

Presentation Summaries: Innovation Failures and Financial Instruments Required for Market Success

**Prepared for: The Developing Sustainable Energy
Policy Workshop, Building Paths to a Low Carbon
Society Series**

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Session One: Innovation Failures and the Financial Instruments Required for Market Success

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Context

The underpinnings for developing energy policy, to incent the development and market adoption of improved energy technologies, are predicated upon attracting sufficient investment that focuses on the target technologies. Session one addressed the availability of capital and how that can be influenced through creative energy policies.

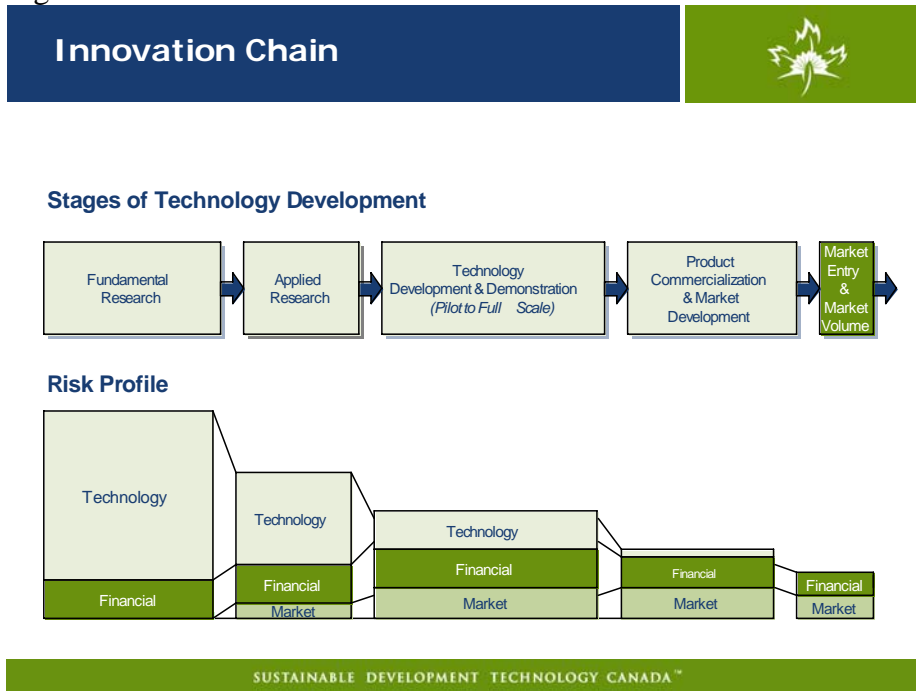
The panel addressed market mechanisms and in particular financial barriers and opportunities to ensure that good ideas are developed through the innovation chain to become valuable technology solutions that will successfully penetrate markets. This would result in creating profits and providing environmental and health benefits to Canadian business and the public at large. The underlying premise is that financial markets are critical to the success of any market transformation and, because of its early stage of development, particularly so for emerging low carbon technologies.

Framework

The innovation chain, shown in Figure 1, is a cyclical process with multiple feedback loops that details the progress of a concept through various levels of research, to technology development and demonstration, followed by product commercialization and development prior to market entry. The associated risk profiles, typically characterized as technology, financial and market risks, define the nature and extent of the different parties required to turn a good idea into a marketable product that provides returns to these players.

Typically greater risks are taken by institutions serving the public good, which are not directly affected by the pressures of shareholder returns. Therefore, the primary players at the fundamental research end of the chain are governments, academia and in some cases the private sector where the technology meets a specific business need or exposure. As a technology becomes better understood, and moves from the research bench towards an emerging product that is focused on specific applications or markets, the degree of technology risk declines. At the development and demonstration phase the different risks have equal impact. The financial sector driven by the requirements for returns accepts limited or no technology risk while it focuses efforts on addressing product commercialization and market development activities. Even beyond the point of market entry there remains some market acceptance and financial risk.

