

**The Politics of a Hydrogen Economy:**  
**Networks and the Role for**  
**Industry, Government, NGOs, and Citizens**

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Thank you for the opportunity to participate in this important event, I look forward to discussing the political challenges of moving towards a sustainable energy future. I will preface my remarks by explaining that my position is based both on research of the existing political and policy framework for the adoption of alternative energy and on my experiences in the political realm.

Some would argue that, given the current institutional framework, we are traversing a path that has been set by our past decisions and our reliance on technology. They insist that we are destined to continue to use the same fuel and energy sources that we have relied on since the Industrial Revolution.

Other analysts assert that we, as a global society, must move to adopt a Hydrogen Economy in the next 40 years because our Oil Economy is coming to a halt. Our oil reserves are depleting. For example, it is sometimes reported that the United States has only 20 billion barrels in reserve and about 6 billion barrels in yet-to-find reserves (Rifkin, 2002:17; United States, 2004). Furthermore, our environment has been damaged by our consumption of fossil fuels. Global warming has become a major issue on the agenda of most industrialized countries and on the minds of their electorate. Canada's signing and ratification of the Kyoto Protocol at the turn of the millennium, committing the country to reducing its greenhouse gas emissions to six per cent below 1990 levels by 2012, is just one manifestation of the changing priorities in society.

Industry is also starting to shift its attention away from traditional energy sources. The automotive sector is often pointed to as a leading example of an emerging trend in the use of alternative fuel sources. The auto sector is particularly significant because it illustrates regional economic competitiveness and the workings of regional economic development in the adoption of new technologies. Toyota is an aggressive developer of alternative fuel vehicle technologies and, by some reports, is leading the industry (Maccormack, 2003:13). Toyota's R&D budget is 5 per cent of sales, which translates to about \$3.6 billion based on fiscal-2000 revenues (Maccormack, 2003:13). DaimlerChrysler and General Motors are also pursuing in-house development of new technologies in an attempt to lead the market. General Motors declared that: "We have elected to be a leader in [hydrogen fuel cell] technology. By that, we mean intellectual leadership. Our goal is not necessarily to be the first to market. We've defined victory as the first company to build and sell a million hydrogen fuel cell vehicles. Profitably" (Maccormack, 2003: 15). But by 2003 no US manufacturer had introduced a hybrid car, while

Toyota and Honda had already “sold 60,000 between them and were aggressively marketing new models” (Maccormack, 2003:15). Ford and General Motors have now joined Toyota and Honda in the sale of hybrid cars. North American firms cannot fall behind their global competitors; our depleting oil reserves, fragile ecosystem and vulnerable economy demand innovation.

With gas prices doubling since last year alone – I recall in London, Ontario in September 2004 gas was at 70 cents per litre, and a year later prices soared to \$1.35 per litre – why have consumers not wholeheartedly abandoned large vehicles like the SUV in favour of new hybrid technology? Insecurity of supply, the high price of fossil fuels and global warming represent windows of opportunity for change to be pursued, but so far it has not happened – why? What role can governments play in promoting change in our social fabric? The answers to these questions are largely absent in the existing literature on alternative energy (Doern, 2005:15). If we are to truly understand how we, as a society, can realize the shift to a Hydrogen Economy, we must come to terms with the political, economic, social and cultural aspects of such a shift. We must move beyond the technology and determine how it can be best used to service the needs of society.

We must consider all the implications of a Hydrogen Economy if we are to build the future for which we hope. These implications include the economic, the social and the cultural and it is here where the nexus of the political landscape lies. I will focus my comments on what needs to be done in order to create a political environment that is open to such a dramatic change in our ideas, institutions and interests in and about energy, sustainable development and the Hydrogen Economy. It is my hope that these roundtables will provide the ammunition that will spur Canadian government to adopt effective energy policies. The federal and provincial governments need to work together in creating visionary public policy, with timely and measurable results, that will contribute to a high quality of life for Canadians.

### ***The Current Political Framework***

To determine the way forward we must turn our attention to the current political framework as it evidences existing constraints and opportunities in the movement towards a Hydrogen Economy.

