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PRODUCTION AND USE OF ELECTRIC ENERGY IN CANADA

1 9 3 2

The output of central electric stations in Canada during 1932 amounted to 16,007,119,000 kilowatt hours, including an estimate of 140,652,000 kilowatt hours for small stations which do not make monthly reports but which generate less than one per cent of the total output. This total was divided into 15,687,242,000 kilowatt hours produced by water power and 319,877,000 kilowatt hours produced by thermal engines. The total output shown in the annual report on central electric stations for 1931 was 16,330,867,000 kilowatt hours, or 323,748,000 kilowatt hours more than this estimate for 1932. The annual report and the totals of the monthly reports for 1931 do not agree on account of corrections made in the annual figures due almost entirely to the manner in which the power was used.

The exports to the United States amounted to 659,901,000 kilowatt hours in 1932 (excluding 7,979,000 kilowatt hours exported by a pulp mill) and 1,227,036,000 kilowatt hours in 1931, or a decrease in 1932 of 567,135,000 kilowatt hours, which more than accounted for the decrease in production.

The amount of electric energy used in Canada, including all line losses, actually increased from 15,103,831,000 kilowatt hours in 1931 to 15,347,218,000 kilowatt hours, or by 243,387,000 kilowatt hours or 1.6 per cent. The significance of this improvement is more apparent when comparisons are made of the coal consumption during 1931 and 1932. The bituminous and lignite coal available for consumption in 1931 was 22,237,000 tons and in 1932, 19,973,000 tons, which was a decrease in 1932 of 2,264,000 tons, or 10.2 per cent. Of course, all this coal was not used for power purposes, but it is quite probable that the coal used for heating buildings showed a smaller rate of decrease than the coal used for power. It is also probable that, aside from the increased use of electricity for domestic use, there was an increased switch from steam to electric drive and also an increased use of surplus power for producing steam. The compilations for 1932 are not yet complete, but in 1931 electric boilers in the pulp and paper industry, having a total rated capacity of 883,450 kilowatts, used 2,032,283,000 kilowatt hours purchased from central electric stations.

Table 1 shows the production of electric energy in each province by the stations making monthly reports. The large decrease was in Ontario where the total was 607,861,000 kilowatt hours, or 12.8 per cent less than in 1931. Over half of this decrease was in exported power from Ontario plants which was reduced by 43 per cent. During 1930 the Niagara plants exported 402,317,877 kilowatt hours of off-peak power, in 1931, 170,783,243 kilowatt hours, and in 1932, only 234,685 kilowatt hours. This loss was, of course, due entirely to industrial conditions on the United States side of the river. Quebec plants showed an increased production of 171,022,614 kilowatt hours, or 2.1 per cent, despite a reduction in exports to the United States of 209,036,990 kilowatt hours. The exports to Ontario, however, increased from 1,319,937,882 kilowatt hours in 1931 to 1,583,467,382 kilowatt hours in 1932, or by 20 per cent. Manitoba, Alberta and British Columbia showed decreases of 6.3, 1.1 and 3.6 per cent, respectively, in production, but the other four provinces showed increases.

Table 2.- The exports are the quantities measured at point of exit on the international boundary and do not include line losses from the power house to the export point, which run up to 5 per cent of the production for export.

Table 3.- The monthly production data are published each month by the Bureau. Upon checking the annual productions with the monthly figures small errors were discovered, caused mainly by including "station use" energy in the output figures. Since the errors were small it was considered better to leave the monthly records undisturbed and show these corrections as "undistributed."

Table 4.- The average daily outputs are the monthly outputs divided by the number of days in each month. Although this treatment corrects the effect of the unequal number of days in months, it does not correct for holidays nor for the unequal number of Sundays, Saturdays and other week days in each month. The relative number of Sundays and Saturdays in a month has a very appreciable effect on the production of electric energy, as also have the holidays and the location of the holidays. On account of the more or less general custom of closing factories Saturday afternoon, the power consumption is less on Saturdays than on other week days and considerably less on Sundays and holidays than on week days. July 1932 contained five Saturdays and five Sundays with the holiday, July 1, falling on Friday which quite probably affected the power consumption on the following Saturday. July 1931 contained only four Saturdays and four Sundays and the holiday fell on Wednesday. Consequently the output on each day of the week might have been the same in each year, but the total and daily average in 1932 would have been lower than in 1931 due entirely to defects in the calendar. The averages for the year are not so materially affected.