Figure 1

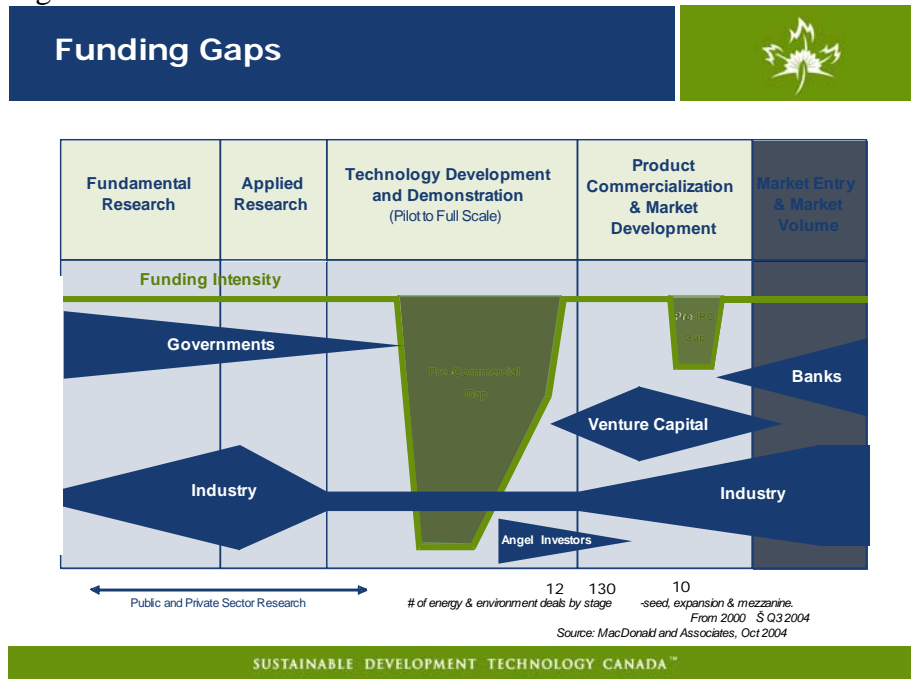


The primary players in the innovation chain and their placements on that chain are depicted in Figure 2. If one maps the availability of risk capital to fund the expensive development and demonstration phase, as illustrated by the funding intensity line, it can be seen that there is a lack of capital at this stage called the pre-commercialization gap or “valley of death”. There is a second gap classified as the pre-initial public offering (IPO) gap caused by market caps in Canada that constrain revenues and the ability of small and medium sized companies to attempt the classic IPO route to market.

At the pre-commercial stage there is both a funding and a capacity gap where many start-up companies do not have the experience or capacity to attract venture capital (VC) that requires greater returns than are possible at this point. Sustainable Development Technology Canada (SDTC) was set up to bridge this gap, thereby reconnecting the innovation chain in the sustainable technology, or clean technology (clean tech) space. SDTC’s experience is that 90% of the projects that it funds are led by small and medium sized enterprises (SMEs) who are in need of financial and business support.

At the national level this break in the innovation chain has significant consequences on the competitiveness of Canada’s economy. Data shows that for every research dollar spent in Canada one dollar of profit is obtained, while in the United States (U.S.) there is a one-to-three ratio. Obviously in this latter case, profits can be returned to the innovation chain attracting more opportunities and reducing the risk profile for investors.

Figure 2



There is also an imbalance in the level of effort/funding across the innovation chain. While it is not possible to collect accurate data on monies invested by industry, approximately \$23B is invested in Canada annually in research and early stage development while the VC industry, on average, places \$2.3B into the innovation chain. VC returns in Canada are significantly lower than in the United States, which helps to drive capital further downstream where uncertainty is less, resulting in a wider pre-commercial gap.

This situation is exacerbated for emerging clean technologies which could be classified as being at a similar state of evolution as biotechnology was some 20 years ago. There are many misconceptions around the nature and viability of the clean tech space, although it is hampered by the fact that its technologies can be found in the broad range of market sectors so that it is harder to define and track performance. However, in the last five years, 50% of the clean tech dollars have been directed towards technologies in the energy field and advanced materials. In Canada, in the development and demonstration area, SDTC's portfolio of some \$860M represents over 100 technology solutions relevant to primary economic sectors in Canada. Another emerging trend is that while Canada has a significant number of small companies in this sector and was keeping pace with the U.S. in relative levels of investment in this space, the last few years have seen us fall behind, and our competitive edge is at great risk. A fundamental approach to address this critical issue is to mobilize the participation of private sector finance focused on clean technology. Therefore, this session addresses these areas which are relevant to innovation in general.

The panel described examples of what is working and what is not in encouraging investments in energy technologies from the different perspectives and needs that are specified according to their placement on the innovation chain. Their suggestions for financial instruments and regulations with the consequent policy implications were discussed.

The panel addressed two fundamental questions:

1. *How do we increase the availability of risk capital and strengthen investor appetite for clean technology to deal with the associated or perceived risks?*
2. *What policies are required to mobilize more capital to support market entry of clean technologies so that Canada can become more economically and environmentally viable?*

The presentations were focused on key steps in financing the innovation chain.

The Beginning of the Early Stage Continuum: Pre-Seed and Seed Stage

In discussing the pre-seed and seed stage of the innovation chain, the higher risk areas where governments and angel investors are involved, **Mr. Andrew Wilkes, Founding Member and Chair, National Angel Association**, addressed the importance of angel investors and how to mobilize them to this space. **Mr. Todd Tessier, Senior Portfolio Manager, British Columbia Ministry of Small Business and Economic Development**, described a successful BC provincial incentive program that has helped create and build innovative SMEs.

Seed, Startup and Early Revenue Stage

VC (in addition to angels and angel groups) typically finances the bulk of the early stage continuum. **Mr. Michael Brown, Chairman, Chrysalix Energy Management Inc.**, looked at a range of capital market and research options for sustainable development and addressed VC and potential significant future disruptions caused by climate change. **Mr. Tom Sweeney, General Partner & Managing Director, Garage Technology Ventures Canada**, looked at Canadian returns and investment approaches compared with those of the U. S., as well as barriers to cross-border investments. He also discussed the notion of value innovation and the fundamental role that intellectual property (IP) transfer plays in the productivity agenda.

Later Stage Commercialization and International Growth

Finally, in the area of project finance, which is particularly important to the commercialization of many capital intensive renewable energy technologies, **Mr. Bill Tharp, Managing Partner, Quantum Leap Co.**, spoke to the policy options currently available. He addressed issues with inequalities in current energy tax incentives between conventional and new clean technologies including the need to attract international investors.

The combined set of policy opportunities described by the experts will enable better linkages and improved performance for investment in this country.

The Importance of Attracting Early Stage Investment Capital: The Resource Example and Recommendations for Sustainable Development

Andrew Wilkes, Chairman, National Angel Organization www.angelinvestor.ca

The National Angel Organization is a grassroots, coast-to-coast Angel investor organization with the mission to (1) promote best investment practices, (2) facilitate investor networking and deal syndication, and (3) to facilitate an organized channel of communication with government, researchers, entrepreneurs and the capital markets.

