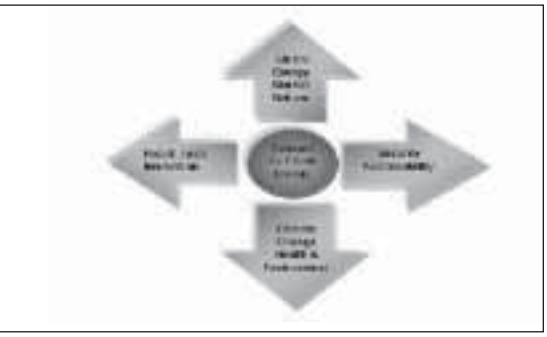
FOSSIL FUELS: GOING THE WAY OF THE DINOSAUR

By Michael Gerbis, P. Eng.

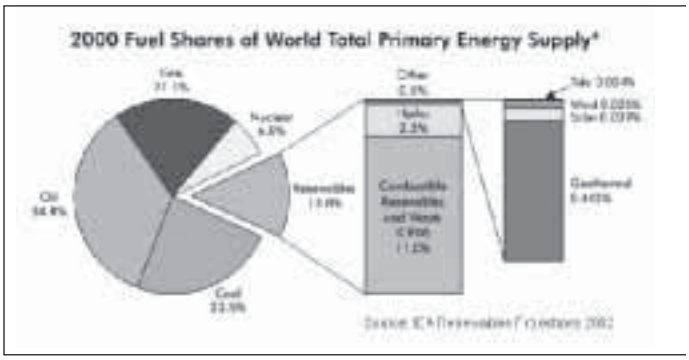
As the theories of how dinosaurs ultimately met their demise rages on, so too does the debate around if and when fossil fuels are likely to follow in their ancestors' footsteps. One thing is for certain — cleaner, smaller distributed energy sources are slowly evolving and will likely take their place at the top of primary generation food chain sometime over the next century.

In fact, the growth of renewables has been almost identical to the annual growth in total primary energy supply, averaging 2% per year over the last 30 years. Impressively, PV, along with other renewable energy sources such as tidal, wind, solar thermal and geothermal have recorded a much higher annual growth rate of 9% [1]. Estimates vary, but most studies agree that the global renewable market is around $US 15 billion (2002), and is likely to rise sharply over the coming decade to between $US 50 and $US 100 billion by 2015.

This trend towards more sustainable energy sources is being driven by a series of converging factors — higher fuel prices, energy security issues, international negotiations around climate change, air pollution and health concerns. These drivers are stronger in Europe (Germany, Denmark, Spain, etc.) and Japan where clean energy is rapidly penetrating the electricity market. Even in the US, where the current President believes further fossil fuel subsidies, more drilling and longer pipelines will solve the "energy crisis", many States are bucking the trend and supporting cleaner energy. The rationale — strong economic, environmental and social benefits such as:



Factors Increasing Demand for Green Energy



Global Energy Supply

- The development of new industries and products with significant potential for exports resulting in local employment and increased economic activity. Over 200 jobs are created per TWh of renewable generation.
- Technology innovation. Denmark and Germany both supported the growth of strong domestic wind markets and are now home to the top three and seven of the largest wind manufacturers in the world.
- Deferring large capital investments for central generating plants and some transmission and distribution line upgrades which will now require between $56 billion (NERC estimate) and $100 billion (Electric Power Research Institute) to upgrade.
- Competitive generation costs in many regions, reduced transmission and distribution costs (e.g. operating, maintenance, capital upgrades, etc.) and lower transport efficiency losses.
- Enhanced energy security by diversifying resources and types of generation, increasing the number of generation facilities and reducing fuel imports.
- Significant environmental and health co-benefits — reduced air emissions of particulates, heavy metals, CO2, NOx, SOx resulting in lower greenhouse gases, reduced acid rain and high smog days which in turn reduces emergency visits and the number of premature deaths and asthma-related illnesses.

SO WHY IS CANADA LAGGING SO FAR BEHIND?

