

BUILDING FORWARD

Alberta's 20-Year Strategic Capital Plan

**ALBERTA'S
RECOVERY
PLAN**

Alberta

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Message from the Premier



For generations, the people who have lived on this land have been optimistic, forward-looking and eager to build healthy, prosperous communities.

Today, this determination is stronger than ever. It's no secret that our province has been going through challenging times.

But Albertans are no strangers to adversity. We've proven time and again that our resilience, creativity and entrepreneurial culture help us to rise above challenges, opening doors to future possibilities.

That blueprint for long-term success has gone into our new Building Forward: The 20-Year Strategic Capital Plan.

As its name suggests, Building Forward is all about how we construct Alberta's future – a future that's going to be filled with technological innovation, profound change and many opportunities. Our task as a province will be to responsibly navigate these currents in ways that help our communities and our economy adapt, grow and thrive.

This will challenge us to plan wisely, use every tax dollar prudently, and work in new and creative partnerships. It will also require that we bring focus to our capital infrastructure investments, in ways that create jobs, expand economic activity and foster innovation across every sector and in everything that we do.

Most of all, it will demand that we unleash the "can-do" spirit that makes Alberta a unique and exceptional place to live, work, play and invest. And in so doing, build a prosperous path forward for all Albertans.

Jason Kenney
Premier of Alberta

Message from the Minister of Infrastructure



As Albertans, we understand how important it is to plan for the future. Despite the challenges that we have experienced in recent years, our province has remained optimistic about the way ahead. That optimism comes from being willing to think critically about what needs to be done, roll up our sleeves and move forward with determination.

In that spirit, I present Building Forward: Alberta's 20-Year Strategic Capital Plan.

Building Forward is all about looking ahead – examining the trends that face us and considering how Alberta should invest in capital infrastructure. It is a high-level roadmap that will guide us in building the facilities, corridors and other assets that will support a positive future for Albertans – a future with strong job growth, diverse economic activity and a climate of innovation.

The World Economic Forum estimates that every dollar spent on capital projects generates an economic return of between five per cent and 25 per cent. Strategic planning and investments are needed to create the biggest impact in terms of job creation, economic growth and sustainability.

Building Forward sets out a bold direction for capital infrastructure in Alberta, including:

- Embracing remote and virtual methods to deliver more personalized services closer to Albertans;
- Leveraging artificial intelligence (AI) and other cutting-edge technologies to enhance health, education, transportation and many other programs and services;
- Strategically investing in capital projects that will attract investment, diversify our economy and create quality jobs for Albertans;
- Expanding roles that the private sector can play as partners in developing schools, highways, housing and other infrastructure; and
- Taking steps to ensure Alberta taxpayers get as much value as possible out of the capital infrastructure we build and maintain.

While Building Forward sets a vision for the next 20 years for all of the Government of Alberta, the Ministry of Infrastructure has already started to put a strong foundation in place for future work. This includes new frameworks to encourage the private sector to come forward with creative approaches and financing solutions that can help provide the infrastructure Albertans need, and project prioritization criteria recently legislated in the *Infrastructure Accountability Act*. It also includes strong support for Alberta's Recovery Plan, designed to position our province for a brighter future while putting Albertans back to work.

As we look ahead over the next 20 years, Albertans can have confidence that the Government of Alberta has a solid plan in place to guide how, when and what we will build as we work to shape a more prosperous Alberta for us all.

Prasad Panda
Minister of Infrastructure

Elements of the 20-Year Strategic Capital Plan

Objectives

1. Strong fiscal management
 2. Maintaining a healthy economy
 3. Encouraging job growth
 4. Focusing on innovation
-

Guiding strategies

1. Putting people at the centre of service delivery
 2. Pursuing innovation and the digital shift
 3. Attracting private investment
 4. Maximizing partnerships
 5. Prioritizing capital maintenance and renewal
 6. Integrating sustainability and resiliency
-

Resilience principles

1. Reflective
 2. Robust
 3. Integrated
 4. Innovative
 5. Inclusive
 6. Flexible
 7. Resourceful
-

Trends

1. Aging and more diverse population
2. Continued urbanization
3. Shift to the virtual realm
4. Affordability constraints
5. Rise of artificial intelligence (AI) and other transformational technologies
6. People-centred service expectations
7. Maintenance of aging infrastructure
8. Fewer silos and more integration
9. Need for sustainability and resilience
10. International volatility

Sectors

1. Delivering integrated, patient-centred health care
-



2. Enabling future-focused K-12 education
-



3. Positioning our post-secondary sector to compete in the changing global economy
-



4. Planning a modern, efficient transportation network
-



5. Powering the world through energy and mineral leadership
-



6. Expanding opportunities in agriculture and forestry
-



7. Sustaining Alberta's environment and building tourism destinations
-



8. Investing in active, vibrant, and diverse communities
-




9. Supporting housing and inclusive living
-



10. Enhancing public safety and access to justice
-



A woman wearing a white hard hat and safety glasses is shown in profile, looking towards the left. She is wearing a light blue shirt with a high-visibility orange and yellow safety vest over it. The background is a blurred control room with various screens and equipment. The lighting is warm and focused on the woman's face.

Shaping a prosperous future for Alberta

Alberta is going through a period like none other in its history. Large economic shifts, leaps in technology, a global pandemic, and other events are bringing about drastic changes in how we all live, work, play, and raise our families. These force us to think about how our province can succeed in this complicated world – and what it will take to do that.

A plan to guide the way forward



Alberta is going through a period like none other in its history. Large economic shifts, leaps in technology, a global pandemic, and other events are bringing about drastic changes in how we all live, work, play, and raise our families. These force us to think about how our province can succeed in this complicated world – and what it will take to do that.

At our core, Albertans are creators. We tackle big challenges, come up with new ideas, and establish enterprises that help make lives better. Our drive to create is what sets us apart, and it is the key to a prosperous future for our province.

To help shape that future, the Government of Alberta has developed Building Forward: Alberta's 20-Year Strategic Capital Plan.

Building Forward is part of the government's commitment to responsible decision making. The Capital Plan has a significant impact on Alberta's economy. Having a comprehensive capital planning framework in place will help our province manage costs, maximize benefits, and mitigate risks.

As part of this planning framework, the new *Infrastructure Accountability Act* puts more rigour around the Government of Alberta's capital funding decisions and provides taxpayers with greater transparency about investments. The act demonstrates how government is raising the bar for evaluating projects proposed for each year's Capital Plan. Progress on those specific projects is reported annually in Alberta's Annual Infrastructure Report.

The act also legislates the release of Building Forward, with intent to guide evidence-based, longer-term strategic planning of infrastructure investments beyond the horizon of the annual Capital Plan. While the act legislates aspects of how the annual Capital Plan is developed, Building Forward offers a comprehensive analysis of how infrastructure may look in the future. It takes an Alberta-wide frame, putting thought into not only urban centres, but also the experiences and needs of rural communities. Building Forward is intended to help government navigate its way through the challenges and opportunities facing our province over the next two decades, ensuring we will have the right infrastructure in place to support Alberta's future.

Key strategic objectives and principles

Building Forward is designed around four major objectives for provincial investment in infrastructure over the next 20 years. All four are underpinned by the Government of Alberta's commitment to safe, reliable infrastructure.

Objective one Strong fiscal management

Government must strike a balance between infrastructure needs and strategic investment in infrastructure, and the responsibility for careful management of financial resources. Infrastructure requires significant investment over many years to build and maintain, so it is imperative for government to plan for and manage these assets. This means making strategic investments in core infrastructure that will improve Alberta's competitiveness and productivity, and support priority areas, such as health care, education, and job creation, while also ensuring that government stays within its means. The Government of Alberta's strong fiscal management will benefit Albertans today and in future generations.

Objective two Maintaining a healthy economy

A robust and diversified economy generates wealth for individuals, businesses, and organizations. This helps support charitable giving in communities and provides revenue to support important public services, such as health and well-being, education, and justice.

Objective three Encouraging job growth

A strong job market offers numerous well-paying opportunities for Albertans across a variety of industries, sectors, and skill sets. It enables the development of stronger families and communities, supporting Albertans to lead fulfilling lives. Infrastructure projects allow for the continuous support of jobs that directly support our economy.

Objective four Focusing on innovation

A climate of innovation spurs the development, adoption, and use of new technology, and encourages new ways of thinking and doing. Innovation helps our province become more productive and competitive, improve environmental performance, create safer and more resilient communities, attract investment, and provide a higher quality of life for all Albertans.

Achieving these four major objectives makes it possible for our province to realize success on many fronts.

Resilience principles

Several key principles based on resilience were used to guide the development of the 20-Year Strategic Capital Plan, including:

1. Reflective
2. Robust
3. Integrated
4. Innovative
5. Inclusive
6. Flexible
7. Resourceful

Taking a comprehensive view

Infrastructure supports much of our daily lives – from the roads we drive on, to the electricity we use, to the water we drink and the food we eat. Infrastructure also forms the backbone of social services through hospitals, schools, universities, colleges, and housing. It is a key driver of our province’s economy and public services, a critical factor in the safety and resiliency of our communities, and a significant portion of the provincial budget.

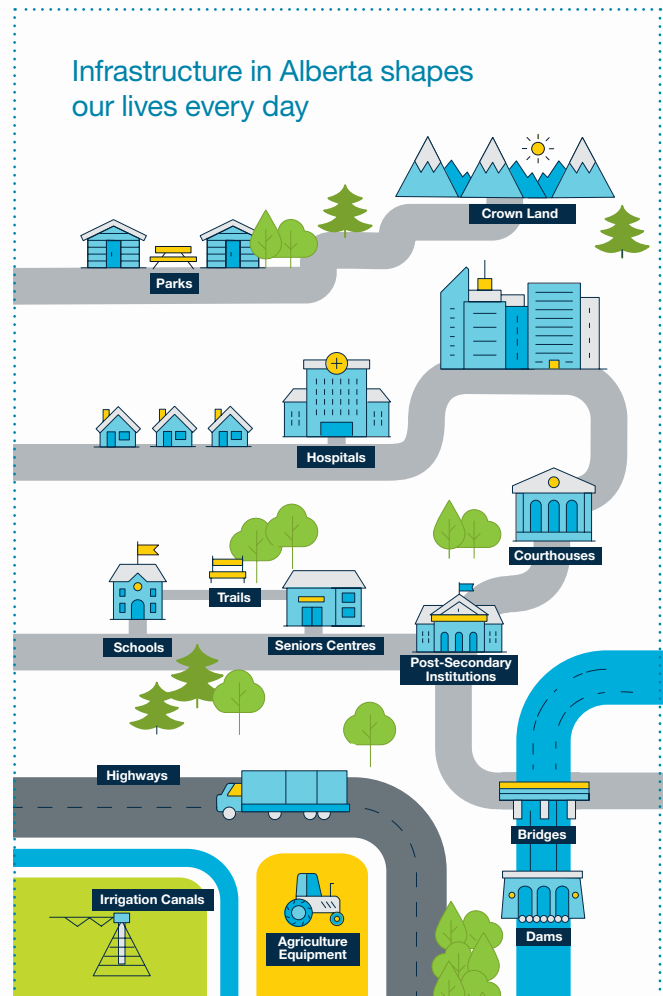
Recognizing this, Building Forward takes a comprehensive view, assessing trends and opportunities across the public, non-profit, and private sectors. This plan charts a strategic course for government’s capital choices, with the following considerations in mind:

The Government of Alberta’s capital asset base

Each year, the Government of Alberta invests in capital assets, such as schools, hospitals, court houses, and provincial highways. These assets are owned and operated by provincial government departments or public entities (e.g., school boards, post-secondary institutions, Alberta Health Services). These capital assets are fundamental for supporting the delivery of key public services, such as health, education, and justice.

Capital grants made to other entities

Another key component of public capital investments is the distribution of grant funding to entities outside the Government of Alberta to support our capital assets. Most notable are grants to municipal governments for local assets, such as roads, transit, water/wastewater facilities, and recreation facilities, as well as grants to non-profits for assets such as affordable housing, seniors housing, continuing care, and cultural facilities. Although these capital assets are owned by others, they are a significant part of the Government of Alberta’s Capital Plan and are directly influenced by government spending.



The role of private capital investment

The vast majority of infrastructure in Alberta is neither owned nor funded by the Government of Alberta, but by private entities. This can include everything from the house owned by an Alberta family, to the strip mall down the street, to a major gas processing plant located outside of town. Powering most of Alberta's economic activity, private capital investment is vital for the strength of our communities, but is driven by market forces. However, government can use policy and financial levers to encourage private investment in desired sectors or locations.

Public capital investments can act as such levers, enabling projects in the Capital Plan to generate multiplier effects in terms of private capital investments.

Provincial strategies and guiding policies

The Government of Alberta has established goals in numerous areas. These are articulated in various provincial strategies and guiding policy frameworks. Strategically, it makes good sense to align public capital investments with these strategies and frameworks to realize progress on multiple fronts.

By looking at the entire landscape, Building Forward provides valuable insight on how the Government of Alberta should approach capital investments to help shape our desired future while optimizing every dollar invested.

Building Forward complements and intersects with other Government of Alberta strategies and frameworks including:

- **Alberta's Recovery Plan**
- **Tourism Strategy**
- **Alberta 2030: Building Skills for Jobs Post-Secondary System Strategy**
- **Alberta Hydrogen Roadmap**
- **Stronger Foundations, Alberta's 10-year strategy to improve and expand affordable housing**
- **Agri-food Sector Investment and Growth Strategy**
- **Alberta Health Services Review**
- **Aviation, Aerospace and Logistics Strategy**
- **Broadband Strategy**
- **Data Strategy**
- **Digital Strategy**
- **Finance and Fintech Strategy**
- **Financing Alberta's Strategic Transportation Act**
- **Investment and Growth Strategy**
- **Labour and Talent Strategy**
- **Manufacturing Strategy**
- **Minerals Strategy**
- **Natural Gas Vision and Strategy**
- **Pharmaceuticals and Life Sciences Strategy**
- **Technology and Innovation Strategy**

Informed by engagement and evidence



Given the importance that capital infrastructure has for our province, the development of Building Forward has been informed by subject matter experts, stakeholders, and Albertans.

Engaging Albertans, stakeholders, and subject matter experts

In summer 2020, Albertans were surveyed on overarching global trends that could impact the way government plans and delivers capital projects. Their responses provided insight on which trends are the most pressing for Alberta to respond to over the next 20 years. Results showed that Albertans largely agreed with the trends identified and felt many were top priorities for how Alberta strategically plans its long-term capital investments.

This engagement was complemented with systematic evidence and input-gathering across the Government of Alberta, enabling these efforts to stretch into every major public policy area.

Trends analysis and strategic foresight

In an age of rapid economic, political, social, environmental, and technological changes, exercises in strategic foresight are not intended to predict the future, per se. Rather, the idea is to explore possible futures based on current trends and trajectories, so that we may gain a deeper understanding of the implications, opportunities, and challenges of these trends. This methodology serves as the basis for Building Forward.

The evidence gathered from Albertans and across government was used to identify overarching trends that will have particular relevance for Alberta's capital infrastructure over the next two decades.

While some trends are well established and have a high degree of certainty (such as the aging of the population), others have lower degrees of certainty as to the speed and intensity at which they will occur (such as the spread of artificial intelligence (AI)). Exploring the interaction of these trends and their different levels of maturity enables us to develop evidence-based foresight that will help guide our future approaches.

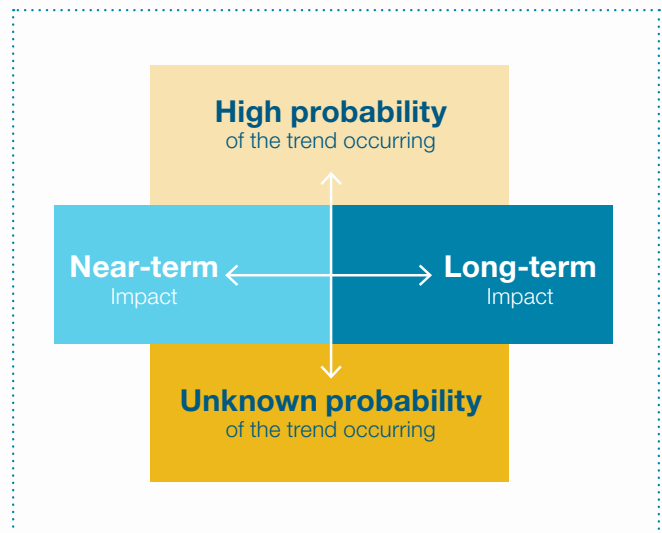
Recognizing this, the overarching trends, along with the sector-level trends, were examined to determine the nature, extent, and timing of strategic capital planning that will be required in Alberta.

Trends that are highly likely to impact our province in the nearer term drive a need for prioritized action. Trends with less certainty or longer-term impacts will require ongoing attention and will be carefully watched so that our province is ready to respond to these trends as they evolve.

Importantly, COVID-19 has influenced this analysis. Some trends that were previously considered longer term in nature have been accelerated by the pandemic. The initial consequences of this have been factored into the strategic foresight of Building Forward and the direction it sets.

The trend analysis and strategic foresight underlying Building Forward is part of its strength as a tool and guide. While sparking debate and challenging assumptions, it will help to strengthen strategic planning and decision making for capital investment across the Government of Alberta.

Throughout Building Forward, categories appear below each trend. Trends that have been accelerated due to COVID-19 are labeled ACCELERATED to demonstrate the shift and heightened urgency.



While robust in its development, Building Forward is a strategic foresight document involving a long-term time horizon. It is not intended to list specific projects or predict the future. Instead, it is about anticipating and preparing for tomorrow's challenges rather than reacting to yesterday's problems. By taking this long-term view, Building Forward explores how issues might evolve, thereby improving our readiness to respond to them.

The 20-Year Strategic Capital Plan is intended to be flexible. As legislated in the *Infrastructure Accountability Act*, it will be updated every four years to reflect our province's ongoing evolution and changing needs. As was done for this plan, it will be important for stakeholders, subject matter experts, and Albertans at large to be engaged in the development of each future iteration.

Examples of major infrastructure today in Alberta



1,000+ health facilities
(including continuing care and community care facilities)



2,000+ school buildings



5,000+ modular classrooms



10,000+ public seniors' lodge units



3,000+ affordable housing building assets



700+ post-secondary building assets



20+ historic sites, museums, and two Jubilee Auditoria



20+ publicly funded and privately funded post-secondary institutions



10+ labs, development centres, and incubators



60+ courthouses and correctional facilities



500+ km of main irrigation canals and dykes



200+ water management systems



3.3 billion m3 of water storage for irrigation and the environment in 70+ reservoirs



7,600+ km of irrigation canals and pipelines



nearly 64,000 lane km of roads



26,000+ km of electricity transmission lines



433,000+ km of energy pipelines



4,600 bridges



200,000+ km of electricity distribution lines



6,800+ km of main rail track



80+ international, regional, and paved community airports



Where we stand today

Infrastructure supports our way of life, throughout our lives – from the schools we attend as children, to the highways and transit we use for travel, to the hospitals we access for care, and the homes we settle into as seniors.

Supporting Alberta families, communities, and businesses with quality infrastructure requires significant investment.