Table 5.- The twenty-five largest stations produced over 95 per cent of the total output and four of them produced 61 per cent. The Beauharnois Light, Heat and Power Company started operation in October. With a full year's operation it will move up on the list. The output of the Hydro Electric Power Commission of Ontario includes the total output of the plant at Chats Falls on the Ottawa river owned jointly by the Commission and the Ottawa Valley Power Company. The entire output of this plant is consumed on the Ontario side of the river.

Table 6.- The increasing use of electric drive is indicated by the steadily increasing ratio of rated capacity of electric motors in manufacturing industries to total capacity of power equipment. These ratios have increased from 61 per cent in 1923 to 76 per cent in 1931 with scarcely a halt, and are as follows:

1923	61 per cent	1926	69.0 per cent	1929	74.7 per cent
1924	65 " "	1927	70 " "	1930	74.0 " "
1925	68.7 " "	1928	72 " "	1931	76 " "

There is an error in these ratios in as much as an industry generating its own electricity might have motor capacity much in excess of the capacity of the prime movers and while it is correct to consider such an industry as 100 per cent electric drive, the excess is credited to other plants without electric drive or with less than 100 per cent in computing the subtotals and grand total ratios. The ratios, however, are closely relative and do indicate the great and rapid growth of electricity for power purpose in Canadian industry as a whole and in particular industries. The data in table 6 are for all manufacturing industries by groups and the data for only the large power consuming industries in each group have been shown. There were, however, many smaller industries which used electric energy entirely as a source of power and many more which were above 90 per cent electric drive.

Table 7.- The mining industries showed an increase over 1930 in total power equipment, also in total motor capacity, and the percentage of electric drive of 75.5 was only slightly under the ratio for 1930. The non-metal mining showed a reduction in total power, motor capacity and in ratio of motor capacity to total power capacity.

Table 8.- Manufacturing industries in Ontario contained more power equipment and a greater motor capacity than in any of the other provinces, but Manitoba showed the highest ratio of electric drive. This is due to the concentration of manufactures in Winnipeg which has an abundant supply of hydro-electric power. The industries included in tables 6, 7, and 8 were only the plants operating during the year and these tables do not include equipment in plants that were idle throughout the year.

22/5/33-350

Table 1. KILOWATT HOURS GENERATED BY PROVINCES

1 9 3 2

Province	Water	Fuel	Total
Prince Edward Island ...	.....	3,564,831	3,564,831
Nova Scotia	190,741,876	84,848,570	275,590,446
New Brunswick	389,490,410	35,978,786	425,469,196
Quebec	8,457,731,359	24,900	8,457,756,259
Ontario	4,149,658,698	64,100	4,149,722,798
Manitoba	894,899,908	959,500	895,859,408
Saskatchewan	187,334,650	133,825,033	321,159,683
Alberta	143,851,231	49,471,439	193,322,670
British Columbia	1,142,614,275	1,408,280	1,144,022,555
TOTAL	15,556,322,407	310,145,439	15,866,467,846

Table 2. KILOWATT HOURS EXPORTED

1 9 3 2

	Total
Hydro Electric Power Commission of Ontario	350,019,900
" " " " " " (Surplus)	219,385
Cedars Rapids Manufacturing and Power Co.,Ltd.	180,076,312
Canadian Niagara Company	103,049,092
" " " (Surplus).....	15,300
Ontario and Minnesota Power Company	13,329,550
Maine and New Brunswick Electric Power Company	11,434,344
British Columbia Electric Company	141,055
Northport Power and Light Company	239,668
Maritime Electric Company	320,752
Sherbrooke Railway and Power Company	423,016
Northern B.C. Power Company	50,690
International Railway Company	210,121
Fraser Companies, Limited	7,979,000
Detroit and Windsor Subway Company	371,900
TOTAL	667,880,085

Table 3.