The simple answer is we have billions of dollars of private and public money wrapped up in resources, industries and capital assets that support fossil fuel (and nuclear) dinosaurs — or at least their remains. In addition, next to agriculture, "the energy industry enjoys the most outrageous subsidies, market distortions and other forms of disguised aid than any other" (from the Economist, Sept. 20, 2003 issue). These are exacerbated by:

I. TECHNOLOGY CHALLENGES

Although significant advances have occurred over the past 25 years, many clean energy technologies are still hindered by 'immature technology characteristics' such as high capital and/or operating costs, low efficiencies of conversion, and lack of availability of stable and quality feedstock.

II. MARKET RULES & PRICING

Fossil fuel electricity pricing and related legislative obstacles often skew prices lower by hiding public investments and debt and inhibiting the entrance of smaller, cleaner and sometime more cost effective distributed generation.

III. INCONSISTENT STANDARDS, GUIDELINES AND RULES

Out-dated and unfair approval processes, along with nonexistent, inconsistent or poorly implemented market rules and procedures such as net metering or interconnection guidelines are stifling growth of distributed generation within

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both Provincial (or State) regulated or de-regulated markets. This is compounded by federal (e.g. electrical codes) and municipal (building codes and permits) standards that are also often cumbersome, hard-to-interpret and favour large-scale generation.

IV. MISPERCEPTIONS AND LACK OF AWARENESS

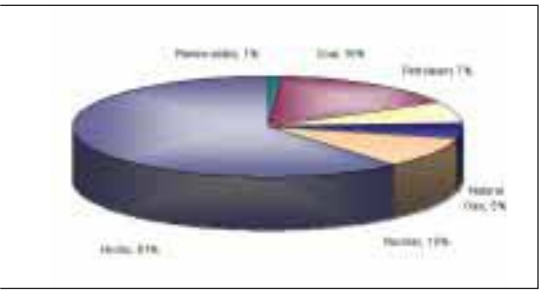
While awareness is increasing, the understanding of clean distributed energy technologies — from their benefits to technical issues around installation and power quality, is limited across all stakeholder groups. Politicians to policy makers, end-users to insurers, and designers to architects to engineering contractors or builders have alot to learn.

Given its importance, the level of investment and the current stature, electricity generated by fossil fuels (and nuclear) is unlikely to disappear overnight. In reality, it is not practical or warranted to preach for their rapid extinction either — at least not in the short-term.

TRANSFORMING COMMITMENT INTO ACTION

It is critical, however, that as we begin to re-invest in our electricity generation, transmission and distribution system that we diversify our future assets and look to clean energy as part of the solution. Similar to investment portfolios that look to mutual funds, the energy solution must incorporate a package of investments to spread risk, maximize benefits and match local (or individual facility) needs with the best available clean energy technology.

Corporate leadership is starting to unfold as many larger companies — Dupont, GM, Interface, BP, etc. are making significant investments into cleaner energy. Action from key players such as financial investors also appears to be growing as venture capitalists are sensing and reacting to the market forces that are rapidly increasing the demand for clean energy.



Canadian Energy Capacity

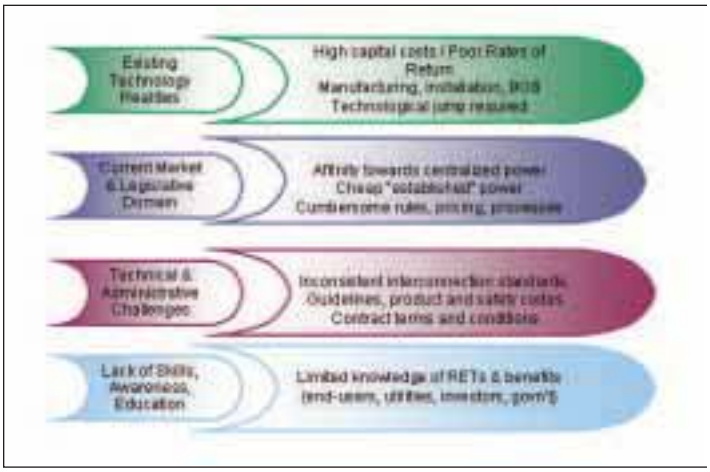
While governments in Europe and Japan are providing clear signals that clean energy must be a priority, most governments in Canada are still struggling to act. They must overcome the inherent bias to look for short-term solutions and make a long-term commitment to more sustainable energy. In the end, consumers and businesses will benefit as shown in many US States and European countries where clean energy has taken hold.