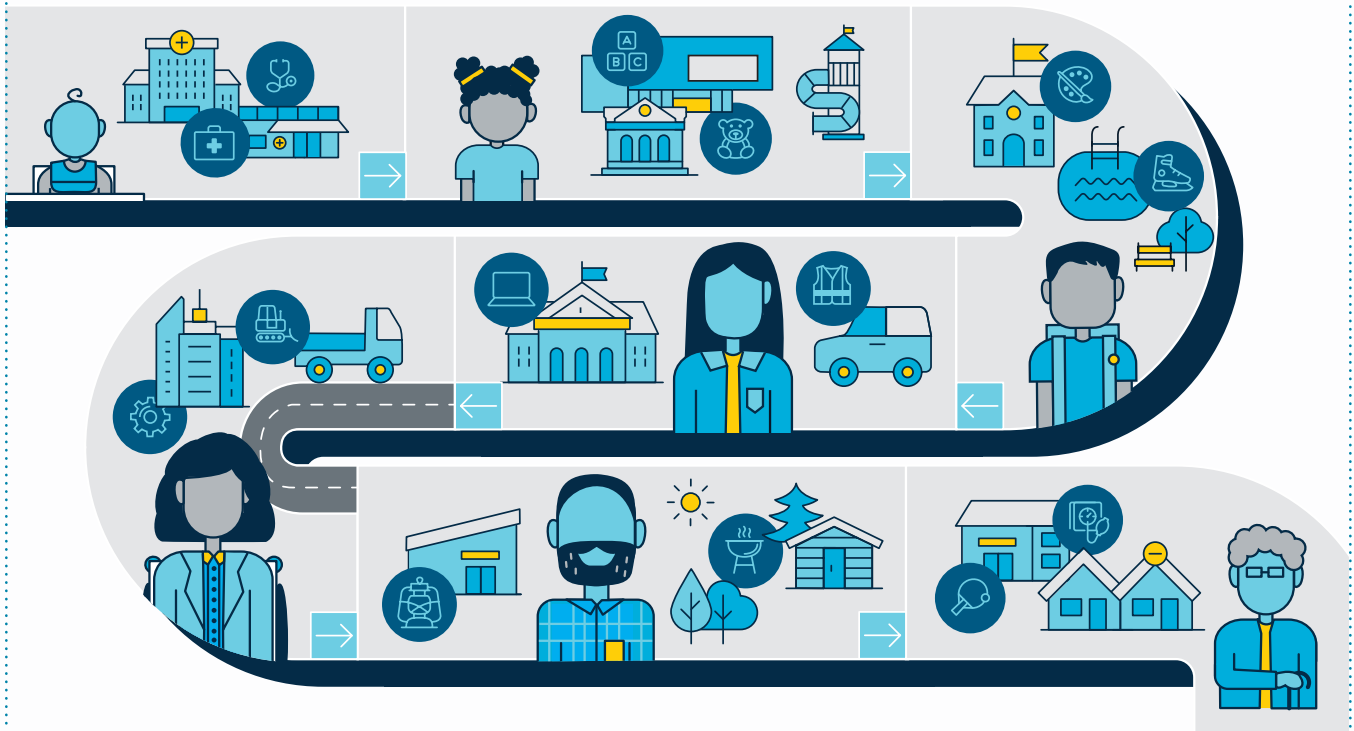
The significance of infrastructure investment

Infrastructure supports our way of life, throughout our lives – from the schools we attend as children, to the highways and transit we use for travel, to the hospitals we access for care, and the homes we settle into as seniors.

Each year, the Government of Alberta produces the annual Capital Plan, which outlines public capital investments the government will make to foster economic growth and support infrastructure that Albertans need.

Supporting Alberta families, communities, and businesses with quality infrastructure requires significant investment.

Infrastructure supports us in all life stages



Projects outlined in the Capital Plan contribute to Alberta's inventory of provincially and third-party-owned capital assets.

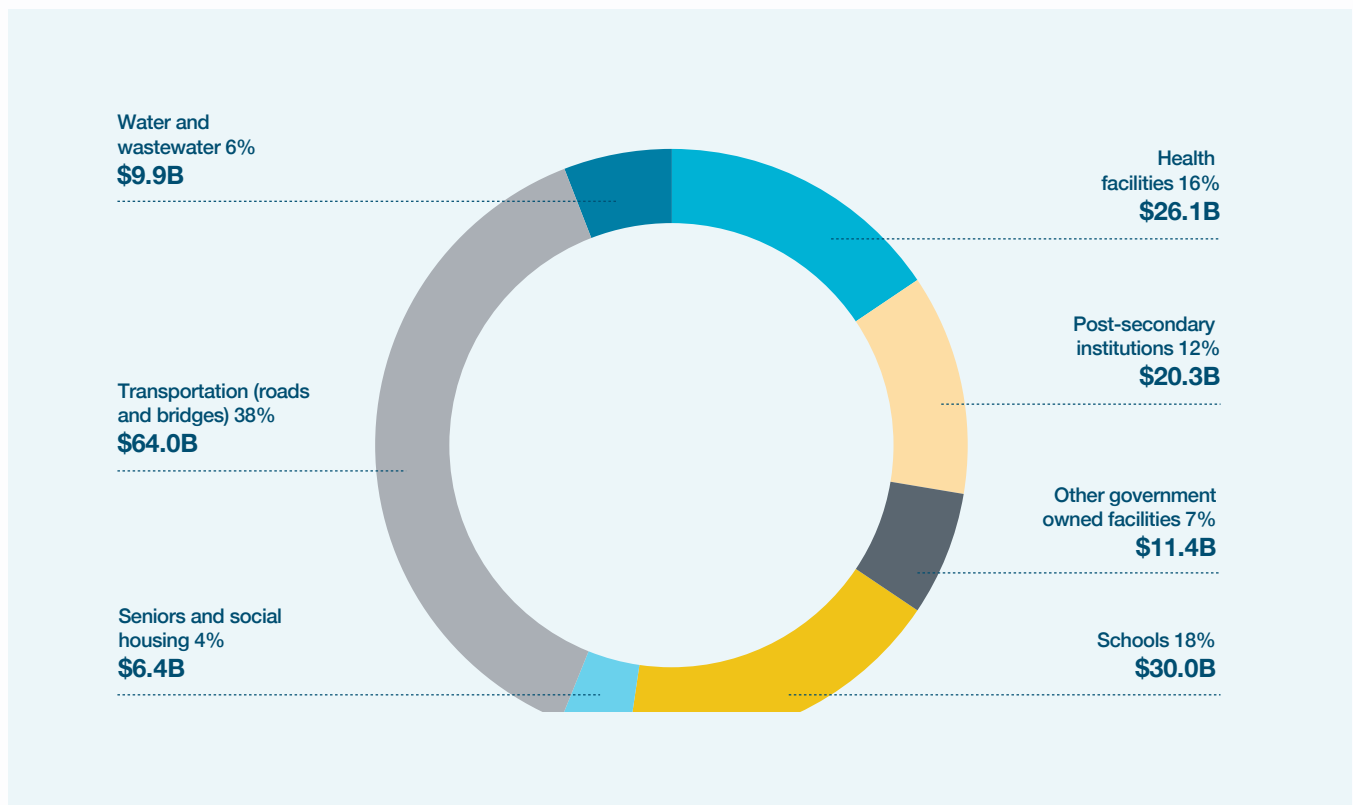
Over the past decade, the Government of Alberta's capital spending on infrastructure has averaged \$7 billion per year. According to the MacKinnon Panel, Alberta spends more on capital investment per capita than other provinces.

Part of what makes infrastructure a significant expenditure is its long-term nature. While the construction of new capital infrastructure often represents a large up-front cost, the ongoing operating and maintenance costs represent a much larger portion of the total investment over the life of an infrastructure asset.

The current replacement value of Government of Alberta's assets is estimated at \$168.33 billion.

Replacement value is the estimated cost to replace or rebuild an asset.

Replacement value of Government of Alberta infrastructure assets 2021



Alberta's Recovery Plan

Alberta's Recovery Plan is a plan to breathe new life into Alberta's economy and create new opportunities for every Albertan. It's a plan to build, to diversify, and to create jobs for today and tomorrow.

We launched the plan in June 2020 during a worldwide pandemic, global recession, and collapsing world oil prices. Today, Alberta's economy is on the rebound.

We are projected to lead the country in economic growth both this year and next. Alberta's Recovery Plan capitalizes on that momentum and will help every Albertan take hold of our bright future.

The plan takes action to build on our economic strengths so we can attract investment and position our province for prosperity. With Alberta's Recovery Plan, we are leaving behind one of the most challenging times in our history and embracing a future of endless possibilities.

Through the third pillar of the Alberta Recovery Plan, Alberta's government is building for the future and creating jobs today, so we have the roads, schools, hospitals, highways, housing, and other public buildings we need for tomorrow. We're investing in things like rural broadband and critical infrastructure projects, and in doing so, we're laying the foundation for thousands of good-paying private sector jobs and creating spinoff benefits for Alberta – including making communities more attractive to investors and employers looking to relocate.

Building Forward: The 20-Year Strategic Capital Plan furthers the third pillar of the Alberta's Recovery Plan. Building Forward provides a transparent and strategic direction for how government invests in planning, constructing, renewing, and maintaining infrastructure over the long term. It supports Alberta's recovery by focusing every future investment into public infrastructure on supporting jobs, growing communities, boosting economies, and helping ensure Alberta remains a world-class destination for people to live, work, and raise a family.

Alberta's Recovery Plan is founded on five pillars:

1. Strengthening our workforce

Making sure workers and businesses have what they need to succeed in the future.

2. Growing our resources

Continuing to invest in oil and gas, forestry, agriculture, and tourism.

3. Building for the future

Creating jobs by building the roads, schools, and hospitals Alberta will need in the years to come.

4. Helping everyday Albertans

Providing support and benefits for individuals, families, and small businesses after the pandemic.

5. Diversifying our economy

Attracting new investment in emerging sectors like finance and fintech, film and television production, and technology and innovation to create jobs for the future.



Alberta's 20-Year Outlook

Over the long term, we want Alberta's strategic capital investments to shape a prosperous future for our province – one based on fiscal responsibility, a healthy economy, strong job growth and a climate of innovation.

But how can this best be done? Where are the most promising opportunities likely to be found? What kinds of disruptions or barriers are we likely to face?

Alberta's 20-year outlook

Over the long term, we want Alberta's strategic capital investments to shape a prosperous future for our province – one based on fiscal responsibility, a healthy economy, strong job growth, and a climate of innovation.

But how can this best be done? Where are the most promising opportunities likely to be found? What kinds of disruptions or barriers are we likely to face?

In order to plan for the next 20 years, it is important to examine trends that are poised to impact how Alberta invests in infrastructure. Although we cannot predict the future with absolute certainty, the government is committed to keeping in touch with economic, social, environmental, and technological changes – including those on the horizon, and those upon us now.

To provide these insights, Building Forward considers the major trends facing our province and the approaches we might take to prepare for, navigate and leverage them.

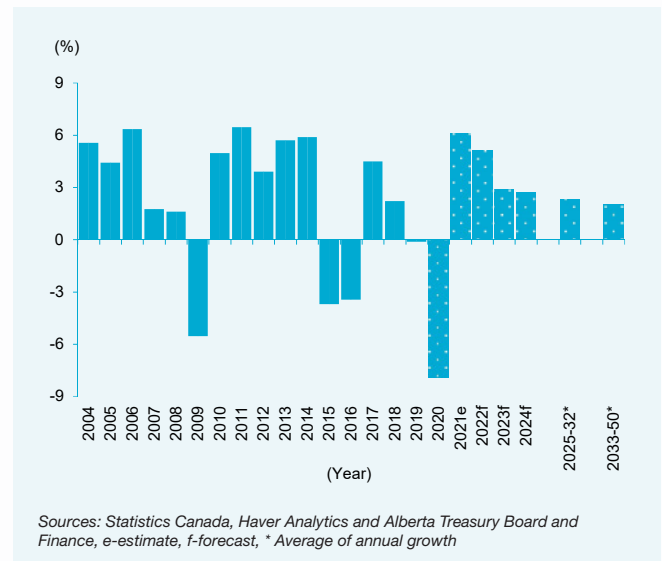


Economic projections and assumptions

Serving as a baseline, today's projections about the Alberta economy help guide our thinking about our province's capital needs and opportunities over the longer term.

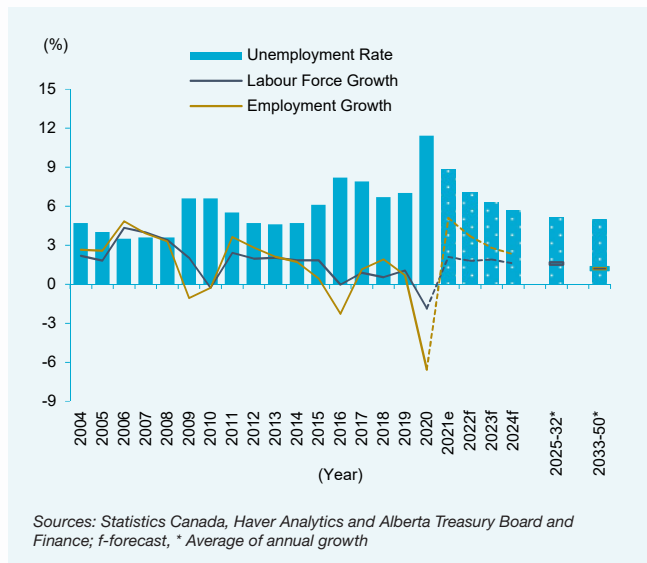
After a historically challenging year, the Alberta economy is rebounding strongly from the double blow of the COVID-19 pandemic and collapse in oil prices. Following a severe contraction of 7.9 per cent in 2020, Alberta's real GDP is now forecast to bounce back 6.1 per cent this year and fully recover in 2022 with solid growth of 5.1 per cent. While the recovery was initially led by consumer spending and residential investment, business activity has also picked up this year. The strong recovery in oil prices is supporting a rebound in energy sector activity, while non-energy exports are benefiting from rising global demand and higher commodity prices.

Economic growth to moderate as economy reaches potential Year-over-year change in Alberta's real GDP



Even though Alberta's economic recovery is anticipated to be quick and robust, it is expected to vary across sectors. This will result in an uneven employment recovery and only a gradual decline in the unemployment rate. As of November 2021, employment is up 5.1 per cent year-to-date. Employment is forecast to grow 3.7 per cent in 2022, while the unemployment rate is expected to fall from a record high of 11.4 per cent in 2020 to 7.1 per cent in 2022.

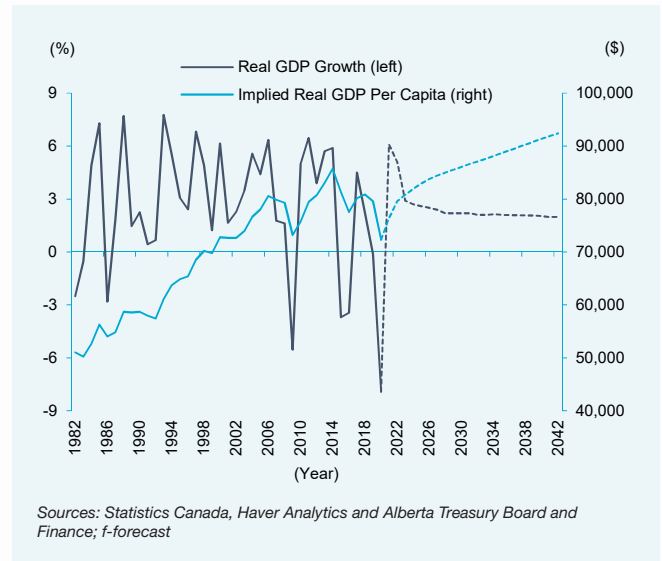
Unemployment rate to decline amid solid job growth
Labour market indicators



Over the medium term, growth is expected to moderate as the economy moves from recovery to expansion. The economy is forecast to grow at an average rate of 2.7 per cent per year from 2022 to 2025. This solid growth will be supported by improved market access, rising exports, and a pickup in business investment driven in part by Alberta's lower corporate tax rate and other policy and regulatory changes. Lagging industries will continue to make up for lost ground, and unemployment will ease to around 5.0 per cent by 2025.

As the economy approaches its potential, economic and employment growth are expected to moderate. As a result, real GDP is expected to grow at an annual average rate of 2.3 per cent out to 2031. Alberta's economic growth is forecast to moderate further in the following decade, averaging 2.0 per cent, driven by economic fundamentals of continued population growth and productivity gains.

Growth in real incomes to continue
Alberta real GDP growth and GDP per capita projections



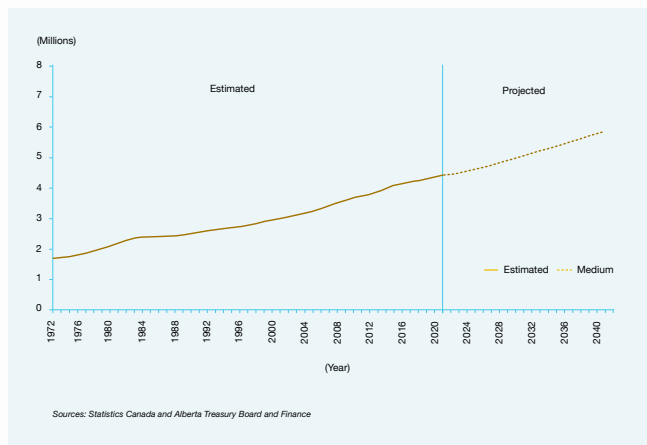
Population projections and assumptions

Alberta's economic activity and population growth tend to be closely linked.

Periods of strong GDP growth tend to bring about substantial in-migration as people flock to Alberta in search of jobs and opportunities. Conversely, periods of economic downturn are associated with weaker in-migration and a dampening of population growth.

Given its economic impacts, it is understandable that COVID-19 has impacted Alberta's population growth. Pandemic-related travel restrictions have also severely affected the movement of immigrants and non-permanent residents to Canada and Alberta. Between April and December 2020, Alberta added 15,754 residents, one quarter the increase of the same period in 2019.

Alberta population, historical (1972-2019) and projected (2020-2046)



As of July 1, 2020, Alberta's population was 4,420,029. While the COVID-19 pandemic continues, annual population growth in our province slowed from 1.3 per cent in 2020 to 0.5 per cent in 2021. In addition to lower international migration, net outflows of interprovincial migrants are expected unless Alberta's unemployment rate improves.

The unknowns around COVID-19 make it a complicating factor in the near term. The successful deployment of vaccine, for example, will help support a return to more normal linkages between economic and population growth. In the meantime, the re-opening of economies and the gradual return of international travel may be erratic.

From a projection standpoint, however, COVID-19 is not likely to significantly impact longer-term population trends over the 20-year horizon.

Alberta's Office of Statistics and Information estimates that by 2040, Alberta's population will be approximately 5.9 million – an increase of 1.4 million residents. This represents an average annual population growth rate of 1.4 per cent.

Over half (54 per cent) of these additional residents are expected to come from international migration. Another 32 per cent will be from natural increase, with the remainder due to interprovincial migration.

Global trends

We can take note of global trends that stand to influence jurisdictions of all shapes and sizes. Research done by international organizations is helpful here.

For instance, the Global Infrastructure Hub provides data, insights, and best practices on infrastructure issues for the G20 group of nations, including Canada. In its 2021 report, Infrastructure Futures, the organization outlined 25 large-scale, transformative “megatrends” that have the potential to fundamentally shift the way countries build and use infrastructure.¹

Please see [Appendix B](#) for an overview of Global Infrastructure Hub’s latest list of global trends that will impact how countries build and use infrastructure.



Overarching trends in Alberta

With the global context in mind, we can consider the unique position and circumstances of our province.

A number of overarching trends are likely to impact the way Alberta evolves socially, economically, and environmentally over the next 20 years. These overarching trends will be experienced to varying degrees across sectors, organizations, and communities. As a result, these trends will have profound implications for how our province invests in capital infrastructure between now and 2040. The COVID-19 pandemic has significantly shifted many aspects of our daily lives. The impact on long-term trends remains unclear but will continue to be monitored.

Overarching trends include:

1. Aging and more diverse population
2. Continued urbanization
3. Shift to the virtual realm
4. Affordability constraints
5. Rise of artificial intelligence (AI) and other transformational technologies
6. People-centred service expectations
7. Maintenance of aging infrastructure
8. Fewer silos and more integration
9. The need for sustainability and resilience
10. International volatility

► **Did you know?**

During engagement with Albertans and stakeholders in summer 2020, respondents classified these trends as something for the Government of Alberta to “Act Now” or “Develop Strategies” for, indicating strong support for these trends to be analyzed as part of this strategic plan.

