

# Creativity & Convergence



March 24<sup>th</sup>  
Engineering innovation  
Edmonton, Alberta

November 30<sup>th</sup>  
Creating the new economy  
Calgary, Alberta



## CONFERENCE PROCEEDINGS – Edmonton and Calgary

*Time for creativity and convergence in creating the new Alberta!*

**Alberta is weathering a crude shock at all levels.** The recent rapid decline in the price of oil has shocked the Alberta economy:

- Shocked into getting spending under control - to live within its means with government re-jigging taxes, reminding Albertans that public services are not free
- Shocked into saving a portion of revenue – for muting future shocks
- Shocked into using the D word - "Diversification": Governments - acknowledging that public services cannot rely so heavily on a single source of revenue, Corporations – acknowledging that export markets need to be developed, and Both – that the future cannot be ignored just because the present is prosperous
- Shocked into financing economic diversification to avoid future shocks with the Alberta Government referencing: value-added manufacturing, climate change, aboriginals, seniors, and education.

**Policy options for diversification.** Clarity is needed on what role government expects to play in exercising "Diversification". Economic shocks are more and more prevalent given - with no end in sight, the rapid emergence of new technologies, climate change, and globalization.

**1. Policy options.** There are several:

- **Passive** – government has a poor track record in economic development, so let the market take the risk and decide what is fitting for Alberta. Use savings to mute future shocks.
- **Active - Non-financial** - introduce tax and regulatory measures to stimulate innovation, limiting government's financial risk. Savings are also used to mute declining revenue and spending shocks with some savings dedicated to infrastructure spending to accommodate rising unemployment associated with reduced economic activity.
- **Active - Financial** – actively invest for advancing the commercialization of emerging technologies, accepting that like it or not government is held responsible for economic

development. Some savings are dedicated to on-going economic development for anticipating rapid economic transitions.

## 2. Preferred policy option. Diversification is too important to be based on ideology.

- **Shared responsibility.** Government is no better or worse than markets in forecasting the future. The future is a joint responsibility and not without risk: Governments - as the stewards of public resources, royalties, and taxes are held responsible by the public – with some corporate involvement, for a sustainable economy. Corporations are also held responsible by the market – with some regulatory control by government, for a sustainable economy. Managing the future economy is a 3-way partnership here between government, business and people.
- **Balanced growth.** Economies that are dependent on oil revenues are among the most challenging to diversify. Diversification means more than diversity, the objective is resilience – to avoid or mute shock. Successful management of diversification requires: vision, competition and regulatory controls, a supportive public and political alignment, and mature institutions.

**Principles for economic diversification.** Those at the conference investigated several issues with the following principles derived from their deliberations for advancing innovation and contributing to Alberta's economic diversification.

- **Accountability.** A serious commitment to diversification warrants an assessment index for guiding investment and independently reporting to the public on Alberta's capacity to weather crude shocks
- **Public Policy.** Development of diversification policies requires mature, independent institutions, institutions possessing a future perspective and protected from politicization
- **Investment and Procurement.** Innovation is essential for diversification and requires: angel networks for accumulating and allocating domestic capital and procurement practices that target Alberta-made solutions
- **Service Competition.** Competition is essential for managing costs and quality. Subject public services to competition through the periodic readiness review for their contracting-out or privatization and address the explosive growth and fragmentation of NGOs many of which operate on government funding
- **Learning and Health.** Both are viewed as essential public services under increasing pressure to change. Education - commit to an educational system that prepares students to live in Alberta, Canada and learn to adapt in a global society of on-going change. Health - Alberta's health industry - and associated services, must be responsive to changing needs, the critical role of management in balancing supply and demand, and the increasing role of emerging technologies in personalized medicine

- **Climate Change and Energy Alternatives.** The public expects energy and environment policy to be integrated warranting an aggressive assessment of energy alternatives for ensuring that Alberta - and Canada, are not bankrupt in a post-carbon economy
- **Value-added Manufacturing.** As Alberta's economy matures, significant opportunities are emerging for manufacturing and export of Alberta's carbon-rich assets in agriculture, energy and forestry plus information and knowledge management
- **Infrastructure.** Alberta's ongoing development of contemporary telecommunications and transportation systems are critical for supporting the delivery of Alberta's goods and services to markets around the world.

