



2011 GHG REDUCTION SUMMIT

SUMMARY REPORT

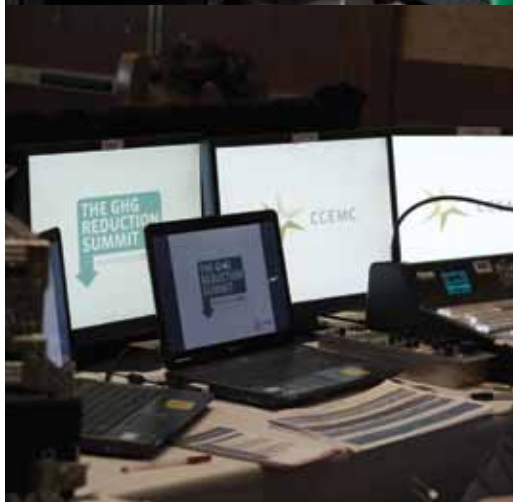
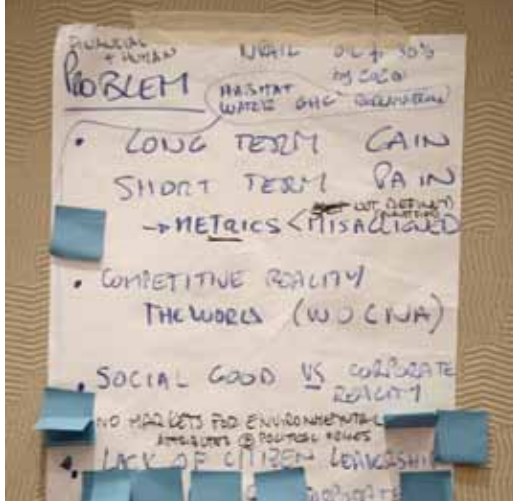


TABLE OF CONTENTS

● OVERVIEW

THE SUMMIT	2
THE PANEL DISCUSSIONS	3
THE BREAKOUT SESSIONS	3

● SETTING THE STAGE

OPENING PLENARY	5
THE INNOVATION SYSTEM	7
DELEGATE PERCEPTIONS	9
NETWORKING, CREATIVITY AND INNOVATION	11

● SUMMIT OUTCOMES

GENERAL OBSERVATIONS	12
KEY THEMES	13
THEME 1 – OPEN, DISTRIBUTED INNOVATION	13
THEME 2 – ENTREPRENEURIAL CULTURE	14
THEME 3 – CREATIVE FUNDING ALTERNATIVES	15
THEME 4 – STRATEGIC INVESTMENT	15
THEME 5 – ENABLING INFRASTRUCTURE	16
THEME 6 – CREATE THE NEED FOR CHANGE	17
THEME 7 – BENEFITS FROM EXISTING TECHNOLOGIES	18

● POTENTIAL DIRECTION

INTEGRATE ENERGY AND CLIMATE CHANGE STRATEGIES AT THE PROVINCIAL AND FEDERAL LEVELS OF GOVERNMENT	19
ESTABLISH LONG-TERM STABLE POLICIES	19
DEVELOP A TRANSITION PLAN FOR ALBERTA	19
STRENGTHEN THE DEMAND SIDE FOR ENERGY CONSERVATION AND EFFICIENCY	20
MAINTAIN A SUSTAINABLE FUNDING MODEL	20
DEVELOP A COMPREHENSIVE, COORDINATED CLIMATE CHANGE MANAGEMENT SYSTEM	20
BUILD AND SUPPORT A CULTURE OF INNOVATION	20

● CLOSING REMARKS

● NEXT STEPS

● APPENDIX: SPEAKER PROFILES

KEYNOTE SPEAKERS

JEREMY RIFKIN	1
SEAN WISE	2
JOSH LINKNER	3

PANEL 1: TECHNOLOGY & INNOVATION- “THE CLEAN TECH INNOVATION SYSTEM”

DR. DAVID LYNCH	4
DAVE HASSAN	4
JOEY HUNDERT	5
MATT MCCULLOCH	5

PANEL 2: FINANCIAL & HUMAN CAPITAL

DAVID LAWLOR	6
PAULA MCGARRIGLE	6
JAMES CHEPYHA	7

PANEL 3: PUBLIC POLICY

DAVID BIETTE	8
DR. ROGER GIBBINS	8
DR. ROBERT PAGE	9
WISHART ROBSON	9

This summary report is an attempt to provide an overview of the diverse discussions that occurred during the 2011 GHG Summit and does not necessarily reflect the views of the CCEMC. The 2011 GHG Reduction Summit Summary Report was prepared by independent facilitators who were responsible for fostering discussion and debate during the break-out sessions.

How do we ensure our public policy & Biz hubs transition from a resource based to a knowledge based system?



OVERVIEW

CLIMATE CHANGE IS DRIVING A COMPELLING AND IMMEDIATE NEED TO REDUCE GREENHOUSE GAS (GHG) EMISSIONS, AND ALBERTA HAS THE OPPORTUNITY TO LEAD THE WORLD.

To cut GHG emissions to committed levels, technologies, both new and existing, will need to be developed and deployed on a vast scale. Historically, however, technology breakthroughs take decades to make it to the mass market. Entrepreneurs struggle to find much needed capital; investors painstakingly review the risk profile of emerging technologies and the potential return on their investment. Intellectual property is closely guarded; patents are created to prevent others from copying good ideas. Regulations are often required to encourage adoption; and end users, be they large energy companies or the average consumer, are hesitant to change from the familiar status quo.

The lag between innovation and adoption must be reduced if GHG emission reduction targets are to be achieved. This requires focused innovation, efficient use of capital and enabling of regulations.

The Climate Change and Emissions Management (CCEMC) Corporation held its inaugural GHG Reduction Summit in Edmonton, Alberta on May 15-17, 2011. The purpose of the Summit was to spark the dialogue between industry leaders, technologists, policy-makers, financiers and other key stakeholders from diverse backgrounds.

The Summit program addressed topics and issues that were relevant to the industry while the networking activities focused on building connections between delegates. By providing a forum for such frank discussion, delegates were able to delve into many of the systematic issues, share perspective and voice opinion amongst the people who need to hear it.

THE OBJECTIVES OF THE SUMMIT WERE TO:

- Provide delegates with differing perspectives on the challenges and opportunities associated with reducing GHG emissions;
- Identify key problems that will have to be addressed to meet challenges and exploit opportunities;
- Solicit input from delegates on the alternatives to address these key problems; and
- Develop a set of recommendations for moving forward.

THE OUTCOMES ACHIEVED THROUGH THE SUMMIT WERE:

- Broadening the thinking about GHG reduction challenges and opportunities;
- Acknowledgement that new ideas, new ways of thinking and new ways of working together will be required; and
- Greater clarity on what needs to be done, by whom and how.

Information arising during conversation and provided by the Summit delegates resulted in ideas that offered potential directions for consideration by all stakeholders. These ideas offer the opportunity to strengthen the GHG management system.



ERIC NEWELL

Chair,
Climate Change and Emissions Management (CCEMC) Corporation

OVERVIEW

THE SUMMIT

The GHG Reduction Summit was opened by Eric Newell, Chair of the CCEMC, who provided an overview of the mandate of the CCEMC and why its role is so critical given the global context within which Alberta operates. He challenged the audience to think about how Alberta can continue to address the growing demand for fossil fuels while at the same time reducing GHG emissions and building a stronger, more diverse economy. Eric stressed that meeting GHG emission reduction targets will require a robust, diverse “system of innovation” (the focus of the Summit) to accelerate the discovery, development and deployment of new ideas.

The Honourable Rob Renner, Minister of Environment, reiterated the mandate of the CCEMC and highlighted that the real difference between the CCEMC and other organizations is the focus on achieving tangible results – results that demonstrate that Alberta is moving towards the attainment of its GHG reduction targets. Minister Renner acknowledged that the dependence on fossil fuels is transitory and that over time, the world will transfer to alternate forms of energy. The challenge for Alberta is developing all of its natural resources (renewable and non-renewable) in a sustainable way while investing in the development of alternative forms of energy.

The opening keynote address, entitled “Leading the Way to the Third Industrial Revolution”, was delivered by Jeremy Rifkin. This provocative presentation challenged the delegates to think about creating a master plan for Alberta to become the flagship for Canada in the creation of a parallel vision for using its natural resources – a vision based on “distributed renewable energy”.

A simplified model of the Innovation system was presented to provide the context for the panel discussions and breakout sessions. Delegates were asked to highlight where they believed the biggest challenges were in getting new clean technology discovered, developed and deployed. This provided the baseline for evaluating “shift in thinking” as the Summit progressed.

THREE DIFFERENT PANEL DISCUSSIONS, AND SUBSEQUENT WORKSHOPS, FOCUSED ON THE TOPICS OF:

- Innovation and Technology;
- Financial and Human Capital; and
- Public Policy

THESE SESSIONS WERE COMPLEMENTED BY:

- Sean Wise, who spoke about mitigation of potential barriers to knowledge transfer, and how to ensure innovation is used to drive Alberta’s climate change activities; and
- Josh Linkner, who shared proven techniques to drive creativity and innovation as the means to find solutions to complex problems.

The Summit concluded with a presentation by Dr. Bob Fessenden, Deputy Minister for The Premiers’ Council on Economic Strategy. His presentation provided highlights of the report *Shaping Alberta’s Future* and drew attention to the report’s conclusions and their alignment with many of the findings from the Summit.

THE PANEL DISCUSSIONS

Three panel discussions were conducted over the two days of the Summit, each comprised of four panellists. Profiles for all the panellists (and keynote speakers) are included in the Appendix.