¹ “Infrastructure Futures: The impact of megatrends on the infrastructure industry,” GI Hub, 2020, https://cdn.gihub.org/umbraco/media/2980/infrastructure-futures-report_final-v4a_updated-exhibit-5.pdf.

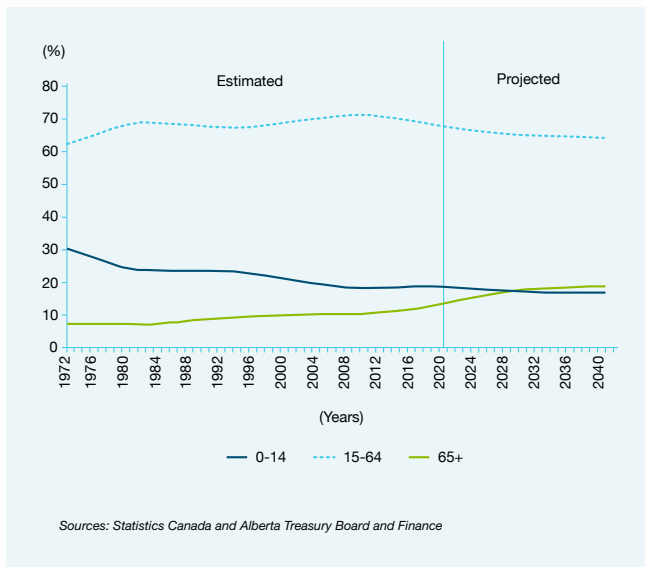
Aging and more diverse population

- > Impact: Mid- to long-term
- > Probability: High

As Alberta’s population grows in overall size, it will also dramatically evolve. Over half of our province’s population growth is expected to come from outside Canada, leading to an increasingly rich mix of languages, cultures, and backgrounds. Newcomers to Alberta over the next 20 years will arrive with a variety of skill levels, expertise, and global connections, helping drive new opportunities across our province’s economy. Alberta is also home to a substantial and fast-growing population of Indigenous Peoples, currently representing 6.5 per cent of the province’s overall population and the third largest Indigenous population behind Ontario and British Columbia.

At the same time, the average age of Alberta’s population is projected to rise from 38.5 years (in 2020) to 41.2 years by 2040. Driving much of this will be the “baby boom” cohort, the youngest member of which will reach 65 years of age in 2030. By 2040, almost one-in-five Albertans will be a “senior” (i.e., 65 years or older), including members of the much smaller cohort that follows the baby boom. As baby boomers age, Alberta’s oldest seniors (i.e., those 80 years of age and older) will markedly increase in number between 2026 and 2040, at an average rate of 5.5 per cent per year.

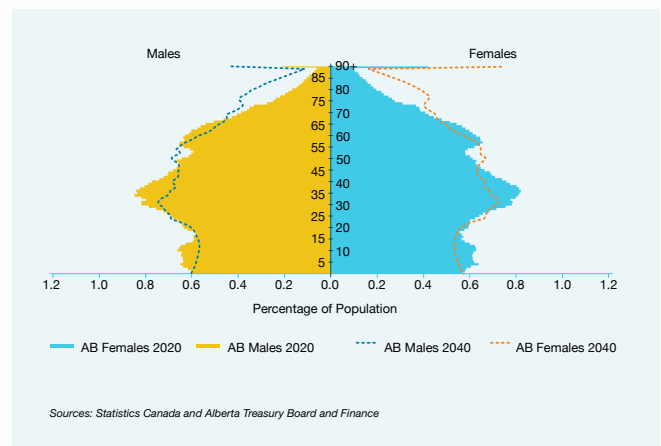
Population by age group, medium scenario, 1972-2040



By contrast, the number of school-aged children in Alberta (i.e., five to 18 years old) is expected to grow far more slowly, at an average annual rate of 1.1 per cent until 2025, and 0.9 per cent thereafter until 2040.

The emerging adult cohort (i.e., 18-24 years old), heavily influenced by migration, will shrink in the near term before accelerating to growth of 2.2 per cent annually between 2022 and 2034.

Alberta’s age pyramids, 2020 vs 2040



Even though Alberta’s population will be aging, the milestone of reaching 65 years of age is simply not what it used to be. The notion of traditional “retirement” is in rapid decline and many people will likely continue to work during their senior years. However, the realities of aging will ultimately have consequences for the delivery of programs and services, the evolution of workplaces, the way communities are planned and built, and for the safety of residents.

Continued urbanization

- > Impact: Long-term
- > Probability: High

Over time, Albertans have increasingly migrated to urban areas. Population forecasts for the Edmonton-Calgary corridor, which includes the census divisions of Edmonton, Red Deer, and Calgary, indicate this trend is expected to continue. Although it covers only six per cent of Alberta's land area, the corridor is currently home to 77 per cent of our province's population, making it the most urbanized area of the province². The projected growth of this region will outpace the provincial average.

By 2040, about eight in 10 Albertans will live in the Edmonton-Calgary corridor, making it home to approximately 4.7 million people including:

- Over three quarters (77 per cent) of all school-aged children;
- Almost eight in 10 (79 per cent) of all young adults; and
- Almost eight in 10 (78 per cent) of Alberta's oldest seniors.

Grande Prairie will also be influenced by this trend. Serving as a major service centre for northwestern Alberta and northeastern British Columbia, Grande Prairie has experienced strong growth over the past decade. The population of Census Division 19, which includes Grande Prairie, is forecast to grow at a higher rate than the provincial average.

The continued urbanization of Alberta is consistent with patterns that are happening worldwide and is driven by several factors. The majority of newcomers tend to settle in urban centres as these locations often have existing cultural communities that can offer support networks.

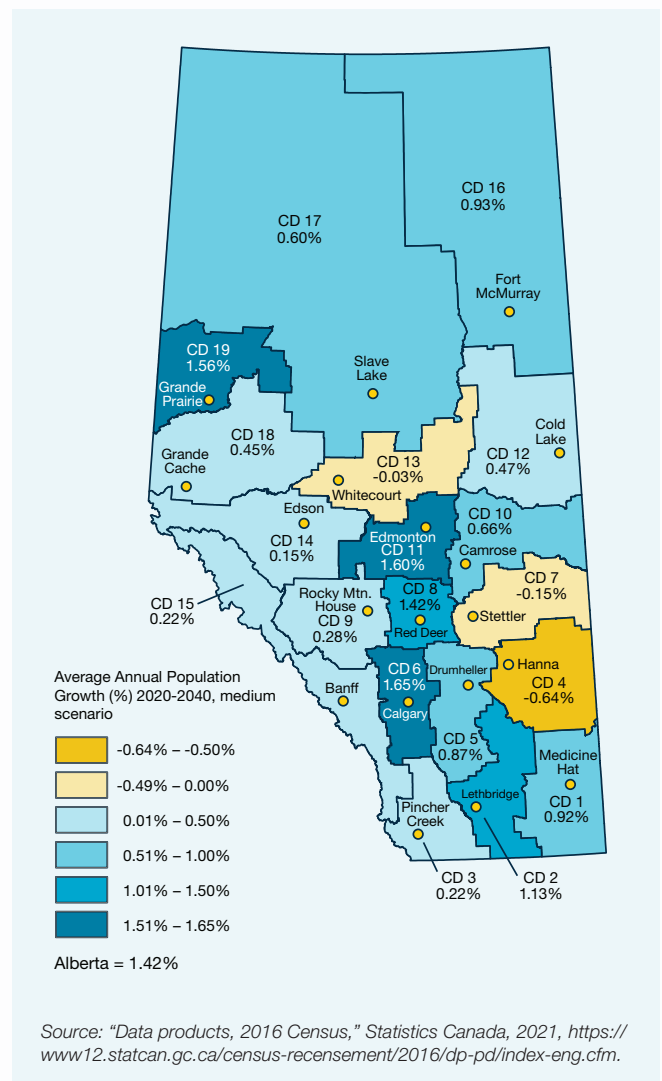
Urbanization is also occurring amongst Indigenous Peoples; in 2016, about 46 per cent of Indigenous Peoples in Alberta lived in the metropolitan areas of Edmonton and Calgary, up from 42 per cent in the 2006 Census.

Urban centres tend to have a greater array of amenities and services available, including recreation, health services, education, shopping, and transportation options. They also offer a greater range of economic opportunities and, due to their size, facilitate a higher degree of networking and collaboration amongst workers and across industries.

The COVID-19 pandemic has forced many employers to embrace working-from-home scenarios. If this continues, employees may move away from cities as they no longer need to live in urban centres for employment.

The impact of this recent shift over the long term is not clear, but may have implications for continuing urbanization.

While it comes with challenges in terms of service demand pressures, sustainability, and land-use conflicts, urbanization also presents opportunities. From a capital standpoint, the higher concentration of residents, businesses, and other organizations can offer economies of scale when developing infrastructure.



² "Infrastructure Futures: The impact of megatrends on the infrastructure industry," GI Hub, 2020, https://cdn.gihub.org/umbraco/media/2980/infrastructure-futures-report_final-v4a_updated-exhibit-5.pdf.

Shift to the virtual realm

> **Impact: Near- to mid-term**

> **Probability: High**

> Accelerated (due to COVID-19)

Advancements in computing power, internet-based applications, smartphone technology, and social media have all combined to make the virtual world an almost seamless extension of the tangible world. Over the past two decades, a growing variety of functions and services have become available through electronic means. In a 2019 Statistics Canada survey, overall 2.3 per cent of Canadian industries reported using virtual mixed and augmented reality, with professional, scientific, and technical services sectors reporting 9.7 per cent³. Over the next two decades, we can expect an ongoing and more expansive shift toward the virtual realm.

COVID-19 has served to accelerate this shift. Steps to slow the spread of the virus have forced citizens to limit in-person interactions and explore how their work and learning can be done remotely. While they have realized varying degrees of success and efficiency, organizations of all kinds have had opportunities to explore the potential of the virtual realm in ways they previously did not. This will have lasting impacts; even after COVID-19 passes, people will reflect on these experiences and examine how virtual tools can be further leveraged to reduce costs, enhance convenience, and achieve outcomes.

Advances in technologies, such as virtual reality and augmented reality, will further enable the shift. These tools will give rise to more options for teaching, learning, and delivering services that compete with or complement traditional approaches in “brick and mortar” locations.

The ongoing shift to the virtual realm will have implications for whether, where, and how people move around and interact, changing the demand profiles for transportation and information technology (IT) systems. Ultimately, we will need to consider how many physical “trips” will be permanently replaced by virtual or remote alternatives across any number of sectors. This will impact capital needs on multiple fronts, including highways and transit, cybersecurity tools to protect systems and operations in virtual environments, and investments in information technologies to enable better digital services and data infrastructure for better citizen experience and privacy of data. It will also drive a need for Albertans across the province to have access to sufficient broadband connectivity.

Affordability constraints

> **Impact: Near- to mid-term**

> **Probability: High**

Growing competition around the world and upheaval in markets have placed pressure on budgets everywhere. This is leading business owners, non-profits, and governments to explore ways of improving their bottom lines. We can expect these efforts to be ongoing as organizations are increasingly challenged to control costs and be as competitive as possible.

This affordability constraint will affect the nature and level of capital investments. For example, some entities may choose to reduce their reliance on physical locations or consolidate space. Others may choose to make significant investments in IT assets in order to expand into internet-based sales and service delivery.

On the public side, affordability for taxpayers will be a consistent and enduring requirement. Leveraging the cost benefits of counter cyclical capital investments, for example, by investing more when prices are low, and limiting investment when costs are high and workers and resources are in high demand, will help maximize the impact of limited tax dollars. All governments must explore innovative ways of providing essential programs and services while controlling expenses. Capital projects will need to get the “best bang for the buck,” with each investment ideally helping to achieve multiple objectives, such as maintaining fiscal responsibility, attracting investment, encouraging job growth, and meeting the needs of a changing population. Greater focus on capital maintenance and renewal, to extend the life and maximize the value of existing infrastructure, will contribute to greater affordability for Albertans over the longer term.

See [Strategy Five](#) for more on capital maintenance and renewal.

³ “Use of advanced or emerging technologies, by industry and enterprise size,” Statistics Canada, June 9, 2021, <https://www150.statcan.gc.ca/t1/tbl1/en/tv.action?pid=2710036701&pickMembers%5B0%5D=1.5&pickMembers%5B1%5D=3.1>.

Rise of artificial intelligence (AI) and other transformational technologies

- > Impact: Near- to mid-term
- > Probability: High

Perhaps the most disruptive trend over the next 20 years will be the continued rise of AI and its integration into countless aspects of life. Having moved well out of its infancy, AI is now more than a sector unto itself, and is emerging as a tool that can be used across multiple industries and applications. It is predicted that by 2030, AI will deliver global economic activity of approximately \$13 trillion⁴.

The integration of AI will alter the landscape for how goods and services are produced and provided, leading to strategic enhancements in service delivery and business automation. AI will give rise to new types of careers in machine learning, robotics, and other technologies while placing premiums on skills that require the creativity, critical thinking, and empathy of humans. In this way, AI opens an economic doorway for Alberta to become a leader in machine learning, robotics, AI, and other converging and emerging technologies.

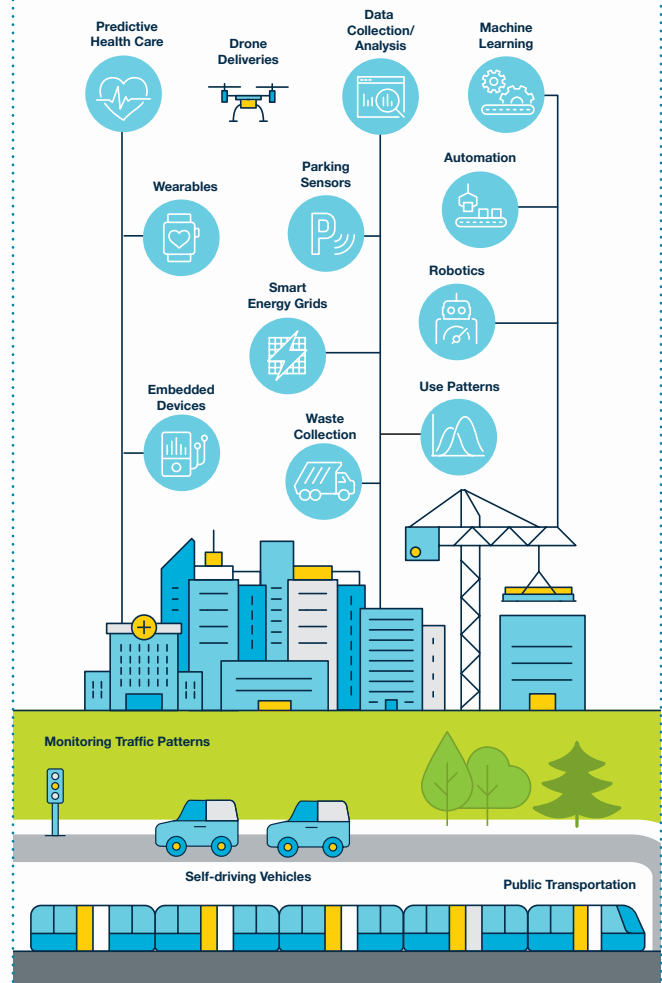
From an economic perspective, Alberta is positioned to realize benefits from this trend, owing to a strong stable of talent and other assets in AI research. Our province is home to the Alberta Machine Intelligence Institute (Amii), one of three Canadian AI hubs. Ranked among the top five in the world for AI and machine learning, Amii (and its partner, the University of Alberta) has helped give rise to a growing ecosystem that includes numerous start-ups, accelerators, and investor organizations. This ecosystem offers strong potential for job creation and economic growth.

AI can also enable the Government of Alberta to anticipate and better meet the needs and expectations of citizens. From a capital standpoint, the rise of AI may have massive implications, particularly in relation to decisions about investments in IT assets and transportation infrastructure.

Beyond AI, Alberta can expect additional transformational technologies to emerge and develop over the next 20 years. Examples of such transformational technologies are addressed in the strategies and sectors throughout this plan.

See [Strategy Two](#) for more about how the Government of Alberta is approaching AI.

How artificial intelligence (AI) is impacting infrastructure



⁴ “Notes from the AI frontier: Modeling the impact of AI on the world economy,” MGI, September 4, 2018, <https://www.mckinsey.com/featured-insights/artificial-intelligence/notes-from-the-ai-frontier-modeling-the-impact-of-ai-on-the-world-economy#>.

People-centred service expectations

> **Impact: Mid-term**
> **Probability: High**

Amid the growing diversity, complexity, and competitiveness of the world, providers of goods and services are realizing that one size does not fit all. Consumers increasingly desire solutions that are tailored to meet their particular needs and circumstances. Moreover, they expect these solutions to be accessible, particularly when technology can make it so.

Retail is perhaps one of the best examples of this trend. Shopping used to mean travelling to a physical store and choosing from a limited selection of goods. Today, a person can use their smartphone to browse an almost unlimited selection of items that cater to their unique needs and tastes, and have their purchases delivered to their doorstep.

The shift toward inclusive, personalized, and accessible service can be expected to occur in more contexts. For example, education programs are likely to become more specialized and delivered to accommodate individual learners. Health services will be increasingly patient-centred in both structure and delivery. Albertans will increasingly want to access public programs, services, and information at consolidated locations or, ideally, from the comfort of their homes. Online registry services, a growing suite of online government services and programs, and the launch of MyAlberta Digital ID, offer examples of how the Government of Alberta has already begun shifting to meet these expectations.

Over the longer term, the demand for person-centred and accessible services will have consequences for where and how capital assets are designed, situated, and built.

Maintenance of aging infrastructure

> **Impact: Near- to mid-term**
> **Probability: High**

Over many decades, our province has established a substantial inventory of public capital assets. These assets age over time. In some cases, this translates into specific assets being less effective or efficient in meeting our needs. In other cases, it means an asset may present safety concerns that need to be addressed. The realities of aging infrastructure are shared by governments worldwide.

The need to maintain infrastructure will be an ongoing issue, with demands for infrastructure renewals competing with demands for new assets. Finding ways to balance and reconcile these demands will be an ongoing challenge. It will force our province to be vigilant in caring for the assets we already own, and will demand robust rationalization of new public capital assets and investments.



Fewer silos and more integration

> **Impact: Mid-term**
> **Probability: High**

As the world grows more complex, people and businesses are increasingly reaching across different fields to develop necessary solutions. Interdisciplinary collaboration is becoming the norm rather than the exception.

Several industries have already been moving down this path to improve efficiencies, lower costs, and become more competitive. A company that was long seen as a residential construction firm, for example, might now be better characterized as a technology company that uses green innovations to build sustainable homes.

In health and social services, growing knowledge is leading to better understanding about the interrelated impacts of community design, vulnerability, inclusion, poverty, addictions, trauma, risk, and other factors for developing stronger families and communities. This is leading to more multidisciplinary collaboration amongst policy-makers and service-providers to better help those in need and to pursue preventative approaches that will help build a stronger society.

Overall, the trend is one of fewer silos and more integration – in how we learn, how we work, and how we build.

From a capital standpoint, more integration can mean more co-location. Driven by a desire to encourage collaboration and reduce duplication, organizations will increasingly look to yield as many benefits as possible from a single asset. This will be further driven by financial and ecological concerns as organizations seek to limit costs, reduce footprints, and improve disaster resilience.

The push for more integration will influence the design, location, and use of projects. It will demand greater planning, collaboration, and community engagement when it comes to land-use decisions, such as the development of corridors and special zones. It will also allow for greater optimization of capital budgets, enabling a single investment to achieve multiple objectives.

The need for sustainability and resilience

> **Impact: Near- to mid-term**
> **Probability: High**

Albertans take pride in our province's scenic landscapes, open skies, and diverse natural assets. We understand the importance of keeping our water, air, and land as clean and healthy as possible – and we have a long history of doing so.

A changing climate will make this an even greater challenge. Over the past number of years, we have witnessed how wildfires, floods, and other phenomena can have consequences for the health and welfare of our communities, our economy, and our lives. Guarding against and adapting to severe events, and being able to build back better after they occur, will be crucial, particularly against the backdrop of temperature and precipitation extremes that historically come with living in Alberta.

