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Publication of the Swiss Canadian Chamber of Commerce Toronto and Montreal
Publication de la Chambre de Commerce Suisse-Canadienne de Toronto et Montréal

October/November Octobre/Novembre 2010

Feature:

Energy

Reportage:

l'Énergie

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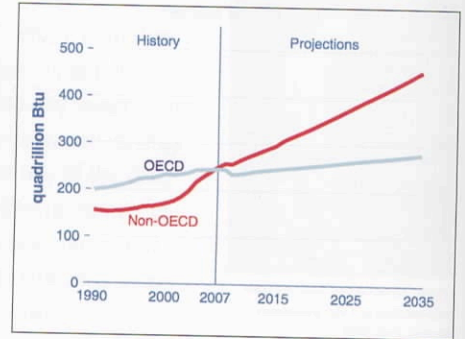
CHANGING THE WORLD ONE SOLAR PANEL AT A TIME

By Michael Zimmerman of Group IV Solar

The era of cheap energy is over. The future price of fossil fuels will be significantly higher than that enjoyed by the previous generation. This is as much a function of resource constraints as it is a matter of changing public policy. Not only must we "reach-further" to replenish the depleted marginal barrel of oil reserves (for example, via expensive deep-water drilling or oil-sands production), but we are also starting to 'price in' the true ecological and human cost of our carbon-based economy. Specifically, burning a barrel of oil or ton of coal has an effect on our natural environment and increases our health care burden via the pollution produced.

Within the realm of electricity generation, the public view of traditional fossil fuels such as coal, oil and natural gas is decidedly negative. Recent events in the Gulf region are a prime example of this. Furthermore, carbon-free alternatives to fossil fuels such as nuclear power projects have decade long lead-times, difficult licensing processes, extremely high capital costs with a near-certainty of cost overruns, face rising input prices and require extensive human capital which has collapsed since the nuclear heyday of the 1970's. While the perception of the operating safety of nuclear plants has improved compared to the decade that brought the Chernobyl disaster and Three Mile Island, a long-term storage solution to hazardous nuclear waste has proven elusive thus far. Therefore in many cases, these projects are still met by a skeptical if not hostile public.

Short-term effects of the recession notwithstanding, rising overall energy demand is a reality as emerging economies assume an increasingly important role in determining global energy balances. Indeed, between 2007 and 2035 the EIA estimates that energy consumption in non-OECD countries will grow over 84% compared to a paltry 14% in the developed world (Figure 1). To put this in context, populations are forecast to increase 30% and 13%, respectively. So where will the energy production come from to essentially drive this much-needed



increase in global standards of living? (Figure 2) In absolute terms, sadly the answer is more oil, natural gas and especially more

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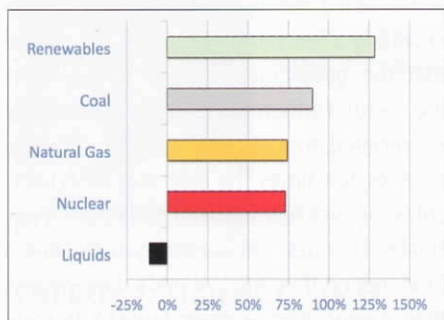
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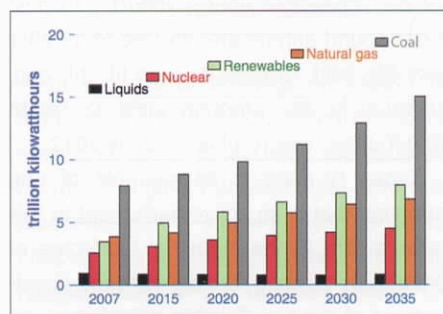


coal with these fuels accounting for roughly 70% of this increase.



While the renewable energy sector will likely remain relatively small as a proportion of overall energy production (<15%), renewables will be the fastest growing means by which our hunger for energy will be satisfied (Figure 3). There are several reasons behind this trend. For example, in sharp contrast to the nuclear example above, building a solar photovoltaic (PV) plant is very quick and straightforward. Additionally, rapidly declining costs across the supply chain and technological advancements means that grid parity (where the cost of clean power equals that of polluting technologies) will be reached much sooner than generally anticipated only a few years ago. However, the factor perhaps most responsible for the impressive growth trajectory of renewables is the broad based support that the industry enjoys. Public perceptions are extremely favourable with solar considered to be amongst the most desirable power sources by US citizens for example.

