

ESB

Electricity Supply Board

Forty Third Annual Report

For year ended 31st March 1970

Board Members

T. MURRAY, B.A., Chairman

C. GORDON LAMBERT, B.A., B.Comm., F.C.A.

T. MacMAHON, B.E., B.Sc.

B. O CEARBHAILL, B.A., LL.B.

J. A. RYAN, M.A.

Secretary to Board

J. G. GARGAN, B.L., F.A.C.C.A.

Chief Executive

J. J. KELLY, M.E., C.Eng., F.I.Mech.E.

Chief Engineer

A. HARKIN, M.E., F.I.E.E., M.I.Mech.E.

Director, Generation/Transmission

S. TINNEY, B.E., B.Sc., M.I.E.E.

Director, Finance

L. J. BARRY, F.A.C.C.A.

Director, Commercial

R. W. RYDER, M.E., B.Sc., F.I.E.E.

Director, Personnel

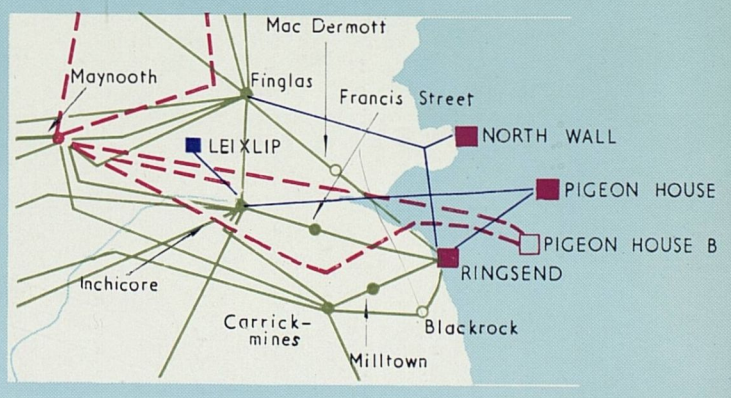
P. J. MORIARTY, F.C.I.S.

ELECTRICITY SUPPLY BOARD · Lower Fitzwilliam Street · Dublin 2 · IRELAND

Pr. I. 1383

COVER—The Dam on Pollaphuca Resevoir

GWEEDORE
CLADY
Letterkenny
CATHALEEN'S FALL
CLIFF
Sligo
BELLACORICK
ARIGNA
Shankill
To E.B.N.I
Dundalk
Louth
Carrick-on-Shannon
Castlebar
Dryoridge
Navan
Platin
LANESBOROUGH
Mullingar
Finglas
Maynooth
Athlone
SHANNON BRIDGE
RHODE
ALLENWOOD
See inset below for city side circuits
SCREEB
FERBANE
Newbridge
Inchicore
Derryfrench Tynagh
Galway
PORTARLINGTON
Carrick-mines
GOLDEN FALLS
POLLAPHUCA
Portlaoise
Carlow
TURLOUGH HILL
Ennis
Arklow
MILTOWN MALBAY
Shelton Abbey
ARDNACRUSHA
Killonan
Thurles
Kilkenny
Limerick
TARBERT
Rathkeale
Wexford
Cahir
Charleville
Waterford
GREAT ISLAND
Tralee
Mallow
Dungarvan
CAHIRCIVEEN
Macroom
Kilbarry
Knockraha
CARRICADROHID
INNISCARRA
MARINA
Haulbowline
Whitegate
Trabeg
Raffeen
Dunmanway
Bandon



General Outline of the

GENERATION and TRANSMISSION SYSTEMS

31st March, 1970

- HYDRO STATIONS
- STEAM STATIONS
- STEAM STATIONS PROJECTED
- PUMPED STORAGE STATION PROJECTED
- 220 KV TRANSFORMER STATION
- 220 KV TRANSFORMER STATIONS PROJECTED
- 110 KV TRANSFORMER STATIONS
- 110 KV TRANSFORMER STATIONS PROJECTED
- 220 KV LINES
- 220 KV LINES PROJECTED
- 110 KV LINES
- 110 KV LINES PROJECTED
- 275 KV LINES PROJECTED
- OTHER HIGH VOLTAGE LINES

Highlights of the Year

	1969–70	1968–69
REVENUE:		
Electricity	£39,390,000	£34,457,000
Appliance Sales	£2,175,000	£2,073,000
Installations	£980,000	£826,000
Net Revenue	£189,000	(—)£343,000
ASSETS	£233,090,000	£208,258,000
SALES (in millions of units)	4,412	4,012
GENERATION CAPACITY (MW)	1,410	1,290
PEAK DEMAND (MW)	1,128	1,050
NO. OF CONSUMERS	786,500	765,213
NO. OF EMPLOYEES	11,291	10,750

(Cash figures are rounded-off to the nearest thousand)

ESB

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General Outline of Generation and Transmission System

TO THE MINISTER FOR TRANSPORT AND POWER

The Board presents the Annual Report and Accounts for the year ended 31st March, 1970, in accordance with section 7 (4) and Section 32 (1) of the Electricity (Supply) Act, 1927.

The increase in the demand for electricity in Ireland is now one of the highest in Europe. It can be attributed to the rapid growth in industrial development and to higher living standards.

This growth rate places heavy demands on the Board's resources in the areas of construction, capital and manpower. The Board had foreseen this growth pattern and its plans for the development of generation, transmission and distribution facilities are adequate to meet all demands through the next decade.

The Board, as in previous years, met all its commitments for interest, depreciation and repayment of capital. The year's operating margin was adequate to meet these commitments and to leave a small surplus. This is a satisfactory situation which demonstrates the very close relationship maintained between rates of charge and the Board's operating costs.

In this, European Conservation Year, the Board participated actively in a number of events associated with the development of public awareness of conservation and the preservation of amenity. It continued its work in the development of areas in the vicinity of generating stations, by landscaping, tree-planting, and re-seeding. The fisheries development programme was maintained and plans made for the construction of a new hatchery on the River Lee.

In the period covered by this report the Board commissioned a management survey and the recommendations agreed with the Consultants are now being implemented. The new management structure is designed to equip the Board's organisation to meet the requirements of the future.

Electricity Output

The total electricity output for the year was 5,246 million units, an increase of 497 million units (10·5%) over the previous year. Electricity supplied to the system was provided as follows:

	million units sent out	percentage
Hydro	586	11·8
Peat (sod)	505	10·2
Peat (milled)	1,289	26·0
Coal (native)	86	1·7
Oil	2,493	50·3

Generation from native sources provided 49·7% of total output.

Financial Results

The accounts for the year show a surplus of £176,251. This satisfactory outcome for the year could not have been achieved but for the higher electricity charges introduced as from 1st January, 1970.

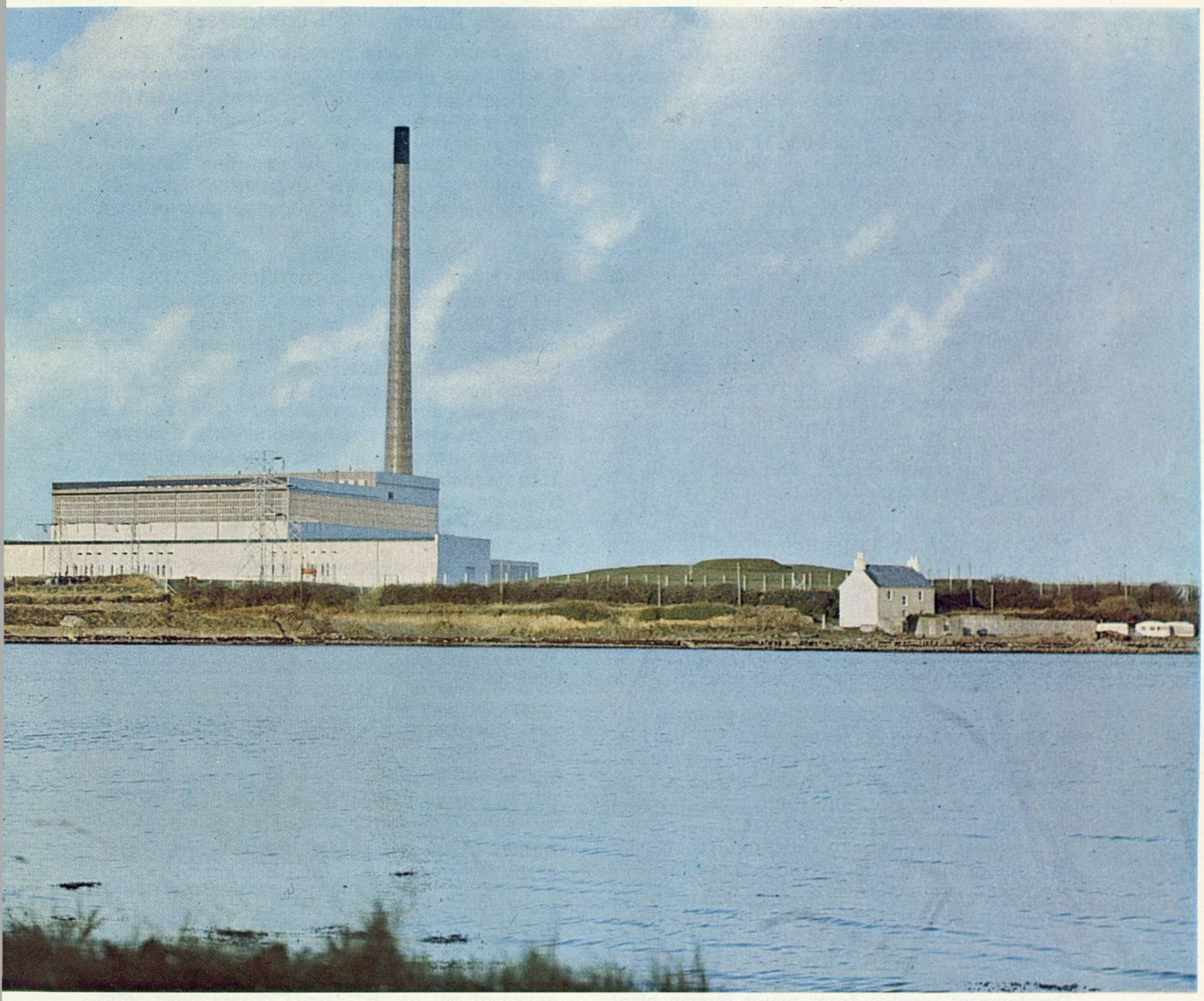
Revenue from sales of electricity was £39,389,616, an increase of £4,932,794 or 14·3% on the figure for the previous year. Expenditure for the year reached £39,302,408, an increase of £4,361,704 or 12·5% over the 1968/69 figure.

Turnover tax paid by the Board amounted to £422,592.

The summarised Revenue and Expenditure figures are as follows:

	Year ended 31st March, 1970	Preceding year
	£	£
Working expenditure	23,728,773	21,189,295
Interest (net)	6,816,183	6,228,797
Depreciation provision	5,621,000	5,217,000
Capital redemption	3,136,452	2,305,612
	£39,302,408	£34,940,704
Revenue (including miscellaneous revenue)	39,478,659	34,571,712
Surplus	£176,251	£368,992 (Deficit)

Taking credit for installations and merchandise profits and allowing for the loss on fisheries, the result for the year is a surplus of £188,757. The



The Tarbert Generating Station, Co. Kerry.

costs, amounting to £73,095, of buying the fishing rights of long line fishermen in Lough Ree (which is referred to in the Fisheries Report), together with the expenses of the Stock Issue of March, 1970, have been written off against the surplus. Allowing for the credit forward of £30,797 from the previous year, the balance now carried forward is £106,297.

Financial Outlook

Whilst the financial results for the year are regarded as satisfactory, costs under all headings continue to rise and the margins available are not sufficient to enable the Board to absorb all such increases.

The Board is directing continuous attention towards the achievement of maximum savings in all fields of operation, but in the present pattern of national and international money inflation, periodic increases in rates of charge are unavoidable if the Board is to meet its obligations and maintain financial stability.

Capital Expenditure

A total of £25,837,332 was spent on capital

assets during the year. The value of assets brought into commission was £19,293,989.

Capital Finance

In April, 1969, a loan of 50 million Deutsche Mark was negotiated with a consortium of German Banks led by the Nordbank, Hamburg, with the Banking House Merck Finck & Co., Munich, as the nominated agent of the consortium. In the following October a further loan of 75 million Deutsche Mark was obtained from the same source. The terms and conditions of both loans were satisfactory and fully in line with international rates. The revaluation of the Deutsche Mark affected the first loan and increased the sterling equivalent by £430,000. The increase in capital liability, together with the discounts on both loans, has been written off against the Capital Reserve for repaid capital. The reserve will be restored in due course when the loans have been fully amortised, as the amounts to be provided by way of sinking fund will cover the whole, including discount and revaluation loss. While revaluation also impacts on the annual loan interest payment, the effective interest cost of the loan remains lower than the rates prevailing on the Irish market.

In March, 1970, stock issues in the dual form of long and short term were successfully introduced in the home market. Each was an innovation as the amounts to be issued were not fixed in advance; the Board determined the amounts of the issues at £5·6 million for the long term stock and £3·25 million for the short term premium stock on the day after the issue.

The finance necessary to carry out the capital programme for the year and leave a margin towards future requirements was provided from the proceeds of the German loans, the home stock issues, State contribution for rural capital expenditure, the draw down, as required, of the loan from the International Bank for Reconstruction and Development, credits from major foreign plant suppliers and internal resources. Meanwhile, surplus funds have been temporarily invested.

While the Board's efforts to obtain capital finance for its immediate requirements have been successful, there has been no easing of pressure in the demand for long-term capital. The continuing provision of funds to meet commitments on the scale which the enterprise now demands is a major problem. The Board's views on capital finance, as expressed in last year's Annual Report, still obtain, particularly in regard to the importance of avoiding deficits, creating adequate revenue reserves and ensuring that the true cost of electricity is reflected in its price.

Electricity Debtors

The electricity debtors at the 31st March, show a substantial increase over the preceding year. This situation was caused by the long strike in the Board's computer division, during which time detailed accounts could not be issued to the majority of consumers. The position has now been substantially corrected and the figure for electricity debts is rapidly approaching normal levels.

Sales

Total electricity sales in 1969/70 were 4,412 million units, an increase of 9·9% over the previous year. This is more than 2½ times the sales of 1,692 million units achieved in 1959/60 and represents an average annual increase of 10·1% in sales throughout the 1960's.

This high growth rate has enabled the Board to pass on to its consumers the benefits which come from large-scale production units so that the increases in electricity charges have been very much lower than the increased costs for goods and services in general. This is a major achievement in view of the substantial element of inflation in commodity prices which, of course, affects the Board to the same extent as it does commercial undertakings in general.

Generation

The capacity of the Board's generating plant was increased to a total of 1,410 MW with the commissioning of two 60 MW units at the Tarbert generating station in Co. Kerry.

Four station projects were under construction during the year:

Tarbert, Co. Kerry:	First development consisting of two 60 MW oil-fired units.
Pigeon House B, Ringsend, Dublin:	First development consisting of two 120 MW oil-fired units and two 14 MW gas turbine units.
Great Island, Co. Wexford:	Second development consisting of one 120 MW oil-fired unit.
Turlough Hill Pumped Storage Hydro Project,	Consists of four 73 MW pump/turbine units.

Progress continued on the other projects as planned. The fullest use was made of modern computer techniques in programming to meet the target commissioning dates.

In executing the work, the Board's policy of employing Irish manufacturers and contractors to the maximum practical extent was continued.

Future Generation Capacity

The extension to the Shannonbridge generating station, which will cost £3·54 million, is scheduled for commissioning in 1974. A detailed study is in progress to decide between a policy of heavy expenditure on the maintenance of ageing plant in earlier peat-fired stations to utilise the fuel which is still available, and a policy of capital investment in new and more efficient generating plant in those stations.