OUTPUT OF LARGE 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	
1 9 3 1											
January	1,456,326	32,395	1,488,721	44,394	735,385	469,438	104,099	103,010	20,187	12,208	162,443
February	1,311,136	27,851	1,338,987	31,097	674,560	422,213	88,481	94,785	17,298	10,553	145,498
March	1,391,982	25,576	1,417,558	34,338	703,708	451,912	95,991	106,033	15,992	9,584	127,985
April	1,388,034	23,056	1,411,090	52,154	717,900	415,482	101,539	100,959	13,360	9,696	97,677
May	1,342,940	22,846	1,365,786	53,433	693,853	394,243	102,640	98,771	12,781	10,065	86,824
June	1,267,869	21,959	1,289,828	52,675	638,719	379,568	101,337	95,570	12,139	9,820	88,602
July	1,230,622	20,700	1,251,322	50,712	620,634	369,294	100,480	89,502	12,297	8,403	95,085
August	1,234,266	21,883	1,256,149	44,924	644,446	352,877	98,119	93,900	12,905	8,978	99,780
September	1,263,412	25,001	1,288,413	46,251	662,400	355,122	102,835	96,804	13,436	11,565	93,288
October	1,400,704	27,638	1,428,342	55,743	736,381	384,065	123,087	101,428	15,332	12,306	95,423
November	1,385,378	29,642	1,415,020	56,725	731,014	373,084	125,867	98,688	18,819	10,823	73,357
December	1,397,876	34,306	1,432,182	55,214	722,508	385,407	130,407	104,340	20,908	13,398	69,362
Undistributed corrections ...	+ 8,107	+ 3	+ 8,110	+ 25	+ 5,196	+ 2,697	+ 510	- 321	+ 3	.....	.....
TOTAL	16,078,653	312,857	16,391,510	577,686	8,286,706	4,755,401	1,275,392	1,183,468	185,457	127,400	1,235,324
1 9 3 2											
January	1,382,794	31,124	1,413,918	48,584	721,827	374,534	129,950	107,899	20,382	10,742	61,767
February	1,297,892	27,241	1,325,133	46,998	682,589	355,865	115,399	97,041	18,125	9,116	52,422
March	1,363,912	24,784	1,388,696	44,292	713,227	394,206	110,943	101,244	15,410	9,374	55,414
April	1,306,753	22,736	1,329,489	50,445	700,575	363,099	99,544	93,090	12,413	10,323	54,982
May	1,249,226	21,789	1,271,015	53,897	661,740	344,635	95,863	93,091	12,294	9,495	51,354
June	1,176,673	21,559	1,198,232	47,894	633,614	325,476	83,542	86,147	11,996	9,563	64,864
July	1,133,555	22,026	1,155,581	38,583	606,872	317,815	81,519	88,766	11,986	10,040	59,015
August	1,206,682	23,538	1,230,220	44,786	663,911	326,021	82,129	89,835	13,530	10,008	69,192
September	1,254,644	24,496	1,279,140	48,069	687,536	337,472	90,082	91,485	13,976	10,520	71,500
October	1,362,670	27,474	1,390,144	50,989	763,577	348,530	104,780	94,794	16,072	11,402	50,738
November	1,417,074	31,153	1,448,227	53,110	823,035	333,565	111,404	95,960	18,393	12,760	35,023
December	1,400,793	32,398	1,433,191	52,587	801,939	326,173	116,933	103,161	19,679	12,719	41,609
Undistributed corrections ...	+ 3,654	- 173	+ 3,481	- 2	- 2,711	+ 2,268	+ 3,998	+ 101	.....	- 173	.....
TOTAL	15,556,322	310,145	15,866,467	580,232	8,457,731	4,149,659	1,226,086	1,142,614	184,256	125,889	667,880

Table 4.