**Resolutions for advancing innovation and diversification.** The premise of the Conferences was that diversification of Alberta's economy is needed to protect the province from the extreme impact of rapid declines in the price of oil. Discussions in Edmonton March 24<sup>th</sup> among 170 attendees and Calgary November 30<sup>th</sup> with 140 attendees led to the following resolutions:

## CALGARY RESOLUTIONS

### I. A RESILIENT ECONOMY

The Alberta economy is vulnerable to crude shocks due to forces beyond its control. Measures to diversify and increase the province's economic resilience have largely failed. The province needs to pivot the development of its economy in advance of a global transition to post-carbon alternatives. This will require leadership, public engagement and communications, financing and enterprise, new networks and international relationships.

#### A. An Informed, Engaged Public

1. Extend the province-wide dialogue about economic diversification and the province's need for a more resilient economy
2. Strengthen the contribution of Alberta's education system for improving Alberta's socio-economic resilience and the quality of life - preparing students for an ever-changing environment
3. Promote the formation of On-line collaborative networks on topics of economic relevance; introduce the On-line U-Who application

#### B. Financing A New Economy

4. Public financial support should target scalable ventures
5. Focus on developing and exporting Alberta "services" - the knowledge economy
6. Expand the Alberta legacy fund (Alberta Heritage Fund) to include financing dedicated to a more resilient economy

#### C. Preparing the Community

7. Develop local angel networks for co-operative financing of local community enterprise
8. Encourage the formation of themed Regional clusters (Innovation Zones), calling for collaboration, value-added processing of Alberta's commodities and a shared focus among municipalities for economic development

9. Promote emerging opportunities in cleantech for local economies inspired by concerns about climate change

D. Health - Essential to the Economy

10. Capitalize on Alberta's centralized health system as an asset for health services and economic diversification

E. Accountability - Never Again

11. Develop better ways of assessing and monitoring the status of Alberta's economic resilience; further development of ABCtech's economic resilience index

## II. LEADERSHIP IN INNOVATION

Innovation is essential for competing in an ever-changing environment. The province more than ever needs to support innovation at all levels. A "new Alberta", requires leadership for exploring and engaging: government, people, innovators, companies, and entrepreneurs; they all count.

Leadership is essential for engaging and mobilizing communities, promoting entrepreneurship and establishing the processes to support innovation. There are many stories of successful ventures and many more of failures. Survival and growth are a continuous learning venture.

Leadership calls for 1) focused communications and 2) inspiring and experienced mentors for revealing the possibilities.

A. Future Leaders in Innovation

12. Establish a "creativity portfolio" recognizing young leaders who think ahead, inspire others and are prepared to challenge the status quo
13. Partner with Makerspace, Intervivos, MentorUP, and start-up agencies that promote, recognize and develop entrepreneurs
14. Ask Alberta's 22,500 NGOs how they might help in "Creating a new Alberta" and identify opportunities for inter-agency collaboration
15. Host a pan-Alberta series of events for the public and school children in designing "the new Alberta!"

