Innovation Session Proceedings

PNWER Annual Summit – Whistler, British Columbia
July 22, 2014

Co-Chair Alana DeLong, MLA, Alberta
Co-Chair Dave Zepponi, Northwest Food Processors Association

Speakers
Best Practices in Energy Efficiency in the Northwest
Pam Barrow, *Director, Energy & Sustainability, Northwest Food Processors Association*

Innovation Policy and Cross-border Regional Collaboration Panel
Greg Caws, *President & CEO, BC Innovation Council*
Egils Milbergs, *Chief Innovator, Washington Business Alliance and Center for Accelerating Innovation*
Diane Smith, *CEO, American Rural*
Stephen Lougheed, *President & CEO, Alberta Innovates Technology Futures (invited)*

Dave Zapponi and Alana DeLong: opening remarks and introduction to Pamela Barrow

Pamela Barrow - Accelerate Technology Coming into the Private Sector
Northwest Food Processors Association (NWFPA) is celebrating 100 years. Members include food processors and suppliers. NWFPA members are the second largest user of electricity in PNW in the industrial sector.

Key issues:
- Energy use directly impacts bottom line – prices are volatile.
- How we use and manage energy affects how we manage our business.
- Energy use accounts for 90% of GHG emissions on site.

Solutions:
- State and federal governments and utility companies offer incentives to reduce consumption.
- NWFPA Board of Directors adopted an energy vision in 2009 to recognize how involved energy is in their ability to be competitive in a global marketplace.
- A sustainable energy use plan will enhance competitiveness.

In Jan 2009, industry-wide energy goal is set to reduce energy intensity (use per lb. of product):
Reduce by 25% in 10 years, 50% in 20 years: through innovation, new technologies and new resources. This stretch goal was intended to encourage innovation through constraints.

Areas of Action: (refer to slides for graph)
- Efficient equipment, design, and O&M practices
- Energy management
- Process improvement (Lean, 6 sigma)
- Distributed generation

Need innovation, new technologies and new resources in all of the above areas.

Began with collaborative approach in OR, WA, ID, CA:

- Developed profiles of emerging technologies for food processing (119 technologies, some still in developmental stages).
- National energy efficient roadmap portfolio for industry created in 2012 through workshop to identify all technology areas and state of development that interest food processors.
- Portfolio developed for combined heat and power as well.
- NWFPA Energy Committee developed list of 13 technology areas of specific interest to industry.

Identification of areas of challenge that need solutions by means of new technology that is directly applicable to food processing industry.

One-size innovation does not fit all: developers are looking for technologies that apply broadly (biggest possible market), but that is a problem for industry because of the variation of needs between (and within) industrial sectors. E.g. refrigeration controls are different in different regions (industrial fridges vs. heat pumps)

Utility Energy Program Challenges:

- Extreme diversity among industrial sectors
- Application of technologies typically needs to be customized
- Great innovations come from worldwide sources
- Innovation comes too fast to be systematically indexed

NWFPA needed a new approach to technology innovation – connecting challenges and solutions was proving too difficult.

Enter: Innovation Showcases – discovery and evaluation by sector
Showcases occur four times per year. Emerging solutions include:

- Lighting & building controls
- Cold storage insulation
- Cold storage controls & diagnostics
- Robotics
- Waste heat recovery

Innovation Showcases (Skip & team) conduct a worldwide search for technology solutions and identify legitimate vendors to participate in technology showcases and create a short list for the energy committee's review and consideration. Committee chooses three vendors to present at the showcase. Each showcase also includes a panel of experts to discuss the technologies and trends in the industry, and ask hard questions of the vendors. During the showcase, vendors will demonstrate technologies, e.g. lighting retrofit for increased efficiency.

Conference Call-in Presenter: Skip - Emerging Tech Accelerator (ETA)
Top vendors for lighting are Digital Lumens, Lumetric Lighting, and Acuity Brands
Top vendors for waste heat recovery / heat exchange are Q Power, Thermal Energy
Upcoming showcase is on Robotics
Refer to slide 21 for graph of attendance and success rate of showcases. Started small to be able to scale up over time.
Feedback from Northwest Energy Efficiency Alliance and industry conveners: grateful for showcase service and exposure to both markets and technologies.
Feedback from suppliers and industry members: grateful for support in preparation for vendors and easy and engaging nature of presentation from vendors

Future showcases will cover a range of technology areas: lighting & building controls, robotics, waste heat, absorption chillers, recall planning & prevention, water management
Note: City of Portland is excited by the opportunity these showcases present, and wants to bring people from seven bureaus to learn about new technologies.