EACH PANELLIST WAS AFFORDED 10-15 MINUTES TO GIVE A PRESENTATION ABOUT ONE OF THREE TOPICS AS FOLLOWS:

TECHNOLOGY AND INNOVATION

- Dr. David Lynch, Dean of Engineering, University of Alberta
- Dave Hassan, Team Lead Environmental Technology Investments, Cenovus Energy Inc.
- Matt McCulloch, Director, Consulting Services, The Pembina Institute
- Joey Hudert, CEO, Innovaculture

FINANCIAL AND HUMAN CAPITAL

- David Lawlor, Director, Environmental Affairs, ENMAX Corporation
- Paula McGarrigle, Managing Director, SOLAS Energy Consulting
- James Chepyha, Vice President of Investments – Alberta, Chrysalix
- Josh Linkner, CEO and Managing Partner, Detroit Venture Partners

PUBLIC POLICY

- Wishart Robson, Climate Change Advisor to the President and CEO, Nexen Inc.
- David Biette, Director Canada Institute, Woodrow Wilson International Center for Scholars
- Dr. Robert Page, Chair, Government of Canada’s National Round Table on the Environment and the Economy
- Dr. Roger Gibbons, President and CEO, Canada West Foundation

OVERVIEW

THE BREAKOUT SESSIONS

DELEGATES ATTENDED ONE OF FOUR BREAKOUT SESSIONS AFTER EACH PANEL DISCUSSION. EACH SESSION WAS SUPPORTED BY A FACILITATOR AND ONE OF THE PANELISTS, AND DELEGATES WERE ASKED TO RESPOND TO A SPECIFIC QUESTION RELATED TO THE PANEL DISCUSSIONS.

QUESTIONS POSED TO THE WORKSHOP PARTICIPANTS INCLUDED:

SESSION 1: INNOVATION AND TECHNOLOGY

- What role, if any, should universities have in the ownership and commercialization of IP (Intellectual Property)?
- How can we increase low carbon technology development and adoption, and have a sound business case?
- How do we quickly change the mindset of business leaders in Alberta to expand from the resource-based economy to include knowledge and technology?
- What are the barriers to rapid deployment of innovative technologies for GHG reduction? How do we overcome these barriers?

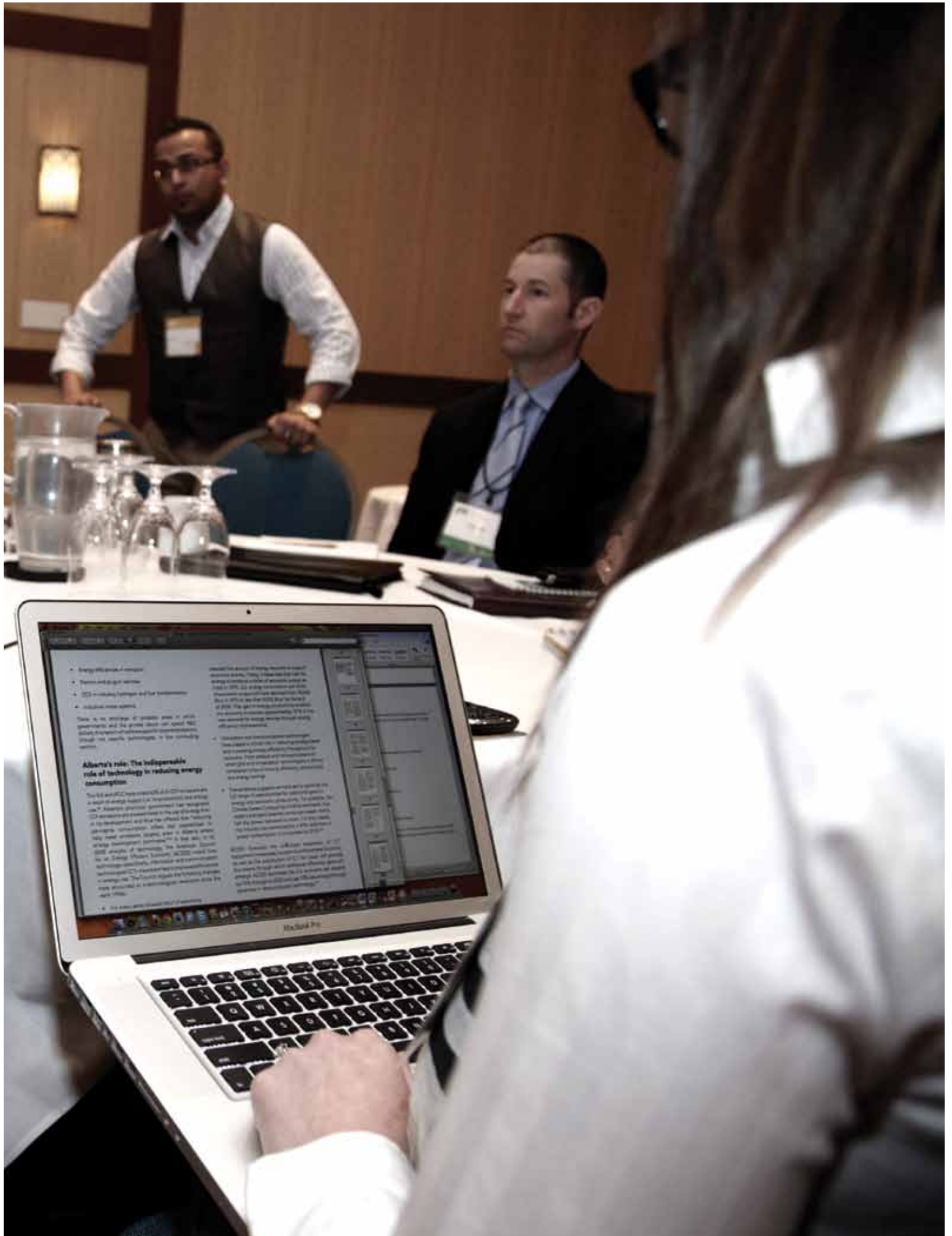
SESSION 2: FINANCIAL AND HUMAN CAPITAL

- How can we attract and retain the best minds to work on technology development (across the innovation spectrum) here in Alberta?
- How can we use financial mechanisms to increase the deployment of clean technology innovations?
- How can we increase low carbon technology development and adoption and have a sound business case?
- How would we change financial and human capital systems to improve clean technology?

SESSION 3: PUBLIC POLICY

- What's the role of public policy in advancing clean energy in Alberta?
- How can government create an innovative environment?
- To what extent, and in what form, should government place a price on carbon?
- To what extent is Alberta willing to pay the price for technology advancement?
- In its use of public funds, should government promote innovation across the full energy spectrum or should it promote innovation only where Alberta has a competitive advantage?

The responses to these questions formed the basis of the key themes and recommendations outlined in this document.



Energy efficiency measures

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Alberta's role: The indispensable role of technology in reducing energy consumption

The U.S. and U.K. have made significant investments in a host of energy-saving technologies and energy-efficient buildings. Alberta's provincial government has recognized the importance of investment in the energy-saving technologies of its development and that the effect of "energy efficiency" is not just a buzzword, but a reality. Many energy-saving technologies are available, and many are being implemented in Alberta. The following are some of the most important energy-saving technologies that are being implemented in Alberta:

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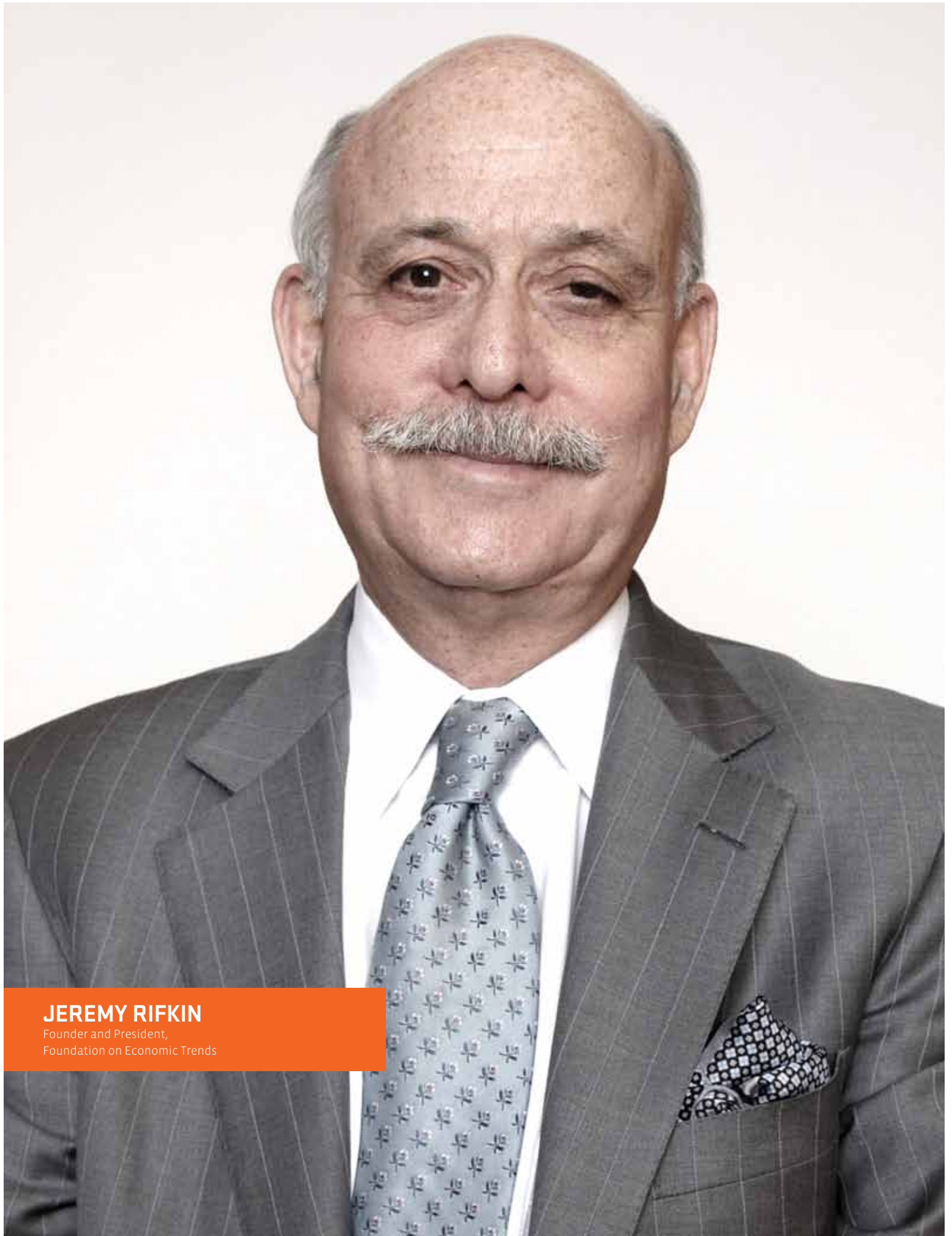
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JEREMY RIFKIN

Founder and President,
Foundation on Economic Trends

SETTING THE STAGE

“... OUR SPECIES IS IN REALLY, REALLY SERIOUS TROUBLE.”