(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	
1 9 3 1											
January	46,978	1,045	48,023	1,432	23,722	15,143	3,358	3,323	651	394	5,240
February	46,826	995	47,821	1,111	24,091	15,079	3,160	3,385	618	377	5,196
March	44,903	825	45,728	1,108	22,700	14,578	3,096	3,421	516	309	4,129
April	46,268	768	47,036	1,738	23,930	13,849	3,385	3,366	445	323	3,256
May	43,320	737	44,057	1,723	22,382	12,718	3,311	3,186	412	325	2,800
June	42,262	732	42,994	1,756	21,291	12,652	3,378	3,185	405	327	2,953
July	39,698	667	40,365	1,636	20,020	11,913	3,242	2,887	396	271	3,067
August	39,815	706	40,521	1,449	20,789	11,383	3,165	3,029	416	290	3,219
September	42,114	833	42,947	1,542	22,080	11,837	3,428	3,227	448	385	3,110
October	45,184	891	45,980	1,798	23,754	12,389	3,971	3,272	494	397	3,078
November	46,179	988	47,167	1,891	24,367	12,436	4,195	3,290	627	361	2,445
December	45,093	1,106	46,199	1,781	23,307	12,436	4,207	3,366	674	432	2,237
Undistributed corrections..	+ 22	...	+ 22	...	+ 14	+ 8	+ 1	- 1	...	...	...
AVERAGE	44,051	857	44,908	1,583	22,703	13,029	3,494	3,242	508	349	3,384
1 9 3 2											
January	44,606	1,004	45,610	1,567	23,285	12,081	4,192	3,481	657	347	1,992
February	44,754	939	45,693	1,621	23,537	12,271	3,979	3,346	625	314	1,808
March	43,997	799	44,796	1,429	23,007	12,716	3,579	3,266	497	302	1,788
April	43,558	758	44,316	1,681	23,353	12,103	3,318	3,103	414	344	1,833
May	40,298	702	41,000	1,739	21,346	11,117	3,092	3,003	396	306	1,657
June	39,222	719	39,941	1,597	21,120	10,849	2,785	2,872	400	319	2,162
July	36,566	711	37,277	1,244	19,577	10,252	2,630	2,863	387	324	1,904
August	38,925	759	39,684	1,445	21,416	10,517	2,649	2,898	436	323	2,232
September	41,821	817	42,638	1,602	22,918	11,249	3,003	3,049	466	351	2,383
October	43,957	886	44,843	1,644	24,632	11,243	3,380	3,058	518	368	1,637
November	47,236	1,038	48,274	1,770	27,435	11,119	3,713	3,199	613	425	1,167
December	45,186	1,045	46,231	1,696	25,868	10,522	3,772	3,328	635	410	1,342
Undistributed corrections..	+ 10	...	+ 10	...	- 7	+ 6	+ 11	...	...	...	...
AVERAGE	42,504	847	43,351	1,585	23,109	11,338	3,350	3,122	503	344	1,825

Table 5. OUTPUT OF 25 LARGEST CENTRAL ELECTRIC STATION SYSTEMS IN CANADA

1 9 3 2

	Kilowatt Hours Generated
Hydro Electric Power Commission of Ontario	/ 2,985,187,370
Shawinigan Water and Power Company Quebec Power Company Canadian Light and Power Company	2,610,343,123
Canadian Hydro Electric Power Corporation St. John River Power Company	2,509,910,452
Duke Price Power Company	1,673,119,325
West Kootenay Power Company	580,021,067
Winnipeg Electric Company and Manitoba Power Company	511,024,078
Montreal Light, Heat and Power Consolidated	477,028,150
British Columbia Power Corporation Vancouver Island System Mainland System Kamloops System	465,000,724
Canada Northern Power Corporation	441,150,290
Alcoa Power Company, Ltd.	x 413,780,051
Winnipeg Hydro Electric System	384,103,830
Canadian Niagara Power Corporation	273,909,700
Abitibi Electric Development Co.,Ltd.	204,282,001
Churchill River Power Co., Ltd.	187,334,650
James Maclaren Company, Ltd.	176,874,750
Price Brothers & Co.	172,446,680
Montreal Island Power Company	172,307,040
Southern Canada Power Company	160,609,700
Nova Scotia Power Commission	158,560,449
Great Lakes Power Company	153,531,817
Calgary Power Company	143,427,388
Ontario and Minnesota Power Company	101,604,200
Ottawa Electric Company	86,175,881
East Kootenay Power Company	70,588,530
Beauharnois Light, Heat and Power Co. (three months)	60,719,000
TOTAL	15,173,040,246

/ Includes 352,240,060 kilowatt hours of Ottawa Valley Power Company, Chats Falls, in Quebec -- all used in Ontario.

x Includes 53,528,738 kilowatt hours used for testing new equipment.

Table 6.

