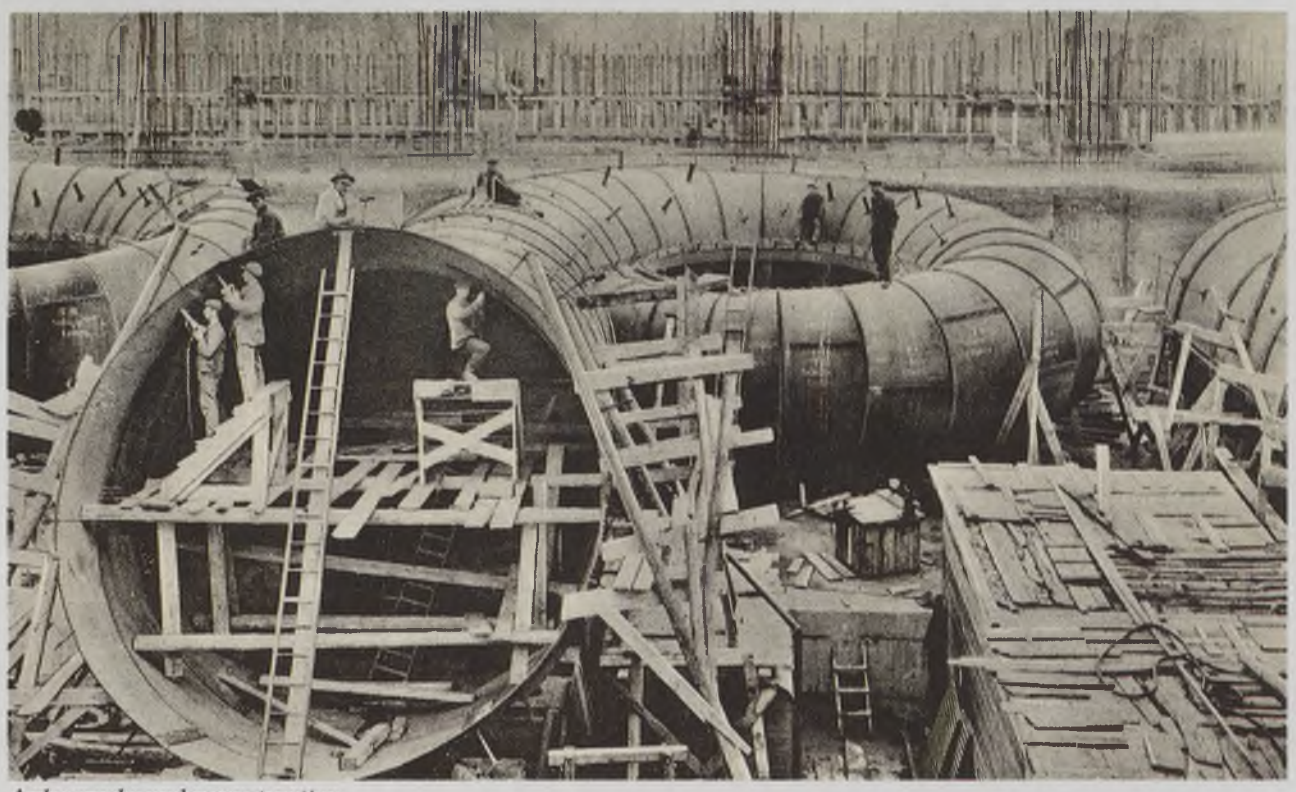
Parteen Weir controls the flow of water from the Shannon into both the headrace and the old river channel. There are six sluice gates on the old river outlet, and three sluices and a navigation gate on the canal outlet.

A flow of 10 tonnes per second is allowed down the old river for fishery and conservation purposes. Apart from this flow all available water up to the full station capacity is discharged down the headrace canal. In major floods when the flow in the river exceeds 400 tonnes per second, the excess is released down the old river channel.

A fish pass of 13 steps is built into the weir to allow migrating fish to pass into the upper Shannon.

On the east bank is Parteen Weir fish hatchery. Salmon and trout reared at the hatchery are used to re-stock the Shannon and many other Irish rivers.

