

GREAT WASTE OF COAL AS PRODUCT PRESENT UTILIZED IN CANADA

Expert Advocates Coke as Substituted for Anthracite which has to be Imported

IMMENSE SAVING RESULT

The following is taken from a review of the coal resources of Canada by F. E. Lucas, in the final report of the Fuel Controller:—

"In 1913 Canada produced 15,012,178 tons of coal. We imported 12,096,227 tons of bituminous, 4,208,862 tons of anthracite, and 710,109 tons of coke. In the same year we exported 1,562,020 tons of bituminous and 68,235 tons of coke. From that time forward Canada has lost ground or remained practically stationary, due to shortage of labour and transportation facilities by reason of war conditions, until the 1918 figures show a total coal production of 15,180,000 tons, with imports as follows:—

	Tons.
Bituminous coal	17,331,177
Anthracite coal	5,253,751
Coke	969,932
Coal exported in 1918	1,902,010
Coal exported in 1918	26,013

ENORMOUS WASTE OF COAL.

"The coal consumption of the country may be roughly divided as follows: For use in the manufacture of coke and gas, railway locomotives, industrial plants, and domestic use. In all these there are serious and at the same time preventable losses. There are many individual plants that could show fuel or power reports that would be startling when compared with general practice. At the foot of the list, so far as thermal efficiency is concerned, might be placed the domestic consumption, with not over 4 or 5 per cent of the thermal value of the coal recovered. Locomotives are little, if any, better from an economical standpoint. The general run of industrial plants will not exceed 7 to 8 per cent, and in the production of beehive coke there is an enormous waste of fuel and by-products. There are, however, many installations which are getting results much in advance of the averages here given, but in most of these cases there is still room for a 50 per cent saving.

"I contend that we are not getting anything like the amount of light, heat, and power we should, or could get, and I further contend that in getting this extra light, heat, and power we would not only be conserving the coal supply but getting cheaper power, and at the same time recovering other products which would be of great economic value to the country and lead to the extension of existing industries and the establishment of new ones.

SUBSTITUTE COKE FOR ANTHRACITE.

"Starting with the importation of anthracite, which is practically all used as domestic fuel. This can be almost entirely eliminated, and in so doing give as large returns on the invested capital as any industrial concern in the country.

"The substitution of coke as domestic fuel instead of anthracite is nothing new. It has not been tried out in this country except for the comparatively small stocks of gas coke which are sold by the various city gas plants. There are, however, plants in the United States that cater to a very large domestic and industrial trade in coke. One railroad has used about 700 tons of coke per day in their locomotives for years.

COKE MADE FROM LOW-GRADE COAL.

"A coke for domestic use can be made from coals which are not suitable for the production of metallurgical coke or for the highest and most economic production of gas in city gas plants. Different qualities of coke can be made in

Coal Resources of North America and Exhaustion to Date. Net Tons.

Province or State.	Original Mineable Coal.				Exhaustion to Date. (All Kinds).
	Anthracite.	Bituminous.	Lignite.	Total.	
Alberta	1,182,571,708	217,593,194,364	963,795,942,428	1,182,571,708,500	44,516,881
Arctic Islands		6,615,000,000		6,615,000,000	
British Columbia	670,628,188	77,289,898,719	5,867,996,648	83,828,523,555	60,630,453
Manitoba			176,400,000	176,400,000	
New Brunswick		166,477,500		166,477,500	1,334,353
Nova Scotia		10,715,162,220		10,715,162,220	172,322,387
North W. Territory			5,292,000,000	5,292,000,000	
Ontario			27,562,500	27,562,500	
Prince Ed. Island					
Quebec			65,942,730,000	65,942,730,000	3,707,798
Saskatchewan					
Yukon	46,293,975	231,469,875	5,168,586,150	5,446,350,000	517,361,982
Alabama		67,613,679,000		67,613,679,000	
Arizona		10,032,750	14,147,831,250	14,157,864,000	
Arkansas	90,620,208	1,397,061,540	400,239,252	1,887,921,000	69,622,092
California		27,537,584	16,452,166	43,989,750	7,739,530
Colorado	293,925,417	131,443,447,323	64,212,906,510	195,950,279,250	341,414,715
Georgia		933,376,500		933,376,500	15,179,811
Idaho		600,163,956	100,144,044	700,308,000	
Illinois		201,491,136,000		201,491,136,000	1,988,389,228
Indiana		53,075,121,750		53,075,121,750	538,855,858
Iowa		29,173,252,500		29,173,252,500	339,202,338
Kansas		30,013,578,000		30,013,578,000	247,110,979
Kentucky		123,384,082,500		123,384,082,500	499,147,573
Maryland		8,048,250,000		8,048,250,000	296,899,009
Michigan		12,005,453,250		12,005,453,250	43,936,566
Missouri		84,038,062,500		84,038,062,500	215,900,610
Montana		2,669,020,200	378,619,579,800	381,288,600,000	88,695,304
New Mexico		19,000,822,475	172,926,677,275	191,927,499,750	91,871,659
North Dakota			698,246,104,500	698,246,104,500	13,045,108
Ohio		94,010,175,000		94,010,175,000	1,268,845,957
Oklahoma		54,976,383,000		54,976,383,000	119,904,318
Oregon			1,000,408,500	1,000,408,500	3,491,293
Pennsylvania	20,980,593,853	112,653,761,897		133,634,355,750	9,716,272,407
South Dakota			1,020,804,750	1,020,804,750	
Tennessee		25,676,673,750		25,676,673,750	232,007,481
Texas		8,001,580,073	23,012,296,177	31,013,876,250	56,497,933
Utah		88,221,174,285	159,084,465	88,380,258,750	80,583,364
Virginia	900,407,340	21,609,776,160		22,510,183,500	213,396,715
Washington		11,439,366,246	52,467,707,754	63,907,074,000	121,586,767
West Virginia		152,614,113,750		152,614,113,750	1,800,948,769
Wyoming		80,590,426,139	590,437,268,611	671,027,694,750	236,784,757