POWER EQUIPMENT OF MANUFACTURING INDUSTRIES+
IN CANADA

1 9 3 1

INDUSTRIES	Total power employed	Electric Motors Operated: By purchased power	Electric Motors Operated: By power generated in the industries	Electric Motors Operated: Total motor capacity	Electric Power: Per cent of total
	H.P.	H.P.	H.P.	H.P.	P.C.
Group 1.- Vegetable Products	322,401	212,284	26,286	238,570	74.0
Biscuit, confectionery, etc.	23,491	19,636	236	19,872	84.6
Breweries	24,669	17,971	1,803	19,774	80.2
Flour and feed mills	116,757	58,212	2,467	60,679	52.0
Rubber goods	64,329	61,419	697	62,116	96.6
Sugar refineries	21,554	6,874	13,553	20,427	94.8
Group 2.- Animal Products	98,892	71,303	1,705	73,008	73.8
Butter and cheese	27,940	20,439	...	20,439	73.2
Leather tanneries	13,169	10,723	...	10,723	81.4
Slaughtering & meat packing	29,740	24,664	343	25,007	84.1
Group 3.- Textiles & Textile Products	186,952	127,968	26,866	154,834	82.8
Cotton yarn and cloth	81,770	48,543	20,858	69,401	84.9
Dyeing, cleaning & laundry	14,745	8,888	370	9,258	62.8
Hosiery & knitted goods	17,183	10,851	1,242	12,193	71.0
Silk & artificial silk	13,616	12,947	354	13,201	97.0
Group 4.- Wood and Paper Products	2,126,398	1,148,343	336,070	1,484,413	69.8
Furniture	22,057	10,774	2,066	12,840	58.2
Planing mills, sash & door	44,912	27,053	772	27,825	62.0
Printing and publishing	23,551	21,999	68	22,067	93.7
Pulp and paper	1,666,601	1,007,240	290,339	1,297,579	77.9
Saw mills	288,176	25,468	39,184	64,652	22.4
Group 5.- Iron and Its Products	589,261	409,920	99,593	509,513	86.5
Agricultural implements	25,148	19,308	686	19,994	79.5
Automobiles	42,519	21,054	20,485	41,539	97.7
Bridge and structural steel	28,861	27,765	537	28,302	98.1
Castings and forgings	67,312	62,894	1,207	64,101	95.2
Machinery	30,428	22,439	3,605	26,044	85.6
Primary iron and steel	213,236	102,301	59,302	161,603	75.8
Railway rolling stock	108,659	90,045	6,607	96,652	88.9
Group 6.- Non-ferrous Metal Products	424,738	328,998	22,119	351,117	82.7
Brass and copper products	18,073	17,390	340	17,730	98.1
Electrical apparatus & supplies	88,088	75,051	4,817	79,868	90.7
Non-ferrous metal smelting	309,395	227,375	16,962	244,337	79.0
Group 7.- Non-metallic Mineral Products	212,179	170,572	14,524	185,096	87.2
Cement	78,126	70,472	2,954	73,426	94.0
Clay products, domestic	28,276	19,653	539	20,192	71.4
Coke and gas	24,711	17,679	6,666	24,345	98.5
Petroleum products	30,995	15,726	1,740	17,466	56.4
Group 8.- Chemicals and Chemical Products	96,893	69,587	12,637	82,224	84.9
Acids, alkalies and salts	46,992	26,847	8,350	35,197	74.9
Fertilizers	14,435	14,348	...	14,348	99.4
Group 9.- Miscellaneous Industries	56,963	48,436	...	48,436	85.1
Artificial ice	10,239	10,189	...	10,189	99.5
Shipbuilding	29,920	25,644	...	25,644	85.7
Total All Manufacturing Industries +	4,114,677	2,587,411	539,800	3,127,211	76.0

+ Excluding central electric stations.

Table 7. POWER EMPLOYED IN THE MINING INDUSTRIES[1] IN CANADA, 1931

INDUSTRIES	Total power	Electric Motors Operated: By purchased power	Electric Motors Operated: By power generated in the industries	Electric Motors Operated: Total motor capacity	Electric Power Per cent of total
	H.P.	H.P.	H.P.	H.P.	P.C.
Metal mining	248,399	198,579	7,849	206,428	83.1
Non-metal mining	50,718	42,903	1,507	44,410	87.6
Sand, gravel and stone	49,489	32,901	589	33,490	67.7
Coal, gas, petroleum	172,032	39,184	69,314	108,498	63.1
Total Mining [1]	520,638	313,567	79,259	392,826	75.5

