

**The Effect of the Proposed Hydro Rate Increase on the  
Manitoba Economy**

**Manitoba Hydro  
2017/18 & 2018/19 GRA**

**Consumers Coalition**

**Submitted by the Public Interest Law Centre**

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## The Effect of the Proposed Hydro Rate Increase on the Manitoba Economy

On May 5, 2017, Manitoba Hydro applied for a 7.9 % rate increase effective August 1, 2017/18 as well as a 7.9 % rate increase effective April 1, 2018. In Public Utilities Board Order 80/17, Manitoba Hydro was granted an interim rate increase for the 2017/18 year of 3.36% effective August 1, 2017.<sup>1</sup> In a letter dated September 5, 2017, Manitoba Hydro indicated that it now projects rate increases of 7.9% for six years for the fiscal years 2018-2019 to 2023-2024, followed by one year at a 4.54% increase before returning to a price increase of 2.00%.<sup>2</sup>

With estimated consumer price inflation (CPI) rates of approximately 1.9% per annum during the period between 2018/19 and 2024/25 (Appendix 3.2, p. 10), in real terms the projected increases are 6% per year for the first six years and 2.64% for 2024-2025. The rate increases will cause households, businesses and government sectors to reallocate spending, which in turn will alter the demand for goods and services in the Manitoba economy.

Focusing on the rates increases projected by Manitoba Hydro between 2018-19 and 2024-25, this report provides an overview of the expected aggregate effects of the projected Hydro price increases on the sectors of the Manitoba economy, applying an input-output approach to determine the full effect on the economy. The data used are Statistics Canada's Supply and Use tables for Manitoba (2014) and the industrial multipliers for the same year.<sup>3</sup> We outline the assumptions made concerning the responses of households, industry and government to the Hydro price increase as well as the multipliers in the next section, and we present a variety of results based on alternative assumptions. The estimates are calculated as deviations from a stable economy in which all prices (including hydro) grow at the rate of inflation. Our preferred estimates indicate that due to the proposed increase in real hydro prices, the Manitoba economy will be 3.4% smaller after seven years than it would have been in the absence of hydro price

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1 Order 80/17, p 3

2 17 09 05 Letter KA Shepherd Hydro to PUB, p 2

3 This is the latest year for which provincial tables are available. We assume that the structure of the economy has not altered substantially in the previous three years. All analyses are done in real terms (removing the impact of inflation). Provincial multipliers (15F0046X) and Provincial supply and use tables for 2014 (15-602-X) were released November 8, 2016. (<https://www.statcan.gc.ca/eng/nea/list/io>)

increases above the inflation rate. Moreover, the hydro price change will result in close to 3900 fewer jobs in the province after seven years than would exist without the price increases.<sup>4</sup>

## **Methodology**

An Input-Output analysis is performed to evaluate the full economic impact of an injection into, or withdrawal from, the economy. Statistics Canada tables allow us to identify the flows of expenditure between industries, households and government. For each industry, we can determine how much is spent on inputs (including hydro), and the destination of its outputs. We can also identify which industries the inputs come from, the proportion of inputs that are produced in Manitoba or imported from other provinces or countries and the proportion of outputs that remain in the province or are exported. The economy is a complex web of interactions and a change in one sector creates ripples through the rest of the economy as households and industries adjust.

Input-Output analyses highlight the multiplying effect of an injection into (or a withdrawal from) the economy.<sup>5</sup> We model the additional spending on hydro that results from the price increase as a broad based withdrawal from the economy on the assumption that the revenue from the projected price increase is not re-circulated into the economy but is a broad-based withdrawal from the economy.<sup>6</sup> Households, firms and governments will adjust their spending patterns – more spending on hydro means less spending on other goods, services or

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4 In applying the model, we hold all other economic influences to zero. Thus, the results should be read as deviations of the economy from the counterfactual of hydro price increases equal to the expected rate of inflation, not as absolute changes.

5 See Appendix C for further details.

6 Typically, price increases are transfers from one sector of the economy (consumers) to another sector (producers), and the input-output model would not be the best option for analysing the impact of a price change. However, we assume that the revenue from the hydro price increase will not be recirculated. The revenue has been designated for Bipole III deferral account (Tab 2, p. 19; App 6, p. 28) and to avoid “incremental borrowing (Tab 2, p. 58). We see no evidence in the GRA that Manitoba Hydro plans to use the cash flow generated from the proposed rate increases to increase annual spending in the province beyond the rate of inflation (1.9%). It is also notable for this assumption that Manitoba Hydro continues to diversify investor base into international markets (Tab 3, p. 22).

inputs. In the following sections, we outline the assumptions imposed on how households, firms and governments react to the higher hydro prices and provide details of the direct effects.<sup>7</sup>

The initial fall in demand as households, firms and government sectors readjust their spending patterns is the direct effect, but this is only the spark that will then propagate throughout the economy. Industries will react to the falling demand for their products by further reducing the demand for their own inputs, and so on. The effect lessens in each iteration so the full effect resulting from industry demand decline can be calculated. This is termed the “indirect effect” and is captured by what is known as the simple (or Type I) multiplier.<sup>8</sup>

Additionally, the fall in industry demand may lead to lower wages, fewer jobs and the closure of some vulnerable companies. This will further reduce household demand for goods and services, creating an additional impact on the economy. This is termed the “induced effect.” Total (or Type II) multipliers capture both indirect and induced effects.

These multipliers have been calculated by Statistics Canada for all industries and government categories in Manitoba. For the total economy, the simple multiplier is approximately 1.35 and the total multiplier is 1.5. This implies that for every dollar withdrawn from the economy due to the increase in real (after inflation) hydro rates, there will be an additional \$0.35 decline in GDP or labour income due to indirect effects and \$0.50 from induced effects. The multipliers for jobs are defined for every million dollars in output, so that a withdrawal of \$1,000,000 from the economy will result in a loss of 1.35 jobs from the direct and indirect effects combined and 1.5 jobs when we add the induced effects.

We first outline the assumptions imposed on household, firm and government behaviour to estimate the direct effects of the real price increases and provide details of the initial (2018-2019) direct effects.

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7 Two basic assumptions underly the supply and use models. First, the linear homogeneous production functions for each sector implies constant technical coefficients, no economies or diseconomies of scale and no externalities. In other words, the structure of the economy may be estimated to shrink and grow but inputs rise and fall in proportion – there is no substitution among inputs. Second, the economy operates under conditions of excess capacity – any increase in final demand can be met by an increase in sectoral output. Similarly, any additional demand for labour can be met. The major limitation of the model is the lack of relative price changes and behavioural responses. We have adjusted for this manually.

