



RETScreen Clean Energy Management Software



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RETScreen's Mission: Empower Cleaner Energy Decisions Worldwide

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A world map with numerous yellow dots indicating project locations across all continents. Surrounding the map are various images and documents related to RETScreen projects:

- Top Left:** A modern building with a solar panel array on the roof.
- Top Center:** A red industrial building with solar panels.
- Top Right:** A collage of images showing different types of buildings and solar installations.
- Middle Left:** A solar panel array on a roof with a technical document overlay.
- Middle Center:** A wind turbine in a field.
- Middle Right:** A group of people sitting at a table, possibly in a meeting or classroom.
- Bottom Left:** A document titled "Detailed Energy Audit" for Bard College, Arden-Hudson, New York, dated December 2004, featuring a photo of a large building.
- Bottom Center:** A document titled "National Grid State Thermal Program" with a photo of a power plant.
- Bottom Right:** A document titled "THE GREEN HOUSE AT BIRD COLLEGE" with text describing a project.
- Bottom Far Right:** A large group photo of people standing in front of a building.



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RETScreen Overview

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- World's leading clean energy decision-making software



- Energy efficiency; heating & cooling; power generation; and cogeneration
 - Fossil fuels
 - Renewable energy



- 36 languages covering 2/3rds Earth's population



- 460,000+ users in 222 countries & territories
 - 30,000+ new users each year
 - 700+ universities & colleges use for training & research
 - Well over \$8 billion in direct user savings since 1998

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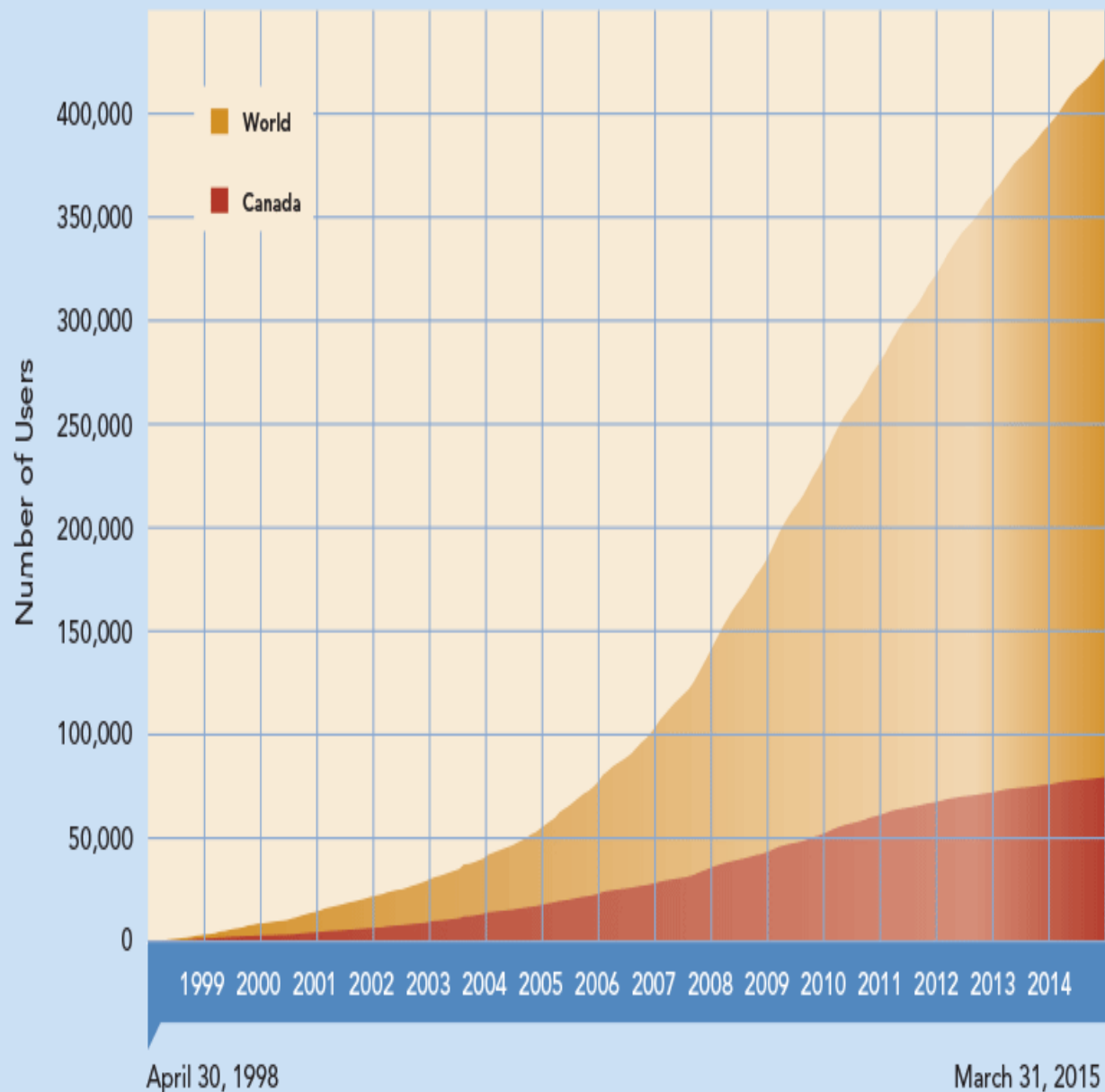


