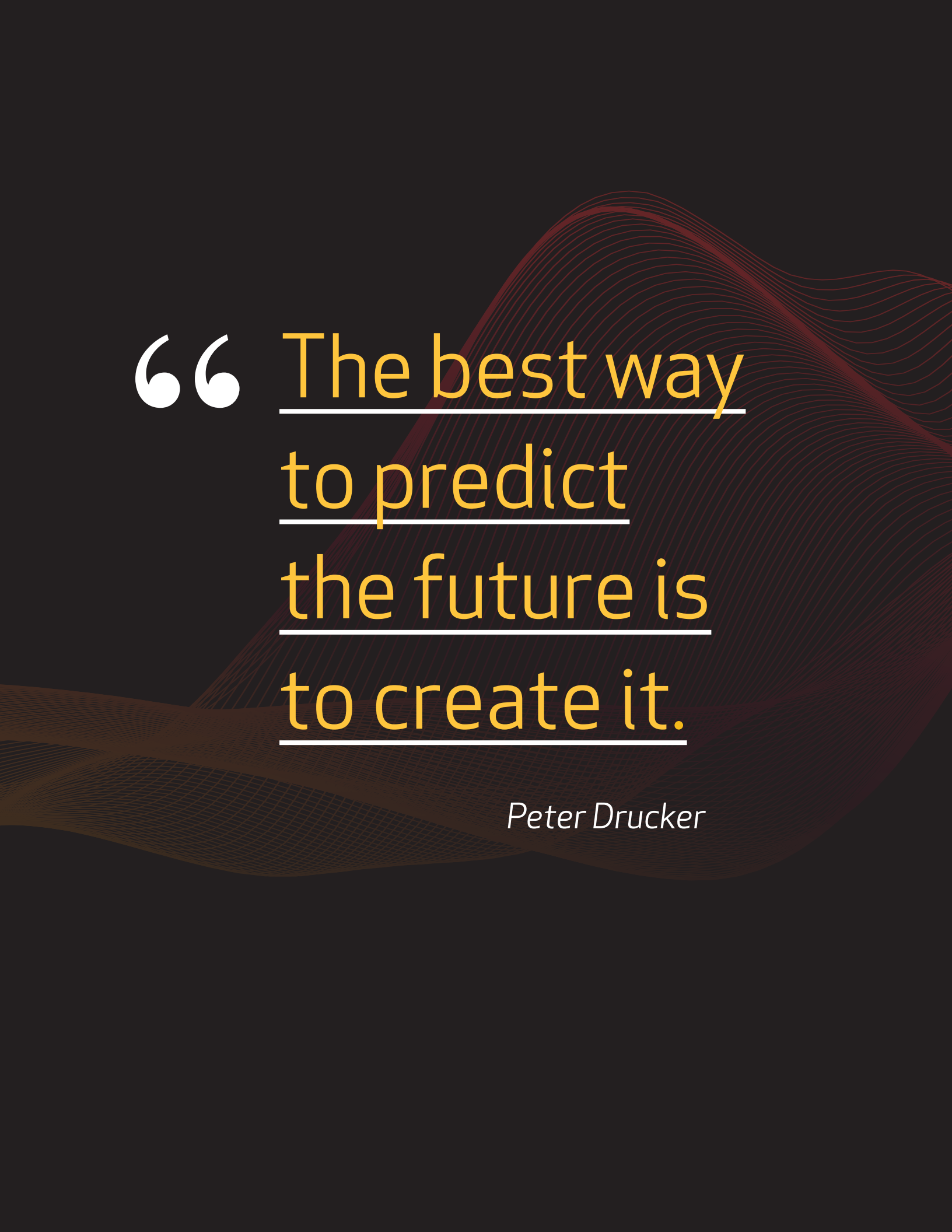


IN·NO·VATE:

**VERB.** MAKE CHANGES,  
ESPECIALLY BY  
INTRODUCING NEW  
METHODS, IDEAS  
OR PRODUCTS.

SEE ALSO:

ALBERTA INNOVATES.



“ The best way  
to predict  
the future is  
to create it.”

*Peter Drucker*

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# MESSAGE FROM THE BOARD CHAIRPERSON



**Brenda Kenny** PhD

THE COVID 19 HEALTH PANDEMIC HAS IMPACTED EVERY REGION, EVERY SECTOR OF THE ECONOMY AND EVERY ASPECT OF LIFE AND BUSINESS.

Through the hardships and disruptions of the past year, collaboration brought down silos and brought together diverse players to solve problems faster than ever. Companies, countries and communities embraced the need for rapid adaptation and planning that reimagines on a continuous basis, what's possible for the future.

This Business Plan spans the next three years, as Alberta navigates pandemic recovery as well as the acceleration of a changing economic and technological landscape. Alberta Innovates will continue to respond to policy directions as new Government of Alberta strategies take shape, while anticipating and preparing for the needs of Albertans and Alberta companies.

Beyond the recovery, the major drivers creating both risks and opportunities for Alberta include convergence of technologies, digitization and environmental performance.

No single technology or industry holds the key to economic recovery, or to transform the economy. Rather, the convergence of emerging technologies, platforms and applications are signaling the way forward. The Alberta Innovates plan embraces that system of innovation, accelerates the development and deployment of new technologies and business applications, and helps to pave the way for growth today and prosperity for the future.

Although the pandemic accelerated the use of digital and virtual platforms, Alberta Innovates has been heading in that direction, digitally transforming Alberta's traditional strengths to be future ready. With this business plan we're continuing to drive the use of data and digital technologies across Alberta's key sectors from energy to agriculture to health care and the environment using artificial intelligence and emerging technologies to pivot to new opportunities.

More industries, investors, and sectors view environmental, social and governance (ESG) scores as crucial for long term competitiveness, and have adopted net zero carbon emission targets. Alberta Innovates is forging partnerships and advancing technologies that help achieve those goals. The intrapreneurship and expertise being tapped and channelled in new ways will position Alberta as a leader in clean energy and advanced manufacturing economy for years to come.

Alberta Innovates is uniquely positioned as the Government of Alberta's agency accountable for the system of innovation and related jobs and economic growth. With this Business Plan, Alberta Innovates will continue to deliver on pre-existing commitments and targeted programs, while we work to align opportunities and partnerships that anticipate and respond to the needs of Albertans and looking beyond to what's possible.

This year Alberta Innovates is marking the centennial of provincial research and innovation and a first of its kind in Canada – the Scientific and Industrial Research Council of Alberta formed in 1921.

Albertans are trailblazers and as we build on that legacy, we are looking to the next 100 years and how the unique resources of this place and time can position Alberta at the forefront of global opportunity and leadership.

# MESSAGE FROM THE CEO



Laura J. Kilcrease

THERE IS A STRUCTURAL SHIFT UNDERWAY AND IT IS PULLING THE FUTURE FORWARD AT A MORE RAPID PACE THAN SOCIETY HAS EVER EXPERIENCED. OPPORTUNITIES THAT EITHER WEREN'T FEASIBLE OR DIDN'T EXIST A SHORT YEAR AGO HAVE BEEN OPENED LITERALLY OVERNIGHT.

RESILIENCE IS THE DRIVING FORCE BEHIND INNOVATION IN OUR PROVINCE.

Energy producers and users have witnessed the relentless transition toward a net zero carbon economy. Agriculture, food processing and supply chains face intricate global logistics challenges. And, demands on the health care system have out-paced capacity, even before the pandemic.

Alberta Innovates has been steering course to tackle these mega-challenges. Projected technology growth areas include data, digital, analytics, e-commerce, logistics, transportation, blockchain and cyber-security and Alberta Innovates is actively engaged with local entrepreneurs in these areas.

In parallel, we are partnering with industry leaders to help pivot resident skills and infrastructure to new uses and market opportunities. This is unlocking unprecedented value potential and securing new competitive footing for Alberta firms in the borderless technology-driven economy.

Digital and data applications along with interdisciplinary teamwork and trusted partnerships are the building blocks of strong innovation system performance.

Through our investment programs and support for entrepreneurs, we're creating the conditions for startups to grow and new jobs to be created. We support industry-scale transformation with applied research expertise to enable key sectors to evolve. And, initiatives such as INVENTURE\$, our Carbon Fibre Grand Challenge, the Alberta Carbon Conversion Technology Centre, and the Digital Health Summit act as magnets to draw capital and market attention to core areas of Alberta innovation strength and leadership.

With this Business Plan, Alberta Innovates is looking beyond the horizon to opportunities where Albertans can build new sustainable growth and prosperity well into the future.

# EXECUTIVE SUMMARY

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ALBERTA INNOVATES IS PRESSING FORWARD WITH ITS CORE MISSION OF ENABLING RESEARCH AND INNOVATION (R&I) ACROSS THE PROVINCE, EVEN AS THE COVID-19 PANDEMIC CONTINUES TO DISRUPT EVERY ASPECT OF LIFE AND BUSINESS FOR ALBERTANS AND PEOPLE EVERYWHERE.

Indeed, the pandemic has accelerated the pace of change and innovation. This unprecedented event underscored the value of our earlier work to identify the convergence of emerging technologies, platforms and applications that are shaping the future. Alberta must not only keep pace, but look beyond the horizon to proactively gain ground in areas that will enable prosperity for the long term.

With Business Plan 2021-24, we will continue to deliver on pre-existing commitments and targeted programs, while we work to align opportunities and partnerships that anticipate and respond to the needs of Albertans.

## OUR FOCUS AREAS – RESPONSIVE TO CHANGING CONDITIONS

---

LAST YEAR, ALBERTA INNOVATES IDENTIFIED FIVE FOCUS AREAS FOR ITS INVESTMENTS: DIGITAL HEALTH, INNOVATIVE HYDROCARBON PRODUCTS, SMART AGRICULTURE, ARTIFICIAL INTELLIGENCE AND THE ENTREPRENEURIAL ECOSYSTEM.

These remain our focus areas in the 2021-24 planning cycle with expanded emphasis on clean technology to better align with cross-ministerial priorities within the Government of Alberta. To reflect this shift, our Innovative Hydrocarbon Products focus area is now called **Clean Resource Technologies**. We will continue to build value in Alberta bitumen through development of innovative hydrocarbon products. We also recognize Alberta will need to decarbonize resource production to be recognized as a global leader in the environmental, social and governance (ESG) arena. Clean technology addresses sustainability while creating opportunity for economic diversification in Alberta.

We are also implementing our **digital health strategy** in the coming year. Wearable medical devices, virtual reality, artificial intelligence and 5G wireless network technology will make personalized health care, better preventative care, and more efficient health system workflows possible. Innovation is key to providing people with the right care in the right place at the right time.

**Smart agriculture** remains a focus area for Alberta Innovates. With world's population expected to grow by one billion people by 2030, food, arable land and water will become scarcer. Adopting innovative technologies will allow the agri-food industry to respond to these global challenges. Here, at home, agriculture will help boost Alberta's recovery from the current downturn. Advanced sensors, remote monitoring, automation, artificial intelligence and blockchain technology are leading to greater production, better efficiency, sustainable processes and land use, and new jobs.

Alberta Innovates also will continue to foster a strong **entrepreneurial ecosystem** which enables economic growth. Startup companies will need to navigate the impacts of the COVID-19 pandemic for years to come. Yet, these disruptions are also driving acceleration of digital and other technology products in the economic recovery. New funding to Alberta Innovates in the 2021 provincial budget is targeted to supporting Alberta's startups and entrepreneurs, and ultimately creating new jobs for Albertans.

Over the last two decades Alberta Innovates investments played a central role in establishing artificial intelligence capacity and infrastructure in the province. This generated top technologies, discoveries and world-leading talent in the industry. Continuing to invest in **artificial intelligence** as an enabling platform will extend its benefits across sectors and our focus areas. Maintaining our lead in the development and application of artificial intelligence promises significant economic advantage. Artificial intelligence could add an estimated \$13–16 trillion USD to global economic output over the next decade and boost GDP for local economies by up to 26 per cent.

See the Focus Areas section of this business plan for more details and key activities by our business lines.

## **POWER OF COLLABORATION AND CONNECTION**

THE URGENCY TO ADDRESS THE INTERNATIONAL HEALTH CRISIS OF 2020 DEMONSTRATED THE POWER OF COLLABORATION IN RAPID DEVELOPMENT OF VACCINES AND COVID TREATMENTS. THIS REINFORCES ALBERTA INNOVATES' PRACTICE OF WORKING COLLABORATIVELY WITH VALUED PARTNERS TO ACCELERATE THE ADOPTION OF NEW IDEAS.

The province's innovation ecosystem is greater than the sum of its parts and Alberta Innovates serves as leader, convener, connector and influencer to develop capacity, platforms and networks that connect innovators with the right supports at the right time.

The section titled "Creating the Foundation for a Vibrant R&I System" outlines our key platform and capacity-building activities in 2021–24, along with cross-sectoral R&I partnerships and collaborations. We hope to come together in Calgary this September at INVENTURE\$ 2021. This premiere innovation event is produced by Alberta Innovates to bring together great minds and great ideas to spur creative collisions and deal-making.

## **100 YEARS AND COUNTING**



THE YEAR 2021 MARKS THE CENTENNIAL OF INNOVATION IN ALBERTA, MAKING IT A VERY SPECIAL YEAR FOR OUR CORPORATION. IN 1921 THE PROVINCIAL GOVERNMENT CREATED OUR PREDECESSOR ORGANIZATION, THE SCIENTIFIC AND INDUSTRIAL RESEARCH COUNCIL OF ALBERTA (SIRCA). IT WAS FIRST SUCH ORGANIZATION IN CANADA.

For more than a century, Alberta Innovates has been an integral part of the province's scientific research and economic history. Although it has seen different forms — and several name changes — the philosophy at the heart of the organization has always been clear. As we look ahead to the next 100 years, we are confident in the ingenuity of our science, research and innovation community to help Alberta grow and Albertans thrive.

# BUSINESS PLAN

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# HIGHLIGHTS

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WE ARE ALBERTA'S RESEARCH AND INNOVATION ENGINE.

FOR A CENTURY, ALBERTA INNOVATES HAS SUPPORTED RESEARCHERS, COMPANIES AND ENTREPRENEURS WHO HAVE BUILT INDUSTRIES AND STRENGTHENED COMMUNITIES ACROSS THIS PROVINCE. **NOW WE ARE WORKING WITH OUR PARTNERS AND CLIENTS TO CREATE NEW OPPORTUNITIES AND FORGE A HEALTHY, SUSTAINABLE AND PROSPEROUS FUTURE FOR ALBERTANS TODAY AND FOR GENERATIONS TO COME.**

WE ARE ALBERTA INNOVATES...  
**SOLVING PROBLEMS, CREATING POSSIBILITIES.**

## OUR VISION

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TO BE INDISPUTABLY RECOGNIZED PROVINCIALY, NATIONALLY AND INTERNATIONALLY AS A LEADER IN CATALYZING RESEARCH AND INNOVATION IN ALBERTA.



# WE ARE

## A funder and service provider:

- We support post-secondary researchers, entrepreneurs and companies of all sizes with our investments.
- We offer targeted funding programs, services and expertise to achieve the province's research and innovation (R&I) priorities.

## A partner and collaborator:

- We support networks and collaborations to ensure our clients are connected to the right resources at the right time – helping them succeed (or fail) faster.
- We offer applied research and advanced manufacturing expertise and industrial facilities at our two subsidiaries – to help clients test, scale and validate ideas and prototypes.

## A convenor and connector:

- We advance the growth and scale of innovation by bringing together innovators, industry and thought leaders.

# ABOUT US

ALBERTA INNOVATES SUPPORTS R&I ALIGNED WITH GOVERNMENT OF ALBERTA PRIORITIES OUTLINED IN THE ALBERTA RESEARCH AND INNOVATION FRAMEWORK (ARIF). OUR ACTIVITIES AND IMPACTS CONTRIBUTE TO WORK IN MANY AREAS OF GOVERNMENT AND BY OUR PARTNERS.



11 Locations



Employees  
587 FTEs



2 Subsidiaries

*InnoTech Alberta Inc.  
C-FER Technologies (1999) Inc.*



Investment  
*of \$159 million for 2021-22*

# FIVE FOCUS AREAS OF INVESTMENT

WE ACCELERATE AND LEAD INNOVATION FROM DISCOVERY TO USE ACROSS ALL SECTORS IN ALL PARTS OF THE PROVINCE. AS ALBERTA'S LARGEST R&I AGENCY, WE ARE UNIQUELY POSITIONED TO PROPEL GREAT IDEAS FORWARD. WE HAVE IDENTIFIED FIVE FOCUS AREAS FOR OUR INVESTMENTS TO HELP ADDRESS CHALLENGES FACING ALBERTA. THESE STRATEGIES BUILD ON THE SKILLS AND SUPPORTS WE HAVE DEVELOPED IN THE R&I SYSTEM.



## Digital Health

Advance digital health technologies to accelerate improvements in the quality and long-term sustainability of our health system and the health of Albertans.



## Clean Resource Technologies

Invest in R&I that transforms bitumen into non-combustion, value-added materials, and clean technologies that improve environmental sustainability and economic diversification.



## Smart Agriculture

Lead smart agriculture R&I and address food security challenges through adoption of technology for significant impact in Alberta and beyond.



## Entrepreneurial Ecosystem

Continue to support a growing entrepreneurial ecosystem in Alberta through the programs, networks and connections we provide to entrepreneurs and startups to commercialize their innovations and scale their businesses.