8 Bess and Ambargis (2011) provide a useful description of the multipliers.

## Direct Effect: Households

We assume that households will adjust their consumption patterns in response to a change in Hydro prices, so that the bundle of goods and services consumed by households will alter, but the total amount spent on goods and services will not increase in the initial stage. We use the estimate of the price elasticity of demand (PED) provided by Manitoba Hydro of 0.29 (App. 7.1, p. 57) which suggests that for every one percent increase in hydro prices, households will reduce their usage by 0.29%<sup>9</sup>. With this elasticity estimate, a price increase of 6% will reduce the quantity of hydro used by 1.74%, leading to an increase in household expenditure on hydro of 4.26%. Table 1 shows the calculated real cumulative change in household spending on Hydro after applying the real price increase and the behavioural response. The bolded columns show the cumulative total change in expenditure on hydro in real terms, both without behavioural response (column D) and with the behavioural response (column G). The figures from column G are applied to household spending.

Second, we assume that households will adjust spending on other goods and services to offset the increase in spending on hydro, subject to income elasticities of demand (IED).<sup>10</sup> Consider the household budget after hydro expenditure as the household's available income. The increase in hydro prices reduces the amount remaining for other goods and services. However, the decline in spending on other goods and services is not equal across categories. The demand for necessity items such as food, shelter, and health care will not vary substantially as income alters – these goods have a relatively low IED. Alternatively, the demand for goods such as clothing, furniture, and recreation will vary with income- these goods have a relatively high IED. We apply the IEDs calculated by Stevens and Simpson (2014).<sup>11</sup>

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9 The price elasticity of demand is the percent change in quantity used divided by the percent change in price. A PED of 0.29 implies that a one percent increase in the price of hydro will reduce quantity by 0.29 percent. Labandiera et al (2017) perform a meta-analysis of the literature on price elasticity of demand for electricity. They estimate the average estimate across studies and sectors to be 0.126 for short run elasticities, and 0.365 for long run elasticities. Residential and commercial estimates are slightly lower than those for industrial use in the short run, while the commercial estimates are lowest in long run elasticity estimates.

10 Similar to PED, the IED is the percent change in quantity purchased divided by the percent change in income. An income elasticity below (above) 1.00 indicates that as income rises, the quantity of the good purchased falls (rises) as a proportion of total income.

11 Details are provided in Appendix D.

**Table 1: Cumulative Change in Hydro Spending**

(A)	(B)	(C)	(D)	(E)	(F)	(G)
Fiscal year ending	Nominal Rate Increase	Real Rate Increase	No behavioural response, % Change in Expenditure on Hydro	Elasticity	Price induced change in Quantity demanded	W/ Behavioural response, % change in Expenditure on Hydro
2019	7.90	6.00	<b>6.00</b>	0.29	-1.74	<b>4.26</b>
2020	7.90	6.00	<b>12.36</b>	0.29	-3.58	<b>8.78</b>
2021	7.90	6.00	<b>19.10</b>	0.29	-5.54	<b>13.56</b>
2022	7.90	6.00	<b>26.25</b>	0.29	-7.61	<b>18.64</b>
2023	7.90	6.00	<b>33.82</b>	0.29	-9.81	<b>24.01</b>
2024	7.90	6.00	<b>41.85</b>	0.29	-12.14	<b>29.71</b>
2025	4.54	2.64	<b>45.60</b>	0.29	-13.22	<b>32.38</b>

The estimated effect of the first year price increase on household spending is presented in table 2. Electricity comprises 2.18% of total household budgets. Applying the 4.26% change in spending on hydro leads to a 0.09% increase in household spending that must then be offset by reductions in other categories. We expect a decline in spending on household equipment and furnishings to fall by 0.11% and transportation spending to fall by 0.13%. On the other hand, we expect spending on food purchased from stores to fall by only 0.04% and spending on health care to fall by 0.05%. The largest spending category is Shelter Excluding Electricity, which is estimated to fall by 0.06%.

**Table 2: First Year Real Changes in Household Spending**

<b>Simpson &amp; Stevens Category Name</b>	<b>Percent Change in Spending</b>	<b>Spending as a proportion of After-Hydro Spending</b>
Electricity spending increases by	+4.26	2.2
<b>Results in an increase in HH Spending of</b>	<b>+0.09</b>	
<b>To offset the increase in HH Spending on Electricity, other categories decline by the following percentages, based on their income elasticities of demand:</b>		
Food Purchased from stores	-0.04	13.9
Tobacco & Alcohol	-0.07	5.2
Clothing	-0.10	4.1
Shelter Excluding Electricity	-0.06	21.1
Household Operations	-0.07	1.0
Household Equipment & Furnishings	-0.11	5.9
Health Care	-0.05	4.1
Transportation	-0.13	15.6
Recreation	-0.12	8.7
Reading	-0.07	0.7
Education	-0.34	1.2
Miscellaneous	-0.11	13.4
Personal Care	-0.08	4.4
Gas and Other Fuels	-0.003	0.7
<b>Total</b>	<b>-0.09</b>	<b>100.0</b>

**Direct Effect: Industry and Government Sectors**

In comparison to the behavioural responses we expect from households, in our base scenario, we make no comparable assumptions for industry and government.<sup>12, 13</sup> The response of industries to an increase in an input price will vary substantially across firms. Businesses may

12 Industries and government categories are classified in the Statistics Canada tables according to the North American Industrial Classification System (NAICS). We use the least aggregated level of industrial classification in the model (detailed level) although some tables provide information for more aggregated levels. An industry includes all economic units with similar production processes. Industries include farms, incorporated and unincorporated businesses and government business enterprises. As these are aggregated numbers, we cannot determine whether an industry is comprised of a few large businesses or a large number of small businesses.

13 Non-profit organizations are included as industries. Non-profit categories include Educational services, Ambulatory health care services, Social assistance, Arts, entertainment and recreation, Religious organizations, Grant making, civic and professional organizations, and Other non-profit organizations serving households.

(i) pass on the cost to consumers in the form of higher prices, (ii) reduce spending on other inputs and/or (iii) reduce profits. If profits fall below some threshold, firms may shut down or move production out of the province.<sup>14</sup> We make the simplifying assumption that the direct effect is (ii) industries initially respond to the higher hydro prices by reducing spending on other inputs. While firms may respond by increasing prices, firms are less likely to pass on the increased costs when they face a competitive market with imports from jurisdictions not subject to the higher input price. Although the proportion of provincial use (household consumption and industrial inputs) that is imported varies widely across goods and services, imports comprise 27% of all use in the economy. We assume that the third reaction of firms - reduce profits and potentially close or relocate – is best captured not as a direct effect of the hydro prices but as the induced effects picked up through the multiplier (discussed in the following section).