OPENING PLENARY

The Summit's opening plenary began with these provocative words. Jeremy Rifkin, the founder and Chairperson of the Third Industrial Revolution Global CEO Business Roundtable, explained why he believes this statement is true. From his perspective, we collectively are not grasping the enormity of the climate change challenge.

His solution to this problem is that “we need a new vision and a sound economic game plan for the vision that is practical, can be implemented within two generations, moves us post-carbon and creates a sustainable economic base.” This is the premise of the Third Industrial Revolution, one that is based on collaborative behaviour and distributed renewable energy.

THE FIVE PILLARS OF THE THIRD INDUSTRIAL REVOLUTION, ACCORDING TO RIFKIN, ARE:

RENEWABLE ENERGY

Targets for renewable energy need to be set. The European Union, for example, has established a mandatory target of 20% renewable energy (solar, wind, hydro, geothermal, ocean waves and biomass) by 2020. Setting these targets has started the EU on a path to greatly increase the renewable portion of its energy mix with the goal of becoming more energy efficient and less dependent on non-renewable energy sources.

BUILDINGS AS POWER PLANTS

While renewable energy is available everywhere, and new technologies are allowing it to be collected and used more efficiently, the centralized distribution model based on “20th century thinking” is not good enough to deal with current and emerging challenges. The answer is to design and construct buildings that create all of their own energy from locally available renewable energy sources – in essence, buildings become mini power plants. This conversion of existing building stock would create the added benefit of a construction boom resulting in a growing economy.

STORAGE

To maximize renewable energy and minimize cost, it will be necessary to find ways to store energy. One storage medium, hydrogen, could “store” all types of renewable energy to make sure that a reliable supply of energy is always available. Excess electricity, using electrolysis, would be used to split water into hydrogen and oxygen. The hydrogen is then stored until needed when it is converted back to electricity.

SMART GRIDS

A smart grid is to power what the internet is to communication. The premise is that the power grid is reconfigured into an integrated network allowing for the bi-directional sharing of energy when and where it is needed with buildings (as mini power plants using renewable energy) being the source of that energy. This concept of “distributed generation” would make today's centralized top-down flow of energy increasingly obsolete.

ELECTRIC PLUG-IN TRANSPORT

Plug-in electric vehicles are the fifth pillar of the Third Industrial Revolution. By connecting into the smart grids, vehicles could be powered up anywhere in the network. And, when not in use, these “power stations on wheels” could provide electricity back to the grid.

SO HOW DO WE GET THERE?

Rifkin suggests we must start to create a new business model, one that is distributed and collaborative. While we cannot shut down the old model (one that is based on non-renewable energy), we need to create a parallel vision, one that current and future generations will embrace.

Rifkin concluded that it must start right here in Alberta. Alberta is rich in renewable energy – wind, geothermal, solar, biomass that must be more fully developed. If we create a master plan for Alberta, we can become the flagship for Canada. This is a daunting endeavour, but worth pursuing for the sake of future generations.

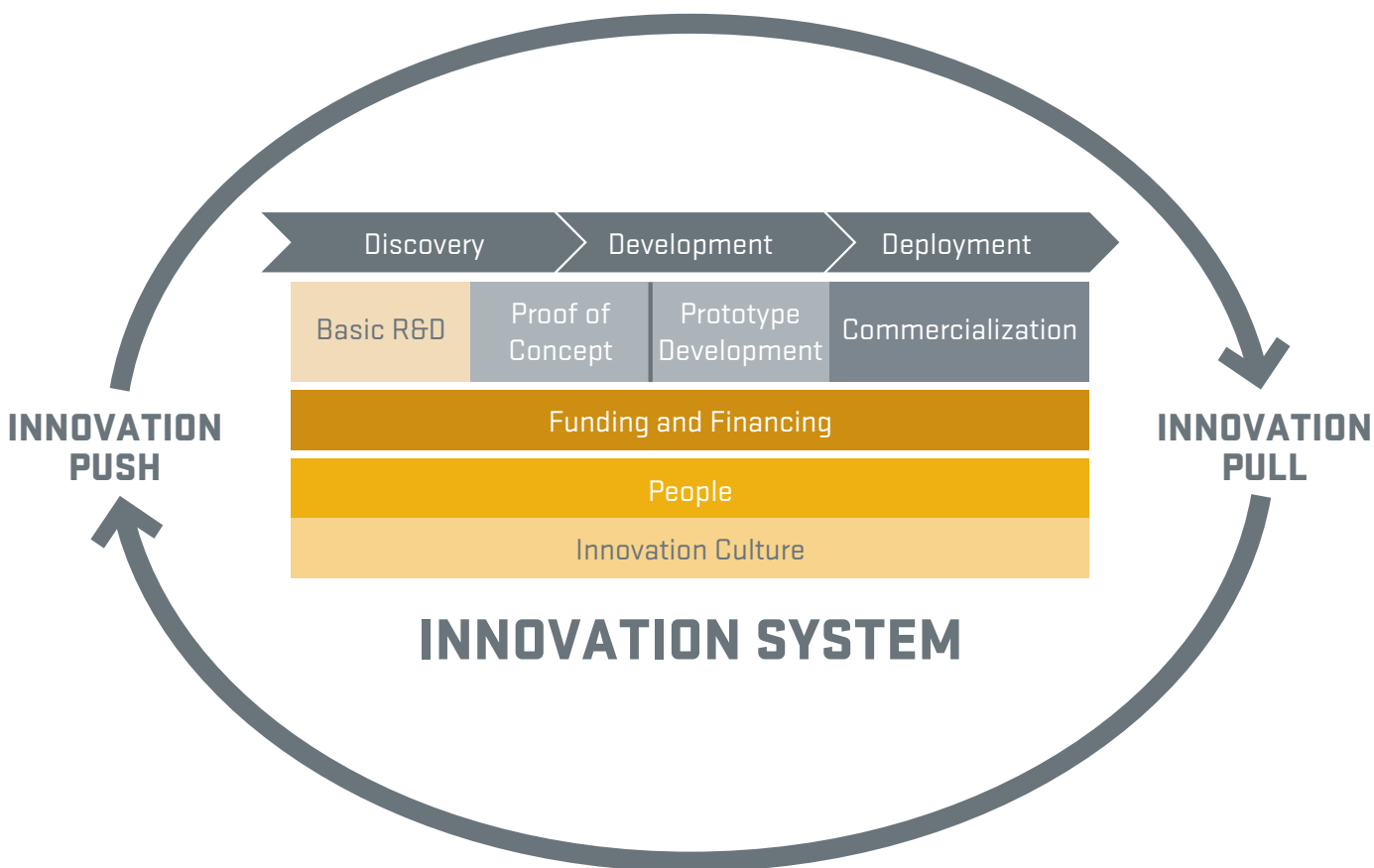
Rifkin's presentation was thought-provoking and provided excellent context for the subsequent discussions on the role of innovation and the innovation system in meeting the challenge of GHG emission reductions.

SETTING THE STAGE

THE INNOVATION SYSTEM

Historically, technology breakthroughs take decades to make it to the mass market. This lag between innovation and adoption must be reduced if GHG emission reduction targets are to be achieved. However, there are many inter-related components that must work together if greater efficiency is to be achieved.

THE FOLLOWING MODEL WAS PRESENTED TO HELP FRAME THE CONVERSATION AROUND THE CHALLENGES ASSOCIATED WITH MORE EFFICIENT DEPLOYMENT OF NEW, TRANSFORMATIVE CLEAN TECHNOLOGY.



Within the system, the process of innovation is dynamic, driven by the “push” and “pull” forces within the continuum. These forces create a circular flow between the short-term and long-term needs of society (the pull force), and the public policies designed to foster innovation (the push force).

The pull force represents the global influences of societal or user needs (e.g., reduce GHG emissions). When “pulled” by the needs of society, research and other innovative activities are more likely to yield products and services that people value, or those with commercial potential. Pull forces can be long-term in nature (e.g. need to address climate change), or shorter-term (e.g. need to increase energy efficiency).

The push force is the supply side of innovation. It represents policies, incentives and investments made by government to create an environment for innovation. The supply side of innovation is most effective when responsive to pull forces.

SETTING THE STAGE

FOR SIMPLICITY, THREE MAIN PHASES WITHIN THE INNOVATION SYSTEM WERE DEFINED AS FOLLOWS:

DISCOVERY

Creation of new ideas or discovery of new knowledge, primarily through research efforts.

DEVELOPMENT

Testing and proving the economic or societal value of the idea or new knowledge.

DEPLOYMENT

Adoption or application of new or improved products, services or processes.

WITHIN THESE PHASES ARE A NUMBER OF ELEMENTS, OR FACTORS, THAT ALLOW INNOVATION TO TAKE PLACE, INCLUDING:

TECHNOLOGY DEVELOPMENT – stages:

- Basic Research and Development
- Prototype Development
- Technical Validity/Pilot
- Commercialization

FUNDING AND FINANCING – vehicle:

- PUBLIC INVESTMENT: Investments funded by the government.
- VENTURE CAPITAL: High-risk equity capital that helps finance and support start-ups from a pool of funds (e.g. pension funds).
- ANGEL INVESTMENT: A form of private equity, where an individual investor provides financial backing for a small business start-up or entrepreneur. Like venture capitalists, angel investors often fund high-risk, innovative ventures that are difficult to obtain through conventional sources.
- CORPORATE CAPITAL AND PERSONAL INVESTMENT
- CONVENTIONAL FINANCING: Business loans or public equity markets. Less risky investments are often financed through loans, retained earnings or public equity.