## Artificial Intelligence

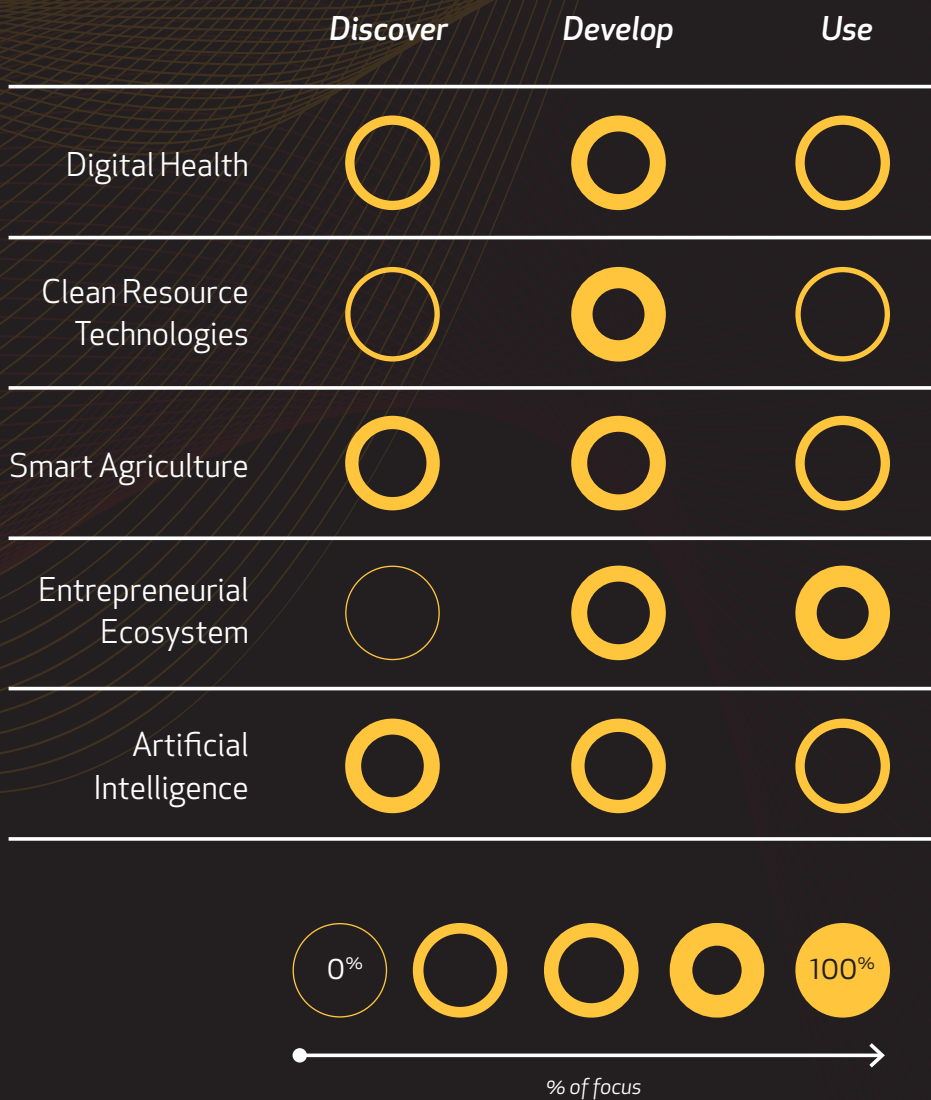
Build on our past successes in creating world-recognized artificial intelligence capacity in Alberta by supporting further development and application across sectors.

# OUR FOCUS AREAS

## ACROSS THE R&I CONTINUUM

THE FOLLOWING GRAPHIC DEPICTS THE NEAR-TERM DISTRIBUTION OF OUR ACTIVITIES IN EACH FOCUS AREA ACROSS THE DISCOVER, DEVELOP AND USE STAGES OF THE R&I CONTINUUM. EACH FOCUS AREA IS AT A DIFFERENT LEVEL OF MATURITY AND OUR EFFORTS ACROSS EACH STAGE ARE HIGHLIGHTED ACCORDINGLY.

*Distribution of activities across R&I continuum - 2021-24*



“ Innovation  
is progress  
in the face  
of tradition.”

*Divad Sanders*

*Founder & CEO, The Rebel Kulture*

# OUR VALUE TO ALBERTA



## INNOVATION IS THE LIFEBLOOD OF ALBERTANS

ALBERTA BEGAN ITS INNOVATION JOURNEY 100 YEARS AGO WHEN THE GOVERNMENT OF THE DAY ESTABLISHED THE SCIENTIFIC AND INDUSTRIAL RESEARCH COUNCIL OF ALBERTA IN 1921. THIS PUBLICLY FUNDED ORGANIZATION WAS TASKED WITH PROMOTING SCIENTIFIC RESEARCH AND INDUSTRIAL DEVELOPMENT OF THE PROVINCE'S RESOURCES – NEW IDEAS THAT WOULD TRANSFORM ALBERTA'S FUTURE.

Application of science and engineering, along with bold foresight and expertise, led to new industries and technologies that supported economic development and improved the lives of Albertans. As the context and needs of the province changed, so too did the name and structure of the organization known today as Alberta Innovates. A century later, one thing hasn't changed – research and innovation will drive diversification and economic growth.

ALBERTA INNOVATES REMAINS THE PROVINCE'S RESEARCH AND INNOVATION ENGINE. WE LEVERAGE OUR PROVINCIAL STRENGTHS AND OUR HISTORY TO ADDRESS CHALLENGES, CREATE NEW OPPORTUNITIES AND FORGE A HEALTHY, SUSTAINABLE AND PROSPEROUS FUTURE FOR ALBERTANS TODAY AND FOR GENERATIONS TO COME. WE SUPPORT INNOVATION ACROSS MULTIPLE SECTORS THROUGH STRATEGIC INVESTMENTS, WORLD-CLASS RESEARCH AND LEADING-EDGE FACILITIES – FROM THE CREATION OF NEW IDEAS THROUGH APPLIED TESTING TO COMMERCIALIZATION OR END USE. OUR WORK BOLSTERS THE R&I SYSTEM TO BE MORE ROBUST AND RESPONSIVE.

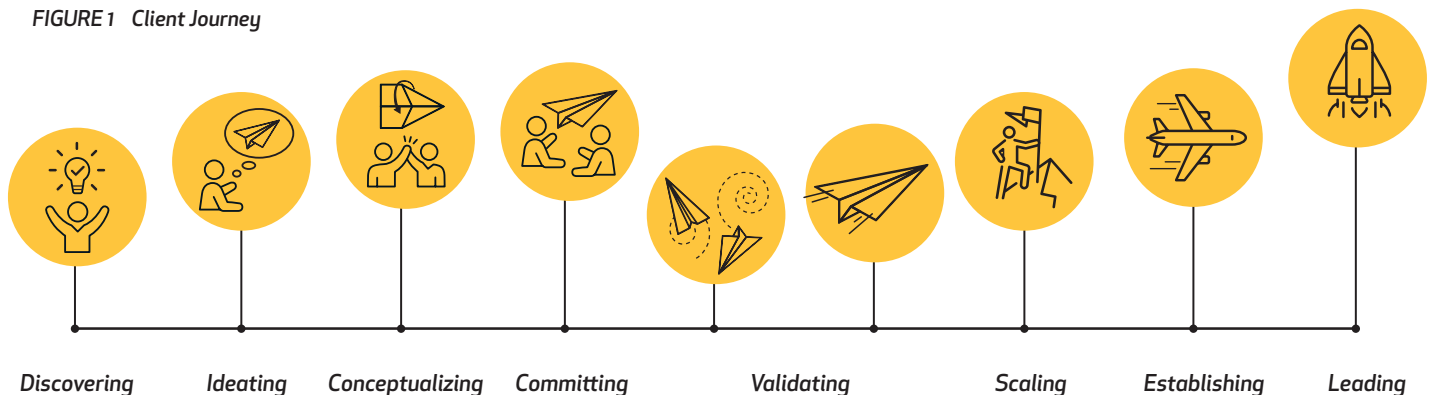
*Innovation is the catalyst for sustainable jobs, economic and community strength, improved health and environmental benefits. As Alberta's largest and only cross-sectoral research and innovation agency, we are uniquely positioned to propel great ideas forward to improve the lives of Albertans.*

The urgency of the global pandemic accelerated what we thought possible. Never before have innovators connected and collaborated so quickly to find solutions to complex problems in the form of life-saving vaccines, treatments and other pandemic responses. When economies shut down, innovators stepped forward with new ways to get things done and help us connect with each other. The pandemic has both taught us and reinforced the power of innovation. Innovation will be the key to unlocking opportunities in the technology, care and green economies. And Alberta Innovates will lead the charge in accelerating innovation by creating the right conditions.

Vaulting a great idea to commercialization or end use is one of the most challenging aspects of innovation the world over. It is also essential if the value from R&I is to be realized. We use our expertise and leading-edge facilities to accelerate this progression in our clients' innovation journey. Internationally recognized applied research and engineering services provided by our subsidiaries – C-FER Technologies and InnoTech Alberta – provide a critical "bridge" that validates, tests and translates innovation into real-world use. Our strategic partners in government, industry and academia value our expertise and ability to improve co-ordination and results within the innovation system.

Our clients engage with us at any point along the client journey where they feel we can help. We assist in the early stages of an idea or concept, when validating and scaling is required, or to help them explore global markets and partnerships as their innovations mature. This journey from discovery to use is rarely linear; clients often must overcome obstacles or pivot to achieve success.

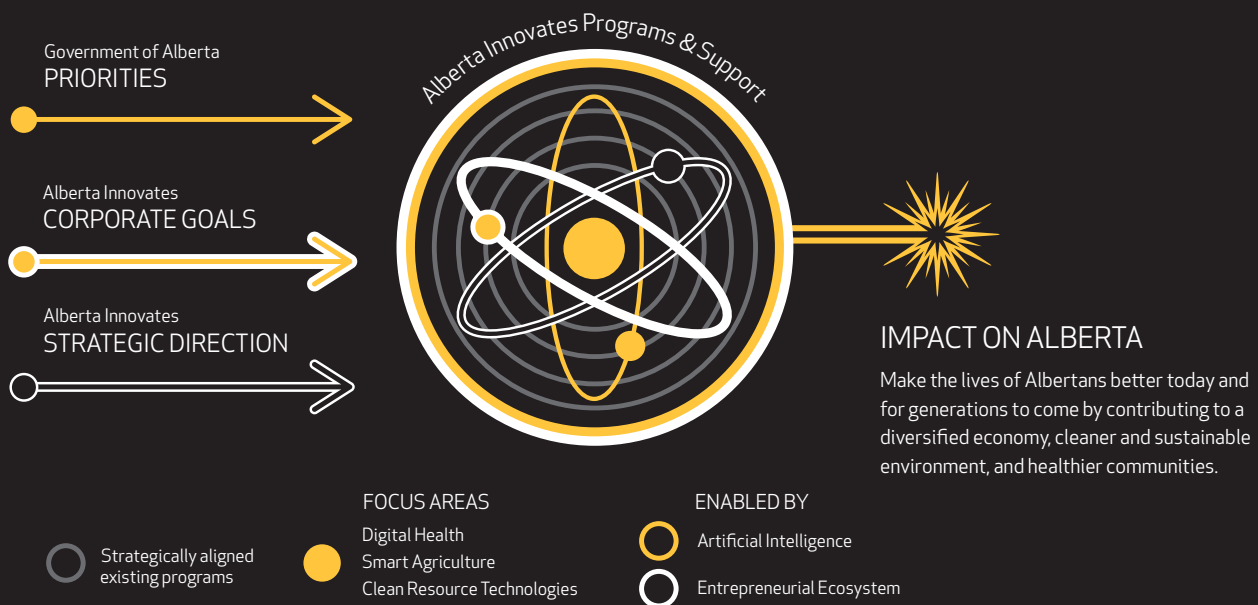
FIGURE 1 Client Journey



# TURNING GOALS INTO ACTION

THIS BUSINESS PLAN OUTLINES HOW OUR STRATEGIC DIRECTION, ACTIONS AND INVESTMENTS WILL CONTRIBUTE TO ACHIEVING OUR CORPORATE GOALS AND ULTIMATELY OUR ORGANIZATIONAL MANDATE SET BY THE GOVERNMENT OF ALBERTA THROUGH THE MINISTRY OF JOBS, ECONOMY AND INNOVATION. CASCADED AND INTERCONNECTED RELATIONSHIPS EXIST BETWEEN THE GOVERNMENT'S R&I PRIORITIES AND OUR CORPORATE PRIORITIES, GOALS, STRATEGIES AND BUSINESS AND OPERATING PLANS (SEE APPENDICES A AND B). THE GOVERNMENT'S PRIORITIES ARE OUTLINED IN THE CURRENT ALBERTA RESEARCH & INNOVATION FRAMEWORK (ARIF) AND WILL BE REFRESHED IN THE FORTHCOMING ALBERTA TECHNOLOGY AND INNOVATION STRATEGY (ATIS). THIS ENSURES ALIGNMENT BETWEEN PRIORITIES AND PLANS, ALL DRIVING TOWARD CREATING POSITIVE IMPACT FOR ALBERTANS.

FIGURE 2 Priorities, Goals, Strategic Direction, Focus Areas and Resulting Impact on Alberta



### **Our six corporate goals are to:**

- Make the lives of Albertans better today and for generations to come by contributing to a diversified economy, cleaner and sustainable environment, and healthier communities.
- Cultivate a world-class research and innovation system that meets the needs of Alberta.
- Drive the generation of discoveries and developments that positively impact Alberta and its industries by leveraging partnerships, collaborations and emerging technology platforms.
- Accelerate and broaden the use of innovative products, technologies and processes.
- Be recognized globally as a leading innovation engine.
- Achieve operational excellence.

### **We have three strategic priorities for our operations:**

- Develop emerging technologies, which include data-enabled innovation; digital technology for business transformation; clean technology; and innovative production and distribution.
- Enhance our knowledge workforce.
- Embrace the digital future.

A SUCCESSFUL RESPONSE TO ALBERTA'S BIGGEST OPPORTUNITIES AND CHALLENGES REQUIRES A COLLISION OF CREATIVE THINKING AND SHARED EFFORT. ALBERTA INNOVATES WILL CONTINUE TO LEVERAGE AND BUILD COLLABORATIONS WITH OUR WORLD-CLASS ACADEMIC COMMUNITY, GLOBALLY RECOGNIZED ARTIFICIAL INTELLIGENCE COMMUNITY, INDUSTRY, PUBLIC AND NOT-FOR-PROFIT ORGANIZATIONS, CONSORTIA, ENTREPRENEURS, SMALL AND MEDIUM ENTERPRISES (SMEs) AND MULTINATIONAL ENTERPRISES (MNEs). GUIDED BY CAN-DO SPIRIT, THESE COLLABORATIONS WILL DRIVE THE DISCOVERY, DEVELOPMENT AND USE OF INNOVATIONS IN ALBERTA AND BEYOND.

All our activities and investments span the Discover, Develop and Use stages of the R&I continuum (see Figure 3 for a description of these stages). We consider the current state of knowledge or innovation as well as the state of readiness and capability in the R&I system as we plan our key actions. This approach assists our operational and resource allocation planning by categorizing what actions should commence in the near term, mid term or longer term. This process also creates a better understanding of what types of outcomes can be anticipated and when, knowing that near-term actions frequently set the stage for mid- and longer-term actions and their outcomes. Collectively, the key actions will create a pipeline of opportunity for the province, with the goal of moving innovations into the hands of Albertans and the world.



# RESEARCH & INNOVATION CONTINUUM

FIGURE 3 The Stages of Research and innovation



## Discover

Aims to create new knowledge or understanding that may or may not have specific applications in mind from the outset. This type of research is usually performed at universities.



## Develop

Involves developing knowledge gained during the Discover stage toward a particular use. This development work typically occurs in applied research areas at universities, colleges and polytechnics, as well as industrial research laboratories and company laboratories.



## Use

Is about translating and applying developed research to address needs in the “real world.” This activity focuses on processes for the uptake, spread and scale of application-ready innovations. Examples include technology adaptation, technology commercialization, product and market innovation and translational research in health care.

“The value of an  
idea lies in the  
using of it.”

*Thomas Edison*

# ACTIONS FOR IMPACT

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SUSTAINABLE ECONOMIC DIVERSIFICATION AND GROWTH ARE CRITICALLY IMPORTANT FOR THE PROVINCE'S RECOVERY!<sup>1</sup> ALBERTA INNOVATES RECOGNIZES THAT NO SINGLE TECHNOLOGY OR INDUSTRY WILL GROW OR TRANSFORM THE PROVINCIAL ECONOMY. INSTEAD, A CONVERGENCE OF EMERGING TECHNOLOGIES, PLATFORMS AND APPLICATIONS IS NECESSARY. COLLISIONS OF DISCOVERIES AND EMERGING TECHNOLOGIES WILL DEVELOP AND GROW NEW INDUSTRIES AND STRENGTHEN EXISTING ONES. ULTIMATELY, THIS WILL CONTRIBUTE TO ECONOMIC DIVERSIFICATION AND INSULATE ALBERTANS FROM VULNERABILITIES ASSOCIATED WITH OUR HEAVY RELIANCE ON THE TRADITIONAL OIL AND GAS SECTOR OVER THE LAST 50 YEARS.