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RETScreen Software: Cumulative Growth of User Base



435,290 users in 222 countries and territories

Top Twenty Countries		
1	Canada	80,894
2	USA	54,105
3	France	36,991
4	Italy	21,815
5	United Kingdom	17,067
6	Spain	14,536
7	China	12,149
8	India	9,812
9	Poland	9,632
10	Greece	9,503
11	Portugal	9,265
12	Brazil	8,610
13	Chile	7,578
14	Germany	7,237
15	Australia	6,678
16	Romania	5,943
17	Mexico	5,529
18	Ireland	4,517
19	Belgium	4,483
20	South Korea	4,098

As of March 31, 2015



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Clean Energy Project Analysis Software

Project information

[See project database](#)

Project name	Scenario 1
Project location	Toronto West
Prepared for	OPA
Prepared by	CETC-Varenes
Project type	Power
Technology	Wind turbine
Grid type	Central-grid
Analysis type	Method 2
Heating value reference	Higher heating value (HHV)
Show settings	<input checked="" type="checkbox"/>
Language - Langue	English - Anglais
User manual	Arabic - العربية Bengali - বাংলা Bulgarian - Български Chinese - 中文 Croatian - Hrvatski Czech - Česko Danish - Dansk Dutch - Nederlands
Currency	
Units	

Site reference conditions

[Select climate data location](#)

Climate data location	Toronto II Arpt Aut
Show data	<input type="checkbox"/>





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清洁能源项目分析软件

项目信息

[见项目数据库](#)

项目名称	Scenario 1
项目位置	Toronto West
接受方	OPA
制作方	CETC-Varenes
项目类型	发电
技术	风力发电机
电网类型	中央电网
分析类型	方法 2
热值参数	高位发热量
显示设置	<input checked="" type="checkbox"/>
语言	Chinese - 中文
用户手册	Chinese - 中文 Croatian - Hrvatski Czech - Česko Danish - Dansk Dutch - Nederlands English - Anglais Farsi - پارسی Finnish - Suomi
货币	
单位	

场地参比条件

[选择气候数据的地点](#)

气候数据地点	Toronto II Arpt Aut
显示数据	<input type="checkbox"/>



RETScreen Software Suite

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Downloading and running *RETScreen Software Suite* will install two separate programs:



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.