PEOPLE AND INNOVATION CULTURE

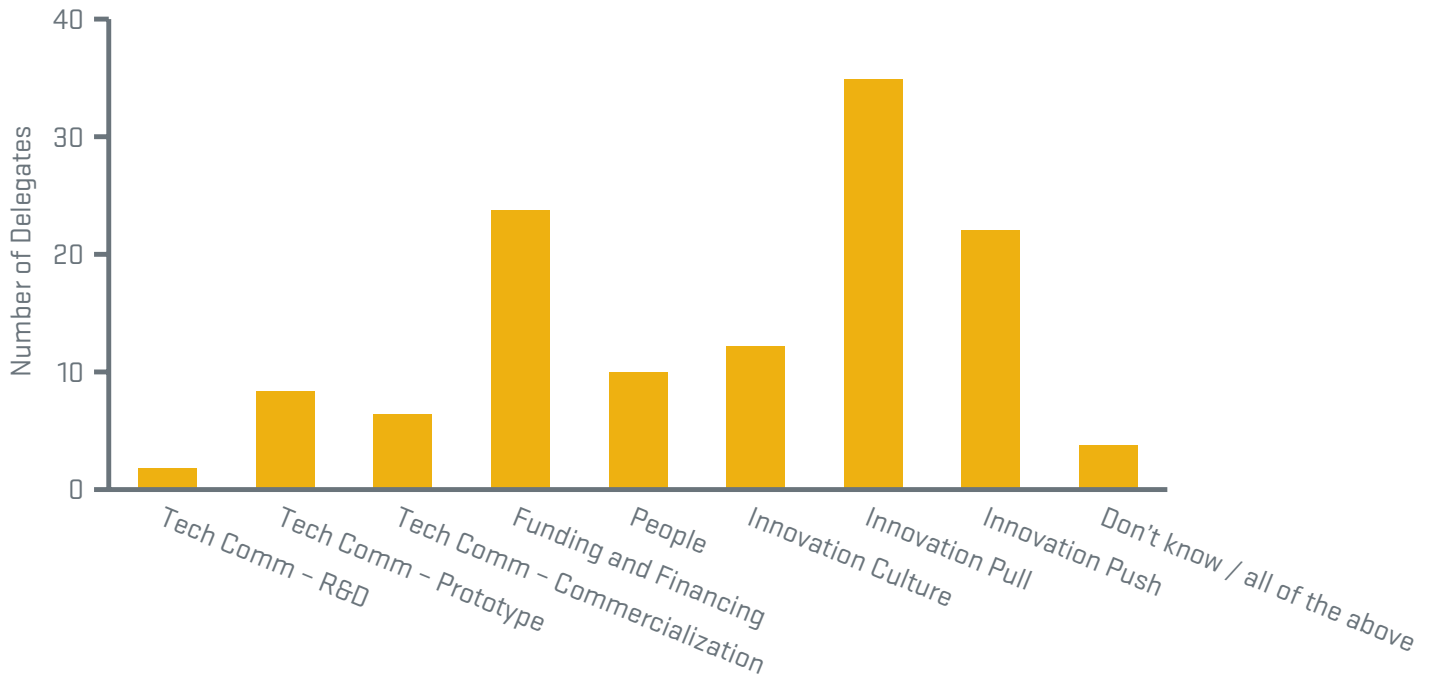
The degree to which organizations can be innovative rests on highly qualified people, or the skills and education of a jurisdiction's population. The process of innovation is becoming increasingly complex, requiring that people continually learn, gain experience and upgrade their skills. The mobility of people, particularly international mobility, is also important, contributing to the sharing and diffusion of knowledge across different geographies. Along each phase of the innovation system, different qualifications and skills are required.

Fostering a culture of innovation within organizations is particularly important. Innovation is not diffused or embraced unless there is an underlying culture of innovation. Culture impacts how people behave and respond to incentives. Characteristics that promote an innovative culture include diversity, creativity, collaboration and risk-taking.

SETTING THE STAGE

DELEGATE PERCEPTIONS

Using the innovative system model to add context, delegates were asked, “Where on this diagram is the single biggest obstacle to integrating existing technologies and increasing the deployment and use of ‘transformative technology?’” The responses are summarized in the following graph.



SETTING THE STAGE

SOME SPECIFIC COMMENTS MADE BY DELEGATES ON THE FOUR AREAS IDENTIFIED AS THE LARGEST OBSTACLES ARE SUMMARIZED BELOW:

INNOVATION PUSH

“Policy is not yet stringent enough to create real change. The price of \$15/tonne is too low to create the required incentive.”

“Clear direction is required to provide policy certainty and to incent commercialization of existing/known technologies.”

“What is government’s commitment to alternative energy and providing and sustaining the ‘push’ towards innovation?”

“How will government sustain the economy while at the same time communicate the need to move away from carbon based energy?”

“Need for more effective policy incentives to push further investment, development, interest in clean tech. Industry has very little policy incentive to invest in clean energy development – because industry is all driven by economics. Policy will push finance and investment by industry.”

FUNDING AND FINANCING

“Not enough funding to support clean tech innovation from concept to pilot to commercialization.”

“Innovative financing programs are needed to make it easy for every industry and building to capture economic energy efficiency opportunities.”

“Lots of funding sources but no coordination and processes can be complicated, confusing and conflicted.”

“How do we change incentives so that we see more clean technology applications commercialized? Many technologies are identified, but they sit undeveloped due to economics.”

“In a low cost carbon environment (relative to other jurisdictions) how do we get the right mix of funding / financing to advance innovation? With a high technology risk and high financing risk, capital intensive energy projects are not going ahead.”

INNOVATION PULL

“The biggest challenge is creating wider awareness / urgency around the issue.”

“The largest obstacle is overcoming negative public perception towards clean technology. How do we shift public perception to become more open minded about the need for clean technology?”

“Market pull can be enhanced through ‘communication strategies’ and this should be considered seriously by all levels of Government and industry associations to create demand for new ‘clean tech’ technologies.”

“Need to make costs and reliability and ease of use of low carbon technologies better than incumbent energy sources to create market draw.”

“Alberta businesses have not adopted, for the most part, innovation as a business strategy. They have not recognized the need for change.”

INNOVATION CULTURE AND PEOPLE

“While we (as a society) incent R&D innovations, the economic decision-makers who allocate capital budgets are reluctant to invest in new technologies. They face barriers – selecting business-as-usual technologies are easier, less time consuming and require less effort. How can we reduce these barriers?”

“Alberta currently has no competitive advantage to draw young great minds. How do we attract talent?”

“How do we enable the transition to a cleaner future while managing dual innovation tracks – innovation in existing energy industries and innovation towards a different energy future?”

“... we lack a culture of innovation in Canada which is a function of risk-taking and risk-management within industry (based on need for accountability to stakeholders) and government (highly risk adverse). How can we encourage a creative economy rather than a fear driven economy?”

“It isn’t the skills; it is the consensus about what the problem is.”

“I don’t think we are asking the right question – we are focusing innovation mostly on current fossil fuel energy systems”

SETTING THE STAGE

NETWORKING, CREATIVITY AND INNOVATION

Meeting the GHG emission reduction challenge will require a new way of thinking and working together. Sean Wise, the second keynote speaker of the Summit, spoke about a critical change that is taking place in the world that, if properly harnessed, could significantly contribute to a much more effective exchange of knowledge – knowledge that could be used to bring new ideas to market more quickly.

The premise of Sean’s talk was that knowledge is the competitive asset of the 21st century and that social networks are the key to optimizing the use of this knowledge. As well, the shape of the network helps or hinders knowledge flow. Through a technique of social network analysis, Sean believes that if innovation is the ultimate goal, “weak” ties (i.e., casual relationships) are more critical than “strong” ties (i.e., formal relationships) for tapping into the distributed and collective knowledge.

Solving the GHG emissions reduction challenge will require a shift to a networked economy where collaboration and reciprocity are key ingredients to success. Group intelligence is dictated by the relationships between members of the groups, not by the assets that each member has. The key, therefore, is to build diverse groups, fill with key stakeholders and share knowledge through this new networked economy.

Josh Linkner, the final keynote speaker, echoed many of the key messages that Sean shared. However, he went one step further and challenged delegates to “be creative” and strive for breakthrough thinking. Too often, we are told, “don’t take risks, play it safe, do as you are told”. However, doing this leads to mediocrity. Doing the opposite helps to solve the challenges we are here to solve.

To drive transformative change, we need to tap into the creative potential of people. Giving people permission to fail provides the opportunity to succeed. Josh went on to describe numerous techniques to help tap into people’s creative side. In doing so, he believes we can unleash the ideas that will help to solve the GHG emission reduction challenge for Alberta and beyond.



SEAN WISE

Professor of Entrepreneurship, Ryerson University
Ted Rogers School of Management and
Founding Partner, Vericorps.com

SUMMIT OUTCOMES

GENERAL OBSERVATIONS

ALTHOUGH MANY DIFFERENT IDEAS SURFACED IN THE WORKSHOPS, SOME ITEMS BECAME KEY CONSIDERATIONS GOING FORWARD.

MARKET PULL FORCES ARE LACKING IN ALBERTA. A COMPELLING NEED FOR CHANGE IS REQUIRED IN ORDER TO FOSTER GREATER INVESTMENTS IN INNOVATION AND TECHNOLOGY.

Attitudes are hard to change. Albertans need to engage to raise awareness and provide greater focus on educating government leaders and consumers on the need to change. Alberta needs strong leaders with vision and passion to regularly speak about the importance of reducing GHG emissions and expanding the economy beyond non-renewable energy.

MARKET PRICING SIGNALS NEED TO BETTER ALIGN SOCIETAL OBJECTIVES WITH PRIVATE RETURN ON INVESTMENT. PRICE SIGNALS ARE CRITICAL TO ACHIEVING GHG REDUCTIONS.

Delegates generally agreed that pricing carbon is more effective than other approaches (e.g. subsidies, rebates or voluntary targets) in achieving GHG reduction targets. Emitters that pay an increasing price for their emissions will develop innovative solutions to cut GHGs. As one participant noted, market pricing structures need to “align government’s objectives of reducing GHGs with private sector’s objective of return on investment”.

GHG REDUCTION POLICIES SHOULD BE BALANCED.

Policies should not be narrowly aimed solely at encouraging companies to reduce GHG emissions (e.g. through adoption and development of clean technology). They should also be coordinated with efforts to reduce end-user emissions (e.g. public transit, gasoline taxes, etc.) and consider ways to incent integration of existing technologies to reduce GHG emissions. There is also a need to actively engage the public in understanding the challenge, trade-offs, and the need for energy efficiency and conservation.

COMPANIES REQUIRE POLICY CERTAINTY AND STABILITY WHEN MAKING LONG-TERM INVESTMENTS IN CLEAN TECHNOLOGY.

Any GHG emission program or policy needs to meet three criteria: predictable, credible and stable. In making investment decisions over the long-term, companies need to have comfort in knowing that the policy environment will not make sudden changes in direction. To create a greater incentive for GHG reduction, carbon prices should increase over time. However, the increases should follow a predictable schedule to facilitate competitive private sector decision making and investment in clean technology.

