Environment

Ontario Ministry of Natural Resources

Economic Impact of Waterpower Projects on Crown Lands in Ontario

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Project Number:

60240297

Date:

April, 2012

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April 12, 2012

Safa Fayek
Policy and Program Advisor
Ministry of Natural Resources
Renewable Energy Program
300 Water Street,
Peterborough, Ontario K9J 8M5

Dear Mr. Fayek:

Project No: 60240297

Regarding: Economic Impact of Waterpower Projects on Crown Lands in Ontario - FINAL

AECOM is pleased to submit the first draft of our assessment of the economic impact of waterpower projects on Crown lands in Ontario. As requested, we have developed a purpose-built model that simulates the economic effects from the potential development of one or a combination of all (41) of the waterpower projects proposed on Crown land in Ontario. In addition, we have discussed the implications of these projects for local and regional communities.

In general, the results appear to indicate that these 41 waterpower projects have the potential to drive many jobs in the local, regional and provincial economies if they were to proceed.

We look forward to discussing this draft report with you.

Sincerely,
AECOM Canada Ltd.

Andrew Keir
Senior Consultant

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Revision Log

Revision #	Revised By	Date	Issue / Revision Description
1	Andy Keir	February 17, 2012	Incorporation of consolidated comments on AECOM draft report from February 13, 2012
2	Andy Keir	March 23, 2012	Incorporation of addition second comments.

AECOM Signatures

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Glossary of Terms

Direct Effects – Initial changes in employment, income and output resulting from production spending in a subject sector

Full-time Equivalent (FTE) Jobs – A ratio indicating the level of employment associated with a business where an FTE of 1.0 represents one person working at full time hours and an FTE of 0.5 represents one person working for half of that time.

Gross Domestic Product (GDP) – The value of all currently produced final goods and services created in a particular time period. This can be considered for the entire economy, or by industry.

Gross Output – The total value of sales related to a good or service, including the value of intermediary goods or services used in their production.

Input-Output (I/O) Models – Portray the economy of a geographic area for a fixed period of time. The models divide all economic activity into sectors. They initially calculate the effect of spending to produce one dollar's worth of output in a subject economic sector. Subsequently, they calculate the "rippled effects" of this first expenditure in all other sectors of the economy that support the subject sector.

Indirect Effects – Subsequent changes in employment, income and output in all economic sectors that support those sectors that are directly affected.

Induced Effects – Subsequent changes in employment, income and output in all economic sectors as a result of income spending by employees in the direct and indirect sectors.

Labour Income – The sum of wages and salaries plus supplementary income.

Model Shock – Specified expenditure in one or more industries or commodities within the input matrices that underlie the Statistics Canada Input-Output model.

Multipliers – Factors of proportionality that measure the effect of one variable on another. For example $ 1 million in GDP may result in $1.3 million in Gross Output. The GDP multiplier to Gross Output multiplier is therefore 1.3.

Nominal Dollars – Are current dollars that include the effects of inflations

Real Dollars – Are constant dollars with the effects of inflation removed

Tax – the tax outputs generated by the IO model are:

Federal

- Federal trading profits on lottery and race tracks
- Federal gas tax
- Federal duty tax
- Federal air tax
- GST

Provincial

- Provincial gallon tax
- Provincial trading profits
- Provincial gas tax
- Provincial amusement tax
- HST
- PST

Executive Summary

There are 41 waterpower projects totaling approximately 171 MW) that are proposed on Crown land in Ontario in the coming 4 years. The Ministry of Natural Resources (MNR) has requested that AECOM assess the economic impact of these projects.

In total the project development costs amount to roughly $811 million and operating and maintenance costs to a horizon year of 2035 sum to $490 million. The provincial charges associated with land and water leases to the horizon year of 2035 amount to roughly $45 million. Revenues derived from the projects to 2035 sum to approximately $2.0 billion and net revenues over the same period amount to $629 million.

The economic outputs generated by the projects are significant. Full time equivalent job creation (person years of employment), amounts to 9,900 with an associated labour income of $677 million. GDP and gross output respectively sum to $1.3 and $2.3 billion respectively. The tax outputs exclusive of business land and income tax amount to $63 million with 27% of these monies going to the Federal Government and 73% going to the Province.

Assuming an annual GHG output of 228 tonnes per MW the projects at net efficiency (55% of nameplate capacity) will account for approximately 458 thousand tonnes of GHG emissions to 2035. Relative to the equivalent energy production from coal, the offset value assuming a GHG offset price of $15 per tonne is in the order of $227 million to 2035.

The majority of project economic effects are concentrated in the Northeast Economic Region followed by the Kitchener-Waterloo-Barrie Region and then the Northeast and Kingston-Pembroke Regions.

Looking at employment, it is estimated that approximately 9% of the jobs fall to local communities in the vicinity of the projects and then at the regional level beyond the communities the capture rates are respectively 3% for the Northwest and Kingston-Pembroke Regions, 22% for the Northeast Region, and 7% for the Kitchener-Waterloo - Barrie Region. Tables 21 and 22 in the body of the report summarize the distribution of economic effects

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1. Introduction

The Ministry of Natural Resources (MNR) has a mandate to support the sustainability of Ontario's natural resource economy while building healthy and resilient ecosystems. The MNR recognizes that waterpower projects on Crown lands have the potential to contribute to both of these objectives.

Currently the MNR has 41 applications for Crown land based waterpower projects that have been awarded Feed-in-Tariff (FIT) contracts from the Ontario Power Authority (OPA)[1]. In an effort to support the ongoing decision-making process for these and other possible waterpower projects the MNR retained AECOM to prepare an economic impact analysis report on the estimated value of the proposed new waterpower projects (41) to the province of Ontario, local and regional communities, and Aboriginal communities.

A key component of this assignment also included development of a computer-based model to enable estimation and forecasting of possible economic impacts and benefits from waterpower projects on Crown lands to a horizon year of 2035.

This report outlines the project specific objectives and deliverables; the approach and methods used to estimate economic impacts; key findings of the economic impact model; other identified socio-economic implications; and a summary of key findings.

1.1 Objectives

The specific objectives of this assignment are to:

- Estimate the overall economic impact to Ontario and local/regional communities, including the following parameters:
- Direct, indirect, and induced local, regional and Ontario level impacts;
- Impact on Gross Provincial Product;
- Impact on direct and indirect employment;
- Impact on overall revenues for the MNR, province, federal, and local municipalities; and
- Impacts and benefits for years 1-5, year 10, and year 25.
- Implications for the following socio-economic considerations:
- Economic diversification for northern and Aboriginal communities;
- Economic benefits for Aboriginal and other communities;
- Revenue generation for MNR and the Ontario government;
- Cumulative impacts of multiple projects per geographic area; and
- Value of carbon reduction credits or offsets associated with these projects.

1.2 Deliverables

There are two deliverables from this assignment:

- A computer-based model that simulates the economic impact derived from one, more or all 41 waterpower projects proposed on Crown lands in Ontario; and

[1] For a complete overview of the FIT program please see: http://fit.powerauthority.on.ca/what-feed-tariff-program

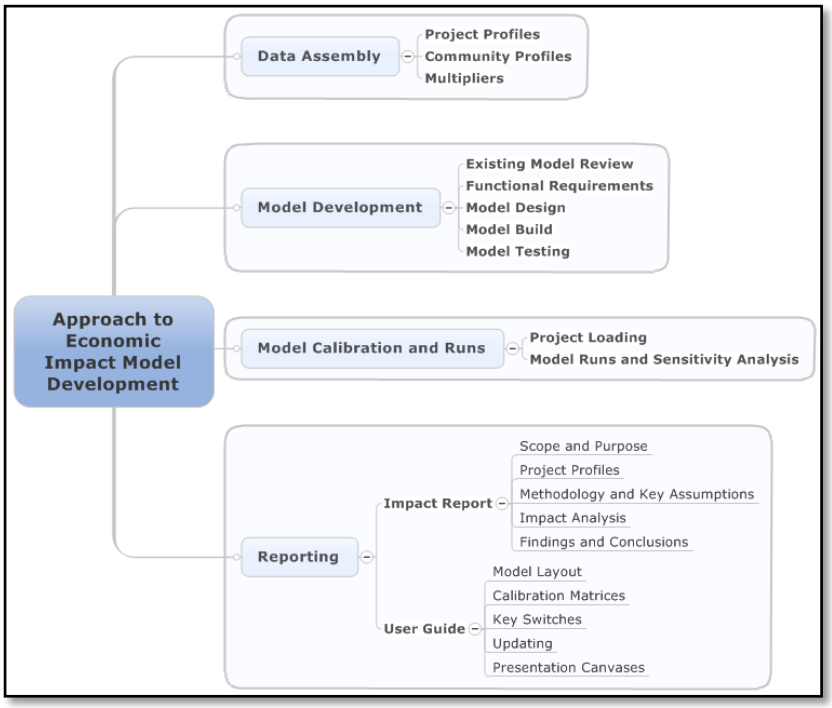
- An economic impact analysis report that summarizes the potential economic benefits derived from waterpower projects on Crown lands in Ontario.

2. Approach and Methods

The approach to the assignment involved the following elements:

- Information and knowledge gathering,
- Economic model development, testing and calibration,
- Analysis and interpretation, and
- Reporting.

Figure 1: Approach to Economic Model Development



With respect to the economic model, only certain enquiries can be addressed, particularly relating to the following:

- Employment,
- GDP,
- Labour income,
- Gross Output
- Tax revenues to the Federal and Provincial Governments
- GHG outputs.

The key steps in the model development are illustrated in Figure 1. The economic model was developed using Quantrix – which is user-defined spreadsheet modeling software.

With respect to all other more qualitative enquiries relating to local and regional economic development and diversification opportunities and implications for Aboriginal communities the following information sources were used:

- Statistics Canada economic multiplier data derived from the Inter-provincial Input/Output Model
- Statistics Canada data providing population and industry sector profiles for Ontario's Economic Regions
- GHG factors for water power and other energy generation sourced from technical literature
- Literature review of current publications relating to economic development in northern Ontario,
- Input from:
    I. AECOM engineers currently assisting development of waterpower projects in Ontario,
    II. Byron Leclair, Director of Energy Projects, Pic River First Nation,
    III. Paul Norris, President of the Ontario Waterpower Association, and

Estimation of local and regional social and economic effects is qualitative in nature. The experience of Pic River First Nation is intended as a case example only. No attempt was made to gather direct experiences from other communities.

IV. AECOM's own experience in working in all regions across Ontario.

In addition to the preceding information sources, AECOM conducted a review of various public data sources that help to describe availability and capacity of supporting construction and operating services in each of the Provincial Economic Regions as a means to help allocate the distribution of benefits to the affected local and regional communities.

3. Economic Impact Model

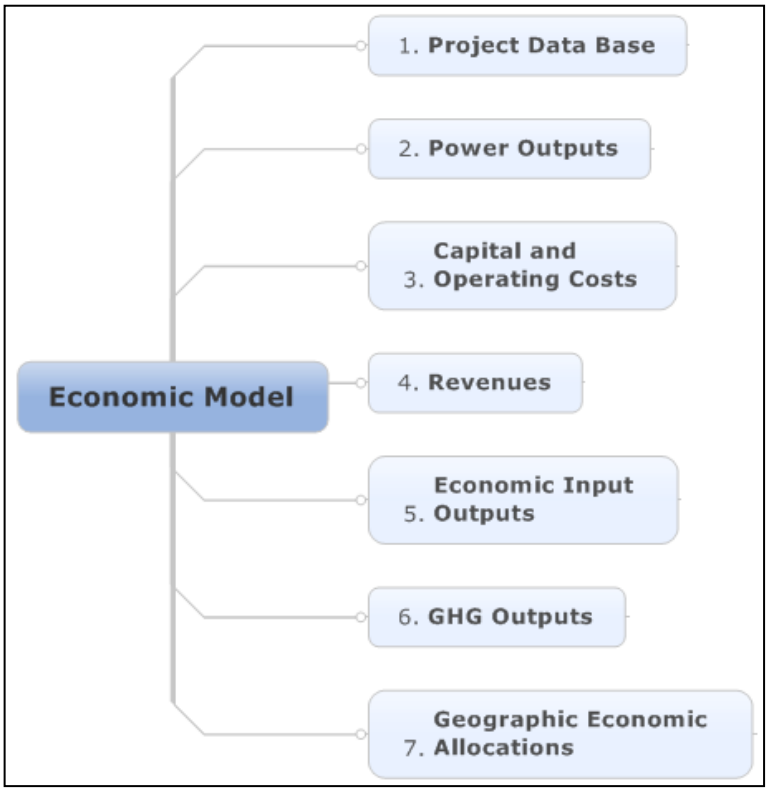
This section is comprised of two sub-sections:

a) Description of the model parameters and key driving assumptions, and
b) Key findings and interpretation of the model outputs.

3.1 Model Description and Parameters

The economic impact model is comprised of 7 Modules (Figure 2) starting with the project data base and project selection. Module 2, addresses power output based on production efficiency. Module 3 deals with capital and operating costs and module 4 addresses revenues. The 5th module calculates economic outputs using multipliers derived from Statistics Canada's Interprovincial Input/Output Model. The 6th module calculates project GHG outputs. The 7th module distributes economic outputs for the 41 study projects based on user-definition of how project expenditures for both development and operations are allocated to local and regional communities. Each of these model components are outlined in the following sub-sections.

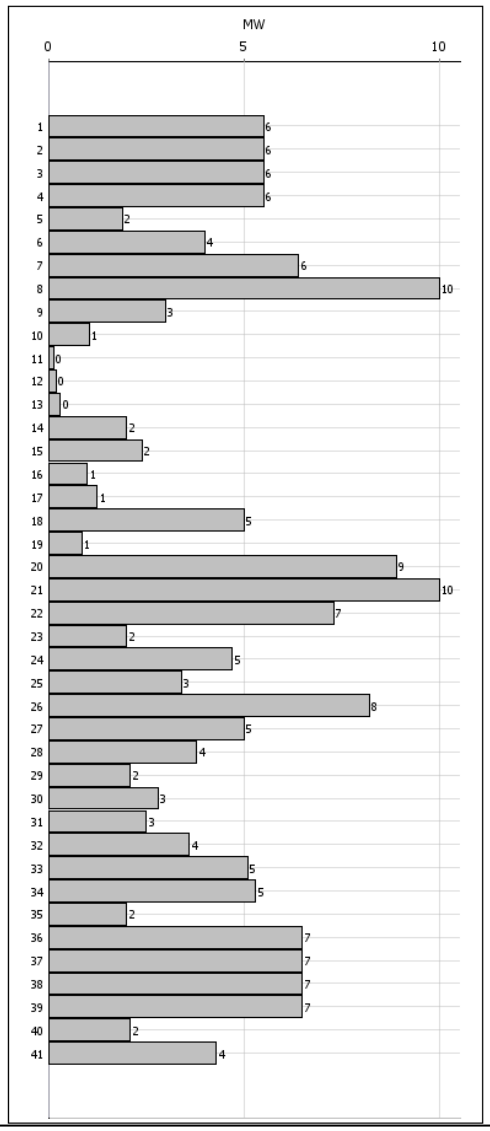
Figure 2: Economic Model Components



The project inventory for this assignment is comprised of 41 waterpower projects of varying size and scale (Figure 3) that together total approximately 171 MW of generating capacity. The description of each project in terms of size, location and ownership structure and generating capacity is the starting point for the model.

