# Clean Energy Project Analysis & RETScreen® International

www.retscreen.net

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## Objectives of Presentation

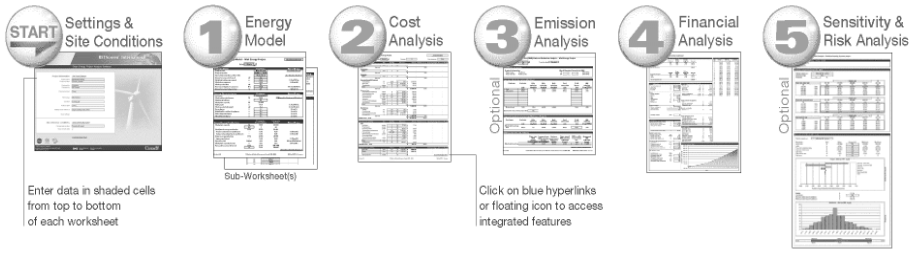
- Raise awareness of RETScreen as a free tool to help empower cleaner energy decisions
- Demonstrate how the RETScreen software works
- Show how RETScreen makes it much easier to identify & assess the viability of potential projects
- Highlight results and impacts & outline future directions for RETScreen

# RETScreen® International

www.retscreen.net

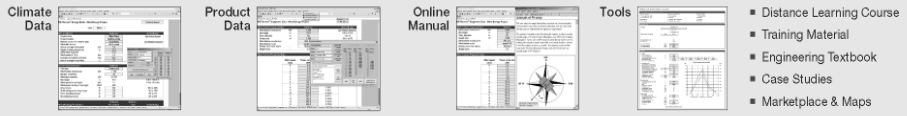
*Clean Energy Project Analysis Software*

## Five Step Standard Analysis




Ready to make **a decision**

### Integrated Features




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

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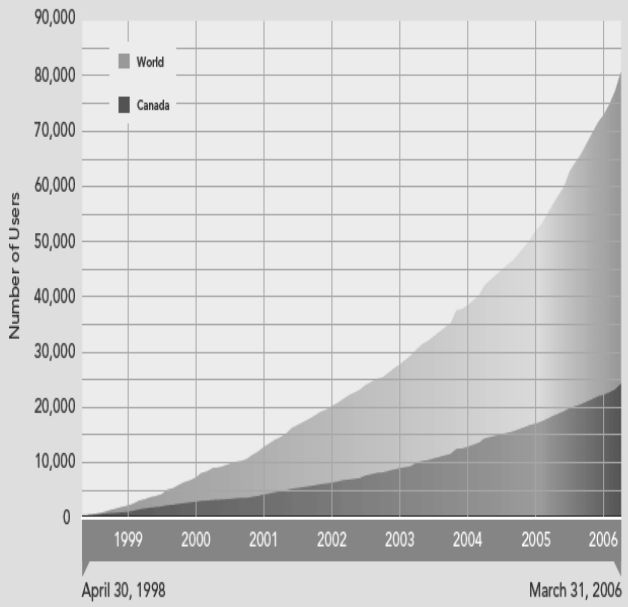
RETScreen® International

## RETScreen Software: Cumulative Growth of User Base




**80,437 users worldwide from 213 countries**

Growing at 425 users every week

| Top Twenty Countries | | |
|---|---|---|
| 1 | Canada | 24,009 |
| 2 | USA | 10,558 |
| 3 | France | 8,228 |
| 4 | UK | 3,569 |
| 5 | Spain | 2,869 |
| 6 | Italy | 2,745 |
| 7 | Australia | 1,694 |
| 8 | Germany | 1,466 |
| 9 | Belgium | 1,272 |
| 10 | India | 1,238 |
| 11 | Portugal | 1,069 |
| 12 | Greece | 972 |
| 13 | Ireland | 883 |
| 14 | Brazil | 815 |
| 15 | Mexico | 673 |
| 16 | Netherlands | 543 |
| 17 | Switzerland | 508 |
| 18 | Argentina | 494 |
| 19 | Romania | 435 |
| 20 | Turkey | 418 |

