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PRODUCTION AND USE OF ELECTRIC ENERGY IN CANADA

1929

The output of central electric stations during 1929 amounted to over 18,014 million kilowatt hours including an estimate for small stations which do not report monthly. The large stations, which generate between 97 and 98 per cent of the total, reported 17,625,900,059 kilowatt hours, or an increase of 10.6 per cent over the 1928 output and almost double the output for 1924.

The rapid increase in the production of electric energy by central electric stations is largely due to the growth of the pulp and paper industry. In 1924 the motors in the pulp and paper mills operated on power purchased from central electric stations had a rated capacity of 315,464 horse power, or 12.4 per cent of all power equipment in manufacturing industries, (the central electric station industry excluded) and in 1927 their rated capacity had more than doubled, increasing to 789,530 horse power, which was 24 per cent of the total power for all industries. Also the pulp and paper industry has been using an increasing amount of electricity for heating water and practically all the electric energy is used 24 hours per day throughout the year as against an average working day for other manufactures of 8 to 9 hours. Although the low rates are important factors in increasing the average consumption per capita for all purposes to 1845 kilowatt hours, which is more than twice the average in the United States and almost 10 times the average in Great Britain, the large consumption by the pulp and paper industry is the main factor.

Other factors entering into the relative per capita consumption of electric energy in Canada and the United States are the costs of fuel and the water power developments. Cheap fuel in the United States tends to increase the proportion of industries producing their own power instead of purchasing it from central electric stations and large hydro electric plants in Canada located in the industrial sections tend to increase the proportion of industries purchasing power. In Canada 98 per cent of the output of central electric stations in 1929 was from water power whereas in the United States the proportion was only 36 per cent and in the United States the capacity of motors operated on purchased power in all industries was only 44 per cent of the total power employed in 1925 (the latest year for which data are available), whereas in Canada the proportion for 1925 was 51 per cent and for 1927 it had increased to 59 per cent.

Although practically every urban municipality in Canada is served with electricity from 600 central electric station power plants, twenty-one organizations and their subsidiaries produce over 90 per cent of the total for the industry. The Ontario Hydro Electric Power Commission, serving the greater part of Ontario, produced 24 per cent of the total for Canada, and the systems of the Ontario Hydro Electric Power Commission, Shawinigan Water and Power Company, Duke Price Power Company, Gatineau Power Company and the Montreal Light Heat and Power Company produced over 12 billion kilowatt hours, or 67 per cent of the total. The output of these twenty-one systems, arranged in order of magnitude of output, is shown on page 6.

The average daily outputs of the large stations for each month 1925-1929 have been plotted on page 8 and the trend as indicated by the moving twelve month average has also been plotted. The projection of the trend, based on information available on plants and additions which will be completed during 1930 and 1931, indicates an average daily output for 1930 of 53 million kilowatt hours as against 48 million for 1929.

During 1929 the export of electricity to the United States amounted to 1,444,208,440 kilowatt hours, or approximately 8 per cent of the total output. Of this, 297,195,592 kilowatt hours was surplus power exported by the Ontario Hydro Electric Power Commission and the Canadian Niagara Power Company from the Niagara plants. The imports were small, amounting to only 6,015,519 kilowatt hours.

The tables on page 7 show the total power employed in Canadian industries for 1927. This power is the rated capacity of water wheels and turbines of 587,595 horse power, steam engines and turbines of 718,157 horse power, internal combustion engines of 57,143 horse power and motors operated on power purchased from central electric stations of 1,924,687 horse power, making the total power employed 3,287,582 horse power. The rating of motors operated on power generated by the industries themselves is also shown which, added to the ratings of the motors operated on purchased power, is the total electric motor power employed. This total electric motor power divided by the total power employed is the per cent of electric power employed. There is a slight error in this computation caused by plants generating their own electric energy having motor capacity greater than the capacity of their prime movers. There is no error in considering such plants as 100 per cent electrified, but the surplus motor capacity affects the ratio of plants operating entirely on thermal or hydraulic power. The error, however, is small since the capacity of the motors operated on power generated by the industries was less than 12 per cent of the total power employed and consequently an allowance of 50 per cent for an over-installation of motor power would reduce the ratio of electric motors to total power by only 3 points.