A separate document (User Manual) details the specifics of the economic model and provides guidance on how to operate the model and change parameters to meet various user-defined needs and applications on a go-forward basis.

Project Nameplate Capacities (MW)



Project Selection

	Include	Project	Applicant
1	yes	Old Woman Falls Hydroelectric Project	Nipiy-OWF HydroKap LP
2	yes	White Otter Falls Hydroelectric Project	Nipiy-OWF HydroKap LP
3	yes	Camp Three Rapids Hydro Electric Project	Amik-CTR HydroKap LP
4	yes	Big Beaver Falls Hydro Electric Project	Amik-BBF HydroKap LP
5	yes	Wasdell Falls Power Project	Wasdell Falls Power Corporation
6	yes	Trout lake River Hydroelectric Project	Horizon Hydro LP
7	yes	High Falls Hydropower Development	High Falls Development Partnership Inc
8	yes	Namewaminikan Waterpower Project	Namewaminikan Hydro Inc
9	yes	Wendigo Waterpower Project	Wendigo Power Partnership Inc
10	yes	Lizard Creek Small Hydro Project	Lizard Power Partnership Inc
11	yes	McCreights Generating Station	Gravel Power Corp
12	yes	Shaw Dam Generating Station	Gravel Power Corp
13	yes	Little Rapids Generating Station	Gravel Power Corp
14	yes	Pecors Power Small Hydro Project	Pecors Power_Cantech Construction Ltd
15	yes	McGraw Falls Dam	Xeneca Limited Partnership
16	yes	Birch Creek Hydro	6324827 Canada Inc
17	yes	Larder Lake and Raven Falls	Xeneca Limited Partnership
18	yes	North Bala Small Hydro Project	Swift River Energy LP
19	yes	Charlton Dam GS Expansion	Kagawong Power Incorporated
20	yes	Gitchi Animiki Behzhig Generating Station	Pic Mobert Hydro Power Joint Venture
21	yes	Gitchi Animiki Niizh Generating Station	Pic Mobert Hydro Power Joint Venture
22	yes	Four Slide Falls	Xeneca Limited Partnership
23	yes	McCarthy Chute	Xeneca Limited Partnership
24	yes	Wanatago Falls	Xeneca Limited Partnership
25	yes	Wabageshik Rapid at Outlet Lake	Xeneca Limited Partnership
26	yes	Lapinigagam Rapids	Xeneca Limited Partnership
27	yes	Middle Twp. Buchan	Xeneca Limited Partnership
28	yes	Near North Boundary Twp Buchan	Xeneca Limited Partnership
29	yes	Cascade Falls	Xeneca Limited Partnership
30	yes	Allen and Struthers	Xeneca Limited Partnership
31	yes	Outlet Kapuskasing Lake	Xeneca Limited Partnership
32	yes	Ivanhoe River_The Chutes	Xeneca Limited Partnership
33	yes	Ivanhoe River_Third Falls	Xeneca Limited Partnership
34	yes	Big Eddy at CPR Bridge	Xeneca Limited Partnership
35	yes	McPherson Falls	Xeneca Limited Partnership
36	yes	Neeskah Project	Neeskah Energy Limited Partnership
37	yes	Peeshoo Project	Peeshoo Energy Limited Partnership
38	yes	Wahpeestan Project	Wahpeestan Energy Limited Partnership
39	yes	Wapoose Project	Wapoose Energy Limited Partnership
40	yes	Marter Twp_Blanche River	Xeneca Limited Partnership
41	yes	At Soo Crossing	Xeneca Limited Partnership

	Nameplate Capacity (MW)
Total Σ	170.57

Figure 3: Generation Capacity (Nameplate MW) for 41 Waterpower Projects on Crown Land

3.1.1 Costs

Cost calculations for each of the waterpower projects are comprised of the following user-specified sub-components:

- Cost escalation factor – for this model has been set at a CPI increase of 2% per year
- Efficiency relative to nameplate capacity - has been set at 55% for all projects
- Capital costs:

- Assumptions – the capital cost per MW, for this model is set at $5.0 million/MW[2]
- Allocation of costs to various planning and construction activities (Table 1)

Table 1: Capital Cost Allocations (per MW) - Base Case

			Allocation	Cost
Planning	Engineering	Pre-feasibility	0.2%	$10,000
		Feasibility	1.6%	$80,000
		Detailed Engineering	7.3%	$365,000
	Site Investigations	Pre-feasibility	0.2%	$10,000
		Feasibility	0.4%	$20,000
		Detailed Engineering	1.1%	$55,000
	Environmental Assessment		3.3%	$165,000
	Legal		3.3%	$165,000
	Accounting		2.4%	$120,000
	Project Management		2.2%	$110,000
	Sum of Planning		22.0%	$1,100,000
Construction	Civil	Overflow spillway/dam	7.8%	$390,000
		Adduction	5.6%	$280,000
		Powerhouse	20.0%	$1,000,000
	Mechanical Electrical	Turbine and Generator	27.8%	$1,390,000
		Balance of Plant	9.0%	$450,000
		Substation and Switchyard	5.6%	$280,000
		Transmission line	2.2%	$110,000
	Sum of Construction		78.0%	$3,900,000
		Total Capital Expenditures	100.0%	$5,000,000

Source: AECOM, 2012

- Operating costs:
  - Estimated life span of project – model assumes a 40 year life span for projects (note: calculations in this report do not reflect full lifespan of projects as a horizon year of 2035 has been used for reporting purposes)
  - Operating charges for land use, water use, and insurance are calculated as a percent of capital
  - Operating costs (annual) broken into various categories such as maintenance and administration , (Table 2)

Table 2: Operating Cost Allocations per (MW)

Fixed Operating Cost per MW	$22,000
Maintenance Reserve per MW	$20,000
Administration per MW	$17,000
Insurance Premium	$75,000
Total Operating Expenditures	$134,000

Source: AECOM, 2012

- Provincial charges:
  - Calculated on a flat revenue rate of $40 per MWh
  - Property Tax levels are set out in Table 3 and the Water Rental charge is 9.5%

[2] *Figure sourced from AECOM Engineering Team that is routinely involved with development of small waterpower projects*

– Also take into account provincial charge "holidays" for New, Retrofit, Redevelopment and Upgrade projects (Note: for purposes of this report these holidays are estimated at 10 years for all project types; also note that although provided for in the model there are no upgrade projects among the subject projects for this report).

Table 3: Property Tax Rates on Gross Revenue According to Power Output

<=50 GWh	2.5%
>50-400 GWh	4.5%
>400-700 GWh	6.0%
>700 GWh	26.5%

Source: Ontario Power Authority, 2009

3.1.2 Revenues

Revenues are generated once the projects are constructed and in operation. The power purchase prices and rate inflation factors, along with adders for community and Aboriginal equity positions are used to determine annual revenues. The power purchase prices are set at $0.131/KWh for facilities under 10 MW, and at $0.121 for facilities greater than 10 MW. Going forward, these prices are inflated at 2% until start-up and thereafter at 2% on 20% of the total production or output.

In addition to power purchase prices some projects are eligible for Aboriginal and or community adder fees. Aboriginal adder fees are calculated at $0.009 per KWh multiplied by the level of Aboriginal equity ownership in the project. Adder fees for community equity are calculated at $0.006 per KWh multiplied by the level of community equity ownership in the project.

3.1.3 Provincial Input/Output

The central drivers in the estimation of economic impacts from one or all of the 41 waterpower projects proposed for Crown land in Ontario are labour, GDP and labour income multipliers as determined through input/output analysis (Table 4).

The Inter-Provincial Input-Output model for 2007 was the basis for the determination of economic multipliers and these values were inflated to 2011 dollars. The following industry sector was "shocked" for the development phase: Electrical Power Engineering and Construction. For the operations phase the sector "shocked" was Electrical Power Generation, Transmission and Distribution.

The basic interpretation using employment as an example is that for every $1.0 million invested in waterpower development (construction) about 4.35 full-time equivalent direct jobs are created. An additional 2.66 indirect and 2.06 induced jobs are also similarly created during the development phase.

These multipliers provide the basis for estimating total economic effects at the provincial level only. In order to determine the potential economic benefits to local and regional communities it is necessary to determine the allocation of expenditures (for both the development and operation phases) that might accrue to local and regional communities.

Table 4: Economic Impact Multipliers (2007 Base year)

		Gross Output	GDP	Labour Income	FTE Jobs
Development	Direct	$1,000,000	$525,576	$273,814	4.35
	Indirect	$448,100	$226,622	$160,266	2.66
	Induced	$330,243	$199,462	$113,854	2.06
	Total	$1,778,343	$951,660	$547,934	9.07
Operations	Direct	$1,000,000	$559,445	$197,814	2.23
	Indirect	$371,900	$206,545	$156,831	2.63
	Induced	$233,520	$140,915	$80,457	1.46
	Total	$1,605,420	$906,905	$435,102	6.31

Source: Statistics Canada Interprovincial Input/Output Model

3.1.4 Greenhouse Gas Outputs

A variety of studies are available that set out the life cycle greenhouse gas outputs for various types of electricity generation. The table that follows indicates the tonnes per MW assumed in the subject model for different types of electricity generation.

Table 5: GHG Lifecycle Outputs for Alternative Types of Electricity Generation

	Tonnes/MW
Lignite	9,233
Coal	7,779
Diesel	6,745
Oil	6,421
Natural Gas	4,371
Solar PV	745
Biomass	394
Nuclear	254
Hydroelectric	228
Wind	228

Source: World Nuclear Association, 2011

The trading value per tonne of GHG emissions incorporated in the analysis in this report is based on $15 per tonne. This is the current North American trading value for carbon in California as per a Carbon Point newsletter dated February 10, 2012.

3.1.5 Geographic Allocations

Development Expenditures

The development of waterpower projects can be divided into 2 phases: Planning and Construction. Much of the development phase for any waterpower project relies on professional services and trades that in many cases are not available in northern or remote regions of Ontario. This is because most of the skills are unique to waterpower

developments no matter the location of the project. The costs for each of the development phases were further divided into sub-categories of activity and estimates for allocation to local and regional communities were made.

Based on input from AECOM engineers and the experience of Pic River Hydro, six expenditure categories in the development stage were considered to likely have some degree of local content in the northern regions of the province:

- Engineering feasibility,
- Site investigation feasibility,
- Environment assessment,
- Overflow spillway/dam,
- Adduction, and
- Powerhouse construction.

The projects are located in four economic regions in the Province of Ontario. Refer to Appendix C for a map of the Regions and refer to Appendix D for a map of the project locations.

In the Northwest Region, the region as whole was assumed to capture between 10% and 40% of the above expenditure categories, (Table 6).

Expenditure allocations for the Northeast, Kitchener-Waterloo-Barrie and Kingston-Pembroke Regions are likely to have higher allocations as illustrated in Tables 7, 8, and 9 respectively.

The higher percentage of local and regional allocation in the Kitchener-Waterloo-Barrie Region reflects the higher concentration of supporting manufacturing and other services required for waterpower developments.

Table 6: Allocation of Capital Expenditures to Local and Regional Communities in the Northwest Region

Northwest Region			Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
					NW	NE	KP	KWB		
Planning	Engineering	Pre-feasibility	0%	30%		2%	2%	8%	58%	100%
		Feasibility	5%	30%		2%	2%	7%	54%	100%
		Detailed Engineering	0%	30%		2%	2%	8%	58%	100%
	Site Investigations	Pre-feasibility	0%	30%		2%	2%	8%	58%	100%
		Feasibility	5%	30%		2%	2%	7%	54%	100%
		Detailed Engineering	0%	30%		2%	2%	8%	58%	100%
	Environmental Assessment		10%	30%		2%	2%	7%	50%	100%
	Legal		0%	30%		2%	2%	8%	58%	100%
	Accounting		0%	30%		2%	2%	8%	58%	100%
	Project Management		0%	30%		2%	2%	8%	58%	100%
Construction	Civil	Overflow spillway/dam	5%	30%		2%	2%	7%	54%	100%
		Adduction	5%	30%		2%	2%	7%	54%	100%
		Powerhouse	5%	30%		2%	2%	7%	54%	100%
	Mechanical Electrical	Turbine and Generator	0%	10%		3%	3%	10%	75%	100%
		Balance of Plant	0%	10%		3%	3%	10%	75%	100%
		Substation and Switchyard	0%	10%		3%	3%	10%	75%	100%
		Transmission line	0%	10%		3%	3%	10%	75%	100%

Source: AECOM, 2012

Table 7: Allocation of Capital Expenditures to Local and Regional Communities in the Northeast Region

Northeast Region			Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
					NW	NE	KP	KWP		
Planning	Engineering	Pre-feasibility	0%	40%	1%		2%	7%	51%	100%
		Feasibility	5%	40%	1%		2%	6%	47%	100%
		Detailed Engineering	0%	40%	1%		2%	7%	51%	100%
	Site Investigations	Pre-feasibility	0%	40%	1%		2%	7%	51%	100%
		Feasibility	5%	40%	1%		2%	6%	47%	100%
		Detailed Engineering	0%	40%	1%		2%	7%	51%	100%
	Environmental Assessment		10%	40%	1%		2%	6%	43%	100%
	Legal		0%	40%	1%		2%	7%	51%	100%
	Accounting		0%	40%	1%		2%	7%	51%	100%
	Project Management		0%	40%	1%		2%	7%	51%	100%
Construction	Civil	Overflow spillway/dam	5%	40%	1%		2%	6%	47%	100%
		Adduction	5%	40%	1%		2%	6%	47%	100%
		Powerhouse	5%	40%	1%		2%	6%	47%	100%
	Mechanical Electrical	Turbine and Generator	0%	30%	1%		2%	8%	60%	100%
		Balance of Plant	0%	30%	1%		2%	8%	60%	100%
		Substation and Switchyard	0%	30%	1%		2%	8%	60%	100%
		Transmission line	0%	30%	1%		2%	8%	60%	100%

Source: AECOM, 2012

Table 8: Allocation of Capital Expenditures to Local and Regional Communities for Projects in the Kitchener-Waterloo-Barrie Region

Kitchener-Waterloo-Barrie Region			Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
					NW	NE	KP	KWP		
Planning	Engineering	Pre-feasibility	10%	80%	0%	0%	0%		9%	100%
		Feasibility	10%	80%	0%	0%	0%		9%	100%
		Detailed Engineering	10%	80%	0%	0%	0%		9%	100%
	Site Investigations	Pre-feasibility	10%	80%	0%	0%	0%		9%	100%
		Feasibility	10%	80%	0%	0%	0%		9%	100%
		Detailed Engineering	10%	80%	0%	0%	0%		9%	100%
	Environmental Assessment		15%	80%	0%	0%	0%		5%	100%
	Legal		10%	30%	1%	2%	2%		56%	100%
	Accounting		0%	30%	1%	2%	2%		65%	100%
	Project Management		0%	30%	1%	2%	2%		65%	100%
Construction	Civil	Overflow spillway/dam	15%	80%	0%	0%	0%		5%	100%
		Adduction	15%	80%	0%	0%	0%		5%	100%
		Powerhouse	15%	80%	0%	0%	0%		5%	100%
	Mechanical Electrical	Turbine and Generator	0%	80%	0%	1%	1%		19%	100%
		Balance of Plant	10%	80%	0%	0%	0%		9%	100%
		Substation and Switchyard	0%	80%	0%	1%	1%		19%	100%
		Transmission line	0%	80%	0%	1%	1%		19%	100%

