

PROCEEDINGS

Creativity & Convergence Conference

March 24th, 2015 – Edmonton

Engineering innovation, blending arts and technology



Diversifying Alberta's economy through technology



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.

Our March 24th Creativity & Convergence Conference was attended by over 170 Alberta researchers and entrepreneurs, public policy influencers and small businesses – see Appendix.

1. 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.

2. Resolutions for advancing innovation and diversification. The premise of the Conference 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 led to the following resolutions:

- **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
- **Public Procurement.** Balancing free trade and economic development interests
 - c) Encouraging public sector organization leaders to support increased procurement, flexibility and innovation for improved business value
 - d) Expecting governments to identify *needs* and be open to innovative solutions (vs. systems based) for service delivery = *open procurement*
 - e) Helping governments scan the horizon to close the credibility gap
 - f) Subjecting public services to a periodic review of their readiness for competition
- **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
 - **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
 - **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) 3rd 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
- **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
- **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
- **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
- **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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Appendix

CONFERENCE REGISTRATIONS (*Unable to attend)

1	Jim	Ackney	Amsoil Dealer
2	Randal	Adcock	Western Diversification
3	Alexandra	Anderson	Seniors Downsizing Services
4	Jim	Andrais	City of Edmonton
5	Sarah	Batchelor	City of St. Albert
6	Patrick	Binns	Abinsi Consulting
7	Allan	Bly	Vitel Consulting
8	Guy	Boston	City of St. Albert
9	Mark	Brostrom	City of Edmonton
10	Vadim	Bulitko	University of Alberta
11	Greg	Burghart	Arrow Engineering
12	Alicia	Cafferata-Arnett	Red Deer College
13	Greg	Campbell	Spieker Point
14	Lan	Chan-Marples	Channal Consulting
15	Victor	Cheng	Biorefining Conversions Network
16	Brant	Coghlan	University of Alberta
17	Pierre	Cormier	Clear Think Inc & CMC - Edmonton
18	Dan	Corns	Magnovate
19	Ven	Cote	AMCC Capital
20	*David	Cox	BioAlberta
21	Barbara	de Visser	Dutch Business Club
22	Jasmine	Del Fierro	University of Alberta
23	Randy	Duguay	TechFLi
24	Brett	Duncan	Finney Taylor
25	Craig	Eastman	EFC-CORP
26	Leroy	Ehnes	Chandos Construction
27	Leila	El-Khatib	Public Works & Gov' Services Canada
28	Jason	Ennis	IMPACT Consulting
29	Jody	Fath	NAIT
30	Robert	Fedosejevs	AB/Canadian Fusion Energy Program
31	Michael	Flood	BioAlberta
32	Grant	Gabert	University of Alberta
33	Solange	Gagnebin	High Level Analytics Inc.
34	Marie	Gervais	Shift Management Inc
35	Kashmir	Gill	National Research Council (NRC)
36	Paul	Godsmark	Cdn Automated Vehicles Centre of Excellence
37	Kannan	Govindarajan	Athabasca University
38	Loan	Gowers	BMO Nesbitt Burns
39	Peter	Gowers	Cogent Investigations & Consulting Inc.
40	Russ	Graff	Town of Stony Plain
41	David	Green	CDML Consulting
42	Marley	Groeneveld	Marley Groeneveld
43	Dunqing	Gu	AMCC Capital
44	Keith	Gylander	TRTech
45	Douglas	Hallett	ISL Engineering

46	Allan	Hamernick	Hamernick and Associates Ltd.
47	Terry	Hampson	H&H Metal Products Inc
48	David	Hancock	Dentons Canada LLP
49	Jay	Haugen	Dentons Canada LLP
50	Philip	Hayford	Edmonton Chamber of Commerce
51	Randy	Heaps	ISL Engineering and Land Services
52	Ken	Hein	VCIO Consulting Group
53	Michele	Heken	Alpha Global Experts
54	Karen	Hibbs	Portage College
55	Michael	Hollinshead	Facing the Future
56	Darryl	Humphrey	D.G. Humphrey and Associates
57	Doran	Ingalls	Parlee McLaws LLP
58	Cindy	Ives	Athabasca University
59	Piyush	Jain	High Level Analytics Inc.
60	Rajesh	Jaiswal	TEC Edmonton
61	Rahim	Jamani	Rahim Jamani
62	Ratka	Janjic	MacEwan University
63	Peter	Jarmics	Angry Coders
64	Karen	Johnson	Town of Devon
65	John	Johnstone	Public Works & Gov' Services Canada
66	Don	Juzwishin	Alberta Health Services
67	Wayne	Karpoff	Willowglen Systems
68	Peter	Kelly	Biosphere Resources Ltd
69	Peyman Azad	Khaneghah	University of Alberta
70	Navneet	Khinda	Student's Union - University of Alberta
71	Perry	Kinkaide	Alberta Council of Technologies
72	Brian	Kryska	Innovation Management Group
73	Michael	Kryton	Michael Kryton
74	Bryanna	Kumpula	Agriculture & Food Council of Alberta
75	Brittany	Kustra	No. AB Business Incubator (NABI)
76	Whatley	Lach	Metal Boss Technologies
77	Dan	Lajeunesse	City of Edmonton
78	Brent	Lakeman	Alberta Innovates - Technology Futures
79	Al	Lalany	University of Alberta
80	Heather	LaRose	TRTech
81	Lauri	Latour	Public Works & Gov' Services Canada
82	Hubert	Lau	AMCC Capital
83	Chris	Lerohl	TEC Edmonton
84	*Darryl	Lesiuk	TC-Partnership
85	Geoff	Li	Oliver Westall and Geoff Li
86	Nicole	Liesner	City of St. Albert
87	Stephen	Lindop	Town of Devon
88	Yang	Liu	University of Alberta
89	Craig	Loewen	Innovation & Advanced Education
90	Yang	Lui	University of Alberta
91	Keith	MacMillan	Infamous Enterprises Ltd.
92	Ron	Maine	Maine Consultants
93	Linda	Mak	Money Mentors