ALBERTA NEEDS TO BE PROACTIVE IN CREATING MARKET INCENTIVES.

Many believe that Alberta’s approach is too reactive to developments in the U.S., including changes in U.S. public opinion regarding the oil sands. Alberta needs to set its own course and stick to it.

GOVERNMENT SHOULD CREATE THE RIGHT CONDITIONS FOR INNOVATION AND TAKE A PORTFOLIO APPROACH TO SUPPORT TECHNOLOGY.

There is appreciation for the challenges in being able to select the “right” clean technology solution. As a result, governments should establish the enabling research infrastructure and provide market incentives (e.g. carbon pricing), but also allow the private sector to innovate across a broad portfolio from which to manage risk.

THE CCEMC APPROACH

The CCEMC is seen to provide a key role in closing the financing gap, helping kick start the development of clean technology in Alberta. The basis of the CCEMC achieves two objectives: providing a market incentive, while also promoting new technology through the recycling of revenue raised. Indeed, many participants argued that the best approach is a tax and flow through of funds for technology development. However, the process for selecting projects should continue to be fair, neutral, transparent, and market oriented.

FINANCIAL + HUMAN

PROBLEM

UTIL

OIL + 30%
by 2020

HASHTAT
WATER GHG REGENERATION

- LONG TERM GAIN
SHORT TERM PAIN

→ METRICS < ^{NOT DEFINED (QUANTIFIED)} MISALIGNED

- COMPETITIVE REALITY
THE WORLD (WOCINA)

- SOCIAL GOOD VS CORPORATE REALITY

NO MARKETS FOR ENVIRONMENTAL ATTRIBUTES @ POLITICAL POWERS

- LACK OF CITIZEN LEADERSHIP

... CORPORATE

RPP (COSTS) LONG EXPENSIVE (SMALL GAINS)

SUMMIT OUTCOMES

KEY THEMES

THEME 1: OPEN, DISTRIBUTED INNOVATION

THE CHALLENGE

Systematic improvements are required to improve the speed at which new ideas related to GHG reduction are shared for uptake in the marketplace.

A NUMBER OF COMMENTS CITED BY CONFERENCE DELEGATES ILLUSTRATE THIS CHALLENGE:

- Universities
 - Focus is on research, with mixed results in innovation; products pushed into markets that may not exist.
 - There are over 200 research intensive universities in North America, yet it is very difficult to find success stories.
 - Almost all universities spend more on IP protection than on selling IP.
 - Limited emphasis on pursuit of zero-emitting energy opportunities.
- Intellectual property protection
 - IP protection can sometimes create barriers to widespread adoption of technologies. We need to mitigate intellectual property barriers that discourage collaboration between the inventor and users.

IDEAS FOR IMPROVEMENT RAISED BY DELEGATES

Develop an open innovation model at the stage of scaling up technology.

OPTIONS FOR ACHIEVING THIS OUTCOME INCLUDE:

- De-emphasize protection of IP
 - Within the University context, this could include greater sharing of know-how, selling IP to investors/funders to attract future private investment; focus on “bragging rights” versus IP as a model for University success (could also help to attract new talent).
- Introduce a system where a portion of the IP stays with the inventor but that the subsequent development is actively shared and disseminated with industry.
- Re-structure IPs (e.g., pool and option early stage IP’s, create tradable IPs).
- Strategically manage the pool and make connections between IPs.
- Include other aspects of IP such as business models and financing.

SUMMIT OUTCOMES

THEME 2: ENTREPRENEURIAL CULTURE

THE CHALLENGE

A lack of creativity in entrepreneurship in Albertans is impeding the development of clean technologies.

Alberta's cyclical economy tends to result in companies reacting to short-term market demands rather than longer-term human capital development. A lack of creative thinkers and entrepreneurs has been exacerbated by chronic labour shortages, in turn constraining innovative solutions to reduce GHG emissions.

IDEAS FOR IMPROVEMENT RAISED BY DELEGATES

There may be opportunities to address the creativity gap in Alberta.

SOME OF THE IDEAS RAISED INCLUDE:

- Design more business school programs to foster creativity.
- Build centres of excellence in key areas, such as energy efficiency and energy economics. This may attract the best and brightest and bring focused, creative solutions in areas of Alberta's competitive strength.
- Actively target innovators in other countries and bring them to Alberta (either physically or virtually).
- Set up "beehives" whereby specialists gather for ten days to work on a problem (a global summit) and then disperse and keep in contact virtually.
- Release virtual "RFPs" for ideas for solutions to problems and the winner gets a nominal prize and the opportunity to work with innovators and mentors.
- Identify "strategic thinkers" that exist throughout all levels in an organization and build a working community or network.
- Create a "pool" of risk taking companies that are linked as a network, and aligned with the higher education sector. This pool would be an incubator for business ideas and create problem solvers. The government may have to provide seed money, but the pool would ultimately be accountable for results as well as share in the risks and rewards.
- Acknowledge and celebrate. Celebrate made-in-Alberta successes and failures in the knowledge and technology industry, no matter how small, to foster a risk-taking, "can do" mentality amongst entrepreneurs.

THEME 3: CREATIVE FUNDING ALTERNATIVES

THE CHALLENGE

Raising capital is seen as a major impediment to the adoption and development of clean technologies.

Part of the challenge is that the gap between business returns required by shareholders and the actual returns to R&D/technology development. There may also be a role for government to provide funding and resources, to narrow the gap.

IDEAS FOR IMPROVEMENT RAISED BY DELEGATES

Evaluate opportunities to create funding alternatives in Alberta.

SOME OF THE IDEAS RAISED INCLUDE:

- More "safe" funding mechanism for projects in the "valley of death" in addition to those currently provided (SDTC). Guarantees on funding from government, whereby the government doesn't provide the funding but backs up the funding, partially or fully.
- Crowd sourcing or collective market intelligence to determine funding, rather than a small group of internal specialists.
- Government providing assistance that links short-term funding into long-term funding – e.g., if investors agree to fund over a longer period of time, the government will top up the ROI on the investment if it occurs.
- The government funding support for finance specialists to work with companies through the "valley of death," moving technology from proof of concept to commercialization and development.

SUMMIT OUTCOMES

THEME 4: STRATEGIC INVESTMENT

THE CHALLENGE

Alberta cannot excel in every area of clean technology.

How can Alberta undertake strategic investments that are aligned with their existing competitive strengths and that have greatest chances of success?

IDEAS FOR IMPROVEMENT

RAISED BY DELEGATES

Focus on strategic investments in Alberta.

SOME OF THE IDEAS RAISED INCLUDE:

- Government should have less of a role in picking winners. Once a strategic area has been established, the private sector should develop technologies based on market needs.
- Start local. Municipalities need to be afforded more authority to act in supporting initiatives such as distributed energy systems to demonstrate there is a practical application to the research, and a willing buyer for technological solutions.
- Government should focus most attention on where it has competitive advantage and strengthen its position in that regard.

THEME 5: ENABLING INFRASTRUCTURE

THE CHALLENGE

How can the government create the right conditions, or enabling infrastructure, for innovation to take place?

While many companies feel the need to innovate, many don't know where to start. For example, what government programs are available? How can I obtain financing? How do I prepare a business case? How can I tap into higher education research? In short, there appears to be information and coordination problems that are preventing many companies from innovating.

IDEAS FOR IMPROVEMENT

RAISED BY DELEGATES

Explore new models to enable organizations to move through the innovation system.

SOME OF THE IDEAS RAISED INCLUDE:

- An alternative model, whereby the support structure and the interface is known so that large scale projects can be designed and tested. It was acknowledged that this will assist in getting technologies to a commercial format, it also prevents innovative technologies from coming to the table and another mechanism will be needed for this.
- A potential role for government suggested by many is that of a “shepherd” and “Sherpa” – providing knowledge transfer and guiding companies through the process of invention, commercialization, technology adoption and the introduction of new products and services. Some options discussed include technology incubation facilities, or creating a Center of Excellence with guidelines and evaluation tools for technology development.
- The government could provide the general infrastructure for testing, with the private sector responsible for creating industry-driven technology.
- As an energy efficiency pilot project, some participants argued that the government could start by introducing energy efficiency programs on subsidized housing. Once savings and critical mass have been achieved, the energy cost savings could be rotated into other projects for more efficiency reductions.

SUMMIT OUTCOMES

THEME 6: CREATE THE NEED FOR CHANGE

THE CHALLENGE

Market pull forces are lacking in Alberta.

A compelling need for change is required in order to foster greater investments in clean technology.

- Lack of awareness. Albertans do not have a strong history of exporting knowledge and technology and as a result don't see the opportunity.
- Alberta does not attract many innovators. The education system is not the source of the problem as many people come here to work in traditional industries.
- Lack of market incentive.

IDEAS FOR IMPROVEMENT RAISED BY DELEGATES

Create better pricing signals.

THERE MAY BE OPPORTUNITIES TO ENHANCE THE CURRENT METHOD OF PRICING CARBON:

- Any attempt to price carbon through a tradable credit regime should be done at a national or international level, as a strictly provincial system would put Alberta companies at a competitive disadvantage. Alberta should show leadership in national/international discussions to create such a system.
- To create a greater incentive for GHG reduction, carbon prices could increase over time. However, the increases should follow a predictable schedule to facilitate private sector decisions making in clean technology.
- Other incentives. Attract and encourage knowledge and technology companies by marketing the current advantages of doing business such as low income tax, no provincial sales tax, access to educated workforce, etc. Enhance tax credits and other incentives to spur investment in knowledge and technology industries

THEME 7: BENEFITS FROM EXISTING TECHNOLOGIES

THE CHALLENGE

How can greater integration of existing technologies for emission reductions be achieved?

While pursuit of breakthrough technology is needed to meet GHG emission reduction goals and targets, support for integration of existing technologies should be viewed as a key priority.

IDEAS FOR IMPROVEMENT RAISED BY DELEGATES

- Conduct a review of the potential GHG emission reductions that could come from the integration of existing non-renewable and renewable forms of energy.
- Consider ways to incent investments that integrate renewable and non-renewable energy in Alberta.
- Provide support for innovations that are designed to bring existing technologies together to achieve GHG emission reduction synergies.



