

# Introduction to RETScreen

Presentation at the 2014 NOFNEC

By: Chris Price, Bimose Tribal Council & Laura  
Sayers, Shibogama FNC

September 30, 2014

# Overview

1. What is RETScreen?
2. Why do we use RETScreen?
3. RETScreen Software
4. RETScreen Worksheets
5. Interpreting RETScreen & Examples
6. RETScreen Training

# What is RETScreen?

- “*RETScreen 4* is an Excel-based clean energy project analysis software tool that helps decision makers quickly and inexpensively determine the technical and financial viability of potential renewable energy, energy efficiency and cogeneration projects”

(Source: RETScreen International [www.etscreen.net](http://www.etscreen.net))

# Why do we use RETScreen?

- “Pre-feasibility” study for renewable energy, energy efficiency projects.
- Gives us an idea on whether a project proposals is worth looking into further
- Inexpensive first step to project planning (software is free to download)
- AANDC ecoENERGY funding program requires proposals to include a RETScreen Analysis.

# Where can we get RETScreen Software?

- [www.etscreen.net](http://www.etscreen.net)
- “Click here to download RETScreen Suite”
- Save or Run RETScreenSuite.exe
- Run the .exe file and it will download to your computer.
  
- “RETScreen 4” is current version.



# Natural Resources Canada

www.nrcan.gc.ca

<b>Français</b> English	<b>Accueil</b> Home	<b>Contactez-nous</b> Contact Us	<b>Aide</b> Help	<b>Recherche</b> Search	<b>canada.gc.ca</b> canada.gc.ca
----------------------------	------------------------	-------------------------------------	---------------------	----------------------------	-------------------------------------

Home

- Home
- Newsletter
- Centre Overview
- Software & Data
- Training Material
- RETScreen Help & Contact Us
- RETScreen Search
- Proactive Disclosure



### RETScreen Software Suite - Download Free

Downloading and running **RETScreen Software Suite** on your computer will install two separate programs, **RETScreen 4** and **RETScreen Plus**, described below.

[Click here to download RETScreen Suite](#)

**RETScreen 4** is an Excel-based clean energy project analysis software tool that helps decision makers quickly and inexpensively determine the technical and financial viability of potential renewable energy, energy efficiency and cogeneration projects.

**RETScreen Plus** is a Windows-based energy management software tool that allows project owners to easily verify the ongoing energy performance of their facilities.

### Newsletter

[417801 users in 222 countries](#)

[District Energy Systems in Canadian Municipalities](#)

[NASA Using RETScreen at Centres Across the United States](#)

[30,000+ Solar Water Heaters Installed in eThekweni \(Durban\), South Africa](#)

[Pennsylvania Firm Deploys Energy Management Software](#)

Click here

Do you want to run or save **RETScreenSuite.exe** (105 MB) from **retscreen.net**?

This type of file could harm your computer.

Run Save Cancel

# RETScreen 4 - Software

RETScreen 4 - Software

RETScreen International  
www.retscreen.net  
Clean Energy Project Analysis Software

**Project information** [See project database](#)

Project name

Project location

Prepared for

Prepared by

Project type

Facility type

Analysis type

Heating value reference

Show settings

**Site reference conditions** [Select climate data location](#)

Climate data location

Show data

NASA UNEP GEF reeep [Complete Energy Model sheet](#)

RETScreen4 2013-08-27 © Minister of Natural Resources Canada 1997-2013.

Start Energy Model Cost Analysis Emission Analysis Financial Analysis Risk Analysis Tools

Ready

Opens in Excel

Shaded in "Grey" are inputs used for reference / information purposes

Shaded in "Yellow" are inputs required for energy calculations

Project type

Facility type

Analysis type

Heating value reference

Show settings

**Site reference conditions** [Select climate data location](#)

Climate data location

Show data

“Method 2”  
is more detailed  
(and required for  
AANDC  
ecoENERGY  
funding  
proposals)



[Complete Energy Model sheet](#)

RETScreen4 2013-08-27

© Minister of Natural Resources Canada 1997-2013.

Navigation tabs: Start | Energy Model | Cost Analysis | Emission Analysis | Financial Analysis | Risk Analysis | Tools

Status: Ready

Tabs along the bottom  
show “Worksheets”



RETScreen4-1 - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Developer Acrobat RETScreen

Arial 10

Clipboard Font Alignment Number Styles

D446

**RETScreen Energy Model - Power project**

**Proposed case power system**

Analysis type  
 Method 1  
 Method 2

**Resource assessment**  
 Solar tracking mode  
 Slope  
 Azimuth

Fixed

Show data

Month	Daily solar radiation - horizontal kWh/m <sup>2</sup> /d	Daily solar radiation - tilted kWh/m <sup>2</sup> /d	Electricity export rate \$/MWh	Electricity exported to grid MWh
January	1.53	1.53		#DIV/0!
February	2.58	2.58		#DIV/0!
March	3.64	3.64		#DIV/0!
April	4.64	4.64		#DIV/0!
May	5.36	5.36		#DIV/0!
June	5.94	5.94		#DIV/0!
July	5.86	5.86		#DIV/0!
August	4.92	4.92		#DIV/0!
September	3.58	3.58		#DIV/0!
October	2.33	2.33		#DIV/0!
November	1.31	1.31		#DIV/0!
December	1.08	1.08		#DIV/0!
<b>Annual</b>	<b>3.57</b>	<b>3.57</b>	<b>#DIV/0!</b>	<b>#DIV/0!</b>