B. A Creative Alberta

16. Engage and promote the new Peter Lougheed Institute, Alberta Science, and the Telus World of Science among others as a network promoting leadership in innovation
17. Establish a multi-media program series for identifying and broadcasting stories of Alberta innovation and innovators, leaders and change agents; revitalize ABCtech Media Productions and its program, "The Next Question"
18. Pilot the introduction of procurement options that call for creative solutions and stir Alberta enterprise

C. New Ideas. New Networks

19. Encourage interdisciplinary approaches to creativity by co-hosting events that engage interests in arts and science, humanities and technology
20. Develop multi-disciplinary networks and create advisories for the design and judging of pan-Alberta contests including the search for human interest stories

21. Create incentives for engaging non-academic and academic interests in research endeavors bridging community and research

#### D. Connective Networks

22. Encourage alternative transportation options by piloting automated auto transportation; assess the merit of an Edmonton-Jasper route

23. Municipalities should adopt intelligent traffic control systems - a neural-net based sensor system, for significantly improving high-density traffic flow

24. Commit to P3 financing for the development of high-speed rail, economic corridors; assess the merit of linking Edmonton-Prince Rupert and Alberta-Mexico for cargo AND Edmonton-Calgary starting with Edmonton-EIA for passenger transport

## II. ENERGY TRANSITIONS

Carbon commodities in energy, agriculture and forestry have been at the heart of Alberta's economy and the source of sustained prosperity for half a century. But change is in the air as new technologies, market forces and regulatory measures force a transition away from a dependency on carbon commodity markets to value-added processing and the search for clean-energy alternatives.

#### A. Financing Energy Transitions

25. Ensure technology assessments include a triple-E assessment of economic, energy and environmental risk/reward opportunities

26. Give priority to R&D and emerging technologies investment options that: solve big problems, have big multi- $\$$ B global markets, and constitute an "early adopter" opportunity for Alberta

27. Revisit funding options for ensuring: continuity throughout the innovation channel and retention of successful enterprises; stratify funding targets by markets/sectors

28. Draw on the Balancing Pool of  $\$$ 1-2B for expanding CCMC and investing in transformative technologies, even if they are disruptive

29. Governments must be timely in making transitions so as not to leave the market in limbo, impeding investment and damaging Alberta industry and international markets

#### B. Alternative Energies

30. Anticipate and expedite the short-term transition to increased use of renewables

31. Wind down what does not fit Alberta's energy future: projects, programs and regulatory mechanisms

32. Introduce a Carbon Tax per joule of energy

33. Divert a portion of Alberta's Carbon Tax to renewable research initiatives and market development

34. Recognize that policies and regulations must be considered that encourage changes in personal responsibility for environmental abuse

35. Set the conditions at the outset for terminating "transitional" subsidies employed for expediting the formation of new energy, agriculture and forestry markets

#### C. Increased Energy Efficiency

36. Introduce medium term solutions for improving energy efficiency: develop virtual net-metering, eliminate regulatory barriers, allow for multi-site power sharing, enable micro-generation producers, complete FOTS to terminate at end user point of use

37. Plan and develop fully functional smart grids and re-generation opportunities

38. Encourage the adoption of distributed power - small power generation facilities

- 39. Utilities should introduce time-of-day billing
- 40. Introduce E-gauge technology- the “gamification of power consumption”

D. The Future of Energy

- 41. Adopt and develop fusion energy as a national project, establishing Alberta and Canada as a global leader contributing to the global transition to a post-carbon, fusion energy future
- 42. The Alberta government should fund a Fusion Energy Directorate to plan for fusion energy technology development as a strategic component of Alberta's sustainable economy
- 43. Investigate the socio-economic impact and the anticipated adoption rates of fusion as the primary source of base-load, commercial power
- 44. Offer to locate a fusion demonstration facility in Alberta co-funded by a North American consortium of the US, Canada, and Alberta and/or including other international contributors.