The immediate generating programme foresees the extension of Pigeon House "B" and Tarbert stations, using larger and more efficient units of the order of 250 MW. Oil tanker berthing arrangements and other site facilities are already developed with these extensions in view.

Work has commenced on drafting of specifications for the Board's first nuclear power station. The team of engineers on nuclear work is being augmented by placing men on training in Great Britain. Training in Germany and U.S.A. is also planned for the coming year.

During the year the Government announced its intention to set up a Nuclear Energy Board.

Investigations are also being carried out to evaluate other pumped storage sites.

Transmission

The 300 MVA autotransformer and switchgear for the interconnection with Northern Ireland were installed and made ready for commissioning at the Maynooth 220 kV Station. The first stage of the North-South power interconnection was ready for operation with the completion of the 220 kV line from Maynooth transformer station to the proposed station at Louth and of the 275 kV double circuit line, northwards from Louth.

A 220 kV station at Turlough Hill is being designed; 220 kV stations at Pigeon House "B", Great Island and Louth are under construction and a 220 kV station at Killonan, near Limerick, was completed and commissioned.

The laying of 12·6 kms. of 220 kV underground cable from Pigeon House "B" to the Inchicore transformer station was almost completed at the end of the year and work was about to commence on the laying of a similar cable to Carrickmines. These connections will provide a link from the Dublin generating stations to the 220 kV network.

Standards of protection of the main transmission system will be improved by the introduction of a new type high-speed intertripping equipment which is on order.

Research and development work was carried out during the year, in collaboration with the Department of Posts & Telegraphs, to determine in detail the effects of the proposed earthing of the 110 kV system neutral.

Distribution

With the continued growth in demand it was necessary to invest over £5,200,000 in the distribution networks during the year, mainly in urban areas. It is expected that expenditure on this work will amount to £5,500,000 in the coming year.

The development of a new 400 kVA unit type transformer station of extremely compact design facilitated the acquisition of substation sites in existing built-up areas where the shortage of space was making it difficult to cater for increase in load.

A new type of low-voltage underground cable which is used in conjunction with service minipillars to supply new housing schemes has been introduced. It is cheaper and easier to lay than the lead-covered cables in general use up to now. It is a different system to the Underground Residential Distribution System outlined in an earlier report and it provides a second alternative to the traditional overhead supply.

Many of the network faults which, if undetected, could lead to failure to supply, first show themselves in the overheating of the defective component. A television-type camera which is capable of measuring temperature variations of as little as 2°C at 100 metres was bought for use in the detection, from the ground, of incipient faults in the network. One such fault was detected recently before it could cause a widespread breakdown of supply.

Investigations were continued, during the year, into the extension of the Board's purchases of native timber poles. To this end researches were established in the Institute of Research and Standards into the possibility of improving the methods and effectiveness of preserving spruce and other species which have proved difficult in the past. Results of experiments are most encouraging and there is every reason to hope that in the very near future all the Board's wood poles will be of native timber.

Rural Electrification

During the year, 9,164 new rural consumers were connected.

The re-canvass of rural areas under the revised post development scheme was continued and by the end of the year, 545 areas had been re-canvassed. Work has been completed in 506 of these and is in progress in 19 others.

Work was continued during the year on the strengthening of networks supplying groups where the growth of load was found to be taxing the existing capacity.

Capital expenditure during the year was £2,775,145. The total invested in the scheme at 31st March, 1970, amounted to £45,511,239 of

which £15,707,826 was by way of subsidy.

The Board has submitted to the Government comprehensive proposals covering the remaining stages of the rural electrification programme.

New Management Structure

In the year under review the services of Messrs. McKinsey & Company, the international firm of management consultants, were engaged to examine the Board's management structure. In the period immediately following that covered by this report, a revised structure of top management has been put into effect and other orginisational changes are planned.

This new structure draws a clear distinction between the policy-making and the managerial functions of top management and is as follows:

The Board will continue to function under a full-time non-executive Chairman, but will in future be concerned with major planning and policy issues related to its statutory functions and to its over-all responsibility for the operation and control of the electricity supply industry. The Board will be responsible for the setting of clear guidelines as a framework for management action, and for the regular review of operating performance: its direct involvement in executive decisions will, however, be confined to decisions affecting specific key areas.

A single position of Chief Executive has been established with over-all responsibility for management and accountable to the Board for the implementation of approved plans and policies. Directors have been appointed in charge of the four main areas of activity—Generation/Transmission, Finance, Commercial, Personnel; the Directors and the Secretary will report through the Chief Executive.

The new system is based on individual rather than collective responsibilities and there will be more formal planning for all activities—both in long and short-term, with extensive delegation to all levels of management within plans approved by the Board.

In putting the new organisation into effect the Board made the following appointments:

Chief Executive	J. J. Kelly, M.E., C.Eng., F.I.Mech.E.
Director, Generation/ Transmission:	S. Tinney, B.E., B.Sc., M.I.E.E.
Director, Finance:	L. J. Barry, F.A.C.C.A.
Director, Commercial:	R. W. Ryder, M.E., B.Sc., F.I.E.E.
Director, Personnel:	P. J. Moriarty, F.C.I.S.

Mr. A. Harkin, Chief Engineer, will continue on his present duties until his retirement later this year, after which the position of Chief Engineer will lapse. The Board would like to take this opportunity of acknowledging the very distinguished service Mr. Harkin rendered to it over a long career.

Staff Training and Development 1969/70

The past year saw a continuing expansion of training activity, both within the Board and at external institutions. In all, the Board has now five training centres in operation.

— The Pigeon House Centre for Generation training.
— The Cable Jointing School in East Wall Road.
— The Sales Training School adjacent to Head Office.
— The Line School in Portlaoise.
— The Training Centre at 92 St. Stephen's Green, which caters for common technical training as well as basic management, supervisory, communications and clerical training.

Board approval was given to a proposed new District Training Scheme for apprentices, which will bring the existing scheme into line with the best continental practice. The setting up of a practical training centre in each District is also in line with the policy of An Chomhairle Oiliuna (ANCO) which requires employers to introduce planned practical training programmes for apprentices. This policy will reduce the work load of the Regional Colleges of Technology, and enable them to devote more time to the academic studies of increasing numbers of apprentices.

The Board is making a considerable investment in staff training and development. This investment will enable the Board to provide, largely from its own staff resources, the skilled manpower which is necessary at all levels, for its development and expansion.

Industrial Relations

In the year under review, there were two major developments in the field of industrial relations—the agreement between the Board and its employees to set up an Industrial Council and the negotiations regarding a new National Agreement.

The Industrial Council will be called upon if ordinary negotiations and conciliation do not provide a solution. The Council must give its recommendation within 14 days of any hearing and, pending the issue of such recommendation, the Trade Unions and Associations concerned have agreed that no industrial action will be implemented. The final draft of the new National Agreement, as agreed in negotiation, has now been placed before all Trade Unions concerned.

It has been agreed by the Board and awaits final acceptance by the Unions.

Discussions regarding the 12th Round increase for salaried staff which took place in the latter part of the year under review were brought to a satisfactory conclusion.

A strike which involved staff mainly from the Computer Division, lasted from August, 1969, to February, 1970. This strike seriously affected the Board's accounting and collection programme and is the reason for the delay in the presentation of this Report.

The management re-structuring referred to earlier in this Report has also been carried through in the Personnel function and the organisation streamlined to provide for more rapid and more effective handling of all Personnel matters. The Board is satisfied that this new establishment will contribute substantially to the resolving of problems in this field and will provide a sound basis on which to build more harmonious industrial relations in the future.

The final report of the Fogarty Committee set up to examine industrial relations in the E.S.B., recommended many changes and those which were within the Board's power to implement have been incorporated in the recent re-organisation. It is for the Trade Union Movement to implement the recommendations concerning the structure of staff representation in the E.S.B., and the Board will co-operate in any way which the Unions consider would be helpful. The Board is hopeful that early attention will be given to this important aspect of industrial relations in the electricity industry.

Conservation and Environment

Conservation of amenity, the development of fisheries and the avoidance of environmental pollution have always been important objectives in the Board's over-all programme. It is widely acknowledged that the Board has been successful in the pursuit of these objectives, whose attainment very often calls for a reconciliation between idealised solutions and the costs of the nation's requirements of electrical energy.

Generating stations in areas which have a scenic value have been carefully sited, and professional assistance in their landscaping has been obtained, whenever necessary. Transmission lines have been routed in such a way as to impinge as little as possible on the landscape.

(Signed) *J. G. Gargan,* SECRETARY

29th September, 1970

The Board has always taken steps to minimise atmospheric pollution from its generating units. The latest example is the 680 ft. chimney stack in the Pigeon House "B" site, designed to diffuse the exhaust gases, and eliminate the possibility of pollution in the area. The chimney was constructed at a cost of £300,000.

The value of the Board's work in the field of amenity conservation is best evidenced by the developments which have taken place adjacent to the major hydro electric projects. At Pollaphuca, near Dublin, and at Inniscarra, near Cork, vast new recreational areas have been created which provide facilities for fishing, for sailing and rowing and for relaxation.

In the midland areas, where the turf stations have been sited, the planting of trees, shrubs and lawns has created new points of beauty.

The effects of thermal generating stations on rivers and estuaries are at present being examined by the Board and relevant data from other countries is being collected. A special survey was carried out to study the effect which the operation of Pigeon House "B" might have in the Dublin Bay area; this will assist the Board in assessing the situation when Pigeon House "B" station is operating at full capacity and also in handling the problems which may develop when nuclear stations are being designed.

The re-seeding which was carried out last year in the Turlough Hill area has proved very successful and further work will be carried out during the coming year.

It is proposed to engage the services of an archaeologist to trace the location of St. Kevin's Road—an ancient pilgrim route— which it is believed runs through part of the site. This will add a further tourist attraction to the mountain road already constructed to the top of Turlough Hill.

Staff

At 31st March, 1970, the numerical strength of the Board's regular staff was 8,600. In addition, there was a temporary staff of 2,691.

The Board desires to express its warm appreciation of the important contribution made by staff at all levels to the work throughout the year and it thanks all concerned for the efficient way in which they carried out their duties. To all who have retired it extends good wishes for their health and happiness.

(Signed) *T. Murray,* CHAIRMAN
C. Gordon Lambert
T. MacMahon
B. Ó Cearbhaill
J. A. Ryan

CAPITAL

The value of the capital assets brought into commission was £19,293,989 of which £2,347,982 related to rural electrification. The total investment in assets in productive use at 31st March, 1970, was:

	£
Generation	82,293,047
Transmission	25,415,686
Distribution (includes rural £44,124,725)	90,372,197
Premises, equipment, transport, etc.	6,927,052
	£205,007,982

In addition, expenditure of £28,082,073 had been incurred on new capital works still under construction at the end of the year. Accordingly the fixed capital investment is £233,090,055.

BORROWING POWERS

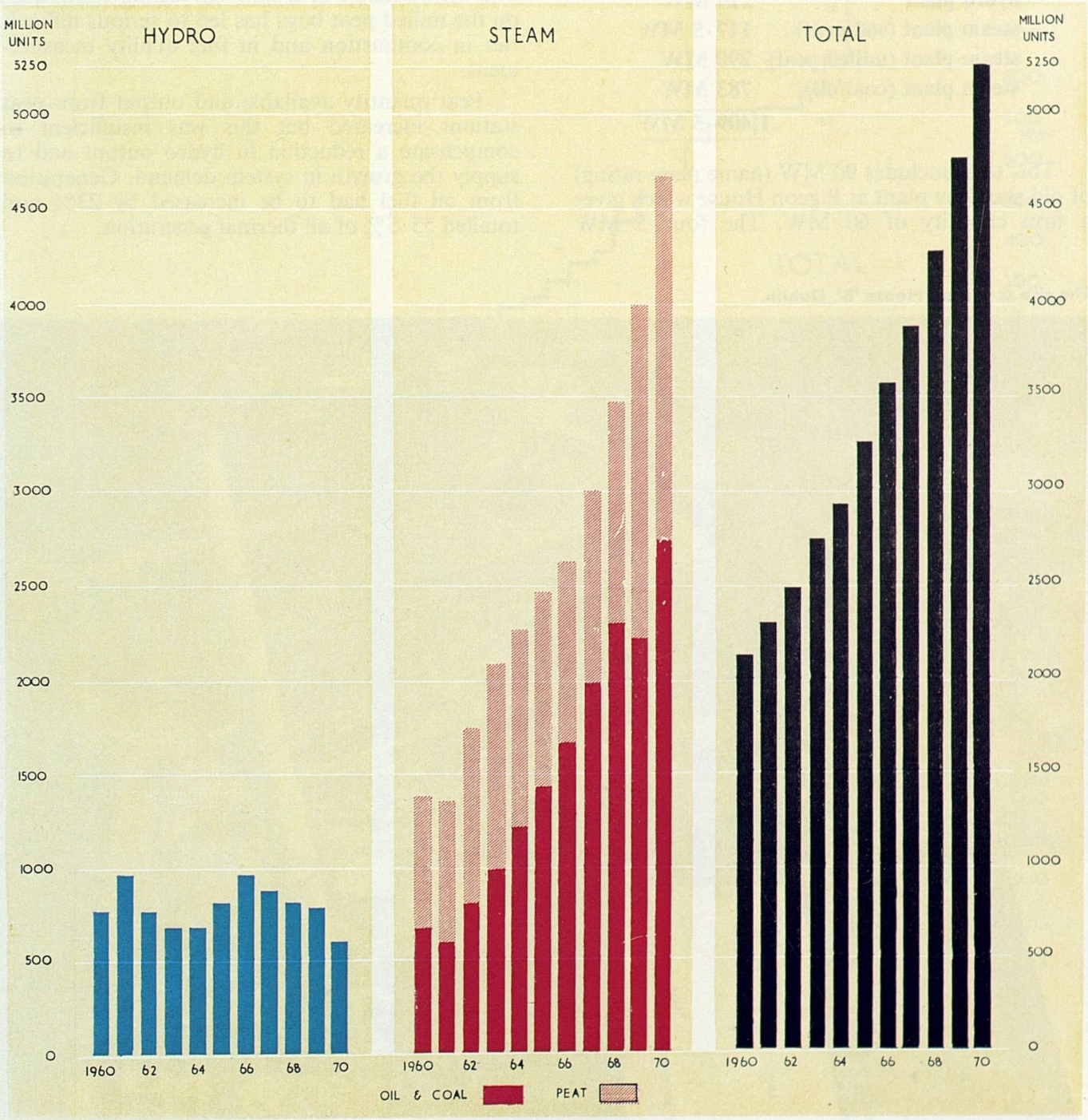
The capital requirements for the year were provided from internal resources, by loans negotiated with foreign banks—including the World Bank—and by temporary advances from the Trustees of the Superannuation Funds.

To assist in financing the future capital programme, two public issues of stock were made in March 1970—£5·6 million of 9½% E.S.B. Stock and £3·25 million of 6% E.S.B. Premium Stock. The Electricity (Supply) (Amendment) Act 1970 authorises a capital expenditure not exceeding £290 million for general purposes, excluding rural electrification. At the 31st March 1970 the Board had approved expenditure totalling £224,694,524 of which £160,883,257 represented electricity assets in commission, the balance of £63,811,267 representing either work in progress or work approved.

The legislative limit to expenditure on rural electrification is £50 million inclusive of capital subsidy for rural electrification provided by the State. At the 31st March, 1970, the amount approved was £46,074,442 of which £44,124,725 represented assets in commission and £1,949,717 work in progress or approved.