JOSH LINKNER

CEO and Managing Partner,
Detroit Venture Partners

POTENTIAL DIRECTION

SIX MAJOR IDEAS EMERGED THAT OFFERED POTENTIAL DIRECTION FOR CONSIDERATION. AND THESE IDEAS OFFER THE OPPORTUNITY TO STRENGTHEN THE GHG MANAGEMENT SYSTEM.

INTEGRATE ENERGY AND CLIMATE CHANGE STRATEGIES AT THE PROVINCIAL AND FEDERAL LEVELS OF GOVERNMENT

The integration of climate change and energy policy requires coordination to ensure responsible utilization of resources while meeting emission performance targets. At present, Canada does not have a National Energy Strategy and in absence, diverse stakeholder interests are pursuing various initiatives based upon differing objectives and priorities. However, there is a common view that a National Energy Strategy would help with the orderly transition toward a low emission energy system over the next several decades. There is much at stake and increasing energy production in Alberta poses a significant challenge for Canada in meeting international commitments to greenhouse gas emission reductions. It is recognized that provinces will need to drive their own policy responses. However, the transition to a carbon constrained future will impact Canada as a whole and Alberta will certainly have a significant contribution to make during this policy dialogue.

POTENTIAL DIRECTION

ESTABLISH LONG-TERM STABLE POLICIES

Linked to a National Energy Strategy is the need to design carbon pricing schemes that reflect the true cost of energy production and consumption. Alberta has established a clear policy for emission reductions and is committed to making investments in technology. However, there appears to be a gap between what can be delivered and what needs to be delivered. Alberta, through its regulatory regime, has a current price on carbon of \$15 per tonne of CO₂e which has stimulated investment in clean technologies. The intensity-based scheme has been successful but the system is confined to Alberta. There is no national strategy for pricing carbon. There exists an opportunity to explore how long-term stable policy can influence the costs to reduce GHG emissions and address carbon emissions on a national scale.

DEVELOP A TRANSITION PLAN FOR ALBERTA

The report “Shaping Alberta’s Future” from the Premier’s Council for Economic Strategy, identifies opportunities Alberta has within its grasp, given its history, endowment and potential. A key theme is realizing the full potential of Alberta’s energy resources for the benefit of all Canadians while addressing issues of environmental impact and cost of production. The report also signals that Alberta is too dependent on one sector of the economy (energy) which puts us at considerable risk. To secure Alberta’s economic prosperity will require thinking about Alberta’s place in Canada and the world. Alberta is uniquely positioned to evaluate options to transition from the current energy economy to a lower carbon economy over time. This will require developing current energy resources wisely and responsibly while moving to develop renewable and alternative energy resources. This transition would take several decades and require thoughtful strategy development and implementation.

STRENGTHEN THE DEMAND SIDE FOR ENERGY CONSERVATION AND EFFICIENCY

Canadians are some of the world’s largest energy users per capita and the majority of CO₂ emissions in Canada come from energy consuming activities rather than from production or transmission. Encouraging reductions in demand side emissions are an important aspect of the climate change policy discussion. Implementing smart electrical metering and grids; retrofit/renovation programs; public transportation infrastructure; smart urban planning and public education programming along with efficient carbon price signals impact energy consumption behaviour.

MAINTAIN A SUSTAINABLE FUNDING MODEL

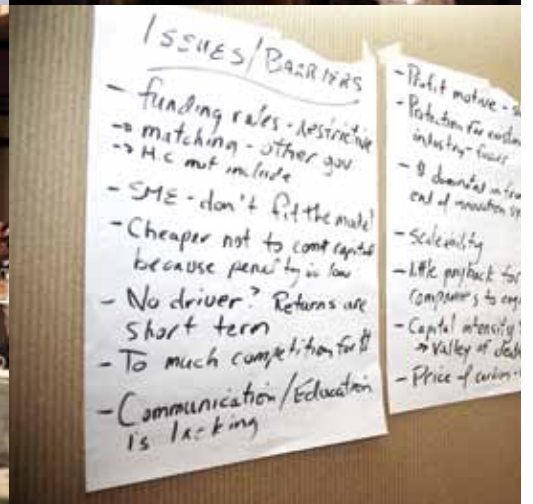
While the CCEMC fulfills an important role investing in projects that reduce emissions reductions and better position Alberta to respond to climate change, the financial resources required to achieve Alberta’s emission reduction targets pale when compared to the size of the challenge. Maintaining a sustainable funding model is seen as a key means by which Alberta can meet the climate change challenge. There is also the opportunity to strengthen working relationships within the investment community to encourage participation, achieve greater funding leverage and accelerate the application of new technologies.

DEVELOP A COMPREHENSIVE, COORDINATED CLIMATE CHANGE MANAGEMENT SYSTEM

One of the key issues highlighted in the report is regarding management of carbon. Demonstrating this understanding to markets, investors and the public by taking action will improve performance and credibility. There are many climate change organizations in Alberta. The CCEMC has been a successful new entrant due in large part to the capacity and resources that have been afforded to function effectively and stimulate investment. Other organizations are also contributing to the climate change challenge. However, the collective efforts are at times confusing. Implementation is a collective responsibility and will require harmonization of all Alberta’s climate change management partners to meet the challenge. There is opportunity to revisit and rationalize supply and demand sides systematically within the context of existing and emerging challenges.

BUILD AND SUPPORT A CULTURE OF INNOVATION

The lack of creativity and entrepreneurship can impede the development of new technologies as well as integration of existing technologies. Alberta can use all available avenues to continue to build a culture of innovation. Social networks focused on generating creative ideas to specific problems; new and innovative educational programs (e.g., “beehives”); creative funding solutions; enabling infrastructure (e.g., the “plug and play” model) are all examples of innovative ideas that can be explored and ultimately implemented in supporting a culture of innovation.



- ISSUES/BARRIERS
- funding rates - restrictive
 - matching - other gov
 - H.C. not include
 - SME - don't fit the mold!
 - Cheaper not to count capital because penalty is low
 - No driver? Returns are short term
 - Too much competition for it!
 - Communication/education is lacking
 - Profit motive - a
 - Protection for existing industry - barrier
 - 0 demand in the end of innovation cycle
 - scalability
 - little payoff for competitors to copy
 - Capital intensity! -> Valley of death
 - Price of capital -

CLOSING REMARKS

BASED ON THE FEEDBACK FROM DELEGATES, THE 2011 GHG REDUCTION SUMMIT WAS A SUCCESS. SOME OF THE COMMENTS RECEIVED WERE:

“SUMMIT WAS NOT AFRAID TO CHALLENGE”

“VERY THOUGHT PROVOKING AND HANDS ON RATHER THAN JUST SIT AND LISTEN, TYPICAL CONFERENCE. WELL DONE!”

“WELL-ORGANIZED, EXCELLENT FORMAT AND PROGRAMMING. GOOD CONNECTIONS FORMED THROUGH NETWORKING.”

“EXCELLENT CALIBRE KEYNOTE SPEAKERS. FANTASTIC DIALOGUE AND SHARING DURING WORKSHOPS.”

“BROAD BASIS OF IDEAS, OPINIONS AND WILLINGNESS TO EXPAND THINKING”

“SPEAKERS WERE EXCELLENT WITH DIFFERENT IDEAS/PERSPECTIVES”



NEXT STEPS

THIS REPORT REPRESENTS A SNAPSHOT OF THE IDEAS THAT WERE DISCUSSED AT THE GHG REDUCTION SUMMIT.

SO HOW WILL IT BE USED?

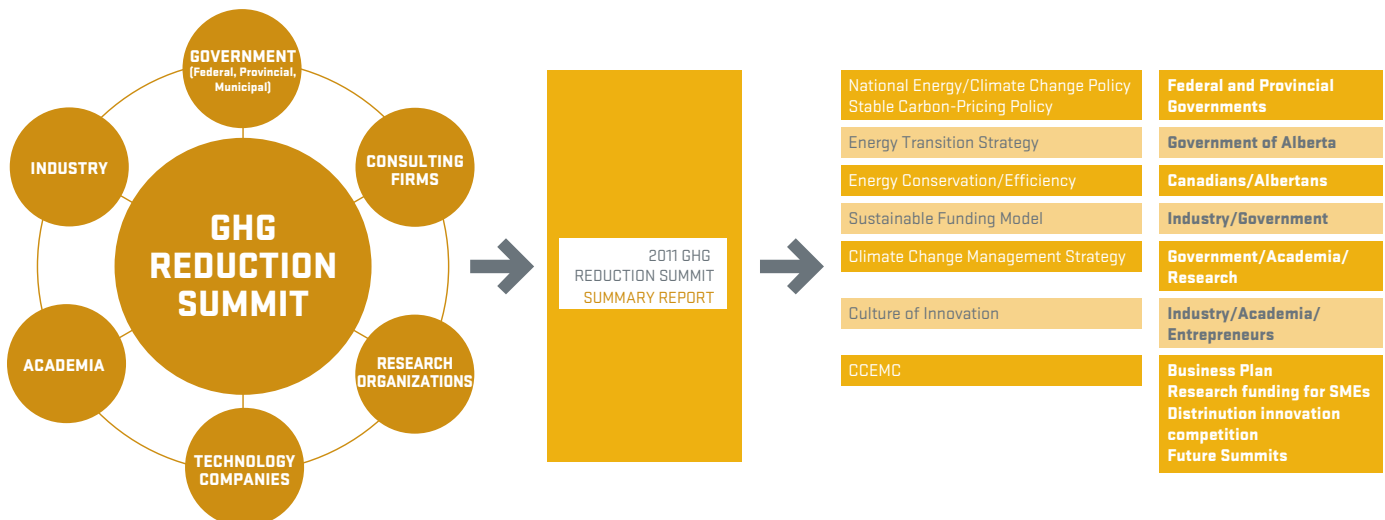
THE RECOMMENDATIONS IN THE PREVIOUS SECTION ARE BROAD AND WILL REQUIRE THE EFFORTS OF MANY DIFFERENT GROUPS TO BECOME REALITY.

- All orders of government will have a role to play in establishing new policies.
- The Government of Alberta needs to develop a clear path to the future and a plan to get there.
- Citizens need to have a greater awareness of the need for conservation and energy efficiency.
- Industry and government will have to work more closely together to create a long-term sustainable funding model.
- Government, academia and research institutions must create an environment in which new, creative ideas can flourish.

While the GHG Reduction Summit program was structured to engage delegates in the systematic issues, as the host for the Summit, the CCEMC was also the subject of much discussion. To this end, the following summarizes how the CCEMC is taking action in response to what was put forth by delegates throughout the course of the Summit.