<sup>1</sup> Government of Alberta 2021-24 Fiscal Plan: Protecting Lives and Livelihoods. <https://open.alberta.ca/publications/budget-2021>

WHEN FOUR PROVINCIAL CORPORATIONS WERE CONSOLIDATED TO BECOME ALBERTA INNOVATES IN 2016, OUR PROGRAM OFFERING WAS DIVERSE AND SPANNED A LARGE BREADTH OF R&I ACTIVITY. WE HAVE BEEN WORKING DILIGENTLY TO TRANSFORM OUR PROGRAMS, SO THEY HAVE MORE DEPTH IN AREAS OF GREATEST OPPORTUNITY FOR ALBERTA.

Our operations have been shifting away from sector-specific initiatives in favour of a more integrated approach in our programming. This shift, driven by the priorities outlined in our five-year strategic plan (see Appendix A), aims to capitalize on Alberta's current strengths while leveraging technologies with the highest promise and encouraging their adoption across sectors. This business plan further advances this shift with a continued focus on opportunities with the greatest potential to transform Alberta's economy. This includes cross-ministerial opportunities and strategies aimed at enhancing innovation, jobs and investment in Alberta.

The accelerating speed of technological change and the capabilities it brings is altering the world we live in more dramatically than any other time in history. Scientists, researchers and innovators around the world are more connected with each other and finding solutions faster than ever before. Never has the world witnessed so many powerful and complementary technologies.

This presents a significant opportunity for Alberta. An opportunity to build on our strengths to accelerate innovation in Alberta, for Albertans.

**We support activities in a variety of areas, all with strategic importance:**

- *Lead and co-ordinate activities that support the growth and diversification of Alberta's agriculture, forestry and food sectors.*
- *Develop and invest in applied R&I programs to sustain, grow and diversify the energy and resource industries, develop clean technology, reduce greenhouse gas emissions and protect the environment.*
- *Provide supports and services across the health innovation spectrum, with the aim of building a strong and resilient R&I system in the health sector.*
- *Invest in Alberta's post-secondary institutions to develop capacity in people, key infrastructure, collaborations and projects.*
- *Assist entrepreneurs and high-growth, high-potential SMEs to reduce the time it takes to commercialize their innovations, and to scale their business.*
- *Provide world-class expertise, testing and applied research services through our subsidiaries, C-FER and InnoTech, for a variety of clients, including industry.*

While the COVID-19 pandemic requires us to pivot and adapt to immediate health and economic issues, mega trends such as climate change, population expansion and urbanization, and shifts in the global economic balance of power continue to have transformative influences on nearly every aspect of our lives, including our jobs and communities.

FIGURE 4 Mega trends shaping our future over the next decade<sup>2</sup>



In the coming decades, Alberta must intensify its efforts to discover, develop and use innovation if we are to thrive. The province's deep tradition in scientific inquiry and top-quality research, combined with our highly skilled workforce and world-leading capabilities in artificial intelligence and machine learning, present us with a tremendous opportunity to be at the forefront of several innovation areas.

With our expertise in energy, agriculture and health, Alberta Innovates is well-positioned to leverage our province's strong R&I system to drive innovations capable of addressing several challenges currently facing Alberta:

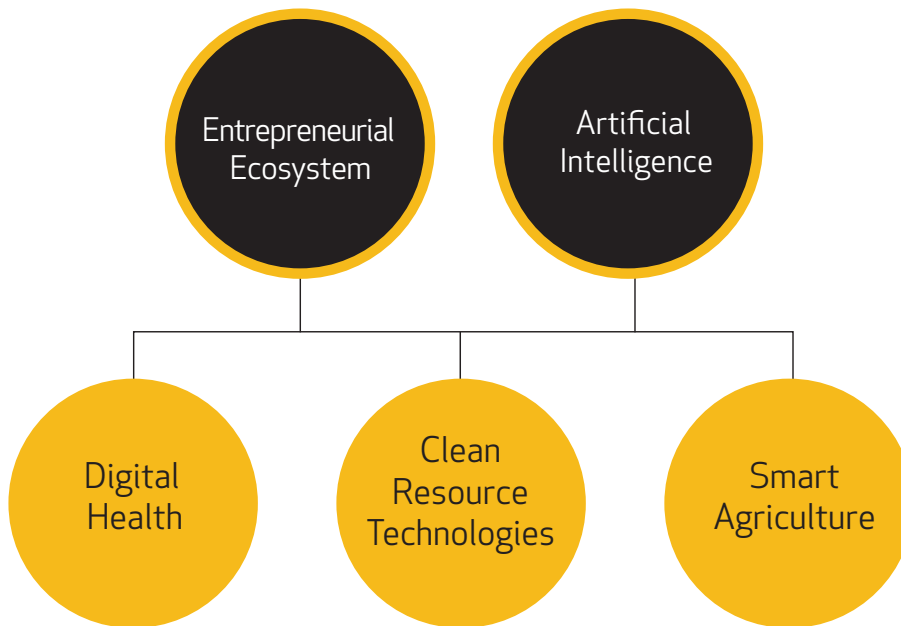
- Ongoing economic hardships resulting from varying global prices for oil, pipeline constraints and the COVID-19 pandemic result in lower worldwide demand and market access issues.
- Our agri-food industry is being pressured to do more with less due to a changing climate, constraints on land and water, declining soil quality and significant increases in global food demand associated with a rapidly growing population and dietary changes.
- A growing and aging population is contributing to greater spending in the health system to unsustainable levels. Health currently consumes nearly 40 per cent of our provincial budget and the pandemic has further strained the system.

Alberta Innovates has identified five focus areas for our investments that will help address these challenges while providing significant economic opportunities for the province (Figure 5). They build on the skills and supports we have developed in the R&I system through our investments over many years. These areas align with our corporate goals and provide a "laser focus" for our strategic priorities – establishing a more clear-cut path forward for our organization. Additionally, our investments in these focus areas will further contribute to the provincial government's Alberta Research & Innovation Framework (ARIF) targets.<sup>3</sup>

<sup>2</sup> <https://www.blackrock.com/ch/individual/en/themes/megatrends>

<sup>3</sup> <https://www.alberta.ca/alberta-research-innovation-framework.aspx>

FIGURE 5 Focus Areas for Investment



The focus areas **Entrepreneurial Ecosystem** and **Artificial Intelligence** serve as enabling tools necessary to drive much of the innovation - and the associated economic stimulus and job growth - in the other three areas (**Digital Health**, **Clean Resource Technologies** and **Smart Agriculture**). These enablers also have broad applicability to a multitude of activities and initiatives in the R&I system and contribute to the achievement of our corporate goals.

Solutions to Alberta's challenges will not happen overnight but through a series of planned and staged actions. Innovation is a complex process that requires appropriate resources over a reasonable period of time. The amount and timing of resources, including additional investment from government and other stakeholders, will be critical to quickly advance early achievements and ensure we are not missing opportunities for greater value creation.

Alberta Innovates efforts in the five focus areas will capitalize on our previous and continuing investments and collaboration in the Alberta Machine Intelligence Institute (Amii), entrepreneurial activities in information and communication technology, the Canadian Automation and Agri-Food Intelligence Network (CAAIN), and the Alberta Clinical Research Consortium for digital health. These previous investments helped establish and advance the enabling infrastructure necessary for the development and implementation of innovations capable of producing positive economic, health, environmental and social impacts.

Business Plan 2021-2024 highlights the near-term actions and key activities that we will undertake across the R&I continuum in areas of importance to Alberta, including our focus areas. The outcomes produced by these actions and activities are, in many cases, the precursors that need to be established before additional actions can be commenced. By keeping the desired downstream impacts in mind, we ensure our actions today create the necessary conditions that enable the results we want tomorrow.

# AREAS OF FOCUS



## DIGITAL HEALTH

THE HEALTH LANDSCAPE HAS SEEN SIGNIFICANT TRANSFORMATION OVER THIS PAST YEAR. THE COVID-19 PANDEMIC HAS CHANGED THE WAY CARE IS DELIVERED IN THE PROVINCE, THE COUNTRY AND AROUND THE WORLD. HEALTH SYSTEMS, CAREGIVERS AND PATIENTS HAVE HAD TO FIND NEW WAYS TO WORK AND INTERACT WHILE MANAGING HEALTH NEEDS.

In addition to the pandemic, the rising cost of health care, aging populations, complexities of health-care systems and changing citizen expectations are driving innovation the health industry. The emergence and use of technologies such as wearable medical devices, virtual reality, artificial intelligence and 5G wireless network technology make personalized health care possible, facilitate better preventative care and increase health system efficiency by streamlining workflows. Innovation is critical to providing effective solutions for patients' evolving needs and the right care in the right place at the right time.

Now is the time for Alberta to shift from traditional methods of providing health care to modern care models enabled by digital health innovations. Costs of care will be reduced while simultaneously creating a seamless user experience, allowing patients to seek care regardless of geographical location. Importantly, the modernized model is more adept in responding to the evolving needs of citizens and empowers them in their overall health and well-being.

System challenges bringing opportunities. There is a clear sense of optimism from stakeholders in the digital health industry, with commitments to collaborate, grow the industry in Alberta and be a leader in this space.

*“Digital health is the convergence of the digital and genomic revolutions with health, health care, living, and society. As we are seeing and experiencing, digital health is empowering us to better track, manage, and improve our own and our family’s health, live better, more productive lives, and improve society. It’s also helping to reduce inefficiencies in health care delivery, improve access, reduce costs, increase quality, and make medicine more personalized and precise.”*

*Innovation expert Paul Sonnier, author of The Fourth Wave: Digital Health*

Alberta is already well-positioned to embark on a digital transformation in health. The province's health information systems – Alberta Netcare, Connect Care, Community Information Integration (CII) and Central Patient Attachment Registry (CPAR) – are gathering, integrating and making accessible standardized key health information in ways that could only be dreamed about not that many years ago. The amount of health data being produced in Alberta is at unprecedented levels, partially because Alberta Health Services (AHS) is Canada's largest integrated provincial health-care system, with more than 115,000 staff and 10,000 physicians serving 4.4 million Albertans across urban and rural settings.<sup>4</sup>

The volume and type of data available will continuously grow and evolve as the development and use of digital health technologies increase. The use of artificial intelligence and machine learning (AI/ML) – already two of Alberta's strengths – will be necessary to manage, analyze and interpret this volume of data to identify health-system issues and solutions.

Having these data and analytical capabilities within an integrated health system will assist in attracting innovators and investments to the province, especially in relation to clinical trials and research. Clinical research in Alberta is also supported by platforms managed by Alberta Innovates such as the Alberta Clinical Research Consortium and the Health Research Ethics Board of Alberta. Access to clinical trials and medical advances through research provide Albertans the opportunity to benefit from earlier access to the best and most innovative health care possible.





## Digital Health

Alberta Innovates' focused investments in Digital Health can accelerate improvements in the quality and long-term sustainability of our health system and ultimately our health. Over the next three years, we will:



### Discover

- Create a digital health “collaboratory” with relevant stakeholders to support the mobilization of a digital health ecosystem.
- Deliver research programs to accelerate discovery in areas of precision health, network medicine and other emerging areas that serve as the pipeline to digital technology development in the health industry.
- Continue to engage stakeholders to create buy-in for digital health as a key driver of economic and health prosperity for Alberta.
- Promote and add clarity to digital data management standards that support data quality.
- Create a mechanism to attract investment to Alberta for digital health initiatives through partnerships with like-minded organizations in the digital health space.
- Enable a digital health economy by supporting the attraction, retention and development of talent in the digital health industry.



### Develop

- Work closely with industry to identify mechanisms to attract the skills necessary for the growth of a digital health economy in Alberta.
- Deliver programs to accelerate the commercialization of digital health technology with a focus on connected devices, immersive technologies, wearables and AI/ML-powered platforms.
- Continue to deliver valuable seminars and workshops to enable the health innovation client journey for innovators in Alberta.
- Build capacity and understanding of ethics, privacy and legal considerations in the development and implementation of health innovation.
- Showcase Alberta to attract investment and clinical health research activity.



### Use

- Build cross-jurisdictional partnerships that increase market access for digital health innovators.
- Deliver programs to accelerate the implementation and adoption of digital health technology, with a focus on connected devices, immersive technologies, wearables and AI/ML-powered platforms and their use in real-world trials.
- Partner with academia and industry to accelerate health R&I in Alberta through the creation of novel digital health platforms provincially.

### Key activities in 2021-24

#### Discover:

- *Develop a digital health collaboratory.*
- *Gather stakeholder feedback and finalize Alberta Innovates' Digital Health Strategy framework.*
- *Identify challenges and roadblocks faced by innovators and explore opportunities to provide supports in those areas.*
- *Continue to engage with stakeholders to increase buy-in and develop a strategy for digitization of clinical health research.*
- *Work with stakeholders provincially and nationally to develop and promote data standards in health R&I projects.*
- *Engage stakeholders and partners to support investment attraction to accelerate innovations towards economic outcomes.*

#### Develop:

- *Identify industry needs and develop mechanism(s) to help address the gaps.*
- *Identify challenges and roadblocks faced by innovators and explore opportunities to provide supports in those areas.*
- *Continue to provide educational programming to stakeholders and clients.*
- *Identify potential program offerings to support capacity development in digital health..*
- *Co-develop the Clinical Trials Alberta website.*

#### Use:

- *Identify partners and explore expansion of market access programming.*
- *Identify challenges and roadblocks faced by innovators and explore opportunities to provide supports in those areas.*
- *Continue to work with stakeholders to develop an integrated suite of enabling platforms.*



## CLEAN RESOURCE TECHNOLOGIES

DEMAND FOR CLEAN TECHNOLOGY AND THE PUSH FOR A NET-ZERO ECONOMY IS GROWING ACROSS THE WORLD. ACTIVITY IN THE CLEAN TECHNOLOGY SECTOR GLOBALLY IS EXPECTED TO BE GREATER THAN \$2.5 TRILLION BY 2022.<sup>5</sup>

The pace of transition to a net-zero economy has been accelerated since the COVID-19 pandemic began. Energy companies have absorbed billions of dollars in losses in climate-related write-downs on stranded assets. More and more governments and businesses around the globe are committed to achieving net zero and are increasingly focused on the significant economic opportunity that the transition will create. As a leading innovation organization in the province, Alberta Innovates has the responsibility to help position Alberta for success in a net-zero economy.

The resource industry will continue to contribute to Alberta's economy in decades to come. Clean technology can help the resource industry become more sustainable. At the same time, Alberta is well-positioned to build a multibillion-dollar clean technology sector for domestic and export markets by leveraging the province's strong engineering and business resources. Broadly, clean technology aims to improve environmental sustainability and is also a great opportunity for economic diversification in Alberta. Recognizing this, the Clean Resource Technologies focus area expands the scope of Innovative Hydrocarbon Products presented in our previous business plan to also include clean technology. Our work to create an innovative hydrocarbon products industry in the province will continue while we simultaneously support Alberta's need to decarbonize resource production.

Significant opportunities include: bitumen beyond combustion (BBC) with bitumen partial upgrading (BPU); blue hydrogen and natural gas value-added products; carbon capture, utilization, and storage (CCUS); water innovation; biofuels; plastics recycling circular economy; smart grid and energy storage (including battery materials); and reclamation. Together, these represent more than \$100 billion in economic potential for Alberta.

The goal of our Clean Resource Technologies focus area is to support innovations that will lead to a strong clean technology sector and a value-added resource industry in Alberta, one that helps Alberta become a global leader in environmental, social and governance (ESG) performance.

### **What is Clean Technology?**

*Clean technology, also referred to as cleantech, is any technological process, product, or service that: 1) provides superior performance or lower costs than the current norm or standards, 2) minimizes negative environmental impacts, and 3) makes more efficient and responsible use of natural resources.*

*– ECO Canada Report: Cleantech Defined: A Scoping Study of the Sector and Its Workforce*

### **What is Net Zero?**

*Achieving net-zero emissions means our economy either emits no greenhouse gas emissions or offsets its emissions – for example, through actions such as tree planting or employing technologies that can capture carbon before it is released into the air.<sup>6</sup>*

<sup>5</sup> <https://www.ic.gc.ca/eic/site/098.nsf/eng/00023.html> - accessed February 20, 2021 or [https://www.ic.gc.ca/eic/site/098.nsf/vwapj/ISED\\_CleanTechnologies.pdf/\\$file/ISED\\_CleanTechnologies.pdf](https://www.ic.gc.ca/eic/site/098.nsf/vwapj/ISED_CleanTechnologies.pdf/$file/ISED_CleanTechnologies.pdf)

<sup>6</sup> <https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/net-zero-emissions-2050.html>

## Clean Resource Technologies



### Discover

- Continue actively pursuing knowledge generation and discovery of clean resource technologies.



### Develop

- Continue to develop programs and partnerships to advance clean technology in Alberta.
- Actively work with industry to develop Bitumen Partial Upgrading technologies.
- Develop technologies aimed at converting bitumen and asphaltene to carbon fibre, activated carbon and asphalt binders.
- Develop clean technologies to improve ESG performance of Alberta's resource industry.
- Develop clean technology products and processes to diversify Alberta's economy.
- Develop natural gas value-added products including blue hydrogen production, hydrogen storage and hydrogen infrastructure.



### Use

- Deploy and commercialize clean resource technologies.