ELECTRICITY PRODUCTION

The diagram below illustrates the output of the generating stations each year since 1960



INCREASE IN UNITS GENERATED

The units generated (and purchased) showed an increase of 497 million (10·5%) over the preceding year. The annual load factor on the basis of units generated was 53·2% compared with 51·7% last year.

An analysis of the cost of Generation appears in the Electricity Production Account (No. 1).

GENERATION

The total installed capacity of the Board's generating stations, following the commissioning of the first 60 MW unit in September, 1969, and the second 60 MW unit in December, 1969, at Tarbert station, amounted to:

hydro plant	**219 MW**
steam plant (sod peat)	**117·5 MW**
steam plant (milled peat)	**290 MW**
steam plant (coal/oil)	**783 MW**
	1,409·5 MW

This total includes 90 MW (name plate rating) of old stand-by plant at Pigeon House which gives a firm capacity of 60 MW. The four 5 MW stations designed to burn hand-won peat are included in this total.

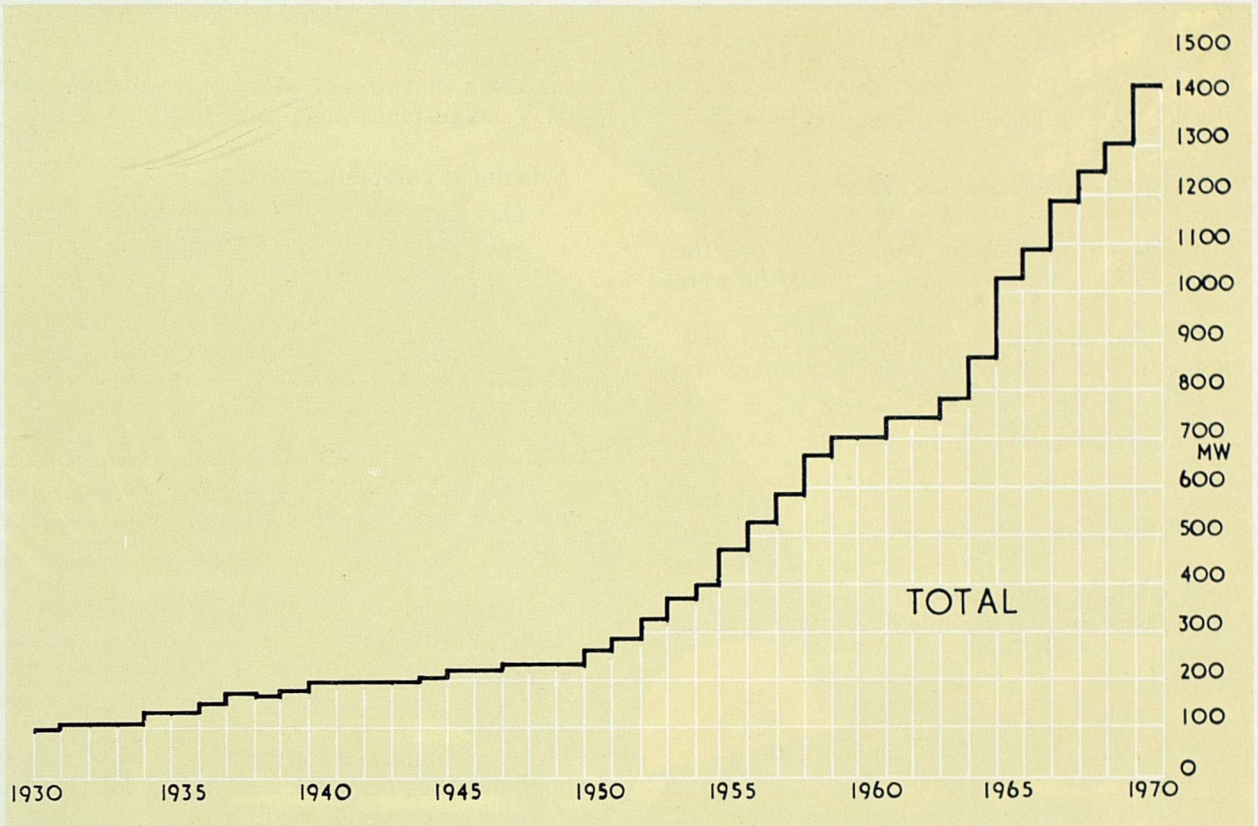
The overall heat consumption rate of the thermal stations improved by 0·7%; milled peat stations, exceptionally, showing a deterioration. The introduction of a new harvesting techniques on the milled peat bogs has led to serious difficulties in combustion and in fuel quality measurement.

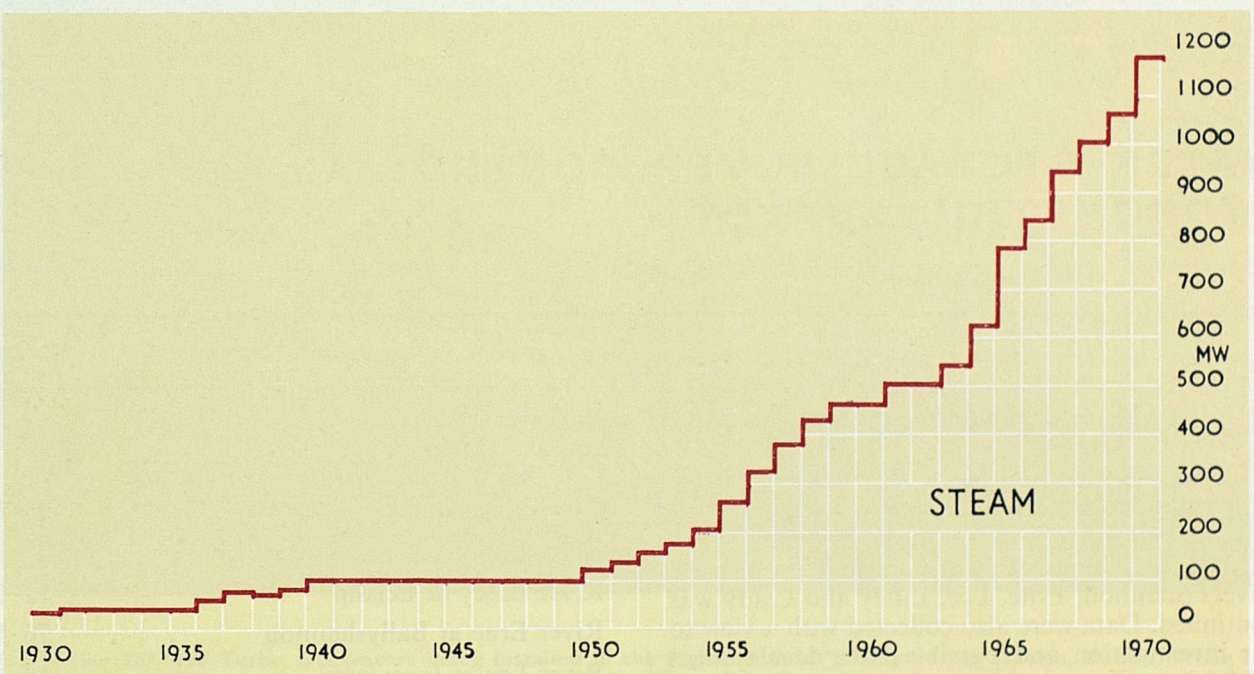
Peat quantity available and output from peat stations increased but this was insufficient to compensate a reduction in hydro output and to supply the growth in system demand. Generation from oil fuel had to be increased by 23% and totalled 55·5% of all thermal generation.

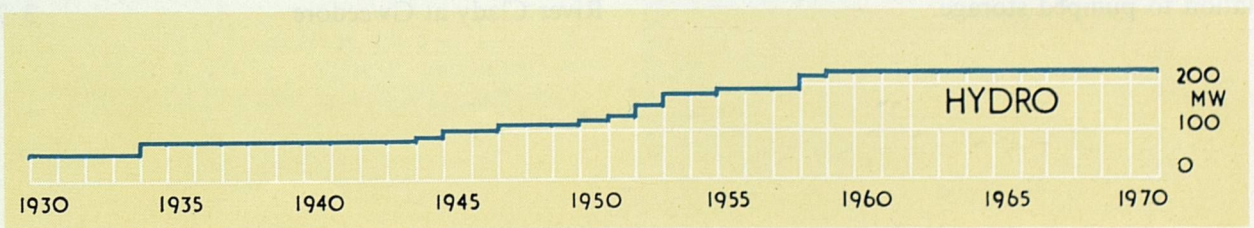
The site at Pigeon House 'B', Dublin.



GENERATION CAPACITY
1930–1970







GENERATION PROJECTS

The following thermal plant projects amounting to 508 MW were under construction:

GREAT ISLAND STATION, Co. Wexford
Oil

The 220 kV switchgear compound, and the superstructure for the extension of the station were completed.

The foundation block for the 120 MW turbine unit was completed and erection of the boiler unit was commenced.

Scheduled completion date 1971/72.

TARBERT STATION, Co. Kerry
Oil

Both 60 MW units were completed and put into operation, the first in September, 1969, and the second in December, 1969.

PIGEON HOUSE 'B' STATION, Dublin City
Oil

The oil tanker berth was constructed and all main buildings and the chimney were substantially completed.

Erection of two 120 MW units, and the two 14 MW gas turbines was proceeding.

Scheduled completion dates:

Gas Turbines	November 1970
Unit 1	Summer 1971
Unit 2	1971/72

TURLOUGH HILL PUMPED STORAGE STATION
Co. Wicklow

Contracts for the main civil works were placed. These include the upper reservoir, the penstock tunnel, the underground cavern and tail race tunnel.

Construction of the upper reservoir was in progress. Excavation of the access tunnel was completed and excavation of the cavern commenced.

Orders were placed for the four 73 MW pump/turbine units, the penstock steel lining, switchgear, cranes and air conditioning plant.

Scheduled completion date 1973/74.

WATER STORAGE, RIVER CONTROL AND HYDROMETRIC SURVEY

The inflows at the hydro stations varied between 70% and 97% of the long term average flows.

The important hydrometric figures for the hydro stations are given in Appendix 8.

The collection of hydrometric data on the Rivers Shannon, Erne, Lee, Liffey and Clady was continued. Data were also collected with a view to the investigation and possible later development of further water power resources particularly in relation to pumped storage.

The total average inflows for the calendar year 1969 were:

	m^3/sec.
River Shannon at Killaloe	138·1
River Liffey at Pollaphuca	7·8
River Liffey at Leixlip	12·1
River Erne at Ballyshannon	76·5
River Lee at Inniscarra	18·1
River Clady at Gweedore	3·7



One of two 120 MW Turbo Generators being installed in the Pigeon House 'B' Generating Station, Dublin. When in operation these will be the largest turbo generators on the System and the first of the reheat type to be used by the E.S.B.

MAIN TRANSMISSION SYSTEM

At Maynooth 220 kV station the 300 MVA autotransformer and switchgear for the interconnection with Northern Ireland were installed and made ready for commissioning. Extension of this station together with those at Shannonbridge and Knockraha to cater for further system development is in progress.

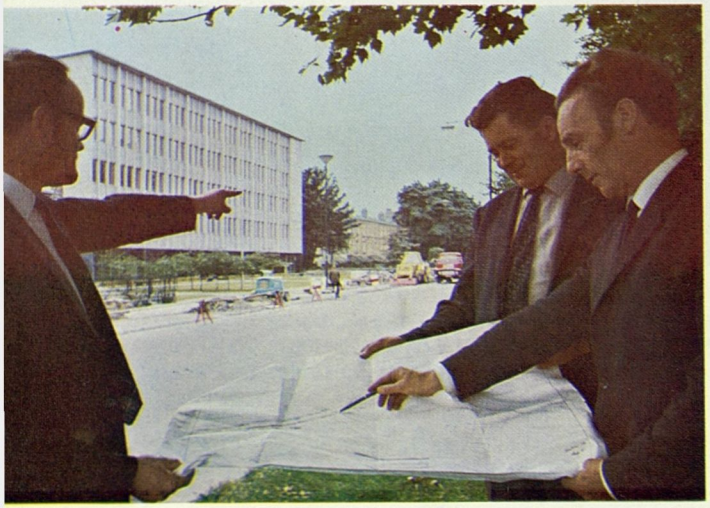
The 220 kV station at Killonan near Limerick was completed and commissioned. Design and construction work on new 220 kV stations at Pigeon House "B", Great Island and Louth is in progress. Design work on a new 220 kV station at Turlough Hill Pumped Storage Generating Station is in progress.

New 110 kV stations were commissioned at Newbridge and Dungarvan. Existing stations at Carrickmines, Milltown, Dundalk and Wexford were extended or uprated. At Inchicore the 38 kV side was replaced by a new indoor installation. An outdoor 110 kV station is ready for commissioning in Mullingar and work is in progress on eleven further new stations. Further extensions and upratings are also in progress.

Remote control schemes completed during the year included Whitegate, Raffeen and Trabeg 110 kV stations which are controlled from Kilbarry and also eleven Dublin City 38 kV stations which are controlled from Bedford Row.

Installation of remote control equipment is in progress for the control of Killonan 220 kV station in Limerick and of East Wall Road 38 kV station in Dublin.

Planning the route for the 220,000 volt cable to link Pigeon House 'B' with Inchicore Transformer Station.



Remote control additions to existing schemes included the interconnector to Northern Ireland at Maynooth 220 kV station, the new Ringsend 110 kV cable at Carrickmines 110 kV station and the new Donnybrook 38 kV cable at Milltown 110 kV station.

To improve the standard of protection on the main transmission system a new type of high-speed intertripping equipment was placed on order for all 220 kV feeders.

A reliable and fast busbar protection scheme is currently being installed in all new 220 kV stations and an investigation is under way to see how this type of protection can best be provided in important existing stations.

Research and development work undertaken included an extensive series of tests in collaboration with the Post Office to determine in greater detail the effects of the proposed earthing of the 110 kV system neutral.

Electronic timing equipment was designed and tested to enable more accurate timing and control of future switching surge measurements.

The laying of 12·6 kms of 220 kV cable from Pigeon House "B" to Inchicore was almost completed, and the jointing of this cable was well advanced. Work was about to commence on laying a second 220 kV cable from Pigeon House "B". This cable is 14·9 kms long and will run to Carrickmines where it will be connected to a 220 kV overhead line to Maynooth. 1·2 km of 110 kV cable was installed between Ringsend and Pigeon House "B".

The first stage of the North/South interconnection was ready for operation with the completion of erection of the 220 kV line from Maynooth to the proposed station at Louth and of the 275 kV double circuit line northwards from Louth.

Erection was under way on the second 220 kV line from Maynooth via Finglas to Louth and of the 220 kV double circuit line from Pigeon House "B" 220 kV cable termination at Inchicore to Maynooth.

Survey and design of the 220 kV lines from Carrickmines to Maynooth and from Great Island to Knockraha were completed.

Survey of the 220 kV lines from Turlough Hill to Great Island and to Maynooth was well advanced.

105 kms of 110 kV overhead line was erected and 14 kms retired from service. This included the complex of lines between Tarbert, Limerick and Killonan and the building of a line from Mallow to Rathluirc. Erection of the extension of this latter line to Killonan was well in hands.

DISTRIBUTION SYSTEM

The following extensions and alterations to the high tension and low tension networks were carried out:

Sixteen 38 kV transformer stations were completed and put into commission.

Three hundred and eighty 10 kV transformer stations were completed; seventy-six 10 kV transformer stations were retired from service.

The operating voltage in ten transformer stations was increased from 5 kV to 10 kV.