In assuming that firms alter their production in response to the change in relative input prices, the response is similar to that of households (without the added complication of behavioural responses). We apply the figures from Table 1 Column D to the model. Industries will incur an increase of 6% p.a. in hydro costs for the first six years, and an increase of 2.6% in the seventh year and will offset these costs with proportional declines in spending on other inputs. Industries for which hydro comprises a large portion of their costs will require a bigger adjustment than those for which hydro is a relatively small input in production.

We assume that the effect of the hydro increase on government operations will be similar to that of industry. Government sectors may react to the higher input price by (i) reallocating spending from other inputs to hydro; (ii) maintaining operations as is and funding through tax increases; and/or (iii) maintaining operations as is, using debt funding. For simplicity, we focus on the first.

Table 3 provides an overview of the initial impact by broad industry category, listed by size of industry. Column (A) indicates the relative size of the industry within the Manitoba economy.

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<sup>14</sup> For our purposes, a business closure and a move to another jurisdiction are equivalent in their impact on the economy.



**Table 3: Initial Effect on Industry and Government**

	(A)	(B)	(C)	(D)
	Industry or Govt as % of Total Input Use	Industry Change in Hydro Spending/Total Change in Hydro Spending	Hydro as Percent of Inputs	Year 1 Change in Hydro/All Inputs
<b><u>Industry (Summary Categories)</u></b>				
Manufacturing	17.2	27.5	1.19	0.071
Finance, insurance, real estate, rental, leasing, and holding	9.4	8.5	0.67	0.040
Transportation and warehousing	6.3	2.4	0.28	0.017
Crop and animal production	6.2	0.0	1.17	0.070
Owner occupied dwellings	5.1	9.7	0.00	0.000
Retail trade	4.7	4.9	0.78	0.047
Wholesale trade	4.1	2.0	0.35	0.021
Residential building construction	3.1	0.9	0.04	0.002
Mining, quarrying, and oil and gas extraction	3.0	3.0	1.08	0.065
Engineering construction	2.8	0.2	0.06	0.004
Professional, scientific and technical services	2.7	2.9	0.26	0.016
Information and cultural industries	2.4	1.2	0.37	0.022
Accommodation and food services	2.3	4.4	0.98	0.059
Health care and social assistance	2.1	0.2	1.04	0.063
Non-residential building construction	2.0	0.1	0.03	0.002
Utilities	1.9	0.4	0.01	0.001
Admin and support, waste mgmt, remediation	1.4	0.0	0.22	0.013
Repair construction	1.2	3.0	0.04	0.002
Other services (except public administration)	1.2	0.1	1.96	0.117
Arts, entertainment and recreation	0.7	0.6	0.58	0.035
Educational services	0.1	0.3	1.93	0.116
Other activities of the construction industry	0.1	0.0	0.32	0.019
Support activities for agriculture and forestry	0.1	0.0	0.16	0.010
Forestry and logging	0.1	0.1	1.01	0.061
Fishing, hunting and trapping	0.0	0.0	0.41	0.024
<b><u>Government Sector</u></b>				
Government education services	3.5	5.2	0.90	0.054
Government health services	4.4	2.7	0.45	0.027
Other federal government services	2.6	4.3	0.41	0.025
Other prov and territorial government services	4.8	1.4	0.80	0.048
Other municipal government services	2.1	7.7	2.75	0.165
Other aboriginal government services	0.8	4.4	1.92	0.115
Non-profit institutions serving households	1.7	2.0	1.92	0.115
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>0.74</b>	<b>0.045</b>

Column (B) indicates the relative burden that each industry bears – the share of the total increase in hydro spending that is incurred by each industry. Column (C) shows the importance of hydro within the industry, that is, the ratio of hydro costs to total cost of production. Column (D) shows the change in spending on hydro as a proportion of all spending. Recall that hydro costs comprise 2.2% of household spending and the first year price increase reflects a 0.09% increase relative to household budgets. In comparison, hydro costs comprise 0.74% of industry and government spending and the first year price increase reflects a 0.045% increase relative to total spending. There is much variation across industries. For example, manufacturing industries comprise 17.2% of total input demand, but will incur 27.5% of the total increase in Manitoba Hydro revenue from industrial and government sectors, due to their relatively high reliance on electricity (hydro spending comprises 1.19% of manufacturing inputs). In comparison, residential building construction covers 3.1% of total input use but will incur only 0.9% of the total change in hydro spending, since electricity is a relatively small input into production (0.04%). Note however that although the direct effect of the hydro price increase is stronger in manufacturing than in residential building construction, manufacturing as a whole is more export-oriented than residential building construction. The secondary effects in residential building construction will be stronger than in manufacturing, as the industry’s consumers are primarily concentrated in Manitoba.

The bottom panel of Table 3 shows the situation facing broad government sectors. Hardest hit will be “Other Municipal Government Services” for which hydro comprises a very high (2.75%) proportion of inputs. Indeed, municipal government services, will contribute 7.7% of the total hydro spending increase from industry and government. Again, this is a sector that is not export-oriented and so the secondary impact will be relatively strong.

Table 4 provides similar information for selected industries at a more detailed level. The top panel lists the effects for the ten largest detailed industries. The largest detailed industry - crop production - will see total input costs increase by one-twentieth of a percent (0.049%), less than the average industrial effect. Large industries that will incur a higher than average increase in hydro relative to their total spending (Col D) are Lessors of Real Estate and Animal production (except aquaculture). The second panel of Table 4 shows the industries that will bear the largest proportion of the total industrial increase in hydro spending. Basic chemical

manufacturing, comprises only 0.38% of total input use will incur 8.5% of the increased hydro costs. The bottom panel shows those industries who will suffer the largest increase in their total input costs. It is notable that two of the industries most impacted by the hydro price increases are non-profit organizations. The top ten industries in this bottom panel comprise only 1.6% of the total at this detailed level of industrial categorization.

