



ASRA Strategic Meeting: Dr. Peter Hackett

> January 31, 2008

> Slide 1: INTRODUCTION

Thank you for inviting me here. And thank you ASRA for giving me all this time to speak with you, I very much appreciate it. I know what a precious commodity time is and I am grateful for the opportunity.

I kind of feel like Paul McCartney, who after forty years in the music industry was invited to the Grammys for the first time, but don't think I'm going to break into "Helter Skelter"

If I sang anything it might be, with apologies to Corb Lund:
"hurtin Albertan with nothing more to lose
too much oil money, not enough booze"

> Slide 2: LEN BOLGER

I want to start today by honouring a member of the ASRA family: Len Bolger. It was at this same ASRA event last year that I sat and listened to Len's overview of Alberta's energy future and, like you, I sat enthralled. But I did more than that. As he spoke, I realised we had a giant amongst us. I realised we needed to recognise that before it was too late. At the break, I organized an impromptu committee to recommend Len for the Order of Canada. We started immediately, but we were too late. And a giant passed from us before we could recognise the enormous contribution he made to Canada.

Len was this marvellous word: *authentic*. And when Len spoke, each of us in this room realised Len was speaking about "Building a better tomorrow in Alberta" and about nothing else.

And all I ask today is we keep that goal - and that example - in our minds as we talk about building a better tomorrow in Alberta. And I ask that each of us in the ASRA family cherishes our heroes whilst they are still amongst us.

> Slide 3: BUILDING A BETTER TOMORROW

Eddie Isaacs, the Executive Director of AERI and I moved quickly to make sure that Len's name and contributions would live on in Alberta. We established two Len Bolger Awards in Energy Research Excellence. Hany El Sayed at the University of Calgary is one of the first winners. Hany is busy applying nanotechnology to building better fuel cells.

Len's wife Jean and his son David were at each of the award ceremonies in Edmonton and Calgary. Jean said that Len would have been enormously proud of what these young researchers were attempting to do here in Alberta. More of that later.

>Slide 4: MANDATE

Let me move on now and talk about the role of the Alberta Ingenuity Fund in Alberta's research and innovation system.

As I do that I need to make the standard disclaimer:

This presentation contains forward projections that are subject to market and political uncertainties. Investors should be warned that actual results may not meet these expectations. Furthermore, the opinions I express today are personal opinions. They are not the views of the Alberta Ingenuity Fund or its Trustees. And if these opinions are in any way controversial, they may not even be my own.

That being said, our role is very clear. It is to support science and engineering research and the application of that knowledge to improve Alberta's economy, society and environment. It's a mandate to support Alberta's research and innovation system and to help improve the economy and quality of life of Albertans. It's also a mandate to encourage Albertans to pursue careers in science and engineering. I find this language beautiful and enabling. The people who framed this legislation excluded no field of science and engineering. They excluded no area of benefit to Alberta.

>Slide 5: INTEGRATED PROGRAM: SOURCE of FUNDS

It's a big job and we are growing into the role. This slide shows expenditure growth from two sources: the blue from the AHFSE endowment; the red from allocations from the Government of Alberta to deliver upon Government priorities established by ASRA. Actually that colour is not red, it is more like the colour of blood. These funds include monies expended on the Alberta TSE Research Strategy, the Alberta Water-for-Life Research Strategy, the Alberta Integrated Graduate Student Scholarship Program, the Alberta Nanotechnology Strategy and the Alberta University-Industry Partnership Program in Nanotechnology, *nanoWorks*.

Compound annual growth rate runs at 40 per cent per year. First we took baby steps and then we were flying under the radar screen. This year we forecast some \$38 million in expenditures and next year we project \$52 million.

This means Alberta might just have developed the ability to have an integrated strategic research funding organization.

>Slide 6: PARTNERSHIPS: INTEGRATION and ALGMENT

Or it will, if it maintains this trajectory.

Focus is the key imperative in deciding where we will invest. And focus brings with it co-investment from partners to targeted areas.

Here we show the amounts that Alberta Industry and our sister agencies in the ASRA family invest through specific partnerships toward shared goals.

This data speaks to the current state of integration and alignment of effort towards Alberta's Sustainable Prosperity Imperatives.

>Slide 7: FRAMEWORK for PARTNERSHIPS

That being said, we need a framework for partnerships.

These are factors we consider. I will say little more about this, but let me say that benefit to Alberta, shared strategic intent and authenticity rank enormously high with us. Authenticity finally tracks back to good governance, but there would be no better definition of this than Len. When Len spoke, it was clear that the only issue at play was:

Building a better tomorrow in Alberta.