The industries as a whole show that 70 per cent of the power employed was electric motors and several industries operated entirely on electric energy, the three large industries being the automobile, cement and printing and book binding industries. There were many industries for which over 90 per cent of the power employed was electric power and there were also many individual plants operating entirely on electric energy even in industrial groups showing ratios of 90 per cent or lower. A rather significant feature of the table is the large percentage of electric energy employed in coal mines and gas and oil industries.

KILOWATT HOURS GENERATED BY PROVINCES

1929

Province	Water	Fuel	Total
Prince Edward Island	-	1,968,769	1,968,769
Nova Scotia	88,767,170	17,657,279	106,424,449
New Brunswick	96,433,384	29,273,095	125,706,479
Quebec	8,677,204,000	91,525	8,677,295,525
Ontario	6,138,487,711	8,804,200	6,147,291,911
Manitoba	1,109,129,650	5,072,500	1,114,202,150
Saskatchewan	-	109,051,667	109,051,667
Alberta	107,285,367	95,933,524	203,218,891
British Columbia	1,077,128,505	63,611,763	1,140,740,268
Total	17,294,435,787	331,464,322	17,625,900,109

KILOWATT HOURS EXPORTED

1929

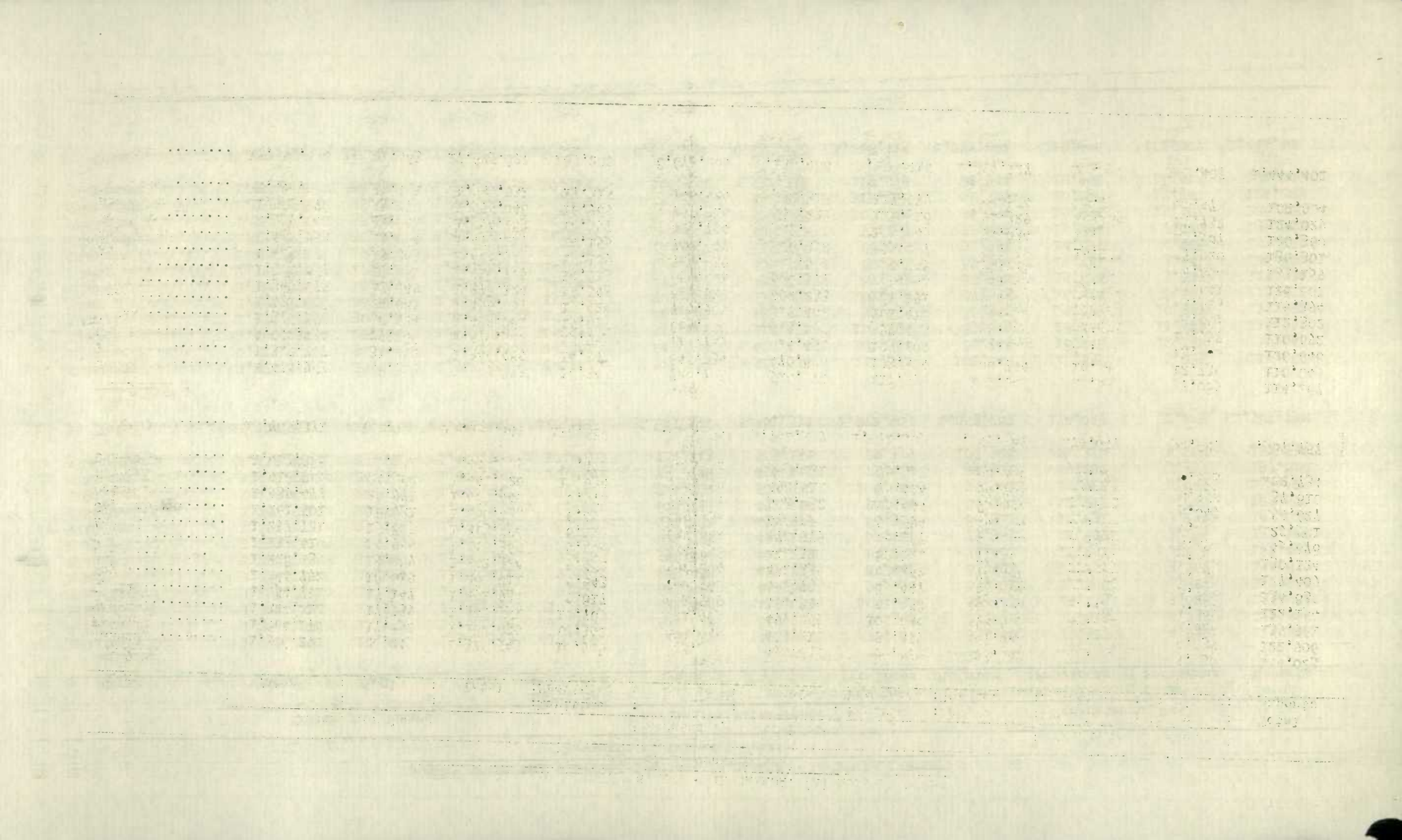
	Total
Hydro Electric Power Commission of Ontario	390,199,400
" " " " " " (Surplus)	297,106,592
Cedars Rapids Manufacturing & Power Company, Ltd.	431,481,998
Canadian Niagara Company	289,264,917
" " " (Surplus)	89,000
Western Power Company	359,850
Ontario and Minnesota Power Company	15,413,600
Maine & New Brunswick Electric Power Company	10,353,937
British Columbia Electric Company	706,507
West Kootenay Company) Northport Power & Light Company)	377,972
Maritime Electric Company	919,799
Sherbrooke Railway & Power Company	385,214
International Electric Company Northern B.C. Power Company	26,780
International Railway Company	201,374
Fraser Companies, Ltd.	7,321,500
Total	1,444,208,440