Source: AECOM, 2012

Table 9: Allocation of Expenditures in Local and Regional Communties for Projects in the Kinsgton-Pembroke Region

Kingston-Pembroke Region			Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
					NW	NE	KP	KWP		
Planning	Engineering	Pre-feasibility	0%	40%	1%	2%		7%	51%	100%
		Feasibility	10%	40%	1%	2%		6%	43%	100%
		Detailed Engineering	0%	40%	1%	2%		7%	51%	100%
	Site Investigations	Pre-feasibility	0%	40%	1%	2%		7%	51%	100%
		Feasibility	10%	40%	1%	2%		6%	43%	100%
		Detailed Engineering	0%	40%	1%	2%		7%	51%	100%
	Environmental Assessment		15%	40%	0%	1%		5%	38%	100%
	Legal		0%	40%	1%	2%		7%	51%	100%
	Accounting		0%	40%	1%	2%		7%	51%	100%
	Project Management		0%	40%	1%	2%		7%	51%	100%
Construction	Civil	Overflow spillway/dam	5%	40%	1%	2%		6%	47%	100%
		Adduction	5%	40%	1%	2%		6%	47%	100%
		Powerhouse	5%	40%	1%	2%		6%	47%	100%
	Mechanical Electrical	Turbine and Generator	0%	30%	1%	2%		8%	60%	100%
		Balance of Plant	0%	30%	1%	2%		8%	60%	100%
		Substation and Switchyard	0%	30%	1%	2%		8%	60%	100%
		Transmission line	0%	30%	1%	2%		8%	60%	100%

Source: AECOM, 2012

Operating Expenditures

The allocation of operating expenditures is set out in Tables 10 through 13 for each study region. The local community can be expected to capture the majority of expenditures associated with fixed operating costs and maintenance reserves. They will also capture some of the administrative expenditures. The economic regions will only capture a relatively small portion of these expenditures except for the Kitchener-Waterloo-Barrie Region which is likely to capture a significant percentage given its exceptionally strong and diversified economic profile relative to the other economic regions. Insurance costs are likely to flow outside the region to other parts of the Province as are Provincial Charges.

Table 10: Allocation of Operating Expenditures for Projects in the Northwest Region

Northwest Region	Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
			NW	NE	KP	KWP		
Fixed Operating Cost per MW	80%	10%		0%	0%	1%	9%	100%
Maintenance Reserve per MW	70%	10%		0%	0%	1%	18%	100%
Administration per MW	20%	10%		1%	1%	5%	62%	100%
Insurance Premium	0%	0%		2%	2%	7%	89%	100%
Provincial Charges	0%	0%		2%	2%	7%	89%	100%

Source: AECOM, 2012

Table 11: Allocation of Operating Expenditures for Projects in the Northeast Region

Northeast Region	Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
			NW	NE	KP	KWP		
Fixed Operating Cost per MW	80%	10%	0%		0%	1%	9%	100%
Maintenance Reserve per MW	70%	10%	0%		0%	1%	18%	100%
Administration per MW	20%	10%	1%		1%	5%	63%	100%
Insurance Premium	0%	0%	1%		2%	7%	90%	100%
Provincial Charges	0%	0%	1%		2%	7%	90%	100%

Source: AECOM, 2012

Table 12: Allocation of Operating Expenditures for Projects in the Kitchener-Waterloo- Barrie Region

Kitchener-Waterloo-Barrie Region	Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
			NW	NE	KP	KWP		
Fixed Operating Cost per MW	80%	10%	0%	0%	0%		10%	100%
Maintenance Reserve per MW	50%	40%	0%	0%	0%		10%	100%
Administration per MW	20%	30%	1%	1%	1%		48%	100%
Insurance Premium	0%	20%	1%	2%	2%		76%	100%
Provincial Charges	0%	0%	1%	2%	2%		95%	100%

Source: AECOM, 2012

Table 13: Allocation of Operating Expenditures for Projects in the Kingston-Pembroke Region

Kingston-Pembroke Region	Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
			NW	NE	KP	KWP		
Fixed Operating Cost per MW	80%	10%	0%	0%		1%	9%	100%
Maintenance Reserve per MW	70%	10%	0%	0%		1%	18%	100%
Administration per MW	20%	10%	1%	1%		5%	63%	100%
Insurance Premium	0%	0%	1%	2%		7%	90%	100%
Provincial Charges	0%	0%	1%	2%		7%	90%	100%

Source: AECOM, 2012

3.2 Key Findings from Model

3.2.1 Project Portfolio

There are 41 projects in the current portfolio with a combined capacity of 170.57 MW (Table 14). The distribution of projects by Economic Region is set out in the table below. All of the projects have FIT contracts.

Table 14: Project Distribution

	Projects		Name Plate Capacity	
	#	% of Projects	# MW	% of MW
Northwest Region	4	10%	21.4	13%
Northeast Region	35	85%	141.97	83%
Kitchener Waterloo Barrie	1	2%	1.9	1%
Kingston Pembroke	1	2%	5.3	3%
Total	41	100%	170.57	100%

Source: AECOM, 2012

3.2.2 Power Output

For the purposes of this analysis it has been assumed that the projects have an operating efficiency of 55% (Table 15). In a recent paper the OPA estimates that the operating efficiency of small waterpower projects is in a range of 50% to 60%.

Table 15: Project Power Outputs

	Name Plate MW Capacity	Output Efficiency	MW Output	KWh Output	MWh Output	GWh Output
1	5.50	55%	3.03	26,499,000	26,499	26.50
2	5.50	55%	3.03	26,499,000	26,499	26.50
3	5.50	55%	3.03	26,499,000	26,499	26.50
4	5.50	55%	3.03	26,499,000	26,499	26.50
5	1.90	55%	1.05	9,154,200	9,154	9.15
6	4.00	55%	2.20	19,272,000	19,272	19.27
7	6.40	55%	3.52	30,835,200	30,835	30.84
8	10.00	55%	5.50	48,180,000	48,180	48.18
9	3.00	55%	1.65	14,454,000	14,454	14.45
10	1.04	55%	0.57	5,010,720	5,011	5.01
11	0.13	55%	0.07	626,340	626	0.63
12	0.20	55%	0.11	963,600	964	0.96
13	0.30	55%	0.17	1,445,400	1,445	1.45
14	2.00	55%	1.10	9,636,000	9,636	9.64
15	2.40	55%	1.32	11,563,200	11,563	11.56
16	1.00	55%	0.55	4,818,000	4,818	4.82
17	1.25	55%	0.69	6,022,500	6,023	6.02
18	5.00	55%	2.75	24,090,000	24,090	24.09
19	0.85	55%	0.47	4,095,300	4,095	4.10
20	8.90	55%	4.90	42,880,200	42,880	42.88
21	10.00	55%	5.50	48,180,000	48,180	48.18
22	7.30	55%	4.02	35,171,400	35,171	35.17
23	2.00	55%	1.10	9,636,000	9,636	9.64
24	4.70	55%	2.59	22,644,600	22,645	22.64
25	3.40	55%	1.87	16,381,200	16,381	16.38
26	8.20	55%	4.51	39,507,600	39,508	39.51
27	5.00	55%	2.75	24,090,000	24,090	24.09

	Name Plate MW Capacity	Output Efficiency	MW Output	KWh Output	MWh Output	GWh Output
28	3.80	55%	2.09	18,308,400	18,308	18.31
29	2.10	55%	1.16	10,117,800	10,118	10.12
30	2.80	55%	1.54	13,490,400	13,490	13.49
31	2.50	55%	1.38	12,045,000	12,045	12.05
32	3.60	55%	1.98	17,344,800	17,345	17.34
33	5.10	55%	2.81	24,571,800	24,572	24.57
34	5.30	55%	2.92	25,535,400	25,535	25.54
35	2.00	55%	1.10	9,636,000	9,636	9.64
36	6.50	55%	3.58	31,317,000	31,317	31.32
37	6.50	55%	3.58	31,317,000	31,317	31.32
38	6.50	55%	3.58	31,317,000	31,317	31.32
39	6.50	55%	3.58	31,317,000	31,317	31.32
40	2.10	55%	1.16	10,117,800	10,118	10.12
41	4.30	55%	2.37	20,717,400	20,717	20.72
Total	170.57		93.81	821,806,260	821,806	821.81

Source: AECOM, 2012

3.2.3 Costs

The 41 projects have a total development (capital) cost of approximately $811 million with 18% of this attributable to planning and permitting activities and the remaining 82% associated with actual construction (Table 16). Operating costs for the 41 projects to 2035, exclusive of provincial charges amount to roughly $490 million. To 2035, the provincial charges associated with the project portfolio for property tax are about $9.4 million and the water lease sum is in the order of $35.8 million.

The table and graph that follow respectively depict expenditure totals and the flow of these expenditures over time (Figure 4).

Table 16: Project Costs (Real $)

		Years 2011-2015	Years 2011-2020	Years 2021-2035	Total 2011-2035
Development	Planning	$145,282,499	$145,282,499	$-	$145,282,499
	Construction	$665,222,995	$665,222,995	$-	$665,222,995
	Sum of Development	$810,505,494	$810,505,494	$-	$810,505,494
Operations	O&M	$33,088,620	$147,370,519	$342,845,698	$490,216,218
	Property Tax	$-	$-	$9,407,771	$9,407,771
	Water Rental	$-	$-	$35,749,531	$35,749,531
	Sum of Operations	$33,088,620	$147,370,519	$388,003,001	$535,373,520
Sum of Costs		$843,594,113	$957,876,013	$388,003,001	$1,345,879,014

Source: AECOM Model, 2012

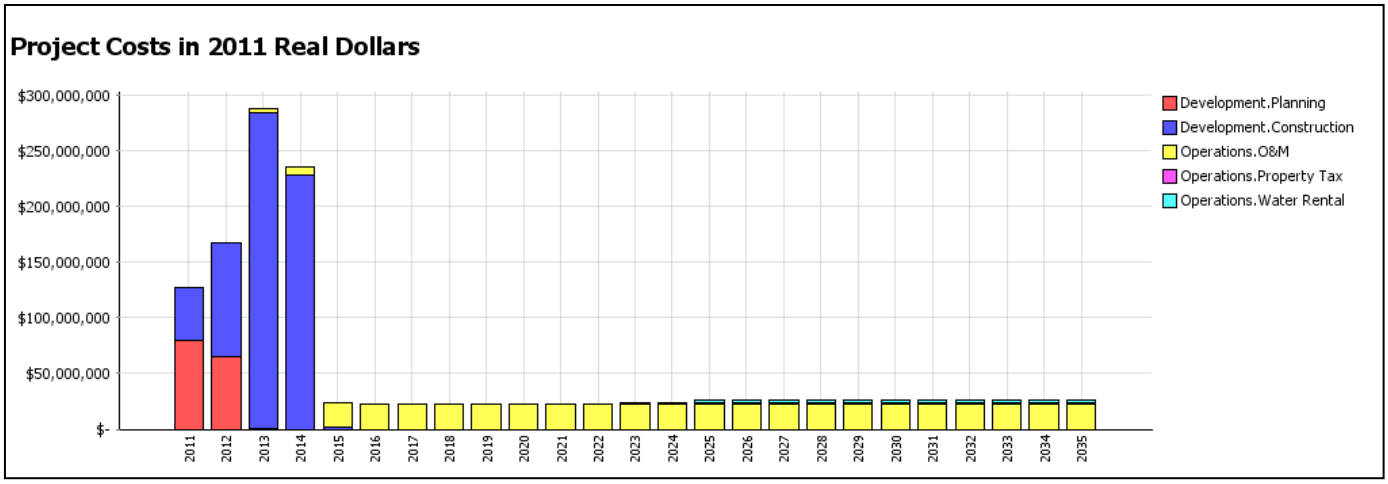


Figure 4. Project Cost Flows (Real $)

3.2.4 Revenues

The revenues generated by the project portfolio are estimated to total $2.0 billion to 2035. A breakdown of the revenue streams over specified time frames is set out in Table 17. Figure 5 presents a graph of the revenue flow

Table 17: Project Revenues (Real $)

		Years 2011-2015	Years 2011-2020	Years 2021-2035	Total 2011-2035
Power Purchase Price	FIT	$154,842,082	$664,322,233	$1,304,653,065	$1,968,975,298
	Non Fit	$-	$-	$-	$-
Adder	Aboriginal	$397,456	$1,811,708	$4,242,755	$6,054,463
	Community	$1,445	$8,672	$21,681	$30,353
	Sum of Adder	$398,901	$1,820,380	$4,264,436	$6,084,816
Sum of Revenue		$155,240,984	$666,142,613	$1,308,917,501	$1,975,060,114

Source: AECOM Model, 2012

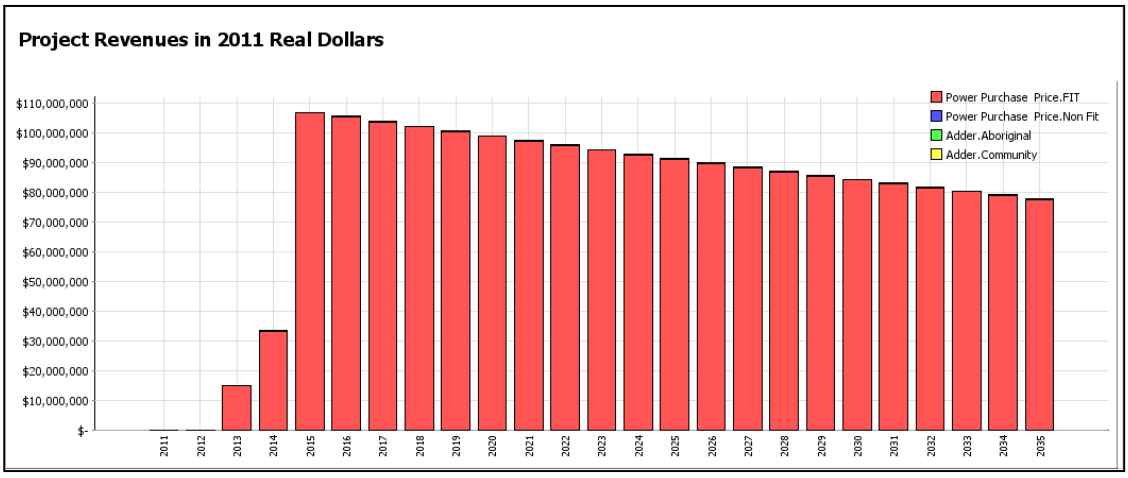


Figure 5. Project Revenue Flow (Real $)

The net revenues (revenues minus costs) for the project portfolio are estimated to total $629 million to the year 2035. Table 18 and Figure 6 depict the annual cash flows over this time period.