**Table 4: Effect of First Year Hydro Price Change on Selected Detailed Industries**

	(A)	(B)	(D)	
	<b>Industr y Size - % of Total Input Use</b>	<b>Industry Change in Hydro/Tota l Change in Hydro</b>	<b>Change in Electricity/ Total Inputs</b>	
<b><u>Top 12 Industries ranked by Size (Use of Inputs)</u></b>				
1	Crop production (ex. greenhouse, nursery and floriculture)	<b>4.33</b>	4.53	0.049
2	Residential building construction	<b>3.28</b>	0.15	0.002
3	Truck transportation	<b>2.84</b>	0.31	0.005
4	Lessors of real estate	<b>2.24</b>	5.86	0.123
5	Animal production (except aquaculture)	<b>2.10</b>	4.96	0.111
6	Meat product manufacturing	<b>2.08</b>	1.41	0.032
7	Non-residential building construction	<b>2.06</b>	0.07	0.002
8	Electric power generation, transmission and distribution	<b>1.87</b>	N/A	N/A
9	Financial investment, funds and other financial vehicles	<b>1.85</b>	0.29	0.007
1				
0	Conventional oil and gas extraction	<b>1.74</b>	1.16	0.031
11	Telecommunications	<b>1.69</b>	0.58	0.016
1				
2	Food services and drinking places	<b>1.64</b>	1.61	0.046
<b><u>Top 12 Industries Ranked by Contribution to Total Increase in Hydro Spending</u></b>				
1	Basic chemical manufacturing	0.38	<b>8.50</b>	1.047
2	Lessors of real estate	2.24	<b>5.86</b>	0.123
3	Animal production (except aquaculture)	2.10	<b>4.96</b>	0.111
4	Crop production (ex. greenhouse, nursery and floriculture)	4.33	<b>4.53</b>	0.049
5	Non-ferrous metal (except aluminum) prod and processing	1.39	<b>4.28</b>	0.145
6	Copper, nickel, lead and zinc ore mining	0.84	<b>2.04</b>	0.114
7	Food services and drinking places	1.64	<b>1.61</b>	0.046
8	Meat product manufacturing	2.08	<b>1.41</b>	0.032
9	Automotive repair and maintenance	0.47	<b>1.33</b>	0.135
1				
0	Grant-making, civic, professional, similar organizations	0.41	<b>1.23</b>	0.142
<b><u>Top 10 Industries Ranked by Hydro Spending Change as a Proportion of Total Inputs</u></b>				
1	Basic chemical manufacturing	0.38	8.50	<b>1.047</b>
2	Pulp, paper and paperboard mills	0.13	1.10	<b>0.404</b>
3	Support activities for oil and gas extraction	0.07	0.56	<b>0.364</b>
4	Educational services	0.17	1.19	<b>0.333</b>
5	Social assistance	0.10	0.69	<b>0.326</b>
6	Professional and similar organizations	0.09	0.56	<b>0.298</b>
7	Dry cleaning and laundry services	0.07	0.37	<b>0.249</b>
8	Other metal ore mining	0.02	0.09	<b>0.197</b>
9	Iron and steel mills and ferro-alloy manufacturing	0.29	1.19	<b>.193</b>

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0	Religious organizations	0.28	1.05	<b>0.176</b>

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### **Direct Effect of Fall in Demand by Industry Affected**

The decline in household, industry, and government spending on goods and services other than hydro results in decreased demand across the board. The Statistics Canada tables allow us to translate the fall in demand for goods, services and inputs to the industries affected. The initial, first year, decline in demand by industry is presented in Table 5. Demand for output from manufacturing is expected to fall by 0.03% in the first year, primarily due to the fall in industrial input demand. Demand for owner-occupied dwellings is expected to fall by 0.06%, due to the decline in household demand. The largest decline is for educational services (a decline of 0.3%). Demand for government sector output falls between 0.009% (Health) and 0.041% (Other Municipal). This shows the first year, direct effect of the projected price increase.

It is important to note that most, but not all, of the fall in demand is borne by the provincial economy. Sixty-six percent of the decline is borne by provincial industries, but 14% is borne by international imports and 20% by interprovincial imports.

### **Applying the multiplier – Indirect and Induced Effects**

The full direct effect obtained for each industry will have a ‘trickle down’ effect on the economy as well since the reduced demand for inputs, goods and services translate into reduced demand for output. We apply the simple (Type I) and total (Type II) multipliers to the direct effect.<sup>15</sup>

Column 1 of table 6 shows the expected first year effects on the economy. We expect a direct decline in output between 0.06% and 0.07% depending on whether we consider the simple or total multiplier. The output decline will translate to a reduction in in GDP between 0.083% and 0.11%, compared to the counterfactual situation of inflation level price increases. Labour income faces similar declines. The first year impact suggests a shortfall of 95 to 126 Manitoban jobs.

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<sup>15</sup> Specific multipliers for key industries are provided in Appendix E.

**Table 5: Initial Direct Decline in Output Demand (from Households, Industry and Government) by Sector**

Industry (Summary Categories)	Proportion of Total Output	Percent Decline	Proportion Due to Falls by		
			Household	Ind	Gov't
Manufacturing	12.6	-0.032	19.0	70.5	10.4
Finance, insurance, real estate, rental and leasing and holding companies	6.9	-0.071	42.8	52.2	4.9
Transportation and warehousing	4.6	-0.047	22.4	68.6	9.1
Crop and animal production	4.5	-0.050	1.9	97.8	0.3
Owner occupied dwellings	3.8	-0.059	100.0	0.0	0.0
Retail trade	3.4	-0.078	66.7	24.7	8.6
Wholesale trade	3.0	-0.055	28.6	56.0	15.4
Mining, quarrying, and oil and gas extraction	2.2	-0.042	0.1	99.5	0.4
Professional, scientific and technical services	2.0	-0.061	9.0	61.3	29.7
Information and cultural industries	1.7	-0.087	48.1	38.8	13.0
Accommodation and food services	1.7	-0.047	59.6	29.4	11.0
Health care and social assistance	1.5	-0.080	26.3	1.0	72.8
Utilities	1.4	-0.012	0.6	85.2	14.2
Non-profit institutions serving households	1.3	-0.052	41.4	7.3	51.3
Administrative and support, waste management and remediation services	1.0	-0.110	6.1	63.4	30.5
Repair construction	0.9	-0.152	0.5	43.9	55.6
Other services (except public administration)	0.8	-0.100	59.0	27.2	13.8
Arts, entertainment and recreation	0.5	-0.093	80.9	15.5	3.6
Educational services	0.1	-0.314	22.7	36.2	41.1
Other activities of the construction industry	0.1	-0.072	1.6	75.6	22.8
Support activities for agriculture and forestry	0.1	-0.070	0.0	97.9	2.1
Forestry and logging	0.0	-0.076	0.4	98.4	1.2
Fishing, hunting and trapping	0.02	-0.031	19.9	80.1	0.0
Other provincial and territorial government services	3.6	-0.029	31.3	53.6	15.1
Government health services	3.3	-0.009	38.8	8.2	53.0
Government education services	2.6	-0.013	91.4	4.7	3.9
Other federal government services	1.9	-0.006	18.3	24.9	56.8
Other municipal government services	1.5	-0.041	22.7	45.0	32.3
Other aboriginal government services	0.6	-0.005	100.0	0.0	0.0
<b>Total</b>	<b>73.3</b>	<b>-0.048</b>	<b>40.1</b>	<b>45.1</b>	<b>14.8</b>
International imports	12.1	-0.061	44.9	42.4	12.8
Interprovincial imports	14.6	-0.073	27.5	60.6	12.0
<b>Sum of full effect</b>	<b>100.0</b>	<b>-0.053</b>	<b>38.2</b>	<b>47.8</b>	<b>14.0</b>