## Key activities in 2021-24

### Discover:

- Conduct life-cycle analysis of GHG emissions from existing pathways and new technologies in oil sands and natural gas production in Alberta.
- Model optimal energy systems to achieve net zero in Alberta by 2050.
- Generate knowledge and discovery related to climate vulnerability and sustainable water management in Alberta.
- Discover climate-resilient restoration practices.

### Develop:

- Continue to develop programs and national and international partnerships.
- Actively work with industry to develop, pilot and demonstrate Bitumen Partial Upgrading technologies.
- Continue activity with Carbon Fibre Grand Challenge; demonstrate activated carbon manufacturing; demonstrate novel asphalt production.
- Operationalize the Canadian Emissions Reduction Innovation Network; advance CCUS technologies; improve water-use efficiency and productivity in municipal, agriculture and resource industry; advance low-energy remediation and reclamation technologies.
- Invest in development of renewable fuels; waste-to-biofuels; Alberta Smart Grid Consortium; micro-grid technologies and systems integration pilots and demonstrations; conventional and advanced geothermal pilots; battery materials and energy storage.
- Invest in development of natural gas value-added products including blue hydrogen production, hydrogen storage and hydrogen infrastructure. This includes novel blue hydrogen production; hydrogen-diesel hybrid engine testing; hydrogen storage, carrier and infrastructure technology; natural gas value-added products; plastics recycling technologies.

### Use:

- Deploy methane emission reduction technologies.
- Move two or more BPU technologies to commercial demonstration stage and one to commercial production stage.
- Move three or more BBC technologies (carbon fibre, activated carbon and asphalt binder) to commercial demonstration stage and one or more to commercial production stage.
- Move two or more blue hydrogen and natural gas value-added technologies to commercial demonstration stage and one to commercial production stage.
- Move five or more clean technologies (CCUS, water, biofuels, geothermal, smart grid, reclamation, etc.) technologies to commercial demonstration stage and three or more to commercial production stage.



## SMART AGRICULTURE

INNOVATIVE TECHNOLOGIES ARE CHANGING THE FACE OF MODERN FARMING AROUND THE WORLD. “SMART AGRICULTURE” FOCUSES ON THE DEVELOPMENT AND APPLICATION OF TECHNOLOGIES TO INCREASE THE QUANTITY AND QUALITY OF AGRICULTURE AND AGRI-PRODUCTS ACROSS THE VALUE CHAIN.

The world’s population is expected to grow to 8.5 billion by 2030,<sup>7</sup> creating greater demands on the food system than ever before. This population growth, and shifting consumption patterns, climate change and scarcity of natural resources, are driving the agri-food industry to respond rapidly and adapt. The COVID-19 pandemic highlighted the resiliency of the food system and the importance of agile and adaptable supply chains. While the agricultural industry was not spared from the economic consequences of the pandemic, early reports indicate the industry in Canada remained relatively stable compared to many other industries.<sup>8</sup> Agriculture will also be key to Alberta’s economic recovery from the current downturn.<sup>9</sup>

Alberta’s landscape is ideal for agricultural production – from growing pulses and other crops to raising livestock to value-added processing. This has led Alberta’s agri-food industry to be a significant economic driver in the province, with more than \$29 billion in sales and \$11.6 billion in exports of primary and processed agriculture and food products in 2019.<sup>10</sup> It employs nearly 77,000 people and contributes \$9.25 billion to gross domestic product (GDP).<sup>11</sup>

Alberta also has the skills and expertise to create significant impact in Alberta and beyond. With access to more than 22 research and innovation facilities,<sup>12</sup> Alberta is positioning itself to be a world leader in advanced and emerging technologies for agriculture and food within the emerging agricultural revolution. Our agri-food sector is poised to be an area of GDP growth for the province in the coming years. It is estimated that Alberta-based investments in smart agriculture will generate an additional cumulative impact of more than \$4 billion after 10 years.

*“Future agriculture technologies will use sophisticated technologies such as robots, temperature and moisture sensors, aerial images, and GPS technology. These advances will let businesses be more profitable, efficient, safer, and environmentally friendly.”*

World Government Summit, Agriculture 4.0 – The Future of Farming Technology

7 UN - World Population Prospects 2019: Highlights | United Nations

8 <https://www.fas.usda.gov/data/canada-overview-covid-19-impacts-canadian-agriculture>

9 <https://www.agcanada.com/daily/ag-industry-a-potential-bright-spot-post-pandemic>

10 <https://open.alberta.ca/dataset/79f01912-5e5c-469e-8cf4-97cfc6901cea/resource/99a6af21-3620-4138-ae5c-2cefe1c48f19/download/af-agriculture-statistics-factsheet-2019.pdf>

11 <https://open.alberta.ca/dataset/79f01912-5e5c-469e-8cf4-97cfc6901cea/resource/99a6af21-3620-4138-ae5c-2cefe1c48f19/download/af-agriculture-statistics-factsheet-2019.pdf>

12 <https://investalberta.ca/key-sectors/agriculture/>

The future of farming in Alberta will see the introduction of drones, sensor-controlled systems, and other smart technologies to monitor crop, soil and livestock health and productivity. The emergence of autonomous machinery will assist with labour-intensive activities and data collection, and play a key role in addressing labour shortages and increasing food production.<sup>13</sup> Artificial intelligence and predictive modelling will inform timely decision-making, ensure precise use of agricultural inputs, and be used to identify solutions to prevent disease or pest outbreaks. Innovations in blockchain technology will allow consumers to buy with confidence, with a view into where and how their food was produced.<sup>14</sup>

Digital and technical transformation is fast-moving in the competitive agri-food industry. Continued advancement requires strong linkages across the innovation system. Alberta Innovates' connections and collaborations with groups such as the Canadian Automation and Agri-Food Intelligence Network (CAAIN), Results Driven Agricultural Research (RDAR) and others provides us with the opportunity to create provincial and national partnerships necessary for Alberta's agricultural transformation.

Over the next few years, our focus on Smart Agriculture will begin to accelerate the transformation of this industry and will provide an opportunity to impact performance at every step of the agriculture food value chain, from rangeland and field to our tables. Alberta will increase its ability to feed more people in an environmentally sustainable way while generating economic growth, new jobs and prosperity in our province.



<sup>13</sup> <https://www.bustedcubicle.com/features/industry-disrupted/agriculture>

<sup>14</sup> <https://caain.ca/about-us/>

## Smart Agriculture

Specifically, in 2021–24, we will lead the industry by focusing on:



### Discover

- New DNA tools and cross-platform technology applications.
- Effective methods to standardize, digitize and use data along the agri-food value chain.
- Support for applied research in autonomous systems for farms and food manufacturing.



### Develop

- Validation and demonstration of new DNA tools.
- Prototype development to validate and demonstrate the use of remote monitoring autonomous systems for farms and food manufacturing.
- Development of technologies aimed at sustainable agriculture and food systems.



### Use

- Commercialization, technology, knowledge transfer and adoption of new DNA tools and cross-platform technology applications.
- Commercialization of demonstrated and proven technologies and products.
- Commercialization and adoption of autonomous systems for farms and food manufacturing.

### Key activities in 2021–24

#### Discover:

- Continue to work with partners, collaborators and the research community to advance new DNA tools.
- Work with partners and collaborators to leverage funding, explore standards for a digital food supply chain and offer programs to support activities along the agri-food value chain.
- Continue to work with partners including the post-secondary institutions, research and industry organizations, Results Driven Agricultural Research and CAAIN, to advance applied research.

#### Develop:

- Provide support through programming such as the Smart Agriculture and Food Digitization and Automation Challenge.
- Explore ways to attract funding and incorporate investments in sustainable agriculture and food systems.
- Support post-secondary institutions, research organizations and SMEs to advance technology solutions.

#### Use:

- Work with Alberta Innovates business units such as Entrepreneurial Investments, and other partners and collaborators, to identify activities with high commercialization potential.



## ENTREPRENEURIAL ECOSYSTEM

NEVER HAS THERE BEEN A GREATER NEED TO SUPPORT AND GROW AN ENTREPRENEURIAL ECOSYSTEM IN THE PROVINCE. WITH THE COVID-19 PANDEMIC AND ONGOING HARDSHIPS IN OUR OIL SECTOR, STARTUP COMPANIES ARE FACING STAFF REDUCTIONS, REDUCED PRODUCT DEMAND AND A DECREASE IN INVESTMENT ACTIVITY. YET, WITH THE ACCELERATION OF DIGITAL AND OTHER TECHNOLOGY PRODUCTS THROUGH THE PANDEMIC, TECHNOLOGY-BASED STARTUPS ARE A KEY PIECE TO ALBERTA'S ECONOMIC RECOVERY.<sup>15</sup>

*“...a decade of research has shown, most of the net job creation in the economy comes from new, young companies, especially those that scale.”*

*Startup Genome, Global Startup Ecosystem Report, 2020*

The global startup economy created nearly \$3 trillion in value between 2017 and 2019.<sup>16</sup> With leading universities, an active venture capital market and successful entrepreneurs and businesses in the province, Alberta's entrepreneurial ecosystem has great potential to expand and grow. We are beginning to see a shift from an innovation economy dominated by large and established corporate players to an increase in entrepreneurial ventures and startup companies. In fast-growing sub-sectors like artificial intelligence and blockchain, Edmonton has been identified as an emerging, vibrant ecosystem to watch.

Creating a strong entrepreneurial ecosystem is a fundamental enabler for building a technology-rich economy. Alberta Innovates is well-positioned to continue supporting a growing entrepreneurial ecosystem in the province through the programs, networks and connections we provide to entrepreneurs and startups working to commercialize their innovations and scale their businesses. Our support of high-growth, high-potential SMEs helps reduce the time it takes to commercialize innovations and knowledge-based products.

Coaching, community and capital are our pillars of support for the entrepreneurial ecosystem and they work closely together as a system. The innovation community collaborates within this system to bring Alberta's R&I to the next stage in its evolution more rapidly. Alberta's innovative technologies get to market sooner by shortening the time to initiate interactions between R&I stakeholders and increasing the speed of commercialization. This, in turn, increases the number of successful SMEs that contribute to our economy.

<sup>15</sup> <https://startupgenome.com/reports/gser2020>

<sup>16</sup> <https://startupgenome.com/reports/gser2020>

## Entrepreneurial Ecosystem

Our actions are designed to support the advancement of commercial and non-commercial technologies into uses that benefit the province. Over the next three years, we will bolster the evolution of the Entrepreneurial Ecosystem in several ways:



### Develop

- Explore mechanisms and pilot programs to turn researchers into entrepreneurs, and/or move our research investments into development and use.
- Maintain and leverage partnerships to connect SMEs with researchers in Alberta Innovates focus areas.



### Use

- Work with the Regional Innovation Networks to balance early-stage startup supports with the need to create more supports for companies in the scale-up phase of their evolution.
- Expand investment readiness knowledge and connections to investors.
- Explore and launch new pilot investment programs targeted at strategic focus areas and marketplace need, such as industry pull, global technology partnerships and scale-up requirements.
- Increase investments in startups according to our strategic focus areas and invest in more scale-up and growth companies and activities.
- Identify opportunities to strengthen the Alberta Innovation Network through collaborative pilot projects, workshops and enhanced connectivity activities.
- Leverage alumni and industry networks to increase collaboration and engagement for planning and evaluation.

### *Key activities in 2021-24*

#### **Develop:**

- *Collaborate with post-secondary institutions and other partners to identify ways to increase interaction between SMEs and researchers through funding, networking and other activities.*

#### **Use:**

- *Work with partners, Regional Innovation Networks, and the Alberta Innovation Network to strengthen supports for SME scale-up and growth.*
- *Expand investment readiness knowledge, impactful supports and investor connections.*
- *Increase SME understanding of capital raise process.*
- *Evaluate new program pilots and adjust programs as required.*
- *Support traction and scale-up investments and monitor for co-developed outcomes.*
- *Explore new programming and supports to accelerate the scale-up and growth of SMEs.*







## **ARTIFICIAL INTELLIGENCE**

ARTIFICIAL INTELLIGENCE IS NO LONGER A CONCEPT OF THE FUTURE – WE ARE EXPERIENCING IT EVERY DAY IN WAYS WE LIKELY DO NOT REALIZE, THROUGH THE SERVICES AND PRODUCTS WE USE. BUSINESSES ARE PROGRESSIVELY CHANGING THE WAYS THEY WORK BY USING ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING TO SAVE TIME AND MONEY.

These applications help companies automate operations, generate real-time business insights (e.g., predicting outcomes), reduce errors and enhance client experience. The COVID-19 pandemic has greatly accelerated development of artificial intelligence applications for industry, governments and others including the health-care system.<sup>17</sup>

In Canada, four out of five C-suite executives believe they risk going out of business entirely if they don't scale artificial intelligence in the next five years.<sup>18</sup> There is little dispute that artificial intelligence will drive transformative changes for businesses, with early evidence showing increased profitability of nearly 40 per cent and cost savings that can be measured by an order of magnitude.<sup>19</sup> As it is increasingly adopted, the impact of artificial intelligence in our everyday lives will increase exponentially with no limit in sight.

Alberta has great potential to be a leader in the development, and equally or more importantly, in the use of artificial intelligence. It would create a significant economic advantage for our province, given that artificial intelligence could add an estimated \$15.7 trillion USD to global economic output over the next decade and boost GDP for local economies by up to 26 per cent.<sup>20, 21, 22</sup> According to a report prepared for Alberta Innovates, the potential impact to the Alberta economy by adoption of data-driven technologies by 2025 is GDP growth of \$1.027 billion, with employment gains of 7,000 jobs and 140 new companies.

Over the last two decades, investments made by Alberta Innovates and its predecessors helped establish artificial intelligence capacity and infrastructure in the province, which in turn produced some of the top technologies, discoveries and talent in the industry. These achievements have been noticed by the rest of the world. Alberta is home to the Alberta Machine Intelligence Institute (Amii). The expertise of Amii and others in the province led Google's DeepMind lab to choose Alberta as the site for its first international artificial intelligence research lab outside London, England.

17 [https://www.thelancet.com/journals/landig/article/PIIS2589-7500\(20\)30295-8/fulltext](https://www.thelancet.com/journals/landig/article/PIIS2589-7500(20)30295-8/fulltext)

18 [https://www.accenture.com/\\_acnmedia/thought-leadership-assets/Pdf-2/accenture-Built-to-Scale-Pdf-Report.pdf#zoom=50](https://www.accenture.com/_acnmedia/thought-leadership-assets/Pdf-2/accenture-Built-to-Scale-Pdf-Report.pdf#zoom=50)

19 [https://www.accenture.com/fr-fr/\\_acnmedia/36dc7f76eab444cab6a7f44017cc3997.pdf](https://www.accenture.com/fr-fr/_acnmedia/36dc7f76eab444cab6a7f44017cc3997.pdf)

20 McKinsey Report: Notes from the AI Frontier

21 <https://www.pwc.com/gx/en/issues/data-and-analytics/publications/artificial-intelligence-study.html>

22 <https://www.pwc.com/gx/en/issues/analytics/assets/pwc-ai-analysis-sizing-the-prize-report.pdf>

Alberta Innovates' world-class reputation and desire to partner has resulted in additional investments from the Government of Canada and numerous industrial partners. There is now even greater potential to support the translation of knowledge generated by Amii and its partners to solve challenges and create prosperity.

*“Artificial intelligence heralds dramatic potential for growth for both the economy and for humans.”*

*Mark Purdy, Managing Director – Economic Research, Accenture Institute for High Performance*

A large amount of Alberta's investments in artificial intelligence over the last 20 years have been in the discovery stage of the R&I continuum. The success of those investments now enables our province to develop and apply that knowledge toward real-world uses. Alberta Innovates is in an ideal position in the R&I system to support this transition by connecting artificial intelligence expertise with industries seeking solutions to their needs.



## Artificial Intelligence

Our actions in 2021–24 will continue to build artificial intelligence capacity in Alberta and begin to optimize artificial intelligence use across multiple sectors, with a focus Digital Health, Clean Resource Technologies and Smart Agriculture. Specifically, we will:



### Discover

- Provide funding and supports that will allow Amii to continue to develop and accelerate artificial intelligence capacity in Alberta.
- Ensure that skill development aligns to and supports Government of Alberta post-secondary and labour market development plans.
- Ensure data governance and access platforms, such as the Alberta Data Institute, support our focus areas of Digital Health, Smart Agriculture and Innovative Hydrocarbon Products.



### Develop

- Attract highly qualified and skilled artificial intelligence talent to Alberta, capitalizing on reduced supports in other jurisdictions.
- Explore opportunities to deploy artificial intelligence in the resource industry by optimizing oil sands and unconventional oil and gas or improving the efficiency and safety of crude oil transportation, as examples.
- Explore skill development programs aligned to Government of Alberta strategies.
- Develop opportunities for digital transformation to improve reliability and maintenance of data in the energy sector.

### Key activities in 2021–24

#### **Discover:**

- *Continue to work with Amii and other partners and collaborators to support the artificial intelligence capacity in Alberta.*
- *Build an offering to ensure researchers and recent graduates have the business acumen and networks to drive commercialization of research efforts.*
- *Reimagine, refocus and realign the Alberta Data Institute in support of Alberta Innovates focus areas and work with stakeholders to establish a clear value proposition for the institute.*

#### **Develop:**

- *Explore opportunities to increase the impact of artificial intelligence talent investments with other groups in the province including the post-secondary institutions and Amii.*
- *Work with partners and collaborators to advance the development of artificial intelligence technologies in the resource industry.*
- *Continue to provide programs to support the development of artificial intelligence technologies in the Clean Resource Technologies space.*
- *Explore avenues to grow skill development through increased interaction with applied research institutions and regional colleges.*
- *Invest and support SMEs, oil and gas producers, and post-secondary institutions in developing machine learning, artificial intelligence and data-driven technologies to reduce costs and improve environmental outcomes.*

“ Innovation is  
the change  
that unlocks  
new value.”