- Recognizing the need to improve access to funding, the CCEMC recently issued a Call for Proposals directed at Small and Medium Enterprises (SME) including both start-ups (i.e. pre-revenue) and small companies. The focus of this Call for Proposals is on product and market challenges that if resolved could lead to significant GHG reductions.
- The CCEMC is currently exploring the opportunity and benefits that could result from the development, sponsorship and management of a distributed innovation competitions including: innovation prize, multi-agent problem solving, and research tournaments or competition.
- The CCEMC is committed to integrating the learning and input from the Summit into the CCEMC annual business planning activities.
- While not anticipated in the next 12 months, the CCEMC is considering options for another GHG reduction summit in the future. In the meantime, the CCEMC is committed to circulating the proceedings of the inaugural summit through this report to the delegates and maintaining a network of relationships.

THIS DIAGRAM PROVIDES A “ROADMAP” TO HELP MOVE ALBERTA TO A NEW FUTURE!



The CCEMC is responding to what it heard at the GHG Summit. Not surprisingly, many of the main suggestions that were put forward are shared with other stakeholders including government, academia, industry, entrepreneurs and citizens.

Lack of citizen

LEADERSHIP vs

GOV OR CORPORATE

How do you stimulate/catalyse
Leadership to ^{Rapidly} deploy technologies
(Gov/Corp)

to reduce GHG emissions?

- INCOME TAX ACT TO
MODIFY SOCIAL BEHAVIOUR.

Vault

APPENDIX: SPEAKER PROFILES

KEYNOTE SPEAKERS



JEREMY RIFKIN

While oil, coal, and natural gas will continue to provide a substantial portion of the world's and the European Union's energy well into the 21st century, there is a growing consensus that we are entering a twilight period where the full cost of our fossil fuel addiction is beginning to act as a drag on the world economy. Looking to the future, every government will need to explore new energy paths and establish new economic models with the goal of achieving as close to zero carbon emissions as possible.

As a futurist of extraordinary vision, Jeremy Rifkin doesn't just illuminate the complexities of global trends - he helps mould them. His 17 books on the impact of scientific and technological changes on the economy, the workforce, society and the environment, have influenced the shifting ideologies of the 21st century. The President of the Foundation on Economic Trends, Rifkin is an advisor to heads of state and government officials around the globe. He speaks frequently before government, business, labor and civic forums and has lectured at more than 200 universities in some 30 countries in the past 30 years.

Mr. Rifkin recently advised the government of France during its presidency of the European Union (July 1st to December 31st, 2008). Mr. Rifkin also served as an adviser to Chancellor Angela Merkel of Germany, Prime Minister Jose Socrates of Portugal, and Prime Minister Janez Janša of Slovenia, during their respective European Council Presidencies, on issues related to the economy, climate change, and energy security. He currently advises the European Commission, the European Parliament, and several EU heads of state, including Prime Minister Jose Luiz Rodriguez Zapatero of Spain and Chancellor Angela Merkel of Germany.

Mr. Rifkin is the founder and Chairperson of the Third Industrial Revolution Global CEO Business Roundtable, which recently entered into an informal collaboration with the European Commission to help facilitate a long-term economic plan to usher in a Third Industrial Revolution infrastructure and economy across the 27 member-states of the EU.

In addition to his involvement in international concerns, Rifkin has been an influential authority on public policy within the United States. He has testified before numerous Congressional committees and has had a hand in dictating the terms for responsible government policies on environmental, scientific and technological issues. The National Journal named Rifkin as one of 150 people in the U.S. that have the most influence in shaping federal government policy.

Rifkin is the author of a number of best-selling books including, *The End of Work*, *The Biotech Century*, *The Age of Access*, *The Hydrogen Economy*, and *The European Dream*. His latest book, *The Empathic Civilization*, was published in January 2010. Rifkin's monthly column on global issues appears in many of the world's leading newspapers and magazines, from the *Los Angeles Times* to *The Guardian*, to *Al-Ittihad* in the U.A.E. He has been a frequent guest on television, including CNN's *Crossfire*, *Face the Nation*, *The Lehrer News Hour*, *20/20*, *Larry King Live*, *Today*, and *Good Morning America*.

Mr. Rifkin has been a fellow at the Wharton School's Executive Education Program since 1994, where he lectures to CEOs and senior corporate management from around the world on new trends in science and technology and their impacts on the global economy, society and the environment.

Speaking to many of the world's leading Fortune 500 companies, his fascinating presentations are interdisciplinary in nature, and cover a wide range of topics pertaining to the challenges and opportunities of globalization in the 21st century.

APPENDIX: SPEAKER PROFILES



SEAN WISE

Prof. Sean Wise studies networks. In particular, he studies knowledge networks, those channels over which data is transmitted and from which wisdom is deduced. Strong, well-formed knowledge networks are one of the key performance drivers behind the success of world's greatest ventures, including Facebook, Google and Apple. But how does one build the right network? Is there even such a thing as the right network? And even more importantly, how can potential barriers to knowledge transfer be spotted and addressed before they arise?

Prof. Sean Wise's work on collaborative online knowledge networks has been featured twice at the annual summit of the MIT's Center for Collective Intelligence and more recently on the White House's own list of best practices when it comes to innovation challenges.

Entrepreneurial evangelist, lawyer, professor and business mentor, Sean Wise - MBA, helps make entrepreneurial dreams come true. Prof. Wise specializes in helping emerging and high growth potential organizations raise funds, turn a profit and be successful. His intense, entertaining and direct approach has earned him a loyal following of disciples who swear by his lessons and best practices for business success.

A self-confessed entrepreneur by the age of 13, Sean Wise has helped train over 3500 entrepreneurs who have now collectively raised more \$2.1B from a wide variety of investment sources.

In September 2008 his newest book was released in the US by Penguin Publishing (NYC) titled: How to Be a Business Superhero. Prof. Wise's first book, Wise Words: Lessons in Venture Capital and Entrepreneurship, is now in its second printing. Prof. Wise also writes a popular national online column on Venture Capital and Entrepreneurship for the Globe and Mail titled Wise Words, and his blogs and podcasts can be found online at: www.SeanWise.com. The Journal of Private Equity, for March 2008, features Prof. Wise's academic research on Secondary Variables that impact M&A Pricing.

Sean Wise has been dubbed the "Dragons' Keeper", for his recurring role as Online Host and Industry Advisor for CBC television's hit business reality show, Dragons' Den. Dragons' Den originated in Japan and is an international success, including in the UK on the BBC. On the show, aspiring entrepreneurs pitch their business concepts and products to a panel of business moguls who have the cash and the know-how make it happen. In addition to screening and advising contestants, Prof. Wise also led the show's community presence through his extensive blogging and speaking schedule.

Prof. Wise has teamed with a Manhattan-based private equity firm to change the way startup companies are funded. With offices in Manhattan and Toronto, Sean Wise is the Founding Partner of Vencorps.com which is reinventing the business of seed venture capital funding.

Sean Wise studied Engineering and Economics at Carleton University before earning his Law and MBA degrees from the University of Ottawa. He is the Adjunct Professor of Entrepreneurship at Ryerson University's Ted Rogers School of Management, and this fall will pursue his Ph.D in Business, focused on Collective Business Intelligence in Collaborative Online Information Networks, at the University of Glasgow. Prof. Wise sits on the Boards of several young technology companies, as well as the Hospital for Sick Children's (aka SICK KIDS) online subsidiary www.aboutkidshealth.com. He is a Law Society member and member of the Canadian Venture Capital Association.

APPENDIX: SPEAKER PROFILES

KEYNOTE SPEAKERS



JOSH LINKNER

Breakthrough solutions to difficult challenges require more than just hard work and commitment. Creativity is the driving force of change, yet one of the most underdeveloped skills in organizations of all sizes and types. In the fight to improve environmental quality, the most effective answers are often elusive and difficult to find. Josh Linkner will share proven techniques from the world's top leaders on how to drive creativity and innovation to accomplish meaningful results. You will gain a specific set of tools to drive your own creativity to its full potential.

Josh Linkner is the New York Times Bestselling author of *Disciplined Dreaming: A Proven System to Drive Breakthrough Creativity*. He is the CEO and Managing Partner of Detroit Venture Partners, a venture capital firm helping to rebuild urban areas through technology and entrepreneurship.

Josh is the Founder, Chairman and former CEO of ePrize, the largest interactive promotion agency in the world providing digital marketing services for 74 of the top 100 brands.

Prior to ePrize, Josh was the founder and CEO of three other successful technology companies. He has been named the Ernst & Young Entrepreneur of the Year, the Automation Alley CEO of the Year, and the Detroit Executive of the Year. Josh's writings are published frequently by *Fast Company* and *Forbes* and he's been featured in the *Wall Street Journal*, *Inc. Magazine*, *USA Today*, and on *CNBC*. Josh is also a professional-level jazz guitarist performing regularly in jazz clubs throughout the United States.

Most importantly, Josh is on a mission to make the world more creative.

PANEL 1: TECHNOLOGY & INNOVATION- "THE CLEAN TECH INNOVATION SYSTEM"



DR. DAVID LYNCH

Dean of Engineering, University of Alberta

David Lynch was born in Minto, New Brunswick, received a B.Sc. in Chemical Engineering from the University of New Brunswick in 1977, and completed a Ph.D. in Chemical Engineering at the University of Alberta in 1982. He was appointed to the faculty at the University of Alberta in January 1981 and has carried out research in the area of catalytic reaction engineering.

Under Dr. Lynch's leadership as Dean of Engineering since 1994, the total engineering undergraduate and graduate student enrolments have more than doubled to over 5,600 students, over 170 new engineering professors have been hired, over 40 Chair positions (endowed and industrially funded) have been established, and four new buildings have been constructed containing over one million square feet of space for engineering education and research with a fifth major structure shortly starting construction.

Dr. Lynch has provided the leadership to establish several major initiatives including the National Institute for Nanotechnology, the Helmholtz – Alberta Initiative, and the Imperial Oil – Alberta Ingenuity Centre for Oil Sands Innovation.

He has received numerous awards including the AC Rutherford Award for Excellence in Undergraduate Teaching, the APEGGA Centennial Leadership Award, and the ASTech Award for Outstanding Contribution to the Alberta Science and Technology Community.