Annual solar radiation - horizontal MWh/m<sup>2</sup> 1.30  
 Annual solar radiation - tilted MWh/m<sup>2</sup> 1.30

**Photovoltaic**

Type  
 Power capacity kW  
 Manufacturer  
 Model  
 Efficiency %  
 Nominal operating cell temperature °C  
 Temperature coefficient % / °C  
 Solar collector area m<sup>2</sup>

mono-Si  
 45  
 0.40%  
 #DIV/0!

Miscellaneous losses %

**Inverter**

Efficiency %  
 Capacity kW  
 Miscellaneous losses %

**Summary**

Start Energy Model Cost Analysis Emission Analysis Financial Analysis Risk Analysis Tools

“ENERGY MODEL” worksheet collects data on renewable energy technology and the costs of energy offset.

RETScreen4-1 - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Developer Acrobat RETS

Link\_CA\_Start

### RETScreen Cost Analysis - Power project

**Settings**

- Method 1
- Method 2
- Notes/Range
- Second currency
- Cost allocation

Notes/Range: None

Initial costs (credits)	Unit	Quantity	Unit cost	Amount	Relative costs
<b>Feasibility study</b>					
Feasibility study	cost			\$ -	-
Subtotal:				\$ -	-
<b>Development</b>					
Development	cost			\$ -	-
Subtotal:				\$ -	-
<b>Engineering</b>					
Engineering	cost			\$ -	-
Subtotal:				\$ -	-
<b>Power system</b>					
Photovoltaic	kW	0.00		\$ -	-
Road construction	km			\$ -	-
Transmission line	km			\$ -	-
Substation	project			\$ -	-
Energy efficiency measures	project			\$ -	-
User-defined	cost			\$ -	-
Subtotal:				\$ -	-
<b>Balance of system &amp; miscellaneous</b>					
Spare parts	%			\$ -	-
Transportation	project			\$ -	-
Training & commissioning	p-d			\$ -	-
User-defined	cost			\$ -	-
Contingencies	%			\$ -	-
Interest during construction			\$ -	\$ -	-
Subtotal:			Enter number of months	\$ -	-
<b>Total initial costs</b>				\$ -	-
<b>Annual costs (credits)</b>					
<b>O&amp;M</b>					
Parts & labour	project			\$ -	-
User-defined	cost			\$ -	-
Contingencies	%			\$ -	-
Subtotal:				\$ -	-
<b>Periodic costs (credits)</b>					
User-defined	cost			\$ -	-
End of project life	cost			\$ -	-

[Go to Emission Analysis sheet](#)

Start Energy Model **Cost Analysis** Emission Analysis Financial Analysis Risk Analysis Tools

“COST ANALYSIS”  
worksheet  
collects data on  
CAPITAL and O&M  
Costs

RETScreen4-1 - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Developer Acrobat RETScreen

Clipboard Font Alignment Number Conditional Formatting Styles Cells

Link\_GHG2\_Start

RETScreen Emission Reduction Analysis - Power project

**Emission Analysis**

- Method 1
- Method 2
- Method 3

**Base case electricity system (Baseline)**

Country - region		GHG emission factor (excl. T&D) tCO2/MWh	T&D losses %	GHG emission factor tCO2/MWh
Canada	All types	0.196		0.196

Baseline changes during project life

**Base case system GHG summary (Baseline)**

Fuel type	Fuel mix %	Fuel consumption MWh	GHG emission factor tCO2/MWh	GHG emission tCO2
Total	0.0%	0	0.000	0.0

**Proposed case system GHG summary (Power project)**

Fuel type	Fuel mix %	Fuel consumption MWh	GHG emission factor tCO2/MWh	GHG emission tCO2
Total	100.0%	0	0.000	0.0

**GHG emission reduction summary**

	Base case GHG emission tCO2	Proposed case GHG emission tCO2	Gross annual GHG emission reduction tCO2	GHG credits transaction fee %	Net annual GHG emission reduction tCO2
Power project	0.0	0.0	0.0		0.0
Net annual GHG emission reduction	0.0	tCO2	is equivalent to	0.0	Cars & light trucks not used

Complete Financial Analysis sheet

Start Energy Model Cost Analysis Emission Analysis Financial Analysis Risk Analysis Tools

“EMISSION ANALYSIS” estimates the reduction in Greenhouse Gases (GHG)

RETScreen4-1 - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View Developer Acrobat RETScreen