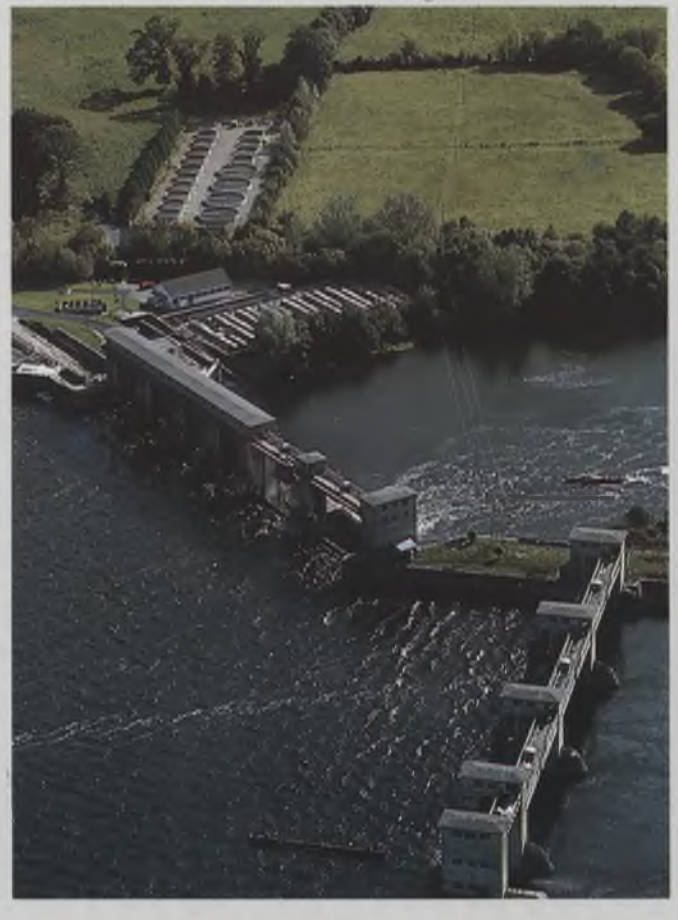
In 1980 a 600 kW turbine and generator was installed at Parteen to utilise the constant discharge of 10 tonnes per second down the old river.



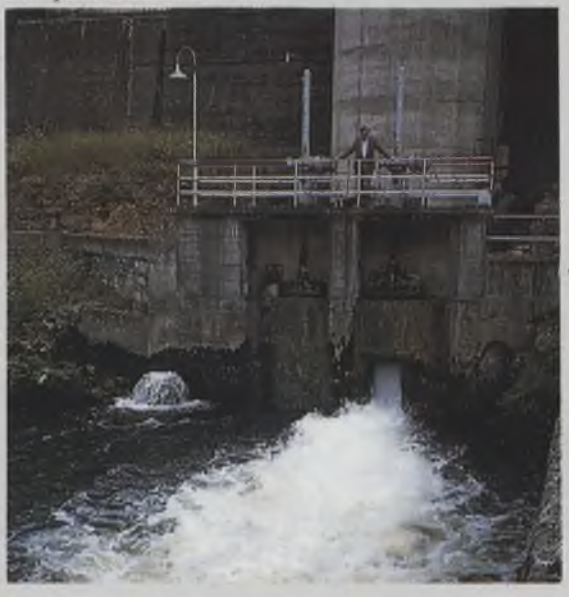
Ardnacrusha under construction.

View of station.

Parteen Weir with fish hatcheries in background.



Fish pass at Ardnacrusha.



TECHNICAL PARTICULARS

Catchment area	10,400 km²
Average annual rainfall	1,000 mm
Average annual flow	180.0 m³/sec
Average head	28.3 m

Weir	4 double roller gates each 10 m wide. 2 single roller gates each 18 m wide.
Head Race	Length 12.8 km. Capacity 400 m³/sec.
Tail Race	Length 2.4 km.

Turbines	*1*	*2*	*3*	*4*
Type	Francis	Francis	Francis	Kaplan
Rated H.P.	34,000	30,000	30,000	30,000
R.P.M.	150	150	150	167
Year com.	1929	1929	1929	1934
Maker	Escher Wyss	Voith	Voith	Voith

Alternators	*1*	*2*	*3*	*4*
Type	3 phase, 50 cycle			
Nor. rating (kVA)	30,000	30,000	30,000	25,000
Power factor	0.7	0.7	0.7	0.9
Voltage	10,500	10,500	10,500	10,500
Maker	S.S.W.	S.S.W.	S.S.W.	S.S.W.

Transformers

Name	*Maker*	*Capacity*	*Voltage Ratio*
T101, T102 and T103	S.S.W.	30,000 kVA	11,000/112,300
T104	S.S.W.	30,000 kVA	10,500/112,000
T141	A.E.G.	31,500 kVA	110,000/ 40,887
T41	A.S.E.A.	8,000 kVA	11,282/ 43,365
T42 and T43	S.S.W.	8,000 kVA	11,000/ 43,365
T44	S.S.W.	8,000 kVA	11,000/ 42,315
ST11 and ST12	A.E.G.	800 kVA	10,500/397,000

Arc Suppression Coils

100 ASC	S.S.W.	120 A
40 ASC 1 & 40 ASC 2	A.S.E.A.	80 A

Generating Hall.