Angel investors are private, individual investors who invest their own money. As an investment class, Angels are typically amongst the first investors who screen and finance Canadian innovation and therefore they lie at the heart of the early-stage continuum and play a fundamental role in the national debate on innovation, productivity and competitiveness.

In Canada, it is most often the funding of founders, friends, family and Angel investors that start a company. Business Angels are the oldest, largest, and most often used source of outside funds for entrepreneurial firms. They fund some \$11 Billion in new investment each year. Less than 1% of Canadian companies have been started with venture capital. Problematically for the Canadian innovation agenda, many Angel investors across the country have moved away from the more risky, early stage of technology investing to the more mature stages of a business' development. As a result, they are investing in real estate, resource sectors and capital pool companies.

A major hindrance to Canada's commercialization efforts is the pre-commercialization funding gap (see chart above). This funding gap, sometimes known as the "Valley of Death", is defined by the funding shortage that occurs between the primarily government or corporate funded Research & Development stage of a businesses' development and just before a new company is large enough to attract financing from banks, institutions, public investors or VCs. In order to fund the pre-commercialization gap, significant amounts of capital must be attracted to commercialize innovation.

The Challenge

Investment flows to businesses or sectors with higher returns in relation to the inherent risk of the venture. Investment programs, such as the labour-sponsored investment fund program, flow through share programs and investment tax credits, have demonstrated that large pools of capital will flow when tax incentives are put in place and risk is reduced.

Two examples of programs that help attract investment capital and that are working are effectively are found in the Canadian resource industry and in the technology sectors in British Columbia and the United Kingdom.

1. The Resource Sector Example

- In 2006, over \$1.1 billion was invested in new publicly listed mining, and oil and gas TSX Venture Exchange flow-through share investments. Flow-through shares enable a taxpayer to reduce their income otherwise payable through the deduction of Canadian Exploration Expenses (CEE), Canadian Development Expenses (CDE) and Canadian Renewable and Conservation Expenses (CRCE).
- Flow-through shares are invested in the provinces of British Columbia (48% of the country total) and Alberta (28% of the country total). Provinces like Ontario receive less than 16% of the investment funds. It was thus noted that eastern Canadian provincial treasuries are indirectly subsidizing other provinces; often in sectors, which may be less friendly to sustainable development and are negatively increasing climate change.
- Large “big quantum” capital flows estimated at \$100 billion will be invested in the oil sands by 2010.

Lessons learned:

- Strong investment returns attract large capital flows.
- Tax incentives reduce risk and improve return on capital attract investment capital.
- Strong sector food chains attract early stage capital, as investors know there will be well-defined exits, thus reducing early stage risk levels.
- Lessons learned in other capital intensive sectors can be applied to other sectors and promoting sustainable development.

2. The BC Innovation and Productivity Tax Credit

- The Innovation and Productivity Tax Credit or “IPTC” is a 30% tax credit on investments in eligible small businesses. The IPTC encourages informal private investors to invest in seed and early stage companies in the economic sectors that the government decides are important. The IPTC regulations pre-determine the eligibility of companies based on simple size and sector type criteria.
- Once a company is approved as being eligible and allocated a specific tax credit allotment, individual investors then invest up to that amount in the eligible company. Upon making their investments, investors can apply for a 30% refundable tax credit.
- The investment dollars are put to work in the eligible small business before the tax credit is paid (unlike the LSIF credits or the old scientific tax credit programs).
- Similar programs have been in effect in the United Kingdom and British Columbia for more than ten years and in about ten U.S.A. states.

- The data show that such programs attract significant incremental investment and have quick paybacks for the government (within two years in the province of BC).
- The IPTC is a proven method of addressing the pre-commercialization gap.

The IPTC proposal has the support of the following groups: Conference Board of Canada (1 of the 6 Quick Hits for Commercialization), Canadian Federation of Independent Business, Canadian Advanced Technology Alliance, Canadian Task Force on Early Stage Funding, Ottawa Centre for Research & Innovation, Foragen Technology Ventures Inc., MaRs Discovery District for Medical and Related Sciences, National Angel Organization, Primaxis Technology Ventures Inc., Petroleum Technology Alliance Canada, and Sustainable Development Technology Canada.

Recommendations to Attract Early Stage Investment Capital

1. Use tax incentives to support public policy initiatives such as attracting capital for sustainable development.
2. Implement sustainable energy and Clean-tech initiatives that have, at a minimum, tax incentives that stimulate investment in the mining and resource sectors (carbon emitters); and preferably have higher incentives to promote sustainable energy development.
3. Implement an Innovation and Productivity Tax Credit (“IPTC”) targeted at the Clean-tech sector to attract capital from high net-worth individuals and attract the management expertise of experienced entrepreneurs to this important sector. The IPTC could be funded 50% each by the federal and participating provincial governments.
4. Governments should co-invest along side Clean-tech funding capital pools (including Angel capital pools) in private-public clean technology funds, run by the private sector to seed and attract large pools of capital to the Clean-tech sector.

British Columbia: An Overview of Fiscal Programming and Strategy for the Clean-tech Sector

Todd Tessier, Ministry of Economic Development, British Columbia (BC)

On Accelerating the Commercialization of Clean Technology

For the past several years, the federal government of Canada has spent billions of dollars on research and development (R&D) programming (\$13 billion as of 2004), while annual venture capital investment in early stage companies in Canada remains at historic lows - averaging \$200 to \$250 million per year.

Our federal and provincial models for supporting early stage investment - primarily tax credits offered by registered labour-sponsored funds - has been a 20 year experiment that is not sustainable, competitive, nor can it be considered an appropriate vehicle for commercializing clean technology.