We seek to partner with organisations as authentic as Len.

>Slide 8: FOUR KEY STRATEGIES

I want to move quickly now to recite the articles of faith: those elements of strategy that underpin how we design our programs, where we chose to act and the actors we chose to work with.

These are four strategies I brought with me to Alberta three years ago. And they are still relevant today. The first means making big bets to have chance of winning, not small bets so there is no chance of losing. The second is having an innovation systems approach. The third is to go with winners. The fourth is that we need to build upon our culture of risk taking.

Alberta has a head start on all these lines of strategic action. It really *is* better in Alberta.

>Slide 9: INNOVATION DNA

Innovation DNA looks at what we need to do to sustain progress and prosperity.

What is the sustaining motive of development?

I think it is this: the interaction between the creativity of individuals and a society's capacity to accept innovation. Two things. Both at once. The one patterning the other. There is no progress with only one.

This interaction leads to dynamic innovation, the capacity to reproduce and the capacity to evolve. It leads to the creative in *creative destruction*.

>Slide 10: CELEBRATING INGENUITY

But don't take my word for it. This is what Bill Buxton says:

"You have to spend as much time directing your innovation and creativity to fostering a culture of creativity and receptiveness to innovation as you spend on the ideas themselves."

Bill is a Chief Scientist at Microsoft and was the lead proponent of Alias Wavefront.

>Slide 11: TALKING ABOUT WHAT WE DO...

And it is not only Bill. Here is what Maggie, a PhD student at the University of Lethbridge, says:

Unless and until the average Albertan – Martha - understands the innovation imperative, they will not sustain the innovation investment. And unless and until the average Albertan – Henry – understands the innovation imperative, they will not accept the fruits of innovation investments; be they new products or new public policies.

I strongly agree with Maggie.

>Slide 12: IRON SCIENCE TEACHER

That's why we place building a science culture in Alberta at the pinnacle of all we do.

That's why we build public engagement activities as a requirement of all of our focused investments. It is everybody's work.

That's why at today's Centers Event at the Shaw Centre you will not only find researchers and Venture Capitalists but also 200 – 250 middle school students all having the time of their lives learning about science.

>Slide 13: STUDENTS

And that is why we are partnering with Science Alberta Foundation – we will invest \$5 million dollars with them over the next ten years to bring the word about Alberta's Sustainable Prosperity Imperatives into schools and communities all over this province.

And if you want a definition of an authentic organization – I can think of no better example than Science Alberta Foundation: a jewel in the crown of Alberta's innovation system.

And now to the two key slides in this talk:

First, stones in the river. Just like the stones in the river, innovation will flow around us, we cannot prevent it. Just like stones in the river, innovation will shape us, we cannot prevent it.

>Slide 14: STONES IN THE RIVER

It will flow around us and it will shape us. Each innovation builds upon the previous one. Each innovation enables the next. Innovation accelerates.

We are familiar with this in ICT, but the same underlying driver will spread into materials and manufacturing through nanotechnology and into biology through synthetic biology.

Exponential innovation means that things appear out of nowhere. Accelerating innovation means that progress in capability in life sciences over the next five years will equal that made in all previous years.

It means we ain't seen nothing yet. It means we have to get in early. It means the fast follower strategy cannot work. It means we have to pick our spots. It means we have to go big or go home.

It means there is no safe place to stand.

>Slide 15: INNOVATION DYNAMICS

And, it means we have to pay attention to innovation dynamics. This is the second key slide. It lays out some of the pathways and flows in our innovation system: in our research institutions and in our knowledge-based companies. It helps us figure out where to act, how to act and who to act with.

Our research institutions take in people and money and produce HQP, knowledge and a little IP. Our companies listen to markets, conceptualize products and take in people, IP, money and technology from global sources to create products that are commercialized in global market places.

These are the two actors that we work with. Each actor has its own motivations. People come to work every day to do different things in these two places. Each with its own values. Our programs are designed to transform these two types of institutions and raise their performance to global levels by acting at key points in these cycles. And by increasing the local coupling between the cycles.

>Slide 16: STRATEGY MAP

Innovative firms
Global markets
Innovation DNA
Public engagement
Exponential innovation,
Innovation dynamics and

Building a better tomorrow in Alberta.

These are the key considerations behind our strategy map...

>Slide 17: PERFORMANCE FRAMEWORK

They are behind our performance framework...