*Jamie Notter*

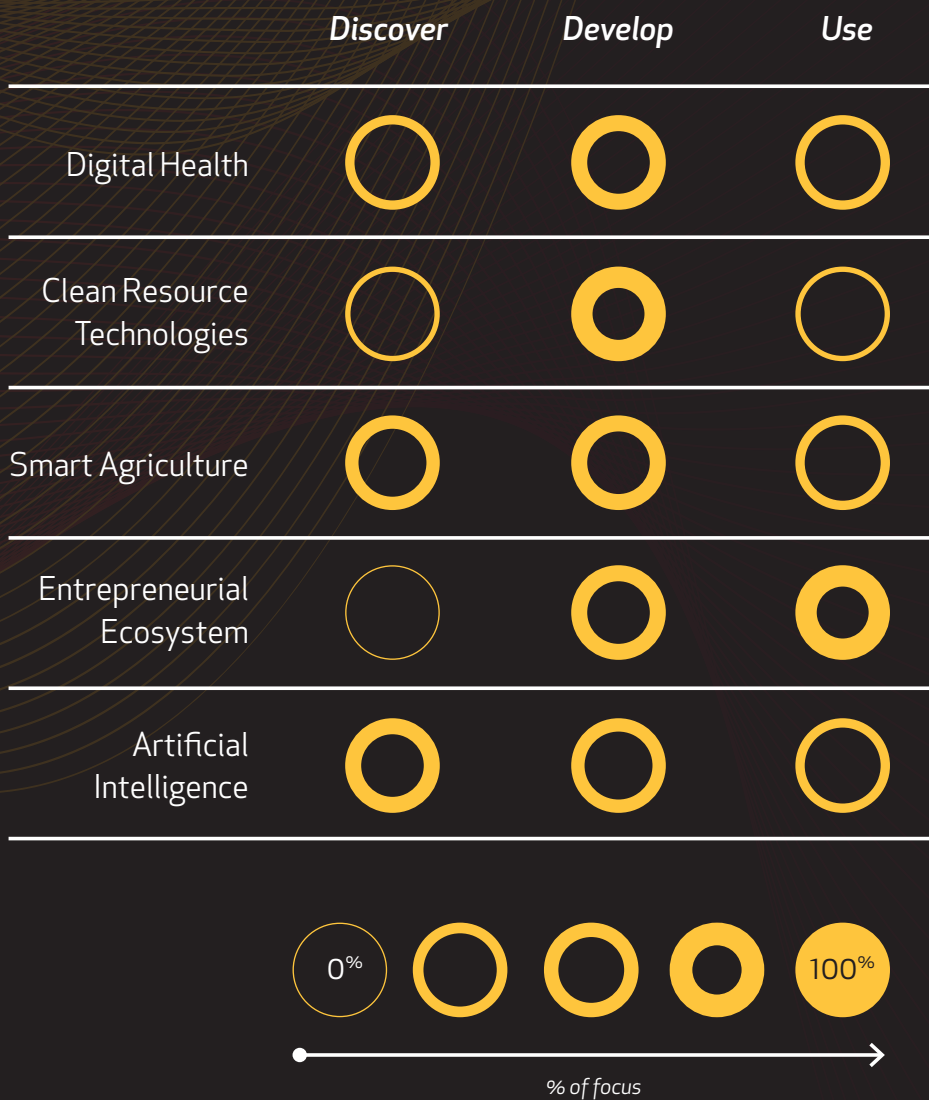
*Co-founder, PROPEL*

# OUR FOCUS AREAS

## ACROSS THE R&I CONTINUUM

THE FOLLOWING GRAPHIC DEPICTS THE NEAR-TERM DISTRIBUTION OF OUR ACTIVITIES IN EACH FOCUS AREA ACROSS THE DISCOVER, DEVELOP AND USE STAGES OF THE R&I CONTINUUM. EACH FOCUS AREA IS AT A DIFFERENT LEVEL OF MATURITY AND OUR EFFORTS ACROSS EACH STAGE ARE HIGHLIGHTED ACCORDINGLY.

FIGURE 6 Distribution of activities across R&I continuum – 2021-24



# CREATING THE FOUNDATION FOR A VIBRANT R&I SYSTEM

ALBERTA INNOVATES SERVES AS A LEADER, CONVENOR, CONNECTOR AND INFLUENCER TO DEVELOP CAPACITY AND PLATFORMS, AND CREATE MEANINGFUL PARTNERSHIPS AND COLLABORATIONS.

THE FOLLOWING ACTIVITIES CREATE THE BROADER FOUNDATION FOR GROWING AND STRENGTHENING ALBERTA'S R&I SYSTEM.

## PLATFORMS AND CAPACITY BUILDING

SUPPORTING R&I CAPACITY AND PLATFORMS REDUCES BARRIERS TO INNOVATION AND PROVIDES CLIENTS TIMELY ACCESS TO EXPERTISE AND RESOURCES TO ADVANCE THEIR INNOVATIONS. OUR INVESTMENT IN PLATFORMS AND CAPACITY TAKES MANY DIFFERENT FORMS DEPENDING ON SYSTEM NEEDS.

Key platforms and capacity-building activities in 2021–22 will include:

- Continued investment in R&I talent development to nurture research, technical, business and other skills required in areas such as health and emerging technologies.
- Investment in other areas of importance for Alberta, including prion innovation, recovery technologies, bioindustrial innovation and other emerging areas such as medical cannabis.
- Building capacity for carbon fibre scale-up (at InnoTech Alberta) and hydrogen infrastructure (at C-FER Technologies).
- Continued support for research ethics including the Health Research Ethics Boards of Alberta and creation of an Ethics of Innovation program to provide pragmatic tools and guidelines for the ethical, privacy and legal considerations associated with innovation development and implementation.
- Leading a multi-partnered initiative to attract clinical health research to Alberta and launch the Alberta Clinical Trials website.

## **PARTNERING AND COLLABORATING**

WE LEVERAGE EXISTING CROSS-SECTORAL R&I PARTNERSHIPS AND COLLABORATIONS, AND CREATE NEW ONES – HELPING TO PROPEL GREAT IDEAS FORWARD, FASTER.

Key partnering and collaborating activities in 2021–22 will include:

- Continued partnerships and collaborations to facilitate health system transformation with the Alberta Health Services Partnership for Research & Innovation in the Health System; Canadian Institutes for Health Research – Strategy for Patient Oriented Research; and the Alberta Clinical Research Consortium.
- Continued partnerships and collaborations with the Clean Resource Innovation Network; Emissions Reduction Alberta; Natural Resources Canada; Sustainable Development Technology Canada; Canada’s Oil Sands Innovation Alliance; Transition Accelerator; Alberta Water Council.
- Collaboration with the Alberta Ministry of Environment and Parks to support programs addressing chronic wasting disease in Alberta.
- Work with Emissions Reduction Alberta to advance agricultural and food innovations.
- Collaboration with Natural Resources Canada and the Alberta Ministry of Agriculture and Forestry on programs related to bioindustrial innovation.

## **CONVENING AND CONNECTING**

WE BRING TOGETHER R&I SYSTEM PLAYERS TO REDUCE BARRIERS, CONNECT OUR CLIENTS WITH THE RIGHT RESOURCES AT THE RIGHT TIME, AND INCREASE THE ADOPTION AND SPREAD OF INNOVATIONS.

Key convening and connecting activities in 2021–22 will include:

- Leveraging our INVENTURE\$ Unbound events to continue sharing ideas and engaging a vital, growing community of innovators, investors and service providers. INVENTURE\$ pivoted from being an in-person event in 2019 to a series of virtual events throughout 2020 and into 2021. We will continue the momentum of INVENTURE\$ Unbound with hopes of hosting an in-person event once again in September 2021.
- Providing leadership and expertise in the clean technology sector, with national groups such as the Clean Resource Innovation Network; Canadian Emissions Reduction Innovation Network; Canadian Institute for Climate Choices and the Energy Futures Lab.
- Assist the evolution of our Regional Innovation Networks to create an interconnected Alberta Innovation Network.
- Create a national cannabis ecosystem that generates medical evidence for purified individual cannabis components to treat health conditions.

“ If you look at history,  
innovation doesn't  
come just from giving  
people incentives; it  
comes from creating  
environments where  
their ideas can connect.

*Steven Johnson*

*Science & technology author*



# PERFORMANCE MANAGEMENT



Our economy was hit particularly hard with the dual shock of COVID-19 and the unprecedented collapse of oil prices for which our province faces a long road to recovery.<sup>23</sup> As we head into our second year in the fight against COVID-19 and on the heels of two successive budget reductions, we have therefore adjusted our targets for 2021–22 relative to those previously identified in Business Plan 2020–23. The revised targets better reflect the difficult times that Albertans are experiencing as well as the lag time between budget changes and their effect on downstream outcomes. We will revise our targets accordingly in future business plans as the province experiences economic recovery.

Each of our corporate goals is accompanied by a goal statement that briefly describes the high-level activities through which the goal will be accomplished. Included are intended outcomes for the goal and associated key performance indicators (KPIs) that will measure progress towards the outcomes. The most recent actual results are provided for reference as are targets for future performance. An additional goal has been added this year to reinforce our commitment to operational excellence.

## GOAL 1

MAKE THE LIVES OF ALBERTANS BETTER TODAY AND FOR GENERATIONS TO COME BY CONTRIBUTING TO A DIVERSIFIED ECONOMY, CLEANER AND SUSTAINABLE ENVIRONMENT, AND HEALTHIER COMMUNITIES.

### Goal Statement

Innovation will create a stronger economy and improvements in our environment, and will enhance our health system and our overall well-being.

### Intended Outcomes

- Contribute to improved economic prosperity in Alberta.
- Contribute to the mitigation of negative environmental impacts.
- Contribute to the improved health of Albertans.

PERFORMANCE MEASURES	ACTUALS 2019–20*	TARGETS 2020–21**	TARGETS 2021–22
# of new hires (jobs) in Alberta from R&I investment	2,389	2,580	2,750
Net SME revenue growth for every \$1 of Alberta Innovates funding	\$7.37	6.02	6.14
% of SMEs supported by AI that are exporting	47.7%	42%	44%
# projects with GHG emissions reduction	127	75	90
# of projects using real-world data to develop digital health tech	N/A	10	15

\*Some actuals do not reflect the full suite of AI investments due to differing program objectives. Actuals for 2020-21 will be available in our 2021 Annual Report.

\*\*As presented in the 2020–23 Business Plan.

## GOAL 2

CULTIVATE A WORLD-CLASS RESEARCH AND INNOVATION SYSTEM THAT MEETS THE NEEDS OF ALBERTA.

### Goal Statement

Continue to develop a highly qualified and skilled R&I talent pool and improve system connectivity.

### Intended Outcomes

- Sustain and/or grow client access to R&I physical and virtual infrastructure supported by Alberta Innovates.
- Continue to support the development of Alberta's R&I knowledge workforce.
- Clients have a positive experience with Alberta Innovates.

PERFORMANCE MEASURES	ACTUALS 2019-20*	TARGETS 2020-21**	TARGETS 2021-22
# of clients accessing R&I infrastructure supported by Alberta Innovates	770	800	800
# of people (trainees, researchers, entrepreneurs, etc.) supported	1,210	1,100	1,175
% clients with a positive client experience (i.e. satisfaction)	87%	85%	85%

\*Some actuals do not reflect the full suite of AI investments due to differing program objectives. Actuals for 2020-21 will be available in our 2021 Annual Report.

\*\*As presented in the 2020-23 Business Plan.

## GOAL 3

DRIVE THE GENERATION OF DISCOVERIES AND DEVELOPMENTS THAT POSITIVELY IMPACT ALBERTA AND ITS INDUSTRIES BY LEVERAGING PARTNERSHIPS, COLLABORATIONS AND EMERGING TECHNOLOGY PLATFORMS.

### Goal Statement

Enable the production of new knowledge and innovations in areas of strategic importance. Leverage our network of partnerships, collaborations and emerging technology platforms to share these new advances in ways that lead to their adoption and use.

### Intended Outcomes

- Generate knowledge, discoveries and developments to drive innovation in areas of strategic importance.
- Establish partnerships with organizations to generate knowledge, discoveries and developments for specific needs/issues.

PERFORMANCE MEASURES	ACTUALS 2019-20*	TARGETS 2020-21**	TARGETS 2021-22
# peer-reviewed publications from R&I investments	1,100	1,700	1,000 <sup>†</sup>
# patents produced from R&I investments	55	190	50 <sup>†</sup>
% of investments in the Discover & Develop stages of the R&I Continuum	N/A	TBD	TBD <sup>‡</sup>
# partnerships with organizations to generate knowledge, discoveries and developments for specific needs/issues	N/A	TBD	TBD <sup>‡</sup>

\*Some actuals do not reflect the full suite of AI investments due to differing program objectives. Actuals for 2020-21 will be available in our 2021 Annual Report.

\*\*As presented in the 2020-23 Business Plan.

<sup>†</sup>Change in data collection methodology from broader definition of publications to peer-reviewed only and from all types of patent activity to issued patents only.

<sup>‡</sup>2021-22 will be baseline year for data capture.

## GOAL 4

ACCELERATE AND BROADEN THE USE OF INNOVATIVE PRODUCTS, TECHNOLOGIES AND PROCESSES.

### Goal Statement

Apply knowledge, discoveries and developments to address the province’s needs. These innovations include policies, processes, technologies and products, practices and services. The adoption of innovation is the cornerstone to achieving wider impact.

### Intended Outcomes

- Support (financial and non-financial) provided to entrepreneurs and SMEs advances innovation development and commercialization.
- Innovations supported by Alberta Innovates demonstrate TRL progression.
- Innovations are produced with the support of Alberta Innovates.

PERFORMANCE MEASURES	ACTUALS 2019-20*	TARGETS 2020-21**	TARGETS 2021-22
\$ invested in the support of entrepreneurs and SMEs	\$23.9M	\$38M	\$39M
Advancement of innovations across the Technology Readiness Levels	3.3	2.1	3.0
# of innovations created with support of Alberta Innovates	1,137	820	1,100

\*Some actuals do not reflect the full suite of AI investments due to differing program objectives. Actuals for 2020-21 will be available in our 2021 Annual Report.

\*\*As presented in the 2020-23 Business Plan

## GOAL 5

BE RECOGNIZED GLOBALLY AS A LEADING INNOVATION ENGINE.

### Goal Statement

Invest in R&I activities in strategic areas of importance to Alberta and build on evidence and global trends. These investments solve challenges in our province and have significant opportunity on a global scale.

### Intended Outcomes

- Continue to invest in areas of strategic importance.
- Partner with industry, government, academia and others to stimulate innovation in areas of need.
- Increase awareness of Alberta Innovates among Albertans and others.

PERFORMANCE MEASURES	ACTUALS 2019-20*	TARGETS 2020-21**	TARGETS 2021-22
\$ invested in strategic areas of importance	\$126 M	\$117 M	\$159 M
\$ attracted to AI from external sources	\$57 M	\$38 M	\$53 M
#/% of local, national and international participants attending INVENTURE\$	4,000	3,500	3,500

\*Some actuals do not reflect the full suite of AI investments due to differing program objectives. Actuals for 2020-21 will be available in our 2021 Annual Report.

\*\*As presented in the 2020-23 Business Plan

## GOAL 6

### ACHIEVE OPERATIONAL EXCELLENCE.

#### Goal Statement

Enable achievement of the organization's corporate goals through internal initiatives that promote operational excellence committed to fostering a future-ready culture, high ethical standards and continuous improvement.

#### Intended Outcomes

- Build an environment that encourages and fosters continuous improvement.
- Promote a culture that attracts, engages and retains top talent.
- Uphold a robust structure of corporate governance, principles and standards.

PERFORMANCE MEASURES	ACTUALS 2019-20*	TARGETS 2020-21**	TARGETS 2021-22
# of digital technologies deployed to streamline business processes and reporting	N/A	N/A	TBD‡
Cumulative % reduction in client requirements supporting Red Tape Reduction activities**	6.9%	12%	20%
Overall employee engagement rating †	58%	N/A	65%

\*Some actuals do not reflect the full suite of AI investments due to differing program objectives. Actuals for 2020-21 will be available in our 2021 Annual Report.

\*\*As presented in the 2020-23 Business Plan.

†Completed bi-annually – next survey scheduled for Fall 2021.

‡2021-22 will be baseline year for data capture.

## OUR RESEARCH & INNOVATION

### IMPACT FRAMEWORK

ALBERTA INNOVATES IS COMMITTED TO DEMONSTRATING THE IMPACT AND VALUE OF OUR INVESTMENTS. REFLECTING INTERNATIONAL BEST PRACTICES, ALBERTA INNOVATES IS GUIDED BY AN IMPACT FRAMEWORK THAT HELPS US PLAN, MEASURE, EVALUATE AND COMMUNICATE OUR PROGRESS. WORKING TOGETHER WITH THE COMMUNITY, THE FRAMEWORK (OUTLINED IN APPENDIX A) GUIDES OUR INVESTMENT AND KEY IMPLEMENTATION ACTIVITIES TO ACHIEVE INTENDED OUTCOMES AND IMPACT. ALBERTA INNOVATES IS A LEARNING ORGANIZATION AND USES EVIDENCE TO LEARN WHAT WORKS AND SHARE LESSONS LEARNED SO THAT WE CAN CONTINUOUSLY IMPROVE.