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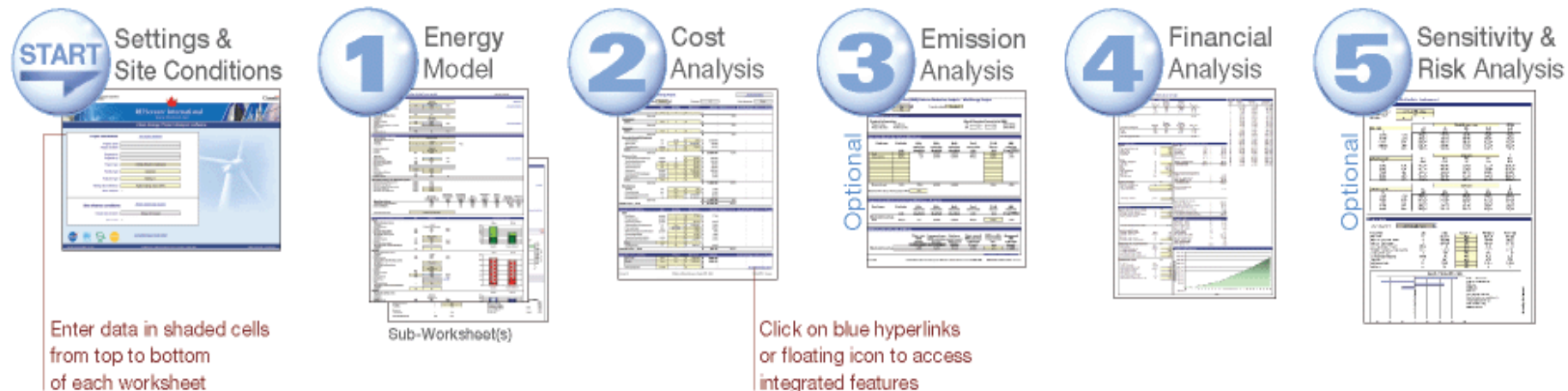


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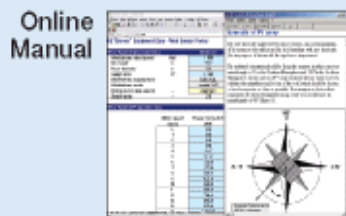
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Five Step Standard Analysis



Ready to make **a decision**

Integrated Features



- Distance Learning Course
- Training Material
- Engineering Textbook
- Case Studies
- Marketplace & Maps

Emission & Financial Analysis

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Method 1

RETScreen Energy Model - User-defined

User-defined

Energy Green power Other

Base case Proposed case

Technology Grid electricity Wind turbine

Power capacity kW 2,500

Capacity factor % 5.256

Electricity exported to grid MWh 2,000

Incremental initial costs \$/kW 0.010

OM (savings) costs \$/kWh 0.150

Electricity export rate \$/kWh

Emission Analysis

GHG emission factor	T&D losses	GHG emission factor
(excl. T&D) ICCOMWH	%	ICCOMWH
Base case electricity system (Baseline)		
Country - region		
Fuel type	All types	
Electricity exported to grid	MWh 5,256	T&D losses 8.0%

GHG emission

Base case 10002 1,167

Proposed case 10002 93

Gross annual GHG emission reduction 10002 1,074

GHG credits transaction fee % 0.0%

Net annual GHG emission reduction 10002 1,074 is equivalent to 218 Cars & light trucks not used

GHG reduction income \$/10002 0.00

GHG reduction credit rate \$/10002 0.00

Financial Analysis

Financial parameters

Inflation rate	yr	2.0%
Project life	yr	20
Debt ratio	%	70%
Debt interest rate	%	7.00%
Debt term	yr	10

Initial costs

Incremental initial costs	\$	4,000,000	100.0%
Other	\$	0.00	0.0%
Total initial costs	\$	4,000,000	100.0%

Incentives and grants

\$ 0.0%

Annual costs and debt payments

OM (savings) costs	\$	
Fuel cost - proposed case	\$	0
Debt payments - 10 yrs	\$	398,657
Total annual costs	\$	451,217

Annual savings and income

Fuel cost - base case	\$	0
Electricity export income	\$	785,400
Other	\$	
Total annual savings and income	\$	785,400

Financial viability

Pre-tax IRR - equity	%	34.6%
Pre-tax IRR - interests	%	12.3%
Simple payback	yr	5.4
Equity payback	yr	3.2