Pamela Barrow (again)
M-TAC Pilot (Manufacturing Technology Acceleration Centre)

National Institute of Standards and Technology has provided a one-year grant. Partnering with OR, ID, WA, industry steering committee will identify technical and business challenges outside of energy. This focus will allow NWFPA to achieve the same progress with these other challenges that they have with energy. The steering committee will identify and prioritize the new technologies, and then choose a new technology to hold a showcase for.

Intention to do demonstration projects for two technologies for each of WA, OR, and ID. Refer to www.nwfpa.org for more information.

Wrap-up:
These showcases are a way for the private sector to get these technologies to and from the smaller communities and tie the region together through electronic information sharing. Until it is commercialized, a new technology isn't really an innovation. It's just a nice idea. Through these showcases, we are accelerating the adoption of new technologies through the Internet. It is a win-win for suppliers and buyers.

Question: Are the showcases effective?

Response: People really like this service. People can sign up in advance, no limit on participants, feedback on the program has been very positive. Vendors each get 30 min for presentation and questions. Participants can follow up with vendors to ask questions and arrange site visits. People in rural communities generally don't get out to discover new vendors and technologies, and the vendors can't get to everyone in rural communities either (e.g., a vendor out of Tennessee had five site visit requests after his presentation). People can't absorb more than three new technologies at a time and trying to go for longer than two hours at a time is unrealistic for both time availability and people's mental capacity. There have been a few technology glitches but they have been worked out.

Innovation Development Panel

Greg Caws, BC Innovation Council: Introduction to Innovation in BC

BCIC is part of the government, with the Ministry of Technology, Innovation and Citizens' Services

Mission: Make BC a great place for entrepreneurs and accelerate the commercialization of technology

Impact of Technology (refer to slideshow for more statistics)
- Technology is the 3rd biggest industry in BC (construction and food industry is bigger)
- BC is approximately 20% of the total of PNWER
- Jobs are 4.3% of workforce
- Wages are more than double the average

- Industry is growing quickly

Example of technology application: Genomes – use genetics to identify food traits that are desired, and choose those plants to propagate.

Today's innovation characteristics:
- People are starting businesses and staying
- Big companies are moving here
- Experienced people in tight supply
- Schools produce good talent
- Angel investing is available, but the next round is tough

BCIC Engagement Philosophy
- Don't duplicate
- Fill gaps
- Commercialize technology
- Fill underserved markets

Primary Focus
- Accelerator network
- Cross-sector integration
- Academic support for universities and students

Financial Incentives
- Small venture tax credits
- Research and experimental development tax credit
- Industrial research assistance program
- Others

Priority: grow accelerators

Partners:
- 13 partners
- Executives in Residence (30) – have successfully exited businesses

Partner selection:
- Demonstrated need
- Track record
- Availability of funding
- Other partners
- Standards adoption (Steve Blank, Lean Startup)
- Selection of EIRs
- Etc.

Company Initiation Process
- Careful interviewing for limited slots
- Match with Executive in Residence
- Etc.

Market Validation Training: Focused on identifying if you have a real market

Biggest Challenge: Measurement of performance in markets over meaningful timeframe

Results: 242 companies have come through accelerator

How to set up a network:

- In BC, wrote a significant position paper over the course of a year, examine best practices from all over the world and applied to BC to develop applicable methodology
- Adopt the standard
- Work with experience partners
- Build a prototype program
- Start growth slowly and iterate
- Build with motivated candidates

Egils Milbergs, President for Center for Accelerating Innovation, Western Business Alliance

US is facing many problems, but the people in this room can solve these problems by thinking big, starting small, and acting now.

Washington innovation impacts the world: Boeing, Microsoft, Starbucks, Costco, Amazon, Nordstrom, and Expedia. Estimate that WA, 6 million people, serves over 1 billion customers.

In Washington State, Egils is as far away from Washington DC as possible – seeking a more collaborative environment.

There are 25 critical indicators to measure the innovativeness of a state (or province). In the past few years, WA has been in the top 5 (Massachusetts is 1, Delaware is 2, California is 3)

How can you measure how your region is doing in terms of innovation?

- In 1960s and 1970s, focus was cost advantage (economies of scale)
- In 1980s and 1990s, focus was quality advantage (make it better)
- In 2000s, focus is on innovation advantage (make something new)
- Win by creating new consumer value and staying ahead of the other guy.

Emerging ideas: industry clusters, innovation partnership zones, and ecosystem models

Why innovation? Higher wages, competitiveness ranking, addresses needs in health, energy, etc.

US has not made innovation a priority in the country. This is a problem.