Clipboard Font Alignment Number Styles

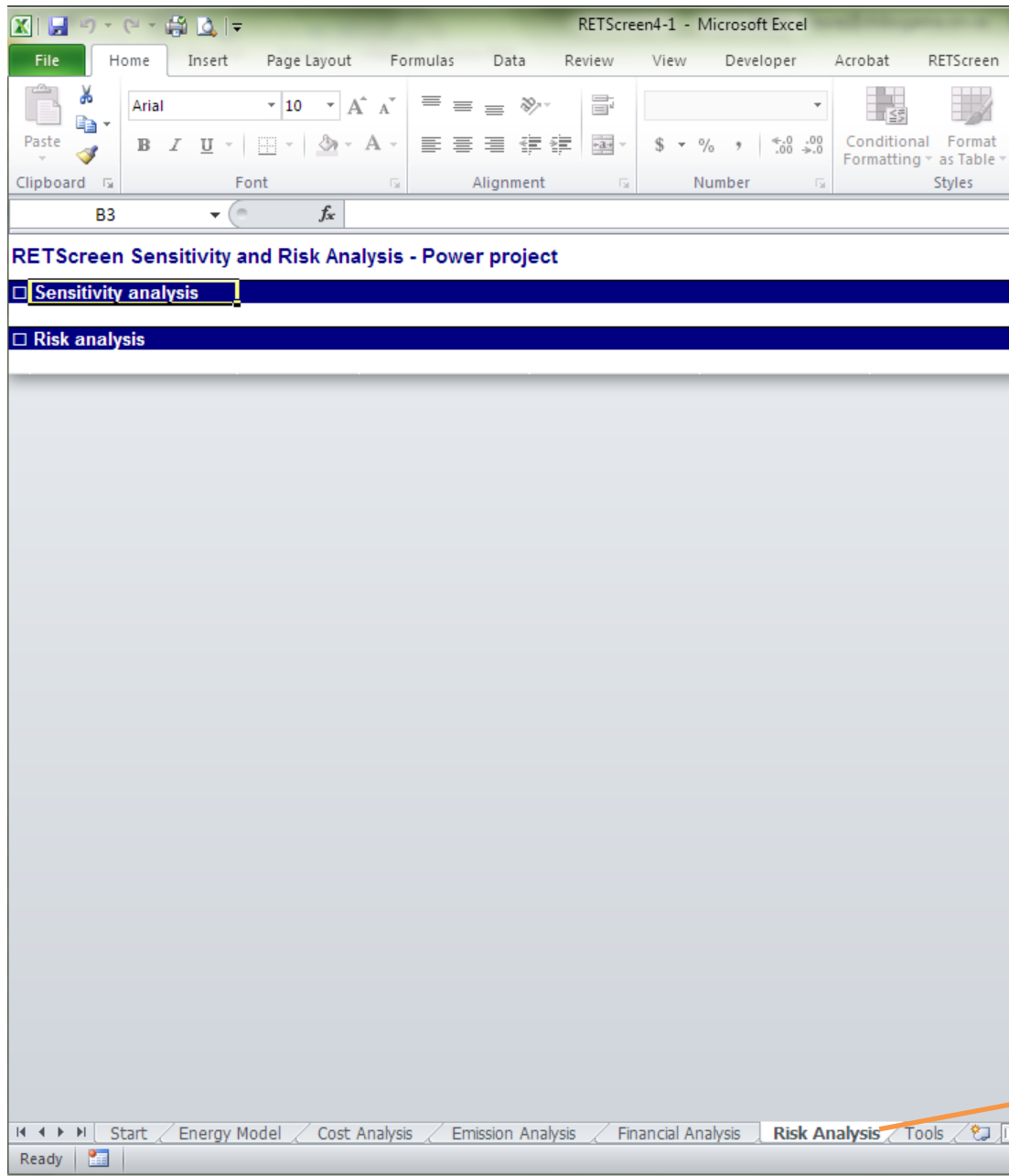
Link\_FS\_Start

**RETScreen Financial Analysis - Power project**

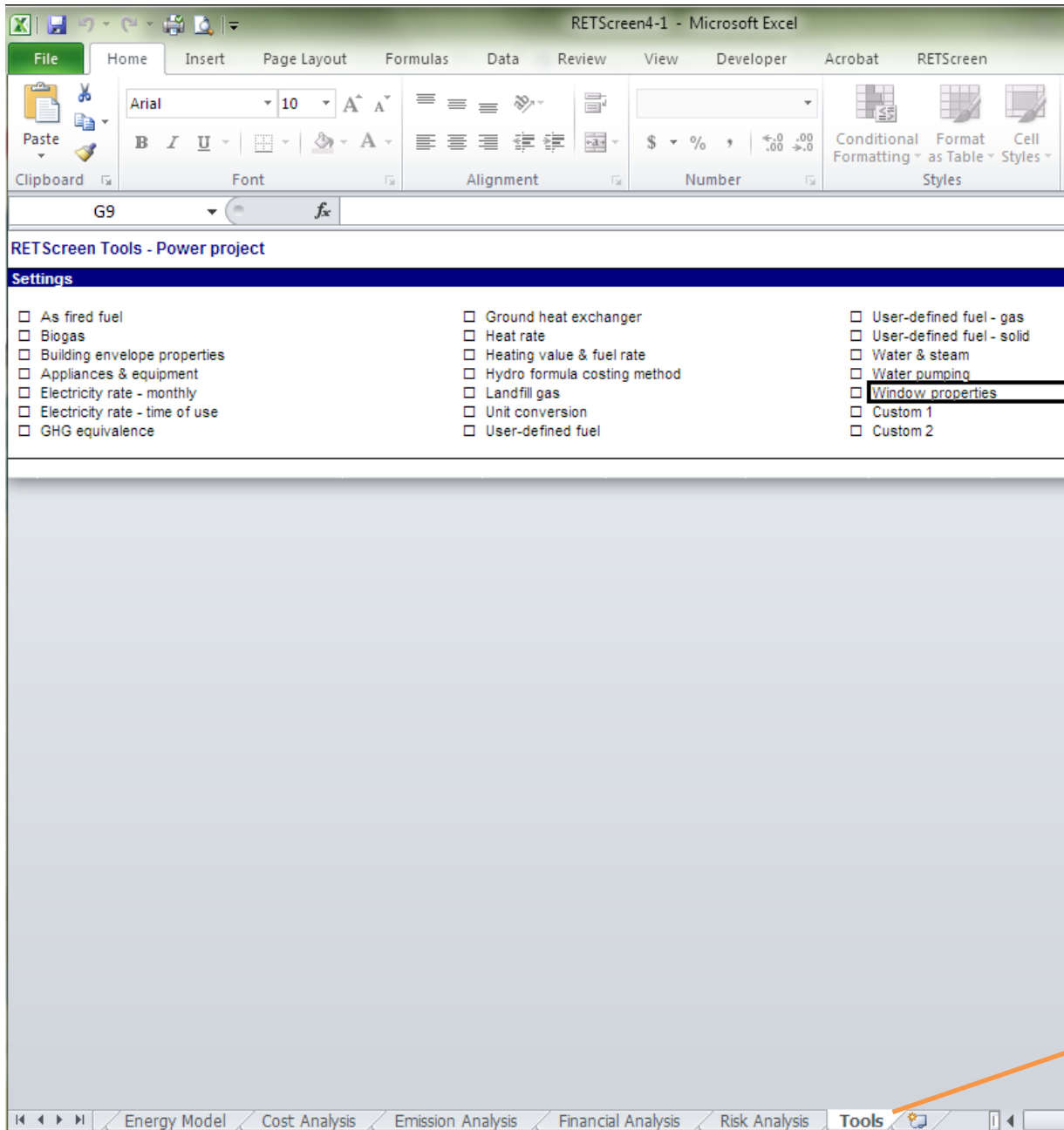
Financial parameters			Project costs and savings/income summary			Yearly cash flows		
<b>General</b>			<b>Initial costs</b>			<b>Yearly cash flows</b>		
Fuel cost escalation rate	%		Power system	\$	0	Year	Pre-tax	After
Inflation rate	%		Balance of system & misc.	\$	0	#	\$	\$
Discount rate	%		<b>Total initial costs</b>	<b>0.0%</b>	<b>\$ 0</b>	0	#REF!	#RI
Project life	yr		<b>Annual costs and debt payments</b>					
<b>Finance</b>			O&M	\$	0			
Incentives and grants	\$		Fuel cost - proposed case	\$	0			
Debt ratio	%		<b>Total annual costs</b>	<b>\$</b>	<b>0</b>			
<b>Income tax analysis</b>			<b>Periodic costs (credits)</b>					
			<b>Annual savings and income</b>					
			Fuel cost - base case	\$	0			
			<b>Total annual savings and income</b>	<b>\$</b>	<b>0</b>			
<b>Annual income</b>			<b>Financial viability</b>					
<b>Electricity export income</b>			Pre-tax IRR - equity	%	#REF!			
			Pre-tax IRR - assets	%	#REF!			
			After-tax IRR - equity	%	#REF!			
			After-tax IRR - assets	%	#REF!			
<b>GHG reduction income</b>			Simple payback	yr				
Net GHG reduction	tCO2/yr	0	Equity payback	yr	#REF!			
Net GHG reduction - 0 yrs	tCO2	0	Net Present Value (NPV)	\$	#REF!			
			Annual life cycle savings	\$/yr	#REF!			
			Benefit-Cost (B-C) ratio		#REF!			
<b>Customer premium income (rebate)</b>								

Start Energy Model Cost Analysis Emission Analysis **Financial Analysis** Risk Analysis Tools

“FINANCIAL ANALYSIS” summarizes overall costs, cost of energy offset, interprets fuel savings, calculates payback period and annual costs savings



**“RISK ANALYSIS”**  
allows for  
sensitivity and risk  
analysis on key  
financial  
parameters.  
These are  
optional and  
inputs on this  
worksheet to not  
impact the others



“TOOLS” allows users to input further details and calculations. This worksheet is optional.