>Slide 18: PERFORMANCE MEASURES

And our performance measures, both in general ...

>Slide 19: FINANCIAL PERFORMANCE DATA

... as well as specific terms.

>Slide 20: PLATFORMS and SECTORS

They inform the sectors and platforms that we consider investing in.

>Slide 21: INGENUITY BUSINESS CASE ANALYSIS

And they are built into the business case analysis that our Trustees look to us to provide before they approve major investments in focused initiatives.

As you will see from the slide, the key considerations have to do with relevance, jurisdictional advantage and capturing benefits here in Alberta:

Building a better tomorrow.

This then flows out into our innovation community through programs and here is the growth of those programs over time.

>Slide 22: INTEGRATED PROGRAM

Our programs support the very best graduate students in Alberta. They recruit post-doctoral fellows to the province. They support the very best new faculty in Alberta.

They recruit senior faculty, special people with the ingenuity gene, as scholars and they support them for five years. The idea is, that scholars will either start or join key focused priority initiatives for Alberta, priority initiatives like the Ingenuity Centres, Institutes, or Accelerators.

Our programs support entrepreneurship training, student entrepreneurs and executives-in-residence. They support interns and associates in Alberta-based companies, large or small, as researcher or business associates.

And our programs support partnerships between Alberta business and Alberta research institutions through *nanoWorks* and the Centres of Research and Commercialization.

>Slide 23: INTEGRATED PROGRAM

Here is how it all plays out against the current ASRA priority areas - in alignment with the Alberta strategies developed in Alberta by ASRA – and please remember that forward projection disclaimer.

>Slide 24: INTEGRATED PROGRAM

Here's how it all plays out by performer: Alberta research institutions, Alberta knowledge-based companies and strategic research alliances between business and research institutions.

And as you can see, the participation of Alberta business in these programs is already significant and will continue to grow. Since I believe we are a bit unique in working directly with companies, and since we all share the concept of having companies at the centre of that better tomorrow in Alberta...

>Slide 25: LIFESCIENCES: 27 COMPANIES

... I have listed here for you the names of the Alberta-based life sciences companies that we work with.

>Slide 26: ICT: 35 COMPANIES

The ICT companies.....

>Slide 27: ENERGY & ENVIRONMENT: 30 COMPANIES

... And the energy companies.

Each of those names is code for a young researcher or business associate, working with a dynamic Alberta-based company to bring forward a new product or service to be marketed around the world out of Alberta.

Each of those names is code for a newly-created channel between an Alberta-based company and a research institution – a channel that can only enrich the experience of both. Each of those names represents an enabling link - a link that will endure beyond our financing. And each of those names is code for innovation, risk taking and dynamism. And each is code for the idea that we can do it *in* Alberta. We can succeed in Alberta. We can change the world *from* Alberta.

We can build that better tomorrow in Alberta...

>Slide 28: FOCUSED on ALBERTA'S PRIORITIES

So I hope that quick tour of programs has convinced you that we are committed to Alberta's priorities.

That we are pushing integration through strategic partnerships.

And that we are pushing the alignment agenda.

>Slide 29: ACCELERATORS: \$94 MILLION OVER 10 YEARS

In what follows, I want to say a few words about Accelerators and then I want to take you on a quick trip around Alberta's innovation ecosystem so you can see how it all integrates and where the hand-offs are.

Accelerators represent a commitment of significant funding to a privileged few so that Alberta can build a global brand as an innovation icon. A big bet in a Canada pathologically opposed to making big bets: an attempt to change the name of the game and thereby the level of achievement in an area of exponential innovation.

>Slide 30: INDIVIDUAL MOTIVATION

At the heart of Accelerators is the idea that we want to enable folks who are motivated by both USE and by UNDERSTANDING to attain the highest levels of achievement and outcomes.

People that live in Pasteur's Quadrant in the language of Donald Stokes.

What kinds of cats are these?

Well they are cats like Chris Somerville...

>Slide 31: CHRIS SOMERVILLE

...the first person to work with *Arabidopsis* as a model system. Because Chris is who he is, the Carnegie Foundation gives him \$6 million a year to operate the Carnegie Institute of Plant Biology at Stanford. Stanford gives him a building for a dollar a year. Because of who he is, Chris is on an advisory board to BP, and he has convinced them that by 2050, 20 per cent of energy will be plant-based. BP has recently announced a \$500 million investment to develop the IP platform for that technology. And Chris will lead the new Institute at Berkeley.