OUTPUT OF CENTRAL ELECTRIC STATIONS IN CANADA. (A) MONTHLY OUTPUT

(Thousands of Kilowatt Hours)

Month	Totals for Canada			Generated by Water-Power					Generated by Fuel		Total Exports
	Water	Fuel	Total	Maritime Provinces	Quebec	Ontario	Prairie Provinces	British Columbia	Prairie Provinces	Other Provinces	
1928											
January	1,306,298	20,245	1,326,543	10,908	613,339	492,035	96,676	93,340	15,315	4,930	124,023
February	1,264,178	17,852	1,282,030	10,342	604,439	469,216	92,359	87,822	13,613	4,239	122,906
March	1,324,612	17,939	1,342,551	10,785	621,465	499,059	100,638	92,665	14,113	3,826	135,961
April	1,254,791	17,147	1,271,938	9,817	601,969	464,846	92,658	85,501	13,750	3,397	122,154
May	1,264,792	16,019	1,280,811	9,643	600,568	487,733	85,447	81,401	12,257	3,762	134,830
June	1,228,235	14,089	1,242,324	9,452	596,804	462,239	83,252	76,488	11,251	2,838	127,409
July	1,233,410	14,955	1,248,365	9,266	614,556	448,102	82,121	79,365	11,699	3,256	130,124
August	1,297,731	15,825	1,313,556	8,212	637,862	478,979	86,367	86,311	12,631	3,194	145,678
September	1,261,501	18,931	1,280,432	6,455	608,132	472,256	90,594	84,064	12,911	6,020	129,501
October	1,439,477	20,971	1,460,448	8,571	724,509	503,032	108,044	95,321	15,922	5,049	154,627
November	1,416,958	24,562	1,441,520	10,834	737,298	498,711	75,414	94,701	19,207	5,355	137,810
December	1,413,388	27,541	1,440,929	12,401	714,213	505,131	79,335	102,308	21,378	6,163	122,734
Total	15,705,371	226,076	15,931,447	116,686	7,675,154	5,781,339	1,072,905	1,059,287	174,047	52,029	1,587,757
1929 #											
January	1,478,953	28,920	1,507,873	14,242	728,703	516,574	117,592	101,842	21,835	7,085	114,267
February	1,315,207	31,282	1,346,489	14,341	645,934	470,824	103,364	80,744	18,546	12,736	110,645
March	1,440,734	29,786	1,470,520	15,995	714,729	514,451	105,704	89,855	18,206	11,580	126,648
April	1,378,557	30,524	1,409,081	15,677	685,180	493,997	97,453	86,250	19,527	10,997	110,692
May	1,431,806	24,881	1,456,687	15,424	709,909	517,402	101,418	87,653	16,414	8,467	112,302
June	1,360,875	17,249	1,378,124	14,543	677,920	492,233	87,191	88,988	13,626	3,623	119,394
July	1,392,857	17,852	1,410,709	14,813	696,621	506,577	86,941	87,905	14,211	3,641	128,601
August	1,425,572	19,363	1,444,935	15,109	713,519	515,964	88,049	92,931	14,897	4,466	133,159
September	1,455,053	22,064	1,477,117	14,155	746,647	506,352	95,257	92,642	15,044	7,020	136,301
October	1,559,042	35,241	1,594,283	16,597	813,794	529,568	105,049	94,034	19,654	15,587	126,360
November	1,559,178	35,870	1,595,048	16,989	797,314	542,228	111,318	91,329	18,138	17,732	124,029
December	1,496,600	38,431	1,535,031	17,315	746,934	532,318	117,079	82,954	19,958	18,473	102,004
Total	17,294,434	331,463	17,625,897	185,200	8,677,204	6,138,488	1,216,415	1,077,127	210,056	121,407	1,444,402