Cumulative cash flows graph

Method 2

RETScreen Energy Model - Energy efficiency measures project

Fuel & schedule

Fuel	Availability	Availability 1	Availability 2	Availability 3	Availability 4	Availability 5	Availability 6
Electricity	100%	100%	100%	100%	100%	100%	100%

RETScreen Cost Analysis - Energy efficiency measures project

Facility characteristics

Occupancy rate - daily	Monday	100%
Tuesday	100%	
Wednesday	100%	
Thursday	100%	
Friday	100%	
Saturday	100%	
Sunday	100%	
Occupancy rate - annual	%	100%

RETScreen Emission Reduction Analysis - Energy efficiency measures project

Energy efficiency measures

Measure	Unit	Quantity	Unit cost	Amount	Relative costs
Incremental initial costs	\$			4,000,000	100%
Annual costs (proposed)	\$			451,217	11%
Annual savings and income	\$			785,400	19%

RETScreen Financial Analysis - Energy efficiency measures project

Financial parameters

Inflation rate	yr	2.0%
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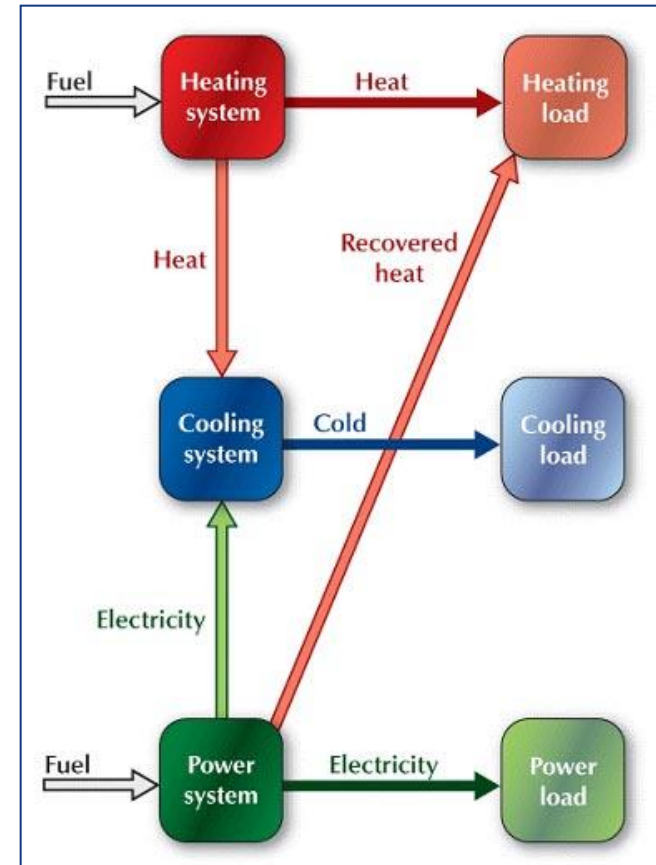
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Project Types

- Energy Efficiency Measures
- Power
- Power-Multiple Technologies
- Heating
- Cooling
- Combined Heating & Power
- Combined Cooling & Power
- Combined Heating & Cooling
- Combined Cooling, Heating & Power

- User-defined



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Questions?

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RETScreen 4 Demonstration: Wind Farm

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- Windfarm proposed for northeast of Brazil (Natal)
 - Ten 3 MW turbines, 90 m rotors, on 90 m towers
 - Wind speed of 7.5 m/s measured at 80m height
 - US\$1700/kW installed
 - US\$15/MWh O&M costs
 - US \$60/MWh export rate
 - Inflation of 3%
 - 20 year project life
 - 70% debt financing at 8.5% interest rate over 15 years
- Will this attract investment? If not, what improvements can be made?
 - Move to windier (8.5 m/s) site
 - Oversized rotors (2 MW, 90 m rotors) on 105 m towers
 - US\$2000/kW installed (more expensive turbines)
 - Seek better financing: interest rate of 6%
 - GHG emissions reductions sold at \$30/tonne



Photo: Carla Wosniak

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