# Interpreting RETScreen & Examples

What if we want to build one of these:



10MW Solar Farm

# Example #1

## Project information

[See project database](#)

Project name   
Project location

Prepared for   
Prepared by

Project type

Facility type

Analysis type

Heating value reference

Show settings

## Site reference conditions

[Select climate data location](#)

Climate data location

Show data

New 10MW Solar Farm in Kenora Ontario  
- Found total cost by tendering



RETScreen - Microsoft Excel

Link\_ES\_Start

**RETScreen Energy Model - Power project**

**Proposed case power system**

Analysis type  
 Method 1  
 Method 2

**Resource assessment**  
 Solar tracking mode: Fixed  
 Slope: 49.8  
 Azimuth: 0.0

Show data

Month	Daily solar radiation - horizontal kWh/m <sup>2</sup> /d	Daily solar radiation - tilted kWh/m <sup>2</sup> /d	Electricity export rate \$/MWh	Electricity exported to grid MWh
January	1.48	3.90	354.5	1,277.0
February	2.51	5.14	354.5	1,490.4
March	4.12	6.38	354.5	1,973.5
April	5.35	5.94	354.5	1,721.8
May	5.96	5.57	354.5	1,630.9
June	6.01	5.25	354.5	1,463.9
July	5.99	5.39	354.5	1,526.4
August	5.01	5.07	354.5	1,446.3
September	3.43	4.14	354.5	1,174.8
October	2.19	3.45	354.5	1,040.2
November	1.36	2.94	354.5	894.4
December	1.13	3.17	354.5	1,030.4
<b>Annual</b>	<b>3.72</b>	<b>4.69</b>	<b>354.50</b>	<b>16,670.1</b>

Annual solar radiation - horizontal MWh/m<sup>2</sup>: 1.36  
 Annual solar radiation - tilted MWh/m<sup>2</sup>: 1.71

**Photovoltaic**  
 Type: mono-Si  
 Power capacity: 10,000.00 kW  
 Manufacturer: Heliene  
 Model: mono-Si-HEE300M-285W 1 unit(s)  
 Efficiency: 97.0%  
 Nominal operating cell temperature: 45 °C  
 Temperature coefficient: 0.40% / °C

Orientation:  
 Fixed  
 Slope  
 Azimuth

Hydro One FIT  
 Contract Rate

RETScreen4-1 RETScreen - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View RETScreen

Normal Page Layout Full Screen Workbook Views Ruler Formula Bar Gridlines Headings Zoom 100% Zoom to Selection New Window Arrange All Freeze Panes Split Hide Unhide Save Workspace Switch Windows Macros

Link\_ES\_Start

February	2.51	5.14	354.5	1,490.4
March	4.12	6.38	354.5	1,973.5
April	5.35	5.94	354.5	1,721.8
May	5.96	5.57	354.5	1,630.9
June	6.01	5.25	354.5	1,463.9
July	5.99	5.39	354.5	1,526.4
August	5.01	5.07	354.5	1,446.3
September	3.43	4.14	354.5	1,174.8
October	2.19	3.45	354.5	1,040.2
November	1.36	2.94	354.5	894.4
December	1.13	3.17	354.5	1,030.4
<b>Annual</b>	<b>3.72</b>	<b>4.69</b>	<b>354.50</b>	<b>16,670.1</b>
Annual solar radiation - horizontal	MWh/m <sup>2</sup>	1.36		
Annual solar radiation - tilted	MWh/m <sup>2</sup>	1.71		
<b>Photovoltaic</b>				
Type		mono-Si		
Power capacity	kW	10,000.00		
Manufacturer		Heliene		
Model		mono-Si-HEE300M-285W	1 unit(s)	
Efficiency	%	97.0%		
Nominal operating cell temperature	°C	45		
Temperature coefficient	% / °C	0.40%		
Solar collector area	m <sup>2</sup>	10,309		
Miscellaneous losses	%	0.0%		
<b>Inverter</b>				
Efficiency	%	97.0%		
Capacity	kW	10000.0		
Miscellaneous losses	%			
<b>Summary</b>				
Capacity factor	%	19.0%		
Electricity exported to grid	MWh	16,670.1		

[Complete Cost Analysis sheet](#)

Start Energy Model Cost Analysis Emission Analysis Financial Analysis Risk Analysis Tools

Ready 110%

Photovoltaic  
Specifications:  
Type  
Capacity  
Manufacturer  
Model  
  
Inverter  
Specifications

RETScreen4-1 RETScreen - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View RETScreen

Normal Page Layout Full Screen Workbook Views Ruler Formula Bar Gridlines Headings Show Zoom 100% Zoom to Selection New Window Split Arrange All Hide Freeze Panes Unhide Save Workspace Switch Windows Macros

Link\_CA\_Start

### RETScreen Cost Analysis - Power project

**Settings**

Method 1 Method 2 Notes/Range Second currency Cost allocation Notes/Range None

Initial costs (credits)	Unit	Quantity	Unit cost	Amount	Relative costs
<b>Feasibility study</b>					
Site investigation	p-d			\$ -	
Resource assessment	project			\$ -	
Environmental assessment	p-d			\$ -	
Preliminary design	p-d			\$ -	
Detailed cost estimate	p-d			\$ -	
GHG baseline study & MP	project			\$ -	
Report preparation	p-d			\$ -	
Project management	p-d			\$ -	
Travel & accommodation	p-trip			\$ -	
Overall	cost	1	\$ 250,000	\$ 250,000	
Subtotal:				\$ 250,000	0.9%
<b>Development</b>					
Contract negotiations	p-d			\$ -	
Permits & approvals	p-d			\$ -	
Site survey & land rights	p-d			\$ -	
GHG validation & registration	project			\$ -	
Project financing	p-d			\$ -	
Legal & accounting	p-d			\$ -	
Project management	p-d			\$ -	
Travel & accommodation	p-trip			\$ -	
User-defined	cost	1	\$ 15,000,000	\$ 15,000,000	
Subtotal:				\$ 15,000,000	54.5%
<b>Engineering</b>					
Site & building design	p-d			\$ -	
Mechanical design	p-d			\$ -	
Electrical design	p-d			\$ -	
Civil design	p-d			\$ -	
Tenders & contracting	p-d			\$ -	
Construction supervision	p-d			\$ -	
User-defined	cost	1	\$ 12,250,000	\$ 12,250,000	
Subtotal:				\$ 12,250,000	44.5%
<b>Power system</b>					
Photovoltaic	kW	10,000.00		\$ -	