38 kV overhead lines	net increase	63·7 kms.
38 kV underground cables	net increase	10·1 kms.
10 kV overhead lines	net increase	59·9 kms.
10 kV underground cables	net increase	107·8 kms.
low tension overhead mains	net increase	85·4 kms.
low tension underground mains	net increase	138·0 kms.

Work has commenced on a project to use billing data available from the main computer to derive information regarding the loadings on 80,000 local transformers as part of the programme of network improvement during the next decade. Local consumption data will be procured from billing sources and peak loadings calculated from this. The transformer loadings may then be applied to the network at any point, to provide information on individual networks and to detect areas of low voltage.

A geographical and electrical model of the overall 10 kV network will be stored in the computer and calculations may be made on this. From the model the computer will also be able to produce network diagrams for any area. The project will enable the Board to reduce the incidence of voltage drop due to overloaded transformers and 10 kV networks.

This is the first time that this application of the computer has been used in Ireland. The system will employ a plotting machine to draw the diagrams from computer instructions. This procedure will provide an analysis of the system which could not be achieved by any other method and will, when in full operation, ensure the most effective development of the network at the lowest cost.



An E.S.B. hydraulic press boring machine in operation in Dublin. This machine enables cables to be laid under roads without disrupting traffic or interfering with the road surface. It can also be used for laying cables under canals, rivers or railways.

SALES

For more than a decade the Board has developed and employed market research techniques which have enabled it to be well-informed on market trends and customer attitudes. The research results have been used in the identification of marketing opportunities and the formulation of marketing strategies, particularly for the domestic market.

Regular research reveals, for example, how many of the Board's consumers possess various electrical appliances and the rate at which levels of ownership are changing. The table at right shows how levels of ownership of a variety of appliances have increased throughout the sixties.

While the ownership of domestic central heating systems is still relatively low (8% in 1968/69), it is encouraging to know that the Board's marketing activities on the Warm Home Plan and Electricaire systems have achieved results which are equal to those of all other fuel systems combined. Confidence that this trend will continue is reinforced by knowledge that owners of electric central heating are highly satisfied with its efficiency and economy.

The Board has now extended its market research activities into the industrial and commercial markets and it is anticipated that the results will be as useful in the seventies as the results of domestic market research were in the sixties.

Ownership of Appliances

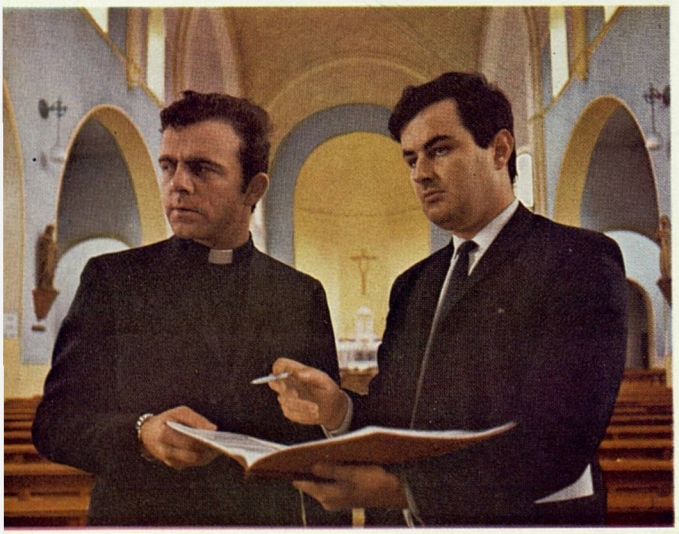
	1958/59	1968/69
Electric Cookers	23%	30%
Immersion Heaters	11%	20%
Washing Machines	13%	36%
Refrigerators	7%	31%
Vacuum Cleaners	23%	34%
Kettles	38%	50%
Irons	77%	89%
Electric Blankets	2%	19%
Electric Central Heating	—	4%

Sales Growth in the Sixties

Total electricity sales in 1969/70 were 4,412 million units. Sales in 1959/60, ten years earlier, were 1,692 million units. Thus the average annual increase in electricity sales throughout the sixties was 10·1%.

The high rate of growth of electricity sales in all markets has enabled the Board to pass on to its consumers the benefits which come from the rapidly increasing scale of production. Thus, in a decade during which the general level of prices for consumer goods and services has risen by no less than 45%, the average price per unit of electricity has risen by only 2·5% from 2·09d in 1959/60 to 2·14d in 1969/70.

The rate of growth of electricity sales in Ireland is well above the international average. A comparison for the years 1958 to 1968 is given on page 17.



An E.S.B. heating advisor provides plans and on-the-spot information.

Housewife of the Year 1969

Mr. & Mrs. McStay and family. Mrs. McStay won the Housewife of the Year Competition in 1969. This competition is co-sponsored by the E.S.B. Mrs. McStay lives at Ballyfermot in Dublin.



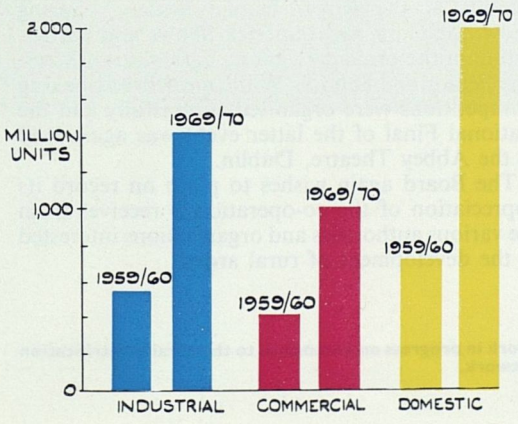
Appliances

Sales of appliances on the Merchandise Trading Account amounted to £2,125,090 excluding turnover tax, compared with £2,025,765 last year. The gross profit was £397,962 representing a rate of 18·73%. The Merchandise Trading Account, having been charged with overhead expenses and interest on working capital, showed a net profit of £12,525.

Contracts

The value of installation contracts completed amounted to £980,389 compared with £825,570 for last year. The gross profit amounted to £158,142 representing a rate of 16·13%. The Installations Trading Account, having been charged with overhead expenses and interest on working capital, showed a net profit of £40,550.

ANALYSIS OF UNITS SOLD



Annual Increase in Electricity Sales 1958/1968

France	7·0%
Sweden	7·0%
United Kingdom	7·0%
U.S.A.	7·1%
West Germany	8·2%
Italy	9·2%
Ireland (E.S.B.)	9·6%
Spain	10·9%

RURAL ELECTRIFICATION

The expenditure on rural electrification during the year amounted to £2,775,145. This brings the total invested in the scheme to-date to £45,511,239. of which £15,707,826 was by way of subsidy.

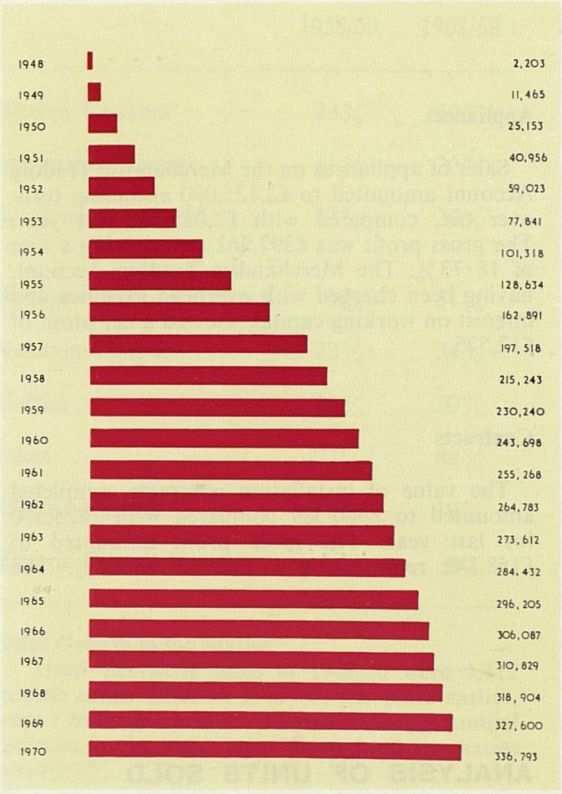
Rural consumers used an estimated 1,039 million units, an increase of 13% on the previous year's consumption. The overall average consumption was 2,956 units per consumer, compared with 2,715 in 1968/69. The average figure for farm and domestic use increased from 1,666 to 1,786 units. Rural revenue, at £11,309,755, represented an average price per unit of 2.62d.

The Board contributed to the regular support of Macra na Feirme and Macra na Tuaithe under the appropriate Associate Membership schemes. In addition it sponsored, with the co-operation of the Irish Farmers' Journal, the 1969–70 "Know Your Area" Competition in which Macra na Tuaithe Clubs competed for the annual Citizenship Award.

Sponsorship of courses held under the auspices of the Irish Countrywomen's Association at An Grianan continued during the year. There was a good attendance of girls from different parts of the country at a residential course on "Rural Homemaking". Week-end courses on Youth Leadership and Care of the Aged were held for the benefit of voluntary workers in these fields in rural areas.



The following diagram illustrates the cumulative total of consumers connected, under the Rural Electrification Scheme, as at 31st March each year from 1948 to 1970:



The growth of farm and domestic consumption in rural areas continued in step with the overall increase by all consumers.

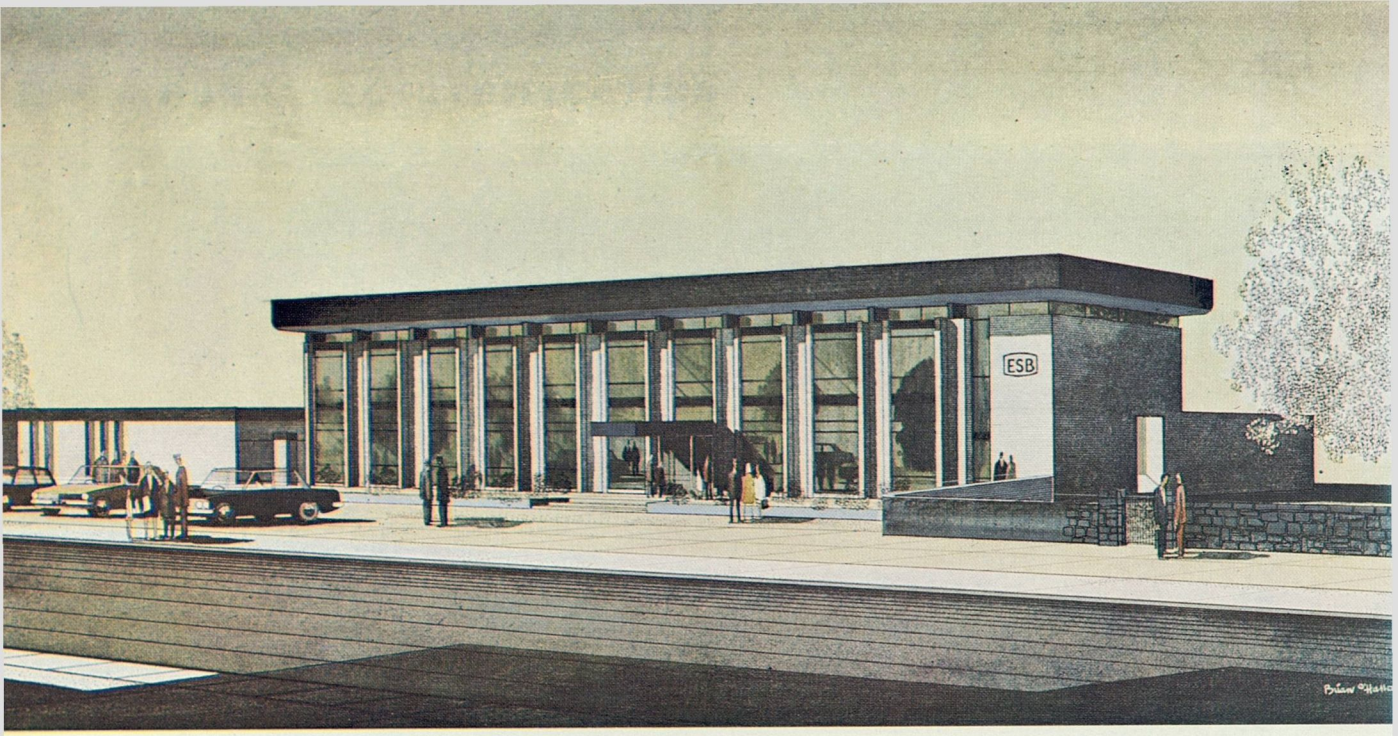
The main rural promotional activities comprised exhibits at the Royal Dublin Society's Spring Show, the Cork and Limerick Shows and participation in the principal County agricultural shows. The Senior and Schools Wholemeal Bread-baking Competitions were organised successfully and the National Final of the latter event was again held in the Abbey Theatre, Dublin.

The Board again wishes to place on record its appreciation of the co-operation it receives from the various authorities and organisations interested in the development of rural areas.

Work in progress on extensions to the rural electrification network.



The E.S.B. exhibit at the Spring Show.



An impression of the reconstructed District Office at Portlaoise.

PREMISES

A new service centre at Mullingar and a training school for linesmen at Portlaoise were completed. Work on new District Headquarters at Tralee was nearing completion. Portlaoise District Headquarters is being extended and work was in progress on the new District Headquarters at Waterford. Plans were being prepared for new District Headquarters at Dublin North-West, Dublin South and Galway. Premises projects at fifty other locations were at the planning or construction stages.

Work continued on the additional staff houses at New Ross for Great Island Generating Station personnel and on the completion of the first phase of the Tarbert Station staff housing project.

The new headquarters building in Fitzwilliam Street was nearing completion and was in partial use.

SUPERANNUATION SCHEMES AND TRIBUNALS

The number of contributing members in the Schemes at the end of the year was, General Employees—2,607; Manual Workers—3,773.

The General Employees' and the Manual Workers' Tribunals were dissolved by the Industrial Relations Act, 1969, with effect as from 3rd June, 1969, but both continued to function on a non-statutory basis until 30th September, 1969.

STAFF TRAINING

By International standards Board expenditure on staff training is very high. One of the reasons for this is that the educational system in this country differs appreciably from systems in more industrialised countries such as England, and does not cater fully for the needs of industries like the E.S.B. which are in the forefront of technological development and require a wide range of skilled staff. As a result, such industries have to run or sponsor training courses which are essentially educational in nature. Another reason for the extensive training commitment is that the recent industrial expansion in the country has created a demand for trained men with experience in new technologies. Such men are frequently only available in organisations like the E.S.B. and there tends to be an outward flow of these men into other sectors of the economy.

The range of training within the Board is extensive and the aim of catering for all staff is gradually being achieved. Major development/training programmes for the following categories are either well established or under way:

Line foremen, chargehand linesmen, linesmen, trainee linesmen;

Distribution and rural development assistants;

Existing craftsmen, e.g. electricians and mechanical fitters;

Operatives and supervisors in generating stations;

Demonstrators and sales personnel;

Apprentices.

As well as sponsoring engineers and other staff to do postgraduate work leading to masters' degrees, the Board also gives scholarships both to its own staff and to school leavers to pursue technician courses. It also assists clerical staff who are studying for accountancy or other qualifications and sponsors a wide range of staff attending courses at Universities, Irish Management Institute, Institute of Public Administration, College of Industrial Relations, foreign establishments, etc. Internal courses are run in supervisory, basic management and communications techniques.

These are but some of the training activities and an idea of the scale can be seen by the fact that by the end of 1970, some 50 people will be engaged fulltime in providing training within the Board.



Two E.S.B. Apprentices, Ciaran Dowling, Cork and Patrick Dunne, Portlaoise being presented with silver medals which they won at the International Apprenticeship Competition, by Mr. Brennan, T.D., Minister for Labour.