Table 18: Project Net Revenues (Real $)

	Years 2011-2015	Years 2011-2020	Years 2021-2035	Total 2011-2035
Costs	$(843,594,113)	$(957,876,013)	$(388,003,001)	$(1,345,879,014)
Revenues	$155,240,984	$666,142,613	$1,308,917,501	$1,975,060,114
Net Revenue	$(688,353,130)	$(291,733,400)	$920,914,500	$629,181,100

Source: AECOM, 2012

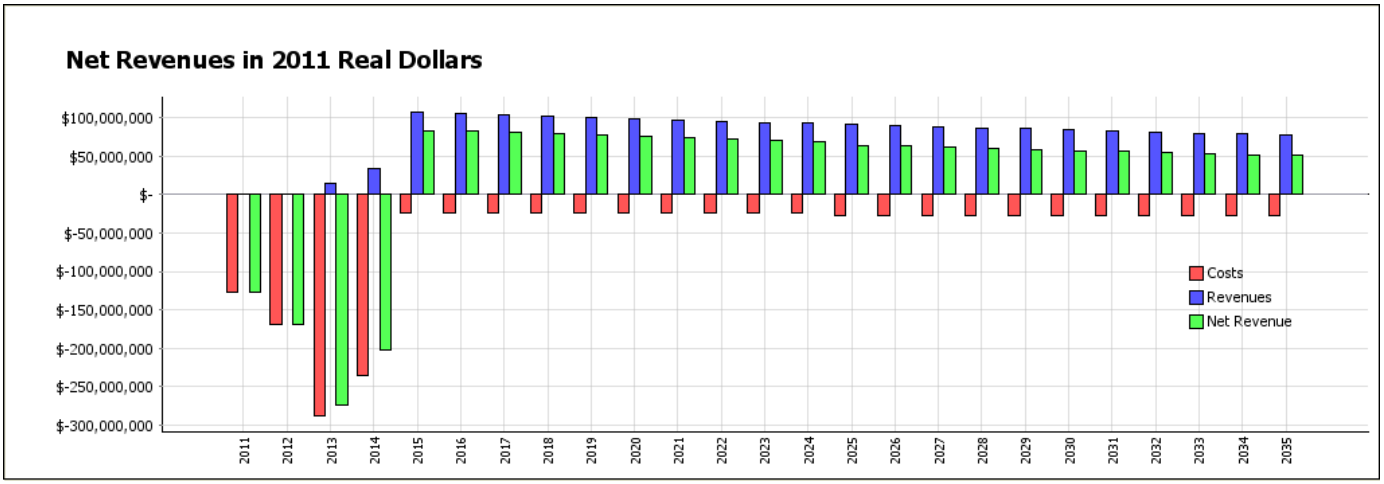


Figure 6: Project Net Revenue Flow (Real $)

3.2.5 Provincial Economic Output Effects

The economic outputs generated by the projects in the Province of Ontario using Statistics Canada multipliers are highlighted in Table 19. Approximately 9,900 full time equivalent (FTE) jobs[3] are created by all 41 projects from initial development through to the end of operations. Of these 69% are created in the development stage and 31% results from operations. The total direct jobs account for 44% of the jobs created, indirect for 33% and induced for 23%. Figure 7 depicts the distribution of FTE jobs over the life of the project portfolio.

Total labour income generated by the projects amounts to approximately $677 million and the total GDP and Gross Output effects are respectively $1.3 billion and $2.3 billion.

[3] *Note: 1 FTE job = 1 person year of employment. Therefore 9,900 FTE jobs equals 9,900 person years of employment*

Table 19: Project Economic Outputs (Real $)

		Years 2011-2015		Years 2011-2020		Years 2021-2035	
		Development	Operations	Development	Operations	Development	Operations
Gross Output	Direct	$810,505,494	$33,088,620	$810,505,494	$147,370,519	$-	$388,003,001
	Indirect	$363,187,512	$12,305,658	$363,187,512	$54,807,096	$-	$144,298,316
	Induced	$267,663,766	$7,726,855	$267,663,766	$34,413,964	$-	$90,606,461
	Total	$1,441,356,771	$53,121,132	$1,441,356,771	$236,591,579	$-	$622,907,778
GDP	Direct	$425,982,235	$18,511,263	$425,982,235	$82,445,700	$-	$217,066,339
	Indirect	$183,678,376	$6,834,289	$183,678,376	$30,438,644	$-	$80,140,080
	Induced	$161,665,047	$4,662,683	$161,665,047	$20,766,717	$-	$54,675,443
	Total	$771,325,658	$30,008,235	$771,325,658	$133,651,061	$-	$351,881,862
Labour Income	Direct	$221,927,751	$6,545,392	$221,927,751	$29,151,952	$-	$76,752,426
	Indirect	$129,896,473	$5,189,321	$129,896,473	$23,112,266	$-	$60,850,899
	Induced	$92,279,292	$2,662,211	$92,279,292	$11,856,990	$-	$31,217,557
	Total	$444,103,517	$14,396,925	$444,103,517	$64,121,208	$-	$168,820,882
FTE Jobs	Direct	3,255	68	3,255	303	-	797
	Indirect	1,989	80	1,989	357	-	940
	Induced	1,541	44	1,541	198	-	521
	Total	6,786	193	6,786	858	-	2,258

Source: AECOM Model, 2012

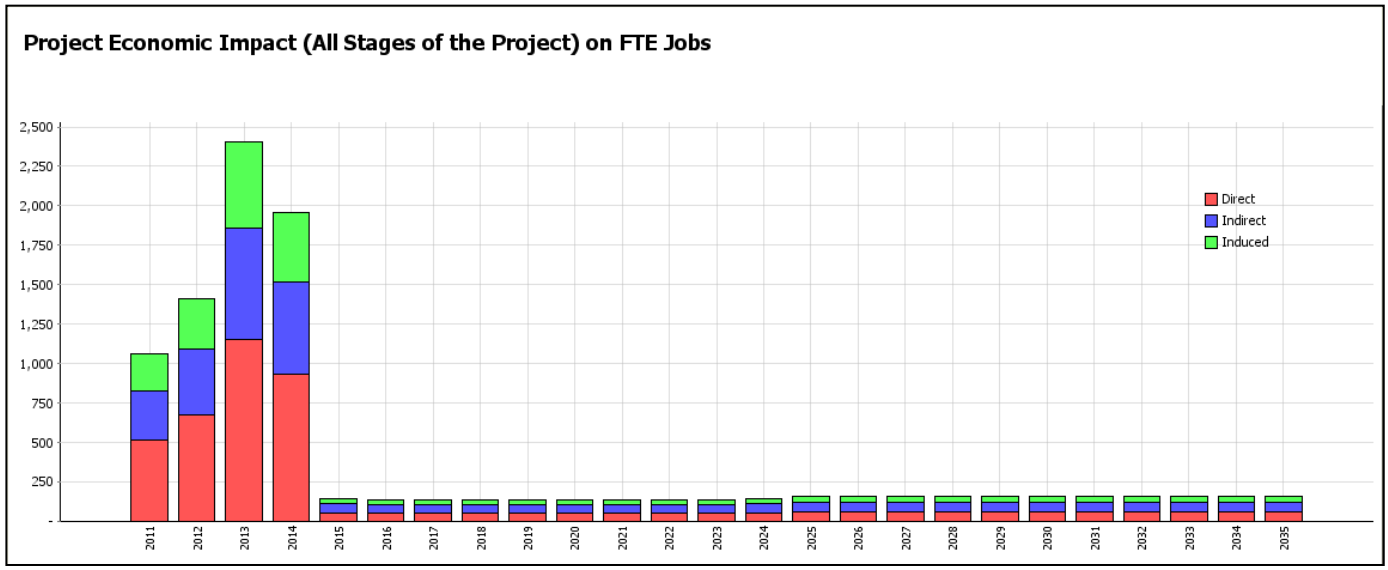


Figure 7: Total FTE Job Creation

3.2.6 Tax Outputs

The 41 projects also generate potential taxes (exclusive of income, business tax) for Provincial and Federal coffers. Based on the use of Statistics Canada Multipliers the projects generate approximately $67 million in taxes with 27% of these monies flowing to the Federal Government and 73% moving to the Province of Ontario. The various flows are depicted in Table 20 and Figure 8.

Table 20: Project Tax Outputs (Real $)

	Years 2011-2015	Years 2011-2020	Years 2021-2035	Total 2011-2035
Federal	$11,925,268	$13,085,229	$3,938,230	$17,023,459
Provincial	$35,773,064	$37,969,790	$7,458,194	$45,427,984
Sum of Jurisdictions	$47,698,331	$51,055,019	$11,396,424	$62,451,443

Source: AECOM Model, 2012

Note: Federal Taxes – Federal trading profits on lottery and race tracks, Federal gas tax, Federal excise tax, Federal duty tax, Federal air tax, and GST.
Provincial Taxes – Provincial environment tax, Provincial gallon tax, Provincial trading profits, Provincial gas tax, Provincial amusement tax, PST, and HST.

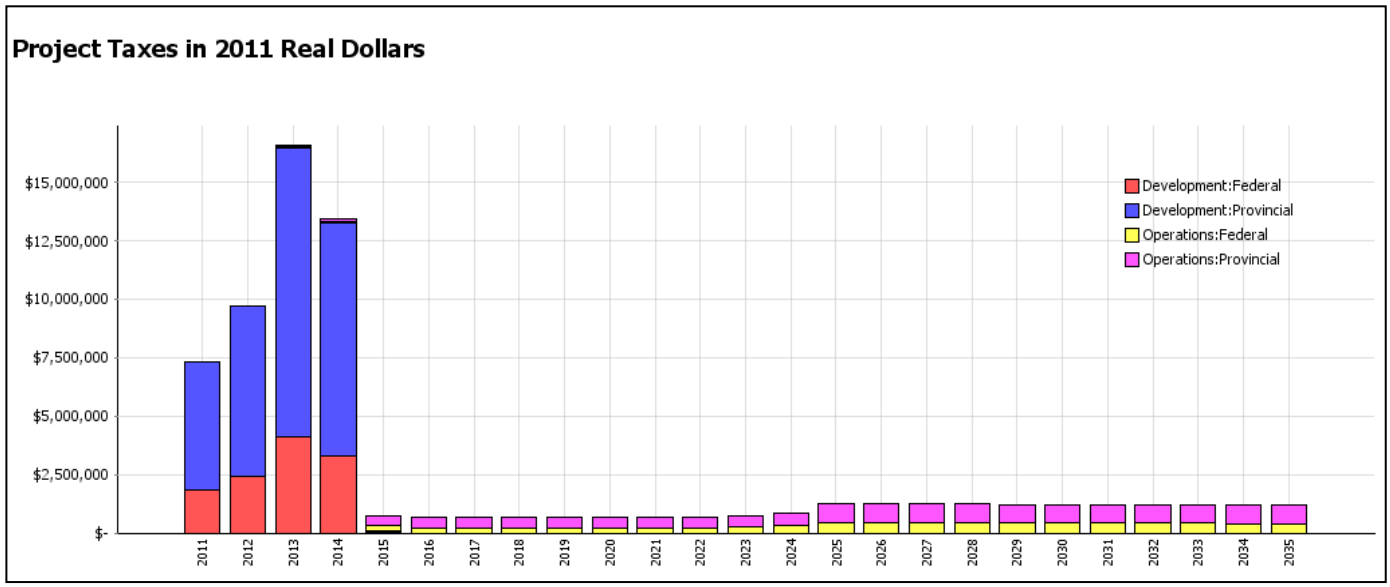


Figure 8: Project Taxes (Real $)

3.2.7 GHG Outputs

Based on technical literature, approximately 228 tonnes of GHG are produced per MW of Hydroelectric power generation. This being the case it is estimated that the projects in aggregate (at 55% efficiency of nameplate capacity) generate approximately 458,000 tonnes of GHG to the horizon year of 2035. However, relative to other forms of electricity generation hydro electric power is a very low net emitter. The graph that follows (Figure 9) provides a comparative value of greenhouse gas offsets, assuming an equivalent level of energy production to that of the project portfolio and a GHG offset price of $15 per tonne.

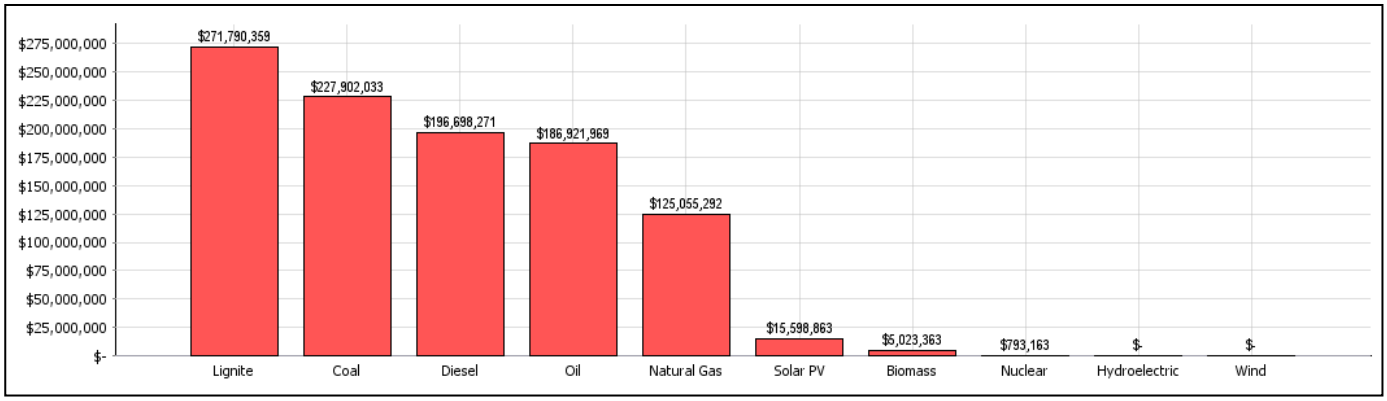


Figure 9: GHG Offset Comparison (at net efficiency of projects)

3.2.8 Region and Community Effects

The distribution of project economic effects by region is set out in Tables 21 and 22. The majority of economic benefits occur in the Northeast Region followed by the Northwest, Kingston Pembroke and the Kitchener Waterloo Barrie Regions. Approximately 9 % of the jobs fall to local communities in proximity to the projects. At the regional level not counting job capture by constituent project communities the regional capture rates are 2.6% in the Northwest, 21.5% in the Northwest, 2.5% in Kingston-Pembroke and 7.0% in Kitchener-Waterloo-Barrie. It is roughly estimated that 58% of employment created by the project portfolio occurs in the Provincial locations beyond the four host regions.