The key is then to transform the statement of commitment into action by developing conducive electricity markets that encourage distributed generation and recognizes the value of small scale, adaptable clean energy. This can be accomplished through a number of activities such as:

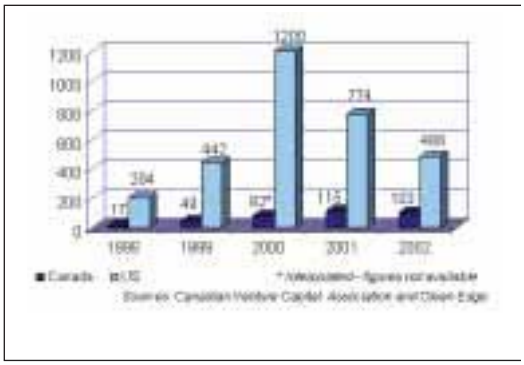
I. ESTABLISHING REGULATORY FRAMEWORK THAT IS CONDUCIVE TO CLEANER DISTRIBUTED GENERATION

This means transforming markets so that existing barriers are eliminated or significantly reduced. For example, remove existing pricing caps (such as those in Ontario) and allow the electricity prices to match the true cost of generation - this would not only encourage new investment in the province it would also encourage energy efficiency which is the best form of clean energy around. Other tried and true measures that have been proven in numerous jurisdictions include:

- Instituting a minimum national/ provincial Renewable Portfolio Standard (RPS) that each jurisdiction would have to adhere to or surpass
- Implementing mandatory net billing and time of use metering
- Adopting consistent, fair and uniform interconnection protocols and guidelines
- Establishing the requirement that utilities must offer standardized and simple energy-purchase agreements for distributed generators;
- Agreeing on a price premium, other favourable pricing mechanisms (e.g. Alberta's locational credits, GST or PST exemptions, or allowing interest on investments in renewable energy be tax deductible) and/or the elimination of specific fees such as debt reduction or transmission charges for green power; and
- Removing unfair subsidies to the fossil fuel and nuclear energy industry — $170+ million went to the nuclear industry in 2003.



Casting A Shadow



Clean Energy Investments in North America

II. WALKING THE TALK THROUGH PROCUREMENT

Federal, provincial and municipal governments utilize a lot of power. Allocating a small (and increasing) percentage of the annual energy budget to purchase Green electricity would go a long way to supporting the development of new cleaner generation — not to mention other high priority issues such as air pollution and greenhouse gas reduction. This could be complimented through innovative and proven financing mechanisms such as a revolving fund like the Better Buildings Partnership used to promote energy efficiency in Toronto.

The Solutions Must Be Varied

III. CREATING A STRONG INDUSTRY VOICE

Government leadership might be critical to catalyze action, but success will only be achieved if industry provides joint leadership and commitment. Specifically, the clean energy industry needs to work together in order to develop a strong overarching national voice that can lobby and coordinate mutually beneficial activities - solar, wind, biomass, small hydro and geothermal are too small on their own to compete against the giant fossil fuel dinosaurs that currently graze on Parliament Hill.

IV. CLEARLY ALIGN GOVERNMENT INITIATIVES AND ENHANCE COORDINATION

Federal and provincial government in-house and cooperative efforts that support clean energy must be more closely aligned with one another and those related to climate change, clean air and human health.

V. CONTINUE TO ENHANCE AWARENESS

Build on and expand current efforts to enhance the understanding and knowledge of all stakeholders engaged in the financing, design, manufacture, distribution, installation and operation of distributed generated energy systems, along with those who can influence the up-take of these products through programs and policies.

The government and industry have made remarkable progress in this area, but need to continue their efforts on all fronts.

In the end, whether by biomass suffocation or solar radiation, fossil fuels will go the way of the dinosaur and small decentralized clean energy systems will replace them just as personal computers have replaced mainframes. The only question that remains is when and how fast.

[1] IEA Renewables Projections 2002.

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IN OUR NEXT ISSUE::

Please see Issue 8 of Electricity Today for important new research on "Extending Transformer Life through Continuous On-line Oil Conditioning" by Stevo Kovacevic and Nick Dominelli of Powertech Labs, Inc., and Barry Ward of the Electric Power Research Institute (EPRI).

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