Two approaches to innovation:

1. Linear Model: research, development, technology transfer, commercialization
2. Ecosystem Model: R&D, transformers, funders, support services, networks, regulatory (all as a network)

In the area of development, the creation of different funds (seed funds, angel funds) tries to move ideas to a new stage of development.

- In the linear model, there is a valley of death between each stage with barriers to success.

- The ecosystem model gives innovation a habitat for success through a system perspective, not a process perspective. Silicon Valley is a habitat for innovation with all the necessary factors for boosting innovation.

In Washington State: Strategy in Action

- Intent was to create an innovation habitat in WA
- Put out a call for proposals for people who wanted to create innovation zones: Urban Clean Water IPZ: City of Tacoma, Centre for Urban Waters, University of WA, prime waterfront, Tacoma Convention Center, Puget Sound, etc.

Example: Tacoma's innovation in water

Results in cluster-to-cluster economic development, which is a win-win situation through collaboration instead of competition. Building the innovation ecosystem outside your immediate geographic area results in shared benefits in different areas.

Crucial success factors for innovation ecosystem:

- Leadership (make connections to make the system work)
- Strategy (designed by the private sector through business leadership, no trust of government strategies)
- Culture (innovation, risk-taking, collaboration)
- Governance (what kind of structure is wanted, non-profit, profit, etc.)
- Innovation system scorecard (measurement)

Understanding resilience and sustainability: Instead of the typical triple bottom line image of overlapping circles, instead think of the economy as being nested inside of society which is nested inside of the environment. If the planet fails, no business will succeed.

Example: the Bullet building in Seattle is the greenest building in the world (off-grid for water and energy)

Move toward a circular economy: Biological material becomes technological material in a circular process. If we minimize all kinds of waste, we are improving the efficiency of the system and health of system.

Example: recyclable Starbucks cup and high school students who changed behaviour from 5% of people to 50% of people in school who used a reusable cup in two years.

Washington Business Alliance:

- Includes founder of Sonicare, Starbucks, others.
- Business image needs to change: stop thinking of business as a bad guy trying to keep people down. Business wants to pay people a good wage and not destroy the environment.
- Seeking to optimize the role of business and the role of government in business

Conference: Converge@Seattle 2014
Topics:

- Future of higher education
- Future of manufacturing
- Digital economy & internet of things
- Women in Innovation

Story: In 1936, rowing was the most popular collegiate sport. In the Olympics in 1936, University of Washington was the winner of the men's eight team. This team from the wrong side of the tracks worked together and became Olympic champions. Teamwork, innovation in boat design, and a focus on something bigger than themselves.

If you want a successful ecosystem, you need to feel part of a bigger network with a bigger purpose.

Diane Smith, CEO of American Rural (thenewrural.com, Montana Governor's appointee to PNWER)

Moved from Washington, DC to Montana and became an entrepreneur, creating Vubiquity for cutting edge video technology (started with two guys, a dog, and an idea in a coffee shop with Wi-Fi to $30 million in service in 3.5 years).

Big question for entrepreneurs: have your customers pre-paid you? Sell before you're done; get the money in the bank.

What is rural?

- In the US, rural is defined as a community of under 2500 (Canada is less than 1000 people).
- In American Rural, communities of 2,500 to 50,000 people qualify (do you lock your car in your garage? No? You're not urban).
- 88 M people live in rural America. This is 2.2 x more than people over 65 years old, and 3.7x more than people living in cities with more than 1 million inhabitants
- People in rural areas are naturally entrepreneurs because that is how they grew up, without ready jobs to go into.

Entrepreneurs = new jobs. Jobs are created in the US primarily by new businesses less than five years old. Why give tax credits to startups? They don't have profitable income. But entrepreneurs turbo charge job creation.

Low-tech to high-tech off the beaten track: authentic is the new black

- Solar roadways – developing solar powered road panels to form a smart highway
- Yellowberry – high school girl didn't like her first bra buying experience, so created a bra shop for tweens
- RanchHacks – mobile apps for beef ranching industry
- Mamalode – parenthood's best magazine
- Red Ants Pants – young woman was tired of wearing men's work jeans, so built a women's work jeans company (great social media ad campaigns)

Note: 4 out of 5 of these examples were co-founded or founded by women.

Story about "can-do" spirit in rural and small towns:
A tree falls across the road in Washington, DC and traffic is backed up for miles waiting for tree removal. In a small town, someone would have a chainsaw to deal with the tree or a few people would get out of their cars and figure it out, instead of waiting for help.

Being an entrepreneur means trees in your road every day. You want to hire people who figure it out.

What's going on beyond the coasts?