Table 21: Geographically Distributed Project Economic Outputs

		Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
				NW	NE	KP	KWB		
Northwest	Gross Output	$27,723,913	$43,300,577	$-	$5,867,146	$5,867,146	$21,250,860	$188,787,301	$292,796,944
	GDP	$15,544,807	$23,291,272	$-	$3,186,526	$3,186,526	$11,535,920	$103,109,516	$159,854,568
	Labour Income	$7,658,932	$13,192,668	$-	$1,749,441	$1,749,441	$6,343,607	$55,573,201	$86,267,291
	FTE Jobs	105	200	-	26	26	94	813	1,263
Northeast	Gross Output	$185,419,056	$451,617,451	$12,742,929	$-	$32,935,900	$119,000,671	$1,109,613,403	$1,911,329,411
	GDP	$103,996,885	$242,482,355	$6,976,768	$-	$17,940,341	$64,784,594	$607,975,066	$1,044,156,009
	Labour Income	$51,183,029	$138,147,519	$3,729,951	$-	$9,755,371	$35,291,532	$324,218,229	$562,325,631
	FTE Jobs	699	2,097	54	-	144	520	4,708	8,222
Kingston-Pembroke	Gross Output	$6,955,527	$17,733,237	$485,454	$1,263,538	$-	$4,568,697	$42,227,729	$73,234,182
	GDP	$3,896,019	$9,519,046	$265,524	$687,646	$-	$2,485,060	$23,114,209	$39,967,504
	Labour Income	$1,926,434	$5,427,351	$142,423	$375,009	$-	$1,357,615	$12,367,251	$21,596,084
	FTE Jobs	26	82	2	6	-	20	180	317
Kitchener-Waterloo-Barrie	Gross Output	$3,074,402	$12,019,916	$84,013	$189,287	$189,287	$-	$7,938,686	$23,495,591
	GDP	$1,706,085	$6,491,801	$46,826	$105,030	$105,030	$-	$4,425,727	$12,880,499
	Labour Income	$871,427	$3,629,386	$23,558	$53,667	$53,667	$-	$2,224,897	$6,856,601
	FTE Jobs	12	54	0	1	1	-	31	99

Source: AECOM Model, 2012

Note: NW = Northwest Region; NE = Northeast Region; KP = Kingston Pembroke Region; KWB = Kitchener Waterloo Barrie Region

Table 22: Geographically Distributed FTE Jobs by Project Region for Specified Time Periods

			Years 2011-2015	Years 2011-2020	Years 2021-2035	Total 2011-2035
Northwest	Local Community		23	42	63	105
	Local Region		186	189	11	200
	Other Project Regions	NW	-	-	-	-
		NE	21	22	4	26
		KP	21	22	4	26
		KWB	75	79	15	94
	Rest of Province		572	627	186	813
	Sum of Areas		897	981	283	1,263
Northeast	Local Community		155	279	421	699
	Local Region		2,005	2,026	71	2,097
	Other Project Regions	NW	36	40	14	54
		NE	-	-	-	-
		KP	108	116	28	144
		KWB	394	423	97	520
	Rest of Province		3,090	3,458	1,250	4,708
	Sum of Areas		5,789	6,342	1,880	8,222
Kingston-Pembroke	Local Community		6	11	16	26
	Local Region		79	80	3	82
	Other Project Regions	NW	1	2	1	2
		NE	4	4	1	6
		KP	-	-	-	-
		KWB	15	16	4	20
	Rest of Province		120	134	46	180
	Sum of Areas		226	247	70	317
Kitchener-Waterloo-Barrie	Local Community		6	7	5	12
	Local Region		48	49	5	54
	Other Project Regions	NW	0	0	0	0
		NE	0	0	0	1
		KP	0	0	0	1
		KWB	-	-	-	-
	Rest of Province		12	16	15	31
	Sum of Areas		66	74	26	99

Source: AECOM Model, 2012

Note: NW = Northwest Region; NE = Northeast Region; KP = Kingston Pembroke Region; KWB = Kitchener Waterloo Barrie Region

4. Socio-economic Implications: Case Example

It is well known that economic development projects of any kind, scale and size will contribute to a local and regional economy in two fundamental ways:

- Primary Effects: Employment and income; and
- Enabling Effects: Subsequent or follow-on contributions to community well-being and sustainability.

The previous section details the primary effects (wealth creation) of the 41 waterpower projects in terms of jobs, income, and revenues to government. These primary effects then enable investment in a variety of community assets which can be classified as follows:

- *Human Assets*: such as education and training
- *Social Assets*: such as investments is recreational or community gathering places
- *Financial Assets*: such generation of additional indirect and induced employment opportunities and local business revenues
- *Physical Assets*: such as investments in roads, water/wastewater systems, housing, etc.
- *Environmental Assets*: such as protection of environmental habitats and culturally sensitive areas

All together, the integration and enhancement of these assets define how a community's (or a region's) well-being might be affected by these and other developments. Many northern communities and regions in Ontario have experienced population outmigration over the past 15 years by as much 25%. The primary reason for this outmigration is the economic decline in the forestry sector and stagnation in the mining and tourism sectors. Typically, the portions of the local populations that have recently left tend to be skilled and young, pursuing opportunities in other "growth" regions of Ontario or Canada.

It is difficult to predict accurately how any local community might benefit from the development of a waterpower project. Pic River First Nation is simply one case example and it is not intended to be representative all communities. It does demonstrate a positive outcome of waterpower development.

In the following sub-sections a discussion of key socio-economic considerations using this community well-being framework is presented. This discussion is high level and strategic since no attempt was made to collect community-specific data or information at this point in time. Consequently, the information presented here is illustrative only.

4.1 Economic Diversification- A Case Example

The economy of much of northern Ontario has been linked to the "boom and bust" cycles of key natural resource sectors of forestry and mining. In recent years, the closure of many milling operations and some mines has resulted in high unemployment leading to significant population outmigration particularly in the northeast and northwest regions of Ontario. These two northern regions are potential hosts to 39 of 41 of the waterpower sites. Thus, any new development, large or small, has the potential to create new wealth in the community and consequently offer temporary and some long-term opportunities for local residents and businesses.

It is estimated that between 3-5% of the overall project budget is spent locally.[4] In the experience of Pic River Hydro this is driven by the nature of the expenditures. Professional and manufacturing activities are largely unavailable locally or even regionally (in the northeast or northwest). Many of the local supporting activities and services are limited to semi-skilled labour, guiding services, and some equipment rentals. Some skilled contracting and specialized trades are available in the region. However, the bulk of essential skills required to develop and construct hydro facilities (including manufacturing facilities for turbines and generators) are only available outside these northern regions and are typically located in southern Ontario if in the province at all.

Economic diversification comes from the investments made in community assets (using revenues from waterpower projects) that in-turn increase the capacity of a community to attract or build new business opportunities.

However, the revenues generated for locally owned and operated waterpower projects can provide a significant financial base from which investments in community assets can be made. In the case of the Pic River First Nation, the community expects to receive in the order of $68,000 per year for each installed MW[5] based on investment in run of river hydro projects. For a waterpower project of 5 MW this translates into $340,000 per year. Also, it should be noted that under the current FIT regime, the revenue stream for the study projects may differ. However, it should be also be noted that this level of revenue generation for the community is based on its level of ownership as well as the unique circumstances of the site and project.

Since a small waterpower project typically generates a limited number of operating jobs[6], economic diversification comes from the investments made in other community assets that in turn increase the capacity of a community to attract or build new business opportunities that serve to retain youth and skill labour in the community, as well as attract new skills and residents to the community. In the case of Pic River First Nation, revenues from their waterpower projects have been invested in schools, a health clinic, other community facilities and infrastructure, and new business ventures. The same can be true for any other community depending on its investment level in these projects.

In some ways, being a partial or full owner of even a small waterpower project can provide sufficient financial resources for any community to re-invest in new opportunities and/or selected community assets that will in-turn support economic and social diversification. At a regional level, if sufficient numbers of new development projects are initiated the same chain of economic and social diversification can be achieved for the region. In many parts of northern Ontario there is currently resurgence in the mining sector offering new wealth creation opportunities, but these 39 of 41 waterpower projects provide an alternative source of economic diversification.

4.2 Value to Aboriginal Communities: A Case Example

From the perspective of Pic River First Nation, their interest in development projects like waterpower and now transmission is expressed by Byron Leclair as follows:

> *"Our interest in project development is driven by three community priorities, jobs during construction, careers in operations, and acquiring long term non-governmental sources of revenue. Pic River has invested this cash into other community infrastructure projects including housing, education, and business development."*

[4] Byron Leclair, Director, Pic River Hydro, 2012. Pic River Hydro is owned by the Pic River First Nation. Experience of Pic River is based on three hydro power developments.

[5] It is important to note this value is highly variable and depends on ownership allocation and the unique circumstances of each site.

[6] In the case of Pic River Hydro, only 2 jobs are created for operations.

This means that the real value to Aboriginal communities (like Pic River First Nation), is about creating opportunity for its members and re-enforcing pride and confidence in their community, and their Aboriginal traditions and culture. Leclair further notes that:

> *"... the skills and abilities acquired through hydro development have a much broader application in the overall organization (community) especially in our business development. We now have several joint ventures with mining companies, something that I am not sure we could have done in 1990. Our history has opened our eyes to what is possible in resource development projects in our territory ... to the point where we are confident in proposing the construction of (a) $600 million dollar transmission project."*

It appears that 12 of 41 of the waterpower projects examined in this study have some degree of Aboriginal ownership and involvement. These communities include: Pic Mobert First Nation, Chapleau Cree First Nation, Brunswick House First Nation/Chapleau Ojibwe First Nation, Constance Lake First Nation, McCreebec Council of the Cree Nation, and a consortium of: Animbiigoo Zaagi igan Anishinaabek (AZA) First Nation, Bingwi Neyaashi Anishinaabek (BNA) First Nation and Biinjitiwaabik Zaaging Anishinaabek (BZA) First Nation. One other project involves joint ownership with a local (non-Aboriginal) community.

5. Summary

At the present time there are 41 new waterpower projects that have been awarded Feed-in-Tariff contracts from the Ontario Power Authority (OPA). In combination they have a capacity of roughly 171 MW. Most of the projects are situated in Northern Ontario with the majority located in the Northeast Economic Region.

A computer model was built to generate the statistics that underpin this report and this model is subsequently being supplied to MNR for ongoing work and analysis.

Background information used to calibrate and the model was drawn from: Statistics Canada; industry participants involved with facility ownership and representation of Ontario waterpower interests; and AECOM staff with strong experience in waterpower and economic development in Ontario, particularly northern Ontario.

The model and analyses in this report first, examined the projects from a provincial perspective, addressing capital and operating costs, provincial charges and revenues. A second tranche of analyses utilized input / output multipliers to establish the economic impacts of the projects individually and in combination in terms of full time equivalent jobs, GDP, labour income, gross output and selected taxes. All of these impacts were further parsed in terms of direct, indirect and induced levels. A greenhouse gas calculation was also done to determine the output tonnage generated by the projects within during operation. The final tranche of analysis took the provincial economic outputs and allocated these to host local communities, and economic regions and then the rest of the province.

An underpinning assumption for the analysis was the use of a base cost figure of $5 million per MW for the project development.

In total the project development costs amount to roughly $811 million and operating and maintenance costs to year 2035 sum to $490 million. The provincial charges associated with land taxes and water leases over the life of the projects amount to roughly $45 million gross. Revenues derived from the projects to 2035 including Aboriginal and

Community added fees sum to approximately $2 billion. Net revenues to the same horizon year, sum to approximately $629 million.

The economic outputs generated by the projects are significant. Full time job creation is 9,900 with an associated labour income of $677 million. GDP and gross output respectively sum to $1.3 and $2.3 billion respectively. The tax outputs exclusive of business land and income tax amount to $63 million with approximately 27% of these monies going to the Federal Government and 73% going to the Province.

Assuming an annual GHG output of 228 tonnes per MW the projects at net efficiency (55% of nameplate capacity) will account for approximately 458,000 tonnes of GHG emissions to 2035.Relative to the equivalent energy production from coal, the offset value assuming a GHG value of $15 per tonne is in the order of $227 million to 2035.

The majority of project economic effects are concentrated in the Northeast Region followed by the Northwest, Kingston-Pembroke and Kitchener Waterloo Barrie Regions.

Looking at employment, it is estimated that approximately 9% of the jobs fall to local communities in the vicinity of the projects and then at the regional level beyond the communities the capture rates are respectively 3% for the Northwest and Kitchener-Pembroke Regions, 22% for the Northeast Region and 7% for the Kitchener-Waterloo-Barrie Regions. Tables 21 and 22 in the body of the report summarize the distribution of economic effects.

Beyond the economics effects of project construction and operation, the revenues generated for locally owned and operated water power projects can provide a significant base from which investments in community assets can be made. Investment in these assets, (i.e. infrastructure, housing, education, health care etc.), increase the capacity of a community to attract or build new business opportunities. These in turn serve to retain youth and skilled labour in the community as well as attract new skills and residents to the community. It is these investments that support economic and social diversification and enable community well being.

Of the 41 projects 12 have some degree of Aboriginal ownership and involvement (refer to Table 23). It was pointed out that Aboriginal interest in project development is driven by 3 community priorities, jobs during construction, careers in operations and acquiring long term non-governmental sources of revenue. As evidenced by the Pic River First Nation the involvement and ownership in hydro projects can provide a stepping stone to community improvement and a sustainable economic future.

Table 23: Projects with Aboriginal Ownership

	FIT Applicant	FIT Project Name	Aboriginal Equity Ownership	Aboriginal Equity Ownership %
1	Nipiy-OWF HydroKap LP	Old Woman Falls Hydroelectric Project		
2	Nipiy-OWF HydroKap LP	White Otter Falls Hydroelectric Project	Yes	20%
3	Amik-CTR HydroKap LP	Camp Three Rapids Hydro Electric Project	Yes	20%
4	Amik-BBF HydroKap LP	Big Beaver Falls Hydro Electric Project	Yes	20%
5	Wasdell Falls Power Corporation	Wasdell Falls Power Project		
6	Horizon Hydro LP	Trout lake River Hydroelectric Project		
7	High Falls Development Partnership Inc	High Falls Hydropower Development	Yes	50%
8	Namewaminikan Hydro Inc	Namewaminikan Waterpower Project	Yes	50%
9	Wendigo Power Partnership Inc	Wendigo Waterpower Project	Yes	51%
10	Lizard Power Partnership Inc	Lizard Creek Small Hydro Project		
11	Gravel Power Corp	McCreights Generating Station		
12	Gravel Power Corp	Shaw Dam Generating Station		
13	Gravel Power Corp	Little Rapids Generating Station		
14	Pecors Power_Cantech Construction Ltd	Pecors Power Small Hydro Project		
15	Xeneca Limited Partnership	McGraw Falls Dam		
16	6324827 Canada Inc	Birch Creek Hydro		
17	Xeneca Limited Partnership	Larder Lake and Raven Falls		
18	Swift River Energy LP	North Bala Small Hydro Project		
19	Kagawong Power Incorporated	Charlton Dam GS Expansion		
20	Pic Mobert Hydro Power Joint Venture	Gitchi Animiki Behzhig Generating Station	Yes	35%
21	Pic Mobert Hydro Power Joint Venture	Gitchi Animiki Niizh Generating Station	Yes	35%
22	Xeneca Limited Partnership	Four Slide Falls		
23	Xeneca Limited Partnership	McCarthy Chute		
24	Xeneca Limited Partnership	Wanatago Falls		
25	Xeneca Limited Partnership	Wabageshik Rapid at Outlet Lake		
26	Xeneca Limited Partnership	Lapinigagam Rapids		
27	Xeneca Limited Partnership	Middle Twp. Buchan		
28	Xeneca Limited Partnership	Near North Boundary Twp Buchan		
29	Xeneca Limited Partnership	Cascade Falls		
30	Xeneca Limited Partnership	Allen and Struthers		
31	Xeneca Limited Partnership	Outlet Kapuskasing Lake		
32	Xeneca Limited Partnership	Ivanhoe River_The Chutes		
33	Xeneca Limited Partnership	Ivanhoe River_Third Falls		
34	Xeneca Limited Partnership	Big Eddy at CPR Bridge		
35	Xeneca Limited Partnership	McPherson Falls		
36	Neeskah Energy Limited Partnership	Neeskah Project	Yes	50%
37	Peeshoo Energy Limited Partnership	Peeshoo Project	Yes	50%
38	Wahpeestan Energy Limited Partnership	Wahpeestan Project	Yes	50%
39	Wapoose Energy Limited Partnership	Wapoose Project	Yes	50%
40	Xeneca Limited Partnership	Marter Twp_Blanche River		
41	Xeneca Limited Partnership	At Soo Crossing		