David Lynch is a Professional Engineer in Alberta and he is a member of the Board of Directors of Micralyne Inc., the Climate Change and Emissions Management Corporation, Alberta Innovates – Energy and Environment Solutions, and the Pure North S'Energy Foundation.

APPENDIX: SPEAKER PROFILES



DAVE HASSAN
Team Lead, Environmental Technology Investments, Cenovus Energy Inc.

As Team Lead, Environmental Technology Investments, Dave is responsible for overseeing the activity of two investment funds, one dedicated to improving energy efficiency within Cenovus' operations and another directed externally to companies and research groups that are developing technologies to reduce the environmental impact of energy production and consumption.

Dave has over 30 years of oil and gas experience with an emphasis on new technology and commercial play development, primarily in oil sands and heavy oil. Prior to his current position, Dave held various leadership roles including Acting Vice-President at Weyburn for EnCana Corporation, Cenovus's predecessor company.

Co-inventor on two patents for oil sands/heavy oil, Dave directed a project that received an APEGGA Summit Award for Project Achievement. He has authored or co-authored several papers, one of which received a Canadian Heavy Oil Association award for Best Technical Paper.

Dave has experience in public consultation and regulatory process and is qualified as an expert witness in regulatory proceedings. A professional engineer, Dave holds a Bachelor of Applied Science degree in geological engineering from the University of Toronto.



JOEY HUNDERT
CEO, Innovaculture

Joey Hundert is a young executive, singly-focused on sustainability, operating out of the Edmonton area for the past 10 years. Between 2001 - 2009, Joey ran several successful consulting firms in the areas of enterprise development, venture capital, economic analysis, strategic planning, business planning, community planning and sustainable technologies. He has been involved with dozens of start-up enterprises, helping in the areas of planning, strategic oversight and sourcing capital. More recently, Joey has founded Innovaculture, an Agriculture 2.0 company specializing in indoor, sustainable food production. Further, in January of this year, Joey launched the world's first green carnival, with amusement park rides running on biofuels, wind and solar. The carnival, called "Sustainival," will be touring the US and Canada this spring and summer.



MATT MCCULLOCH
Director, Consulting Services, Pembina Institute

Matt McCulloch is Director of the Pembina Institute's Corporate Consulting Services. Matt's passion is to facilitate the forward shift of Canadian businesses' sustainability performance by integrating sustainability solutions into their strategies and operations while advancing promising clean technologies.

His experience includes leading the development of life-cycle value assessment, a leading edge sustainability decision-making tool, advising sustainability report development, facilitating sustainable innovation practices through triple-bottom-line and systems thinking, and advancing innovation as a core competency. He provides advice on developing progressive climate strategies, including becoming carbon neutral and identifying and evaluating quality GHG offset projects. A major focus for Matt is building corporate cultures of innovation and identifying public policies to more rapidly deploy innovation as a means to long term sustainability.

APPENDIX: SPEAKER PROFILES

PANEL 2: FINANCIAL AND HUMAN CAPITAL



DAVID LAWLOR
Director, Environmental Affairs,
ENMAX Corporation

Mr. Lawlor has a wide range of responsibilities and interests. His main responsibilities include: environmental policy review and advocacy; facilitating the development of and reporting on renewable energy projects; GHG protocol development and obtaining environmental approvals for new facilities for ENMAX Corporation and its subsidiaries. However, Mr. Lawlor also has a passion for and interest in renewable energy technologies and as a result was ENMAX Corporation's representative at the 2009 Solar Decathlon in Washington DC.

Mr. Lawlor serves on a number of committees and boards including: Board Member, Clean Air Strategic Alliance (CASA), Chair of the Calgary Chamber of Commerce Environmental Committee, Chair of Canadian Electricity Association Sustainable Electricity Program Steering Committee.

Mr. Lawlor holds a Bachelors degree from the University of Saskatchewan and Masters of Environmental Studies (MES) from Dalhousie University.



PAULA MCGARRIGLE
Managing Director, SOLAS Energy
Consulting Inc.

Ms. McGarrigle has focused the majority of her 20-year career on the deployment of renewable energy technology in North America. She is a leader in climate change and renewable energy policy within the Canadian renewable energy community, ENGOs, policy makers, and consultants. Her significant experience in project development, business development and organizational strategic planning within the renewable energy sector has resulted in developments totalling over 1,100 MW. Ms. McGarrigle was formerly the head of Shell Canada's Wind Energy Department, and Director of Business Development for Suncor Energy's Alternative and Renewable Energy department. Prior to entering the renewable energy sector, she worked in the oil, gas, and chemicals industries doing engineering, business and international consulting. Ms. McGarrigle's academic background includes two undergraduate degrees from the University of Alberta, Canada; Bachelor of Science in Biology and Chemistry and a Bachelor of Science in Chemical Engineering. Ms. McGarrigle also holds an MBA in Finance from Queen's University, Canada.



JAMES CHEPYHA
Vice President of Investments -
Alberta, Chrysalix

James joined Chrysalix in 2010, bringing 20 years of corporate finance experience in the energy industry with him. Most recently, he was responsible for establishing and managing Goldman Sachs' principal investing in the Canadian energy sector and prior to that, he built and managed Union Bank of California's Canadian operations, including portfolio development.

James has worked for both domestic and foreign financial institutions in Canada with a focus on corporate, debt, equity, and structured finance. He now heads Chrysalix's Alberta investment focus contributing to the firm's mission to help "clean up" traditional hydrocarbon methods.

James has a Bachelor of Commerce (with Honours) from the University of Saskatchewan and an MBA from the Schulich School of Business at York University in Toronto.

APPENDIX: SPEAKER PROFILES

PANEL 3: PUBLIC POLICY



DAVID BIETTE

Director Canada Institute, Woodrow Wilson International Center for Scholars

David Biette is director of the Canada Institute, an integral program of the Woodrow Wilson International Center for Scholars in Washington, D.C. The Center is the living, national memorial to President Wilson established by Congress in 1968 – a neutral forum for free, open, and informed dialogue in a nonpartisan setting.

The Canada Institute works to increase awareness and knowledge about Canada and U.S.-Canadian relations among U.S. policymakers and opinion leaders.

From 1992 to 2001, Biette was executive director of the Association for Canadian Studies in the United States; he served as a political-economic officer at the Canadian Consulate General in New York City from 1986 to 1992, where he was a policy analyst for energy, environment, political, native affairs, and transportation portfolios.

He has an M.A. in international relations from the Johns Hopkins School of Advanced International Studies in Washington, and a B.A. from Bowdoin College in Maine.



DR. ROGER GIBBINS

President and CEO, Canada West Foundation

Roger Gibbins is President and CEO of the Canada West Foundation, a public policy research group based in Calgary and operating across the four western provinces. Prior to assuming the leadership of the Canada West Foundation in 1998, Roger was a professor of political science at the University of Calgary, where he started his academic career in 1973 and served as department head from 1987 to 1996. An ongoing appointment as a Faculty Professor of Political Science continues his association with the University of Calgary.

Roger has authored, co-authored or edited 22 books and more than 140 articles and book chapters, most dealing with western Canadian themes and issues. In 1998 he was elected as a Fellow of the Royal Society of Canada, and was the President of the Canadian Political Science Association from 1999 to 2000. In 2007, he was awarded the Alberta Lieutenant Governor's Award for Exceptional Achievement, Distinctive Leadership and Outstanding Contribution to Public Administration.

Roger was born in Prince George, British Columbia, and received his undergraduate degree from UBC and his doctorate in political science from Stanford University in California.

APPENDIX: SPEAKER PROFILES

PANEL 3: PUBLIC POLICY



DR. ROBERT PAGE

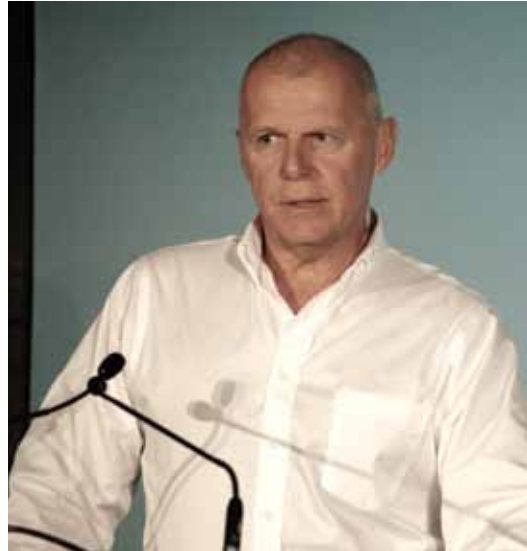
Chair, Government of Canada's National Round Table on the Environment and the Economy

Dr. Page is known nationally and internationally for his work on energy and the environment in areas such as climate change, emissions trading, biodiversity and protected spaces, environmental impact assessment, and policy and regulation.

Dr. Page was Chair of the Government of Canada's National Round Table on the Environment and the Economy (NRTEE) and Chair of the management committee for the International Standards Organization 14000 series of international environmental standards, which develops standards for adoption by industry and government (Geneva). He is also the TransAlta Professor of Environmental Management and Sustainability in the Institute for Sustainable Energy, at the University of Calgary, and is a member of the Board of Directors for ENMAX Corp.

From 1997 to 2007, Dr. Page was the Vice-President of Sustainable Development at TransAlta Corporation. Prior to joining TransAlta in 1997, he spent 25 years in consulting, academic teaching and research, including as Dean of Environmental Design, University of Calgary.

Dr. Page has also served as Past Chair of the Board of the International Emissions Trading Association (Geneva) and is a former member of the Business Environment Leadership Council of the Pew Center on Global Climate Change. (Washington, D.C.).



WISHART ROBSON

Climate Change Advisor to the President and CEO, Nexen Inc.

Wishart has spent the past 40 years working on the safety and environmental aspects of a wide range of oil and gas exploration, production and transportation projects in Canada and over 50 international locations. Currently Wishart is the Climate Change Advisor to the President and CEO of Nexen. In this capacity he provides strategic advice to the Board and senior executives respecting the many issues that meet at the intersection of climate and energy policy. He works with the operating divisions to assist in their understanding of proposed/new regulations and compliance options and has been active in the International Emissions Trading Association, the Integrated CO₂ Network and various national and international oil and gas associations. He recently served a three year term on the National Roundtable on the Environment and the Economy and is a frequent speaker on climate/energy policy, energy transitions and technology.



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