Revised data.



(B) AVERAGE DAILY OUTPUT
(Thousands of Kilowatt Hours)

Month	Totals for Canada			Generated by Water Power					Generated by Fuel		Total Exports
	Water	Fuel	Total	Maritime Provinces	Quebec	Ontario	Prairie Provinces	British Columbia	Prairie Provinces	Other Provinces	
1928											
January	42,138	653	42,791	352	19,785	15,872	3,118	3,011	494	159	4,001
February	43,592	615	44,207	357	20,843	16,179	3,185	3,028	469	146	4,238
March	42,729	579	43,308	348	20,047	16,099	3,246	2,989	455	124	4,386
April	41,826	571	42,397	327	20,066	15,494	3,089	2,850	458	113	4,072
May	40,799	517	41,316	311	19,373	15,733	2,756	2,626	396	120	4,349
June	40,941	470	41,411	315	19,893	15,409	2,775	2,549	375	95	4,247
July	39,787	482	40,269	299	19,824	14,455	2,649	2,560	377	105	4,198
August	41,862	510	42,372	265	20,576	15,450	2,786	2,785	407	103	4,699
September	42,050	631	42,681	215	20,271	15,742	3,020	2,802	431	200	4,317
October	46,435	676	47,111	276	23,371	16,228	3,485	3,075	514	162	4,985
November	47,232	819	48,051	361	24,576	16,624	2,514	3,157	640	179	4,575
December	45,593	888	46,481	400	23,040	16,294	2,559	3,300	695	199	3,959
Average	43,028	619	43,647	320	21,028	15,839	2,939	2,902	477	142	4,350
1929 #											
January	47,708	933	48,641	459	23,507	16,664	3,793	3,285	704	229	3,689
February	46,971	1,117	48,088	512	23,069	16,815	3,691	2,884	662	455	3,952
March	46,475	961	47,436	516	23,056	16,595	3,410	2,898	587	574	4,085
April	45,952	1,017	46,969	523	22,839	16,467	3,248	2,875	651	366	3,690
May	46,187	803	46,990	498	22,900	16,690	3,272	2,827	530	273	3,628
June	45,362	575	45,937	485	22,597	16,408	2,906	2,966	454	121	3,980
July	44,931	575	45,506	478	22,472	16,341	2,804	2,836	458	117	4,148
August	45,986	624	46,610	487	23,017	16,644	2,840	2,998	480	144	4,295
September	48,502	735	49,237	472	24,888	16,879	3,175	3,088	501	234	4,543
October	50,291	1,137	51,428	535	26,251	17,083	3,389	3,033	634	503	4,076
November	51,973	1,195	53,168	566	26,577	18,074	3,711	3,045	604	591	4,134
December	48,278	1,239	49,517	558	24,095	17,172	3,777	2,676	643	596	3,290
Average	47,382	908	48,290	507	23,773	16,818	3,333	2,951	575	333	3,957

Revised data.