**Table 6: Full Effect on Manitoba Economy**

Year	Cumulative Change						
	1	2	3	4	5	6	7
Fiscal Year Ending	2019	2020	2021	2022	2023	2024	2025
Nominal Rate Increase	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	4.54%
<b>Simple Multiplier (Direct and Indirect Effects)</b>							
Output	-0.062	-0.194	-0.397	-0.676	-1.034	-1.473	-1.949
GDP basic price	-0.083	-0.258	-0.528	-0.899	-1.375	-1.960	-2.592
Labour income	-0.084	-0.262	-0.536	-0.913	-1.395	-1.989	-2.631
Jobs	-95	-296	-606	-1032	-1577	-2248	-2974
<b>Total Multiplier (Direct, Indirect and Induced Effects )</b>							
Output	-0.071	-0.222	-0.455	-0.774	-1.182	-1.684	-2.189
GDP basic price	-0.111	-0.346	-0.709	-1.205	-1.842	-2.624	-3.412
Labour income	-0.108	-0.336	-0.687	-1.169	-1.787	-2.545	-3.309
Jobs	-126	-392	-802	-1365	-2085	-2971	-3862

The first year multipliers are applied to all industries, providing a starting point for the second year simulation. We repeat the calculation of the direct effect and multipliers for each subsequent year, applying the cumulative change in real hydro prices outlined in Table 1. After the full seven years, we observe a direct output decline of 1.9% to 2.2% (Column 7). GDP is estimated to be 2.6% - 3.4% lower than we would expect with inflation-level hydro prices. The loss of jobs after seven years is expected to be between 2974 and 3862. Our preferred estimates, as noted earlier, are those that apply the total multiplier to the assumptions outlined above.

### Robustness Tests

As noted previously, we have assumed a zero price elasticity of demand for electricity in industries and governments. It is probable that industries, especially the industries in which hydro spending comprises a large portion of their inputs, will seek to reduce the impact of the hydro price increase by reducing their use of hydro, either by (i) readjusting their production method to be less energy intensive, (ii) switching to a different energy source, or (iii) relocating their energy intensive production outside the province. Ignoring the first two adjustments implies that our estimates will overestimate the demand decline for other inputs. Ignoring the third adjustment implies that the demand decline is underestimated.

**Table 7: Robustness Simulations**

Year	Cumulative Change						
	1	2	3	4	5	6	7
Fiscal Year Ending	2019	2020	2021	2022	2023	2024	2025
Nominal Rate Increase	7.90%	7.90%	7.90%	7.90%	7.90%	7.90%	4.54%
<b>Lower Bound: Simple Multiplier with PED=0.29 applied to all sectors</b>							
Output	-0.052	-0.161	-0.330	-0.562	-0.860	-1.227	-1.625
GDP basic price	-0.069	-0.214	-0.439	-0.748	-1.144	-1.632	-2.162
Labour income	-0.070	-0.218	-0.446	-0.759	-1.161	-1.657	-2.194
Jobs	-79	-246	-504	-858	-1312	-1873	-2480
<b>Upper Bound: Total Multiplier, PED=0.29 on HH only Plus a 10% decline in the top 10 Hydro Intensive Detailed Industries</b>							
Output	-0.071	-0.392	-0.621	-0.935	-1.298	-1.793	-2.327
GDP basic price	-0.111	-0.611	-0.968	-1.457	-2.023	-2.794	-3.626
Labour income	-0.108	-0.593	-0.938	-1.413	-1.962	-2.710	-3.517
Jobs	-126	-692	-1095	-1649	-2290	-3162	-4105

We perform two robustness tests for the industry analysis.<sup>16</sup> In the first, we apply the PED of 0.29 not only to household electricity consumption but also for industry and government electricity consumption. Allowing all sectors (households, government and industry) to reduce their consumption of hydroelectricity in response to the price increase will dampen the negative effect of the projected price increases on the economy. We apply the simple multiplier to this simulation, providing a lower bound estimate. In the second, we allow a 10% reduction in the top ten energy intensive industries (those in the bottom panel of Table 4), simulating the overall impact of an exodus from the province.<sup>17</sup> The total multiplier is applied here, providing an upper bound estimate. Table 7 shows the results. If we applied a behavioural response to every sector – households, industry and government – we end with a 2.1% decline in GDP relative to the counterfactual, and a loss of 2480 jobs. Our upper bound estimate is a 3.6% decline in GDP and a loss of over 4000 jobs.

<sup>16</sup> IEC may develop an alternative estimate of industry decline and industrial price elasticity of demand. If so, we expect to also incorporate their estimates into further robustness tests.

<sup>17</sup> The model does not allow us to distinguish between a 10 percent decline in output across all firms within the industry, and a complete shut-down of specific firms that account for 10 percent of the industry output.



## **Carbon Pricing**

It should be noted that these calculations are conducted under conditions of *ceteris paribus* (all else equal), that is – the only change observed in the model is the hydro price increases. Changes in the prices of other goods – notably changes in the prices of other fuels due to recently announced and implemented provincial carbon pricing policies – are not included in the model. Policies that raise the price of carbon will reduce the behavioural response of households, industry and government to the proposed hydro price increase. That is, the incentive to switch to alternative forms of energy or to relocate production will be lessened, although the precise policy and its impact is not yet clear.