As events take shape worldwide, periods of resource scarcity could be a recurring feature over the next 20 years. Alberta stands to be among a dwindling number of stable locations with substantial natural assets. This will create opportunities while also demanding care and vigilance.

For instance, our province has abundant arable land that will become increasingly vital for helping feed the world; this will challenge us to remain excellent land stewards as we enable diverse activities on Alberta's landscapes. Similarly, global fresh water supplies stand to become increasingly scarce. Our province's water management expertise will be essential for maintaining the health and security of water resources. Reducing air pollution will also remain an ongoing imperative as Alberta experiences population and economic growth. The shift to a lower-carbon future and the rise of Environment, Social and Governance (ESG) movements will also take on greater prominence as Alberta continues to invest in technologies and innovations that secure a sustainable future.

Conserving resources, mitigating risk, using greener materials, reducing footprints, building resiliency, and minimizing impacts will influence the choices of individuals and organizations, that, in turn, will influence capital investment choices.

International volatility

- > **Impact: Long-term**
- > **Probability: Unknown**

Volatility in the world is nothing new. Albertans are familiar with how events beyond our borders can have massive implications for our province. Alberta's energy, agriculture, and forestry industries have all felt the impacts of U.S. policies on issues, such as softwood lumber, energy pipelines, and beef imports. Battles for market share amongst oil-producing nations in Asia and the Middle East have led to swings in oil prices, having dramatic consequences for Alberta families and communities. COVID-19 has brought into sharp focus how global interconnectedness can impact all of us at the local level.

Looking forward, international volatility is likely to increase. Concerns regarding economic protectionism, cyberterrorism, and cross-border intellectual property theft are on the rise. Longstanding alliances amongst nations are more frequently under strain. As the world's population further expands and resources become more limited, we can expect to see more aggressive moves by countries to advance their interests.

As a subnational jurisdiction with a relatively small population and an export-based economy, Alberta will continue to be affected by global forces while having very little influence over them. At the same time, we are also strategically positioned with abundant natural resources, a well-educated population, a stable democracy, and vast research assets.

This will make it important for Alberta to secure its critical assets and infrastructure to protect our communities and economic interests. It will also challenge us to strike the right balance of boldness and prudence in our investments so that we are deliberately carving out a prosperous future for our province amidst a more volatile world.



Alberta's guiding strategies for capital infrastructure

To help achieve its four major objectives — strong fiscal management, maintaining a healthy economy, encouraging job growth, and focusing on innovation— Building Forward identifies six guiding strategies for capital investment in Alberta.

These guiding strategies will inform the Government of Alberta's planning for capital investments over the long term.

Alberta's guiding strategies for capital infrastructure

To help achieve the four key strategic objectives, Building Forward sets out six guiding strategies:

1. Putting people at the centre of service delivery
2. Pursuing innovation and the digital shift
3. Attracting private investment
4. Maximizing partnerships
5. Prioritizing capital maintenance and renewal
6. Integrating sustainability and resiliency

These guiding strategies will inform the government's planning for capital investments over the long term.

Underpinning these strategies and objectives is the need for data, digital, and broadband strategies that allow the government to keep pace with the needs of Albertans.

Technology is not just an industry, it is the future of every industry. In recognition of this, the Government of Alberta is working to deliver better, faster, and more accessible services for Albertans.

We have a vision that, by improving connectivity, access to data, digital skills, and services, Alberta's government will be better positioned to embrace advances in technology.

The four strategic objectives and six guiding strategies are supported by the Government of Alberta's foundational commitment to safe, reliable infrastructure.



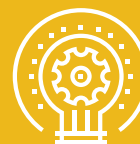
Objective one
Strong fiscal management



Objective two
Maintaining a healthy economy



Objective three
Encouraging job growth



Objective four
Focusing on innovation

STRATEGY ONE

Strategy one Putting people at the centre of service delivery

As we have seen in retail and other sectors, services are shifting to become ever more inclusive and accessible, with the aim of personalizing the client experience. With new technologies making this more feasible and cost effective to do, there are opportunities to bring this approach into the delivery of public services.

Some systems are already moving in this direction. For example, Alberta Health Services continues to enact its foundational patient-first strategy. Under this approach, health professionals work together to ensure patients and families are at the centre of all health care activities, decisions, and teams rather than forcing the patient to adapt to rigid, dated processes.

► **Did you know?**

After conducting a facility-based continuing care review in early 2021, the Government of Alberta is taking action to make Alberta's continuing care system better, safer, and more sustainable. From the input given by Albertans and residents, and the learnings from COVID-19, the Government of Alberta is implementing recommendations from the review including:

- *Providing direction to support couples and companions to remain living together in continuing care facilities, if they choose;*
- *Phasing out shared rooms in continuing care facilities;*
- *Updating design guidelines for continuing care centres and targeting capital funding to support a great variety of models for upcoming builds;*
- *Providing capital grant funding to support Indigenous groups for continuing care services in the communities where they live; and*
- *Expanding community care and service options to enable more people to stay at home.*



STRATEGY ONE



Similarly, the Government of Alberta is continuing work to put the needs of children and their families at the centre of social work practice. This includes efforts to simplify the assessment process to remove jargon and to include the child's perspective in planning for their safety. The government also works with Indigenous communities to include their cultures and traditions in case planning, and to include Elders, community members and others in helping to keep and find safe homes for children. In the realm of education, the emergence of specialized programs will enable students to learn in ways that work best for their learning styles and circumstances.

Applying this people-centred delivery approach across all public services will bring benefits to Albertans. Services will become more accessible as they are moved away from rigid and centralized models and toward more flexible and decentralized approaches. Shifting from "one size fits all" models to inclusive, personalized approaches will improve the effectiveness of services, making for a more prudent use of taxpayer dollars, and allow for the more targeted reduction of risk and vulnerabilities.

For example: In February 2020, the Governments of Alberta and Canada announced the development of new affordable seniors housing for Albertans in Oyen, Spirit River, and Manning. Alberta Seniors and Housing and Alberta Health are collaborating to combine a seniors lodge and continuing care units in the same facility to enable a flexible range of care. The rural lodge partnership received \$37 million from the provincial and federal governments, which will go toward 173 new seniors' lodge and continuing care spaces.

For example: Albertans are increasingly looking to pursue learning opportunities that will prepare them for their individual career ambitions and can better integrate into their lives. This requires a post-secondary system that is nimble, keeps pace with a rapidly changing global economy, and offers individualized learning experiences. As the future of work continues to alter the skills, knowledge, and competencies that each learner will require, Alberta's post-secondary institutions will need to work together. They will need to develop innovative solutions in areas, such as condensed degrees (or ladder learning), short-term reskilling program delivery, work-integrated learning, and access.

STRATEGY ONE

Enabling this shift will mean adapting how public capital investments are designed, built, and located. Such investments could use a variety of approaches:

Barrier-free and universal designs

When public money is invested in developing facilities, those facilities must be built in ways that accommodate all members of the public. Capital assets should incorporate universal designs that enable inclusion and safety of all peoples, helping to put Albertans at the centre of service delivery.

For example: The new Red Deer Justice Centre was planned and designed to be barrier-free and accessible throughout all eight floors. Universal design principles have been used in all public, private, and secure spaces, such as access ramps at main entrances and wayfinding patterns and signage. This will ensure all court users have barrier-free access. Special consideration has been given to design features that will help support members of the public when they are required to attend court. Space will be available to appropriate non-government organizations based on the programming they provide. There are day offices allocated on each court floor along with available meeting spaces. The day offices are flexible in design, enabling service providers to use the offices as needed.

Pursuing integration

Instead of separate buildings that silo services and professionals, infrastructure developments should be designed in ways that help bring communities together. This will help make services more accessible to Albertans and foster the kind of collaboration needed for client-centred service delivery.

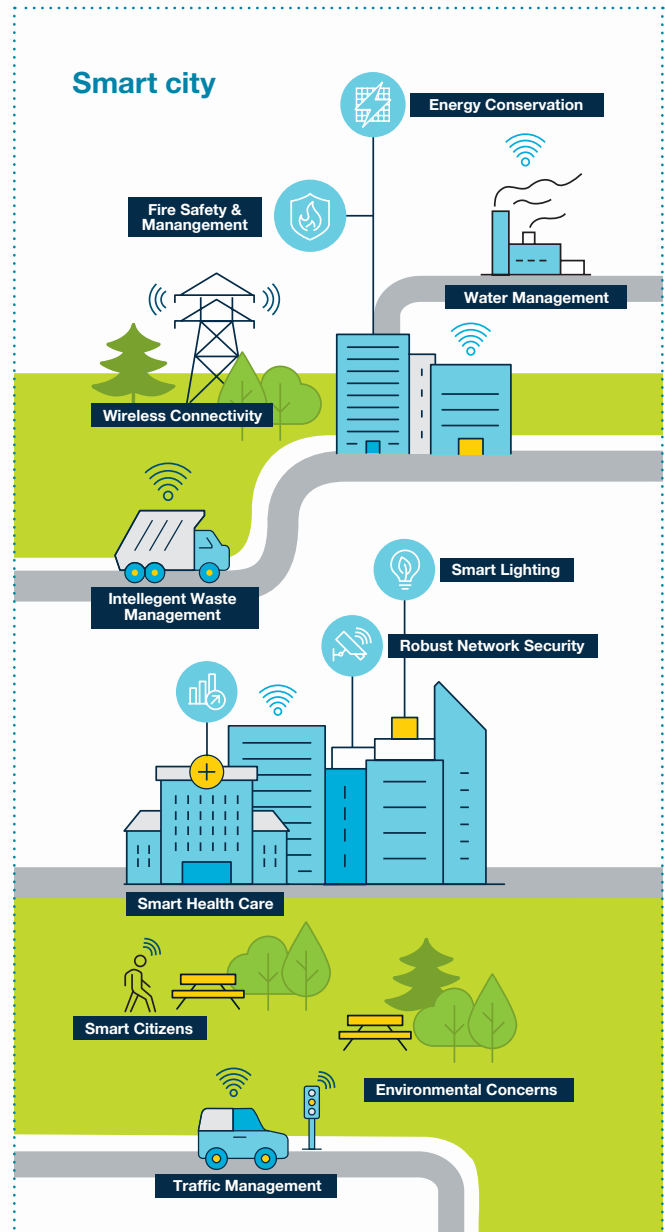
Decentralization

Greater personalization, inclusiveness, and accessibility often involves moving service delivery closer to Albertans – be it their community, their home, or their smartphone. This means adjusting the nature and scale of capital investments.

Exploring potential for smart cities

Smart cities are intended to improve the lives of Albertans through innovation, data, and connected technology. Numerous Alberta communities are working to integrate technology for human-centred design, increased connectivity, and open and transparent access to information and infrastructure.

Examples of this include intelligent syncing of traffic signals to reduce commuting times for residents and response times for emergency responders. The McKinsey Global Institute estimates that smart city technologies can improve quality-of-life indicators by 10 to 30 per cent⁵.



⁵ "Smart cities: Digital solutions for a more livable future," MGI, June 5, 2018, <https://www.mckinsey.com/business-functions/operations/our-insights/smart-cities-digital-solutions-for-a-more-livable-future>.

STRATEGY TWO

Strategy two Pursuing innovation and the digital shift

The development, adoption, and use of technologies offers the potential to fundamentally change how Albertans produce, consume, and access goods and services. It also stands to impact how people live, work, and play in our communities profoundly, fueling the rise of ‘smart’ networks and systems. Consequently, it will influence where, how, and the extent to which public capital investments are made. Aggressively pursuing technology, universal broadband coverage, and a broader shift toward data and digital tools will enable our province to develop infrastructure that can support a growing knowledge economy, innovation ecosystem, and government modernization, as well as improve the lives and livelihoods of Albertans.

Alberta’s Data Strategy and Digital Strategy will bring innovation and modernization to the centre of government business, and make it easier for Albertans to engage with the province — making us more responsive in a changing digital age.

Alberta’s Broadband Strategy will focus on driving improved access to high-speed broadband in Alberta’s underserved rural, remote, and Indigenous communities. This will help to kick-start growth and diversification in rural and Indigenous economies, and support all sectors as the underpinning infrastructure on which to achieve many of the objectives of this 20-year plan.

Artificial intelligence (AI) has enormous potential and will play a critical role in building communities of the future. AI-based applications can reduce backlogs, cut costs, overcome resource constraints, free workers from mundane tasks, improve the accuracy of projections, inject intelligence into scores of processes and systems, and sift through huge volumes of data. The technology stands to influence the evolution of every part of Alberta society, including how the government delivers services and engages with Albertans.



STRATEGY TWO

Alberta is very well positioned to explore the potential of AI, given the significant AI research assets in our province. Alberta's AI ecosystem has seen an incredible upswing in growth, with the attraction of various labs and major players in the industry (e.g., Google Deepmind) and an increase in AI start-ups. By leveraging this ecosystem, Alberta organizations across the public, non-profit, and private sectors can serve as innovators, creators, and early adopters of technology, helping achieve better outcomes for Albertans.

See [Sector Six](#) and [Sector Seven](#) for more about how the Government of Alberta is approaching AI.

What we heard: In summer 2020, we asked Albertans about the top future trends that government needed to watch for over the next 20 years. Almost 60 per cent of respondents noted that virtual service delivery was the top trend that the province needed to act on for strategic capital planning.

Virtual service delivery is another area where technology can be used to improve efficiencies and affordability. COVID-19 caused us to test the boundaries of what can be done virtually or moved online. This has led to new channels of service being established and has taught us lessons about how additional virtual services might be enabled in the future.

For instance, Albertans now have an easy way to pay for government services through [MyAlberta eServices](#). Albertans can also quickly find what they need through this platform, no matter which department offers the service. [MyAlberta eServices](#) provides business areas with more efficient ways of delivering core business responsibilities and supports a government-wide approach to IT investments that simplifies the user experience.

See [Sector One](#) in What It Means For Albertans for more on virtual service delivery.

Technology will also impact the production of goods and commodities. The increasing prevalence of 3D printing will enable individuals and businesses to build their own custom items, prototypes, or on-demand needs. On-site energy solutions could enable more consumers to generate their own electricity and heating needs, as well as the potential to sell their excess production in energy markets, thereby pressuring governments to create enabling policies.

By continuing to adopt technologies and aggressively pursuing the broader digital shift, the Government of Alberta can keep pace with societal expectations, while getting more mileage out of the capital budget.

An increase in virtual service delivery, for instance, may require less investment in very costly traditional “brick and mortar” delivery. Capital assets built with smart technologies will have longer service lives and lower operating and maintenance costs over the long term. The use of self-driving or autonomous vehicles can improve traffic, driver safety, and convenience, enabling efficient transportation investments. The analysis of data generated through technological applications will provide valuable insights on infrastructure life cycles, capital maintenance and renewal decisions, and asset longevity trends, helping optimize the use of tax dollars⁶.



⁶ “Providing government services with a remote and virtual workforce, A response to COVID-19,” EY, 2020, https://assets.ey.com/content/dam/ey-sites/ey-com/en_us/topics/government-and-public-sector/ey-gps-providing-government-services-with-a-remote-workforce.pdf.

STRATEGY TWO

Furthermore, by serving as an early and strong technology adopter, the Government of Alberta will enhance the competitiveness of our province. This will translate into more economic activity and job growth. It can also help support the commercialization of innovations developed by Alberta's tech companies, helping to further diversify our economy.

► **Did you know?**

The Government of Alberta has signed information-sharing memoranda of understanding (MOUs) to help support the research into the feasibility of high-speed transportation in the province. Such research can provide an understanding of how these new transportation technologies can safely and quickly move Albertans around the province.

High-speed transportation is a mode of passenger and freight transportation that provides a quick alternative to train or car travel, potentially taking pressure off highways and facilitating travel between cities. Edmonton, Red Deer, and Calgary fall within the defined corridor distance for high-speed transportation, as established by the International Transport Forum.

Moving in this strategic direction will involve a number of key imperatives:

Pursuing universal broadband coverage

With the internet rapidly becoming the main vehicle for the delivery of services, high-speed broadband is now considered by many to be an essential service. The pandemic has highlighted more than ever that access to a reliable, high-speed, broadband internet connection is not just important to Albertans, but essential for Alberta's recovery and economic diversification.

The expansion of broadband connectivity across the province, the development of fifth-generation (5G) technology, and an increase in 5G-enabled devices will allow access to higher bandwidth, faster speeds, better throughput, and increased reliability, all of which will open up new opportunities for innovation and increased application of technology in everything we do. The speed and low latency of 5G are being touted as important enablers of the "internet of things," which offer great potential for building "smart" capital assets. Investments in connectivity infrastructure, such as broadband and 5G, will be critical to enable a province-wide technological push.

Addressing connectivity disparities in rural and remote Alberta communities will be particularly important. Aside from opening the door to services such as remote education and telehealth, investment in connectivity can bring wider societal and economic gains including creating jobs, attracting investment, and growing the GDP by increasing productivity through technology.

Capital funding in expanding broadband access for Indigenous communities will support economic diversification initiatives, opportunities to build new workforce skills, and launch or support new growth sectors (e.g., tourism).

See [Sector One](#) supporting Indigenous health in Alberta and [Sector Ten](#) enabling virtual courts and digital workflow strategies for more on virtual service delivery.

► **Did you know?**

Service Alberta estimates that investing in broadband and reaching universal coverage may:

- *Create up to 900 jobs in Alberta to deploy and install the broadband technology needed to increase coverage;*
- *Return \$500 million to \$1.7 billion in annual GDP growth to Alberta through improved connectivity for households and businesses;*
- *Strengthen connectivity to businesses driven to online transaction dependence due to the pandemic, and support economic recovery;*
- *Improve access to health care for Albertans who cannot currently access a primary care provider, while also reducing costs of health care delivery; and*
- *Increase productivity and growth in the application of AgTech in Alberta's agricultural sector.*



► **Did you know?**

As part of broader efforts to develop and diversify its economy, the Government of Alberta is working with municipalities, which are taking bold steps to dramatically enhance broadband internet service.

For example: the City of Beaumont plans to establish an ultra high-speed, open-access broadband network that is accessible to all residents and businesses in the city through a public-private partnership. Any internet service provider will be able to access the network, which will feature the highest speed fibre-optic broadband infrastructure commercially available in the world. If the plans are realized, Beaumont will welcome a significant investment from Smart City Capital, with Jacobs Engineering Group leading project design and delivery. The City will provide rights-of-way that enable the installation of necessary fibre optics. In addition to setting a strong foundation for new economic opportunities, the project will make Beaumont one of North America's first 10 Gigabyte cities.

► **Did you know?**

The Government of Alberta is currently developing a Broadband Strategy to close Alberta's connectivity divide. The province has announced up to \$150 million in broadband funding to support the long-term viability of our communities and businesses, support lives and livelihoods, and attract investment. This initial investment will begin to close the divide between rural and urban communities and strengthen Alberta's economic development and job creation potential.

Embedding technological capability

Existing provincial capital assets will need to be upgraded in order to use digital innovations and pursue virtual service delivery. Infrastructure will also require additional safeguards, such as system backups and cybersecurity tools, to ensure reliable access to services for all Albertans⁸.

► **Did you know?**

Intelligent Transportation System devices installed in vehicles, roads, bridges, and terminals collect information, such as road and weather conditions, traffic speed, volume and delays. These systems involve vehicles, drivers, passengers, road operators, and managers all interacting with each other and the environment, and linking with infrastructure systems to improve the safety, competitiveness, and capacity of our highway network.

Enhancing data management

As the Government of Alberta increasingly embraces digitalization, the amount of data generated through its operations will continue to grow. Big data analysis will assist government decision making by providing predictions, recommendations, and more automation across programs and services. Effective data management will be essential. The Government of Alberta is adopting a Cloud First Policy in which cloud computing is the first option considered to deliver IT services. Continued strategic investments in data management and cybersecurity systems will be needed to consistently ensure access, protection, integrity, and reliability of government-held data.