Source: MNR Data Base

Appendix A

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Appendix B

Selected Output Tables from Model

Note: All $ information set out in this Appendix reflects real $

Capital and Operating Cost Projections

	Development			Operations				Sum of Costs
	Planning	Construction	Sum of Development	O&M	Property Tax	Water Rental	Sum of Operations	
2011	$80,321,999	$46,605,000	$126,926,999	$-	$-	$-	$-	$126,926,999
2012	$64,613,999	$103,525,499	$168,139,499	$-	$-	$-	$-	$168,139,499
2013	$346,500	$284,777,998	$285,124,498	$3,202,600	$-	$-	$3,202,600	$288,327,098
2014	$-	$229,085,998	$229,085,998	$7,114,060	$-	$-	$7,114,060	$236,200,058
2015	$-	$1,228,500	$1,228,500	$22,771,960	$-	$-	$22,771,960	$24,000,460
2016	$-	$-	$-	$22,856,380	$-	$-	$22,856,380	$22,856,380
2017	$-	$-	$-	$22,856,380	$-	$-	$22,856,380	$22,856,380
2018	$-	$-	$-	$22,856,380	$-	$-	$22,856,380	$22,856,380
2019	$-	$-	$-	$22,856,380	$-	$-	$22,856,380	$22,856,380
2020	$-	$-	$-	$22,856,380	$-	$-	$22,856,380	$22,856,380
2021	$-	$-	$-	$22,856,380	$-	$-	$22,856,380	$22,856,380
2022	$-	$-	$-	$22,856,380	$-	$-	$22,856,380	$22,856,380
2023	$-	$-	$-	$22,856,380	$115,150	$437,571	$23,409,101	$23,409,101
2024	$-	$-	$-	$22,856,380	$255,788	$971,993	$24,084,160	$24,084,160
2025	$-	$-	$-	$22,856,380	$818,771	$3,111,329	$26,786,480	$26,786,480
2026	$-	$-	$-	$22,856,380	$821,806	$3,122,864	$26,801,050	$26,801,050
2027	$-	$-	$-	$22,856,380	$821,806	$3,122,864	$26,801,050	$26,801,050
2028	$-	$-	$-	$22,856,380	$821,806	$3,122,864	$26,801,050	$26,801,050
2029	$-	$-	$-	$22,856,380	$821,806	$3,122,864	$26,801,050	$26,801,050
2030	$-	$-	$-	$22,856,380	$821,806	$3,122,864	$26,801,050	$26,801,050
2031	$-	$-	$-	$22,856,380	$821,806	$3,122,864	$26,801,050	$26,801,050
2032	$-	$-	$-	$22,856,380	$821,806	$3,122,864	$26,801,050	$26,801,050
2033	$-	$-	$-	$22,856,380	$821,806	$3,122,864	$26,801,050	$26,801,050
2034	$-	$-	$-	$22,856,380	$821,806	$3,122,864	$26,801,050	$26,801,050
2035	$-	$-	$-	$22,856,380	$821,806	$3,122,864	$26,801,050	$26,801,050
Total	$145,282,499	$665,222,995	$810,505,494	$490,216,218	$9,407,771	$35,749,531	$535,373,520	$1,345,879,014

Revenue Projections

	Power Purchase Price		Adder				Sum of Revenue
	FIT	Non Fit	Aboriginal	Community	Combination	Sum of Adder	
2011	$-	$-	$-	$-	$-	$-	$-
2012	$-	$-	$-	$-	$-	$-	$-
2013	$15,084,676	$-	$28,619	$-	$-	$28,619	$15,113,295
2014	$33,268,068	$-	$85,987	$-	$-	$85,987	$33,354,055
2015	$106,489,337	$-	$282,850	$1,445	$-	$284,296	$106,773,633
2016	$105,191,927	$-	$282,850	$1,445	$-	$284,296	$105,476,222
2017	$103,517,538	$-	$282,850	$1,445	$-	$284,296	$103,801,834
2018	$101,869,801	$-	$282,850	$1,445	$-	$284,296	$102,154,097
2019	$100,248,292	$-	$282,850	$1,445	$-	$284,296	$100,532,588
2020	$98,652,593	$-	$282,850	$1,445	$-	$284,296	$98,936,889
2021	$97,082,294	$-	$282,850	$1,445	$-	$284,296	$97,366,590
2022	$95,536,990	$-	$282,850	$1,445	$-	$284,296	$95,821,286
2023	$94,016,283	$-	$282,850	$1,445	$-	$284,296	$94,300,579
2024	$92,519,782	$-	$282,850	$1,445	$-	$284,296	$92,804,078
2025	$91,047,102	$-	$282,850	$1,445	$-	$284,296	$91,331,398
2026	$89,597,863	$-	$282,850	$1,445	$-	$284,296	$89,882,159
2027	$88,171,692	$-	$282,850	$1,445	$-	$284,296	$88,455,988
2028	$86,768,222	$-	$282,850	$1,445	$-	$284,296	$87,052,518
2029	$85,387,092	$-	$282,850	$1,445	$-	$284,296	$85,671,388
2030	$84,027,946	$-	$282,850	$1,445	$-	$284,296	$84,312,242
2031	$82,690,434	$-	$282,850	$1,445	$-	$284,296	$82,974,730
2032	$81,374,212	$-	$282,850	$1,445	$-	$284,296	$81,658,508
2033	$80,078,941	$-	$282,850	$1,445	$-	$284,296	$80,363,237
2034	$78,804,287	$-	$282,850	$1,445	$-	$284,296	$79,088,583
2035	$77,549,923	$-	$282,850	$1,445	$-	$284,296	$77,834,218
Total	$1,968,975,298	$-	$6,054,463	$30,353	$-	$6,084,816	$1,975,060,114

Net Revenue Projection

	Costs	Revenues	Net Revenue
2011	$(126,926,999)	$-	$(126,926,999)
2012	$(168,139,499)	$-	$(168,139,499)
2013	$(288,327,098)	$15,113,295	$(273,213,803)
2014	$(236,200,058)	$33,354,055	$(202,846,003)
2015	$(24,000,460)	$106,773,633	$82,773,173
2016	$(22,856,380)	$105,476,222	$82,619,842
2017	$(22,856,380)	$103,801,834	$80,945,454
2018	$(22,856,380)	$102,154,097	$79,297,717
2019	$(22,856,380)	$100,532,588	$77,676,208
2020	$(22,856,380)	$98,936,889	$76,080,509
2021	$(22,856,380)	$97,366,590	$74,510,210
2022	$(22,856,380)	$95,821,286	$72,964,906
2023	$(23,409,101)	$94,300,579	$70,891,478
2024	$(24,084,160)	$92,804,078	$68,719,918
2025	$(26,786,480)	$91,331,398	$64,544,917
2026	$(26,801,050)	$89,882,159	$63,081,109
2027	$(26,801,050)	$88,455,988	$61,654,938
2028	$(26,801,050)	$87,052,518	$60,251,468
2029	$(26,801,050)	$85,671,388	$58,870,338
2030	$(26,801,050)	$84,312,242	$57,511,192
2031	$(26,801,050)	$82,974,730	$56,173,680
2032	$(26,801,050)	$81,658,508	$54,857,458
2033	$(26,801,050)	$80,363,237	$53,562,187
2034	$(26,801,050)	$79,088,583	$52,287,533
2035	$(26,801,050)	$77,834,218	$51,033,168
Total	$(1,345,879,014)	$1,975,060,114	$629,181,100

Comparative Greenhouse Gas Projections (Tonnes)

	Lignite	Coal	Diesel	Oil	Natural Gas	Solar PV	Biomass	Nuclear	Hydroelectric	Wind
2011	-	-	-	-	-	-	-	-	-	-
2012	-	-	-	-	-	-	-	-	-	-
2013	121,368	102,253	88,663	84,405	57,460	9,788	5,182	3,339	2,994	2,994
2014	269,600	227,139	196,951	187,492	127,638	21,742	11,510	7,418	6,650	6,650
2015	862,985	727,069	630,435	600,159	408,567	69,596	36,845	23,744	21,288	21,288
2016	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2017	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2018	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2019	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2020	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2021	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2022	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2023	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2024	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2025	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2026	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2027	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2028	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2029	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2030	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2031	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2032	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2033	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2034	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
2035	866,184	729,764	632,772	602,384	410,081	69,854	36,981	23,832	21,367	21,367
Total	18,577,629	15,651,741	13,571,490	12,919,736	8,795,291	1,498,196	793,163	511,149	458,272	458,272

Note: Comparison based on a power output of 93.81 MW for study projects (55% of Nameplate Capacity)

Comparison of GHG Offset Value (at 15$ per tonne)

	Lignite	Coal	Diesel	Oil	Natural Gas	Solar PV	Biomass	Nuclear	Hydroelectric	Wind
2011	$-	$-	$-	$-	$-	$-	$-	$-	$-	$-
2012	$-	$-	$-	$-	$-	$-	$-	$-	$-	$-
2013	$1,775,616	$1,488,892	$1,285,037	$1,221,168	$816,991	$101,908	$32,818	$5,182	$-	$-
2014	$3,944,245	$3,307,334	$2,854,502	$2,712,628	$1,814,813	$226,372	$72,899	$11,510	$-	$-
2015	$12,625,448	$10,586,708	$9,137,203	$8,683,066	$5,809,180	$724,612	$233,350	$36,845	$-	$-
2016	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2017	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2018	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2019	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2020	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2021	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2022	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2023	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2024	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2025	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2026	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2027	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2028	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2029	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2030	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2031	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2032	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2033	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2034	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
2035	$12,672,253	$10,625,955	$9,171,076	$8,715,255	$5,830,715	$727,299	$234,215	$36,981	$-	$-
Total	$271,790,359	$227,902,033	$196,698,271	$186,921,969	$125,055,292	$15,598,863	$5,023,363	$793,163	$-	$-

Note: Comparison based on a power output of 93.81 MW for study projects (55% of Nameplate Capacity)

FTE Jobs Generated by Projects Located in Northeast Region

	Local Community		Local Region		Other Project Regions								Rest of Province		Sum of Areas	
					NW		NE		KP		KWB					
	Development	Operations	Development	Operations	Development	Operations	Development	Operations	Development	Operations	Development	Operations	Development	Operations	Development	Operations
2011	19	-	323	-	6	-	-	-	17	-	62	-	482	-	909	-
2012	25	-	429	-	8	-	-	-	23	-	83	-	640	-	1,207	-
2013	41	4	693	1	12	0	-	-	37	0	134	1	1,034	11	1,951	17
2014	32	9	550	1	10	0	-	-	29	1	106	2	820	24	1,547	37
2015	0	26	4	4	0	1	-	-	0	2	1	6	5	72	10	110
2016	-	26	-	4	-	1	-	-	-	2	-	6	-	72	-	111
2017	-	26	-	4	-	1	-	-	-	2	-	6	-	72	-	111
2018	-	26	-	4	-	1	-	-	-	2	-	6	-	72	-	111
2019	-	26	-	4	-	1	-	-	-	2	-	6	-	72	-	111
2020	-	26	-	4	-	1	-	-	-	2	-	6	-	72	-	111
2021	-	26	-	4	-	1	-	-	-	2	-	6	-	72	-	111
2022	-	26	-	4	-	1	-	-	-	2	-	6	-	72	-	111
2023	-	27	-	5	-	1	-	-	-	2	-	6	-	74	-	114
2024	-	27	-	5	-	1	-	-	-	2	-	6	-	76	-	117
2025	-	30	-	5	-	1	-	-	-	2	-	7	-	85	-	130
2026	-	30	-	5	-	1	-	-	-	2	-	7	-	85	-	130
2027	-	30	-	5	-	1	-	-	-	2	-	7	-	85	-	130
2028	-	30	-	5	-	1	-	-	-	2	-	7	-	85	-	130
2029	-	30	-	5	-	1	-	-	-	2	-	7	-	85	-	130
2030	-	30	-	5	-	1	-	-	-	2	-	7	-	85	-	130
2031	-	30	-	5	-	1	-	-	-	2	-	7	-	85	-	130
2032	-	30	-	5	-	1	-	-	-	2	-	7	-	85	-	130
2033	-	30	-	5	-	1	-	-	-	2	-	7	-	85	-	130
2034	-	30	-	5	-	1	-	-	-	2	-	7	-	85	-	130
2035	-	30	-	5	-	1	-	-	-	2	-	7	-	85	-	130
Total	118	610	1,999	103	35	19	-	-	105	38	386	132	2,981	1,696	5,624	2,598

FTE Jobs Generated by Projects Located in Northwest Region

	Local Community		Local Region		Other Project Regions								Rest of Province		Sum of Areas	
					NW		NE		KP		KWB					
	Development	Operations	Development	Operations	Development	Operations	Development	Operations	Development	Operations	Development	Operations	Development	Operations	Development	Operations
2011	2	-	21	-	-	-	2	-	2	-	8	-	63	-	99	-
2012	3	-	31	-	-	-	3	-	3	-	12	-	93	-	145	-
2013	7	-	74	-	-	-	8	-	8	-	30	-	223	-	349	-
2014	6	1	60	0	-	-	7	0	7	0	24	0	181	2	284	3
2015	-	4	-	1	-	-	-	0	-	0	-	1	-	11	-	17
2016	-	4	-	1	-	-	-	0	-	0	-	1	-	11	-	17
2017	-	4	-	1	-	-	-	0	-	0	-	1	-	11	-	17
2018	-	4	-	1	-	-	-	0	-	0	-	1	-	11	-	17
2019	-	4	-	1	-	-	-	0	-	0	-	1	-	11	-	17
2020	-	4	-	1	-	-	-	0	-	0	-	1	-	11	-	17
2021	-	4	-	1	-	-	-	0	-	0	-	1	-	11	-	17
2022	-	4	-	1	-	-	-	0	-	0	-	1	-	11	-	17
2023	-	4	-	1	-	-	-	0	-	0	-	1	-	11	-	17
2024	-	4	-	1	-	-	-	0	-	0	-	1	-	11	-	17
2025	-	5	-	1	-	-	-	0	-	0	-	1	-	13	-	20
2026	-	5	-	1	-	-	-	0	-	0	-	1	-	13	-	20
2027	-	5	-	1	-	-	-	0	-	0	-	1	-	13	-	20
2028	-	5	-	1	-	-	-	0	-	0	-	1	-	13	-	20
2029	-	5	-	1	-	-	-	0	-	0	-	1	-	13	-	20
2030	-	5	-	1	-	-	-	0	-	0	-	1	-	13	-	20
2031	-	5	-	1	-	-	-	0	-	0	-	1	-	13	-	20
2032	-	5	-	1	-	-	-	0	-	0	-	1	-	13	-	20
2033	-	5	-	1	-	-	-	0	-	0	-	1	-	13	-	20
2034	-	5	-	1	-	-	-	0	-	0	-	1	-	13	-	20
2035	-	5	-	1	-	-	-	0	-	0	-	1	-	13	-	20
Total	18	91	185	15	-	-	20	6	20	6	74	20	559	249	877	386