Much of the current political framework presents institutional barriers that reinforce the use of existing energy and fuel sources. In Canada, the debate about alternative energy focuses almost exclusively on climate change, an environmental policy, to the neglect of the economic and social aspects of alternative energy (Doern, 2005:15). Focusing the political agenda on environmental issues, while exceptionally important, means that governments do not grasp how the Hydrogen Economy will positively affect employment and the balancing of the federal budget—both definitive priorities of governments since the adoption of New Public Management ideas in the 1980s and 1990s (Pollit and Bouckaert, 2000)

Reshaping the debate to include implications for jobs, government spending and economic growth will help generate the necessary political discussions. At the federal level, the government committed \$5 billion dollars in its 2005 Budget towards achieving sustainable

development, including a commitment to cut greenhouse gas emissions (Canada, 2005). Nonetheless, the commitments are housed under environmental policy and so take a narrow focus.

Some hope for a more focused approach to promoting alternative energy sources came in 2003 when the federal government released its *Canadian Fuel Cell Commercialization Roadmap*. Unfortunately, because the *Roadmap* is largely absent from broader policy debates it seems to have had little concrete effect. For example, in Ontario, the recent decision to pursue an *Ontario Fuel Cell Innovation Program* fails to incorporate many of the *Roadmap*'s recommendations. There needs to be a real commitment to working together federally and provincially to implement energy policy. We need to commit to goals and timelines that create an environment where business and government invest together with measurable results. We must promote consumer understanding of the social and economic challenges of **not** moving forward with determination and enthusiasm.

Canada must also join in a broader regional, if not global, movement towards a Hydrogen Economy. We need a platform for sharing ideas and fostering an international Hydrogen Economy that promotes sustainable development and trade. Our participation in the International Partnership for the Hydrogen Economy, an initiative of the United States, provides such an opportunity. It is disappointing that this partnership has demonstrated little political impact. Compared to the policies in place and actively pursued in the United States and Europe, Canada can be called a laggard in terms of its alternative energy strategy. Canada lacks a coherent strategy directed at implementing the Hydrogen Economy, whereas both the United States and the European Union have defined strategies. The European Union has even developed a blueprint to make the Hydrogen Economy a reality by 2020. We risk being left behind in an area where we have traditionally had a decided advantage.

Canada's federal structure also means that work could and should be done at the provincial level. If we take Ontario as a case study, we find, as at the federal level, a programmatic approach rather than a coherent strategy towards the development of a Hydrogen Economy. There is a broad commitment to cut greenhouse gas emissions and to achieve sustainable development, however, policies such as the \$3 million annual commitment of the *Ontario Fuel Cell Innovation Program* designed to promote commercialization of the technology, are program-based (Ontario, 2005). This program-centred approach does not match with the overall strategy that is needed in order to achieve the vast social, political and economic change necessitated by a Hydrogen Economy.

Governments have identified that the promotion of alternative energy sources is a necessary component of national development. But why has broader change not been made possible? We need a ***national strategy*** that incorporates local, regional and provincial governments. We must develop the necessary policy, legal and institutional infrastructure required to ensure that the necessary economies-of-scale are achieved so that costs can be driven down. Consumer interest and demand can further encourage developments towards the realization of the Hydrogen Economy. Change can only be achieved if demand pulls it through the system. And demand will only promote change once it is economically feasible.

### ***Harnessing Demand and Pulling Change: The Need for a Network***

We must ask ourselves: if the program-based approach is not nurturing success, what needs to be done to define a coherent national strategy that encompasses the economic, social, cultural, environmental and political aspects of the Hydrogen Economy? What are the political hurdles that lie in the way of the Hydrogen Economy?

Successful economic sectors include participants that help define the political and policy agenda through clearly articulated needs and demands. Economic clusters nurture innovative businesses by facilitating joint-investment. These clusters are driven by strategic rivalries and alliances in the business environment, the prevailing demand conditions, the available input resources, and related supporting industries (Martin and Porter, 2001). A thriving economic cluster requires a well-developed policy network. Successful industrial policies that aim to nurture the Hydrogen Economy need a network to link the resources of state and societal actors by mobilizing and coordinating their bureaucratic structures (Atkinson and Coleman, 1989).

### ***Refocusing Government Institutions and Policies***

Institutionally, governments need to adopt a more horizontal management approach. All departments and ministries must work together to develop a strategy that addresses the needs of the Hydrogen Economy, from rebalancing federal-provincial relationships to the social welfare implications of shifts in the economic status of individuals and families as they adopt new technology. Industry may require assistance, both as oil producers reorganize to extract hydrogen from carriers and as other businesses begin to develop products that service the fledgling economy. Businesses are often surprised to find financial rewards tied to practices that adhere to sound environmental policy. It is crucial that government work together with industry to better understand how “social and economic processes interact in order to answer when and why firms commit to sustainable development” (Bansal, 2005:214-215).