Well Alberta has a strategic interest in this bio-economy. We have a lot of land, a lot of sun and a lot of fibre. The point here is: Chris comes from Grande Prairie. His father was the vet there. His mother lives two streets from me in Glenora. His sister runs the Acquired Taste Tea Company on 102 Avenue. And if you go there for tea you will see an oil painting of Chris's dad on the wall.

>Slide 32: ACCELERATORS

Accelerators are about giving people like Chris a place to grow in Alberta and a place to bring benefits to Alberta. It's about riding that exponential innovation curve as a leader and not as a follower.

And accelerators are attracting attention. At the launch, Minister Horner announced the Nanotechnology Accelerator and said he would like to do four more of them.

To which we say: "Go Doug. Let's get it done – or we're bringing Mary Walsh back."

And this time the gloves will be off - she will be loaded for bear.

>Slide 33: TWO CNETRES DEDICATED TO OIL SANDS INNOVATION

Now let's do a quick trip around Alberta's innovation eco-system. And I think I will have just have time to talk to energy and life sciences. I could talk nanotechnology, prion, water or ICT - and I will if you invite me back.

In energy, we support two Centres, one at the UofC and one at the UofA. And we support ways and means for them to work together. Each Centre attracts major investments from the oil sands

industry. Each Centre provides industry a voice at both the governance and the program management-level. Each Centre has significant investment and alignment with AERI. And each Centre has scholars making major contributions and students spinning-off entrepreneurial activity and new business.

>Slide 34: IMPERIAL OIL

At the University of Alberta the industry is Imperial Oil.

>Slide 35: IMPERIAL OIL-ALBERTA INGENUITY COSI

Imperial Oil invests in COSI because:

“...it is going to identify and develop technologies that will enhance development of the oil sands resource, at the same time making meaningful progress in environmental performance.”

These are issues that Alberta and AERI care about.

>Slide 36: VISION, CENTRE, INDUSTRY, SCHOLAR, STUDENT...

COSI is going about developing new oil sands extraction methods that use less water and less energy to improve upgrading in the surface mining process industry in Alberta...

>Slide 37: Dr. STEVE KUZNICKI

... By applying nanotechnology to the Oil Sands. Let me introduce Steve Kuznicki – the prototype for a scholar.

Steve is the innovator’s innovator. He has 50 patents in industrial use. He has founded entire industry sectors.

Since coming to Alberta as a scholar he has four more patents - real patents not vanity patents - applying nanotechnology, zeolites, to Alberta’s problems...

>Slide 38: MOLECULAR SIEVES AND THE OIL SANDS

Problems like low-cost, waterless upgrading and metals removal in the oil sands industry...

>Slide 39: MOLECULAR SIEVE SURFACE TEMPLATE

Problems like slashing the cost of nano-silver production, opening up applications across the board and into novel areas like clean coal technologies for export to China...

>Slide 40: LOW COST CRYSTALLINE NANOSILVER

... And into the traditional ones like anti-microbials. Did you know that new cars are delivered with the inside surfaces coated with nanosilver? Big markets...

>Slide 41: AWRD-WINNING STUDENT: CHRIS LIN

And Steve's dynamism attracts the very best students.

Here is Chris Lin, the second Bolger Award winner.

Chris is not only a superstar student, like Hany, he is also enrolled in the Student Entrepreneur program at Tec Edmonton...

>Slide 42: LIBIN EXECUTIVES-IN-RESIDENCE

... Where he is mentored by Grant Parks, the Libin-Entrepreneur-in-Residence. When Grant takes the nanosilver company out Chris wants to be on the team.

And if not that one, then on another one that is just as compelling.

>Slide 43: INGENUITY I NINDUSTRY

And this dynamism and entrepreneurship is repeated across the board, with Industry Associates in companies like Computer Modelling Group.

>Slide 44: BAKER PETROLITE

...Baker Petrolite...

>Slide 45: QUADRARISE

...and Quadrise Canada Fuel Systems

>Slide 46: CENTRE FOR IN SITU ENERGY

Let's move down to Calgary to the Centre for In-situ Energy

>Slide 47: Dr. PEDRO PEREIRA-ALMAO

AICISE is built upon two very entrepreneurial Scholars. One of these, Pedro, left Venezuela where he worked in the heavy oil industry. Pedro brings expertise in nano-engineered catalysts to Alberta from Venezuela.

>Slide 48: IN SITU UPGRADING

The key idea is that these catalysts might be deployed in the SAGD process, carrying out some of the upgrading underground - with huge savings in cost, natural gas and environmental footprint.