OUTPUT OF 21 LARGEST CENTRAL ELECTRIC STATION SYSTEMS
IN CANADA

1 9 2 9

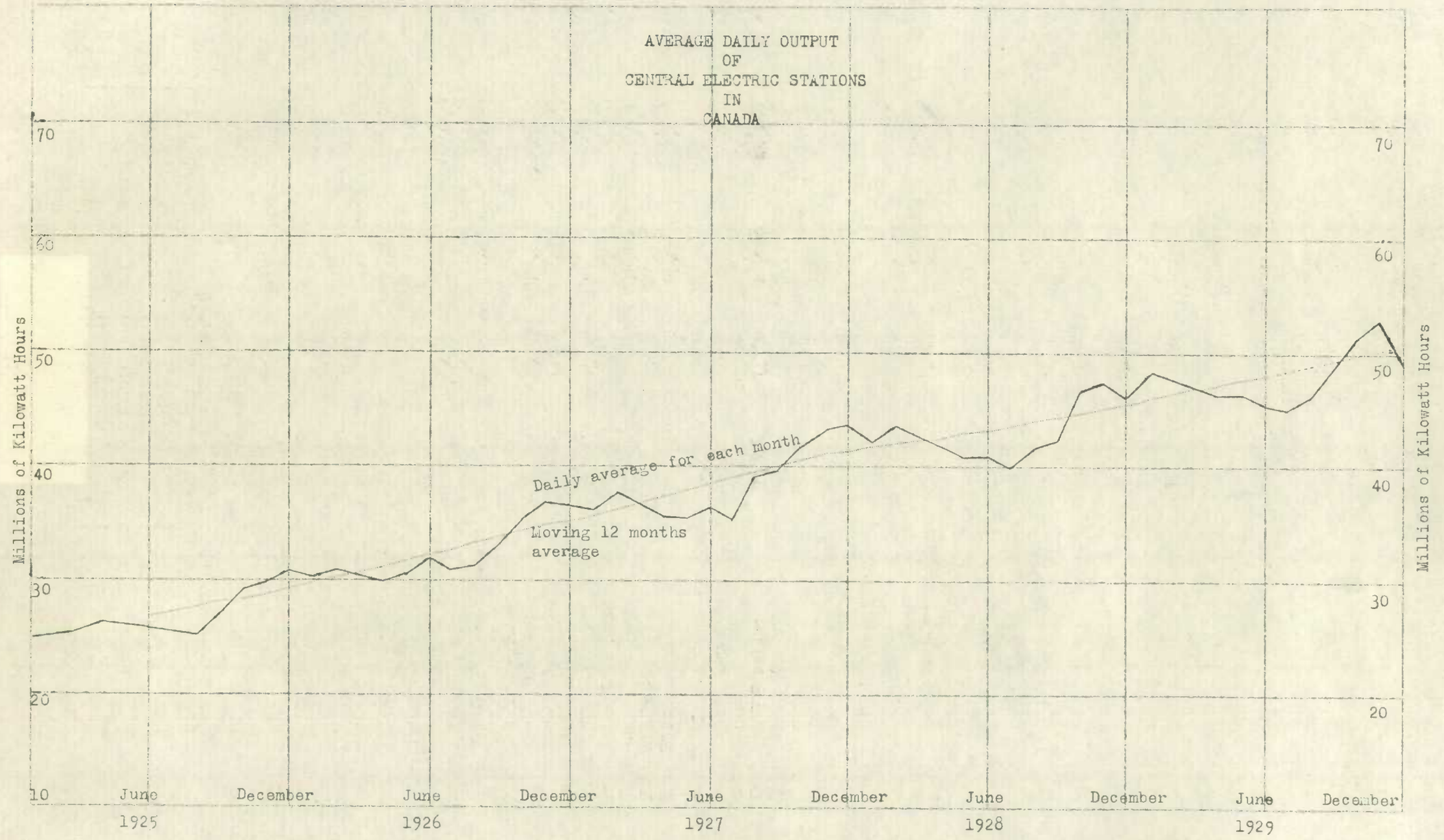
		Kilowatt Hours Generated
Hydro Electric Power Commission of Ontario		4,354,588,058
Shawinigan Water and Power Company	2,765,816,410	
Quebec Power Company	150,743,120	2,991,186,430
Canadian Light and Power Company	74,626,900	
Duke Price Power Company		2,092,418,376
Gatineau Power Company	1,276,625,299	1,586,205,799
Ottawa and Hull Power Company	309,580,500	
Montreal Light, Heat and Power Company		1,060,362,170
Winnipeg Electric Company) Manitoba Power Company)		703,975,000
Canadian Niagara Power Company		632,276,400
West Kootenay Power Company		541,334,100
British Columbia Electric Company	66,689,246	
Vancouver Power Company	108,237,600	429,533,366
Western Power Company	254,606,520	
Winnipeg Hydro Electric System		405,154,650
Canada Northern Power Corporation		347,797,680
Dominion Power and Transmission Company		184,651,700
Price Brothers and Company		175,316,152
Southern Canada Power Company		144,618,610
The Huronian Power Company		113,726,600
The Great Lakes Power Company		108,254,632
Calgary Power Company		105,388,717
Ontario and Minnesota Power Company		98,405,000
Kaministiquia Power Company		83,626,000
East Kootenay Power Company		78,795,200
Nova Scotia Power Commission		70,199,200
TOTAL		16,307,813,840