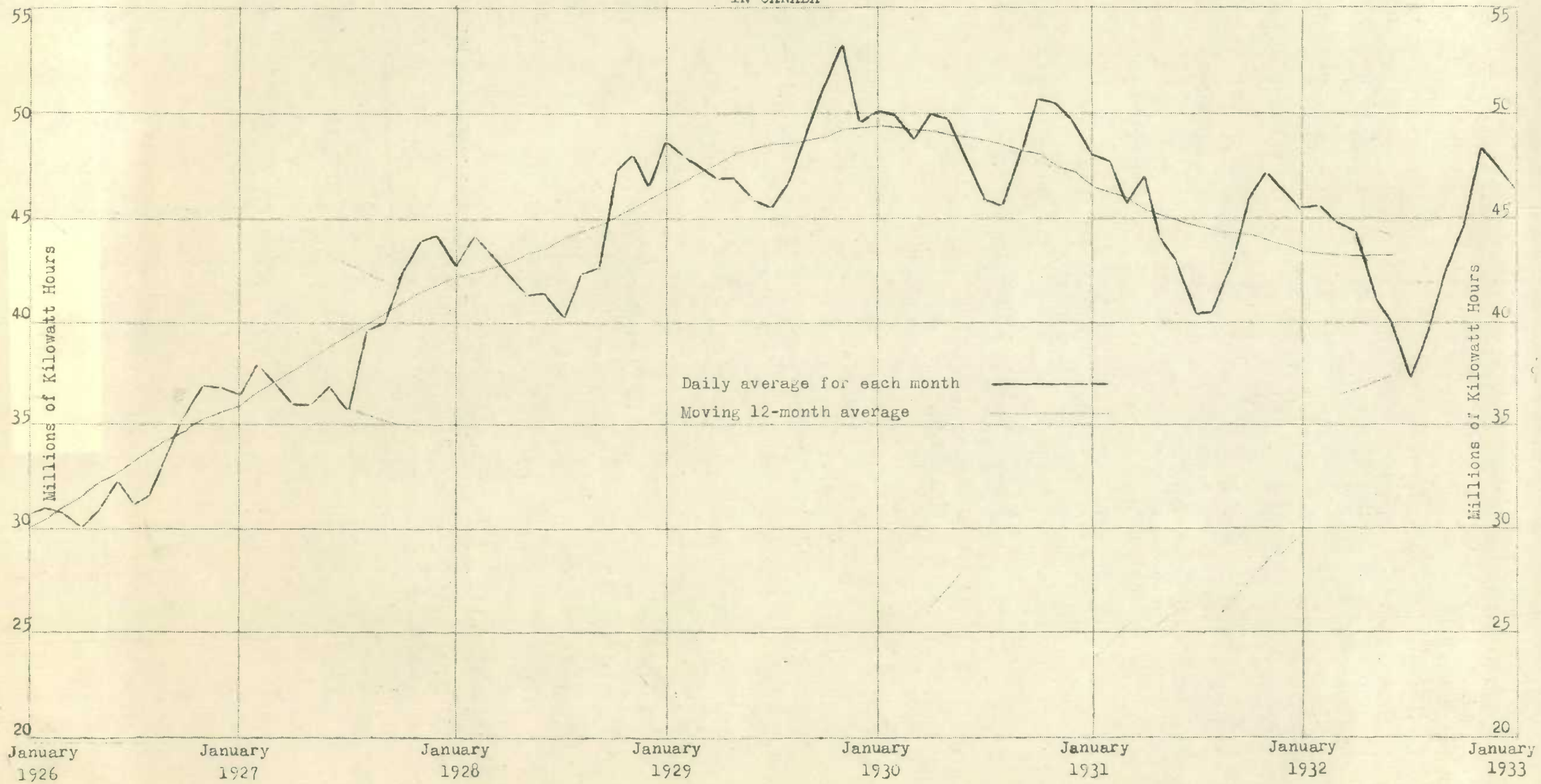
[1] Excluding non-ferrous smelting, salt, cement, clay products and lime.

Table 8. TOTAL POWER EMPLOYED IN MANUFACTURING INDUSTRIES[1] IN CANADA 1931

PROVINCES	Total power employed	Electric Motors Operated: By purchased power	Electric Motors Operated: By power generated in the industries	Electric Motors Operated: Total motor capacity	Electric Power Per cent of total
	H.P.	H.P.	H.P.	H.P.	P.C.
Prince Edward Island	4,258	656	357	1,013	23.8
Nova Scotia	172,486	63,014	38,808	101,822	59.0
New Brunswick	171,751	82,123	41,718	123,841	72.1
Quebec	1,465,096	1,003,159	103,192	1,106,351	75.5
Ontario	1,629,588	1,060,135	243,811	1,303,946	80.0
Manitoba	116,287	102,948	593	103,541	89.0
Saskatchewan	30,982	19,060	173	19,233	62.1
Alberta	67,393	42,562	3,035	45,597	67.7
British Columbia and Yukon	456,837	213,754	108,113	321,867	70.5
CANADA	4,114,677	2,587,411	539,800	3,127,211	76.0

[1] Excluding central electric stations.

AVERAGE DAILY OUTPUT
OF
CENTRAL ELECTRIC STATIONS
IN CANADA



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