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## **Appendix A: Statement of Qualifications and Duties – Dr. Wayne Simpson**

### **Statement of Qualifications**

Dr. Wayne Simpson has a PhD from the London School of Economics (1977) and is a Full Professor in the Department of Economics at the University of Manitoba, where he has taught since 1979. His areas of academic expertise include labour economics, applied econometrics, applied microeconomics, quantitative methods, and economic and social policy analysis.<sup>18</sup> He has authored or co-authored three books and more than fifty peer-reviewed articles on these and related topics, including one book and several articles that deal with poverty and income maintenance issues. He is currently on the editorial board of *Canadian Public Policy*, Canada's foremost peer-reviewed academic journal for economic and social policy, and the executive council of the Canadian Economics Association. He was a 2014 recipient of the McCracken award for the development and analysis of economic statistics from the Canadian Economics Association. Dr. Simpson has published and taught in the area of urban and regional economics and has expertise in the determination of the regional impact of decisions by firms and governments.

Dr. Simpson expertise in applied microeconomics and econometrics are especially relevant to this hearing on Manitoba Hydro rates. Applied microeconomics is the study of the behavior of individual agents (e.g., firms and households) in the market using modern theory and empirical methods. It seeks to apply the analysis to practical problems such as risk management and investment strategies. Applied econometrics uses specific statistical techniques, particularly regression methods, to analyze and predict economic behavior and apply it to practical social problems.

In addition to his academic career, Dr. Simpson has worked at the Bank of Canada, the federal Department of Labour, and the Economic Council of Canada. He has also served as a consultant to the private sector and government, primarily in the areas of labour economics and policy evaluation. In recent years, he has served as an expert advisor to Prairie Research Associates

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<sup>18</sup> His professional expertise in applied microeconomics and applied econometrics provides a foundation for the analysis of issues related to the management of risk by firms and to the assessment of risk using modern economic and statistical techniques. His expertise also provides a framework to assess the contributions of equities, bonds and interest rates to investment risk.

(PRA) Inc. and Human Resources and Skill Development Canada as well as to CAC Manitoba through the Public Interest Law Centre.

Wayne Simpson has provided expert evidence at the Public Utilities Board including at the 2014 Needs for and Alternatives to Review of Manitoba Hydro's Preferred Development Plan, the 2007-2008 and 2016 hearings to determine maximum fees for payday loans and the 2007, 2010, 2013, 2014 and 2016 Manitoba Public Insurance Rate Applications on the Rate Stabilization Reserve and investment strategy. He also provided written evidence in the 2013 payday loan review.

Wayne Simpson will rely on his expertise in applied econometrics, applied microeconomics, and social policy application and analysis in this proceeding.

Dr. Simpson's curriculum vitae was filed with the Consumers Coalition's application to intervene in this proceeding.

### **Duties**

The following duties were assigned to Dr. Simpson in the Manitoba Hydro 2017/18 and 2018/19 General Rate Application.

The Public Interest Law Centre retained Dr. Simpson's services to assist the Consumers Coalition with its participation in the Public Utilities Board review of Manitoba Hydro's Application on issues related to rate increases and rate impacts, bill affordability, and risk and uncertainty analysis.

Dr. Simpson's duties include:

- Rate increases and rate impacts
  - Conducting a literature review on regional impact analysis, developing a methodology and analyzing the impact of Manitoba Hydro rate increases on Manitoba economy and vulnerable rate classes;
  - Drafting first and second rounds of Information Requests;
  - Reviewing responses to Information Requests;
  - Drafting a report as expert evidence;

- Preparing response to Information Requests on the report; and
- Preparing for and attending the Public Utilities Board hearing, including the providing testimony.
- Bill affordability
  - Conducting a literature review on energy poverty, including identifying problems and options and conducting an analysis of options;
  - Drafting first and second rounds of Information Requests;
  - Reviewing responses to Information Requests;
  - Drafting a report as expert evidence;
  - Preparing response to Information Requests on the report; and
  - Preparing for and attending the Public Utilities Board hearing, including the providing testimony.
- Risk and uncertainty analysis
  - Reviewing past assessments and outstanding issues;
  - Reviewing Tab 7 Electric Load Forecast, Demand Side Management & Energy Supply, App 7.1 2016 Load Forecast;
  - Reviewing Tab 4 Financial Targets & Uncertainty Analysis;
  - Drafting first and second rounds of Information Requests;
  - Reviewing responses to Information Requests;
  - Drafting a report as expert evidence (if necessary);
  - Preparing response to Information Requests on the report; and
  - Preparing for and attending the Public Utilities Board hearing, including the providing testimony (if necessary).

Dr. Simpson's retainer letter includes that he is to provide evidence that:

- is fair, objective and non-partisan;
- is related only to matters that are within his area of expertise; and
- to provide such additional assistance as the Public Utilities Board may reasonably require to determine an issue.

Dr. Simpson's retainer letter also includes that his duty in providing assistance and giving evidence is to help the Public Utilities Board. This duty overrides and obligation to the Manitoba Branch of the Consumers Coalition.

## **Appendix B: Statement of Qualifications and Duties – Dr. Janice Compton**

### **Statement of Qualifications**

Dr. Janice Compton holds a PhD from Washington University in St. Louis (2005). She joined the University of Manitoba in 2005 and is Associate Professor in the Department of Economics. Her areas of academic expertise include labour economics, applied econometrics, applied microeconomics, household economics and migration. She has published papers in highly ranked labour economics and household economics journals, and has contributed to a volume on Household economics.

Dr. Compton's expertise in applied microeconomics and econometrics, and household economics is especially relevant to studying the impact of hydro rate increases on Manitoban families and the Manitoba economy. These fields focus on the changing behavior of households in reaction to policy and market signals (prices), and the effects of such policy changes on outcomes such as employment, household structure, and spending patterns. The methodologies used in these fields are advanced statistical techniques, primarily regression analysis.

Prior to entering academia, Dr. Compton worked at Statistics Canada and the Federal Ministry of Finance. She has worked extensively with large, national datasets and microsimulation models. Her expertise in labour economics, quantitative data analysis and econometrics, and social policy will be utilized for this analysis.

Dr. Compton's curriculum vitae was filed with the Manitoba Branch of the Consumers' Association of Canada's application to intervene in this proceeding.

### **Duties**

The following duties were assigned to Dr. Compton in the Manitoba Hydro 2017/18 and 2018/19 General Rate Application. The Public Interest Law Centre retained Dr. Compton's services to assist the Consumers Coalition with its participation in the Public Utilities Board review of Manitoba Hydro's Application on issues related to rate increases and rate impacts.