94	Lois	Macklin	Alberta Health Services
95	Tom	Mansfield	AB Innovation & Advanced Education
96	Keelan	Marples	No. Edmonton Business Association
97	Lisa	Marquardson	NSERC - Prairies
98	Derek	Marriot	CMC Canada: Alberta
99	Gord	Marriott	Gord Marriott Communications
100	Rus	Matichuk	Summex
101	Craig	McDougall	Dentons Canada LLP
102	Greg	McIntyre	CMC Canada
103	Heather	McRae	MacEwan University
104	Sean	McRitchie	City of St. Albert
105	Lauren	Mercier	University of Alberta
106	*Arlene	Merling	Arlene Merling
107	Shirley	Mitchell	Luau Data/ Dr. B. Lycka
108	Bill	Moulton	Service Alberta
109	Kabir	Nadkarni	University of Alberta
110	John	Nielsen	WSP Canada
111	Robbie	Nissen	Lambert Intellectual Property Law
112	Tom	Ogaranko	Tessellate Inc.
113	Kelly	O'Neill	Athabasca University
114	Harold	Pacheco	City of St. Albert
115	Connie	Parenteau	President - APEGA
116	Clare	Paulson	Better Leaders
117	Domenic	Pedulla	Cdn Food Safety Consulting Group
118	Katelyn	Petersen	German-Cdn Centre Innov & Research
119	Michael	Pinkowski	TechFLi
120	Natalie	Potvin	University of Alberta
121	Gail	Powley	Willowglen Systems & BESTT
122	Jean-Paul	Provost	NAIT
123	Margaret	Puplampu	Western Economic Development
124	John	Putters	Visonstate
125	Nicole	Ralph	Edmonton Chamber of Commerce
126	Alex	Ramirez-Serrano	4FrontRobotics
127	Michael	Rawson Clark	Clark Ecoscience and Sustainability
128	Amir	Reshef	Dentons Canada LLP
129	Justin	Riemer	AB Innovation & Advanced Education
130	Dawn	Ringrose	Organizational Excellence Specialists
131	John	Robbins	University of Alberta
132	Klaas	Rodenburg	Alberta Council of Technologies
133	Katherine	Rogers	University of Alberta
134	Sol	Rolingher	Duncan & Craig
135	Eriin	Rothwell	Meyers Norris Penny (MNP)
136	Heidi	Schurman	Abinsi Consulting
137	David	Schuster	VHS Ventures
138	Dar	Schwanbeck	No. AB Business Incubator (NABI)
139	Ed	Schykulski	Town of Devon
140	Don	Scott	AB Innovation & Advanced Education
141	Amy	Scott	Dentons Canada LLP

142	Laura	Severage	University of Alberta - APRIL
143	Conrad	Siegers	Conrad Siegers
144	Lorenz	Sigurdson	University of Alberta
145	Chad	Smith	Hybrid Forge
146	Chris	Smith	Visonstate
147	Michael	Smith	Intralink Solutions
148	Brian	Stewart	Campus Innovation
149	*Paul	Stinson	BioAlberta
150	Glenn	Stowkowy	Stantec
151	Alexander	Suen	University of Alberta
152	Alyssa	Tintinaglia	No. AB Business Incubator (NABI)
153	Steven	Trembath	4FrontRobotics
154	Ryan	Tucker	MetalBoss Technologies
155	Hussam	Tungekar	Edmonton Chamber of Commerce
156	Gwynne	Turner	Edmonton Chamber of Commerce
157	Peter	Unwin	Quantiam Technologies Inc
158	Wim	van Beek	Mammoet
159	Dave	Walbillig	Quantiam Technologies Inc
160	Wang	Wang	University of Alberta
161	Peter	Wardell	Chandos Construction
162	Oliver	Westall	Oliver Westall and Geoff Li
163	John	White	Planet Telecom
164	Terry	Whitehead	Alexander Whitehead Exec Search
165	Kristina	Williams	Alberta Enterprise Coporation
166	Kevin	Wong	Stonecracker Scientific Law
167	Jay	Woosee	Alberta Innovates
168	Colten	Yamagishi	Nimbus Creative
169	Junfeng	Yang	Athabasca University
170	Chris	Yip	Light Sculpture Design
171	Adam	Zawadiuk	NAIT
172	Sandie	Zhao	Sandie Zhao
173	Blaine	Zuk	Kuzuk Consulting Ltd.

CONFERENCE SUPPORTERS

				
				
				
				
Also supportive - 				