## EDMONTON RESOLUTIONS

- A. Monitoring Diversification.** Measuring objectives is evidence of a commitment to their development
  - a. Developing criteria and a score-card for monitoring progress and conducting comparative analyses of diversification and assessing Alberta's capacity to weather future shocks
  - b. Developing metrics for monitoring the performance of economic development agencies and incubators as investments in Alberta’s economic diversification
- B. Public Procurement.** Balancing free trade and economic development interests
  - a. Encouraging public sector organization leaders to support increased procurement, flexibility and innovation for improved business value
  - b. Expecting governments to identify *needs* and be open to innovative solutions (vs. systems based) for service delivery = \*open procurement\*
  - c. Helping governments scan the horizon to close the credibility gap
  - d. Subjecting public services to a periodic review of their readiness for competition
- C. Value-added Manufacturing.** Capitalizing on Alberta’s strategic assets
  - a. Collaboration. Integrated development of Alberta agriculture and forestry, bio-tech and life sciences
    - i. Agriculture & Food Processing. Safe, secure supply and commercial opportunities in food processing
      - 1. Educating the industry about emerging opportunities in analytics for improved productivity, value-added opportunities and decision making in the allocation of resources
    - ii. Forestry & Wood Products. Identifying measures for value-added manufacturing employing fibre, bio-materials and reclamation technologies
    - iii. BioTech & Life Sciences. Capitalizing on Alberta having a single, integrated health services system
      - 1. Establishing Alberta as a leader in personalized medicine including the use of genomics, cell therapies and medical devices

- 2. Educating the industry about emerging opportunities in analytics for improved service delivery, commercial applications and decision making in the allocation of resources
  - b. Communications. Engaging the general public and increasing their education about the industry, the regulations and the threats/opportunities
  - c. Trust Building. Serving as an honest broker in a knowledge-based economy
    - i. Presenting the public with timely and accurate information, independent of industry and government
    - ii. Governing the accuracy and integrity of data and information
- D. Climate Change.** The merging of energy and environmental policies and practices
  - a. Convergence. Promoting Alberta/Canada leadership in addressing climate change, integrating energy and environmental policy and supporting the development of cleanTech and energy alternatives for a post-carbon economy
  - b. Commercialization. Recognizing the convergence of energy and environmental sensitivities as a commercial opportunity, e.g., environmental monitoring, for value-added manufacturing
  - c. Reality. Monitoring the gap between market rhetoric about climate change and purchasing practices
- E. Alternative Energies.** Prospects for a greener, post-carbon economy
  - a. Concentration. Establishing a centre for the commercialization of alternative energy technologies
  - b. Exploration. Creating a focus group to explore the commercialization of emerging alternative energies.
    - i. 3<sup>rd</sup> generation biofuels, e.g. Algae:
      - 1. Energy and nutrients
      - 2. Carbon capture and remediation of hydrocarbons
      - 3. Grid Energy Storage
    - ii. Fuel cells
      - 1. Batteries
      - 2. Thermal Storage
      - 3. Smart Grid/buildings
  - c. Leadership. Securing funding for establishing the Alberta Fusion energy Directorate
    - i. Creating an Advocacy Committee to bring fusion in general and laser fusion specifically to Alberta
    - ii. Developing a strategy to incubate fusion related technologies:
      - 1. Photonics [lasers, energy, healthcare, instrumentation]
      - 2. Materials [nanotech, additive manufacturing]
      - 3. Analytics [3D modeling and AI]
    - iii. Developing a unique position for establishing Alberta as the industry's international fusion knowledge-hub, by:
      - 1. Embedding Alberta researchers in global programs
      - 2. Hosting regular gatherings of global fusion experts in Edmonton

- iv. Advocating for hosting - post-ignition, an international fusion energy demonstration plant in Alberta

**F. Infrastructure.** Employing technologies for ensuring safe, accessible and economic: tele-communications, transportation and education