Start Energy Model Cost Analysis Emission Analysis Financial Analysis Risk Analysis Tools

Feasibility  
\$25,000

Development  
\$15,000,000

Engineering  
12,250,000

Link\_CA\_Start

**Power system**

Photovoltaic	kW	10,000.00		\$	-
Road construction	km			\$	-
Transmission line	km			\$	-
Substation	project			\$	-
Energy efficiency measures	project			\$	-
User-defined	cost			\$	-
Subtotal:				\$	0.0%

**Balance of system & miscellaneous**

		<b>Fuel handling system</b>			
Specific project costs	project			\$	-
Delivery equipment	project			\$	-
Preparation equipment	project			\$	-
Storage equipment	project			\$	-
Distribution equipment	project			\$	-
Building & yard construction	m <sup>2</sup>			\$	-
Spare parts	%			\$	-
Transportation	project			\$	-
Training & commissioning	p-d			\$	-
User-defined	cost			\$	-
Contingencies	%		\$ 27,500,000	\$	-
Interest during construction			\$ 27,500,000	\$	-
Subtotal:		Enter number of months		\$	0.0%

**Total initial costs**

				\$	27,500,000	100.0%
--	--	--	--	----	------------	--------

**Annual costs (credits)**

	Unit	Quantity	Unit cost	Amount
<b>O&amp;M</b>				
Land lease & resource rental	project			\$ -
Property taxes	project			\$ -
Insurance premium	project			\$ -
Parts & labour	project			\$ -
GHG monitoring & verification	project			\$ -
Community benefits	project			\$ -
General & administrative	%		\$ -	\$ -
User-defined	cost			\$ -
Contingencies	%		\$ -	\$ -
Subtotal:				\$ -

**Periodic costs (credits)**

	Unit	Year	Unit cost	Amount
User-defined	cost			\$ -
End of project life	cost			\$ -

[Go to Emission Analysis sheet](#)

Power System  
10MW  
Photovoltaic  
  
Total Cost of  
\$27,500,000

RETScreen4-1 RETScreen - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View RETScreen

Normal Page Break Preview Custom Views Full Screen

Link\_GHG2\_Start

### RETScreen Emission Reduction Analysis - Power project

Emission Analysis

- Method 1
- Method 2
- Method 3

Global warming potential of GHG  
 25 tonnes CO2 = 1 tonne CH4 (IPCC 2007)  
 298 tonnes CO2 = 1 tonne N2O (IPCC 2007)

#### Base case electricity system (Baseline)

Fuel type	Fuel mix %	CO2 emission factor kg/GJ	CH4 emission factor kg/GJ	N2O emission factor kg/GJ	Electricity generation efficiency %	T&D losses %	GHG emission factor tCO2/MWh
Hydro	100.0%	0.0	0.0000	0.0000	100.0%	10.0%	0.000
Electricity mix	100.0%	0.0	0.0000	0.0000		10.0%	0.000

Baseline changes during project life

#### Base case system GHG summary (Baseline)

Fuel type	Fuel mix %	CO2 emission factor kg/GJ	CH4 emission factor kg/GJ	N2O emission factor kg/GJ	Fuel consumption MWh	GHG emission factor tCO2/MWh	GHG emission tCO2
Electricity	100.0%	0.0	0.0000	0.0000	16,670	0.000	0.0
Total	100.0%	0.0	0.0000	0.0000	16,670	0.000	0.0

#### Proposed case system GHG summary (Power project)

Fuel type	Fuel mix %	CO2 emission factor kg/GJ	CH4 emission factor kg/GJ	N2O emission factor kg/GJ	Fuel consumption MWh	GHG emission factor tCO2/MWh	GHG emission tCO2
Solar	100.0%	0.0	0.0000	0.0000	16,670	0.000	0.0
Total	100.0%	0.0	0.0000	0.0000	16,670	0.000	0.0
Electricity exported to grid	MWh	16,670		T&D losses	0	0.000	0.0
						Total	0.0

#### GHG emission reduction summary

	Base case GHG emission tCO2	Proposed case GHG emission tCO2	Gross annual GHG emission reduction tCO2	GHG credits transaction fee %	Net annual GHG emission reduction tCO2
Power project	0.0	0.0	0.0	0%	0.0
Net annual GHG emission reduction	0.0	tCO2	is equivalent to	0.0	Cars & light trucks not used

Because Kenora is completely dependent on Hydro electricity generation, there is no emission offset

Microsoft Excel window: RETScreen4-1 - RETScreen - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View RETScreen