From Final Report of Fuel Controller showing coal resources of Canada and the United States, and the amount of coal used from these reserves to the present time.

the same plant or a different type of plant can be constructed in which, by low-temperature distillation, an entirely different type of solid fuel can be made. While coke is more bulky than anthracite, yet tests have proven beyond doubt that pound for pound it is as good or very often better than anthracite as a fuel.

"In the production of this fuel many valuable by-products are obtained, such as gas, tar, ammonia, benzol, toluol, xylol, and naphtha, or, combining the latter four, a motor fuel much superior to the best gasoline is obtained.

THE FINANCIAL ASPECT.

Let us suppose that we go to a district where anthracite costs \$9 per ton and bituminous coal \$4.50 and put up a plant for the manufacture of coke. This plant would, of course, furnish any metallurgical coke that might be required within the same district, although the coal for this purpose would have to be more carefully chosen. Assuming the plant to handle 2,000 tons of coal per day. The yields of the various products would vary slightly according to the analysis of the coal, but taking, for example, the ordinary Nova Scotia coal, we would get from 2,000 net tons per day 1,400 tons coke, 12,000,000 cubic feet surplus gas of 600 B.T.U., 18,000 gallons of tar, 54,000 pounds sulphate of ammonia, and 4,500 to 5,000 gallons of motor fuel, thus:—

Cost of Coal—	2,000 tons coal, at \$4.50	\$9,000
Products—		
	1,400 tons coke for sale at \$6.50	\$9,100
	12,000,000 cubic feet gas, at 25 cents per M	3,000
	18,000 gallons tar, at 2½ cents per gallon	450
	54,000 pounds sulphate, at 2½ cents per pound	1,350
	4,500 gallons motor fuel, at 30 cents per gallon	1,350
		\$15,250

In the price given for these products I have discounted war prices, and in the case of sulphate of ammonia have deducted enough off the selling price to pay for the acid lime and other expenses of manufacture.

If the price of anthracite falls below that given (and if any conclusions can be arrived at from figures for the past 10 years, there does not seem to be much hope for it) it would be only fair to assume that the price of bituminous coal would also drop. If, on the other hand, anthracite stays at the price given or continues to rise as in the past years, the comparison is all the more striking.

In one year the total cost for raw material would then be \$3,235,000, while the returns on products sold would be \$5,566,250, or a difference of \$2,281,250. Deducting operating expenses for the year, of \$500,000, leaves \$1,781,250, or approximately 30 per cent return on the cost of the plant, even at the prices of the past two years. With anthracite selling at \$9 per ton, the coke at \$6.50 f.o.b. works, could stand a considerable transportation and handling charge and still control the market.

In giving the above figures I have been exceedingly conservative.

The price of coke given is as low, if not lower, than gas coke. The price given for gas is abnormally low, except for certain sections where there is competition by cheap natural gas, but in any district where such conditions do not obtain the price given is very low. The proposition as laid out is, however, strong enough to stand cutting this price materially, and still be more than ordinarily attractive. The price figured for sulphate of ammonia is, I think, the lowest it has touched in 15 years.

I have been purposely conservative in order to show more clearly the commercial advantages of adopting this line of business. If there is a market for a rich gas for heating and lighting, the total gas from the coal can be used for this purpose and the plant itself can be heated with producer gas from an inferior grade of non-coking coal. By

this means the gas available would be approximately 11,000 cubic feet per ton of coal, instead of 6,000 as in above figures. If producer gas was used the ammonia could be extracted from the coal used in the producers.

Figuring the cost of the coal used in the producers and crediting the recovered ammonia, we find in setting this against the extra gas available for sale that we have considerable additional revenue to add to the total income.

The province of Nova Scotia presents a specific and very striking case where money is being lost to the country. Approximately 200,000 tons of anthracite are imported yearly; at dealers' prices this would mean at least \$1,000,000 per year sent out of the country.

A small coke plant erected at the mines where coal cost would be low could produce coke to replace all this anthracite at a price below that at which the anthracite could be imported.

In addition to saving to the province \$1,000,000 now sent out of the country, the consumer would get as good a grade of fuel much cheaper, and the by-products recovered would increase trade and aid in further industrial expansion.

Wheat Yield Per Acre.

The average yield per acre of fall wheat in Canada is 23 bushels and of spring wheat 19 bushels. This compares with the United States average of 15.5 bushels for winter wheat and 13.2 for spring wheat. The figures are taken from the Canada Year Book which has just been published, and relate generally to 1916-17.

Gold Production.

The gold production of the British Empire was in 1916, the latest year in which complete figures are available, 14,229,844 ounces, or 64 per cent of the world's total. According to statistics in the Canada Year Book, the Dominion comes fifth as a gold-producing country. Australia is third. In silver production Canada takes second place in the world.