Politically, the horizontal management of a shift to the Hydrogen Economy is complex and requires bold commitment and leadership. Politicians and the electorate need to understand the complex nature of the new technology and the problems faced by society if we do not move quickly to integrate it into our daily lives. Misconceptions and misinformation must be dealt with promptly, through public education initiatives, so that the full costs and benefits of a move to the Hydrogen Economy can be thoughtfully debated.

Some analysts argue that the move to a Hydrogen Economy is a marathon (Adamson 2004). A long-term strategy requires long-term commitment and long-term political will. To take a rational choice perspective, governments are elected every four years, and so politicians have a limited time frame in which to make meaningful change and to contribute to social, economic and political developments (Downs, 1957). From a political perspective, then, the Hydrogen Economy as it is currently described in the literature (Rifkin 2002; Brown, 2000) is really a policy solution searching for a policy problem (Kingdon, 1995). Change is expected to

be evolutionary, as Rifkin observes: “According to the Energy Information Administration of the United States Department of Energy, global peak production for cheap crude oil is nearly 35 years away, plenty of time to make the transition to alternative energy strategies” (Rifkin, 2002:14). But, if we have learned anything from the experiences of the Industrial Revolution, I would argue that such dramatic economic, social and political change must happen less by evolution and more by revolution. Our environment and our dependency on oil, a resource some say will reach critical levels by 2020, will not permit a prolonged transition. To be effective, the political agenda must be clearly set to include milestones over the short term and the long term.

So far, governments are adopting an evolutionary policy position characterized by diversification. Governments are funding numerous projects and numerous potential energy sources, but this prevents a clear focus and hinders the growth in consumer demand that will pull change. With the deregulation of the energy sector in the 1980s and 1990s in many industrialized countries, distributed generation became a reality (Rifkin, 2002:195). The diversified policy approach seems to support distributed generation. Nonetheless, this incremental approach will not create the critical mass of demand needed to spark an overhaul of our entire system. Committing political will over the long term is difficult when the fortunes of a Hydrogen Economy lie in a program-centred approach and when public budgets are under clear pressure from other sacred cows, especially health care. It will be too easy to focus on the success of individual programs, rather than how they contribute to the achievement of the overall strategy.

### *Developing a Strong Sector and Policy Network*

Perhaps more significantly, a coherent sector or policy network that can pressure for change seems to be lacking. It will be difficult for the Hydrogen Economy to move from the status of a policy solution searching for a policy problem if the sector does not move past an undefined grouping of interested companies and individuals.

A networked approach may help create the necessary pressure and sectoral framework that will set an agenda for change and ensure opportunities are seized when the policy and political windows open (Martin and Porter, 2001:20). It is crucial to realize that we cannot separate good policy from good politics because they are mutually reinforcing. A networked approach draws on all players of the policy arena. Government, industry, non-governmental organizations (NGOs), interest groups, and people acting both as citizens and consumers all have an important role to play in developing a political environment that is committed to a Hydrogen Economy.

Industry, NGOs, citizens and consumers have a vital role to play but their goals and agenda have yet to be made clear to governments. Consequently, these groups lack the capacity and political capital to demand and pull change in the political arena. The Ontario Government has attempted to identify key sectoral participants for the development of a Hydrogen Economy and has mapped the sector along an innovation corridor between Windsor and Ottawa. The Government has also identified the need to “support the establishment of a fuel cell industry”

(Ontario, 2005). We need to encourage projects like the *Ontario Fuel Cell Innovation Program* throughout the country and work to ensure that they provide a voice for all interested parties in order to achieve effective and coordinated results.

Significantly, citizens are still not wholeheartedly demanding a coherent strategy for sustainable development. Citizen opinions and demands remain issue-oriented and driven by negative preferences. As a result, political reaction to citizen demands remains motivated by negative external factors such as the desire to get rid of smog or decrease gas prices. Changing and harnessing citizens' ideas about sustainable development and the Hydrogen Economy will come from the little things, like a new product that makes life easier. Nurturing public involvement with business on environmental issues fosters proactive innovation in industry management and product development (Klassen and Whybark, 1999:623). This is where we find the intersection of citizen and consumer demands.