- Hackathons

- Start-up weekends
- Social capital – willingness to help people you know (Diane got a meeting with ESPN by calling ESPN engineers in the next town in Montana)
- Idea economy

Other concerns:
- Physical infrastructure matters a lot.
- Businesses without broadband generate $30K less per year than businesses with.
- Students are taking more online courses for university.
- Internet of things: economic value-add is expected to be $2 trillion by 2020.

To learn more about the Internet of things, refer to Mary Meeker Internet report: drivables, wearables, scannables, flyables (available free online)

Welcome to Silicon Everywhere: Valley, Alley, Flatirons, Bayou, South, Canada, etc.
There's never been a better time to live and work in rural America.

Stephen Lougheed, CEO of AB Innovates Technology Futures

Intention to share what is happening in Alberta, a heavily resource-based industry: energy, forestry, food (supported by construction, engineering, and ICT). Population of AB is about the same as Seattle, but there is huge demand for resources, demanding innovation to make it happen.

Innovation system map circa 2008 was complex trying to be all things to all people. Replaced with Alberta Innovates System Corporate 2010:
- Technology
- Energy and environment solutions
- Bio solutions
- Health solutions

Trying to look holistically for opportunities for investment

Mandate: to achieve economic and social benefit for Albertans using research and innovation to grow industry.

What is the expected outcome?
Alberta's priorities are:
- Energy & Environment
- ESRD
- Bio Solutions
- Health Solutions
- Technology Futures

Actions across the priority areas:
- Directed investments in post secondary institutions
- Applied research and development
- Application and commercialization

Outcomes:
- Resilient and healthy communities,

- Broad-based economy,
- Effective resource and environmental management

Trying to import the rural, can-do culture into the cities, and also bring in financing partnerships and relationships. Taking a systems approach, make focused innovation investment by encouraging collaboration through funding decisions.

Innovation System (example of getting oil out of oil sands)

- Design – solution
- Coordinate – grand challenges
- Implement – sector strategies
- Monitor – economic and social benefits to AB

Canadian Pipeline Technology Collaborative Case Study
Working with pipeline industry, starting with academic institutions and examining gaps in understanding and process (valleys of death) through long-term early research, mid/short-term applied research, and then market-ready solutions. There were seven different groups who were working together, but none of them knew it (and TransCanada was working with six of them).

Key outcomes:

- Building globally successful supply chain enterprises
- Solving big industry problems and examining supply chain

Most of the innovation is not coming up through the chain of research, but from people working in the field at the point of market adoption. Pipeline companies are putting more money into coordination because they are seeing the results.

Evergreen Centre for Resource Excellence and Innovation near Grande Prairie (with the most patents filed per capita in Canada). This innovation centre is drawing in the big companies because they are achieving the results.

<u>Examples of recent arrangements</u>
AB-Finland Innovation and Commercialization Program

- Dating service for innovation cross-overs in water technology – opening doors for both North American and European markets. Note: the processes to make paper come from Finland

AB-ON Innovation Program

- Cross-provincial collaborative projects between industry and academia to solve industrial challenges.
- Politically, this is an interesting approach. AB set up an ON fund, ON set up an AB fund.
- Ontario government is funding Ontario businesses to supply what Alberta needs, and Alberta is doing the same thing. Breaking down silos and opening up markets to each other. Linking demand to supply across jurisdictional boundaries.

<u>Question</u>: Intrigued by partnership with Finland. What trends have you seen in cross-border partnerships?
<u>Response</u>: Sometimes, these things are started because they are interesting. What is the underlying dynamic that makes it make sense? Consider the supply and demand dynamic, linking small businesses in ways they can create markets for each other. Where it is working, you have industry, academic, and government working closely together. Most universities have IP prison guards

preventing IP being used by industry, except for Lethbridge. Value from IP comes from jobs created, not royalties received.

Comment: Discussion around rural entrepreneurship. Greg has had experience with science councils become accelerators.
Response (Greg Caws): Problem with disenfranchised people or groups – started working on a virtual accelerator because resources are limited.

Closing Remarks:
Book: Rainforest, identified reason for Silicon Valley success was the personalities who connected all the different aspects: research, entrepreneurs, and funders. The secret is the "keystone", an integrative person who can adapt and become part of different groups. They are influential and impactful.

PNWER is a conglomeration of people who are integrative, influential, and impactful. Innovation happens through questions and access to people. Consider the partnerships that AB is building with ON and Finland: PNWER states should be building those kinds of partnerships.

What is PNWER Innovation trying to accomplish?

- We have big hairy problems (energy, environment), and we also want to build our economy through the new economy (the next Microsoft)
- Need to link the asset map to the problem map
- Where is the competition? Where are our future markets?