>Slide 49: NANOTECH IN THE OIL SANDS

Here is the process in concept form:

Nanotechnology in the oil sands.

>Slide 50: AICISE

Lest this seem too fanciful, here are the partners in this consortium. Each pays \$500 thousand per year to participate. This stuff is for real and AERI is in - as was Len Bolger as a member of the management board of the Centre.

When the AICISE management board meets, Houston is on the line, Spain is on the line, France is on the line.

Industry cares about what AICISE is up to. In fact, industry helps define what AICISE is up to.

Just as Imperial bring huge value to the direction of COSI.

>Slide 51: Dr. STEPHEN LARTER

But AICISE was not founded just upon the entrepreneurship of Pedro fleeing the Chavez regime. It's also founded on the entrepreneurship of another economic refugee fleeing a far drearier regime. One I fled from myself - and I am not talking about Ottawa. Steve Larter, the co-founder of AICISE, came as an Ingenuity Scholar with the intention of applying microbiology to heavy oil recovery.

Steve is Pedro's alter-ego. And they make a fabulous pair. They are the entrepreneurs who have brought industry in.

>Slide 52: STEVE LARTER

And they are the entrepreneurs who have spun industry out. Steve is Chief Scientist in Gushor a spin out headed by...

>Slide 53: JENNIFER ADAMS

... Jennifer Adams, who used to be Steve's student and who was supported by an Ingenuity Graduate Studentship Scholarship - just like Hany and Chris. Named to MacLean's top 25 list of the "best and brightest" young people to watch in Canada, I can tell you if Jennifer had been around when we were handing out Bolger Awards the boys would have had a tougher time of it.

Gushor provides geochemical and reservoir engineering solutions by integrating geology, fluid geochemistry and reservoir simulation. Founded in August 2006, it now has 15 employees and is going gangbusters in the oil patch.

Jennifer tells me that she is not going to cut her hair until she gets that thesis written up!

>Slide 54: INDUSTRY REVOLUTION

But Jennifer and Steve have done something else that we should pay attention to.

Remember, I told you that the University of Calgary brought Steve here to do microbiology in the oil sands.

>Slide 55: METHANOGENESIS

Well he followed that passion. And burst upon the international scene with this article in *Nature Magazine* in December.

I always look for the key phrase in *Nature* papers. In Watson and Crick's paper on the double helix it was this:

"It has not escaped our attention that this structure might have some significance for inheritance."

In Steve and Jennifer's paper it's this:

"Energy recovery from oilfields in the form of methane, based on accelerating natural methanogenic biodegradation, may offer a route to economic production of difficult-to-recover energy from oilfields."

>Slide 56: THE PAPER and THE BUGS

Here is the paper.

Here are the bugs.

>Slide 57: LARTER in NATURE

And here is how the news spread around the world: The BBC, The New York Times and Scientific American. Looks like Alberta is onto something here.

Larter has spun out a second company, Profero Energy, whose focus is on conventional heavy oil reserves in the Athabasca, Peace River, Cold Lake, Lloydminster and Kindersley areas of Alberta and Greater Alberta – I mean Saskatchewan.

Profero plans field tests within months. They plan to feed the naturally-occurring bugs proprietary nutrient formulations with no harmful chemicals and minimal environmental impacts and are out raising money from private, venture and public markets.

And look for more news tonight at the Centre's Gala.

>Slide 58: CENTRE for CARBOHYDRATE SCIENCE

Let's switch to Life Sciences; it's a similar ecosystem with similar connections. And I could tell you about scholars, venture, students, spin-off companies and industry associates.

It's a fascinating story covering nanotechnology in vaccine design, TB, Alzheimer's and opportunistic infections like Candida Albicans, and companies like:

>Slide 59: QSV BIOLOGICS

QSV Biologics...

>Slide 60: INNERVISION

Innervision Medical Technologies...

>Slide 61: FRONTLINE R&D

Chemroutes...

>Slide 62: INDUSTRY ASSOCIATES

...and Innovotech, with applications all across Alberta's health and agriculture industries.

But I do not have time to do it justice.

Let me just offer this nugget of how the connections work: CTI Life Sciences Investment Fund is in Edmonton today talking to QSV because of connections begun in the AICCS.

Innovation dynamics.

>Slide 63: POLYMERIC HETEROBIFUNCTIONAL LIGAND

I want to close by bringing some themes together.

Profero's story is based-upon the power of genes in organisms evolved over eons to carry out some fabulous chemistry in some harsh environments.