ACCOUNTS 1969—1970

No.	
1	Electricity Production Account
2	Electricity (Non-Rural) Revenue Account
3	Electricity (Rural) Revenue Account
4	Profit and Loss Account
5	Preservation and Operation of Fisheries
6	Installations Trading Account
7	Appliance Sales Trading Account
8	Net Revenue Account
9	Statement of Repayable Capital and Redemption
10	Statement of Capital Reserves
11	Statement of Capital Investment in Fixed Assets
12	Balance Sheet

Electricity Production Account for the Year ended 31st March, 1970

	Fuel	Operating Expenses	Maintenance and Repair	Supervision and Local Administration	Works Cost	Per Unit Sent Out 1969/70	Per Unit Sent Out 1968/69	Depreciation and Renewals	Interest and Capital Repayments Allocation	1969/70 Total	1969/70 Per Unit Sent Out	1968/69 Total	1968/69 Per Unit Sent Out
GENERATION	£	£	£	£	£	Pence	Pence	£	£	£	Pence	£	Pence
Coal/Oil													
Marina	680,553	180,066	108,147	28,372	**997,138**	·491	·644	178,000	275,645	**1,450,783**	·714	**1,462,028**	·922
Ringsend	1,764,402	314,551	251,298	57,202	**2,387,453**	·456	·549	391,000	737,615	**3,516,068**	·672	**3,422,511**	·790
Arigna	324,775	62,583	34,687	9,902	**431,947**	1·210	1.149	30,000	54,309	**516,256**	1·446	**367,709**	1·464
Great Island	693,440	123,346	82,451	26,184	**925,421**	·414	·481	204,000	411,177	**1,540,598**	·689	**1,748,438**	·712
Tarbert	231,717	35,949	17,934	7,418	**293,018**	*	—	105,000	210,969	**608,987**	*	—	—
					5,034,977	·473	·565			**7,632,692**	·717	**7,000,686**	·812
Sod Peat (Machine)													
Portarlington	725,800	119,933	79,002	16,610	**941,345**	1·331	1·271	53,000	69,111	**1,063,456**	1·503	**911,783**	1·466
Allenwood	857,729	129,555	87,568	20,175	**1,095,027**	1·274	1·254	78,000	100,738	**1,273,765**	1·482	**1,113,627**	1·493
Lanesborough	349,346	56,644	23,655	7,514	**437,159**	1·072	1·004	32,000	58,649	**527,808**	1·294	**500,715**	1·210
					2,473,531	1·252	1·202			**2,865,029**	1·451	**2,526,125**	1·418
Milled Peat													
Ferbane	1,374,476	186,125	119,878	30,327	**1,710,806**	1·045	·969	180,000	329,958	**2,220,764**	1·357	**2,025,520**	1·269
Rhode	1,093,316	135,350	97,422	25,558	**1,351,646**	·984	1·008	147,000	262,105	**1,760,751**	1·282	**1,565,477**	1·337
Bellacorick	555,189	108,763	80,388	17,492	**761,832**	1·102	1·005	83,000	149,438	**994,270**	1·438	**908,815**	1·324
Shannonbridge	544,772	86,925	48,267	15,163	**695,127**	·852	·799	93,000	161,717	**949,844**	1.165	**886,346**	1·091
Lanesborough	566,241	68,524	41,883	12,386	**689,034**	·808	·815	91,000	160,993	**941,027**	1·103	**785,431**	1·165
					5,208,445	·970	·934			**6,866,656**	1·279	**6,171,589**	1·249
Sod Peat (Hand-won)													
Four 5 MW Stations	171,446	81,015	54,731	9,483	**316,675**	2·468	1·860	44,000	82,158	**442,833**	3·451	**423,995**	2·583
Peak Station													
North Wall	52,478	96,563	49,425	17,349	**215,815**	—	—	93,000	127,020	**435,835**	—	**425,346**	—
Stand-by													
Pigeon House	8,539	81,772	78,538	18,958	**187,807**	—	—	54,000	71,329	**313,136**	—	**310,803**	—
TOTAL—FUEL STATIONS	9,994,219	1,867,664	1,255,274	320,093	**13,437,250**	·737	·791	1,856,000	3,262,931	**18,556,181**	1·018	**16,858,544**	1·082
Hydro													
Shannon	—	93,778	140,489	29,564	**263,831**	·259	·151	49,000	233,643	**546,474**	·536	**503,283**	·339
Erne	—	43,666	64,664	22,617	**130,947**	·137	·110	83,000	350,410	**564,357**	·592	**542,780**	·494
Liffey	—	33,762	33,846	10,969	**78,577**	·492	·409	24,000	76,257	**178,834**	1·121	**171,483**	·985
Lee	—	24,726	24,350	8,188	**57,264**	·225	·137	52,000	269,715	**378,979**	1·491	**347,981**	·935
Clady	—	8,948	7,443	1,433	**17,824**	·322	·305	10,000	65,764	**93,588**	1·689	**84,466**	1·748
TOTAL—HYDRO STATIONS	—	204,880	270,792	72,771	**548,443**	·225	·152	218,000	995,789	**1,762,232**	·722	**1,649,993**	·520
TOTAL—ALL STATIONS	9,994,219	2,072,544	1,526,066	392,864	**13,985,693**	·677	·683	2,074,000	4,258,720	**20,318,413**	·983	**18,508,537**	·987
TRANSMISSION	—	119,384	313,861	170,121	**603,366**	—	—	738,000	1,352,286	**2,693,652**	—	**2,415,167**	—
	9,994,219	2,191,928	1,839,927	562,985	**14,589,059**	—	—	2,812,000	5,611,006				

Electricity purchased in bulk		**8,693**	—	**8,047**	—
General Administration:	£				
Generation	1,116,073				
Transmission	356,966	**1,473,039**	—	**1,153,150**	—
Total Cost		**£24,493,797**	1·185	**£22,084,901**	1·177
Transferred to Revenue Accounts:	£				
Non-Rural	**17,792,930**			**16,049,946**	
Rural	**6,700,867**			**6,034,955**	
		£24,493,797		**£22,084,901**	

*Recently commissioned

No. 2

Electricity (Non-Rural) Revenue Account for the Year ended 31st March, 1970

	£	£	1968/69 £
Electricity Production Account		17,792,930	*16,049,946*
Distribution Charges:			
Operation and maintenance	2,194,687		
Reserve for depreciation and renewals	1,262,563		
Interest and capital repayments	2,288,484		
Supervision and local administration	1,332,474		
		7,078,208	*6,279,101*
General Administration:			
Salaries and wages	1,384,676		
Board members' remuneration *(including full time Chairman)*	9,000		
Travelling expenses	91,585		
Stationery	56,736		
Telephones and postage	23,103		
Lighting and heating	28,891		
Rents and rates	45,678		
Insurance	140,171		
Legal and other professional fees	75,083		
Audit fee	7,000		
Publicity	225,985		
Maintenance of office buildings & equipment	81,300		
Staff training	459,291		
Pensions	150,369		
General assets–interest and capital repayments	358,336		
General assets–depreciation	78,000		
Bad debts	21,046		
Sundry expenses	58,594		
	3,294,844		
Less apportionments charged to:			
Production Account	1,473,039		
Rural Revenue Account	643,451		
Capital Works and other accounts	337,858		
		840,496	*695,503*
Turnover Tax		335,508	*250,745*
Balance transferred to Profit and Loss Account		2,032,719	*1,464,755*
		£28,079,861	*£24,740,050*

	£	1968/69 £
Electricity Charges	27,893,407	*24,540,644*
Meter and Other Charges	186,454	*199,406*
	£28,079,861	*£24,740,050*

No. 3

Electricity (Rural) Revenue Account for the Year ended 31st March, 1970

	£	£	1968/69 £
Electricity Production Account		6,700,867	*6,034,955*
Distribution Charges:			
Operation and maintenance	1,673,202		
Reserve for depreciation and renewals	1,468,437		
Interest and capital repayments	1,851,029		
Supervision and local administration	987,416		
		5,980,084	*5,268,785*
General Administration		643,451	*517,966*
Turnover Tax		87,084	*62,295*
		£13,411,486	*£11,884,001*

	£	1968/69 £
Electricity Charges	11,253,390	*9,664,789*
Meter and Other Charges	56,365	*51,983*
Balance transferred to Profit and Loss Account	2,101,731	*2,167,229*
	£13,411,486	*£11,884,001*

No. 4

Profit and Loss Account for the Year ended 31st March, 1970

	£	£	1968/69 £
Interest payable to the Minister for Finance	2,552,980		
Interest on E.S.B. Stocks and on other loans (*less* temporary investment earnings)	4,074,108		
Stock management and transfer charges	32,277		
Other interest	1,688,184		
		8,347,549	*7,371,808*
Reserves:			
Repayment of capital advances from the Minister for Finance	910,167		
Sinking fund provisions for redemption of E.S.B. Stocks and other loans	2,228,035		
		3,138,202	*2,307,293*
		£11,485,751	*£9,679,101*
Balance transferred from Rural Revenue Account		2,101,731	*2,167,229*
Balance transferred to Net Revenue Account		176,251	—
		£2,277,982	*£2,167,229*

	£	1968/69 £
Interest and Capital Repayments allocated to:		
Production Account	5,611,006	*4,872,253*
Non-Rural Revenue Account	2,288,484	*1,930,229*
Rural Revenue Account	1,851,029	*1,678,993*
Administration	358,336	*271,526*
Fisheries Account	6,124	*6,125*
Installations Account	36,900	*24,800*
Appliance Sales Account	31,400	*17,500*
Capital Works	1,302,472	*877,675*
	£11,485,751	*£9,679,101*
Balance transferred from Non-Rural Revenue Account	2,032,719	*1,464,755*
Miscellaneous revenue	89,043	*114,890*
Interest receivable	156,220	*218,592*
Balance transferred to Net Revenue Account	—	*368,992*
	£2,277,982	*£2,167,229*

No. 5

Preservation and Operation of Fisheries for the Year ended 31st March, 1970

	£	1968/69 £
Preservation, operation and other direct costs	79,803	*73,090*
	£79,803	*£73,090*
Balance brought down	17,061	*17,742*
Salaries and sundry expenses	9,407	*7,961*
Fishery rates	4,877	*4,984*
Reserves for depreciation and renewals	3,000	*3,000*
General administrative expenses and interest	4,474	*4,544*
	£38,819	*£38,231*
Balance brought down	38,819	*38,231*
Capital repayments	1,750	*1,681*
	£40,569	*£39,912*

	£	1968/69 £
Sales of fish, letting of fishing rights and miscellaneous income	62,742	*55,348*
Balance carried down	17,061	*17,742*
	£79,803	*£73,090*
Balance carried down	38,819	*38,231*
	£38,819	*£38,231*
Balance transferred to Net Revenue Account	40,569	*39,912*
	£40,569	*£39,912*

No. 6

Installations Trading Account for the Year ended 31st March, 1970

	£	£	1968/69 £
Cost value of work for which credit had not been taken at 31st March, 1969		399,934	284,469
Cost of installation work carried out during the year		1,059,741	794,738
Gross profit carried down		158,142	146,297
		£1,617,817	£1,225,504
Salaries, wages and commission	£ 52,138		
Travelling expenses	6,020		
Sundry expenses	7,957		
General administrative expenses and interest, as apportioned	51,477		
		117,592	110,271
Balance transferred to Net Revenue Account		40,550	36,026
		£158,142	£146,297

	£	£	1968/69 £
Credit taken for contracts completed and charged		980,389	825,570
Cost value of work for which credit has not yet been taken		637,428	399,934
		£1.617,817	£1.225,504
Gross profit brought down		158,142	146,297
		£158,142	£146,297

No. 7

Appliance Sales Trading Account for the Year ended 31st March, 1970

	£	£	1968/69 £
Cost of goods sold		1,627,469	1,564,819
Direct costs in connection with sales		99,659	78,366
Gross profit carried down		397,962	382,580
		£2,125,090	£2,025,765
Salaries, wages and commission	£ 189,833		
Travelling expenses	21,395		
Publicity	32,755		
Rents, rates and maintenance of property	27,184		
Sundry expenses	19,340		
General administrative expenses and interest, as apportioned	94,930		
		385,437	353,066
Balance transferred to Net Revenue Account		12,525	29,514
		£397,962	£382,580

	£	£	1968/69 £
Sales	2,175,441		
Less Turnover Tax	50,351		
		2,125,090	2,025,765
		£2,125,090	£2,025,765
Gross profit brought down		397,962	382,580
		£397,962	£382,580

Net Revenue Account for the Year ended 31st March, 1970

	£		£	£
Fisheries deficit	40,569	Profit and Loss Account surplus		176,251
Balance carried down	188,757	Installations trading surplus	40,550	
		Appliance Sales trading surplus	12,525	
				53,075
	£229,326			£229,326
Transfer to reserve for renewals, of credits (per contra) as additional provision for the renewal of plant	556,372	Balance brought down		188,757
		Balance brought forward from last year's account		30,797
Compensation to long line eel fishermen—River Shannon	73,095			
		Credits arising consequent on the retirement of assets and the sale of scrapped material		556,372
E.S.B. Stock Issue expenses	40,162			
Balance carried forward	106,297			
	£775,926			£775,926

Statement of Repayable Capital and Redemption thereof to the 31st March, 1970

	Total Receipts to 31st March 1970	Redeemed			Balance Outstanding 31st March 1970
		Total to 31st March 1969	Redeemed during Year	Total to 31st March 1970	
	£	£	£	£	£
Minister for Finance:					
Advances under the Electricity (Supply) Acts and the Shannon Fisheries Act, 1935	**68,450,236**	11,707,756	910,167	12,617,923	**55,832,313**
Electricity Supply Board Stocks:					
5% redeemable 1966–1975	**10,000,000**	3,216,187	181,580	3,397,767	**6,602,233**
6% redeemable 1968–1978	**5,000,000**	963,422	186,000	1,149,422	**3,850,578**
6% redeemable 1982–1987	**12,000,000**	1,514,912	483,940	1,998,852	**10,001,148**
6% redeemable 1984–1989	**16,500,000**	1,969,766	598,928	2,568,694	**13,931,306**
7% redeemable 1986–1991	**13,000,000**	552,135	279,579	831,714	**12,168,286**
7¼% redeemable 1988–1993	**7,000,000**	—	121,049	121,049	**6,878,951**
9½% redeemable 1985–1990	**4,608,842***	—	—	—	**4,608,842**
6% Premium, redeemable 1975	**3,250,000**	—	—	—	**3,250,000**
Funded Loans and Loan Stocks:					
Local Authority Undertakings	**756,021**	756,021	—	756,021	—
New Ireland Assurance Co. Ltd. 6%—repayable by half-yearly instalments, 1962–1987	**500,000**	75,740	13,611	89,351	**410,649**
German Banks 6¾%—repayable by annual instalments, 1975–1984	**5,657,452**	—	—	—	**5,657,452**
German Banks 7¾%—repayable by annual instalments, 1975–1984	**8,486,179**	—	—	—	**8,486,179**
International Bank for Reconstruction and Development 6½%—repayable by half-yearly instalments, 1974–1994	**593,329****	—	—	—	**593,329**
	£155,802,059	£20,755,939	£2,774,854	£23,530,793	**£132,271,266**

*Stock issued £5,600,000: further calls due on 22nd April and 20th May, 1970.
**Loan $14,500,000: drawdown scheduled over phased period.