⁸ "Providing government services with a remote and virtual workforce, A response to COVID-19," EY, 2020, https://assets.ey.com/content/dam/ey-sites/ey-com/en_us/topics/government-and-public-sector/ey-gps-providing-government-services-with-a-remote-workforce.pdf.

PROFILE

AI at the University of Alberta

AI is one of the most disruptive technologies ever developed — set to change the way we live, work, and do business. According to Forbes, AI will transform global productivity, work, and lifestyles, and create enormous wealth. By 2030, McKinsey predicts AI will deliver global economic activity of \$13 trillion; PwC puts that number at \$15.7 trillion. Unsurprisingly, 23 countries have launched national AI programs, but Canada was the first and is now drawing on years of AI expertise and research strength, much of it based here in Alberta.

The University of Alberta has been a leader in AI for over 25 years. Since launching Canada's first Computing Science department in 1964, the university has ranked first in Canada and within the top five globally for studies in AI and is now home to some of the world's top AI experts. In 2002, the university, with support from the Government of Alberta, created the Alberta Ingenuity Centre for Machine Learning, focused on research excellence in machine learning. This institute, rebranded as Amii, became part of the \$125 million Pan-Canadian AI Strategy and launched as a not-for-profit in the heart of Edmonton's downtown core. To date, Amii continues to receive core support from the Government of Alberta through a grant from Alberta Innovates. In 2017, Amii was named one of three national institutes in Canada's five-year AI strategy. As part of that strategy, Amii translates scientific developments into industry applications and helps organizations harness AI to increase growth and competitiveness.

Alberta post-secondary institutions are advancing AI through research and examination of its ethical and privacy implications. Studies are ongoing in a number of areas to drive innovations, such as precision health, smart agriculture tools, optimizing oil and gas recovery, smart prosthetics, advanced manufacturing, and more. The same researchers are also developing tomorrow's technologies, such as smart grids, smart homes, and smart construction. For example, the University of Alberta partners with a number of key industry leaders like Google, IBM, CISCO, Twitter, Amazon, Microsoft, several financial institutions, and DeepMind — a world-leading company in AI research and application. In 2017, Google DeepMind announced the opening of its first international research lab in Edmonton to work closely with Amii and University of Alberta research leaders.

AI's potential is enormous, as are the opportunities to capitalize on Alberta's AI strengths and assets. In 2019, global private investment in AI was over \$70 billion, with autonomous vehicles leading the investment at \$7 billion, followed by drug and cancer research, facial recognition, video content, fraud detection, and finance, many of which are areas in which Alberta AI leads.



PROFILE

Embracing innovation in the way we build

Our province's infrastructure must be built right the first time and in a way that adapts to changing use over its lifetime. Embracing innovation in the way we conceptualize, design, construct, and maintain assets will enable the Government of Alberta to realize better value in public capital investments.

A number of technologies and advances can help secure Alberta's place at the cutting edge of project delivery:

Automation and AI: These technologies are becoming increasingly important in the construction industry. They can help reduce expensive errors, create safer worksites, and make operations more efficient. To maximize these benefits over the next several decades, our province will need to continue working with researchers, industry, and other partners to test emerging technologies and see how they apply to the design, construction, and maintenance of our capital assets. We will also need to ensure the future workforce is equipped with the right skills to use these technologies.

Digitalization of project delivery: Digitalization in the construction industry is fundamentally changing the way projects are realized from start to finish. This includes moving away from clipboards and paper blueprints toward digital formats and programs that allow real-time sharing of online data and information. The ability to quickly and effectively capture, analyze, and share data in real time can help reduce construction time and achieve cost savings, particularly for larger, more complex infrastructure projects.

Procurement and project delivery optimization: The Government of Alberta is currently undertaking a performance review of procurement and project delivery practices. This will identify opportunities around alternative structures, organization, and delivery to ensure efficient and effective procurement of goods and services, including complex construction.

Automation and the future of procurement: Emerging automation technologies are changing how materials and workers are sourced and introducing quicker, easier ways to conduct labour-intensive tasks, such as reviewing lengthy contracts, administering purchase requests, and managing data.

3D printing: The emergence of 3D printing continues to create new and unprecedented opportunities for innovation in project delivery. Through 3D printing, high-quality tools and materials can be manufactured quicker and at a reduced cost with less waste than traditional methods.

Virtual and augmented reality: Expanding existing virtual reality systems could allow users to run simulations in a virtual environment to assess the effectiveness of a capital asset's design without the need to construct a mock-up. For example, a surgical team could simulate various surgeries in an operating room design to test its sufficiency and develop optimal work flows that will contribute to better patient outcomes. Virtual reality has also been used for road construction to map sewer piping and grids prior to excavation.

Smart technology: By improving access to information, communication, and automation, smart technologies enable infrastructure and systems to be managed optimally. For example, with embedded sensors that monitor temperature, illumination, noise, moisture, occupancy, activity patterns, and many other variables in real time, buildings can be more efficiently climate controlled and maintained. Similarly, sensors in roads, bridges, pipelines, and other transportation modes can monitor real-time conditions to reduce incidents, improve preventative maintenance, and identify issues needing attention.

For example, Trans Mountain uses internal inspection tools called Smart Pigs that are sent down pipelines along with the product. Smart Pigs carry onboard computers and sensors to measure the diameter and thickness of pipe walls to detect dents, gouges, or other damages.



STRATEGY THREE

Strategy three Attracting private investment

The Government of Alberta's capital investments can play a powerful role in attracting private investments. Due to its comprehensive reach, the Government of Alberta's capital investments must consider a multitude of factors, including fiscal prudence, project readiness, and Environment, Social and Governance (ESG) factors.

With preferred business tax rates, a vastly improved regulatory environment, a low cost of living, and world-class infrastructure, Alberta offers an incredible value proposition to attract investment. The Government of Alberta is aggressively pursuing every area where our province can further enhance its competitive advantage. This includes infrastructure.

It therefore makes sense to prioritize capital projects that will directly and significantly stimulate private sector investments in Alberta's economy. Priority investments are likely to include assets that contribute to the following areas:

Development of strategic corridors

Strategic corridors offer incredible potential for the province due to their versatility and their responsible approach to land use. Ideally, several assets and functions – such as rail, highways, utilities, broadband, pipelines, and transmission lines – can be co-located along a single corridor, thereby reducing ecological disturbances. This strategic co-location also serves as a powerful catalyst for diverse economic growth. Businesses, industrial facilities, and logistics hubs are naturally drawn to the corridor, since it provides an easy, efficient, and pre-planned means of moving people and goods to and between major markets.

There are opportunities to expand corridors within Alberta and, importantly, to connect Alberta with key resources and markets throughout North America. Given our province's landlocked position, strategic corridors to tidewater are fundamental for achieving greater market access for Alberta goods. These corridors can also offer greater certainty for investors, particularly in relation to regulatory processes and approvals. Establishing, developing, and managing corridors is a complex undertaking with the expected costs and timeframe associated with this type of infrastructure.



STRATEGY THREE

Transportation projects of various sizes and types are critical to developing strategic corridors. For example, capital investments that reduce bottlenecks and enable multi-modal movement will enhance the overall effectiveness of Alberta's transportation networks and attract new private investments.

Major international and regional airports in our province offer interesting opportunities. Strategic investments by the Government of Alberta could help the districts around these airports develop into state-of-the-art multi-modal hubs, stimulating a highly competitive logistics industry in the province.

Transformational investments

Public capital investments can serve as catalysts for the development or expansion of Alberta industries. In this approach, a capital project supported by the Government of Alberta transforms the way an industry grows and evolves, generating multiplier effects as it attracts additional private participants.

An example is the Alberta Carbon Trunk Line (ACTL), financially supported by the Government of Alberta, which has enabled the injection of over one million tonnes of carbon dioxide. This integrated, large-scale carbon capture, utilization, and storage system serves as a backbone that captures carbon dioxide from large industrial facilities and transports it for use in enhanced oil recovery or for storage in deep geological formations. With the world's largest capacity pipeline for carbon dioxide from human activity, the ACTL enables more connections between sources of carbon dioxide and those who can use and store carbon dioxide. This catalyzes private sector investments while improving environmental performance. Alberta now stands as a leader in carbon capture, utilization, and storage, with expertise to share with other jurisdictions exploring this field.

Similar opportunities for transformational investments may be identified to catalyze more private investment in petrochemicals, food processing, recreation and tourism, financial services, hydrogen, pharmaceutical and life science technologies, aerospace, and artificial intelligence (AI).

See [Sector Five](#) and [Sector Six](#) for more on private investment.

► **Did you know?**

As part of Alberta's Recovery Plan, the Alberta Petrochemicals Incentive Program was launched in 2020 with the intent to invest in transformational multi-billion-dollar petrochemical projects throughout the province. For example, Inter Pipeline was awarded a \$408 million grant from the Government of Alberta in support of the Heartland Petrochemical Complex anticipated to be operational in 2022. The emergence of COVID-19 has highlighted the importance of petrochemical manufacturing around the world, as petrochemical facilities make the building blocks required for everyday consumer and professional items, such as medical equipment, computers and cellphones, personal protective equipment, car seats and tires, and fertilizer for agriculture and home gardening. Alberta is already among Canada's largest hubs for petrochemicals manufacturing. With global demand for petrochemicals expected to increase, there is a significant opportunity for Albertans and the province to expand this sector.

► **Did you know?**

Alberta's Investment and Growth Strategy outlines goals to target critical sectors for growth and retention to strategically grow investment in Alberta. It lays out a plan for the province to increase its competitive advantage, improve its investment attraction ecosystem, and raise its reputation as an investment destination. Part of this includes identifying and addressing strategic transportation, infrastructure, talent gaps, and industry supply-chain barriers that deter investment into principal and enabling sectors.

PROFILE

A case for corridors

Recognizing their importance and the common-sense approach they offer, corridors are key components of Alberta's Recovery Plan. Under this plan, the Government of Alberta has established an Economic Corridor Task Force. As part of its work, the task force will identify and assess possible corridors in our province.

This will build upon a variety of investments and efforts that are also contributing to the development of economic corridors.

Through an innovative cost-recovery approach, the Government of Alberta has funded initial construction on a High Load Corridor. Accommodating taller loads, in some cases up to 12.8 metres high, the High Load Corridor is designed with features such as higher overhead utility lines. This enables easier transport of large modules that are fabricated in manufacturing areas, helping to complement on-site construction activities. Comprehensive planning has scoped out a High Load Corridor Network, which could be built out across the province.

The CANAMEX/North-South Trade Corridor spans approximately 1,150 kilometers of Alberta's highways, linking the Coutts, Alberta and Sweetgrass, Montana ports of entry all the way to the Alberta-BC border on Highway 43. The corridor has experienced significant growth. In 2017, at the port of entry alone, Alberta exported goods valued at \$4.46 billion to the U.S. and Mexico. The Government of Alberta has invested over \$2 billion in the corridor over time, including the Edmonton and Calgary ring roads, the Milk River bypass on Highway 4, and the twinning of Highway 43.

In collaboration with other provinces and territories, the Government of Alberta is pursuing initiatives to further develop economic corridors. These include efforts by the Council of the Federation to explore a Pan-Canadian Economic Corridor for utility and transportation infrastructure, as well as efforts by the Council of Ministers Responsible for Transportation and Highway Safety to build a business case for long-term funding in existing corridors and infrastructure.



STRATEGY FOUR

Strategy four Maximizing partnerships

The interactions amongst individuals, businesses, and other organizations are becoming more complex and interrelated. At the same time, competitiveness pressures, resource constraints, and technological developments are forcing decision-makers to squeeze every bit of value they can out of each dollar they invest. In this environment, the idea of “going it alone” on major capital projects is undesirable and, in many cases, financially infeasible. Instead, partnerships will become even more essential.

Leveraging the wide range of expertise, knowledge, and infrastructure from partners across sectors encourages innovation and appropriate risk sharing, ultimately leading to better outcomes. Accordingly, the Government of Alberta will need to maximize the use of partnerships in its capital investments. This will involve building on the foundation of partnership arrangements that already exist and embedding this approach as a standard, default practice.

To do this, government will need to explore ways of working with partners to ensure the right type of infrastructure is in the right place at the right time, while addressing diverse and evolving needs. Key partners will include municipal governments, other provincial and territorial governments, the federal government, the private sector, Indigenous communities, and non-profit organizations.

Municipal governments

Municipalities are essential partners of the Government of Alberta in providing infrastructure for Albertans. Local governments are responsible for a significant amount of the infrastructure Albertans rely upon each day.

The Government of Alberta does not directly control how municipal governments invest in infrastructure, but works with them collaboratively to develop strong, safe, resilient, and prosperous communities by:

- Providing capital and operating funding;
- Maintaining the policy frameworks within which municipalities operate;
- Mitigating, preparing for, responding to, and recovering from large-scale emergencies and disasters;
- Establishing consistent and appropriate safety codes; and
- Helping coordinate infrastructure work among municipalities, between municipalities and the province, and between municipalities and the federal government.

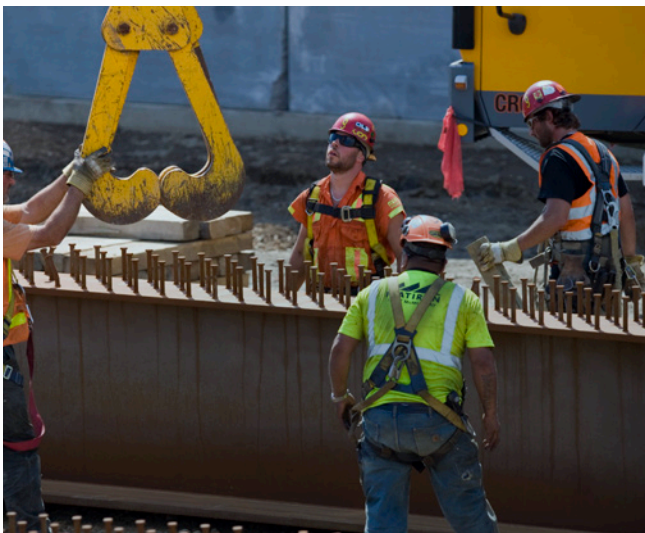


STRATEGY FOUR

These relationships recognize the interconnected nature of municipal and provincial assets. Capital choices made at one level, or in one community, can have significant impacts upstream and downstream on another. For example, provincial highways and municipal roads both have implications for the overall efficiency and competitiveness of Alberta's transportation network, while investments in large-scale disaster mitigation work may have both upstream and downstream implications on nearby communities.

Over the next two decades, Alberta's municipalities will be faced with the challenge of building and maintaining the infrastructure necessary to accommodate a growing population. Municipalities will need to strengthen capacities to prioritize and plan for infrastructure spending within their available resources. This will include a greater emphasis on asset management, such as:

- Assessing infrastructure risk levels;
- Aligning funding to these risks;
- Right-sizing capital to adapt to changing needs; and
- Ensuring long-term strategies, including partnerships with public, private, and not-for-profit organizations, are in place to support infrastructure provisions over the long term.



Strategic approaches, such as regional asset management planning, have the potential to increase efficiencies and reduce costs for municipalities. Synchronized asset management information would boost partnerships for cost-sharing plus integrate and coordinate land-use and infrastructure planning and financing. For example, inter-municipal collaboration frameworks provide a platform for municipalities to work together in undertaking delivery and funding of municipal services that benefit residents in the partnering municipalities. These agreements help municipalities determine how services can be provided as efficiently as possible, taking advantage of the strengths of each participating municipality. Continuing this trajectory will give rise to capital partnerships amongst municipal governments, which can help maximize the value of provincial capital funding.

For example: The Government of Alberta works with Edmonton and Calgary Metropolitan Region Boards on long-term planning, including development of growth plans, integrated regional transportation master plans, and related cross-municipal investment priorities. The Government of Alberta also partners with municipalities on priority infrastructure investments, such as new interchanges on the QEII Highway and planning for the Deerfoot Trail through Calgary.

The Government of Alberta is actively working to help municipalities explore and realize the benefits of working together. This includes the Alberta Community Partnership program, which provides grant funding for planning and collaboration projects that municipalities pursue for the benefit of their residents. The government is also supporting work by Growth Management Boards in the Edmonton and Calgary regions. Through these boards, each major city and surrounding urban and rural municipalities are undertaking strategic planning on issues, such as transit, highways and roads, water and wastewater, and other issues that will support efficient growth and development.

► **Did you know?**

The Alberta Community Partnership (ACP) program provides funding for municipalities to improve their viability and long-term sustainability through support for regional collaboration and capacity building initiatives. Many of the projects funded through the ACP support municipalities to make informed capital planning decisions in a broader regional context. The following projects are a few examples of important collaborative work funded through the ACP program in 2020-21:

- *The City of Fort Saskatchewan partnered with Strathcona County to conduct an emergency and fire services study.*
- *Westlock County partnered with the Town of Westlock and the Village of Clyde to develop an emergency services master plan.*
- *The Town of Coalhurst partnered with Lethbridge County to develop a stormwater management plan that includes supporting topography and hydrology analysis and models.*
- *The Town of Stony Plain partnered with the City of Spruce Grove and Parkland County to develop a regional services delivery framework that includes supporting plans and agreements.*
- *The Village of Carmangay partnered with the Village of Champion and Vulcan County to conduct a regional water infrastructure assessment study.*

► **Did you know?**

With support from the Government of Alberta, several municipalities in the Edmonton Metropolitan region collaborated to develop plans for a regional transit commission with financial support from the Alberta Community Partnership grant. On January 28, 2021, the Government of Alberta formally established the Regional Transit Services Commission with a mandate of improving regional transit and mobility. Eight municipalities in the Edmonton Metropolitan region are participating in the commission.

The Government of Alberta is also considering opportunities to increase transparency and accountability in municipal spending. For example, the province has developed the Municipal Measurement Index to compare the fiscal performance of municipalities across Alberta, and will be expanding this to include comparisons with municipalities in other parts of the country. This approach will help ensure taxpayer dollars are well managed and that local residents have transparent access to information about financial activities in their communities.

Alberta is also committed to supporting municipalities in accessing alternative funding sources, particularly through federal funding. While the majority of federal funding programs are coordinated through the Government of Alberta, ways to improve coordination among municipalities, the Government of Alberta, and the Government of Canada should be continually assessed for efficiency and effectiveness.

Provincial and territorial governments

Over many decades, Alberta has developed strong and productive relationships with other Canadian provinces and territories and American states. These have enabled our province to work together with other jurisdictions on issues of common concern, including issues related to job growth, public safety, economic development, and capital investment.

Through the Council of the Federation, for example, Alberta has joined other provinces and territories in highlighting the importance of flexible federal investment in infrastructure and transportation projects. In May 2020, the council called for a new federal block transfer for infrastructure, which would enable each province and territory to efficiently invest in shovel-ready capital projects. Such a transfer would eliminate the need for complicated applications to federal programs, helping reduce delays and red tape. Provinces and territories would have the freedom and flexibility to quickly undertake the infrastructure projects needed for economic growth and recovery.

At the regional level, Alberta collaborates with other western provinces and territories in a similar fashion. For example, at their 2019 meeting in Edmonton, Western Premiers identified the importance of developing economic corridors. The Western Premiers also highlighted the importance of building partnerships with Indigenous communities on major capital projects in order to foster more sustainable development.

STRATEGY FOUR

Alberta's regional relationships extend internationally. One of note is the Pacific Northwest Economic Region (PNWER), founded by Alberta, Saskatchewan, Yukon, the Northwest Territories, and British Columbia, and the states of Alaska, Idaho, Oregon, Montana, and Washington. PNWER's working groups address a variety of regional issues that have consequences for capital investment, such as transportation, trade, infrastructure funding, and border issues. For example, PNWER's infrastructure group works to identify best practices for alternative approaches to funding infrastructure, such as public-private partnerships (P3).

Going forward, provincial-territorial and regional collaboration will remain important for the Government of Alberta. While each jurisdiction is unique, most are facing similar issues when it comes to jobs, growth, environmental responsibility, and meeting their capital infrastructure needs. Working with others can help our province build support for major initiatives and find solutions that are beneficial for Albertans.