“ You can't use  
up creativity.  
The more you  
use, the more  
you have.”

*Maya Angelou*

# HIGHLIGHTS

## FROM THE 2019-20 ANNUAL REPORT

### ALBERTA INNOVATES DELIVERS RESULTS THAT MATTER TO ALBERTANS.

Times were tough in 2019-20 due to a major downturn in Alberta's economy from a drop in oil prices and the onset of the global pandemic. We responded to a significantly reduced budget by restructuring program areas while maintaining ongoing funding commitments to previously announced projects.

Meanwhile, we continued to accelerate emerging technologies and innovations toward commercialization and into use through our investments and supports. We also shifted more focus to the application of big data and other new technologies in health – to improve patient care for Albertans, obtain better health outcomes and find more efficient, cost-effective ways of delivering care. And we embarked on initiatives and collaborations that move Alberta's oil sands industry in a new, lower-carbon direction and change how Alberta farmers grow food by harnessing technology.

# 2019–20 HIGHLIGHTS:

## WE:

- Reacted quickly to address the global health threat from COVID-19 by funding Alberta universities to research vaccines, testing, treatment and other urgent needs.
- Generated a total of \$57.4 million from external sources.

## WE LAUNCHED NEW INITIATIVES IN 2019–20 TO DRIVE TRANSFORMATIVE INNOVATION, INCLUDING:

- The \$15-million international Carbon Fibre Grand Challenge to accelerate development of carbon fibre from bitumen in Alberta and shift the oil sands industry toward value creation and significantly enhance sustainability in a low-carbon economy.
- The xR Head program, in collaboration with the Alberta Chapter of the Virtual Reality/Augmented Reality Association, to co-ordinate and advance virtual, mixed and augmented-reality innovations in the health field to enhance patient care or support the training of health professionals.
- The Digital Innovation in Clean Energy program, to support the accelerated development of the digital economy in Alberta in priority areas.

Also last year, we played a key role in spearheading the creation of the Canadian Agri-Food Automation and Intelligence Network (CAAIN), a national, not-for-profit organization based in Alberta to enable the accelerated application of digital and automated technologies in the agri-food industry.

Our two subsidiaries – InnoTech Alberta and C-FER Technologies – served nearly 800 clients in 2019–20. This involved testing, de-risking and translating research for clients with the goal of accelerating commercialization and market adoption. InnoTech and C-FER generated \$48.5 million from external sources, contributing to our total revenue generation.



## **IN 2020, SMALL AND MEDIUM ENTERPRISES WE HAD PREVIOUSLY SUPPORTED REPORTED THAT THEY HAD:**

- Created 2,389 net new jobs, almost 88 per cent full time.
- Generated \$7.37 in net revenue growth for every Alberta Innovates dollar invested.
- Generated \$23.50 in follow-on funding for every dollar we invested. About 78 per cent of the investment came from the private sector.

*Seven Alberta-based companies supported by our Executive Business Advisors raised nearly \$47 million in total from other funding sources.*

*Our SMEs showed greater diversification into other areas of Alberta's economy. About 70 per cent of the revenue generated by our SME clients, and 76 per cent of the new jobs they created, occurred outside the energy sector.*

We directly supported 1,210 clients, including students/trainees, SMEs/entrepreneurs, post-secondary researchers, large industry and not-for-profits.

We also directly and indirectly supported 4,800 highly qualified and skilled personnel (HQSP), including students/trainees, research staff and other personnel.

## **OUR NON-SME CLIENTS REPORTED THEY:**

- Developed 1,140 new innovations.
- Raised \$98 million (researchers and trainees supported by Alberta Innovates raised an additional \$98 million from other funders).
- Created new knowledge (1,100 publications were generated by 243 projects we invested in).
- Created spinoffs (10 companies were formed in emerging technology areas).

“Exploration is  
the engine that  
drives innovation.  
Innovation drives  
economic growth.”

*Edith Widder*

*Co-founder & CEO*

*Ocean Research and Conservation Association*

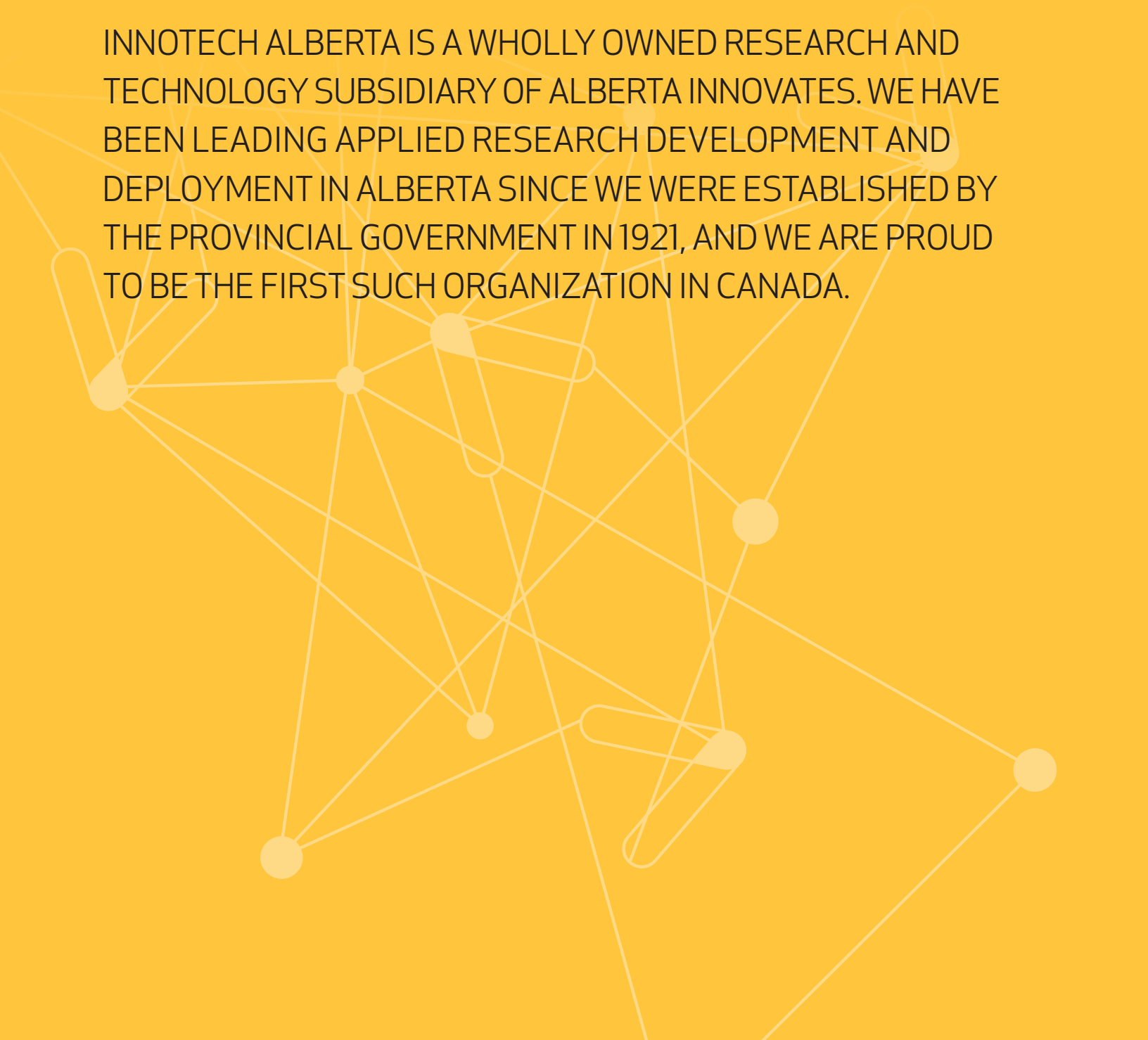
# INNOTECH ALBERTA INC.

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## WHO WE ARE

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INNOTECH ALBERTA IS A WHOLLY OWNED RESEARCH AND TECHNOLOGY SUBSIDIARY OF ALBERTA INNOVATES. WE HAVE BEEN LEADING APPLIED RESEARCH DEVELOPMENT AND DEPLOYMENT IN ALBERTA SINCE WE WERE ESTABLISHED BY THE PROVINCIAL GOVERNMENT IN 1921, AND WE ARE PROUD TO BE THE FIRST SUCH ORGANIZATION IN CANADA.



Ever since we began, our work has focused on productive commercial applications and end uses to build business in Alberta. For a century we have provided expertise, facilities, equipment, methods and data to test, scale and accelerate the development of innovative technologies for industry. We also carry out applied research and development (R&D) on behalf of the public sector to support policies and programs intended to foster Alberta's economic growth and sustainment.

## OUR VALUE PROPOSITION

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WE CREATE VALUE FOR ALBERTA'S CORE AND EMERGING INDUSTRIES BY OFFERING CROSS-SECTORAL SERVICES IN THE ENERGY, ENVIRONMENT AND BIOINDUSTRIAL SECTORS, ALONG WITH MONITORING, ANALYTICS AND INFORMATICS.

We have highly skilled researchers and technical experts on staff, and industrial-scale research and demonstration facilities. We are able to assist clients where they lack our capabilities and capacities, and we're designed and equipped to undertake higher-risk initiatives that our clients wouldn't be able to carry out on their own.

We have a unique public-private funding model – we are largely supported by client revenue and receive some provincial funding for our operations. This allows us to work as a neutral party providing unbiased advice and applied R&D that is globally recognized and trusted.

Our fees also generate external revenue for our parent, Alberta Innovates. Ultimately, the work we do to commercialize research and technology contributes to the economic growth that benefits Albertans.

## GOING FORWARD

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THE R&I SYSTEM IS EVOLVING. ALBERTA IS EXPLORING NEW INDUSTRY OPPORTUNITIES AND SEARCHING FOR WAYS TO EXTRACT GREATER VALUE FROM EXISTING INDUSTRIES. THE R&I SYSTEM IS ALSO COMPLEX – IT INCLUDES ORGANIZATIONS THAT SPAN MANY JURISDICTIONS, SECTORS AND TECHNOLOGICAL STAGES. STRONG LEADERSHIP IS REQUIRED IN THIS SYSTEM TO CONVENE, CO-ORDINATE AND COLLABORATE TO SOLVE ALBERTA'S GRAND CHALLENGES.

InnoTech will continue to provide that leadership and evolve its strategy and services to align with Alberta's public- and private-sector research and technology innovation requirements. We will focus on delivering returns to Alberta and our industries today and in the future. Over the next three years, InnoTech will:

- Continue to fulfil the role of industrial innovation system convenor, catalyst, and connector. We facilitate industry collaborations, programs and projects that lead to innovative products, technologies and approaches. In this role, we will continue to align with and contribute to Alberta Innovates' mandate as the province's innovation engine.
- Continue to provide accelerated pathways to commercialization through innovation, and access to our world-class expertise and industrial facilities. We will help our industries sustain, differentiate or be disruptive in their respective markets.

# KEY ACTIVITIES

## SERVICES

INNOTECH WILL INVEST IN AND UTILIZE ITS EXPERTISE AND ASSETS TO REMOVE BARRIERS AND SUPPORT APPLIED R&D SPENDING BY ALBERTA'S INDUSTRIES. THE WORK INNOTECH DOES IS SPECIALIZED AND CAPITAL-INTENSIVE. IT IS CUSTOMIZED, PROJECT-BASED AND OFTEN UNIQUE.

Adaptability and flexibility are key; we will anticipate, commission, and configure our capacity and capabilities to respond to the evolving demands of public and private industrial innovation. Our client service delivery is structured to serve Alberta's industrial sectors and enable sectoral cross-over to maximize asset utilization and value.

### Energy Services



- In-Situ Recovery Process Development & Optimization
- Bitumen Extraction & Processing
- Flow Assurance & Harsh Environment Material Evaluation
- Advanced Metal Manufacturing

### Environmental Services



- Environmental Impact & Risk Evaluation
- Carbon Capture, Utilization & GHG Mitigation & Decarbonization
- Asset Retirement – Reclamation, Revegetation & Remediation
- Environmental Monitoring

### Bioindustrial Services



- Bioindustrial Product & Process Development
- Biomaterial Production, Processing, Research & Analysis
- Fermentation & Biological Processes & Treatments

### Monitoring, Analytics & Informatics Services *(Cross – Sectoral)*



- Chemical Analysis & Testing
- Industrial IoT, Digital Life-Cycle Support and Sandbox Services
- Pilot & Bench-Scale Experimental Apparatus Development
- Measurement Systems Engineering & Data Analytics

## PARTNERSHIPS & CONSORTIA

INNOTECH BRINGS TOGETHER PUBLIC AND PRIVATE PARTNERSHIPS AND CONSORTIA, AND LEVERAGES ASSOCIATED INVESTMENT, AS A WAY OF ADDRESSING LARGE AND COMPLEX INDUSTRY NEEDS THAT BENEFIT FROM COLLABORATIVE INNOVATION.

We also manage joint industry projects and partner with other applied research and technology organizations to serve industry through large, multi-stakeholder engagements. The synergies that come from such collaborations lead to more timely solutions that benefit Albertans.

## FOCUS AREAS FOR GROWTH

INNOTECH STRIVES TO REMAIN CLIENT-FOCUSED AND DEMAND-DRIVEN. AS THE NEEDS OF OUR CLIENTS EVOLVE, WE WILL TRANSITION ELEMENTS OF OUR EXISTING CORE SERVICES INTO NEW AREAS OF PROBLEM-SOLVING, TESTING, SCALING AND TECHNOLOGY DE-RISKING.

Based on feedback and priorities from our clients and stakeholders, InnoTech has identified its key areas for growth and will continue to make further progress on these during the upcoming year. (See Appendix C for details).



Carbon Capture, Conversion & Utilization (CCU) & GHG Mitigation



Accelerated Development of Oil Sands Technologies



Energy Asset Retirement



Bitumen Beyond Combustion



Hemp & Cannabis



Smart Agriculture



Advanced Manufacturing

These key areas will provide InnoTech with increased revenue, reduced reliance on grant funding and create economic and social impacts for the Alberta. We are also exploring opportunities to pivot our existing capabilities and capacities into new emerging areas – applied data sciences and advanced technologies, hydrogen processing and clean tech – as another means of generating value for Albertans. We will balance strategic and business considerations with market demand and impact assessments, resourcing strategies, funding and partnership opportunities.

## **PERFORMANCE**

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## **MANAGEMENT**

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INNOTECH'S STRATEGY AND PLANNED ACTIVITIES FOR THE UPCOMING YEAR ARE ALIGNED TO SUPPORT ALBERTA INNOVATES' CORPORATE GOALS AND OBJECTIVES. AS A REVENUE-GENERATING ENTITY TYPICALLY WORKING WITH CLIENTS MUCH LATER IN THE INNOVATION PATHWAY THAN ALBERTA INNOVATES, INNOTECH HAS SPECIFIC BUSINESS GOALS THAT GUIDE OUR ACTIVITIES (SEE APPENDIX C).



# C-FER TECHNOLOGIES (1999) INC.

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C-FER'S VISION IS TO HAVE GLOBAL IMPACT IN AN EVOLVING ENERGY INDUSTRY, AND ITS MISSION IS TO ADVANCE SAFETY, EFFICIENCY AND ENVIRONMENTAL PERFORMANCE IN PARTNERSHIP WITH THE ENERGY INDUSTRY.

## **The not-for-profit company has two primary business goals:**

1. Excel at delivering on its mission by striving to be recognized worldwide as the best at what it does and delivering on its customer value proposition.
2. Maintain self-sufficiency by operating without requiring continued financial support from Alberta Innovates, and by generating some surplus to reinvest in the business.

The company currently employs 85 people. They are highly skilled and engaged individuals with a passion for excellence. Approximately 75 per cent of the staff are technologists and engineers, with a broad range of engineering knowledge and experience that primarily support the upstream and midstream energy sectors. The company operates out of two large-scale testing facilities in Edmonton, where equipment can be tested and qualified in conditions close to what they are exposed to in the field. The large-scale testing services are combined with specialized engineering assessments supporting the development and commercial deployment of new technologies in the energy industry.

Over its 37 years of existence, C-FER has built and upheld a strong reputation in the industry as an independent, unbiased provider of these services, and attracts clients from around the world. C-FER works on projects that help operators and equipment manufacturers (in Alberta and globally) evaluate new technologies prior to field implementation, improve their operating efficiency, improve their equipment reliability, reduce their operating costs, and reduce environmental and safety risks related to their operations.

The oil and gas industry downturn that started in 2014 has had a significant impact on the company's ability to acquire new business and balance revenue and expenses. While the company had a very healthy balance sheet as of March 31, 2016, it has recently incurred some debt which has been financed by its parent company, Alberta Innovates.

Even before the crisis associated with the COVID-19 pandemic, i.e., over the 2016–20 fiscal years, revenues had already decreased to about \$14.8 million per year, compared to \$22.3 million per year in the previous three fiscal years (2013–16). Measures were taken over these years to reduce expenses, including reductions in staff (from a high of 115 at one time) to minimize financial losses.