As of March 31, 2006

# Clean Energy Project Analysis Training Material

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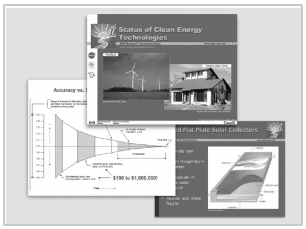
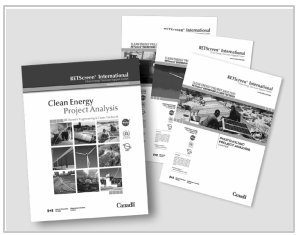


**Presentation Slides**
**(Plus instructor's voice & notes for distance learning)**

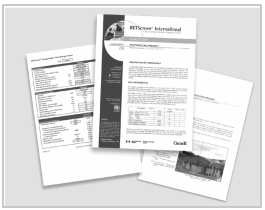
**Available free-of-charge via Website & CD-ROM**

+78 Universities & Colleges use RETScreen for training

+4,000 professionals trained so far



**Engineering e-Textbook**



**Real Project Case Studies**

# Common Platform for Project Evaluation & Development

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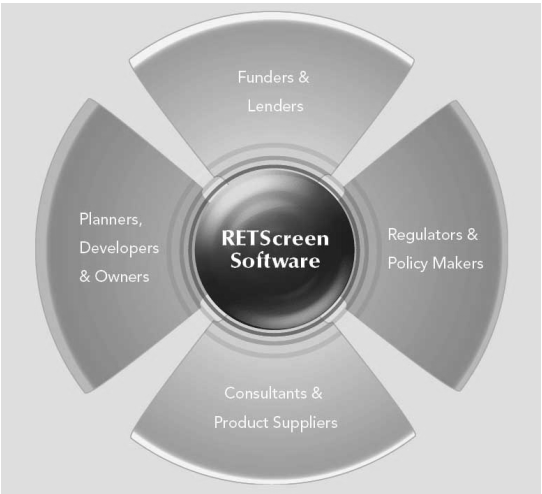
***Raises awareness***

***Facilitates communications***

***Builds capacity***

***Reduces analysis costs dramatically***

***Empowers better decisions***




Arabic
Bengali
**Chinese**
Danish
Dutch
**English**
Finnish
**French**
**German**
Greek
Hindi
Italian
Japanese
Korean
Polish
Portuguese
Romanian
Russian
Spanish
Swedish
Telugu

## Project Viability Depends on Several Factors (Wind Energy Example)



- **Energy resource available at project site**
  (e.g. wind speed)
- **Equipment performance**
  (e.g. wind turbine power curve)
- **Initial project costs**
  (e.g. wind turbines, towers, engineering)
- **"Base case" credits**
  (e.g. diesel generators for remote sites)
- **On-going and periodic project costs**
  (e.g. cleaning of wind turbine blades)

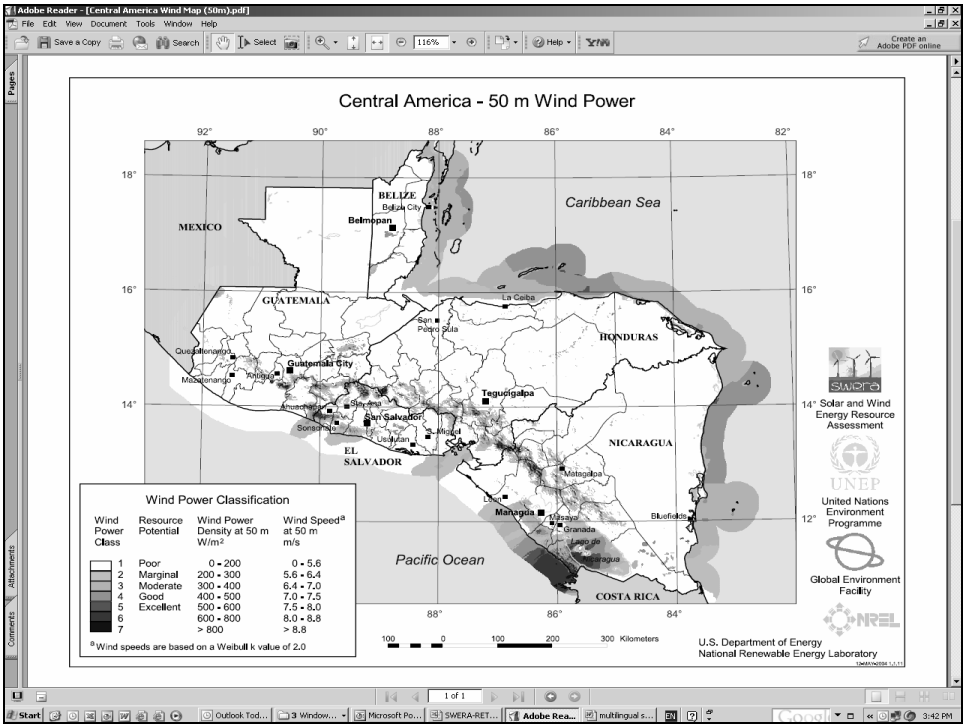
## Project Viability Depends on Several Factors (Wind Energy Example – cont.)