► **Did you know?**

As Alberta continues to diversify its bulk and other commodity exports toward the Southeast Asia market, the railway system in Western Canada has been gaining importance and is critical to Alberta shippers.

The Government of Alberta continues to work with partners, such as Class 1 railways, to review trade corridors, prioritize investments, and maximize supply chain performance. The province is involved in several multi-jurisdictional corridor initiatives, such as the Pan-Canadian Economic Corridor under the Council of the Federation and others under the Council of Transportation Ministers and Western Transportation Advisory Council. The Government of Alberta continues to advocate for increased federal funding for the development and improvement of well-functioning trade corridors and supply chains that safely connect Alberta to domestic and international markets.

See [Strategy Three](#) for more on corridors.

Federal government

The federal government makes and helps fund large-scale investments in mitigation. Alberta will continue to identify priorities and fund necessary infrastructure projects to benefit Albertans. Our province has been experiencing unprecedented economic challenges due to the COVID-19 crisis, the biggest global economic contraction since the 1930s, and the collapse in energy prices. Now more than ever, flexible federal support and investment is needed to help Alberta move forward with economic recovery.

Practically speaking, this means expanding on the access Alberta has to federal infrastructure funding over the next 20 years, including through existing mechanisms such as:

- The Investing in Canada Infrastructure Program, which supports cost-shared projects with the Government of Alberta, municipalities, and other partners through five streams: Public Transit; Green Infrastructure; Rural and Northern Communities; Community, Culture and Recreation; and COVID-19 Resilience;
- The Disaster Mitigation and Adaptation Fund, which aims to strengthen the resilience of Canadian communities through investment in large-scale infrastructure projects;
- The National Housing Strategy, which invests in the protection, renewal, and expansion of social and community housing;
- The Universal Broadband Fund and CRTC Broadband Fund, which aim to support high-speed internet projects across the country;
- The National Trade Corridors Fund, which helps fund infrastructure projects, such as airports, ports, railways, transportation facilities, and access roads; and
- The Canada Community-Building Fund, which provides predictable, long-term, stable funding for Canadian municipalities to help them build and revitalize their local public infrastructure while creating jobs and long-term prosperity.

The Government of Alberta is also pursuing opportunities to use the Canada Infrastructure Bank (CIB). The CIB is a federal Crown corporation that has been established to spur infrastructure development by drawing in private capital from pension funds and other investors. Alberta is working closely with this federal partner to ensure alignment of priority investments and leverage the funding needed to build large, transformational projects that support Alberta's economic recovery and ensure long-term growth for the province.

STRATEGY FOUR

► **Did you know?**

Thanks to a partnership between the Government of Alberta, the CIB, and eight of the province's irrigation districts, Alberta's irrigation infrastructure will experience a transformative impact. A total of \$933 million will be invested in hundreds of kilometres of new water pipelines and new and expanded off-stream reservoirs. When complete, it will expand Alberta's irrigated farmland by up to 230,000 acres – roughly a third of Prince Edward Island's total farmland. The Government of Alberta will contribute \$280 million, and the irrigation districts will contribute \$187 million. The entire partnership is expected to create up to 7,420 direct and indirect permanent jobs and 1,465 construction jobs while improving security and supply of water in the South Saskatchewan River Basin. These visionary investments will add further horsepower to Alberta's incredible agriculture and agri-food industries, contributing up to an additional \$483 million to the province's GDP each year and supporting greater productivity and greater value-added processing activity.

See [Sector Six](#) investing in irrigation for more on Alberta Agriculture Strategy.

Aside from principles of fairness, it makes logical sense for the federal government and the Government of Alberta to collaborate on capital investments. Alberta is driving a national conversation with the federal government to collaborate on priorities and provide greater flexibility to provincial governments in the use of federal funding. This means working with the federal government to overcome delays and red tape, and ensure funding is directed to the projects that make the most sense for Albertans, including large projects that are important to Alberta's economy.

Private sector

Alberta will continue to explore and encourage private investment opportunities that support high-quality infrastructure and increase our global competitiveness. Partnerships with the private sector provide competitive advantages through incentivized innovation and modernization, which in turn create efficiencies and cost savings. The private sector is innovative, adaptable, and efficiency-driven. To leverage these attributes, government needs to make projects “investor ready” and develop innovative frameworks that capitalize on private investment. This can be achieved by supporting strong institutions, strengthening data, building capacity, developing and testing tools, promoting transparency, and encouraging engagement with private sector stakeholders.

One way government can leverage private investment is through public-private partnerships (P3s). With opportunities to be used in a wide range of areas, P3s draw on the expertise of the public and private sectors while encouraging innovation and appropriate risk sharing. When well structured, P3s maximize value for money and enhance the government's ability to deliver projects on time and on budget.

For example: In 2020, the [Government of Alberta initiated Unsolicited Proposals \(USP\)](#) as a new way to attract investment ideas from the private sector. A USP allows the private sector to identify new and innovative ways to deliver public infrastructure. If there is a need in a community, the private sector can submit a proposal to government. This gives government the ability to process unsolicited infrastructure opportunities in a rigorous, transparent, and consistent manner. One of the most important aspects of this process is the assessment of affordability for government. Any ideas need to demonstrate value for money. Implementing the USP process shows government's commitment to attracting private sector investments to the province. It also shows industry that Alberta is open for business and ready to go. We invite the private sector to submit proposals anytime via email to unsolicited.proposals@gov.ab.ca. Together, P3s and USPs can attract private sector investment to Alberta and foster new economic activities. This will help generate new projects that will get many Albertans back to work.

STRATEGY FOUR

For example: Through the Canada Agriculture Partnership, the Government of Alberta and Government of Canada will be investing \$200,000 to help Olds College partner with THRIVE's Canada accelerator and start-up program. Focusing on technology-driven solutions to support the agriculture and food sectors, the THRIVE program will be a natural complement for Olds College's Smart Farm. Essentially a giant agricultural lab of some 2,000 acres, the Smart Farm serves as a learning space for students and a space for agricultural and tech companies to do cutting-edge research for agriculture technology and agri-food development. Fostering partnership between academia, industry, and the research community, the Smart Farm is exploring some of the most important opportunities and challenges facing agriculture. The new investments will enable the THRIVE program to leverage the Smart Farm and other assets at Olds College, helping provide guidance on high-value opportunities, supporting start-ups and increasing Alberta's exposure to Canadian and international companies.

Over the next 20 years, the Government of Alberta will continue to explore private investment opportunities, particularly in the areas of energy, agriculture, technology, and innovation that support high-quality infrastructure and increase our global competitiveness.

See [Strategy Three](#) for more on private investment.

Partnerships with the private sector also help government stay on top of emerging trends and keep pace with innovation in project delivery and technology. For example, private partnership in the IT sector enables us to access valuable knowledge on better ways of collecting and analyzing critical data. These new and improved approaches are key to improving the way we plan for and build capital projects. They will help government stay relevant in an increasingly virtual world, and facilitate the changes needed to meet the increasingly complex needs of Albertans.

Indigenous communities

The federal government has constitutional responsibility for Indigenous Peoples on reserves. However, the Government of Alberta can undertake meaningful partnerships with Indigenous communities on capital investments that help create new opportunities for Indigenous Peoples. The Government of Alberta also provides funding to Métis Settlements through municipal grant programs.

The Government of Alberta is committed to partnering with Indigenous communities on projects that improve their communities' conditions, economic security, access to digital services and broadband, and access to commerce. Over the next 20 years, government will prioritize projects aimed at improving infrastructure that contributes to improved education, health, safety, and economic opportunity. It will also expand internet access to northern and remote communities and increase economic development projects.



STRATEGY FOUR

For example: On the prairies, water is life. Safe, reliable water supplies are essential for the prosperity of Alberta's communities. Sadly, many First Nations have faced impacts of long-term drinking water advisories. Now, a much-needed investment will help change that through the First Nations Regional Drinking Water Tie-In Program. Through a collaborative partnership, \$100 million will fund grants to local water commissions or water supply municipalities, enabling them to extend their services to First Nations. This will ensure there is sustainable drinking water on reserves, helping enhance life for Indigenous Peoples and communities. Ten projects are now underway that will benefit 14 First Nations. The Government of Alberta, First Nations, municipalities, water commissions, and the federal government are key partners in the program.

Alberta will partner with Indigenous communities and the federal government to foster and support the development of consistent, long-term strategies and standardized approaches for infrastructure development in Indigenous communities. Building and maintaining critical infrastructure in these communities requires access to sources of long-term capital in place of bank lending, which usually comes with short-term maturities and risks associated with refinancing. The Government of Alberta will help foster partnerships between Indigenous communities and the private sector to increase the participation of Indigenous Peoples in the development of infrastructure projects.

Better information sharing and engagement with Indigenous communities during the infrastructure planning process can also create opportunities for shared spaces and reduced costs. For example, if there are plans for trenching on a provincial road allowance to install natural gas distribution infrastructure, that information could be shared at an early stage to enable partnership. Ultimately, the project scope could be slightly increased to accommodate the installation of other utilities such as fibre-optic cable, potable water, or power lines since the trenching will already be occurring. Continual communication with the federal government for on-reserve infrastructure investments can also help take advantage of potential synergies of procurement and timing.

► **Did you know?**

There has been a focus in Alberta on strengthening partnerships with Indigenous communities, resulting in a considerable amount of First Nations participation in Alberta's energy sector. The Alberta Indigenous Opportunities Corporation increases Indigenous communities' access to \$1 billion in capital and technical support for natural resource projects and infrastructure. The first loan guarantee from the program was to a group of six First Nations in Alberta to back their investment in the Cascade Power Project. The Oil Sands Monitoring Program, a collaboration among governments, industry, Indigenous communities, and others, is one of the most significant investments in environmental monitoring in the world. Another example is Three Nations Energy (3NE), a corporation owned by Athabasca Chipewyan First Nation, Mikisew Cree First Nation, and Fort Chipewyan Metis Association, which recently completed Canada's largest off-grid solar farm.

Non-profit organizations

Non-profit organizations will continue to play an important role in developing the infrastructure needed for strong, safe, and sustainable communities. As key service providers at the local level, non-profit organizations are well positioned to identify capital needs and priorities in communities. Through strong community connections, frontline service delivery experience, active volunteer bases, and nimble approaches, some non-profits have the ability to mobilize broad-based support for capital projects and pursue such projects with relative efficiency. The challenge will be to leverage these strengths in ways that enable the use of innovative funding models and the ability to bring diverse partners together in mutually beneficial ways.

The Government of Alberta provides funding support for non-profit organizations through the annual Capital Plan as well as through grant programs. This funding is critical to maintaining public infrastructure that supports healthy, prosperous communities, such as sports, recreational, cultural, heritage, or other public-use community infrastructure. The government also partners with non-profit organizations to access federal funding where available.

STRATEGY FOUR



The 2021 Capital Plan, for example, includes \$251 million over three years for sport, recreation, cultural, and community facilities. This funding will go to support capital projects such as the Aurora Project at the TELUS World of Science in Edmonton, a multi-year project to modernize and create new permanent galleries, an early childhood development centre, and upgrade the North Star Dome and other galleries that enable scientific discovery among visitors. An investment of \$15.5 million toward the Calgary Zoo's Canadian Wilds Redevelopment will support new habitats, helping to further enrich the experience and learning of Albertans young and old, and attracting thousands more regional, national, and international visitors.

Flexible arrangements that leverage private support and investments by other governments can diversify a project's funding sources. These types of models optimize competitive advantages for government, the private sector, and other partners by pooling resources while balancing the interests of all parties, including the community in which they reside. This is especially important when fundraising alone cannot raise sufficient money to construct public-use not-for-profit facilities.

► **Did you know?**

The Government of Alberta is supporting the expansion of VIVO for Healthier Generations community recreation centre, which launched a 10-year project to reimagine a new model for healthier choices and social connections. Through its Living Lab, it co-creates, implements, measures, and scales solutions to everyday health challenges people face in their communities. This model brings together citizens, community leaders, a diverse group of experts, local businesses, and government to ignite a curiosity for learning, courage to explore, and strong community connections built through play.

STRATEGY FIVE

Strategy five Prioritizing capital maintenance and renewal

Infrastructure is a long-term investment and represents a significant use of taxpayers' hard-earned money. Although the construction of new capital infrastructure often requires a large up-front cost, the ongoing operating and maintenance costs represent a much larger portion of the total investment over the life of the asset.

For example: The costs to maintain a provincial highway could include:

- \$200,000 per kilometer to complete the second stage of paving and complete a new road two to four years following the initial construction;
- \$35,000 per kilometer to chip seal pavements where needed between years five to eight;
- \$350,000 per kilometer every 15-35 years to complete rehabilitation overlays;
- Up to \$1.4 million for grade widening as necessary;
- Additional costs to fill cracks, fix potholes, and place patches;
- Additional costs to plow snow and repaint lines; and
- Additional costs to maintain grass and weeds, remove brush, fix fallen signs, add lights where necessary, dispose of roadkill, and more.

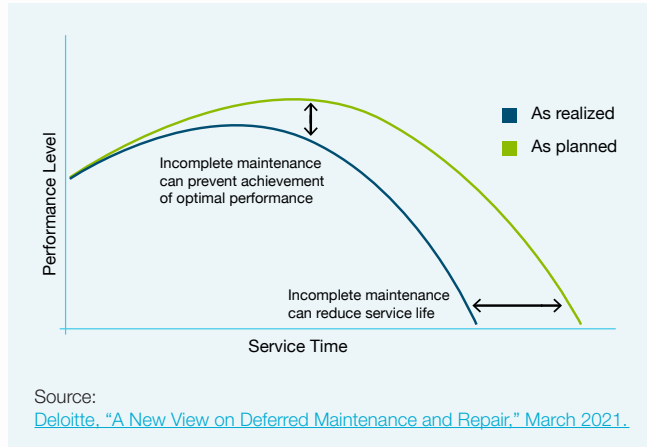
Given that capital assets and their maintenance and operating costs last for many years, it is important to critically consider each new asset while ensuring we keep existing assets in good repair.

Investments in capital maintenance and renewal (CMR) can often be deferred or reduced as a short-term solution during a period of fiscal constraint. While it is important to have budget flexibility to address critical and emergent needs, the consequences of reduced CMR are felt when capital assets begin to show their age. This leads to reduced asset life, increased corrective maintenance, more service interruptions and failures, all of which end up being more costly to taxpayers in the long run.



STRATEGY FIVE

Asset Investment Over Time



► **Did you know?**

Asset management planning is the process of making the best possible decisions regarding the building, operating, maintaining, renewing, replacing, and disposing of infrastructure assets. It considers the full life-cycle cost, which helps to assess and prioritize infrastructure needs to ensure that investments are made in the right place and at the right time to minimize future repair and rehabilitation costs.

A long-term strategy for regular and strategic investments in CMR will extend the life and performance of our province's capital assets. This will enable us to extract maximum value from these assets, supporting greater affordability for Albertans over the longer term. Put another way, it is more cost effective to address problems when they are small, rather than waiting until those problems grow more complex.

Current CMR funding levels are in the range of 0.6 per cent of Asset Replacement Value, whereas industry standards are typically around two per cent. The ideal balance in CMR investments is likely to evolve over time, given that Alberta's capital assets are at a wide range of ages and stages. The size of Alberta's capital stock is also a factor in effectively maintaining government assets, since funding must be distributed across a large number and type of assets.

Over the next 20 years, maintaining our province's infrastructure will become even more critical than it is today. Predictable and stable funding for CMR in the areas of greatest need will be key for maintaining the assets Albertans rely upon, such as roads, bridges, hospitals, and schools. It will also be vital for attracting investment, supporting economic activity, and creating jobs now and into the next several decades.

► **Did you know?**

The average age of affordable housing under agreement in Alberta is more than 35 years old, with increasing need for ongoing maintenance. Government's ownership of almost half of the affordable housing stock creates inefficiencies and delays in planning and completing maintenance work. Fluctuating capital development and maintenance costs add to the fiscal pressures to maintain the supply of government-owned or supported units. A key solution is partnerships and integration.

See [Sector Nine](#) for more about how the Government of Alberta's partnerships will support better housing outcomes.

This will involve taking a number of key steps:

Centralizing capital maintenance and renewal decisions

The distribution of CMR funds to ministries is complex and challenging in a decentralized system. As of Budget 2021, the Government of Alberta began to centralize all CMR funds. The Government of Alberta will determine ministry funding levels based on a government-wide needs assessment and prioritization process. This will increase transparency, improve tracking and reporting on CMR effectiveness, and ensure provincial capital assets can be reasonably maintained now and over the longer term.

Defining capital maintenance and renewal prioritization criteria

The Government of Alberta is developing a framework that will set out a consistent and coordinated approach to the prioritization and planning of CMR investments. Alberta Infrastructure is leading the work on this initiative for vertical infrastructure. Prioritization criteria will help ensure the highest priority investments are identified across government, and identify where CMR funding will be most beneficially allocated.



Rationalizing capital assets and right-sizing the capital stock

Reducing idle infrastructure helps to reduce the amount of outstanding maintenance, which is otherwise costly to taxpayers. The MacKinnon Panel found that government net capital stock per capita, both provincial and municipal, has been consistently above the 10-province average, especially in the last decade. Right-sizing the inventory of provincial capital assets will enable more CMR funding to be directed to core assets, thereby improving our province's ability to properly maintain these assets. As government assesses and prioritizes investments, it will consider opportunities to repurpose, consolidate, or divest assets. This will help reduce the overall amount of outstanding maintenance and achieve better financial sustainability.

► ***Did you know?***

In 2020-21, Alberta Infrastructure sold 15 surplus properties for \$9.4 million and listed 17 properties for a total of \$108 million. In addition, 15 parcels of land were offered and accepted by various municipalities.

Leveraging data for informed decision making

Globally, there is a shift toward more analytical, data-driven, and evidence-informed approaches to infrastructure planning, prioritization, and development. While we are only beginning to scratch the surface of how data can support infrastructure operations and management, Alberta anticipates leveraging technology that supports better data collection, analytics, and insights and informs strategic decision making around CMR for decades to come.

Assess the full life cycle costs of investments

Assessing the full life cycle cost of an asset takes into account the planning, acquisition, operation, maintenance, and disposition of the asset. This applies when making investment decisions and determining the optimal mix for an asset portfolio. Over the long term, applying this type of analysis will achieve better value for taxpayers. Consideration of life cycle costs will proactively provide decision-makers with a more thorough understanding of our province's future CMR needs.

Strategy six Integrating sustainability and resiliency

Over the next 20 years, Alberta faces a number of factors that are poised to impact the integrity and quality of our province's infrastructure. Assets will need to be built to withstand decades of use, changes in use, and exposure to weather extremes. Integrating resiliency and sustainability into all public capital infrastructure will be essential for delivering the best value for Alberta taxpayers and ensuring a sustainable fiscal trajectory for the province.

Doing so makes good sense for a number of reasons. Insufficiently developed infrastructure presents a number of challenges, including poor air quality, exposure to hazardous materials, and inaccessibility. It is also more susceptible to natural disasters and extreme weather events, presenting risks to health and safety and resulting in the need for costly repairs. Albertans have witnessed this happen in some communities in the form of wildfires, floods, and hailstorms.

A sustainable path for capital investment also means that we have assessed what costs future generations can bear without the need for high levels of taxation. The Government of Alberta is committed to sustainability in providing adequate capital funding that is better calibrated to the costs in other jurisdictions and keeps Alberta's net-debt-to-GDP ratio under 30 per cent. (Budget 2021)

► **Did you know?**

According to the Insurance Bureau of Canada, catastrophic events across the country due to extreme weather have caused, on average, \$1.9 billion in insured losses every year over the past decade. (IBC written submission) In 2020, severe weather caused \$2.4 billion in insured damage.

Building sustainability and resiliency into Alberta's capital infrastructure will increase overall efficiency and help infrastructure withstand extreme weather events. It will also support the social, economic, and environmental well-being of communities through conservation of materials, lower emissions, more efficient energy use, and reduced water needs. Investment in infrastructure, such as highways, bridges, and emergency facilities, are particularly critical as they enable evacuation and shelter during severe events, such as fires and floods.