Business volumes were increasing again in Q3 and Q4 of the 2019–20 fiscal year, and approximately \$15.8 million in new contracts were secured during that year. However, the economic fallout of the COVID-19 pandemic and the sharp drop in oil prices started being felt by C-FER in March 2020, with substantial project delays. Increased revenue targets in the 2020–21 budget were no longer achievable because of the business circumstances created by these unprecedented events. Adjustments to the fiscal-year operating plan were necessary, and they again focused on reducing expenses in line with the expected reduced revenues – not only in the 2019–20 fiscal year, but also in the years ahead.

The downturn in the energy industry has forced C-FER’s clients to focus more on improving efficiency and reliability in their operations. Similarly, public pressure has caused C-FER’s clients to consider ways to address climate change and reduce their environmental impact. All this aligns well with C-FER’s mandate, so it is anticipated that going forward, C-FER will continue to play a critical role in the industry, helping it to address new challenges and adopt new technologies.

Recent increases in prospects with high likelihood of proceeding, and projects under contract, indicate a recovery is indeed underway. However, uncertainty exists on the strength and timing of such a recovery.

It is anticipated that a return to profitability will only be possible in three or four years, that is, by the 2023–24 or 2024–25 fiscal year. This will require an increase in staff count to approximately 95 over the same time frame to properly support project activity associated with increased revenues.

To help the company achieve its two primary business goals, C-FER’s management continues to focus on four strategic objectives:

#### **1. Motivate, Engage and Align Staff**

- All employees will understand the company’s mission and contribute to achieving our strategic objectives.
- We will have a feedback-rich culture that ensures we live our values and promote continuous improvement.
- We will support our employees in their career development.

#### **2. Increase Number of Clients**

- We will increase the number of clients to maintain diversification and not be overly reliant on specific clients or industry sectors.
- We will develop opportunities in new sectors of the energy industry, including those related to alternative energy, such as geothermal and hydrogen.

#### **3. Increase Business from Current Clients**

- We will build stronger, trust-based relationships with clients in the industry sectors where we are already active.
- We will focus our business development activities in market segments in which we can clearly differentiate ourselves.

#### **4. Improve Operational Efficiency**

- We will continuously examine our operations to ensure they are efficient and allow C-FER to be self-sufficient.
- We will optimize our staff and equipment utilization, as well as the management of our working capital.

Actionable initiatives have been prioritized to meet these objectives for the next three-year period and measures have been developed that are being tracked quarterly to monitor progress towards each initiative. The responsibility for creating tactics and executing on these initiatives lies with engineering operations, corporate services and HR directors, in consultation with the department managers.

“ Innovation is  
the ability to  
see change as  
an opportunity  
– not a threat.”

*Steve Jobs*

# **OPERATIONS AND GOVERNANCE**



# CONSOLIDATED BUDGET

## BACKGROUND

THIS CONSOLIDATED STATEMENT OF OPERATIONS REFLECTS THE CONSOLIDATION OF ALBERTA INNOVATES WITH ITS TWO WHOLLY OWNED SUBSIDIARY CORPORATIONS, C-FER TECHNOLOGIES (1999) INC. AND INNOTECH ALBERTA INC., ALONG WITH THE ALBERTA FOUNDATION FOR HEALTH RESEARCH.

The expenses are expressed in terms of Alberta Innovates business lines:

- **Research, Innovation & Commercialization:** Includes investments in Health, Clean Resources, Entrepreneurial Investments, Post-Secondary Investments & Emerging Technologies and Strategic Opportunities.
- **Applied Research:** Includes expenses for C-FER Technologies (1999) Inc. and InnoTech Alberta Inc.
- **Administration:** Includes all corporate services such as finance, marketing and communications, information services, facilities, legal, human resources, purchasing, corporate planning and portfolio management, and performance management and evaluation. Administration serves a critical function in the corporation by providing essential supports to the operational business lines (i.e., Research, Innovation & Commercialization and Applied Research). These corporate services enable the operational business lines to work productively and efficiently toward achieving Alberta Innovates strategic priorities and goals. Corporate services play a direct role in advancing our strategic priority of “Embrace the Digital Future” as several corporate services areas will be leading or actively participating in streamlining and automating our internal processes and operations.

## TRENDS

### Revenue

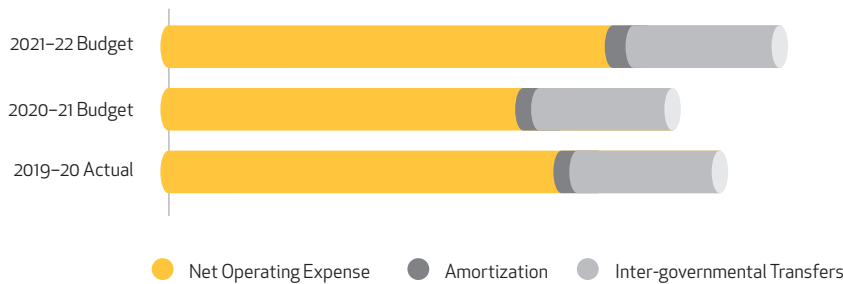
Total revenue is expected to increase by \$35.6 million in 2021-22 compared to the budget in the prior year. The increase is primarily due to \$46 million in funding for other grants received from the Ministry of Jobs, Economy and Innovation. But due to impacts associated with the COVID-19 pandemic and reduced oil prices, we are anticipating a decrease in other revenue of nearly \$10 million, which includes a projected decrease in external revenue of \$6.8 million. This results in a net revenue increase of \$35.6 million.



## Expenses

The gross operating expense target includes amortization and inter-governmental transfers. Inter-governmental transfers are grants or contracts to other government entities that are then eliminated upon consolidation at the GOA. Alberta Innovates net expense target of \$186 million is spending that the organization can direct to strategic priorities and operations.

### Expense Targets



	2019-20 Actual	2020-21 Budget	2021-22 Budget
<b>Gross Operating Expenses</b>	\$ 228,371	\$ 208,641	\$ 251,198
<b>Amortization</b>	(7,202)	(7,880)	(7,900)
<b>Inter-governmental transfers</b>	(60,709)	(52,750)	(57,750)
<b>Net Operating Expenses</b>	<b>\$ 160,460</b>	<b>\$ 148,011</b>	<b>\$ 185,548</b>

Alberta Innovates receives a budgeted revenue and expense target from the Government of Alberta. Although the organization has an accumulated surplus from prior years of underspending, the organization is limited in how much it can spend on an annual basis.

An annual deficit of \$9.1 million is budgeted for 2021-2022, which decreases the accumulated surplus to \$61 million. The accumulated surplus was generated from timing differences on expenditures over the last few years.

## CONSOLIDATED STATEMENT OF OPERATIONS

(Dollars in Thousands)

	2019-20 Actual	2020-21 Budget	2021-22 Budget	2022-23 Budget	2023-24 Budget
<b>Revenues</b>					
Government Transfers					
Funding from Jobs, Economy and Innovation					
Base Grant	\$ 135,068	\$ 119,944	\$ 119,541	\$ 119,465	\$ 119,468
Restricted Grant from Prior Years	20,641	14,703	9,253	1,403	1,000
Other Grants	6,085	5,000	51,307	31,307	26,307
Restricted Capital Contribution	1,691	1,700	1,800	2,000	2,000
Funding from Other Government of Alberta Entities – Other Grants	9,137	4,200	5,000	5,000	4,000
Federal Government Transfers	5,906	1,105	3,000	3,000	1,000
Donations and Other Contributions	489	-	-	-	-
External Revenue and Industry Funding	49,396	54,808	48,000	48,000	48,000
Investment Income	1,577	2,021	2,000	2,000	2,000
Other Government of Alberta Revenue	1,916	3,023	2,223	2,223	1,426
	231,906	206,504	242,124	214,398	205,201
<b>Expenses</b>					
Research, Innovation and Commercialization	\$ 125,475	\$ 117,395	\$ 159,095	\$ 137,335	\$ 130,335
Applied Research	60,111	51,760	50,325	52,000	52,000
Administration	35,583	31,606	33,878	31,127	31,130
Amortization	7,202	7,880	7,900	7,900	7,900
	228,371	208,641	251,198	228,362	221,365
<b>Annual Surplus (Deficit)</b>	3,535	(2,137)	(9,074)	(13,964)	(16,164)
<b>Accumulated Surplus, Beginning of Year</b>	68,729	72,264	70,127	61,053	47,089
<b>Accumulated Surplus, End of Year</b>	72,264	70,127	61,053	47,089	30,925

# CAPITAL PLAN & LEASING

## ARRANGEMENTS

ALBERTA INNOVATES AND ITS SUBSIDIARIES OCCUPY A SIGNIFICANT INVENTORY OF RESEARCH AND OFFICE FACILITIES, MOST OF WHICH ARE OWNED AND OPERATED BY ALBERTA INFRASTRUCTURE. IN ADDITION TO THE GOVERNMENT OF ALBERTA FACILITIES, WE ALSO OCCUPY SPACE WITH COMMERCIAL LEASE ARRANGEMENTS AS SHOWN IN THE TABLE BELOW.

We currently operate across 11 locations: Edmonton (5), Calgary (3), Devon, Vegreville and Victoria, B.C., with well over 1.2 million square feet of space and 600 acres of research farmland. In addition to our facilities, we also possess a substantial inventory of research equipment with an estimated replacement asset value well over \$150 million.

Adequate infrastructure is a vital requirement to support our vision, sustain program effectiveness and manage program growth aligned to corporate and provincial priorities. Over the next three years, an estimated \$55 million will be required to support implementation of priority capital projects.

### COMMERCIAL LEASE

#### ARRANGEMENTS

LOCATION	SIZE	TERMINATION DATE	SCOPE OF OPERATIONS
Victoria Group	5,030 square feet	July 31, 2023	InnoTech Alberta – Water Characterization
Edmonton Pylypow	12,925 square feet	June 30, 2024	InnoTech Alberta – Industrial Sensor Technologies Team
C-FER East Pylypow	36,650 square feet	May 31, 2023	C-FER Engineering Consulting and Full-Scale Testing for C-FER's Pipelines and Structures
Edmonton Bell Tower	30,840 square feet	September 30, 2022	Alberta Innovates
Calgary AMEC Place	5,945 square feet	March 31, 2021 <i>(currently under negotiation)</i>	Alberta Innovates

# RISK AND RISK MANAGEMENT

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## RISK GOVERNANCE AND OVERSIGHT

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ALBERTA INNOVATES IS COMMITTED TO ENSURING THAT RISK MANAGEMENT PRACTICES ARE EMBEDDED IN THE DEVELOPMENT OF STRATEGIC, BUSINESS AND OPERATIONAL PLANS. THIS DRIVES CONSISTENT, EFFECTIVE AND ACCOUNTABLE ACTION AND DECISION-MAKING IN MANAGEMENT PRACTICE AND BOARD GOVERNANCE OVERSIGHT. WE HAVE DESIGNED OUR RISK MANAGEMENT FRAMEWORK TO BE CONSISTENT WITH THE PRACTICES OF GENERALLY ACCEPTED GLOBAL RISK MANAGEMENT STANDARD FRAMEWORKS AND IN ALIGNMENT WITH THE GOVERNMENT OF ALBERTA'S RISK MANAGEMENT FRAMEWORK.

### **Our risk management standard is based on five key principles:**

1. Focus resources and mitigation activities to address significant near-term corporate risks, with ongoing monitoring of all other identified and potential risks.
2. Commit to implementing the Enterprise Risk Management (ERM) standard in a staged fashion, allowing for continuous improvement and efficiencies.
3. Operationalize the standard across the organization through Alberta Innovates' operational, business and long-term strategic plans.
4. Administer the risk management standard in a cost-effective manner by embedding it in the corporate planning processes.
5. Commit to enhanced transparency and shared understanding between our organization and our stakeholder as to our organization's key risks and mitigation strategies.



## RISK MANAGEMENT ROLES AND RESPONSIBILITIES

ROLE	RESPONSIBILITY
<b>Board of Directors</b>	Has ultimate responsibility and accountability for risk management, including responsibility for governance and oversight of Alberta Innovates' risks and responses to them.
<b>Audit Committee of the Board</b>	Is responsible for assessing the adequacy and effectiveness of the Corporation's risk management and internal controls and making recommendations to the Board concerning these matters as it deems appropriate.
<b>Chief Executive Officer (CEO)</b>	Is responsible for ensuring the ERM standard is implemented and operational and keeping the board and its committees informed of changing risks on a timely basis.
<b>Vice President Investments, and Vice President Finance</b>	Have overall responsibility for managing the risk management program and are responsible for ensuring timely and complete reporting on risk management activities to the CEO.
<b>Vice Presidents</b> <i>*In addition to responsibilities above</i>	Are responsible for active participation in the risk assessment process, ownership of designated risks and actively identifying, mitigating and monitoring risks that impact Alberta Innovates' strategic goals and objectives.
<b>Executive Directors and Directors (Management)</b>	Are responsible for active participation in the risk assessment process, the identification and monitoring of risks that impact the organization's strategic goals and objectives, as well as monitoring progress in managing risks and implementing improvement opportunities.

## KEY RISKS

THE FOLLOWING REPRESENT KEY RISKS TO ALBERTA INNOVATES. THESE RISKS ARE IDENTIFIED BASED ON THEIR POTENTIAL IMPACT AND LIKELIHOOD TO IMPACT OUR ABILITY TO DELIVER ON OUR BUSINESS PLAN:

- Government of Alberta reductions to our budget and limitations on expenditures that would adversely affect our ability to fund and transform Alberta's R&I system. Expense targets that limit the use of our accumulated surplus may inhibit the organization from sufficiently investing in new ideas, and/or sustaining funding in high-priority areas.
- Multi-layered reporting requirements combined with a long-term investment model challenges our ability to adequately report on the outcomes of our investments, potentially leading to loss of confidence in Alberta Innovates.
- Inadequate environmental scanning and a low level of readiness to respond to unforeseen health, safety, security, environmental or media events can potentially affect our operations, resources and reputation.

# ENVIRONMENTAL, SOCIAL AND GOVERNANCE APPROACH

*“Society is best served by corporations that have aligned their goals to the long-term goals of society. Bold and transformative steps are needed to shift the world onto a sustainable and resilient path.”<sup>24</sup>*

WORLD LEADERS ADOPTED 17 SUSTAINABLE DEVELOPMENT GOALS (SDGs) IN 2015, INCLUDING: ERADICATE POVERTY, ADDRESS INEQUALITY AND TACKLE CLIMATE CHANGE. THESE, AND RELATED ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG) ISSUES, WERE CAST INTO SHARP FOCUS BY THE UNPRECEDENTED DISRUPTION OF THE COVID-19 PANDEMIC.

ESG metrics are an important means to assess the investment potential of entrepreneurial startups as well as the performance of mature industries and innovation systems. ESG-based analysis encompasses:

- Direct operational and indirect supply chain impacts.
- Evolving social justice, diversity and inclusion interests.
- Forecasted potential and outcomes of emerging technologies.

In 2020, more than a quarter of the world’s professionally managed assets (more than \$30+ trillion) were governed by some type of ESG principles and standards. Strong ESG performance is correlated with better financial returns, corporate longevity and organizational resilience. It also serves as a differentiator in competition for capital investment, talent attraction and retention, and in securing client and industry relationships and community social licence.

<sup>24</sup> World Economic Forum International Business Council (IBC), 2016, Compact for responsive and responsible leadership was originally signed by more than 140 CEOs.

## Five key dimensions of ESG performance have been outlined by the Sustainability Accounting Standards Board and are gaining traction across the global economy.

For Alberta Innovates, ESG-related considerations can indicate:

- Categories of services, products and solutions with high demand and innovation potential.
- Startups that are investment-attractive, scale-capable and operationally durable.
- Reputational benefits or risks associated with sectors, services, products and entities.

Alberta Innovates has begun a review of ESG standards and frameworks, best practices for performance reporting, and to engage with stakeholders on a best-fit ESG approach for Alberta's innovation system.

**FIGURE 7 SASB Sustainability Dimensions**

In developing its standards, SASB identified sustainability topics from a set of 26 broadly relevant sustainability issues organized under these five sustainability dimensions.

### 1 Environment

- GHG Emissions
- Air Quality
- Energy Management
- Water & Wastewater Management
- Waste & Hazardous Materials Management
- Ecological Impacts

### 2 Leadership & Governance

- Business Ethics
- Competitive Behaviour
- Management of the Legal & Regulatory Environment
- Critical Incident Risk
- Systems Risk Management

### 3 Business Model & Innovation

- Product Design & Lifecycle Management
- Supply Chain Management
- Materials Sourcing & Efficiency
- Physical Impacts of Climate Change

### 4 Human Capital

- Labor Practices
- Employment Health & Safety
- Employee Engagement, Diversity & Inclusion

### 5 Social Capital

- Human Rights & Community Relations
- Customer Privacy
- Data Security
- Access & Affordability
- Product Quality & Safety
- Customer Welfare
- Selling Practices & Product Labelling



“ The only way  
to discover the  
limits of the  
possible is to  
go beyond  
them into the  
impossible.”

*Arthur C. Clarke*

*Science-fiction writer*

# APPENDIX A

## ALBERTA INNOVATES – OUR CONTEXT

### VISION AND MANDATE

Our vision is to be indisputably recognized provincially, nationally and internationally as a leader in catalyzing research and innovation (R&I) in Alberta. We have a clear mandate, summarized in Figure 8, that drives our actions, programs and initiatives. We carefully steer the innovation system to bring benefit to Albertans, within the mandate set by the Government of Alberta.