The marketplace is now voicing its displeasure with the pale returns associated with these funds. Our provincial and federal governments must act now to develop appropriate vehicles that offer not just capital, but mentorship for our most promising innovative companies. Our taxpayers are counting on a productive return from our heavy investment in R&D, not to mention the emerging economies that would benefit from Canadian sustainable technology expertise.

British Columbia has taken the lead in a "direct investment" model supported by Angel investors who offer young companies guidance and capital as they try and bring their sustainable energy technologies to the global marketplace.

1. **Public investment in research capacity:** Over \$1.5 billion has been invested in R&D in our academic leaders and research. BC now accounts for 75% of the R&D expenditures in Canada for Fuel Cell & Hydrogen research.
2. **Accessing International capital:** For the past three years BC has led Canada with some of the highest rounds of venture capital financing for Clean-tech companies. The recent \$18 million invested in Angstrom Power Ltd. is an example of this success.
3. **Commercializing success:** BC is home to some of the first profitable Clean-tech companies in North America (e.g., Xantrex Inc. and Power Measurement Ltd.).
4. **Strategic global partnerships:** Over the past several years, Clean-tech companies from BC have successfully negotiated partnerships in global investment with industry leaders such as Shell Hydrogen, Exxon and Schneider.
5. **Realizing investor value:** Independent studies confirm that BC Clean-tech companies generate a higher exit value than most jurisdictions in North America.

The BC Direct Investment Model has been named “a driving force in the commercialization of technology “– *Conference Board of Canada, 2005*

In this past budget, the Province of British Columbia introduced fiscal measures including:

1. Increasing the supply of early stage capital under the Venture Capital Programs by \$17 million, bringing annual program investment capacity to \$87 million; and
2. Increasing the amount of capital a company can receive under the program to \$10 million every two years to help stem the financing gap between U.S. and Canadian Clean-tech companies.

BC continues to evaluate measures such as Scientific Research and Experimental Development (SR&ED) tax credit program expansion and evaluating other risk capital models with the aim of commercializing our most innovative companies.

On the Removal of Taxation Barriers that Discourage the Flow of Cross-Border Private Capital

It is estimated by Industry Canada that approximately \$600 million per year is spent by the federal and provincial governments in the form of Labour Sponsored Investment Funds (LSIF) tax credits offered to individual investors to procure venture capital from unsophisticated individual investors. Do we want to continue on this path? Or, should we try and revert to sourcing private capital from institutional investors that have built the most successful markets for venture capital?

Presently, federal taxation barriers discourage the flow of private capital and expertise from the United States and other leading jurisdictions with private capital due to:

1. The failure to recognize Limited Liability Corporations, exposing them to taxation even if the entities are tax exempt.
2. Exposing private capital investors to disclosure requirements under Section 116 of the Federal Income Tax Act.
3. An outdated definition of a "Canadian Partnership" that becomes tainted if one partner is not a Canadian resident.

The impact of these barriers is far reaching and deprives innovative companies and Canadian capital managers with the opportunity to partner with U.S., and global investors. Canada cannot build a successful marketplace for innovation or a vibrant and competitive Canadian market for risk capital if these barriers are not addressed.

What policies can the federal government implement to support the Clean-tech sector?

The federal government should:

1. Implement a “national Angel tax credit” program to accelerate the commercialization of start-up companies, with smart capital and mentorship offered by the tech-savvy angel investor community. BC’s model has demonstrated success at targeting capital to the companies that need it most.
2. Expand the federal regulations for the SR&ED tax credit programs, allowing access to refundable tax credits by Canadian public companies that are developing IP in this country.
3. Eliminate federal taxation barriers that discourage investment from foreign based venture capital funds, and restrict foreign limited partner participation in the formation of Canadian based venture capital funds.

The Province of BC supports the National Angel Organization and the Conference Board of Canada in its call to implement the Innovation Productivity Tax Credit nationally, as a proven measure to accelerate the commercialization of Clean Technology.

Making More & Losing Less: Capital Markets in a Time of Rapid Climate Change

Michael Brown, Chrysalix Energy Venture Capital

The following five actions should be taken by the federal government:

1. Research – answer questions about climate change and impacts.
2. Determine how Canada should act with developing nations.
3. Attract capital to this important sector.
4. Adopt the Canadian Task Force on Early Stage Funding proposals.
5. Fund the critical mitigation and adaptation energy alternatives.

Action Item 1: Climate Change and Financing Research Topics

The escape of GHGs from the permafrost.

The northern permafrost is melting so fast that Science magazine estimates that within the next 100 years the release of carbon dioxide and methane could match aggregate human greenhouse gas emissions. If so, this would mean that accumulative concentrations will not stabilize at less than 900PPM, or between three to four times pre-industrial levels, accompanied by very big temperature shifts in Canadian territory. About 30% of the permafrost is in Canada. The government owes it to Canadians to tell them the timing and quantity impacts of the physical results, so we can all prepare for how they will impact our infrastructure.

The real costs to Canadians to adapt if stabilization occurs at three to four times pre-industrial levels.

If the above scenario holds, this will affect the severity and speed of impacts on fresh water, food production, land values, forestry, rural and urban living conditions and weather. Without knowing severity & timing we cannot make good decisions about spending to mitigate or adapt, or on the speed of decarbonization, and will not be able to forecast what types of regulation or taxation will ensue.

De-carbonization by way of capture, sequestration and leaving in situ.

There is no such thing as `Canada as an Energy Superpower` if it means selling or using carbon. We need to know the economics of producing all this energy with increasing hydrogen loading. To do that, we need to focus on all de-carbonizing techniques.