Drivers of the above perceptions include the fact that once installed solar PV is soundless, nearly invisible, poses no health or environmental hazard, produces zero pollution, has the potential to make use of otherwise low value real estate, induces a



sense of social good and, most importantly, utilizes a limitless yet free fuel supply. Furthermore, decommissioning a solar plant after it's 30 plus year life span is also simple because most components of the system, including solar cells, are entirely recyclable. Planning for the long-term also ensures that these projects have very little impact on the host site making remediation virtually painless, especially when compared to other technologies.

Additionally, the production and consumption of electricity is often separated by great distances: a suitable site for a hydro dam may be in a remote location or the low calorific content of a given coal deposit may necessitate a mine-mouth type of operation. The transmission and distribution system not only results in significant electrical losses,

but it is also expensive to build-out, partly because reliable service requires redundant lines. Even with redundancy, disruptions in one part of the grid can lead to outages across a much wider range. There is therefore a distinct advantage to generating power at the location where it will be used. Rooftop solar PV is a perfect example of how urban centres, which represent some of the largest electrical loads, can contribute to a relatively more decentralized electric grid.

So the question remains: with the tremendous growth potential found in the renewables space, how can regulators attract the investment needed to drive project development and foster the high-value "green collar" skills relevant to the 21st century? Because we still don't have a mature market for externalities such as carbon or pollution and grid parity has yet to be reached, free market forces will not propel us down this path. Clearly governments will need to take an active role in creating policies that conform to the principles held by the public with respect to environmental issues. This means some form of non-market intervention which typically includes one or more of the following: preferential pricing through feed-in tariffs (FITs), favourable tax treatments or investment tax credits, tradable Renewable Energy Certificates or setting specific targets for the percentage of renewables in the overall energy mix.

History has shown that feed-in tariffs are the most effective means of promoting sec-

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SWISS NEWS, WORLD WIDE



toral activity with Germany being a prime example of the successful implementation of a FIT regime. Since Germany began its FIT program in 2000, the domestic photovoltaic solar power industry had grown to an international powerhouse with 9,677 megawatts of installed capacity by year-end 2009 (compared to 3,595 MW in Spain 2,628 MW in Japan, 2,108 MW in the US, Figure 4), 300,000 jobs created, €500M of annual investment in equipment manufacture facilities and an aggregate investment in renewables totaling some €30B.

Ontario is the new kid on the block with the May 14, 2009 passage of the Green Energy Act (GEA) and FIT program launched by the Ontario Power Authority. However, amongst other facets of the GEA, the act is the most ambitious regime for fostering the development of renewable energy in North America and demonstrates clear leadership and commitment to this arena by policy makers. Currently, coal fired plants account for 18% of all of the installed power generation capacity in the province of Ontario. However, the provincial government committed to a complete phase out of this form of electricity having passed legislation to this effect in 2005. 2,400MW has already been decom-

missioned, another 2,012MW is scheduled to go off-line this year with the remaining 4,488MW expected to be shuttered by 2014. This is the largest greenhouse gas reduction initiative in North America. Under the auspices of the FIT program, it is not unrealistic for the renewable energy industry to post a compound annual growth rate of 15-20% over the next 15 years to help fill this gap. Additionally, the program aims to create 50,000 new "green collar" jobs by 2012.

Group IV Solar is an example of one company that is an active participant in this seismic shift in the industrial landscape of Ontario. By pushing forward with the development of our two flagship solar farms, we aim to supply the energy needs of over a thousand homes which is the equivalent of taking 1,800 cars off the road for 20 years. Furthermore, the Group IV Solar mandate extends beyond merely reducing our collective dependence on fossil fuels as 10% of our profits support local charitable organizations. Indeed, but for the GEA and FIT program, companies such as Group IV Solar would not exist.

A common criticism of our peer group is that we operate in a subsidized industry. Insofar as the FIT rate is above market prices

this may be true, however these rates must compensate for the higher cost of producing power using renewable technologies while providing a fair rate of return to the capital that the government wishes to flow into the sector. Furthermore, it is not commonly appreciated that the oil industry currently receives ten times the subsidies as renewables, or over half a trillion dollars per year. Finally, FIT rates will inevitably come down (and indeed they have already done so less than a year after program launch) as costs come down and it is this author's sincere desire that this industry be subsidy free—for this would mean that we have reached grid parity thus leaving the antiquated and dirty technologies that have fueled the last 150 years of industrial development behind and putting us on a path whereby future generations can freely share in the enlightened and creative capacity of humanity with clean air, earth and water.

Michael Zimerman has a B. Sc. From the University of Winnipeg and an MBA from the University of Toronto. Mr. Zimerman worked at BMO Capital Markets in commodity strategy before founding Group IV Solar.



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