Ensuring capital infrastructure is resilient and sustainable is a major key to maintaining our province's fiscal sustainability. It also has major cost advantages as it helps mitigate risks of destruction and loss caused by disasters and extreme events.

► **Did you know?**

The Insurance Bureau of Canada estimates that the 2013 flooding in southern Alberta caused approximately \$1.7 billion in insured damages. In addition to insurable loss, the provincial and federal governments spent approximately \$1.3 billion on disaster recovery programs. Among the many losses in southern Alberta was Elbow Park School, which was rendered structurally unsound and unsafe for occupancy. As part of reconstruction, the school's base was rebuilt to withstand sinking, shifting, and flooding, and its main floor was raised nearly two meters above grade to accommodate 1-in-500 year flood levels. The integration of sustainability and resilience principles in this way will serve to protect the investments made by taxpayers.

Considering the changing needs of Albertans is also an important part of making capital investments sustainable and resilient. As long-term investments, capital assets should provide optimal value over their lives. To do so, they must be able to accommodate different uses and functions as Alberta's population evolves.

Making sustainability and resiliency fundamental hallmarks of Alberta's capital investments will involve the use of various approaches over the next two decades. These include:

Incorporating energy efficient elements and innovative materials

Using energy efficient technologies in the design and construction of capital assets helps minimize their environmental impacts while enhancing their self-sufficiency. It also reduces their operating and maintenance costs, helping improve affordability. The development and use of innovative materials further contributes to improved sustainability and resiliency. Unlike traditional materials such as cement, clay, plaster, and steel, newer materials are more robust and resistant to wear and tear.

The Government of Alberta can look to adopting the use of advanced materials such as:

- Memory steel, which is sculpted using heat and, once cooled, is permanently set in place to support a structure;
- Zero carbon cement, which is a thin, durable, water-proof and fire-resistant concrete layer that can be laid up to 10 times faster than conventional concrete and uses 95 per cent less material than traditional cement⁹;
- Geosynthetics, which are made from a variety of natural and/or manufactured ingredients and used to stabilize terrain, including railroads, embankments, retaining walls, dams, erosion control, agriculture, and more;
- Cross-laminated timber, which allows for the use of wood affected by drought or insects without compromising integrity;
- Self-healing concrete, which uses water-activated bacteria to form calcites that envelop cracks and make them disappear; and
- Smart bricks, which snap together quickly and leave almost zero waste, while providing space inside for the routing of insulation, mechanical, plumbing, and electrical systems.

► **Did you know?**

Government buildings in Alberta will continue to exceed the National Energy Code for Buildings, which has committed to Net-Zero Ready by 2030. The path to building net zero energy buildings includes designing facilities to use very little energy at the outset, and then address additional needs using renewable energy, such as solar panels. Reducing energy used for buildings, transportation, and industry is essential to meet national targets. Alberta has a high greenhouse gas intensity electricity grid, making the leap to net zero carbon goals more challenging than in other provinces with lower emitting power sources, such as hydroelectricity. Meanwhile, Alberta also has an opportunity to harness the vast amount of sunlight the region enjoys, through solar renewable energy. Alberta gets some of the highest percentage of sunny days per year compared to other provinces, with a total of 320 days of sunlight.

⁹ Thomas Czigler, Sebastian Reiter, Patrick Schulze, Ken Somers, "Laying the foundation for zero-carbon cement," M&C, May 14, 2021, <https://www.mckinsey.com/industries/chemicals/our-insights/laying-the-foundation-for-zero-carbon-cement>.

¹⁰ "Building our Urban Future: Inside Canada's infrastructure and real estate needs," Future Cities, <https://drive.google.com/file/d/1-LpX373falVohTOcGTYE4wun6KS-jeff/view>.

Investing strategically in resilient infrastructure

The Government of Alberta will need to strategically invest in projects that enable the province to assess risks and mitigate, absorb, and rebound from the impacts of significant events. For example, resilient infrastructure such as strategically designed bridges, dykes, dams, and urban storm water systems can help reduce the impacts of natural disasters and extreme weather before they reach communities¹⁰.

Designing for local conditions

A simple but effective approach is to plan and design capital investments with a view to local climate and geographical conditions. This recognizes that different parts of the province present different risks and that a “one size fits all” design is not necessarily the most resilient or sustainable design. Decision making that is based on resilience principles, such as robustness, flexibility, agility and integration, will help ensure Alberta’s infrastructure is able to withstand climate-related stressors. For example, infrastructure in certain southern communities will need to be designed to guard against the impacts of flooding or drought, while in certain northern communities the predominant risk will be from wildfire.

Using simplicity in design

Strong, simple grids and structures tend to have greater resilience and adaptability than complex, varied structures. Design standards that adopt distinguished Welsh architect Alex Gordon’s “loose fit, long life, low energy” model are simplistic in nature and robust to withstand changes and weather exposures. The Government of Alberta will use this approach in designing building structures and envelopes to establish greater flexibility and accommodation and lengthen the lifespan of our infrastructure.

Maximizing flexibility and adaptability

The projects we build today may be required to meet different needs and serve different populations in the future. Through the use of modular and universal design elements, the Government of Alberta can help ensure public capital investments are flexible and adaptable over their lifespans. This will yield facilities that are easy to adjust and reconfigure, helping prepare them for anticipated or unanticipated changes in their users or functions. It will also result in reduced capital costs, particularly when coupled with construction approaches, such as pre-fabrication.

¹⁰ https://futurecitiescanada.ca/downloads/2018/Building_Our_Urban_Futures.pdf

Moving forward

Alberta is a province of creators and innovators, always eager to create and expand, to rise and succeed. That spirit has driven us to make amazing discoveries, develop new industries, and earn a reputation for being a place of opportunity.

As we move forward into the next two decades of Alberta’s story, we must prepare for a more competitive, more volatile, and more rapidly changing world. Ensuring a prosperous future will demand that we carefully and deliberately invest – in our communities, in our economy, and in the health, education and well-being of Albertans.

Capital infrastructure will be an essential part of that investment. With a commitment to Building Forward, the Government of Alberta will have a blueprint that helps make the most of every dollar while developing the facilities, corridors, and other critical infrastructure our province needs.

In doing so, we will unleash the power of capital investment to create opportunity for Albertans and position our province as the best place to work, live, and play for generations to come.

A photograph of a man in a yellow jacket holding a smiling baby in a striped hat. The background is a blurred house. The text is overlaid on the image.

Appendix A: What it means for Albertans

At a high level, the six guiding strategies will serve as a blueprint for the Government of Alberta in its strategic planning of public capital investments.

But what will this look like at a more practical level?

APPENDIX A

At a high level, the six guiding strategies will serve as a blueprint for the Government of Alberta in its strategic planning of public capital investments. But what will this look like at a more practical level?

In these sections, we explore how the guiding strategies are likely to apply across different facets of life in Alberta, given trends our province will face in the areas of:

	Delivering integrated, patient-centred health care		Enabling future-focused K-12 education
	Positioning our post-secondary sector to compete in the changing global economy		Planning a modern, efficient transportation network
	Powering the world through energy and mineral leadership		Expanding opportunities in agriculture and forestry
	Sustaining Alberta's environment and building tourism destinations		Investing in active, vibrant, and diverse communities
	Supporting housing and inclusive living		Enhancing public safety and access to justice



Sector one Delivering integrated, patient-centred health care

Alberta's vision for the future of health-care infrastructure over the next 20 years.

- > Alberta's health-care system is easy to navigate, modernized, and sustainable into the future, providing the best care for each tax dollar spent.
- > Our province's health-care system is built strategically around patient needs, providing timely and efficient health-care services that lead to improved health outcomes for all Albertans.
- > Alberta's health-care services are accessible, integrated, inclusive, and available closer to home. This is supported through virtual health services and a focus on continuing care supports and innovations in community and long-term care.
- > Our province boasts world-class health-care and social support services to best meet complex and evolving patient needs.
- > Alberta's health facilities are future-focused and built with flexibility in mind to adapt to new and emerging technologies, innovative care models, and alternative service delivery approaches.





Albertans value our province’s health system, and for good reason. The health of individuals and families directly contributes to the strength of our communities and economy. The health system also offers incredible potential in shaping a prosperous future for our province. The availability of reliable, high-quality health services enhances Alberta’s standard of living and serves as a compelling draw for business investors and job creators.

Alberta’s health system is also a point of pride for Albertans. Alberta Health Services (AHS) has been recognized as one of Canada’s top employers (2021) and one of Alberta’s top 75 employers (2020). With the first provincial trauma system to achieve distinction from Accreditation Canada, our health sector offers a gold standard of care for Albertans with complex or life-threatening conditions. Specialized clinics for heart care and cancer care make our province one of the best places to be in Canada for treatment in these areas.

► **Examples of capital in this context:**

- Hospitals
- Medical clinics
- Laboratories
- X-Ray, MRI, CT machines
- Continuing care centres

COVID-19 has demonstrated the importance of having quality, adaptable, and accessible health services available for Albertans. Throughout a time of uncertainty, fear, and dramatic upheaval in people’s lives and routines, Alberta’s health system has risen to the occasion and health infrastructure has been critical for the system’s effective response. In addition to primary care clinics, continuing care facilities, and hospitals, capital investments supported the creation of temporary care spaces and field hospital facilities. Laboratory infrastructure took centre stage as our province set about the task of performing tens of thousands of COVID-19 tests. With the development of vaccines for COVID-19, infrastructure is playing a vital part in ensuring their proper storage and efficient distribution, helping our province move past this challenging period.

Alberta’s health sector contributes more than 290,000 jobs to the Alberta workforce and is a major vector for cutting-edge research and innovation, resulting in discoveries that can be exported worldwide. Albertans in the field have been instrumental in research breakthroughs that are helping save, enhance, and extend the lives of millions.

What we heard: When asked about the overarching trends, respondents surveyed in summer 2020 who self-identified as part of the health sector noted that “aging and safety of aging infrastructure” and “virtual service delivery” were the two most pressing trends for government to respond to.

Key Considerations:

- Health services in Alberta are planned and delivered by Alberta Health Services with partnerships including Covenant Health, and oversight and funding from the Government of Alberta.
- Health care is delivered at more than 1,000 facilities throughout Alberta, including hospitals, mental health facilities, and continuing and community care facilities.
- The Government of Alberta provides funding to support the establishment of community-based facilities owned privately by health professionals or non-profit organizations, such as doctor's offices, Primary Care Networks, and clinics.

With the largest province-wide, fully-integrated health system in Canada, Alberta is uniquely positioned to lead the way in delivering enhanced health outcomes for Albertans and others around the globe. The challenge is to leverage our province's health assets while continuing to meet changing needs – and do this sustainably over the long term.

As in many other jurisdictions, health spending in Alberta has steadily marched upward during the past 40 years. In 2021, it accounts for approximately \$23 billion, representing approximately 40 per cent of the provincial budget.

While capital investments in health can generate huge benefits, the overall affordability of the system will need to be kept in mind. The following key trends for the health sector offer insight on how this might be done.



Shifting demand patterns and pressures

- > **Impact: Mid- to long-term**
- > **Probability: High**

The evolution of Alberta's health sector will be driven by demographics, as these influence the nature of health-care needs. Aging and urbanization will be some of the most significant hallmarks of change in our province's population over the next 20 years.

See [Alberta's 20-Year Outlook](#) for more on demographic projections and trends for Alberta.

Urban areas are expected to experience rising demands for health services, with a diverse range of patients presenting a more complex range of health conditions. By contrast, the sustainability of health facilities in smaller communities may become an increasing challenge as populations grow more dispersed in rural regions.

These dynamics will make it necessary to examine how to best ensure Albertans can access health services while maintaining high standards of quality across Alberta. Clinical data modeling and decisions will influence capital investments in health facilities, including clinical service capacity, locations, and design to meet the health needs of communities in sustainable ways for years to come.

Increasing use of virtual health

- > **Impact: Near- to mid-term**
- > **Probability: High**
- > Accelerated (due to COVID-19)

Responding to COVID-19 has shown us the tremendous possibilities of delivering health services by virtual means. Our world is rapidly moving toward a "contact-free" economy in which close in-person interactions are minimized. This is particularly true in the health context, where issues such as disease prevention and viral transmission have great importance¹¹. Delivering health services through virtual means will be critical for maintaining a high standard of patient care while adapting to the new realities of minimal contact.

This will change how our province invests in capital health projects. As more routine and non-complex services take place through virtual means, a higher concentration of complex and acute care will be addressed inside Alberta's hospitals and clinics. When complemented by the digitalization of administrative services, such as records management and appointment scheduling, this will offer greater convenience to patients and generate greater efficiencies by reducing the number of 'no-shows' to appointments and limiting new admissions or re-admissions. It will also enable capital investments to focus more on spaces that provide complex and specialized care, and less on general spaces, such as waiting rooms and offices.

For example: Alberta Health Services (AHS) is making notable progress in establishing virtual care, telehealth, and other technology-enabled care programs. There are 51 local, zone, or provincial initiatives related to community-based virtual care, technology-enabled care, and telehealth programs currently in progress across AHS. Examples of community-based virtual care are the Edmonton Zone Virtual Hospital and Calgary's Complex Care Hub. Both programs offer complex care coordination, medication management, self-management support, and provider linkages to coordinate services from pharmacists, physicians, paramedics, and registered nurses.

¹¹ Kevin Sneader, Shubham Singhal, "The future is not what it used to be: Thoughts on the shape of the next normal," McKinsey&Co., April 14, 2020, <https://www.mckinsey.com/featured-insights/leadership/the-future-is-not-what-it-used-to-be-thoughts-on-the-shape-of-the-next-normal>.

For example: The Complex Care Hub at Rockyview General Hospital in Calgary is a virtual inpatient unit, allowing eligible patients to receive the same kind of acute care and treatment they would receive in hospital, but from their own homes. Patients who visit Rockyview's emergency department for non-urgent treatment are admitted following the same protocol as inpatient admissions, but instead of being transferred to a hospital unit they are sent home to receive outpatient care. Patients receive daily care from their homes, are monitored by community paramedics and nurses, and consult with doctors via Skype. In its first year, the Complex Care Hub facilitated more than 100 admissions and saved over 1,350 days of acute and sub-acute care by providing care outside of hospital. The program has now expanded to a second site at the South Health Campus in Calgary.



Innovation and integration in care models

- > **Impact: Mid- to long-term**
- > **Probability: High**

Over the next 20 years our health system will see an increase in patients with complex needs. To effectively assist patients, health professionals will increasingly look to innovative models of care. Being province-wide and fully integrated, Alberta's health system can offer a patient-centred "whole system" model of care.

Innovations in care models are shaping more integrated care teams, in which health professionals work collaboratively and in partnership with social care providers to treat patients holistically. Models of care will focus less on admitting patients into prolonged stays at institutional settings such as hospitals, and more on assisting and treating people in home and community settings. This will change where and how health services are delivered.

To support these continuously evolving care models, Alberta must invest strategically in assets that are flexible and adaptable to long-term shifts in care. Capital investments must balance the needs of centralized institutional facilities and those relating to community-based assets.

Continued advancement of health technologies

> **Impact: Near- to mid- to long-term**
> **Probability: High**

Technology will bring significant disruption and opportunities over the next 20 years. Advances in health technologies are poised to change our health system dramatically in everything from how patients are diagnosed and treated, to how health-care professionals are trained. Hospitals of the future will be equipped with technologies in the areas of artificial intelligence (AI), 3D printing, and nanotechnology, resulting in greater efficiencies and improved health outcomes for Albertans.

For example: The Heroes in Mind, Advocacy and Research Consortium (HiMARC) supports mental health initiatives for military and first responders. In summer 2020, HiMARC received government funding to develop web-based resources that will expand clinical trials that use virtual reality to treat post-traumatic stress disorder among military members and veterans and to a sample of other first responders, including law enforcement and health-care providers. HiMARC's 3MDR project uses an immersive virtual reality system, including exposure therapy, psychotherapy, virtual reality imagery, and treadmill walking to treat PTSD, moral injury, and other mental health conditions. The new online platform will include resources and resilience-building activities, as well as a trial of virtual group activities.

For example: The rise of unique Health Technology Systems are making the design and operation of hospitals more advanced and efficient. Hospital corridors will need to be built wider to allow the inclusion of technologies, such as Automatic Guided Vehicles and robots. These technologies are used to seamlessly transport medical materials and samples, and must safely and efficiently interact with patients and staff in the same hallway spaces.

Capital projects supporting Alberta's health care sector will need to build future-proof spaces that accommodate new health equipment and technologies as they emerge. They must safely and efficiently interact with patients and staff in the same hallway spaces to enable incorporation of new equipment. This means designing and building with flexibility and adaptability in mind, with features such as wider hallways and optimal room in operating and treatment spaces. Hospitals and other health facilities are likely to look much different from today.

In navigating the above trends over the next 20 years, the Government of Alberta will explore approaches that enable strategic, long-term investment such as:

Improving accessibility to quality health care

Each and every Albertan, regardless of where they reside, needs access to high quality health care. In collaboration with AHS, Alberta's long-term capital planning will ensure that health facilities and services are strategically coordinated so they are more accessible and better aligned with the needs of communities. For example, some advanced inpatient services from tertiary facilities could be moved in order to remain sustainable as the population grows, especially in the Edmonton-Calgary Corridor. Some specialty services, on the other hand, could be moved from larger centres to rural hospitals, helping to keep those facilities viable and bring care closer to rural residents.

Accessibility could also be improved by expanding health capital through public private partnerships (P3s). Formulations of P3s could be used to develop more complex health infrastructure, such as hospitals. This will require the development of a robust framework with strict criteria to balance cost, risk, and the public interest.

The increased use of digital resources in health can help improve access to and effectiveness of care. Enabling this may require investments in IT assets, such as electronic health records, and supporting digital platforms that are secure, respect privacy rights, and share data efficiently. Investments must also be made to address gaps in broadband connectivity, so that all Albertans can make use of virtual health and other digital approaches. It is estimated that only 21 per cent of rural households and only 12 per cent of Indigenous communities in Alberta currently have access to viable broadband speeds.



SECTOR ONE

For example: AHS launched Connect Care on November 3, 2019. The platform houses medical records, prescriptions, and care history at all AHS facilities, right down to doctors notes. This information used to be spread across more than 1,300 independent health information systems. Connect Care is a shift away from paper records to a sophisticated, comprehensive system allowing patients to interact with their own health-care information, and health-care professionals to see all patient information in one place.

For example: More than 500,000 Albertans signed up for MyHealth Records as of January 2021. MyHealth Records is a secure online tool to store, manage, and track key health information, including quick access to test results. It also offers records such as immunizations, medicines received from community pharmacies, journals to track health trends and goals, and reports to share with health providers. Albertans can even upload their own data from personal health devices, including blood pressure monitors, blood glucose meters, and fitness trackers.

Supporting Indigenous health in Alberta

Indigenous communities need adequate connectivity to health services that are culturally appropriate, geographically accessible, and address social determinants of Indigenous health. A lack of quality health infrastructure close to home requires Indigenous Peoples to travel long distances to access adequate services. This means leaving their families and support networks, and can even force them to permanently relocate from their communities to major urban centres.

The remoteness of Indigenous communities can be a factor, as this increases the cost of building health facilities. A lack of broadband infrastructure currently hinders the ability of Indigenous communities to access virtual service delivery, and a lack of sufficient long-term addictions and mental health treatment spaces results in high incidences of reoccurrence. Reliable and secure digital connectivity will be required to enable virtual access to health services.

Over the next 20 years, capital funding will contribute to improving health outcomes of Indigenous Peoples by:

- Enhancing collaboration with the federal government and Indigenous communities to improve the efficiency of resource deployment;
- Improving mental health and addictions treatment;
- Establishing continuing care facilities on-reserve to improve Elder quality of life and reduce transportation expenses;
- Investing in new health facilities on-reserve near urban centres that can perform outpatient surgeries and procedures to alleviate capacity issues faced by provincial facilities and reduce patient wait times; and
- Expanding broadband access for Indigenous communities to improve on-reserve/settlement access to health care, including remote access to telehealth professionals or specialties.