Statement of Capital Reserves at 31st March, 1970

No. 10

			1968/69
	£	£	£
Non-repayable contributions from Minister for Finance under Electricity (Supply) Acts towards capital cost of supplying rural areas	15,707,826		
Other non-repayable contributions for capital works	2,937,304		
		18,645,130	*16,748,965*
Repaid Capital, less intangible assets, currency revaluation and loan discounts written off		**20,801,835**	*18,760,810*
Provision for depreciation, renewal and retirement of physical assets, together with proceeds of sale of assets, less physical assets retired		**73,337,631**	*66,352,865*
Total Capital Reserves		**£112,784,596**	*£101,862,640*

Statement of Capital Investment in Fixed Assets at 31st March, 1970

No. 11

	Total at 31st March, 1969, less retirements	Expenditure less retirements during year	Total at 31st March, 1970, less retirements
	£	£	£
Generation	74,198,378	8,094,669	**82,293,047**
Transmission	22,887,758	2,527,928	**25,415,686**
Distribution	84,150,493	6,221,704	**90,372,197**
General	5,243,012	1,572,388	**6,815,400**
Fisheries	111,652	—	**111,652**
	186,591,293	£18,416,689	**205,007,982**
Capital Works in Progress, including payments on account to contractors and others	21,666,258		**28,082,073**
Total Capital Investment in Fixed Assets	£208,257,551		**£233,090,055**

No. 12

Balance Sheet as at 31st March, 1970

Liabilities and Reserves	£	£	31/3/69 £
Repayable Capital as per Statement No. 9		132,271,266	*112,450,319*
Capital Reserves as per Statement No. 10		112,784,596	*101,862,640*
		245,055,862	*214,312,959*
Loans under the Electricity Supply Board (Superannuation) Act, 1942		3,374	*848,422*
Short-Term Loans		8,106,371	*6,000,000*
Sundry Creditors and Provisions	14,277,553		
Hire Purchase Debts block discounted with Finance House (contra amount included in Sundry Debtors)	3,245,382		
		17,522,935	*13,444,253*
Sinking Funds:			
Electricity Supply Board Stocks (including interest due but unpaid)	1,562,931		
Other loans	266,800		
		1,829,731	*1,362,872*
Reserves:			
Contingencies reserve	1,450,000		
Plant, Self-Insurance—special risks	500,000		
Others	75,000		
		2,025,000	*2,025,000*
Net Revenue Account—Surplus		106,297	*30,797*
		£274,649,570	*£238,024,303*

Note:
At 31st March, 1970, contractual capital commitments amounted to approximately £18,000,000.

Signed: T. MURRAY, *Chairman*
J. G. GARGAN, *Secretary*

Assets	£	£	31/3/69 £
Fixed Assets as per Statement No. 11		233,090,055	*208,257,551*
Electricity Supply Board Stocks (nominal £2,892,994) at cost, held by the Munster and Leinster Bank Nominees Ltd., as depositaries of the Board		2,673,322	*2,958,010*
Sinking Fund Investments:			
E.S.B. Stocks (nominal £1,566,448, market value £1,095,334) at cost	1,557,369		
Other Loans (nominal £331,200, market value £264,960) at cost	266,800		
		1,824,169	*1,357,369*
Stocks (at average cost), **Tools and Working Equipment** (at depreciated cost) on hand and in transit		7,980,309	*6,715,773*
Cost Value of Installation and Other Repayable Work in Progress		1,046,838	*602,743*
Sundry Debtors, advances for goods not yet delivered, accrued but unbilled revenue and hire purchase debts, less provision for bad and doubtful debts		21,136,788	*12,831,619*
Temporary Cash Investment		6,250,000	*5,000,000*
Cash in Hand and with Banks		648,089	*301,238*
		£274,649,570	*£238,024,303*

Signed: L. J. BARRY, *Director, Finance*

AUDITORS' REPORT

As Auditors appointed by the Minister for Transport and Power, with the consent of the Minister for Finance, we have examined the Balance Sheet and Financial Statements numbered 1 to 12, which have been prepared in accordance with the Electricity Supply Acts.

Proper books of account have been kept and proper returns received from offices not visited by us. We have obtained all the information and explanations which we considered necessary for our audit, and the Balance Sheet and Financial Statements are in agreement with the books of account.

Allocations to the various Accounts, made by the Board's officials and approved by the Board, covering Overhead Expenses, Interest and Capital Repayments, and Costs of Generation, Transmission and Distribution have been made on the same basis as in the previous year. Additions have continued to be made to the Depreciation Reserve towards increased cost of renewal of physical assets, the original cost of which has already been fully provided.

In our opinion, the Balance Sheet and Financial Statements give a true and fair view of the outcome of the Revenue Operations of the Board for the year ended 31st March, 1970, and of the state of the Board's affairs as at that date.

KENNEDY, CROWLEY & CO.
CHARTERED ACCOUNTANTS.

HAINAULT HOUSE,
69-71 ST. STEPHEN'S GREEN,
DUBLIN 2.
30TH SEPTEMBER, 1970

APPENDICES

No.

1 Number of consumers and other particulars relating to areas supplied by the Board

2 Growth of electricity sales and number of consumers

3 Analysis of units sold

4 Distribution at high tension of units generated

5 Generation load duration and integrated load duration curves

6 Generation statistics for the year

7 Particulars of generating plant

8 Performance of generating plant

9 Typical daily generation load curves

10 Transmission and distribution systems in commission

11 Progress of the rural electrification scheme

Inside back Cover

Weekly generation

NUMBER OF CONSUMERS AND OTHER PARTICULARS RELATING TO AREAS SUPPLIED BY THE BOARD

Appendix 1

Areas and Towns supplied	Approximate population	No. of consumers at 31st March		Motive power Units sold year ended 31st March	
	thousands	1970	1969	1970 thousands estimated	1969 thousands
ATHLONE	**189·4**	**45,430**	**44,622**	**42,768**	**40,224**
Town	51·0	12,646	12,252	31,169	28,622
Rural	138·4	32,784	32,370	11,599	11,602
CORK	**317·1**	**88,347**	**85,580**	**208,740**	**190,371**
Town	178·4	52,531	50,841	183,587	166,731
Rural	138·7	35,816	34,739	25,153	23,640
DUBLIN CITY	**488·2**	**136,953**	**136,036**	**234,932**	**217,422**
Town	488·2	136,953	136,036	234,932	217,422
DUBLIN NORTH/WEST	**238·4**	**66,405**	**61,801**	**208,317**	**190,018**
Town	174·3	50,166	46,553	175,382	159,427
Rural	64·1	16,239	15,248	32,935	30,591
DUBLIN SOUTH	**145·8**	**48,047**	**46,980**	**39,527**	**34,558**
Town	126·0	43,039	42,238	36,306	32,334
Rural	19·8	5,008	4,742	3,221	2,214
DUNDALK	**222·8**	**60,749**	**59,131**	**158,994**	**142,767**
Town	78·3	22,660	21,997	121,090	108,497
Rural	144·5	38,089	37,134	37,904	34,270
GALWAY	**168·4**	**43,670**	**42,239**	**47,326**	**50,776**
Town	49·5	13,836	13,231	39,413	42,386
Rural	118·9	29,834	29,008	7,913	8,390
LIMERICK	**282·8**	**72,932**	**70,782**	**234,425**	**205,413**
Town	103·3	30,293	29,028	193,330	168,193
Rural	179·5	42,639	41,754	41,095	37,220
PORTLAOISE	**210·7**	**53,267**	**52,012**	**102,902**	**95,100**
Town	78·7	21,511	20,726	84,030	78,089
Rural	132·0	31,756	31,286	18,872	17,011
SLIGO	**251·1**	**71,781**	**69,762**	**32,081**	**28,459**
Town	46·7	13,560	13,292	14,591	12,485
Rural	204·4	58,221	56,470	17,490	15,974
TRALEE	**151·5**	**38,036**	**37,245**	**31,687**	**27,484**
Town	29·9	8,535	8,227	12,310	10,632
Rural	121·6	29,501	29,018	19,377	16,852
WATERFORD	**217·8**	**60,883**	**59,023**	**183,768**	**177,217**
Town	100·1	29,162	28,345	156,956	152,692
Rural	117·7	31,721	30,678	26,812	24,525
TOTALS	**2,884·0**	**786,500**	**765,213**	**1,525,468**	**1,399,809**
Town	1,504·4	434,892	422,766	1,283,097	1,177,520
Rural	1,379·6	351,608	342,447	242,371	222,289

Appendix 2

GROWTH OF ELECTRICITY SALES AND NUMBER OF CONSUMERS

The following table shows, quinquennially from 1930 to 1955 and for each year since, the number of units generated and sold, the revenue, the average price per unit and the number of consumers.

Year ended 31st March	Units generated (and purchased) millions	Units sold millions	Revenue from sales of energy thousands	Average price in pence per unit sold	Total consumers
			£		
1930	60·9	43·2	478	2·66	48,606
1935	206·1	157·0	1,258	1·92	103,037
1940	407·0	318·6	1,946	1·47	172,545
1945	406·3	319·0	2,458	1·85	228,008
1950	784·8	626·2	4,774	1·83	310,639
1955	1,461·7	1,192·2	9,522	1·92	461,901
1956	1,573·1	1,306·6	10,465	1·92	509,546
1957	1,647·7	1,352·6	11,555	2·05	547,910
1958	1,774·8	1,424·6	12,903	2·17	570,345
1959	1,898·2	1,549·4	13,784	2·14	590,921
1960	2,096·0	1,692·2	14,724	2·09	610,946
1961	2,262·3	1,863·6	16,263	2·09	628,241
1962	2,453·0	2,005·1	17,731	2·12	642,753
1963	2,714·9	2,238·5	19,445	2·08	659,932
1964	2,900·8	2,375·9	20,383	2·06	678,054
1965	3,240·2	2,682·6	22,488	2·01	697,491
1966	3,546·2	2,953·3	24,077	1·96	716,113
1967	3,851·0	3,238·1	26,690	1·98	726,561
1968	4,246·4	3,570·1	29,898	2·01	745,430
1969	4,749·0	4,012·3	34,457	2·06	765,213
1970	5,245·7	4,411·6	39,400	2·14	786,500

ANALYSIS OF UNITS SOLD

Appendix 3

Class of Supply	Year ended 31st March, 1970 Estimate (millions)	Year ended 31st March, 1969 (millions)	Increase (millions)	Percentage increase
DOMESTIC				
General Supply	1,782·6	1,638·3	144·3	8·8
Night space heating	181·7	152·7	29·0	19·0
	1,964·3	1,791·0	173·3	9·7
COMMERCIAL				
Lighting	177·4	156·2	21·2	13·6
Heating, cooking and water heating	301·8	274·2	27·6	10·1
Motive power	179·1	161·2	17·9	11·2
Night space heating	200·8	178·7	22·1	12·4
Public lighting	46·3	44·0	2·3	5·2
Miscellaneous	128·2	103·7	24·5	23·6
	1,033·6	918·0	115·6	12·6
INDUSTRIAL				
Maximum demand	1,224·9	1,123·4	100·9	9·0
Lighting	17·3	15·4	1·9	12·3
Heating, cooking and water heating	43·1	40·6	2·5	6·2
Motive power	118·5	114·6	3·9	3·4
Night space heating	9·9	9·3	0·6	6·5
	1,413·7	1,303·3	109·8	8·4
TOTAL	4,411·6	4,012·3	398·7	9·9

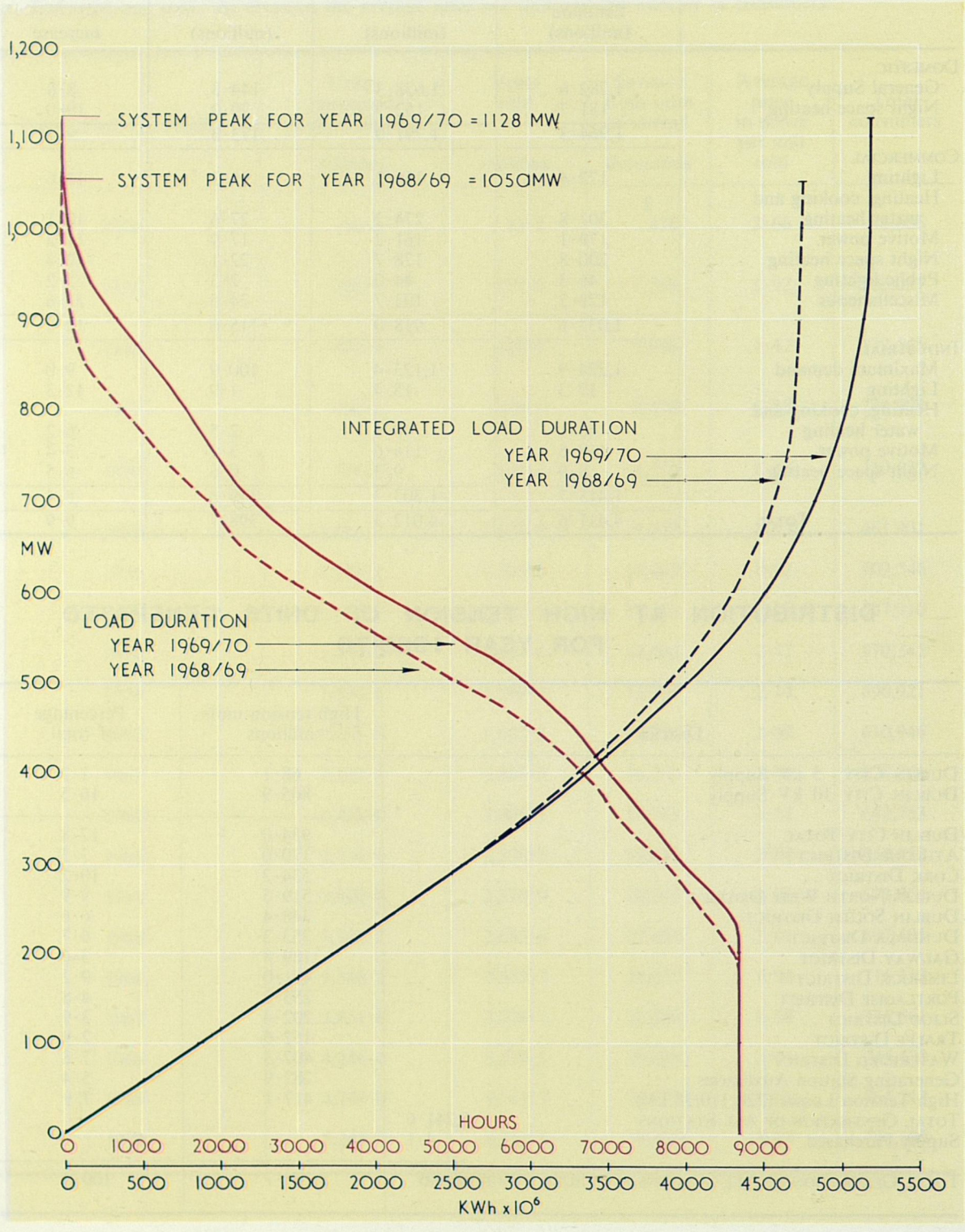
DISTRIBUTION AT HIGH TENSION OF UNITS GENERATED FOR YEAR 1969/70

Appendix 4

District		High tension units millions	Percentage of total
DUBLIN CITY 5 kV Supply		68·1	1·3
DUBLIN CITY 10 kV Supply		865·9	16·5
DUBLIN CITY TOTAL		934·0	17·8
ATHLONE DISTRICT		170·0	3·3
CORK DISTRICT		534·2	10·2
DUBLIN NORTH WEST DISTRICT		519·5	9·9
DUBLIN SOUTH DISTRICT		348·4	6·6
DUNDALK DISTRICT		353·3	6·7
GALWAY DISTRICT		189·8	3·6
LIMERICK DISTRICT		481·0	9·2
PORTLAOISE DISTRICT		253·2	4·8
SLIGO DISTRICT		202·4	3·9
TRALEE DISTRICT		152·6	2·9
WATERFORD DISTRICT		407·3	7·8
Generating Station Auxiliaries		282·9	5·4
High Tension Losses (220/110/38 kV)		417·1	7·9
TOTAL GENERATION OF ALL STATIONS	5,241·6		
Supply Purchased	4·1		
TOTAL GENERATION OF ALL STATIONS PLUS SUPPLY PURCHASED		5,245·7	100·0