FIGURE 8 Alberta Innovates – Who we are

Alberta Innovates is...



## CORPORATE ACCOUNTABILITY

Alberta Innovates was created as a provincial corporation under the Alberta Research and Innovation Act to support R&I activities aligned with Government of Alberta priorities, “including activities . . . directed at the discovery, commercialization and application of knowledge.” Alberta Innovates has two applied research subsidiaries – C-FER Technologies (1999) Inc. and InnoTech Alberta Inc.

We are governed by an appointed board and report to the Minister of Jobs, Economy and Innovation. Most of our activities are funded in large part through the Ministry from a budget approved by the Legislative Assembly. We receive additional funding from other provincial and federal government entities, industry and non-governmental organizations (NGOs). We also generate revenues through contract research activities within our subsidiaries. Our activities and impacts contribute to work being done in several areas of government and by our partners.

We believe the province’s R&I system is stronger and more sustainable when it broadly reflects the overall diversity of our community. We strive to ensure all interested and qualified researchers and innovators have an equal opportunity to participate and contribute. To assist this, we are in the process of establishing an environmental, social and governance (ESG) framework and approach within our organization and throughout our programming.

## FIVE-YEAR STRATEGY

Our five-year strategic plan reflects insights gathered through extensive provincewide consultations with stakeholders across the R&I continuum. It is also based on research into global best practices with applicability to Alberta.

We recognize no single technology or industry will sufficiently transform and diversify our economy – instead, a convergence of emerging technologies, platforms and applications must be applied to solving problems. We further recognize that the collision of research discoveries and emerging technologies is how new industries are discovered, built and grown. Developing new industries, combined with our existing strengths, will diversify our economy and insulate Albertans from resource sector economic swings.

We have come to appreciate the use of data, digital technology and artificial intelligence to shift innovation within Alberta Innovates and are applying it to provide more seamless business operations for our benefit and that of our clients. Our key initiatives, programs and services will focus on the opportunities within these strategic priorities.

## STRATEGIC PRIORITIES

### TO DRIVE INNOVATION

Our five-year strategy charts a course to align our investments and business lines with three R&I priorities:

- Develop Emerging Technologies

We will facilitate the growth and development of emerging technologies in Alberta that have demonstrated potential for high return and lower risk, with a focus on four core areas as outlined in Figure 9.

- Enhance Our Knowledge Workforce

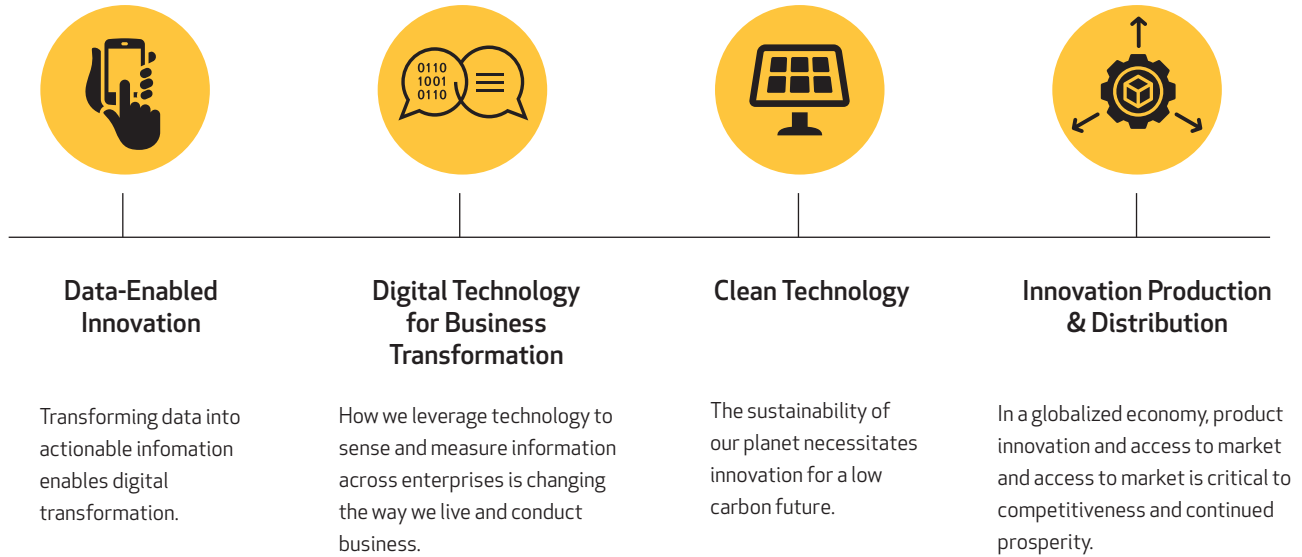
Working with our post-secondary partners and others, we will play a key role in enhancing the province’s knowledge workforce by collaborating to help build and accelerate new training that will enable Albertans to adapt to emerging technologies and the digital future. We will encourage uptake of trained personnel into new industries.

- Embrace the Digital Future

We will streamline and automate our internal processes and operations and ensure target clients are aware of and have seamless access to our programs and services.

FIGURE 9 Core emerging technology areas

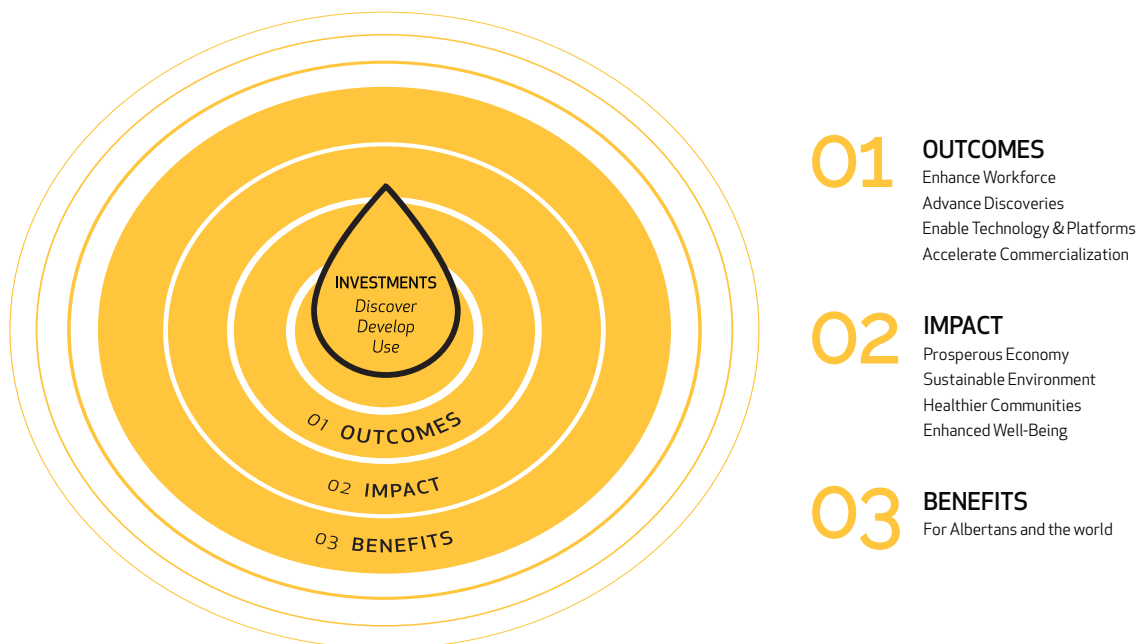
### Four Core Emerging Technology Areas



### Our Research & Innovation Impact Framework

Alberta Innovates is committed to demonstrating the impact and value of our investments. Reflecting international best practices, Alberta Innovates is guided by an impact framework that helps us plan, measure, evaluate and communicate our progress. Working together with the community, the framework (outlined in Figure 10 below) guides our investment and key implementation activities to achieve intended outcomes and impact. Alberta Innovates is a learning organization. We use evidence to learn what works and share lessons learned so that we can continuously improve.

FIGURE 10 Research & Innovation Impact Framework



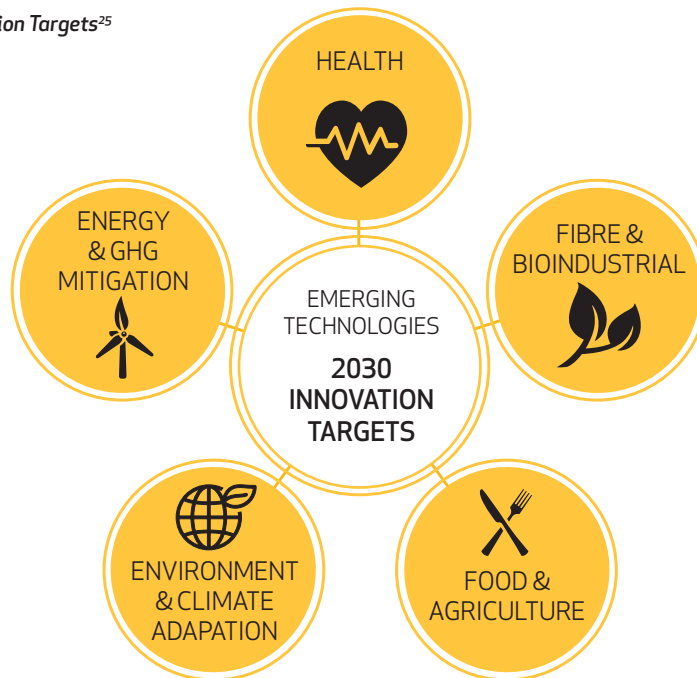
# APPENDIX B

## CONTRIBUTING TO ARIF OUTCOMES

ALBERTA INNOVATES ENSURES STRATEGIC ALIGNMENT TO THE PRIORITIES OF THE GOVERNMENT OF ALBERTA AS SET OUT IN THE CURRENT ALBERTA RESEARCH & INNOVATION FRAMEWORK (ARIF) AND THE FORTHCOMING ALBERTA TECHNOLOGY AND INNOVATION STRATEGY (ATIS).

The Alberta Research and Innovation Framework (ARIF)<sup>24</sup> focuses the work of government, provincially supported R&I organizations and post-secondary institutions on the needs of Albertans through established outcomes and aspirational innovation targets (see Figure 11). The clear direction provided by ARIF helps inform our strategic and business planning. It also empowers us to work with other stakeholders as we contribute to transformational solutions in priority areas – ensuring sustainable economic, environmental and social prosperity for Albertans.

FIGURE 11 ARIF 2030 Innovation Targets<sup>25</sup>



Alberta Innovates contributes to the ARIF innovation targets in multiple ways through our diverse suite of programs and services, as highlighted in this business plan, in various sectors and across the R&I continuum. Our activity includes and requires a diverse range of collaborations with our many clients and partners, comprising post-secondary institutions, researchers, entrepreneurs, industry, and other R&I agencies and groups. In addition, we engage with technical and program experts in several government ministries, including Advanced Education; Agriculture and Forestry; Energy; Environment and Parks; Health; Jobs, Economy and Innovation; Labour.

The Government of Alberta is currently reviewing ARIF and will outline its priorities in the upcoming Alberta Technology and Innovation Strategy. Alberta Innovates will adjust as required.

<sup>24</sup> <https://www.alberta.ca/alberta-research-innovation-framework.aspx>.

<sup>25</sup> <https://www.alberta.ca/assets/documents/arif-report.pdf>



# APPENDIX C

## INNOTECH ALBERTA INC.

### PARTNERSHIPS AND CONSORTIA

The following are a list of partnerships convened and facilitated by InnoTech. For the upcoming year, InnoTech will apply its performance measurement and evaluation framework to these consortia, collaborations and projects to capture and articulate the value they provide for the Alberta innovation system.

<b>Alberta Research Council Core Industry (AACI) Program</b>	Industry-led consortium focused on technology development and solution advancement to address industry-wide challenges related to in-situ heavy oil and bitumen recovery.
<b>Materials and Reliability in Oil Sands (MARIOS)</b>	Links oil sands producers, materials and equipment suppliers, fabricators, and technology providers to collaboratively solve industry-wide maintenance and reliability issues.
<b>Mesocosm Test Facility</b>	Industry-funded facility for monitoring how process water and treated tailings respond ecologically to alternative natural treatment methods.
<b>Alberta Carbon Conversion Technology Centre (ACCTC)</b>	Industry- and government-funded facility for de-risking transformational carbon capture and conversion technologies intended to reduce GHG emissions from natural-gas-fired plants.
<b>Soil Sterilants</b>	Consortia established to create technical and cost-effective strategies and best management practices to achieve regulatory site closure for sites impacted by residual soil sterilants.
<b>Pipeline Integrity and Corrosion Management (PiCOM)</b>	Industry-led working group which facilitates collaborative R&D projects to improve detection, measurement and mitigation methods for corrosion in pipeline systems.

InnoTech works with other partnerships including:

- Alberta Biodiversity Monitoring Institute – a leader in biodiversity monitoring that tracks changes in Alberta’s wildlife and their habitats across the entire province and provides ongoing, relevant, scientifically credible information on Alberta’s living resources.
- Bitumen Beyond Combustion – collaboration with Alberta Innovates Clean Resources business line in development of new value-added products from Alberta’s oil sands resources (e.g., carbon fibre from asphaltene-based feedstock).
- Fibre Processing and Value-Added Products – de-risking and supporting new product application and development for Alberta’s vast fibre resources (e.g., decortication) in conjunction with Alberta Agriculture and Forestry.
- Canadian Oil Sands Innovation Alliance – an alliance of oil sands producers focused on accelerating the pace of improvement in environmental performance in Canada’s oil sands through collaborative action and innovation.

## GROWTH AREAS

As InnoTech continues to serve Alberta's traditional sectors, it also has identified several new and existing initiatives which it will focus on this year. These initiatives are being developed to increase the competitiveness of Alberta businesses in the global economy, enable job creation and employment, and increase export potential and product marketability.

<b>Carbon Capture, Conversion and Utilization (CCU) &amp; GHG Mitigation</b>	<ul style="list-style-type: none"> <li>The Carbon Capture, Conversion and Utilization (CCU) key growth area is intended to demonstrate and de-risk CO<sub>2</sub> capture, conversion &amp; utilization technologies to overcome barriers for industrial adoption and accelerate and reduce cost of commercial deployment.</li> <li>The CCU initiative is projected to accelerate greenhouse gas (GHG) emission reductions within Alberta's industrial sectors and advance the carbontech industry by creating export and economic diversification potential. This initiative supports the transition to low-carbon green economy.</li> </ul>
<b>Energy Asset Retirement</b>	<ul style="list-style-type: none"> <li>Accelerate and reduce the expense for decommissioning and closing retired oil and gas well sites using innovative technologies, knowledge sharing, and best management practices.</li> <li>This initiative has the potential to markedly increase the impact of public investment to reduce the number of unused wells, pipelines, facilities and other artifacts. Most notably being the environmental and economic impacts – potentially creating thousands of jobs in Alberta's energy sector.</li> </ul>
<b>Accelerated Development of Oil Sands Technologies</b>	<ul style="list-style-type: none"> <li>Accelerate development of innovative technologies and processes to address challenges faced by oil sands producers, enabling industry to adapt to constantly evolving market &amp; socio-economic conditions.</li> <li>Growth in this area enables outcomes and impacts aligned to our stakeholders and clients. Investment in capabilities and capacity for accelerating development of oil sands technologies has potential to advance opportunities in:               <ul style="list-style-type: none"> <li>Advancement of non-aqueous extraction (tailings pond elimination).</li> <li>Advanced in-situ recovery processes (lower energy intensity &amp; GHG emission).</li> <li>Partial upgrading technologies (increased marketability &amp; lower GHG).</li> </ul> </li> </ul>
<b>Bitumen Beyond Combustion</b>	<ul style="list-style-type: none"> <li>Accelerate commercial asphaltene-based carbon fibre development in Alberta, including development of local expertise and infrastructure to support the entire value chain.</li> <li>The BBC initiative has the potential to significantly impact Alberta's energy sector and lead expansion into new markets, growth in exports and economic diversification, and job creation and employment.</li> </ul>
<b>Hemp &amp; Cannabis Smart Agriculture</b>	<ul style="list-style-type: none"> <li>Advance technologies to support agriculture and the emerging hemp industry from "seed to final product" with focus on bio-based product development, advanced sampling and monitoring, and genetics and disease control to improve productivity.</li> </ul>
<b>Advanced Manufacturing</b>	<ul style="list-style-type: none"> <li>Advance innovative design, material and processing technologies and methodologies to enable improved competitiveness and economic impact in the manufacturing sector.</li> </ul>

## InnoTech Alberta Business Goals 2021–22



### Revenue Diversity

Increase and diversify revenue across sectors and clients.



### Market Positioning

Improve relevance in Alberta's applied research and development market, to demonstrate value to clients and stakeholders.



### Evolution

Anticipate and capitalize on future client needs by exploring, evaluating and testing emerging platforms and solutions.



### Performance

Improve and articulate operational performance, quality, customer satisfaction and cross-divisional collaboration.



### Talent & Team Development

Support the development of a safe, skilled and flexible workforce with cross-divisional, multi-disciplinary capabilities to support the evolving needs of clients.

“ Innovation is the  
specific instrument  
of entrepreneurship.  
The act that endows  
resources with a  
new capacity to  
create wealth.

*Peter Drucker*

SEE ALSO:

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