

RETScreen

by David Newman



An energy analysis tool

Editor's note: While visiting Natural Resources Canada's CANMET facility on an unrelated international development assignment, Newman discovered the Varennes lab and its RETScreen software. Much of the info he has used here is available on the RETScreen website; his appreciation of the tool's facility in green energy analysis and its potential for procurement is only available here. Not only was he "blown away" by RETScreen, he also saw other gems there that he promises to tell us more about in the future.



BUYING "GREEN" IS becoming the accepted way to do business, especially in the public sector, and buying "smart" can separate the procurement specialist from the tradesman. Combine buying green and smart and procurement takes its place as a major component in modern supply chain management.

Worldwide greenhouse gas (GHG) emissions will soon be reduced by 20 megatonnes a year, thanks to a unique and highly effective but little known green analysis tool – software developed by Natural Resources Canada (NRCAN). That means substantial benefits for climate change and maybe even tradable green credits for Canada, but RETScreen is also projected to save users nearly \$8 billion by 2012.

RETScreen International is a sophisticated but easy to use software package that processes climatic data such as how much solar energy is hitting the earth's surface and meteorological parameters such as humidity and temperature to accurately evaluate the potential of clean energy projects. It is developed and provided free of charge, along with training programs in 21 languages, by NRCAN's CANMET Energy Technology Centre in Varennes, Quebec. The program can be downloaded for free at www.retscreen.net.

Like many things Canadian, it is internationally recognized and renowned, but

barely visible in its own country. This comprehensive green tool is recognized as the world's leading software for screening or assessing the viability of renewable energy technology (RET) applications. It was built collaboratively with international partners, including the United Nations Environment Programme, the US National Aeronautics and Space Administration (NASA) and the World Bank. In fact, the World Bank now insists on RETScreen analysis as a prerequisite to supporting a variety of renewable energy programs.

Started up in 1996, RETScreen depended on information from ground-site weather stations to collect data until about five years ago. After visits to each other's labs and an assessment of user and model needs, RETScreen and NASA came up with a plan to integrate the NRCAN software and a NASA database with satellite weather information. The collaboration worked well and the project took off.

RETScreen software now has 73,556 users in 211 countries around the world. More than 12,000 RETScreen products are downloaded every week and 70 universities and colleges around the world are using RETScreen for training. Over 1 million products have been downloaded from the RETScreen website to date.

Gilles Jean is director general of the Varennes labs and Gregory Leng is considered the father of RETScreen. In June 2005,

NASA awarded Leng its Group Achievement Award, NASA's highest honour, for his contributions as a member of its Earth Sciences Applications Team for their exceptional achievement in developing the highly successful air quality, aviation weather, and energy management applications for the earth science enterprise.

People get excited about the potential of renewable energy but they often don't understand the economics of individual projects. RETScreen helps determine how much money would be saved using renewable energy technologies, choosing the appropriate component or system for their projects and helps avoid wasting money.

As NRCAN itself points out, commercially viable clean energy projects are often missed because decision makers simply don't consider them. Planners, industrial engineers, architects, utility and community energy planners and, yes, procurement specialists too, often fail to appreciate the benefits of energy efficient and renewable energy technologies at the critically important initial planning stage, even when they have proven to be cost-effective and reliable in similar situations elsewhere. The result is missed project opportunities that could otherwise meet energy needs locally and in a sustainable manner, reducing greenhouse gas emissions, saving money and increasing energy security. Informed procurement decisions are an increasingly

What is Monte Carlo simulation?

When we use the word simulation, we refer to any analytical method meant to imitate a real-life system, especially when other analyses are too mathematically complex or too difficult to reproduce.

Without the aid of simulation, a spreadsheet model will only reveal a single outcome, generally the most likely or average scenario. Spreadsheet risk analysis uses both a spreadsheet model and simulation to automatically analyze the effect of varying inputs on outputs of the modeled system.

One type of spreadsheet simulation is Monte Carlo simulation, which randomly generates values for uncertain variables over and over to simulate a model.

Source: www.decisioneering.com/monte-carlo-simulation.html

important component in choosing clean energy projects.

The core of the tool consists of standardized and integrated project analysis software which can be used worldwide to evaluate the energy production, life-cycle costs and greenhouse gas emission reductions for various types of proposed energy efficient and renewable energy technologies compared to conventional energy projects. In addition to the software, the tool includes product, cost and international weather databases, an online manual, a case study based college and university-level training course and electronic textbook and an Internet-based marketplace – all available free.

RETScreen can now also be applied to assess the energy and emissions savings from combined heat and power, or cogeneration applications. The Varennes labs have recently released their new CHP Project Analysis Model. This can be used to easily evaluate the energy production, life-cycle costs and GHG emissions reduction for combined heat and power projects. It evaluates power, heating, cooling, single and multiple buildings, industrial processes and community and district heating and cooling. The CHP Project Analysis Model permits analysis with a wide range of renewable and non-renewable fuels which can be used in parallel, from landfill gas to biomass, biodiesel, hydrogen, natural gas, oil or diesel, coal, municipal waste and many others. The fuels can even be evaluated using multiple types of power, heating and/or cooling equipment, including reciprocating engines, gas, steam or combined turbines, geothermal systems, fuel cells, wind turbines, hydro turbines, photovoltaic mod-

ules, boilers, heat pumps, biomass systems, heaters, furnaces, compressors, absorption chillers and others, all working under operating conditions from base load to intermediate load to peak load.

The product database integrated within the CHP model includes data for 5,880 power, heating and cooling systems manufactured worldwide. The weather database integrated within the model provides access to meteorological data covering the entire surface of the planet, including 4,720 ground-monitoring stations and NASA satellite data. The model includes an online manual, a metric/imperial unit switch, more than 12 computational tools, for example, a landfill gas calculator, and a new Sensitivity & Risk Analysis Worksheet, which carries out a Monte Carlo simulation. (See sidebar.)

This is all wonderful, possibly even revolutionary, and no doubt, many specialists in green and energy procurement or building life-cycle maintenance are feeling their pulse quicken just reading this. In a world where “green” and “sustainability” are no longer just buzz words, successful modern procurement specialists are realizing the value in helping set solid user requirements, scopes of work, compliance standards evaluation and success measurements, and other key procurement instruments and processes based on what is now possible. *~m*

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