Impact of a variety of types of tax shifting.

Tax shifting can, prima facie, be highly effective. Very little work has been done to determine the social and economic impacts of changing tax bases to incorporate the cost of externalities. The government must examine how big the impacts must be to change behaviour and to give positive and negative signals to capital markets. Reduced capital gains tax rates could be limited to the equity of companies in the mandate.

Action Item 2. Influence developing nations by leading by example - and then by marketing Clean-tech know-how in these countries.

Canada's annual emissions are less than the annual increase in Chinese emissions. The cost of most proposed Canadian mitigation programs, in current economic disruption and wealth, are probably poor investments taken on their own, but we need to actively demonstrate to others that progress can be made. *Field of Dreams* scenarios are wishful thinking. We need to consciously make Canada a huge marketing and demonstration site; with all the follow-up this implies.

Further, all government programs designed to encourage new technologies for mitigation and adaptation (including de-carbonization) should have deliberate incentives for internationalization. In many cases, only foreigners can produce the volumes needed to commercialize Canadian innovation, so the government should have facilitating intellectual property (IP) and financing policies.

Action Item 3. Attract Global Pools of Capital.

In the absence of international agreements, we need to take advantage of the mobility and liquidity of capital markets. Aggressive global investors watch every form of fiscal policy to impact capital flows to (and away from) projects when cash flow prospects change. All such policy planning initiatives must be aimed directly at capital markets.

Action Item 4. Implement Canadian Task Force on Early Stage Funding Recommendations.

The recommendations of the 2004 Canadian Task Force on Early Stage Funding should be adopted immediately. These concepts, which continue to have very broad private sector support, focus on making it easier for foreigners to invest in Canada. They are also extensions of the very successful SR&ED programs, which encourage Angel investors to be active in investing in commercializing innovation.

Action Item 5. Increase Technology Funding on a Matching Private-Public Basis

SDTC should be given more funding. The Industrial Research Assistance Program (IRAP) should be expanded with mandates in the same area. Any Industry Canada or Natural Resources Canada replacement for Technology Partnership Canada (TPC) should focus on the mandate area, and be predicated on matching financing (not projects), and should adopt SDTC governance principles.

The mandate area should include technologies for mitigation and adaptation, such as: de-carbonization, energy efficiency, renewable energy, LEEDS qualifications, hydrogen generation/distribution/ use, water efficiency, all forms of greenhouse gas reduction and improved local air quality.

Alternative Energy Infrastructure

William (Bill) Tharp, CEO, The Quantum Leap Company Ltd.

Macroeconomic Drivers

There are two primary macroeconomic driver categories, with each category divided into two. Capital market factors, the first category, has two sub-sectors: 1) the increasing price of traditional sources of energy (e.g., hydrocarbons); and 2) the corresponding depletion of traditional sources of energy (e.g., the peak of oil). Regulatory and legislative factors, the second category, also have two sub-sectors or drivers: 1) increasing awareness of emissions; and 2) de (or re) regulation.

Collectively, these four drivers act in varying degrees of symmetry to advance societal awareness of how carbon emissions impact our world. These factors also materially drive technological innovation.

“Emissions” are broadly defined as pollutants, GHGs, PPMs of various noxious sources, etc. They also exist along a continuum, starting with substances we know and have legislated (e.g., NOX, SOX, mercury) to those where we’re still formulating our opinion and strategies (e.g., carbon). Those where we are still formulating strategy, may also be those that we are the most afraid of, or that present the highest level of complexity. It is human nature to leave those most challenging to the last, which may have very negative implications.

Innovation: Failures & Successes

In the context of the capital markets, failures are something we learn from, and possibly establish a capital loss against. Even a capital loss has value, as it may shield other income from taxes. Successes are those things we have learned to do, again and again, with ever increasing efficiency, effectively freeing up “real returns” with low adjusted risks. Successes may also have developed out of failures or, at a minimum, been framed by failures. Failures may be a path to success.

The objective for capital deployed into the carbon market is to create the greatest impact on a per dollar expended basis. Although Quantum Leap focuses specifically on the energy & efficiency marketplace (venture to project finance), we believe the “high capital expenditure” sector (“high cap-ex”) will, if invested in properly, yield the greatest impact on a dollar for dollar basis. In our experience, almost twice the carbon-mitigating impact is obtained by investing in new operating plants versus developing new widgets – there is data supporting these beliefs, but more work needs to be done in this field. A critical issue is that plants are not cheap, and so “failure” has far-reaching implications – this is what we refer to as the “High Cap-Ex Gap”. *This High Cap-Ex Gap area requires discreet attention by the Federal Government.*

Our daily job is the management of pools of capital (typically tax driven) in the energy and efficiency niche. We are a leader in this field in Canada and have enjoyed failures and, proudly to say, a reasonable list of successes. Instead of covering the landscape I will limit my comments to direct and recent experience of successes and failures, including: renewable projects (wind &

micro hydro (<50mw)) and clean technology venture investments. There are various pros and cons for many of the current mechanisms available (CRCE Flow-through, Class 43.1, Wind Power Purchase Incentive (WPPI), Renewable Power Purchase Incentive (RPPI), etc.). Capital markets respond well to: consistency, accelerating front-end returns (accelerated depreciation / rapid write-offs) and long-term signals.

Federal legislation that, in our experience, works includes: flow-through legislation (CEE subset, CRCE) as it applies to wind and micro hydro, Class 43.1 accelerated legislation, WPPI and SR&EDs. The preferred legislation is flow-through for several reasons: 1) investors respond to flow-through incentives and it enables the government to mobilize retail and institutional private investment; 2) it favours the early stage hunters / builders / developers and Canada is strong in this capacity – in contrast section 43.1 mobilizes the very large energy / utility balance sheets.