I told you earlier that the challenge is exponential innovation. I did not dwell on the fact that the exponential part kicks in when the engineers get involved. If we had left the ICT industry in the hands of the physicists then we would still be putting circuits together with solder, scotch tape and sealing wax. But the engineers got involved and the revolution proceeded.

>Slide 64: ENGINEERING BIOLOGY

The same is happening right now in nanotechnology and it is beginning to happen in biology. At this ASRA meeting last year I told you in a long prelude to a question that the action is moving to synthetic biology, or what Craig Ventner calls synthetic genomics. It's about systematizing biology and programming DNA. It's about bringing the engineers in.

Let me tell you how we have been advancing that cause in Alberta in the year since then. We began by inviting Drew Endy from MIT to give a public lecture on the subject at the Madison Grill.

Since then Drew has been recruited to Stanford to set up a Synthetic Biology Department there, in the engineering faculty.

>Slide 65: VIRAL INNOVATION

Then we turned the Hessel Virus loose. Actually around Ingenuity we don't know whether to call Andrew the Hessel Virus or the Typhoid Mary of Digital Biology.

It says something about the kind of culture that Ingenuity has, there is intense competition for that title in our shop.

At any rate, Andrew is passionate about programming DNA and he goes around infecting people with that passion.

>Slide 66: iGEM

And one of the very powerful infection vectors that Andrew uses is the International Genetically Engineered Machines competition, started by Drew Endy.

For the last two years we have been developing and supporting Alberta teams to go to iGEM. Beginning with the University of Calgary, who won Best Poster Award at MIT in 2006...

>Slide 67: iGEM TEAMS

And then with teams from Lethbridge, Calgary and Edmonton who each won gold medals at this year's competition. And we are looking at eight to nine teams for next year's, including teams from NAIT, SAIT and Manyberries Alberta.

You get the picture. Kids love this stuff.

We are working at the graduate, undergraduate and high school levels. It costs us very little, but we are building a community that can hack into DNA and build an Alberta advantage before that exponential curve moves on.

>Slide 68: BUTANERDS – U OF A

It costs very little, but look at what they achieve. Each team won a gold medal at iGEM.

And the Edmonton team, the Butanerds won first place on the Energy Track. With sponsorships from across the city including from a Toyota dealership who demonstrated that their ATVs could run on butanol, the Butanerds hacked into DNA and reprogrammed an organism to produce bio-butanol.

>Slide 69: TOP 10 OF 2007

Once again, a made in Alberta innovation, addressing Alberta's opportunities, hitting the big-time around the world.

Viral innovation.

Undergraduates.

Building a better tomorrow.

>Slide 70: BIOLOGY GOES DIGITAL

And the virus continues to propagate.

A digital biology network is being formed. Mike Deyholos and Mike Ellison are creating an undergraduate mini-program in synthetic biology that builds upon the iGEM initiative.

So Alberta's involvement in this field is accelerating.

>Slide 71: EARLY INVESTMENT

And that's a good thing because our neighbour down south is not standing still.

And early stage companies and spin-offs are being formed. I think in Alberta-speak this a pre-capitalized infrastructure. A facility – a Biofab – a foundry.

And this is a good place for me to stop and take your questions. I need to bring it back to Len and I need to bring it back to his vision. As Alberta thinks about building that next generation economy, it needs to think very carefully about where it positions itself and how it encourages the right innovation dynamics.

>Slide 72: SUCCESSFUL SPIN-OFFS

It needs to get the fundamentals right. These are the fundamentals that engage all Albertans. These are the fundamentals that encourage creative destruction, invention, play and entrepreneurship. These are the fundamentals that encourage leadership not followership.

We need to trust that Albertans will maintain that pioneering spirit, that innate ingenuity, that will enabling them to figure things out. Like Gautam Rao at CastleRock Research has figured things out, like Nancy Knowlton and David Martin at Smart Technologies have figured things out.

ASRA must put the right instruments in place, instruments that are flexible and driven by the market, the market for products and for ideas. Let's allow our most dynamic companies a strong voice at the centre.

>Slide 73: CLOSING

Let's be very careful that the instruments and strategies are truly capable of:

“BUILDING A BETTER TOMORROW”

Let's be very careful to avoid the trap of building or maintaining structures that were designed with the very best of intentions but fall into the trap of:

“BUILDING A BETTER YESTERDAY”

Thank you ASRA for the time and for this opportunity.

And thank you all for your attention.