Appendix 5

GENERATION LOAD DURATION
AND INTEGRATED LOAD DURATION CURVES
Year ended 31st March, 1970



GENERATION STATISTICS FOR THE YEAR 1969/70

Appendix 6

Station	Year 1969/70			Year 1968/69
	Generated million units	Station use million units	Sent out million units	Sent out million units
ARDNACRUSHA	247·5	2·8	244·7	356·0
CLIFF	68·9	0·6	68·3	75·4
CATHALEEN'S FALL	162·4	1·9	160·5	188·1
CARRIGADROHID	16·9	0·4	16·5	24·1
INNISCARRA	45·2	0·7	44·5	65·2
POLLAPHUCA	20·1	0·9	19·2	20·5
GOLDEN FALLS	7·8	0·2	7·6	8·3
LEIXLIP	11·6	0·1	11·5	13·0
CLADY	13·4	0·1	13·3	11·6
FERBANE	424·5	31·6	392·9	383·0
RHODE	353·9	24·3	329·6	281·0
BELLACORICK	177·8	11·9	165·9	164·8
SHANNONBRIDGE	208·5	12·8	195·7	195·0
LANESBOROUGH	320·9	18·3	302·6	261·1
PORTARLINGTON	180·9	11·1	169·8	149·3
ALLENWOOD	219·2	12·9	206·3	179·0
CAHIRCIVEEN	8·6	1·0	7·6	7·7
MILTOWN-MALBAY	2·5	0·4	2·1	4·5
SCREEB	3·1	0·4	2·7	3·1
GWEEDORE	20·0	1·6	18·4	24·1
PIGEON HOUSE	2·4	3·3	—0·9	—1·0
NORTH WALL	27·5	3·4	24·1	18·9
RINGSEND	1,328·0	72·1	1,255·9	1,039·5
MARINA	513·1	25·5	487·6	380·5
ARIGNA	91·5	5·8	85·7	60·3
GREAT ISLAND	566·3	29·3	537·0	589·0
TARBERT	199·1	9·5	189·6	—
PURCHASED	4·1	—	4·1	3·9
TOTALS	5,245·7	282·9	4,962·8	4,505·9
Maximum daily generation, million units			21·6	19·2
Maximum load generated in kW			1,128,000	1,050,000

PARTICULARS OF GENERATING PLANT

Hydro Stations

Station	River	Catchment area sq. kms.	Average available head metres	Average annual generation million units	Generating sets No.	Generating sets Capacity each kW	Type of turbine
ARDNACRUSHA	Shannon	10,400	28·3	310	3 1	20,000 25,000 **85,000**	Francis Kaplan
POLLAPHUCA	Liffey	309	48·7	45	2	15,000 **30,000**	Kaplan
GOLDEN FALLS		312	16·6		1	**4,000**	Propeller
LEIXLIP		843	17·3		1	**4,000**	Kaplan
CLIFF	Erne	4,320	12·1	275	2	10,000 **20,000**	Kaplan
CATHALEEN'S FALL		4,350	29·7		2	22,500 **45,000**	
CARRIGADROHID	Lee	610	15·4	77	1	**8,000**	Kaplan
INNISCARRA		790	31·9		1 1	15,000 4,000 **19,000**	
CLADY	Clady	80	57·8	13	1	**4,000**	Francis

Pumped Storage Station

Station	Location	Mean gross head metres	Annual Operating Time	Average annual generation million units	Generating Sets No.	Generating Sets Capacity each kW	Type of Units
TURLOUGH HILL (under construction)	Upper reservoir Turlough Hill, lower reservoir Lough Nahanagan Co. Wicklow.	287	1,300 hours approx.	325	4	73,000 **292,000**	Reversible Pump-Turbines

Steam Stations

Station	Location	Generating Sets					Boilers			
		No.	Capacity each kW	Pressure Psi	Temp. °F	Type of cooling	No.	Capacity each k.lb./hour	Type of firing	Fuel type
Pigeon House	Dublin City	1 4	10,000 20,000 **90,000**	250	750	Estuarine	10	100	Oil-fired	Oil
North Wall	Dublin City	3	16,000 **48,000**	400	800	Estuarine	4 3	40 165	Oil-fired	Oil
Portarlington	Co. Laoise	3	12,500 **37,500**	400	800	Tower	3	150	Mech. Stoker	Sod Peat
Allenwood	Co. Kildare	2	20,000 **40,000**	400	800	Tower	4	150	Mech. Stoker	Sod Peat
Marina	Cork City	2 1	30,000 60,000 **120,000**	600 1,150	850 950	Tidal River	3 1	200 550	P.F. and Oil-fired Oil-fired	Coal or Oil Oil
Ringsend	Dublin City	3 3	30,000 60,000 **270,000**	600 1,150	850 950	Estuarine	4 3	200 550	P.F. and Oil-fired Oil-fired	Coal or Oil Oil
Ferbane	Co. Offaly	3 1	20,000 30,000 **90,000**	400 900	800 950	Tower	3 1	220 285	P.F.	Milled Peat
Miltown-Malbay	Co. Clare	1	**5,000**	400	800	Tower	1	60	Mech. Stoker	Sod Peat
Screeb	Co. Galway	1	**5,000**	400	800	Sea	1	60	Mech. Stoker	Sod Peat
Cahirciveen	Co. Kerry	1	**5,000**	400	800	Tower	1	60	Mech. Stoker	Sod Peat
Gweedore	Co. Donegal	1	**5,000**	400	800	River	1	60	Mech. Stoker	Sod Peat

Steam Stations

Appendix 7 cont.

Station	Location	Generating Sets					Boilers			
		No.	Capacity each kW	Pressure Psi	Temp. °F	Type of cooling	No.	Capacity each k.lb./hour	Type of firing	Fuel type
Arigna	Co. Roscommon	1	**15,000**	400	800	Lake	1	165	P.F.	Coal
Lanesborough	Co. Longford	1 1	20,000 40,000 **60,000**	400 900	800 950	River	1 1	220 380	Mech. Stoker P.F.	Sod Peat Milled Peat
Rhode	Co. Offaly	2 1	20,000 40,000 **80,000**	650 900	850 950	Tower	2 1	210 380	P.F.	Milled Peat
Bellacorick	Co. Mayo	2	20,000 **40,000**	650	850	Tower	2	210	P.F.	Milled Peat
Shannonbridge	Co. Offaly	1	**40,000**	900	950	River	1	380	P.F.	Milled Peat
Great Island	Co. Wexford	2	60,000 **120,000**	1,150	950	Estuarine	2	520	Oil-fired	Oil
Great Island (under construction)		1	120,000 **240,000**	1,800	995/995		1	835		
Tarbert	Co. Kerry	2	60,000 **120,000**	1,150	950	Estuarine	2	520	Oil-fired	Oil
Pigeon House "B" (under construction)	Dublin City	2	120,000	1,800	995/995	Estuarine	2	835	Oil-fired	Oil
		2	14,000 **268,000**	Gas turbine sets						

PERFORMANCE OF GENERATING PLANT

Year ended 31st March, 1970

Appendix 8

Hydro-electric Stations

Station	River	Rainfall at station	Total inflow*	Discharge through sets	Water utilisation	Average available head	Water per unit generated	Installed capacity	Units sent out	Plant load factor	Total cost per unit sent out
		millimetres	m³/sec	m³/sec	%	metres	m³	kW	millions	%	pence
ARDNACRUSHA	Shannon	854	132·5	121·6	99·6	28·2	15·4	85,000	244·7	33·3	0·536
POLLAPHUCA		927	8·0	6·3	100	49·0	9·8	30,000	19·2	7·7	
GOLDEN FALLS	Liffey	927	8·0	6·9	100	16·5	28·0	4,000	7·6	22·3	1·121
LEIXLIP		661	12·1	9·9	99·7	17·7	26·7	4,000	11·5	33·2	
CLIFF	Erne	965	80·8	77·1	99·8	12·3	35·0	20,000	68·3	39·4	0·592
CATHALEEN'S FALL				78·4	98·4	29·7	15·1	45,000	160·5	41·3	
CARRIGADROHID	Lee	969	16·0	15·5	99·7	14·3	29·7	8,000	16·5	24·2	1·491
INNISCARRA		915	19·4	18·9	99·4	33·1	13·1	19,000	44·5	27·2	
CLADY	Clady	1,506	3·8	3·2	98·7	—	7·5	4,000	13·3	38·3	1·689

The percentage utilisation of the total discharge is exclusive of river compensation water, and of the draw-off from the Rivers Liffey and Lee for water supply to local authorities as listed herewith:—

Dublin Corporation draw-off from Pollaphuca Reservoir which averaged 19·7 million gals. per day (1·03 m³/sec)
Dublin Co. Council draw-off from Leixlip Reservoir which averaged 6·5 million gallons per day (0·34 m³/sec)
Cork Co. Council draw-off from Inniscarra Reservoir which averaged 0·45 million gallons per day (0·024 m³/sec).

Shannon and Erne rainfall represent average of catchment area.

* *Based on discharge through sets*

PERFORMANCE OF GENERATING PLANT

Year ended 31st March, 1970

Steam Stations

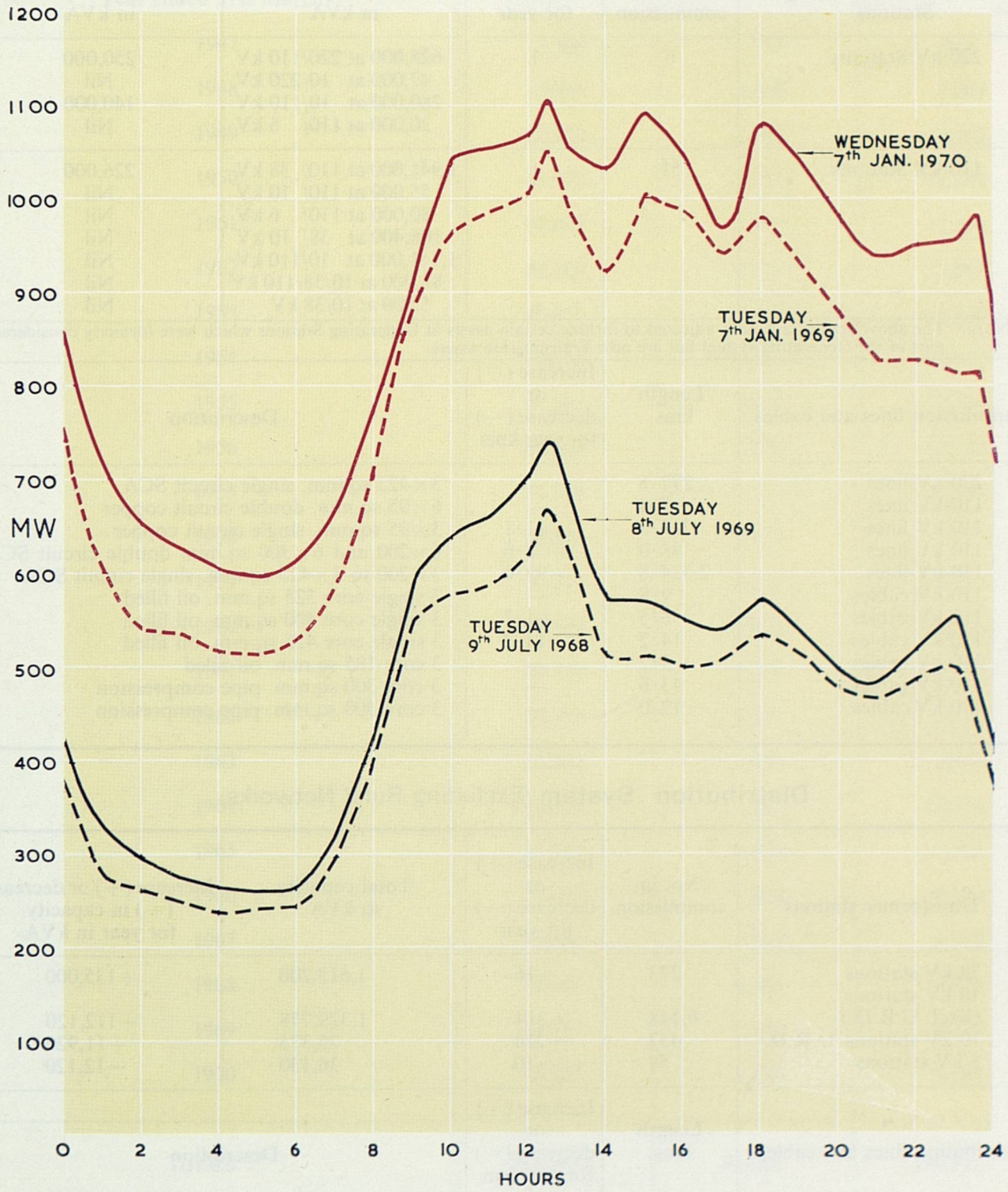
Station	Location	Installed capacity kW	Units sent out millions	Plant load factor %	Fuel type	Total fuel used tons thousands	Total fuel cost £	Fuel cost per unit sent out pence	Total cost per unit sent out pence
Pigeon House (Stand-by Station)	Dublin City	90,000	—	—	Oil	1·7	8,539	—	—
North Wall (Peak Station)	Dublin City	48,000	24·1	6·6	Oil	9·9	52,478	—	—
Portarlington	Co. Laoise	37,500	169·8	55·2	Sod Peat	205·7	725,800	1·026	1·503
Allenwood	Co. Kildare	40,000	206·3	62·7	Sod Peat	245·2	857,729	0·998	1·482
Marina	Cork City	120,000	487·6	48·9	Oil	134·3	680,553	0·335	0·714
Ringsend	Dublin City	270,000	1,255·9	56·3	Oil	341·3	1,764,402	0·337	0·672
Ferbane	Co. Offaly	90,000	392·9	54·0	Milled Peat Oil	726·9 5·5	1,374,476	0·840	1·357
Four 5 MW Stations	West Coast	20,000	30·8	19·6	Sod Peat	50·9	171,446	1·336	3·451
Lanesborough	Co. Longford	20,000 40,000	97·9 204·7	58·6 62·5	Sod Peat Milled Peat Oil	99·3 319·7 1·0	349,346 566,241	0·856 0·664	1·294 1·103
Arigna	Co. Roscommon	15,000	85·7	69·8	Coal Oil	52·5 0·3	324,775	0·910	1·446
Rhode	Co. Offaly	80,000	329·6	50·6	Milled Peat Oil	577·3 2·1	1,093,316	0·796	1·282
Bellacorick	Co. Mayo	40,000	165·9	50·9	Milled Peat Oil	297·8 1·1	555,189	0·803	1·438
Shannonbridge	Co. Offaly	40,000	195·7	59·7	Milled Peat Oil	289·2 1·0	544,772	0·668	1·165
Great Island	Co. Wexford	120,000	537·0	54·0	Oil	136·7	693,440	0·310	0·689
Tarbert	Co. Kerry	120,000	189·6	44·3	Oil	47·8	*	*	*

Milled and sod peat tons are for equivalent standard fuel of 55% and 35% moisture content respectively.