Areas where improvements could be made:

1. Flow-through section 43.1

➤ Re-writing or broadening eligibility to include:

- Thermal applications (e.g., ground source heat pumps) – this is 100% renewable, cuts at heart of urban generation & transmission constrained markets, with the most acute and growing utility issues in Canada.
- High Cap-Ex Carbon Based Projects (e.g., such as many of the SDTC projects advanced today).
- Re-writing certain definition(s) to enable projects to evolve more commercially (e.g., within a construction environment where permitting complexities, many of which are new issues, work through the system). There are currently several examples of various projects (CRCE and otherwise) in jeopardy of failure, where very basic modifications to the legislation would have a materially positive impact.
- Allowing international projects developed by Canadian Developers abroad to qualify (e.g., enabling SDTC-like projects to be developed – this attribute, combined with an inclusion of High Cap-Ex Carbon Based Projects, could position Canada to become a global agent of change – we are already a global leader in development of resources (oil & gas and mining).
- Allowing WPPI & Flow-through deductions to exist in the same project structure (currently mutually exclusive).

2. Class 43.1 - Materially broaden the definition(s)

3. Wind Power Purchase Incentives

- Preclude provincial utility companies from taking the incentive from bidders (e.g. Quebec, Ontario, etc.). This effectively amounts to a de-facto transfer payment and does not impact the developer's economics, where the incentive is directed.

- Allow WPPI & Flow-through deductions to exist in the same project structure (currently mutually exclusive).

Between the Canadian Electricity Association (CEA), Canadian Wind Energy Association (CANWEA), Canadian GeoExchange and the National Round Table on the Environment and Economy – Capital Markets & Sustainability (NRTEE – CMS) a discreet list of practical amendments or modifications could be easily assembled, generating a considerable difference.

Additionally, there is specific federal / provincial legislation that could be harmonized to enable Canada to achieve reasonable renewable portfolio standards (e.g., 10%) domestically and also to become a significant exporter of premium green power to the United States.

Canada also has a unique opportunity, currently there is \$35 billion of institutional/pension capital seeking infrastructure investments (this is equity which could leverage three to five times more capital or \$120-180 billion). If enabled / channeled properly, a considerable percentage of this capital could flow into reasonable, risk adjusted Canadian projects.

The seriousness of the impacts, which a “Carbon Constrained Society” could have on all citizens, requires Governments to use all mechanisms available, and then some. With the right signals, material amounts of private capital can and will flow into this important sector.

Innovation and Venture Capital: A Call to Action
Tom Sweeney, Managing Director & Co-founder
Garage Technology Ventures Canada

Introduction

Garage Technology Ventures Canada is a Montreal-based, early-stage venture capital fund that invests in promising entrepreneurial teams that are explicitly seeking to redefine or dominate their target market niches with truly innovative products and assertive business models that embrace global customers. The technologies of primary interest to Garage include: enterprise and consumer software; communications software & sensors; medical devices (imaging & related diagnostics) and biomedical sensors; clean tech; specialized advanced materials; nanotechnology; and quantum computing. The fund benefits from close strategic ties with Silicon Valley and a distinguished network of technical and business advisors from world class North American and European corporations and universities (e.g., MIT, Hebrew University and Cambridge).

Overview

The presentation and ensuing discussions focused on four major calls to action:

❖ Early Stage Terminology.

A call for a well segmented, national definition of the so called “early-stage continuum” of Canada’s innovation and productivity ecosystem. The definition should reflect a strategic, holistic and contiguous view of all of the ecosystem’s participants, including governments, public R&D facilities, technology transfer agencies, Angels, VCs, banks, lawyers, accountants, consultants, reporting agencies and government development funds (e.g., SR&ED, BDC, etc.). Presently, terms such as “pre seed”, “seed”, “early-stage”, “pre-commercialization” and “pre-revenue” are defined differently (or not at all) by various government agencies and various participants in the ecosystem, including expert panels and national reporting organizations (e.g. NAO, CVCA, CCCE, Statistics Canada, etc.). This raises the fundamental question of how national policy can even be derived or effectively improved when the same word means something different to everyone. (See [Figure 1](#))

❖ Value Innovation.

A call for a national innovation policy review, focused on (1) increasing efficiency in technology transfer from the academic and research system to the private sector, and (2) a national debate leading to greater awareness of the types of innovation the early-stage ecosystem must fund in the very beginning to enable sustainable global companies and to enhance national productivity. The notion of *value innovation* was presented using a model developed by Garage Canada which was inspired by the seminal research of Clay Christensen of Harvard Business School. (See [Figure 2](#))

❖ Cross-Border Taxation.

A call for the federal Finance and Industry Departments to clearly deal with the incredibly inefficient and expensive impediments to co-investing in Canada with foreign investors. As was stated in the presentation, “To the extent the government continues to ignore this issue, voters reserve the right to ignore them complaining about declining productivity”. The reader is invited to read the Canada-California Cross Border VC & IP Working Group Report (June 2006) for a detailed discussion of this matter (this report is available upon request at the Lawrence National Centre).

❖ Technology Taxonomy.

A call for the federal government to completely overhaul the current technology taxonomy used by various agencies and Statistics Canada to segment and define various technology classifications. The Cambridge and Israeli technology taxonomies are excellent examples that are being copied globally by emerging clusters. (Example: we still refer to “Life Sciences” as “Biotech”...)