- **Avoided cost of energy**
  (e.g. wholesale electricity price)
- **Financing**
  (e.g. debt ratio & length, interest rate)
- **Taxes on equipment & income (or savings)**

Photo Credit: Middelgrunden Wind Turbine Co-operative

- **Environmental characteristics of energy displaced**
  (e.g. coal, natural gas, oil, large hydro, nuclear)
- **Environmental credits and/or subsidies**
  (e.g. greenpower rates, GHG credits, grants)
- **Decision-maker's definition of cost-effective**
  (e.g. payback period, IRR, NPV, Energy production costs)




## Projects Facilitated by RETScreen

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### Solar Water Heating at Vancouver International Airport

100 Glazed Solar Collectors Near the Control Tower

"RETScreen helped Taylor Munro Energy Systems recommend the appropriate technology for a solar water heating system at Vancouver International Airport."

Morgan McDonald, Taylor Munro Energy Systems Inc.

Photo credit:
Larry Goldstein, Vancouver International Airport Authority

## Projects Facilitated by RETScreen

RETScreen® International www.retscreen.net

### Photovoltaic Water Pumping System in Africa

Sasso s.n.c., Italy

"We have used RETScreen to design different solar pumping systems installed in Africa."

Armando Martinez, Renewable Energy Consultant

Photo credit:
Armando Martinez

## Projects Facilitated by RETScreen



**Wind Farm in Ireland (7 Turbines x 650 kW)**

Sustainable Energy Authority of Ireland

2003 User Survey Summary:

RETScreen Software used for 20 wind energy projects built or under construction, totalling 100 MW and an investment of $210 million.

Paul Kellett, Technical Manager

Photo credit: Sustainable Energy Authority of Ireland

## RETScreen International Results and Impacts



***Empowering cleaner energy decisions***

| Performance Indicators | Present Impact (1998 to 2004) | | Future Impact (1998 to 2012) | |
|---|---|---|---|---|
| | Canada | World | Canada | World |
| User Savings | $240 million | $600 million | $1.8 billion | $7.9 billion |
| Installed Capacity | 320 MW | 1,000 MW | 4.9 GW | 24 GW |
| Installed Value | $750 million | $1,800 million | $10 billion | $41 billion |
| GHG Reduction | 130 kT $CO_2$/yr | 630 kT $CO_2$/yr | 3.6 MT $CO_2$/yr | 20 MT $CO_2$/yr |

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# Future Directions - RETScreen Version 4

- **In partnership with NASA & REEEP, and building on previous developments with UNEP/GEF and the World Bank, NRCan is:**
  - Developing new RETScreen models to evaluate various **energy efficiency (EE) measures** (e.g. heating, cooling, ventilation and lighting) for residential, commercial & institutional buildings, and for industrial facilities & processes
  - Integrating existing RETScreen RE & cogeneration models, plus new EE models into **one software file** & adding emerging RE technologies, such as wave & ocean current power
  - Expanding the **climate database** to **4,700 ground-stations** & **integrating NASA Satellite Dataset** within the software to cover populated areas across the entire surface of planet
  - Building a new **project database** into the tool, and updating & expanding the product & cost databases
  - Translating software into **21 languages** that cover 2/3 of the world's population
  - Disseminating the software to more than **300,000 users by the end of 2012**, via the Internet & CD-ROM, plus through key stakeholders & an international network of RETScreen trainers