Industry has a dual function in the move towards a Hydrogen Economy. First, they research, design and then build and sell the products that foster the adoption of different technologies than were known in the Oil Economy. Industry is also an employer and governments have an affinity for job creators. Leading researchers will move to where they are supported by both industry and government. Without action, Canada could experience a sector specific brain drain and will miss out on key job creation opportunities. Industry requires a clear institutional and regulatory framework that only governments can provide, whether in the form of research support, standard setting, tax incentives or other tools. Government and industry must investigate how government regulation of the private sector can foster competitive markets in the renewable energy sector (MacDonald, 2005). Government subsidies need to be re-examined, "the incentive to develop new technologies is undercut by policies that keep energy prices artificially low" (Mintz, 2005). Government will only know the role it is expected to play when the sector clearly articulates its needs.

### ***Conclusions – The Way Forward***

The establishment of a coherent policy network (Atkinson and Coleman, 1989) will have a dramatic impact on the long-term success of the Hydrogen Economy, enabling participants to pressure for change both in the marketplace and in government. Pressuring for change also hinges on the establishment of a clear agenda and strategy for change. Setting the agenda and developing an effective strategy requires that industry, interest groups, citizens and consumers be ready to seize opportunities as they present themselves. Change will be accelerated when a robust policy network develops and a clear, meaningful and timely agenda for change is set.

Governments must create an institutional context where research can better intersect with the market to produce cost-effective products that will spur further change and economic sustainability.

Immediate work is required to determine how the fledgling sector and policy network can influence the political and policy agenda. As Canadians, we must quickly commit to achieving a

renewable energy policy. This will help ensure that Canada is the best place in the world to live, work and raise future generations.

## RESOURCES

Adamson, Kerry-Ann. 2004. "Hydrogen from Renewable Resources – the Hundred Year Commitment." Energy Policy 32: 1231-1242.

Atkinson, Michael M. and William D. Coleman. 1989. The State, Business, and Industrial Change in Canada. Toronto: University of Toronto Press.

Bansal, Pratima. 2005. "Evolving Sustainability: A Longitudinal Study of Corporate Sustainable Development." Strategic Management Journal 26: 197-218.

Brown, Lester R. 1989. Eco-Economy: Building an Economy for the Earth. New York: W. W. Norton & Co. Inc.

Canada. Department of Finance Canada. 2005. Budget 2005: Delivering on Commitments. Ottawa. <<http://www.fin.gc.ca/budtoce/2005/budliste.htm#plan>>.

Canada. Industry Canada. 2003. Canadian Fuel Cell Commercialization Roadmap. Vancouver. <<http://www.fuelcellscanada.ca/Roadmap.pdf>>.

Doern, G. Bruce, ed. 2005. Canadian Energy Policy and the Struggle for Sustainable Development. Toronto: University of Toronto Press.

Kingdon, John W. 1995. Agendas, Alternatives, and Public Policies. 2<sup>nd</sup> ed. New York: Harper Collins.

Klassen, Robert D. and D. Clay Whybark. 1999. "Environmental Management in Operations: The Selection of Environmental Technologies." Decision Sciences 30.3: 601-631.

Maccormack, Alan. 2003. Reinventing the Automobile: General Motor's AUTOmomy Project. Harvard Business School. 9-604-064.

MacDonald, Rebecca. 2005. "Government Fostering of the Energy Industry." Paper presented to Lawrence National Centre for Policy and Management. Richard Ivey School of Business, London, Ontario.

Martin, Roger L. and Michael E. Porter. 2001. Canadian Competitiveness: A Decade After the Crossroads. C.D. Howe Institute and Joseph L. Rotman School of Management, University of Toronto.

Mintz, Jack M. 2005. "An Eviabile Challenge." First Annual Joint Ivey and University of Michigan-Ross Business Conference on Business Sustainability. Lawrence National Centre for Policy and Management, Richard Ivey School of Business, London, Ontario.

Ontario. Ministry of Economic Development and Trade. 2005. Ontario Fuel Cell Innovation Program. Toronto. <[www.fuelcells.2ontario.com](http://www.fuelcells.2ontario.com)>.

Pollitt, Christopher and Geert Bouckaert. 2000. Public Management Reform: A Comparative Analysis. Oxford: Oxford University Press.

Rifkin, Jeremy. 2002. The Hydrogen Economy. New York: Penguin Putnam Inc.

United States. Energy Information Administration. 2004. Advance Summary: U.S. Crude Oil, Natural Gas Liquids Reserves, 2003 Annual Report. Washington, D.C.. <[http://www.eia.doe.gov/pub/oil\\_gas/natural\\_gas/data\\_publications/advanced\\_summary\\_2003/adsun2003.pdf](http://www.eia.doe.gov/pub/oil_gas/natural_gas/data_publications/advanced_summary_2003/adsun2003.pdf)>.