Early Stage Terminology

[Figure 1](#) shows the various segments of the Angel and Early Stage VC Continuum. As was explained in the Value Innovation section of the presentation, the government’s proud preoccupation with public R&D spending levels should be trounced by its paradoxical concerns over declining productivity. Part of the problem is that IP transfer in Canada is mostly painful and expensive for entrepreneurs: just ask people who have done it a few times. One component of the solution lies in highlighting the problem’s location in the continuum and focusing policy on fixing it. The natural “cold front” between research and business is in fact the “Pre-Seed” demarcation line. It lies at the legal point in time when a public (or private) R&D institution signs a technology transfer license (or another form of commercial agreement) with a company that will thereafter use that IP commercially.

Why does this definition work in practice? Frankly, reasonable investors want to know that, if the company’s value depends on IP that requires a license, the company has in fact signed that license *a priori*.

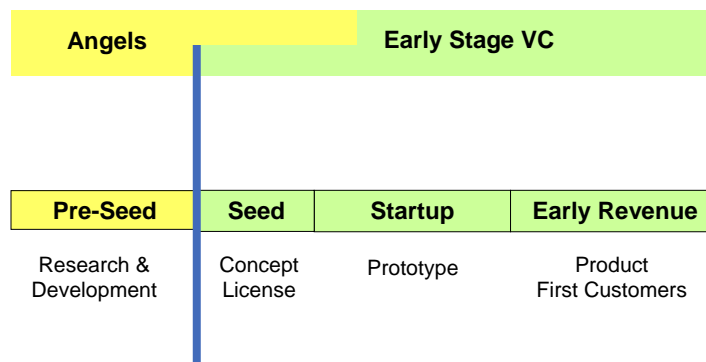


Figure 1. The Angel and Early Stage Continuum

Recommendations

As shown above, a Seed stage company has secured a license to use, or otherwise owns, the IP it seeks to use in its products. A Seed stage company could be one where the business plan is on a napkin and the product design is still in the founder's head in the garage. Seed is neither defined by how much capital the company raises nor by the type of investment structure that is used. A Startup has finished a prototype of the product that will eventually be sold. An Early Revenue company is one that has an early version of its product in beta testing with a customer or has secured its first customer wins against the target business model.

Defining Pre-Seed and Seed in terms of Intellectual Property Rights Transfer naturally provides policy makers and practitioners in Canada's innovation ecosystem with a common basis to better debate strategic issues such as (but not limited to):

- ❖ The observation that Canadian R&D generally has a shorter runway in the Pre-Seed stage than its US and many international counterparts, particularly American universities and research institutions with large foundations and private investment support.
- ❖ The levels of national, provincial and cluster-level Seed stage investment activity (with and without Pre-Seed IP), particularly as a function of public R&D dollars.
- ❖ How policy can be used to improve Canada's current (inefficient) technology transfer "quilt". Why is it that top IP law firms on both sides of the border think UBC apparently has it right on a relative Canadian scale?
- ❖ The role, efficiency and effectiveness of IP Transfer as it relates to innovation and national productivity. (What kinds of companies do we actually start in the first place?)

The Productivity Paradox

Canada currently leads the G8 in public R&D expenditures and is ranked second in the OECD.

Notwithstanding the foregoing, in a first-ever study of its kind, the Canadian Venture Capital Association reported in June 2006 that the ten-year average returns for Canadian VC funds is 3%. This compares poorly to 27% for US VCs and 54% for Silicon Valley VC funds over the same period. (A return of less than 15% or 20% would be considered poor by foreign investors and most non-government Canadian institutions with investment allocations to venture capital.)

Thomson Macdonald reported in June 2006 that the rates of new company formation and early stage investing in Ontario and Quebec are at their lowest levels since 1995. BC's levels are increasing (note the Angel tax credits they have for their investors).

Collectively these three statistics are as disturbing as they are debatable.

Some in government (outside of BC) argue that we started too many companies before and therefore lower company formation rates are acceptable now, particularly given Canada’s smaller VC fund sizes. This conclusion is simplistic (certainly as stated here) and is arguably false in the extreme to the extent that it is adopted as a truism by policy makers. There will always be failures on the path to creating winners and big winners.

One of the primary reasons why U.S. and Silicon Valley funds do better is because of the types of companies that get funded and how much money they get. Silicon Valley, for example, is famous for producing a long string of companies across multiple sectors that go on to define the market categories they either *created or entered with highly differentiated products*. Note that the Angels, Angel Groups and VC investors in the Valley are almost all privately-managed, with experienced executives deciding on what gets funded and then putting their own money at risk, alongside institutional limited partners. What happens there that we can study and apply here? [Figure 2](#) introduces the notion of *value innovation*.