POWER EQUIPMENT OF MANUFACTURING INDUSTRIES #
IN CANADA

1927

INDUSTRIES	Total Power Employed	Electric Motors Operated: By Power Generated in the Industries	Electric Motors Operated: By Purchased Power	Electric Motors Operated: Total Motor Capacity	Per cent Electric Power Employed
	H.P.	H.P.	H.P.	H.P.	
Group I - Vegetable Products	280,170	22,905	172,197	195,102	70
Flour Mills	83,948	2,578	49,804	52,382	62
Feed and Grist Mills	33,457	107	7,339	7,446	22
Rubber Goods	37,052	60	34,661	34,721	94
Sugar Refineries	18,565	11,658	5,066	16,724	90
Breweries	19,977	1,295	12,775	14,070	90
Group II - Animal Products	101,650	2,848	68,063	70,911	70
Butter and Cheese	23,560	-	15,353	15,353	65
Slaughtering & Meat Packing	34,087	775	27,064	27,839	82
Group III - Textiles and Textile Products	157,055	20,862	99,199	120,061	76
Cotton Yarn and Cloth	76,243	17,038	40,454	57,492	75
Hosiery, Knit Goods & Gloves	16,037	1,043	9,221	10,264	64
Group IV - Wood & Paper Products	1,770,909	229,497	922,626	1,152,123	65
Furniture & Upholstering	19,631	2,436	8,007	10,443	53
Boxes & Packing Cases	13,701	867	5,669	6,536	48
Planing Mills	55,022	1,689	27,217	28,906	52
Printing & Book Binding	8,658	246	8,386	8,632	100
Printing and Publishing	17,502	2	15,369	15,371	88
Pulp and Paper	1,309,966	198,116	789,530	987,646	75
Saw Mills	308,251	24,330	43,777	68,107	22
Group V - Iron & Steel Products	451,576	67,176	288,945	356,121	79
Agricultural Implements	21,212	433	14,267	14,700	69
Automobiles	23,188	23,706	7,473	31,179	100
Castings & Forgings	50,516	1,370	43,159	44,529	88
Hardware and Tools	16,389	276	14,120	14,396	88
Machinery	28,559	4,385	21,706	26,091	91
Railway Rolling Stock	90,114	4,855	69,158	74,013	82
Steel & Rolled Products	174,941	25,469	79,224	104,693	60
Group VI.- Non-Ferrous Metal Products	237,520	29,046	148,692	177,738	75
Brass and Copper Goods	15,261	239	13,993	14,232	93
Electrical Apparatus&Supplies	43,298	9,301	33,106	42,407	98
Non-Ferrous Metal Smelting and Refining	172,182	19,506	94,859	114,365	66
Group VII - Non-Metallic Mineral Products	160,196	11,039	129,131	140,170	87
Cement	64,986	1,900	64,555	66,455	100
Clay Products	24,445	69	15,548	15,617	64
Petroleum Products	21,852	1,702	8,868	10,570	48
Group VIII - Chemicals and Chemical Products	65,898	3,132	41,385	44,517	67
Group IX - Miscellaneous Industries	62,608	50	54,449	54,499	87
Shipbuilding & Repairs	25,580	-	22,483	22,483	88
Bridge Building	13,723	-	13,499	13,499	98
Total All Industries (Central Electric Stations excluded)	3,287,582	386,555	1,924,687	2,311,242	70
MINING INDUSTRIES x					
Metal Mining	162,677	7,003	122,771	129,774	80
Coal, Gas, Petroleum Mining	139,923	52,348	20,908	73,256	52
Other Non-Metal Mining (excluding Salt)	45,832	1,723	38,672	40,395	88
Sand, Gravel and Stone	32,028	993	20,351	21,344	67
Total Mining	380,460	62,067	202,702	264,769	69

Central Electric Stations not included. x Excluding cement, salt and other composite mining and manufacturing industries included with manufactures.


AVERAGE DAILY OUTPUT
OF
CENTRAL ELECTRIC STATIONS
IN
CANADA
Millions of Kilowatt Hours
70
60
50
40
30
20
10
Daily average for each month
Moving 12 months
average
June
December
1925
1926
1927
1928
1929