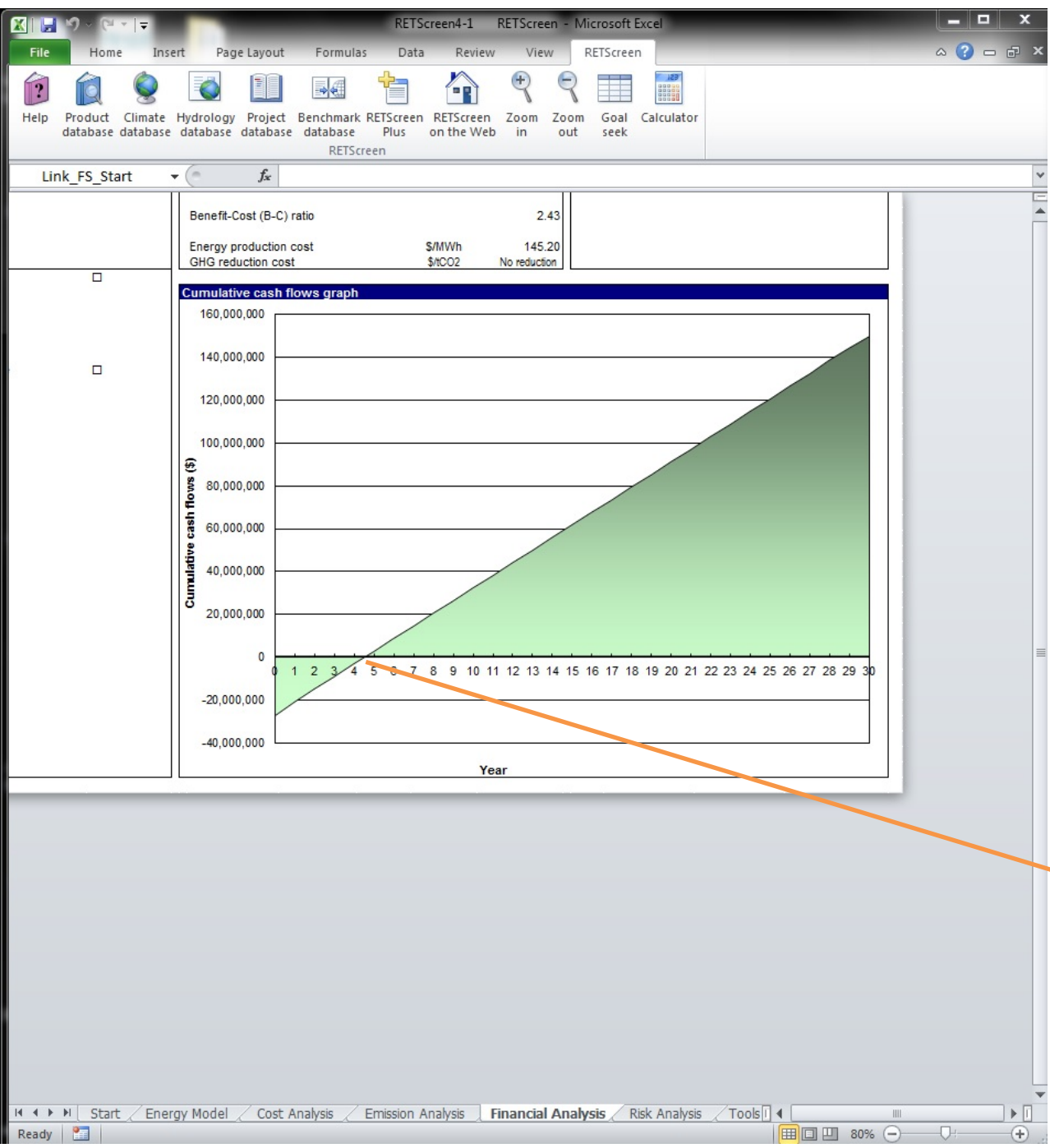
Link\_FS\_Start

### RETScreen Financial Analysis - Power project

Financial parameters			Project costs and savings/income summary			Yearly cash flows		
General			Initial costs			Year	Pre-tax	After-tax
Fuel cost escalation rate	%	2.0%	Feasibility study	0.9%	\$ 250,000	#	\$	\$
Inflation rate	%	2.1%	Development	54.5%	\$ 15,000,000	0	-27,250,000	-27,250,000
Discount rate	%	8.0%	Engineering	44.5%	\$ 12,250,000	1	5,909,560	5,909,560
Project life	yr	30	Power system	0.0%	\$ 0	2	5,909,560	5,909,560
Finance			Annual costs and debt payments			3	5,909,560	5,909,560
Incentives and grants	\$	250,000	O&M	\$	0	4	5,909,560	5,909,560
Debt ratio	%	0.0%	Fuel cost - proposed case	\$	0	5	5,909,560	5,909,560
Income tax analysis			Periodic costs (credits)			6	5,909,560	5,909,560
			Annual savings and income			7	5,909,560	5,909,560
			Fuel cost - base case			8	5,909,560	5,909,560
			Electricity export income			9	5,909,560	5,909,560
			Total annual savings and income			10	5,909,560	5,909,560
						11	5,909,560	5,909,560
						12	5,909,560	5,909,560
						13	5,909,560	5,909,560
						14	5,909,560	5,909,560
						15	5,909,560	5,909,560
						16	5,909,560	5,909,560
						17	5,909,560	5,909,560
						18	5,909,560	5,909,560
						19	5,909,560	5,909,560
						20	5,909,560	5,909,560
						21	5,909,560	5,909,560
						22	5,909,560	5,909,560
						23	5,909,560	5,909,560
						24	5,909,560	5,909,560
						25	5,909,560	5,909,560
						26	5,909,560	5,909,560
						27	5,909,560	5,909,560
						28	5,909,560	5,909,560
						29	5,909,560	5,909,560
						30	5,909,560	5,909,560
GHG reduction income			Financial viability					
Net GHG reduction	tCO2/yr	0	Pre-tax IRR - equity	%	21.6%			
Net GHG reduction - 30 yrs	tCO2	0	Pre-tax IRR - assets	%	21.6%			
			After-tax IRR - equity	%	21.6%			
			After-tax IRR - assets	%	21.6%			
			Simple payback	yr	4.6			
			Equity payback	yr	4.6			
			Net Present Value (NPV)	\$	39,278,541			
			Annual life cycle savings	\$/yr	3,489,012			
			Benefit-Cost (B-C) ratio		2.43			
			Energy production cost	\$/MWh	145.20			
			GHG reduction cost	\$/tCO2	No reduction			
Customer premium income (rebate)			Cumulative cash flows graph					
Other income (cost)								



Financials



# Cash Flows Graph

4.5 year pay back period

http://www.retscreen.net/ang/d\_t\_info RETScreen International Tra... x

Edit View Favorites Tools Help

Natural Resources Canada Ressources naturelles Canada

Canada

Natural Resources Canada  
www.nrcan.gc.ca

Français English Accueil Home Contactez-nous Aide Recherche canada.gc.ca

Home > Training Material

Home  
Newsletter  
Centre Overview  
Software & Data  
Training Material  
Clean energy project analysis  
Energy efficiency  
Heating / Cooling  
Power  
Combined heat & power (Cogeneration)  
Clean Energy Legal Toolkit  
Clean Energy Policy Toolkit  
e-Textbook  
Case studies / Templates  
Figures & graphs  
Photos  
Training Institute  
RETScreen Help & Contact Us  
RETScreen Search  
Proactive Disclosure  
36 Languages: English - Anglais  
Go

RETScreen® International  