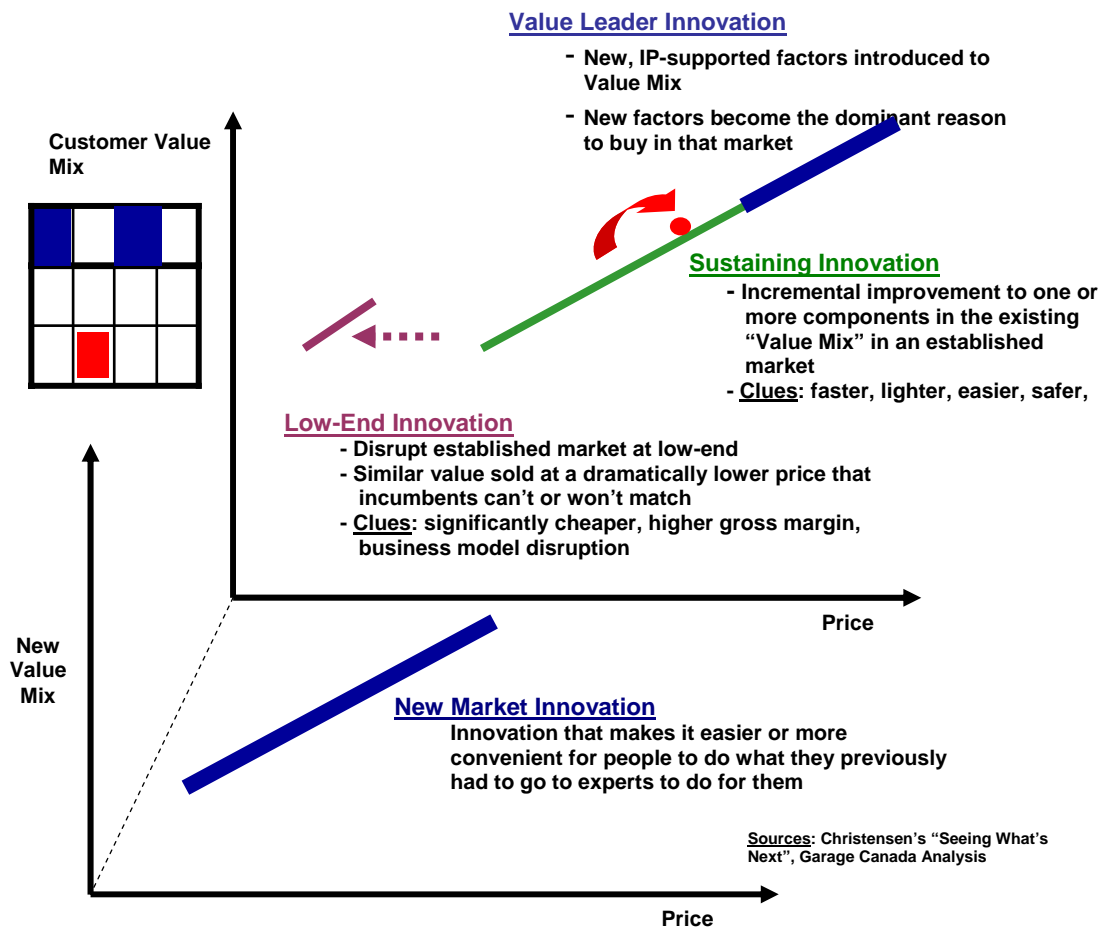


Figure 2. Four Classes of Value Innovation

As explained during the presentation, the top performing funds in the US (and in Canada) have been successful in finding and properly funding companies that fall into at least the *Value Leader* or *New Market* innovation categories. Both of these categories are highly dependent on efficient, timely and effective access to world class IP.

Google was not the first search engine, but it was the search engine that introduced defensible IP from Stanford that enabled new functionality that became the primary reason why customers bought Google's product over the others in the established search category (Value Leadership).

Steve Jobs invented a simple way for our grandmothers and young kids to find a song they liked for \$0.99 and put it into a small device with amazing sound that they could carry with them. Previously, our parents had to cross the street and ask the neighbour's kid to do something called *ripping* and *burning*, which all sounded too nasty at the time (New Market).

Is the next Google sitting in a Canadian post graduates lab? Do we have enough operationally experienced investors putting their money to work at the earliest stage of innovation? Are there enough private venture funds in Canada with sufficient committed capital to carry enough winners in a given cluster all the way to a solid Series B round? Why is it easier for Angels to invest in dry oil wells in Alberta than to bring their executive expertise and successful business acumen to bear on the innovation continuum? Do we have enough early stage venture funds in each cluster with partners who invest their own money alongside public and private institutions?

Cross Border Taxation

In conjunction with the partnerships of Fraser Milner Casgrain, Deloitte, Smart & Biggar and Garage Canada, a comprehensive report was submitted to the Government of Canada in July 2006 that explained the current, Canadian-imposed impediments to cross-border co-investment and certain challenges to Canadian companies in the area of cross-border IP regulation, policy and IP strategy.

Tax Impediments

Three primary tax impediments to investments in Canadian corporations have been identified:

1. There is still no direct rollover treatment available for Canadian shareholders selling to a U.S. acquiror, notwithstanding the government's announcement of a cross-border share-for-share exchange rollover in October 2000.
2. There is tax withholding on non-residents sale proceeds (the "Section 116 issue").
3. There is a lack of flow-through status or treaty benefits for U.S. limited liability companies (LLCs) that invest in Canadian companies.

In addition, other impediments have been identified including withholding taxes on interest and dividend payments which are less serious.

The report notes that these impediments have resulted in some investors deciding not to proceed with a Canadian investment or, if they are willing to proceed, imposing a requirement that the investee company be reconstituted as a U.S. corporation or the VC being forced to establish a Barbados structure (in the case of the LLC problem) which, as discussed below, results in further complications.

Consequential Issues Resulting from Use of U.S. Corporations

As a result of "workarounds" to address the impediments raised above, such as the use of U.S. corporations, other complications are caused which are discussed in more detail in the report.

Corporate Impediments

A secondary reason for the use of U.S. corporations, leaving aside the tax issues discussed above, is that U.S. investors are more familiar with the workings of U.S. corporations and U.S. corporations which offer significant advantages, from the perspective of an investor, compared to a Canadian incorporated corporation. This is discussed in more detail below in the report.

Taxonomy

Interested parties are invited to check out the Library House website in Cambridge UK (www.libraryhouse.net) for a comprehensive overview of the Cambridge cluster and its taxonomy.