*Recently Commissioned

TYPICAL DAILY GENERATION LOAD CURVES

Appendix 9



Appendix 10

TRANSMISSION AND DISTRIBUTION SYSTEMS IN COMMISSION
At 31st March, 1970

Transmission System

Transformer/Switching Stations	No. in commission	Increase for year	Total capacity in kVA	Increase (=) or decrease (—) in capacity for year in kVA
220 kV Stations	6	1	628,000 at 220/110 kV	250,000
			47,000 at 10/220 kV	Nil
			280,000 at 10/110 kV	140,000
			20,000 at 110/ 6 kV	Nil
110 kV Stations	51	1	1,941,000 at 110/ 38 kV	226,000
			55,000 at 110/ 10 kV	Nil
			60,000 at 110/ 6 kV	Nil
			106,400 at 38/ 10 kV	Nil
			1,151,000 at 10/110 kV	Nil
			88,000 at 10/38/110 kV	Nil
			5,000 at 10/38 kV	Nil

NOTE: The above totals have been adjusted to include certain assets at Generating Stations which were formerly considered part of the Generating system but are now Transmission assets.

Transmission lines and cables	Length kms.	Increase (+) or decrease (—) for year kms.	Description
220 kV lines	277·5	—	3×425 sq.mm. single circuit SCA
110 kV lines	7·4	—	6×95 sq.mm. double circuit copper
110 kV lines	733·2	−11·1	3×95 sq.mm. single circuit copper
110 kV lines	88·0	+ 2·6	6×200 and 6×300 sq.mm. double circuit SCA
110 kV lines	2,324·8	+99·6	3×200 to 3×425 sq.mm. single circuit SCA
110 kV cables	9·8	—	3 single core 325 sq.mm. oil filled
110 kV cables	6·5	+1·7	3 single core 400 sq.mm. oil filled
110 kV cables	14·2	+14·2	3 single core 425 sq.mm. oil filled
110 kV cables	3·2	—	3 core 185 sq.mm. oil filled
110 kV cables	13·6	—	3 core 300 sq.mm. pipe compression
110 kV cables	12·0	—	3 core 500 sq.mm. pipe compression

Distribution System (Excluding Rural Networks)

Transformer stations	No. in commission	Increase (+) or decrease (—) for year	Total capacity in kVA	Increase (+) or decrease (—) in capacity for year in kVA
38 kV stations	273	+16	1,615,200	+135,000
10 kV stations (Excl. U.R.D.)	6,148	+314	1,329,778	+112,120
10 kV stations U.R.D.	452	+214	25,375	+11,920
5 kV stations	58	−10	36,130	−12,120

Distribution lines and cables	Length kms.	Increase (+) or decrease (—) for year km.	Description
38 kV lines	4,300·5	+63·7	3×25 to 3×300 sq.mm. Cu. and S.C.A.
38 kV cables	197·6	+10·1	3×95 to 3×680 sq.mm. Solid and oil filled.
10 kV lines	6,019·2	+59·9	Single and three phase.
10 kV and 5 kV cables	1,615·4	+107·8	2×16 to 3×185 sq.mm.
3·3 kV cables	3·7	—	3×185 sq.mm.

PROGRESS OF THE RURAL ELECTRIFICATION SCHEME

Appendix 11

Period	Poles Erected	kms. of line strung	Consumers Connected
Year ended 31st March			
1947	1,300	63	Nil
1948	15,986	1,160	2,203
1949	32,002	2,783	9,262
1950	40,972	3,352	13,688
1951	42,423	3,591	15,803
1952	46,008	3,967	18,067
1953	48,059	4,345	18,818
1954	68,382	6,065	23,477
1955	91,391	7,998	27,316
1956	112,616	9,994	34,257
1957	91,794	8,277	34,627
1958	61,696	5,371	17,725
1959	50,113	4,345	14,997
1960	47,982	4,171	13,458
1961	43,757	3,738	11,570
1962	30,155	2,651	9,515
1963	22,062	1,962	8,829
1964	29,616	2,497	10,820
1965	27,737	2,414	11,773
1966	21,219	1,820	9,882
1967	11,034	915	4,742
1968	16,665	1,284	8,075
1969	14,187	1,144	8,725
1970	14,833	1,173	9,164
TOTALS	981,989	85,080	336,793

TO THE MINISTER FOR AGRICULTURE AND FISHERIES

Report on Fisheries

In accordance with the provisions of Section 10 of the Electricity (Supply) (Amendment) Act, 1961, the Board presents the Annual Report on its fisheries and the Preservation and Operation of Fisheries Account (No. 5) for the year ended 31st March, 1970.

Development

The work on the expansion of the salmon fisheries in the River Shannon continued satisfactorily and the run of fish at Thomond Weir continued at the high level of recent years. An encouraging aspect is the increasing numbers of fin-clipped salmon (produced in the Board's own hatcheries) now being caught in the Board's commercial fisheries, and also by the netsmen operating in the estuary. Efforts are being made to obtain a full count of the numbers of these marked fish so that a proper evaluation of the development programme can take place.

The Board is seriously concerned at the continued exploitation of immature salmon on their feeding grounds in international waters, and notes with grave anxiety the continuing serious decline in the run of spring fish on the Shannon. This year's run was the smallest since counting commenced in 1940. The conservation of this depleted stock is a vital matter and is being considered in conjunction with the Limerick Fishery Board and the netting and sporting interests in the river. The Board is, therefore, glad to note that no increase has been permitted in the number of licences for drift netting off the mouth of the Shannon.

The Board's widespread fishery ownership imposes a special obligation in the public interest to ensure the long-term safety of those valuable natural resources. Special attention is being paid to the problems of the environment and, in particular, to the question of water pollution control in so far as it affects the Board's fisheries. The steady increase in industrialisation and mining activity in the Shannon catchment area in recent years has highlighted the necessity to safeguard the water's quality and purity. The Board has accordingly decided to set up a system for monitoring water quality and this is being introduced immediately in the Limerick area of the Shannon and in the Kilmastulla River, and can be extended to other areas as circumstances demand. Applications for permission to extract or discharge water are rigorously examined.

During Conservation Year a series of visits by fishery interests, angling clubs and school children to the Board's rearing station at Parteen was organized and a special brochure covering the fisheries activities was prepared; it has since been widely circulated and has attracted much favourable comment.

Steady progress continued in the development of the eel fisheries of the Shannon. The collection of elvers from the tidal tributaries was maintained and a continuing study is being made of the design, construction and operation of eel weirs at various sites. Successful commercial eel fishing depends on heavy flood conditions in the river and the water inflow in the Shannon at Killaloe during the autumn of 1969 was only 20% of the long term average. This very exceptional situation had an adverse effect on the runs of silver eels. Almost the total catch took place from mid-December onwards, after the end of the normal fishing season.

The work on the development of Pollaphuca Reservoir as a trout fishery continued and the Board acknowledges the practical assistance it is

obtaining from the local angling clubs in the removal of coarse fish from the lake. 100,000 fingerling trout were released this year and releases on this scale will be made each year in the expectation that a recreational amenity of great value will be established close to Dublin City.

Salmon Disease (U.D.N.)

This disease continued to affect fish in the Shannon, Erne, Liffey and Lee during the year, but once again the Clady was free of it. The number of diseased fish observed was less than previously and it is possible that the outbreak is now waning. The disease was first noticed in the Shannon in 1966 and the progeny of the 1966 salmon run are now returning as grilse.

Very few redds were reported on the Erne spawning grounds in Northern Ireland, and it is possible that the stocks in that river may be seriously affected.

Young salmon again showed no sign of disease and valuable stocks of brown trout, eels and coarse fish in the Shannon also appear to have escaped infection.

The Board continued to be represented on the Research and Co-ordinating Committees set up by the Minister to study this problem. Much valuable information, particularly in the field of fish culture treatments, has been provided by those studies and the Board continued to co-operate fully with the staff of the Veterinary Research Laboratory, the Fisheries Division, Department of Agriculture and Fisheries and the Universities, where work on this complex problem is continuing.

River Lee

The hydro-electric development on this river seriously affected the stocks of salmon and intensive experimental work has been in progress during the last few years to assess the best methods of rehabilitating the salmon fishery. The Board has now decided, following discussions with Fisheries Division, to construct a new rearing station for young salmon. This station, at Carrigadrohid, will have a capacity of 150,000 smolts per annum and will be used exclusively for the rebuilding of the Lee stocks. It is hoped to have it operational in 1971.

Hatcheries and Rearing Stations

It is extremely difficult to purchase adequate numbers of salmon ova to augment the Board's own hatchery production. In particular, it is almost impossible to obtain spring fish ova from known parentage. The small quantity, 50,000 ova, obtained last year from Canada is, therefore, very important and the young fish are being watched with great care. Consideration is being given to utilising the small run of spring fish in the Shannon to obtain optimum benefit. Fisheries Division again acted as a central agency for the importation of ova from disease free sources and the Board received the following allotments:

Salmon:	Iceland	135,000
	Irish Sources	283,000
Sea Trout:	Poland	20,000

Over the last two years an increasing number of fin-clipped salmon have been used for breeding, as studies, both in Ireland and abroad, show that selective breeding stock gives the best rates of survival and returning adults. In consequence, fin-clipped fish stocks assume increasing importance. The total number of ova hatched out was as follows:

Hatchery	*Salmon Ova*
Shannon (Parteen)	1,578,000
Lee (Carrigadrohid)	220,000

At Parteen the Board is now producing approximately 200,000 salmon smolts annually, in addition to ova and fry. At the request of Fisheries Division 5,000 smolts were tagged as part of Ireland's contribution to the international tagging programme designed to evaluate the effects of the high seas fishing off the coast of Greenland.

Fry and smolts were distributed in the following rivers and tributaries: Shannon (below Parteen), Mulcair, Maigue, Nenagh, Suck, Inny, Silver, Feale, Lee (below Inniscarra Dam), tributaries of Lee, and Liffey.

Planting out young trout in Pollaphouca.



Trout underyearlings and yearlings were released in Pollaphuca, Lough Derg and the Shannon in the Limerick area.

Commercial Fishing

Salmon: Commercial fishing was again carried out on the Shannon, Erne and Clady. Exceptionally high prices were obtained for salmon and the revenue increased to a record £41,000.

Eels: Because of the adverse conditions for eel fishing, referred to earlier, the catch of eels was disappointing and revenue, at £19,000, was below that of recent years.

Negotiations on a long outstanding dispute with the long line eel fishermen on the Shannon were completed satisfactorily and the Board paid compensation to the men involved amounting to £73,095. As a result the Board looks forward to an increase in future years in its catch of silver eels.

Angling: The exceptionally dry weather conditions militated against salmon angling on the Mulcair and the midland rivers despite the heavy stocks of fish. On the other hand, excellent results were achieved at Castleconnell, where the water levels are not subject to change. The Board believes that angling in the midlands and on the Erne and Clady Reservoirs could provide a very attractive tourist amenity and discussions have taken place with Bord Failte regarding the development of this potential.

Counting of Salmon

The numbers of salmon counted in the last two years were as follows:

	1969	1968
River Shannon		
Thomond Weir, Limerick	20,141	17,352
Ardnacrusha Fish Pass	6,893	6,238
Parteen Fish Pass	402	611
River Lee		
Inniscarra Fish Pass	65	81
Carrigadrohid Fish Pass	14	7
River Erne		
Cathaleen's Fall Fish Pass	5,262	8,690
River Clady		
Gweedore Weir	880	750
River Liffey		
Leixlip Weir	766	559

Financial

The financial aspects of the fisheries activities on the five river systems directly affected by hydro-electric development are shown in Account No. 5.

Revenue increased by £7,000 to £62,742 and expenditure by £8,000 to £103,311.

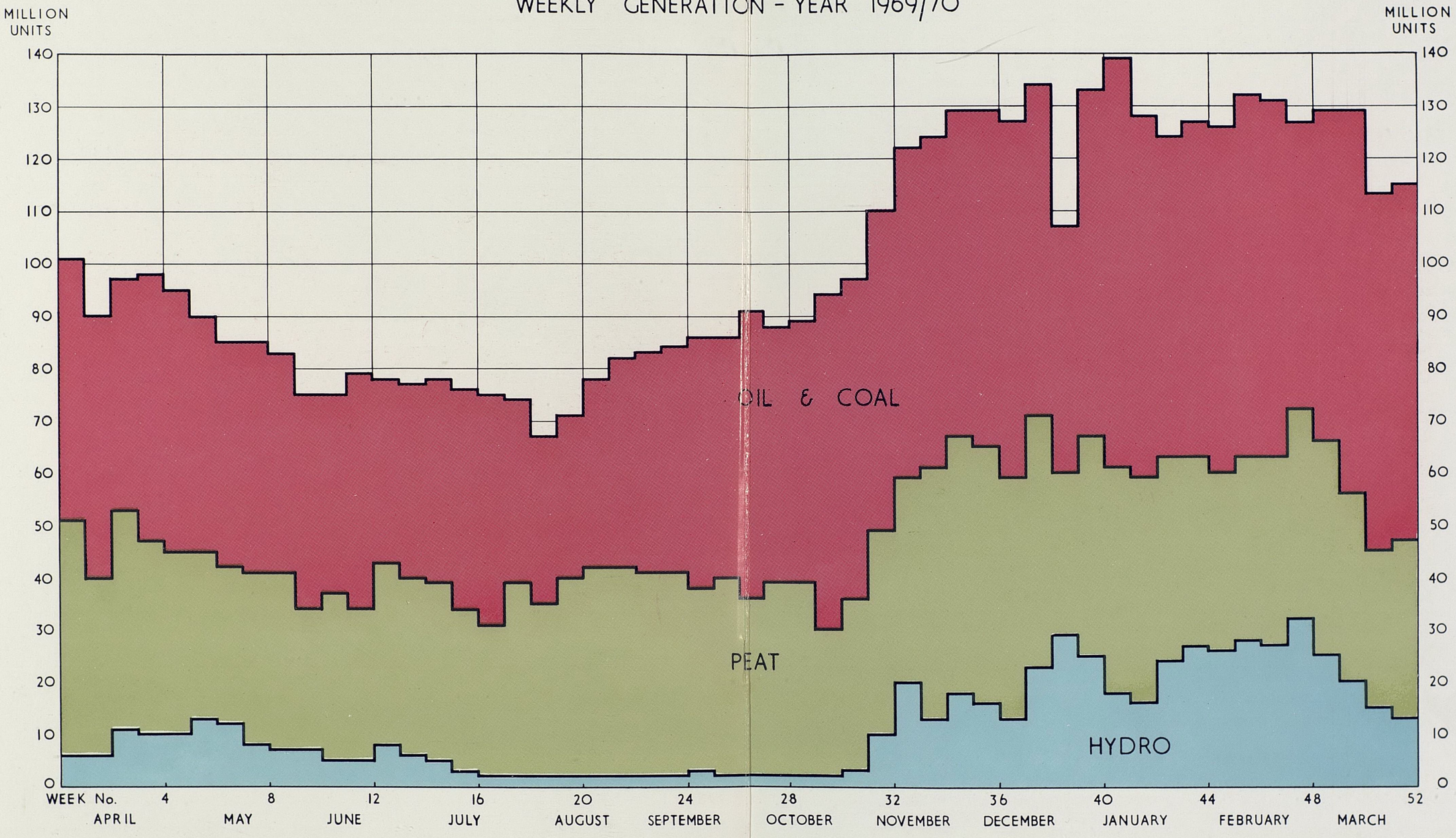
The Board gratefully acknowledges the assistance received from the officers of Fisheries Division, from the Ministry of Agriculture for Northern Ireland, the Inland Fisheries Trust Incorporated, and from the Boards of Conservators and local angling clubs.

(Signed) *T. Murray,* CHAIRMAN
C. Gordon Lambert
T. MacMahon
B. Ó Cearbhaill
J. A. Ryan

(Signed) *J. G. Gargan,* SECRETARY
29th September, 1970.

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WEEKLY GENERATION - YEAR 1969/70



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