Dr. Compton's duties include:

- Conducting a literature review on regional impact analysis, developing a methodology and analyzing the impact of Manitoba Hydro rate increases on Manitoba economy and vulnerable rate classes;
- Drafting first and second rounds of Information Requests;
- Drafting a report as expert evidence;
- Preparing response to Information Requests on the report; and
- Preparing for and attending the Public Utilities Board hearing, including the providing testimony.

Dr. Compton's retainer letter includes that she is to provide evidence that:

- is fair, objective and non-partisan;
- is related only to matters that are within her area of expertise; and
- to provide such additional assistance as the Public Utilities Board may reasonably require to determine an issue.

Dr. Compton's retainer letter also includes that her duty in providing assistance and giving evidence is to help the Public Utilities Board. This duty overrides and obligation to the Consumers Coalition.



## **Appendix C: Methodology Details**

### **Multipliers**

Economic impact analyses of this type are commonly used to estimate the total economic benefit (cost) of investment or withdrawal proposals. An economic “multiplier” (also termed a Keynesian Multiplier) summarizes the successive rounds of increased (or reduced) expenditure that result from an initial investment (or withdrawal) within a jurisdiction. For example, if a firm withdrew \$100 of investment within the province, the full impact on the economy is not merely the \$100 decline, but also the subsequent withdrawals as reduced demand by one sector becomes reduced income in another. The \$100 withdrawal is a fall in industry output demand, which then leads to a fall in industry input demand. Since some of these inputs are imported, a certain proportion of the effect “leaks” out of the economy, so that the first round effect is not the full \$100. Let the proportion of inputs that are imported be  $r_1$ , then of the \$100 withdrawal, ( $\$100 \times r_1$ ) is reduced demand for Manitoban goods and services. This reduced demand again leads to lower demand for inputs needed to create this goods and services, some of which again are imported. So the second round results in ( $\$100 \times r_1 \times r_2$ ) reduced demand. The “chain reaction” that summarizes the full effect of the initial \$100 withdrawal is the direct effect plus the indirect effect of the first period, second period, third period, and so on. As long as a portion of the initial withdrawal is applied to imports, the effect on Manitoban producers falls with each stage and the process will converge to the full economic effect. In particular, if the leakage out of Manitoba is assumed to be a constant proportion  $r$  in each stage, then the multiplier would be  $1 + r + r^2 + r^3 + \dots$ , or  $1/(1-r)$ . The total economic impact would thus be  $-\$100/(1-r)$ .<sup>19</sup>

Statistics Canada calculates the multipliers for the provincial economies using Supply and Use tables which outline the web of transactions in the economy. Two types of multipliers are calculated – simple multipliers (Type I) which limit the impact to industry transactions, and induced or final multipliers (Type II) which also allow for the impact on wages and reduced household demand. The latest available provincial figures were calculated using the 2014 tables. Multipliers vary by industry, since industries vary by input structure and reliance on imports.

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<sup>19</sup> A more extensive discussion of the economic multiplier is contained in Gazel (1998) in which an economic impact analysis is performed to calculate that negative impacts associated with casinos.

A few important considerations should be noted. First, the funds must represent a true withdrawal from the economy rather than funds merely redirected from elsewhere in the economy. As noted in footnote 7, we assume that the revenue from the increased hydro prices re-circulated within the economy. Second, the size of the multipliers are related to the size of the region or jurisdiction, since leakages out of small communities will be relatively larger than leakages out of large regions. Third, the multiplier is a summary measure calculated for a typical or non-specific expenditure, but in practice will vary depending on the nature, such as the industrial category, of the initial impact. Finally, the multipliers values will change over time as the fundamental structure of the economy changes; hence it is not appropriate to employ multipliers from studies conducted in the distant past.

### **Direct Effect**

Typically, the investment or withdrawal that is the basis of an economic impact analysis industry specific – i.e. an industry expands or contracts within the province. When considering the impact of the proposed hydro price increases, the direct effect is more complex and broadly imposed across industries. We use the Supply and Use Tables from Statistics Canada allow us to estimate the direct effect of the hydro price increases on industry output. To this direct effect, the multipliers discussed above are applied to calculate the full effect on the economy.

We begin with the Use tables, which disaggregate spending of households, industries and government into the goods and services purchased for consumption or as inputs to final products. The household (final consumption) table<sup>20</sup> shows broad spending categories in columns (e.g. food, garments, electricity, parking, major tools and appliances, legal services, etc.) and detailed products in rows (canola, fresh potatoes, coal, funeral services, books, etc.).<sup>21</sup> We determine the required increase in spending on hydro-electricity (Table 1) and the proportion of household spending that this represents. Other goods and services must decline to offset this increase, as we have made the assumption that total spending by households remains constant in the direct effect.

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20 The Use table is one combined table, but as we have separate assumptions for the behaviour of households and industry, we split the table into segments.

21 There are 489 categories of goods and services and 86 broad categories of spending.

To determine the amount by which spending on each good and service declines, we apply income elasticities of demand (IED) – the percentage change in quantity demanded due to a percentage change in income. The additional spending required for hydro is treated as equivalent to a fall in income (i.e. income available for spending on other goods and services). If we ignored differences in income elasticity of demand, we could simply reduce the spending on each good or service by the same amount. However, we know that households do not respond to changes in income by proportionally adjusting their spending on goods and services. In response to a fall in income, spending on certain goods (goods with a small elasticity of demand) will not decline substantially while spending on other goods (goods with a large elasticity of demand) will drop more. We apply previously published income elasticities of demand (Appendix D) to calculate the reduced spending on broad categories (e.g. food, garments). Within each column, the row components (detailed goods and services) are reduced proportionally.<sup>22</sup> We sum across rows to determine the amount by which spending on each detailed good and service is lessened to offset the rise spending on hydro.

To determine how this affects industry, we move to the Supply table, which outlines the industries and/or government services from which each detailed good and service is produced.<sup>23</sup> Many come from single industries (e.g. all Manitoba grown canola is produced in the industry labelled “Crop Production (excluding greenhouses)”) while others originate from multiple industries (e.g. 86 percent of Manitoba grown fresh vegetables are produced in Crop production (excluding greenhouses), the other 14% are produced in greenhouses). The Supply table also indicates the proportions of goods and services consumed in Manitoba that are imported from other provinces or countries (e.g. 32 percent of fresh vegetables consumed in Manitoba are produced in Manitoban Crop production (excluding greenhouses), 5 percent are grown in Manitoban greenhouses and 63 percent are imported).