FTE Jobs Generated by Projects Located in Kitchener-Waterloo-Barrie Region

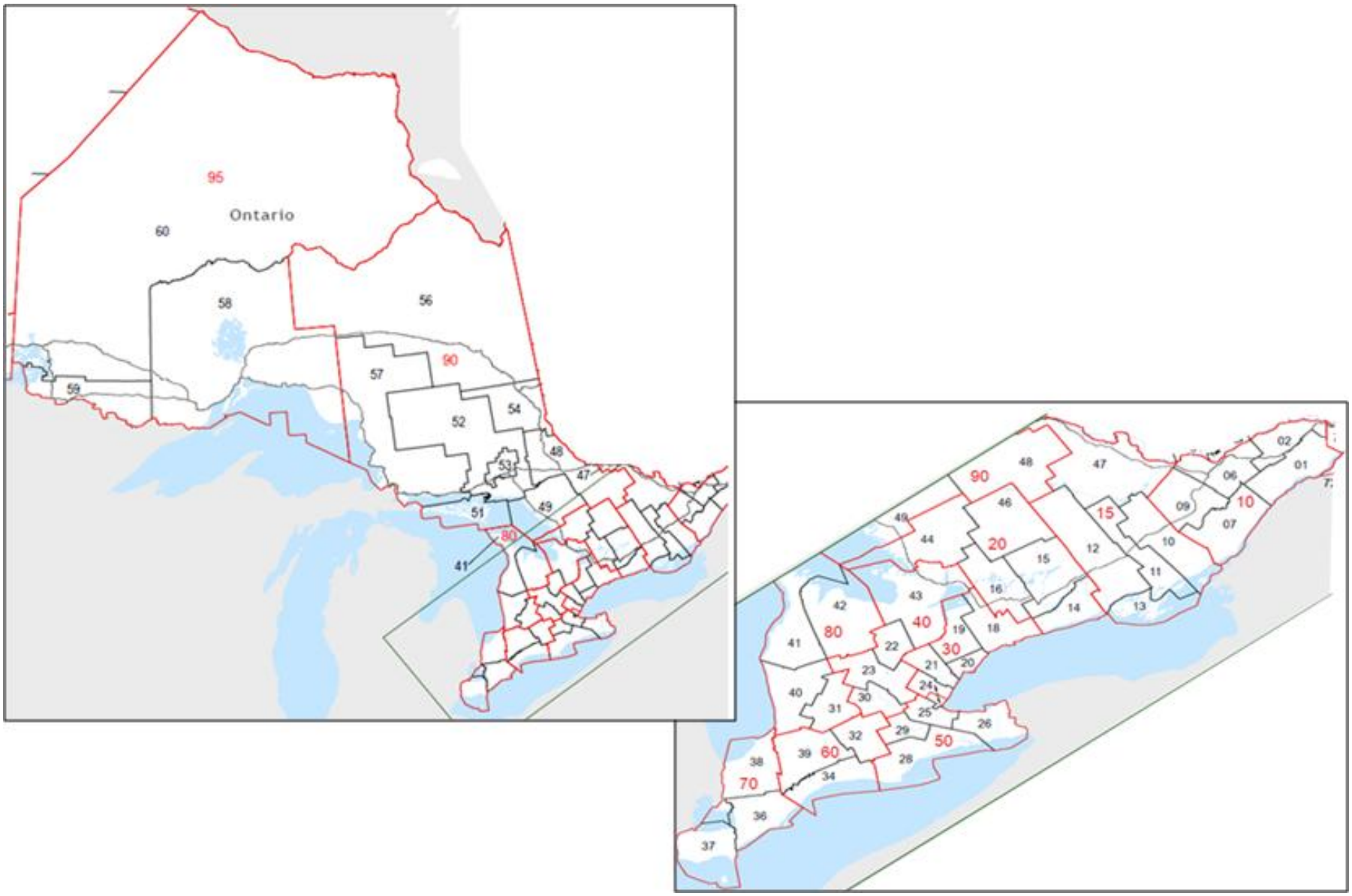
	Local Community		Local Region		Other Project Regions								Rest of Province		Sum of Areas	
					NW		NE		KP		KWB					
	Development	Operations	Development	Operations	Development	Operations	Development	Operations	Development	Operations	Development	Operations	Development	Operations	Development	Operations
2011	2	-	24	-	0	-	0	-	0	-	-	-	5	-	31	-
2012	2	-	24	-	0	-	0	-	0	-	-	-	5	-	31	-
2013	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	1
2014	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	1
2015	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	1
2016	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	1
2017	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	1
2018	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	1
2019	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	1
2020	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	1
2021	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	1
2022	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	1
2023	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	2
2024	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	2
2025	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	2
2026	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	2
2027	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	2
2028	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	2
2029	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	2
2030	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	2
2031	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	2
2032	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	2
2033	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	2
2034	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	2
2035	-	0	-	0	-	0	-	0	-	0	-	-	-	1	-	2
Total	5	8	47	8	0	0	0	0	0	0	-	-	9	21	62	37

FTE Jobs Generated by Projects Located in Kingston-Pembroke Region

	Local Community		Local Region		Other Project Regions								Rest of Province		Sum of Areas	
					NW		NE		KP		KWB					
	Development	Operations	Development	Operations	Development	Operations	Development	Operations	Development	Operations	Development	Operations	Development	Operations	Development	Operations
2011	1	-	9	-	0	-	0	-	-	-	2	-	13	-	24	-
2012	1	-	9	-	0	-	0	-	-	-	2	-	13	-	24	-
2013	2	-	31	-	1	-	2	-	-	-	6	-	46	-	87	-
2014	2	-	31	-	1	-	2	-	-	-	6	-	46	-	87	-
2015	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	4
2016	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	4
2017	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	4
2018	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	4
2019	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	4
2020	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	4
2021	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	4
2022	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	4
2023	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	4
2024	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	4
2025	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	5
2026	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	5
2027	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	5
2028	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	5
2029	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	5
2030	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	5
2031	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	5
2032	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	5
2033	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	5
2034	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	5
2035	-	1	-	0	-	0	-	0	-	-	-	0	-	3	-	5
Total	5	21	79	4	1	1	4	1	-	-	15	5	117	63	222	95

Appendix C

Ontario Economic Regions



Source: Statistics Canada

Ontario Economic Regions

10 Ottawa
1 Stormont Dundas and Glengarry
2 Prescott and Russell
6 Ottawa
7 Leeds and Grenville
9 Lanark

15 Kingston-Pembroke
10 Fronteanc
11 Lennox and Addington
12 Hastings
13 Prince Edward
47 Renfrew

20 Muskoka-Kawarthas
10 Northumberland
11 Peterborough
12 Kawartha Lakes
13 Muskoka
47 Haliburton

30 Toronto
18 Durham
19 York
20 Toronto
21 Peel
24 Halton (part)

40 Kitchener-Waterloo-Barrie
22 Dufferin
23 Wellington
30 Waterloo
43 Simcoe

50 Hamilton-Niagara Peninsula
24 Halton (part)
25 Hamilton
26 Niagara
28 Haldimand-Norfolk
29 Brant

60 London
32 Oxford
34 Elgin
39 Middlesex

70 Windsor-Sarnia
36 Chatham-Kent
37 Essex
38 Lambton

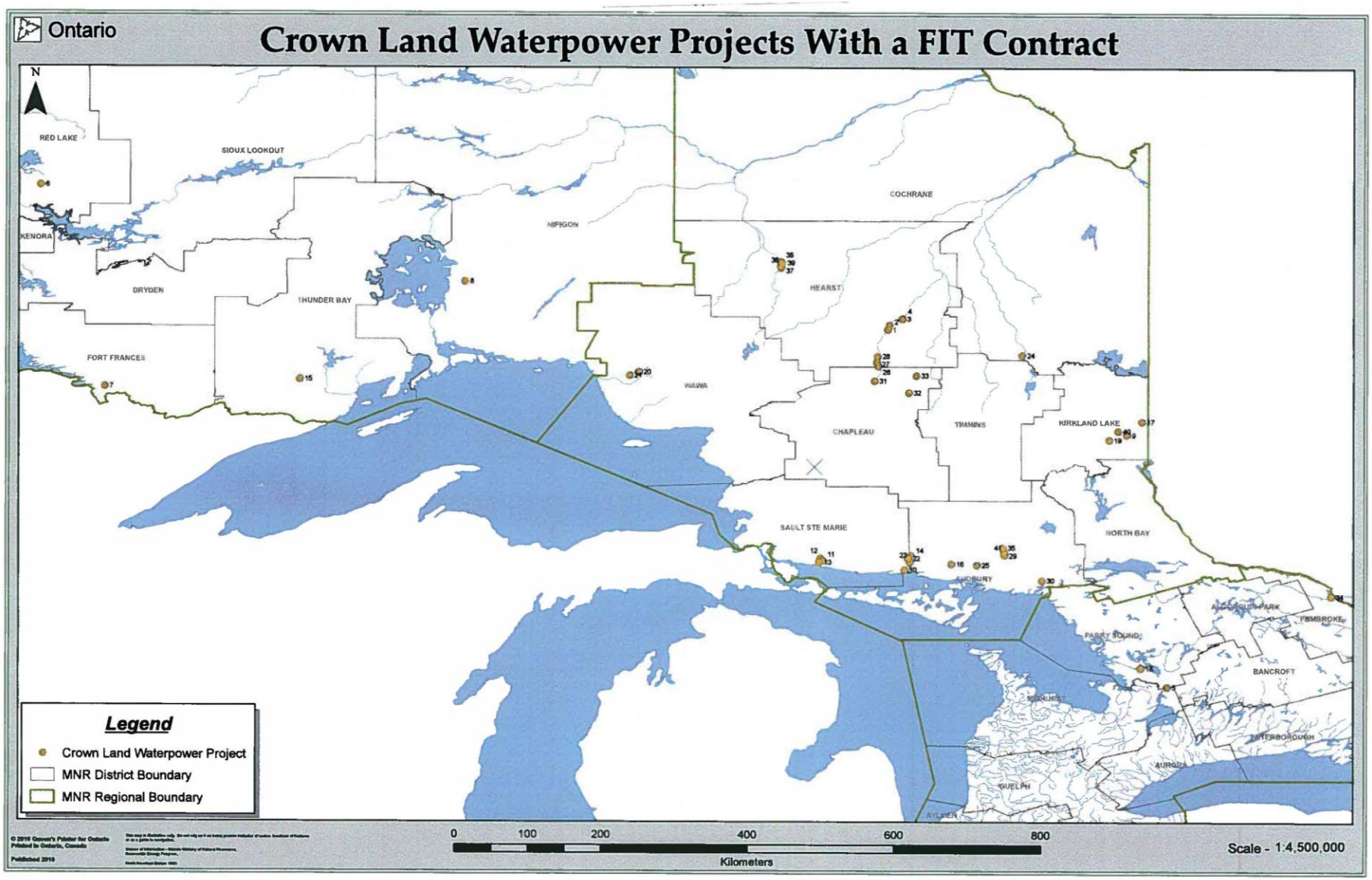
80 Stratford Bruce Peninsula
31 Perth
40 Huron
41 Bruce
42 Grey

90 Northeast
48 Nipissing
49 Parry Sound
51 Manitoulin
52 Sudbury
53 Greater Sudbury
54 Timiskaming
56 Cochrane
57 Algoma

95 Northwest
58 Thunder Bay
59 Rainy River
60 Kenora

Appendix D

Crown Land Waterpower Projects with a FIT Contract


Ontario
Crown Land Waterpower Projects With a FIT Contract
N
RED LAKE
SIOUX LOOKOUT
KENORA
DRYDEN
THUNDER BAY
NIPIGON
COCHRANE
HEARST
FORT FRANCES
WAWA
CHAPLEAU
TIMMINS
KIRKLAND LAKE
SAULT STE MARIE
NORTH BAY
SUDBURY
PEMBROKE
PARRY SOUND
BANCROFT
PETERBOROUGH
AURORA
GUELPH
Legend
Crown Land Waterpower Project
MNR District Boundary
MNR Regional Boundary
0 100 200 400 600 800
Kilometers
Scale - 1:4,500,000

Appendix E

Assumptions

Economic Regions

	FIT Project Name	Economic Region
1	Old Woman Falls Hydroelectric Project	NE
2	White Otter Falls Hydroelectric Project	NE
3	Camp Three Rapids Hydro Electric Project	NE
4	Big Beaver Falls Hydro Electric Project	NE
5	Wasdell Falls Power Project	KWB
6	Trout lake River Hydroelectric Project	NW
7	High Falls Hydropower Development	NW
8	Namewaminikan Waterpower Project	NW
9	Wendigo Waterpower Project	NE
10	Lizard Creek Small Hydro Project	NE
11	McCreights Generating Station	NE
12	Shaw Dam Generating Station	NE
13	Little Rapids Generating Station	NE
14	Pecors Power Small Hydro Project	NE
15	McGraw Falls Dam	NE
16	Birch Creek Hydro	NW
17	Larder Lake and Raven Falls	NE
18	North Bala Small Hydro Project	NE
19	Charlton Dam GS Expansion	NE
20	Gitchi Animiki Behzhig Generating Station	NE
21	Gitchi Animiki Niizh Generating Station	NE
22	Four Slide Falls	NE
23	McCarthy Chute	NE
24	Wanatago Falls	NE
25	Wabageshik Rapid at Outlet Lake	NE
26	Lapinigagam Rapids	NE
27	Middle Twp. Buchan	NE
28	Near North Boundary Twp Buchan	NE
29	Cascade Falls	NE
30	Allen and Struthers	NE
31	Outlet Kapuskasing Lake	NE
32	Ivanhoe River_The Chutes	NE
33	Ivanhoe River_Third Falls	NE
34	Big Eddy at CPR Bridge	KP
35	McPherson Falls	NE
36	Neeskah Project	NE
37	Peeshoo Project	NE
38	Wahpeestan Project	NE
39	Wapoose Project	NE
40	Marter Twp_Blanche River	NE
41	At Soo Crossing	NE