- a. Electrifying Transportation. Ensuring Alberta has a contemporary transportation and distribution system
  - i. Safe at any speed. Automating speedy cargo and passenger transit: driving, drones and rail transit
  - ii. Anything on-time. Educating industry about the application of analytics in logistics for the distribution of commodities and value-added by-products
- b. Modernizing Telecommunications. Ensuring all Alberta has the required connectivity and capacity for information and knowledge transfer
  - i. Analytics Centre. Developing an Analytics Centre for advancing the development of analytics applications
  - ii. Management. Promoting ethics and data analytics for automating decision making
  - iii. Service Delivery. Exploring the relevance of advanced analytics for personalizing professional : healthcare, learning and education, municipal services, transportation, and access to knowledge
- c. Transforming Education. Preparing for change in: how and when, where and why we learn
  - i. Preparing students to live in Alberta, Canada and learn to adapt in a global society of on-going change
  - ii. Recognizing that educational levels and ready access to information are transforming: the nature of work, the requirement for rigid classification levels and the relevance of relational skills
  - iii. Improving the allocation of labour, skills development and competency access
- d. Virtual/ Augmented Reality. Developing applications with commercial relevance
  - i. Authenticity – getting beyond gimmicky
  - ii. Natural/socially easy to engage/effective and practical use of technology
  - iii. Applying augmented reality for aiding in skills transfer
  - iv. Educating people to think in context

**G. Innovation.** Clustering technologies and partnerships, for business retention and attraction

- a. Planning. Developing multiple roadmaps of possible and preferable futures for Alberta, drawing on global expertise for establishing Alberta’s future innovation platforms
  - i. Support productivity established industries with linkages to Alberta Innovations
  - ii. Develop test facilities for expediting integration
- b. Demonstrating. Establishing the Edmonton Region as a demonstration Innovation Zone for capturing IP and the associated commercial benefits, featuring collaboration among municipalities each retaining their distinct identity



- i. Focusing the Region's innovation ecosystem on the development of technologies that are smart, sustainable, and resilient
- ii. Completing an Edmonton Region Technology Inventory - what the Region offers
- iii. Securing and developing existing global contacts (networks) by:
  - 1. Hosting, visiting, establishing virtual facilities in : Brainport, NE; Routes de Laser, FR; the USA and Asia
  - 2. Assembling and communicating compelling stories of what success looks like - telling the story in a compelling way
- c. Improving. Develop a culture of continuous improvement
  - i. Establishing an entrepreneurial institute to leverage best practices and attract the global best practices
  - ii. Developing an open and transparent entrepreneur-centric map of program and services designed to help in starting, growing and expanding entrepreneurial venture
  - iii. Encourage Tech Clubs and the involvement of local resources, e.g., libraries, for inspiring and supporting innovation in youth

**H. Funding Innovation.** Growing Alberta's GDP and increasing its resilience by adopting innovation and invention regardless of cache

- a. Learning. Extending ABCtech's 2014 consultations and actions around innovation and access to capital
  - i. Facilitating a discussion of roles and responsibilities of the innovation ecosystem – engaging Albertans, identifying brokers and being realistic
- b. Designing. Establishing a task force(s) for developing a suite of innovation funding incentives around:
  - i. Tax credits
  - ii. Procurement
  - iii. Program administration methods
- c. Improving. Leveraging process-innovation in government grant programs:
  - i. Clarifying the roles and responsibilities in the innovation ecosystem
  - ii. Simplifying the number and focus of grant programs and expedite the applications processes
- d. Reforming. Develop capital markets fitting for Alberta
  - i. Establishing and marketing an 'Alberta First' RRSP - a TSFA approved mutual fund, dedicated to investment in technology and innovation
  - ii. Developing a direct P2P (internet-based) investment platform for allowing Albertan's to invest directly in vetted technology opportunities, growing and diversifying Alberta's economy

**I. Angel Financing.** Developing angel networks for financing early stage enterprise

- a. Act local. Promoting local enterprise and angel financing for attracting domestic capital
- b. Think future. Sustaining innovation including development of measures for directing wealth transfer to sustain economic development and anticipating wealth transfer

- c. Engage. Support and scale programs that leverage skills development:
  - i. Incubators
  - ii. Mentorship for entrepreneurs
  - iii. Investor education

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