We assume that the calculated decline in goods and services from the Use table are proportionally applied across Manitoban industries in the Supply table (e.g. a 1\$ decline in fresh vegetables would reduce output of Crop Production (excl. greenhouses) by \$0.32 and greenhouse

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22 A further adjustment must be made since the application of the IEDs implies that the total spending decline across columns does not sum to the total spending increase on hydro. The decline in spending on each cell is therefore adjusted slightly and equally to account for this residual.

23 The 486 goods and services are categorized into 237 industries and government services.

production would fall by \$0.05)). This is done for each of the detailed goods and services and summed within industries and government services, resulting in our direct effect due to households.

We repeat the exercise with the Use tables for Industry and Government – first using the Use Tables to determine the decline in spending on detailed goods and services (i.e. inputs) that are necessary to offset the rise in hydro spending and then applying data from the Supply Tables to connect these reductions to the relevant industries and government services.

The decline for each industry and government service from the Household, Industry and Government sectors are summed, giving the full direct effect of the hydro price increase, as shown in Table 5.

## Appendix D: Income Elasticity of Demand

Simpson & Stevens Category Name	Elasticities	Statistics Canada Categories
Food Purchased from stores	0.54	Food Food and non-alcoholic beverage services Non-alcoholic beverages
Tobacco & Alcohol	0.88	Alcoholic beverages Alcoholic beverage services Tobacco
Clothing	1.17	Garments Cleaning of clothing Clothing materials, other articles of clothing and clothing accessories Footwear
Shelter Excluding Electricity	0.7	Paid rental fees for housing Imputed rental fees for housing
Household Operations	0.78	Materials for the maintenance and repair of the dwelling Services for the maintenance and repair of the dwelling Water supply and sanitation services
Household Equipment & Furnishings	1.31	Furniture and furnishings Carpets and other floor coverings Household textiles Major household appliances Small electric household appliances Major tools and equipment Small tools and miscellaneous accessories Other semi-durable household goods Other non-durable household goods Repair of personal and household goods except vehicles Renting and leasing of personal and household goods except passenger vehicles Other services related to the dwelling and property
Health Care	0.62	Therapeutic appliances and equipment Pharmaceutical products and other medical products Out-patient services Hospital services
Transportation	1.5	New passenger cars New trucks, vans and sport utility vehicles Used motor vehicles Other vehicles Spare parts and accessories for vehicles

		Fuels and lubricants Maintenance and repair of vehicles Parking Passenger vehicle renting Other services related to the operation of transport equipment Railway transport Urban transit Interurban bus Taxi and limousine Air transport Water transport
		Other transport services
Miscellaneous	1.28	Postal services Telecommunication equipment Telecommunication services Information processing equipment Recording media Undertaking and other funeral services Audio-visual and photographic equipment
Recreation	1.34	Major durables for outdoor recreation Musical instruments and major durables for indoor recreation Games, toys and hobbies Equipment for sport, camping and open-air recreation Garden products, plants and flowers Veterinary and other services for pets Pets and pet food Recreational and sporting services Cable, satellite and other program distribution services Cinemas Photographic services Other cultural services Accommodation services
		Games of chance
Reading	0.87	Books Newspapers and periodicals Miscellaneous printed matter and stationery and drawing materials
Education	3.83	University education Other education
Miscellaneous	1.28	Life insurance Health insurance Insurance related to transport Property insurance Implicit loan charges

Implicit deposit charges  
 Stock and bond commissions  
 Other actual financial charges  
 Trusteed pension funds  
 Mutual funds  
 Postal services  
 Telecommunication equipment  
 Telecommunication services  
 Information processing equipment  
 Recording media  
 Undertaking and other funeral services  
 Audio-visual and photographic equipment  
 Legal and other services

Personal Care	0.9	Personal grooming services Electrical appliances for personal care Other appliances, articles and products for personal care Jewellery, clocks and watches Other personal effects Child care services outside the home Child care services in the home
		Other social services
Excluded	0	Electricity Gas Other fuels

## Appendix E: Multipliers for the 10 Largest Industries, Government Categories and Total

	Percent of Total Output	Type I: Simple Multipliers (Direct & Indirect)			Type II: Total multipliers (direct, indirect and induced)		
		GDP basic price	Labour income	Jobs	GDP basic price	Labour income	Jobs
<b>Largest 10 Industries</b>							
Owner-occupied dwellings	5.12	1.08	0.00	0.00	1.10	0.00	0.00
Crop production	4.11	1.36	1.97	1.82	1.45	2.17	2.04
Residential building construction	3.11	1.49	1.44	1.49	1.79	1.61	1.73
Truck transportation	2.69	1.58	1.49	1.49	1.95	1.68	1.71
Lessors of real estate	2.13	1.29	3.15	2.45	1.37	3.52	2.78
Animal production (except aquaculture)	1.99	1.92	1.76	1.45	2.12	1.91	1.56
Meat product manufacturing	1.97	1.56	1.74	1.89	1.76	1.94	2.12
Non-residential building construction	1.95	1.71	1.53	1.64	2.10	1.71	1.94
Electric power generation, transmission and distribution	1.78	1.06	1.17	1.38	1.14	1.31	1.81
Financial investment services, funds and other financial vehicles	1.76	1.97	1.79	1.97	2.39	2.01	2.37
Weighted Average of the top 10 Industries	26.60	1.44	1.45	1.39	1.63	1.61	1.61
<b>Government Categories</b>							
Elementary and secondary schools	2.03	1.10	1.08	1.08	1.41	1.21	1.26
Community colleges and C.E.G.E.P.s	0.27	1.20	1.13	1.18	1.51	1.27	1.43
Universities	1.23	1.11	1.11	1.14	1.33	1.25	1.35
Other educational services	0.01	1.26	1.14	1.32	1.62	1.29	1.64
Hospitals	3.55	1.21	1.15	1.20	1.52	1.29	1.41
Nursing and residential care facilities	0.88	1.11	1.07	1.11	1.44	1.21	1.33
Defence services	0.73	1.22	1.19	1.32	1.49	1.33	1.63
Other federal government services (except defence)	1.85	1.21	1.16	1.35	1.50	1.30	1.69
Other provincial and territorial government services	4.84	1.92	1.78	2.60	2.27	1.99	3.12
Other municipal government services	2.09	1.30	1.29	1.39	1.56	1.44	1.63
Other aboriginal government services	0.76	1.16	1.12	1.11	1.45	1.27	1.23
Weighted Average of Government Sectors	18.24	1.38	1.32	1.59	1.69	1.48	1.89
<b>Total</b>	100	1.33	1.35	1.35	1.56	1.51	1.56