Project Output Efficiency

	Name Plate MW Capacity	Output Efficiency	MW Output	KWh Output	MWh Output	GWh Output
1	5.50	55%	3.03	26,499,000	26,499	26.50
2	5.50	55%	3.03	26,499,000	26,499	26.50
3	5.50	55%	3.03	26,499,000	26,499	26.50
4	5.50	55%	3.03	26,499,000	26,499	26.50
5	1.90	55%	1.05	9,154,200	9,154	9.15
6	4.00	55%	2.20	19,272,000	19,272	19.27
7	6.40	55%	3.52	30,835,200	30,835	30.84
8	10.00	55%	5.50	48,180,000	48,180	48.18
9	3.00	55%	1.65	14,454,000	14,454	14.45
10	1.04	55%	0.57	5,010,720	5,011	5.01
11	0.13	55%	0.07	626,340	626	0.63
12	0.20	55%	0.11	963,600	964	0.96
13	0.30	55%	0.17	1,445,400	1,445	1.45
14	2.00	55%	1.10	9,636,000	9,636	9.64
15	2.40	55%	1.32	11,563,200	11,563	11.56
16	1.00	55%	0.55	4,818,000	4,818	4.82
17	1.25	55%	0.69	6,022,500	6,023	6.02
18	5.00	55%	2.75	24,090,000	24,090	24.09
19	0.85	55%	0.47	4,095,300	4,095	4.10
20	8.90	55%	4.90	42,880,200	42,880	42.88
21	10.00	55%	5.50	48,180,000	48,180	48.18
22	7.30	55%	4.02	35,171,400	35,171	35.17
23	2.00	55%	1.10	9,636,000	9,636	9.64
24	4.70	55%	2.59	22,644,600	22,645	22.64
25	3.40	55%	1.87	16,381,200	16,381	16.38
26	8.20	55%	4.51	39,507,600	39,508	39.51
27	5.00	55%	2.75	24,090,000	24,090	24.09
28	3.80	55%	2.09	18,308,400	18,308	18.31
29	2.10	55%	1.16	10,117,800	10,118	10.12
30	2.80	55%	1.54	13,490,400	13,490	13.49
31	2.50	55%	1.38	12,045,000	12,045	12.05
32	3.60	55%	1.98	17,344,800	17,345	17.34
33	5.10	55%	2.81	24,571,800	24,572	24.57
34	5.30	55%	2.92	25,535,400	25,535	25.54
35	2.00	55%	1.10	9,636,000	9,636	9.64
36	6.50	55%	3.58	31,317,000	31,317	31.32
37	6.50	55%	3.58	31,317,000	31,317	31.32
38	6.50	55%	3.58	31,317,000	31,317	31.32
39	6.50	55%	3.58	31,317,000	31,317	31.32
40	2.10	55%	1.16	10,117,800	10,118	10.12
41	4.30	55%	2.37	20,717,400	20,717	20.72
Total	170.57		93.81	821,806,260	821,806	821.81

Off Peak and Peak Power Output

	Off Peak	Peak
1	100%	0%
2	100%	0%
3	100%	0%
4	100%	0%
5	100%	0%
6	100%	0%
7	100%	0%
8	100%	0%
9	100%	0%
10	100%	0%
11	100%	0%
12	100%	0%
13	100%	0%
14	100%	0%
15	100%	0%
16	100%	0%
17	100%	0%
18	100%	0%
19	100%	0%
20	100%	0%
21	100%	0%
22	100%	0%
23	100%	0%
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25	100%	0%
26	100%	0%
27	100%	0%
28	100%	0%
29	100%	0%
30	100%	0%
31	100%	0%
32	100%	0%
33	100%	0%
34	100%	0%
35	100%	0%
36	100%	0%
37	100%	0%
38	100%	0%
39	100%	0%
40	100%	0%
41	100%	0%

Escalation and Base Year

CPI Increase	2%
Base Year	2011

Capital Cost per MW

Cost per MW	$5,000,000

Apportionment of Capital Costs / MW

			Allocation	Cost
Planning	Engineering	Pre-feasibility	0.2%	$10,000
		Feasibility	1.6%	$80,000
		Detailed Engineering	7.3%	$365,000
	Site Investigations	Pre-feasibility	0.2%	$10,000
		Feasibility	0.4%	$20,000
		Detailed Engineering	1.1%	$55,000
	Environmental Assessment		3.3%	$165,000
	Legal		3.3%	$165,000
	Accounting		2.4%	$120,000
	Project Management		2.2%	$110,000
	Sum of Planning		22.0%	$1,100,000
Construction	Civil	Overflow spillway/dam	7.8%	$390,000
		Adduction	5.6%	$280,000
		Powerhouse	20.0%	$1,000,000
	Mechanical Electrical	Turbine and Generator	27.8%	$1,390,000
		Balance of Plant	9.0%	$450,000
		Substation and Switchyard	5.6%	$280,000
		Transmission line	2.2%	$110,000
	Sum of Construction		78.0%	$3,900,000
Sum of Capx			100.0%	$5,000,000

Project Start Dates and Lifecycle Years

	Start Date	Life Cycle
1	2013	40
2	2013	40
3	2013	40
4	2013	40
5	2013	40
6	2014	40
7	2015	40
8	2015	40
9	2015	40
10	2014	40
11	2016	40
12	2016	40
13	2016	40
14	2014	40
15	2014	40
16	2015	40
17	2015	40
18	2015	40
19	2014	40
20	2014	40
21	2014	40
22	2015	40
23	2015	40
24	2015	40
25	2015	40
26	2015	40
27	2015	40
28	2015	40
29	2015	40
30	2015	40
31	2015	40
32	2015	40
33	2015	40
34	2015	40
35	2015	40
36	2015	40
37	2015	40
38	2015	40
39	2015	40
40	2015	40
41	2015	40

Insurance Cost Factor

Insurance (% of Capital)	1.5%

Operating Costs /MW

Fixed Operating Cost per MW	$22,000
Maintenance Reserve per MW	$20,000
Administration per MW	$17,000
Insurance Premium	$75,000
Total Opx	$134,000

Provincial Charge Gross Revenue Rate

MWh	$40.00

Provincial Charge Holidays (Years from Start)

	Property Tax	Water Rental
New	10	10
Retrofit	10	10
Redevelopment	10	10
Upgrade	10	10

Upgrade Status

	Development Type	Satisfies Threshold
1		
2		
3		
4		
5		
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11		
12		
13		
14		
15		
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41		

Property Tax Rates (% of Gross Revenue)

<=50 GWh	2.5%
>50 - 400 GWh	4.5%
>400 - 700 GWh	6.0%
>700 GWh	26.5%

Water Rental Rate (% of Gross Revenue

Rate	9.50%

Revenue Rate on Power Output

		FIT	Non FIT
<= 10 MW ($/KWh)		$0.131	$-
> 10 MW ($/KWh)		$0.121	$-
Inflation	% of Output	20%	20%
	Annual CPI Increase	2%	2%

Aboriginal and Community Adder Rates

	$/KWh
Aboriginal	$0.009
Community	$0.006

Statistics Canada Input / Output Multipliers (Year 2007)

		Gross Output	GDP	Labour Income	FTE Jobs
Development	Direct	$1,000,000	$525,576	$273,814	4.35
	Indirect	$448,100	$226,622	$160,266	2.66
	Induced	$330,243	$199,462	$113,854	2.06
	Total	$1,778,343	$951,660	$547,934	9.07
Operations	Direct	$1,000,000	$559,445	$197,814	2.23
	Indirect	$371,900	$206,545	$156,831	2.63
	Induced	$233,520	$140,915	$80,457	1.46
	Total	$1,605,420	$906,905	$435,102	6.31

Statistics Canada Tax Multipliers (Year 2007)

	Development	Operations
Federal	$14,299	$10,150
Provincial	$43,352	$19,222
Sum of Jurisdictions	$57,651	$29,372

Green House Gas Outputs for Alternative Energy Sources

	Tonnes/MW
Lignite	9,233
Coal	7,779
Diesel	6,745
Oil	6,421
Natural Gas	4,371
Solar PV	745
Biomass	394
Nuclear	254
Hydroelectric	228
Wind	228

Green House Gas Trading Value

Value/tn	$15.00

Regional Economic Capture Rates

		Development	Operations
Other Project Regions	NW	1%	1%
	NE	3%	2%
	KP	3%	2%
	KWB	11%	7%

Northwest Capx Apportionment

			Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
					NW	NE	KP	KWB		
Planning	Engineering	Pre-feasibility	0%	30%		2%	2%	8%	58%	100%
		Feasibility	5%	30%		2%	2%	7%	54%	100%
		Detailed Engineering	0%	30%		2%	2%	8%	58%	100%
	Site Investigations	Pre-feasibility	0%	30%		2%	2%	8%	58%	100%
		Feasibility	5%	30%		2%	2%	7%	54%	100%
		Detailed Engineering	0%	30%		2%	2%	8%	58%	100%
	Environmental Assessment		10%	30%		2%	2%	7%	50%	100%
	Legal		0%	30%		2%	2%	8%	58%	100%
	Accounting		0%	30%		2%	2%	8%	58%	100%
	Project Management		0%	30%		2%	2%	8%	58%	100%
Construction	Civil	Overflow spillway/dam	5%	30%		2%	2%	7%	54%	100%
		Adduction	5%	30%		2%	2%	7%	54%	100%
		Powerhouse	5%	30%		2%	2%	7%	54%	100%
	Mechanical Electrical	Turbine and Generator	0%	10%		3%	3%	10%	75%	100%
		Balance of Plant	0%	10%		3%	3%	10%	75%	100%
		Substation and Switchyard	0%	10%		3%	3%	10%	75%	100%
		Transmission line	0%	10%		3%	3%	10%	75%	100%

Northeast Capx Apportionment

			Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
					NW	NE	KP	KWB		
Planning	Engineering	Pre-feasibility	0%	40%	1%		2%	7%	51%	100%
		Feasibility	5%	40%	1%		2%	6%	47%	100%
		Detailed Engineering	0%	40%	1%		2%	7%	51%	100%
	Site Investigations	Pre-feasibility	0%	40%	1%		2%	7%	51%	100%
		Feasibility	5%	40%	1%		2%	6%	47%	100%
		Detailed Engineering	0%	40%	1%		2%	7%	51%	100%
	Environmental Assessment		10%	40%	1%		2%	6%	43%	100%
	Legal		0%	40%	1%		2%	7%	51%	100%
	Accounting		0%	40%	1%		2%	7%	51%	100%
	Project Management		0%	40%	1%		2%	7%	51%	100%
Construction	Civil	Overflow spillway/dam	5%	40%	1%		2%	6%	47%	100%
		Adduction	5%	40%	1%		2%	6%	47%	100%
		Powerhouse	5%	40%	1%		2%	6%	47%	100%
	Mechanical Electrical	Turbine and Generator	0%	30%	1%		2%	8%	60%	100%
		Balance of Plant	0%	30%	1%		2%	8%	60%	100%
		Substation and Switchyard	0%	30%	1%		2%	8%	60%	100%
		Transmission line	0%	30%	1%		2%	8%	60%	100%

Kingston-Pembroke Capx Apportionment

			Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
					NW	NE	KP	KWB		
Planning	Engineering	Pre-feasibility	0%	40%	1%	2%		7%	51%	100%
		Feasibility	10%	40%	1%	2%		6%	43%	100%
		Detailed Engineering	0%	40%	1%	2%		7%	51%	100%
	Site Investigations	Pre-feasibility	0%	40%	1%	2%		7%	51%	100%
		Feasibility	10%	40%	1%	2%		6%	43%	100%
		Detailed Engineering	0%	40%	1%	2%		7%	51%	100%
	Environmental Assessment		15%	40%	0%	1%		5%	38%	100%
	Legal		0%	40%	1%	2%		7%	51%	100%
	Accounting		0%	40%	1%	2%		7%	51%	100%
	Project Management		0%	40%	1%	2%		7%	51%	100%
Construction	Civil	Overflow spillway/dam	5%	40%	1%	2%		6%	47%	100%
		Adduction	5%	40%	1%	2%		6%	47%	100%
		Powerhouse	5%	40%	1%	2%		6%	47%	100%
	Mechanical Electrical	Turbine and Generator	0%	30%	1%	2%		8%	60%	100%
		Balance of Plant	0%	30%	1%	2%		8%	60%	100%
		Substation and Switchyard	0%	30%	1%	2%		8%	60%	100%
		Transmission line	0%	30%	1%	2%		8%	60%	100%

Kitchener-Waterloo-Barrie Capx Apportionment

			Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
					NW	NE	KP	KWB		
Planning	Engineering	Pre-feasibility	10%	80%	0%	0%	0%		9%	100%
		Feasibility	10%	80%	0%	0%	0%		9%	100%
		Detailed Engineering	10%	80%	0%	0%	0%		9%	100%
	Site Investigations	Pre-feasibility	10%	80%	0%	0%	0%		9%	100%
		Feasibility	10%	80%	0%	0%	0%		9%	100%
		Detailed Engineering	10%	80%	0%	0%	0%		9%	100%
	Environmental Assessment		15%	80%	0%	0%	0%		5%	100%
	Legal		10%	30%	1%	2%	2%		56%	100%
	Accounting		0%	30%	1%	2%	2%		65%	100%
	Project Management		0%	30%	1%	2%	2%		65%	100%
Construction	Civil	Overflow spillway/dam	15%	80%	0%	0%	0%		5%	100%
		Adduction	15%	80%	0%	0%	0%		5%	100%
		Powerhouse	15%	80%	0%	0%	0%		5%	100%
	Mechanical Electrical	Turbine and Generator	0%	80%	0%	1%	1%		19%	100%
		Balance of Plant	10%	80%	0%	0%	0%		9%	100%
		Substation and Switchyard	0%	80%	0%	1%	1%		19%	100%
		Transmission line	0%	80%	0%	1%	1%		19%	100%

Northwest Opx Apportionment

	Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
			NW	NE	KP	KWB		
Fixed Operating Cost per MW	80%	10%		0%	0%	1%	9%	100%
Maintenance Reserve per MW	70%	10%		0%	0%	1%	18%	100%
Administration per MW	20%	10%		1%	1%	5%	62%	100%
Insurance Premium	0%	0%		2%	2%	7%	89%	100%
Provincial Charges	0%	0%		2%	2%	7%	89%	100%

Northeast Opx Apportionment

	Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
			NW	NE	KP	KWB		
Fixed Operating Cost per MW	80%	10%	0%		0%	1%	9%	100%
Maintenance Reserve per MW	70%	10%	0%		0%	1%	18%	100%
Administration per MW	20%	10%	1%		1%	5%	63%	100%
Insurance Premium	0%	0%	1%		2%	7%	90%	100%
Provincial Charges	0%	0%	1%		2%	7%	90%	100%

Kingston-Pembroke Opx Apportionment

	Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
			NW	NE	KP	KWB		
Fixed Operating Cost per MW	80%	10%	0%	0%		1%	9%	100%
Maintenance Reserve per MW	70%	10%	0%	0%		1%	18%	100%
Administration per MW	20%	10%	1%	1%		5%	63%	100%
Insurance Premium	0%	0%	1%	2%		7%	90%	100%
Provincial Charges	0%	0%	1%	2%		7%	90%	100%

Kitchener-Waterloo-Barrie Opx Apportionment

	Local Community	Local Region	Other Project Regions				Rest of Province	Sum of Areas
			NW	NE	KP	KWB		
Fixed Operating Cost per MW	80%	10%	0%	0%	0%		10%	100%
Maintenance Reserve per MW	50%	40%	0%	0%	0%		10%	100%
Administration per MW	20%	30%	1%	1%	1%		48%	100%
Insurance Premium	0%	20%	1%	2%	2%		76%	100%
Provincial Charges	0%	0%	1%	2%	2%		95%	100%