Empowering Cleaner Energy Decisions

**TRAINING MATERIAL**

The RETScreen Clean Energy Project Analysis Course has been created for use by educational centres and training organisations around the globe, as well as for use by professionals and students in "self study" distance learning format. Each training module can be presented as a separate seminar or workshop, or as a section of a college or university course. Combined, they can be presented as a two to four week intensive or a one to two semester regular course. In addition to the presentation slides, instructor's voice and notes available, the training material includes a collection of [case studies](#) and an [engineering textbook](#).

Search for:

[Clean energy project analysis](#)  
[Energy efficiency](#)  
[Heating / Cooling](#)  
[Power](#)  
[Combined heat & power \(Cogeneration\)](#)  
[Clean Energy Legal Toolkit](#)  
[Clean Energy Policy Toolkit](#)  
[e-Textbook](#)  
[Case studies / Templates](#)  
[Figures & graphs](#)  
[Photos](#)  
[Training Institute](#)

**Other training material**

To complement the RETScreen Training Course material, there are useful links to training material from other organisations (e.g. NRCan's Office of Energy Efficiency - OEE, United Nations Environment Programme - UNEP etc.). In addition to this recently developed material, there are also links to older, but still relevant, information for energy efficiency measures. Written in the 1980s, the books in the Energy Management Series are technical manuals that cover a number of topics in the RETScreen Energy Efficiency Measures Model. Although references to energy prices and capital costs in those documents are no longer current, the basic theory and work examples remain valid and instructive.

**Note**

The RETScreen Training Course (i.e. presentation slides, e-Textbook chapters, linked documents, etc.) is provided for informational purposes only and does not necessarily reflect the views of the Government of Canada nor constitute an endorsement of any commercial product or person. Neither Canada nor its ministers, officers, employees or agents make any warranty in respect to this Training Course or assumes any liability arising out of the use of this Training Course.

Some of the content of the Training Course has been posted for organizations (e.g. UNEP) or other entities that are not necessarily subject to [Canada's Official Languages Act](#). Some of the material found in the Training Course (e.g. UNEP's "Energy Efficiency Guide for Industry in Asia" - which is applicable worldwide, not just Asia) is therefore in the Language(s) used by those organizations or other entities in question.

75%

# RETScreen Training

On the website, click on "TRAINING MATERIAL" under the headings on the left hand side. Includes:

- Material
- Courses
- Toolkits
- E-Textbook
- And more...



# Questions?

Chris Price

Bimose Tribal Council

[cprice@bimose.ca](mailto:cprice@bimose.ca)

807-468-5551

Laura Sayers

Shibogama First Nations  
Council

[lauras@shibogama.on.ca](mailto:lauras@shibogama.on.ca)

807-737-2662 ext.2252