Pursuing innovation and integration in care models

The majority of Albertans consistently indicate they prefer to receive health services in the comfort of their homes and communities, rather than through long stays in hospitals or other institutional facilities. Moving care into the community helps facilitate continuity of care and enables more preventive care and chronic disease management. Additionally, this approach reduces the overall costs of Alberta's health system. A shift toward greater investments in outpatient and community care will help reduce pressures on inpatient health facilities and will better align with the expectations of Albertans. Research has shown that supporting people in the setting that best suits their needs can improve their quality of life and health. To that end, capital investments can help bring innovation in care models across Alberta's health system.

Primary care innovation

Primary care includes services providing basic, everyday health needs, such as family doctors or a call to Health Link. When primary care is not available, a patient with an urgent matter is often left with no other option but to go to an emergency room. The Government of Alberta is examining how to better provide urgent services through primary care innovations. Expanding primary care access would promote health prevention while improving access for rural residents. It would also reduce public and capital demands for emergency rooms.

Acute care innovation

Acute care provides treatment for short-term urgent needs typically in a hospital-like setting. Innovations in acute care will be needed to address rising pressures on urban health facilities. One possible approach is to focus larger hospitals on complex needs and deliver specialized services, such as heart care or cancer care, in specialized hospitals or clinics. Leveraging existing facilities in these ways would enable capital investments to be optimized.

Outpatient care innovation

Outpatient services include tests and medical procedures that can take place outside of a hospital or medical centre. Advances in technology and new procedures are expanding the number of outpatient services available. These innovations will further enable the focus of capital investments to shift from large, complex institutional facilities to more flexible and adaptable specialized community facilities.

Focusing on community care innovations

Community care refers to a mix of programs including continuing and long-term care, addiction and mental health care, palliative care, and hospice care. Community care will be a particularly important area of focus, given the increase in seniors in Alberta over the next 20 years.

Improved community care requires the expansion of specialized services in the community that are effectively integrated with hospital services. A recent example of this model is the Gene Zwozdesky Centre at Norwood in Edmonton, which will have clinics such as dental and foot care available for the continuing care residents of the facility as well as for community members. These clinics are designed for higher acuity needs, such as lifts in the dental clinics that allow residents and community members to receive the health procedures that were previously only accessible in an acute care hospital.

To be effective, community care models require investments in community health centres that foster cultural safety and ensure the integration of social and economic supports. Community health centres are built on a culture of patient safety and quality, with empowered multidisciplinary and multi-organization teams working together across the continuum. The shift toward community care reduces crowding in acute care spaces, and leverages alternative facilities and services to treat Albertans in a more cost-effective manner.

Addressing addictions and mental health

Mental health diagnoses and the adverse effects of drug use and other addictions are contributing to increasing case complexity. The burden of chronic conditions and mental health disorders in Alberta has been increasing during the past decade. COVID-19 is also a big contributor to stress, with up to 50 per cent of Albertans expected to experience increased anxiety. The Government of Alberta is committed to exploring innovative care models that integrate mental health services and provide earlier access to addiction and mental health supports by improving the capacity of primary care providers to respond to these issues. This means Albertans can receive care earlier and closer to home, without the need for acute services in lengthy hospital stays. Over the next 20 years, government will continue exploring opportunities to partner with community organizations and health centres on improving access to services that support prevention, stabilization, treatment, and recovery.

► *Did you know?*

Access to services is the hallmark of the Government of Alberta's Mental Health and Addictions Advisory Council. Bringing together people from various health and other backgrounds, and those with lived experience, the council will identify key actions for improving Albertans' access to mental health and addiction services. Areas of focus for the council will include primary care and home care that can be used to bring services closer, more conveniently and in more timely ways to Albertans. The council's work will build on the recommendations made by the Opioid Emergency Response Commission to address the opioid crisis.

Investing in research

Alberta's health system is a leader in innovation. Going forward, Alberta has remarkable potential in areas including regenerative medicine and cell therapies. These offer the potential to transform the treatment of diseases, replace damaged tissues and organs, and create new therapies for auto-immune conditions and organ transplants. Unleashing this potential will require research-related assets, such as the Alberta Cell Therapy Manufacturing Facility, which uses state-of-the-art cleanrooms and advanced equipment to break new ground in vaccine and cell therapy development. Further strategic investment in capital assets will enable our province to pursue leadership in the future of medicine, which will help diversify our economy and create new jobs.

SECTOR ONE

For example: The Stollery Children’s Hospital Pediatric Critical Care Project supports the pediatric simulation program of the educational curricula for all health care professionals at the hospital. The program uses a variety of techniques, including task trainers, standardized patients, and high fidelity mannequins to teach skills, acute care, and team training.

The state of the art Simulation Room comprises a training area where the simulation activities are performed along a control booth that monitors and supervises the overall proceedings. The room includes related simulation/training computer systems, A/V recording equipment, various simulation mannequins, and a fully functional headwall system (complete with medical gas and electrical services similar to those provided in the typical patient rooms), along with space for the patient bed, as well as all necessary patient care related equipment.

The project design provides flexible facilities that accommodate the user groups’ various needs and functions such as the large conference room, which also serves as simulation space and facilitates, and telehealth conferencing along with the clinical workroom for interdisciplinary collaboration.

► **Did you know?**

The Alberta Health Services Performance Review was conducted in 2019 to make AHS more efficient and to find savings that could be reinvested into front-line services. Following the review, AHS submitted a comprehensive implementation plan for the Government of Alberta’s review. In October 2020, the Alberta government directed AHS to take a long-term and gradual approach to implementation, putting patient care above all else. Government approved AHS proceeding with a portion of the actions identified in the plan, with no job losses for nurses and other front-line clinical staff.

These and other approaches will enable our province to shape a future in which Alberta’s health sector continues to be a source of pride for Albertans and a powerful engine of innovation, job creation, and quality of life in our communities.

Whole system care model

To effectively assist patients, health professionals will increasingly look to innovative models of care. Being province wide and fully integrated, Alberta’s health system can offer a patient-centered “whole system” model of care.

Community care: refers to a mix of programs including continuing care, addiction and mental health care, palliative care, and hospice care

Outpatient care: includes tests and medical procedures that can take place outside of a hospital or medical centre



Primary care: includes services providing basic, everyday health needs, such as family doctors or a call to Health Link

Acute care: provides treatment for short-term urgent needs typically in a hospital-like setting



Sector two Enabling future-focused K-12 education

Alberta's vision for the future of education infrastructure over the next 20 years.

- > Students in all areas of the province continue to have access to high-quality K-12 education and programming.
- > Alberta's school infrastructure supports a variety of programming that allows for increasing exposure to diverse skills, and provides students with the opportunity to enhance the connection between their skills and interests, and the work force.
- > Schools are future-focused and built with flexibility in mind in order to adopt changes in programming, integrate technology, and meet the evolving needs of students.
- > Alberta's schools serve as focal points and community hubs for families within their communities, fostering integrated access to social, cultural, health, and recreational resources.
- > Alberta's schools support virtual learning opportunities that integrate programming and increase accessibility for students in rural and remote communities across the province.
- > School completion rates increase with the support of infrastructure designed to promote student well-being, mental health, pride in students' culture and community, intercultural empathy, respect for others, and nurturing positive relationships.





Investments in education pay huge dividends in developing our economy and society. Providing our young people with world-class K-12 education sets them on the right track to be competitive and successful in a changing world. This also leads to strong families and communities, healthy and fulfilled citizens, a creative and entrepreneurial workforce, and a prosperous and resilient Alberta overall.

Infrastructure plays a crucial role in supporting the world-class quality of Alberta’s education system and in supporting the success of learners.

► **Examples of capital in this context:**

- Schools
- Portable classrooms
- Playgrounds

Key Considerations:

- The Government of Alberta supports students, parents, teachers, and administrators in a student-centred K-12 system.
- Alberta has a total of 2,155 educational facilities from early childhood services to grade 12.
- Every year, each school board creates a list of building projects that are important to their communities for the next three years. This list is known as the board’s three-year capital plan.

Positioning students for future success will require a holistic approach to education – focusing not only on academics, but also on mental health, creativity, entrepreneurial thinking, and inspiring lifelong learners. To do this, decisions about K-12 education infrastructure will need to continue reflecting how teaching and learning are changing over time.

This has been made all the more clear by the COVID-19 pandemic, which radically challenged traditional teaching methods. The disruption caused by the pandemic highlighted the need for well-designed school facilities, and the need for remote learning opportunities that can effectively support all Alberta students. It also placed a spotlight on the importance of nurturing not only traditional academics, but also creativity, adaptability, problem-solving, and mental and emotional wellness.

To effectively support a modern, holistic, and high-performing K-12 education system, Alberta will need to continue to plan capital investments strategically, with a commitment to shared province-wide goals. This will require a high degree of collaboration amongst local school boards and the Government of Alberta.

Against this backdrop, the Government of Alberta and local school boards will be challenged to make the most of every capital dollar while working together to navigate the following major trends.

The rise of remote learning

> **Impact: Near- to mid-term**

> **Probability: High**

> Accelerated (due to COVID-19)

Remote learning is not new to our province. For many years Alberta's K-12 education system has enabled alternatives to the traditional in-person approach, such as homeschooling. Alberta learners have had the ability to pursue learning from rural, remote, or other locations through online programs led by school authorities. Teachers have also made use of videoconferencing to bring guest speakers and experiences into their classrooms.

The onset of COVID-19 sent the notion of remote learning into overdrive. Virtually overnight, thousands of K-12 students experienced a dramatic shift in how their education was delivered. The changes brought on by COVID-19 have accelerated existing trends of greater personalization in education, flexibility in the delivery of learning, and use of technology in teaching. The pandemic also highlighted challenges not just related to physical safety, but also challenges related to the need for social development and supports to assist marginalized students. The sudden and sizeable expansion in remote learning has led service providers to offer a range of new solutions. Teachers, administrators, and school boards have had opportunities to explore how remote learning can be programmatically integrated to support traditional school-based approaches.

To fully reap the benefits of virtual learning, learners across Alberta, including rural, remote, and Indigenous communities, will need access to suitable broadband internet connections. The Government of Alberta will also need to continue working with school boards to explore how virtual learning will influence investments in school buildings.



For example: In early spring 2020, Alberta's students left the classroom and had to adapt quickly to virtual learning due to the emergence of COVID-19. Government worked closely with school jurisdictions across the province to ensure students received their lessons through virtual means to complete their school year as planned. This quick shift emphasized the need for Alberta's schools to look ahead and plan for the new and alternative approaches to learning that will become necessary in the future, and consider how infrastructure may be designed and used to support this.

Virtual learning strives to provide as high-quality an education as students receive in classrooms. Students may have the opportunity to learn at their own pace while sharpening their digital skills. It has also highlighted the barriers that need to continue to be addressed to ensure that students have the supports, services, and resources to succeed. An important consideration for both virtual and dispersed learning is digital connectivity. Accessibility to high-speed broadband and bandwidth for students and teachers across the province is critical to delivering high quality education online. Alberta will need to prioritize investments in broadband infrastructure over the next 20 years to ensure that our students have access to the learning programs and tools of today and in the future.

Continued demand for enhanced, flexible, and accommodating teaching styles

> Impact: Mid-term
> Probability: High

Enabling our young people to achieve positive learning outcomes means adapting to new and different learning styles. Increasingly, students and teachers will need to undertake collaborative approaches to learning. This could include personalized learning approaches, in which learning experiences are tailored for an individual student's unique needs, preferences, and interests. The growing diversity of Alberta's population demands greater diversity in our province's school environments and teaching methods.

Different learning styles are also supported by changes in workplaces, which will increasingly value creativity and teamwork. Having a well-rounded education will be essential for Alberta's young people as they are likely to work in many different contexts and be expected to integrate effectively with others across multiple disciplines.

Innovation also contributes to changes in how students understand and interact with ideas and concepts. The use of new technologies in classrooms will help arm our young people with the skills they need to compete and succeed.

These factors will all influence capital investment decisions. Both physical and virtual learning environments will need to adjust to changing dynamics and expectations, and be structured in ways that support educators and learners alike.

Continued capacity and sustainability challenges

> Impact: Near-term
> Probability: High

Demographic changes will lead our K-12 education system to confront demands similar to those of the health system. It is estimated that, by 2040, there will be more than 900,000 school-aged Albertans, three-quarters of whom will be living in the Edmonton-Calgary Corridor. As a result, our province will continue to experience increasing student enrollment in urban communities. Meanwhile, school space will be under-utilized in other communities, including some rural areas. In these cases, there will be added pressure on some rural and remote communities to deliver programs that can meet the needs of students without ballooning costs.

In areas welcoming an influx of new residents, school boards will be challenged to address the needs of increasingly diverse student populations.

At the same time, the province will be challenged to address how gaps in educational infrastructure impact Indigenous Peoples in Alberta. The remote nature and high costs of living of many Indigenous communities result in greater travel distances to school and lower levels of programming and access to technology. Inadequate educational infrastructure contributes to lower educational outcomes for Indigenous students compared to non-Indigenous students.

At the local level, migration patterns within a community can also lead to wide fluctuations in enrolment at a particular school over the life of the building. This complicates the picture. While there will be a need to keep pace with forecasted demand, the Government of Alberta will also need to guard against the risk of over-building. A school that is overbuilt can run the risk of becoming under-utilized or closed prematurely, representing lost opportunities for communities and waste for taxpayers.



Schools as community hubs

- > **Impact: Long-term**
- > **Probability: High**

Schools form part of the building blocks of our cities, towns, and counties. They often serve as gathering places for the surrounding community, hosting sporting events, recreation activities, cultural and religious celebrations, and gatherings. They are often used for continuing education classes, summer camps and special events, such as elections and emergency responses.

The use of schools for non-school functions is expected to expand over the next 20 years; community use of schools has already become a standard part of operating. Increasingly, schools will be deliberately designed to accommodate various activities and services in their multi-purpose spaces outside of regular school hours.

Albertans can continue to expect school facilities to be part of broader developments that feature other services. While the mix of services will be different at each development, they may include elements, such as daycare centres, public services, seniors housing and long-term care spaces, and recreation and sport activities all at a single community hub. In addition to improving Albertans' access to services, this will lead to lower land footprints, greater energy efficiencies, and better economies of scale, helping make these capital projects more affordable and sustainable.

Schools will also be designed to accommodate the integration of community services during school hours. This can better enable prevention and early intervention services to address mental health and other issues facing young people. Enhancing intersections between schools and the broader community in these ways will guard against challenges such as anxiety and social isolation, and promote better outcomes community-wide.

Maximizing the utilization of school spaces will reduce the need to invest in duplicative space elsewhere. By sharing physical infrastructure, the total number of worksites for public services can be reduced, helping provide greater affordability for taxpayers while contributing to greater effectiveness in service delivery.

For example: George P. Nicholson Elementary School in Edmonton is a multi-use facility. The school is home to K-6 classes with Edmonton Public Schools, YMCA Twin Brooks Child Care, and Twin Brooks Public Health Centre.

In navigating these trends, the Government of Alberta will continue to explore approaches, such as the following:

Committing to inclusive, accessible, and personalized learning

The use of specialized programs can help make education more inclusive as it gives rise to learning models that respond to different learning styles and preferences. Education infrastructure is important to support teachers in developing quality and inclusive learning environments and materials. For example, programs that use kinesthetic learning integrate the use and manipulation of materials so that students can engage with objects and concepts. Supporting this approach can mean capital investment in unique assets such as community gardens, outdoor classrooms, and makerspaces. By enabling students to explore in-demand careers and develop related skills, specialized programs help build a well-rounded workforce. In addition to supporting new learning styles, specialized programs can generate renewed interest and boost enrolments in schools. This can serve to re-activate under-utilized schools and spaces, helping to optimize existing assets and revitalize surrounding areas. Education is also made accessible through investments in digital libraries, helping broaden student access to books, images, and videos, regardless of the student's location. While traditional libraries remain important for physical resources, capital considerations will continue to expand to accommodate collaborative learning spaces that support the flexibility of school programs.

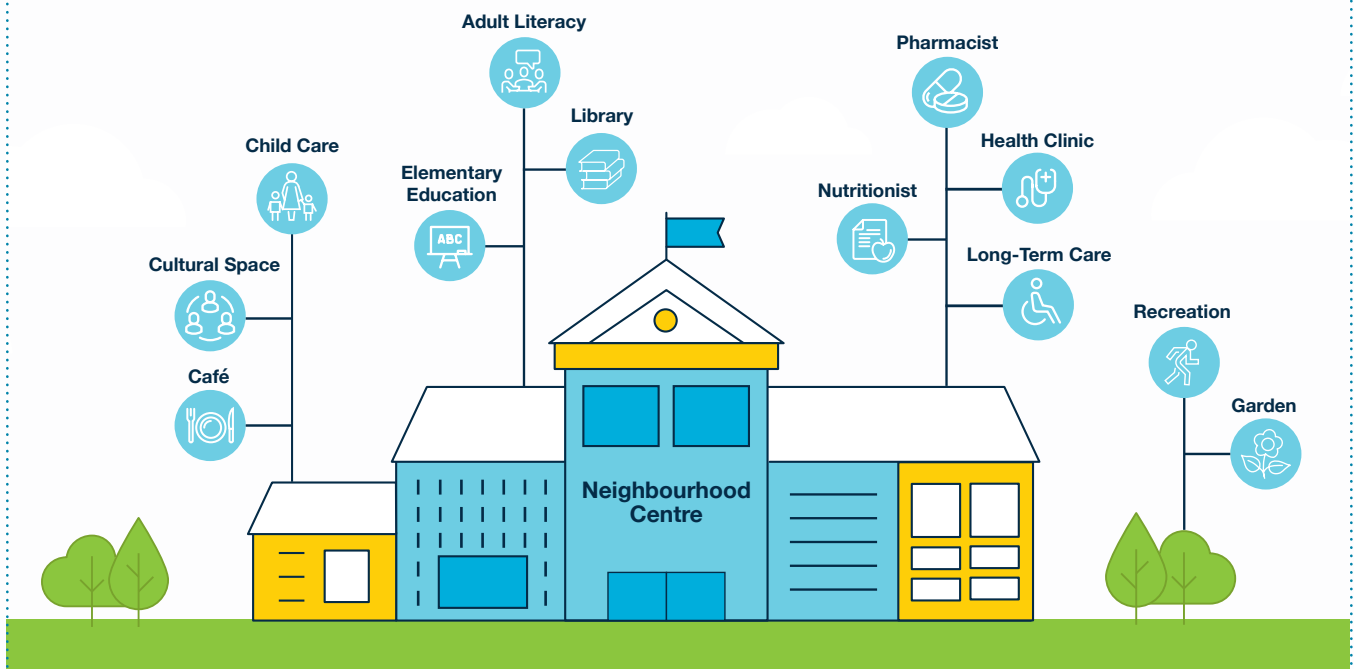
SECTOR TWO

For example: The Amiskwaciy Academy is an Edmonton Public School program of choice, providing comprehensive academic programming within an Indigenous context. The repurposed and modernized municipal building is open to students of all backgrounds. In addition to standard programs, the school offers breakfast and lunch programs, Cree language, Building Construction, Computers and Technology, and Fine Art. It also supports a Dual Credit program partnership with MacEwan University. At Amiskwaciy Academy, students have the opportunity to participate in Indigenous cultural teachings including:

- Traditional ceremonies and rites of passage;
- Indigenous arts;
- Spiritual guidance in the form of traditional ceremonies and rites of passage; and
- Daily drumming and singing.

For example: École Lacombe Composite High School built a nearly net zero greenhouse where students grow bananas, lemon trees, avocados, and pineapples. The tropical oasis is also home to an aquaponics system with many fish. Surrounding the greenhouse is a two-acre community garden with 175 fruit trees and 50 raised beds growing potatoes, garlic, squash, and other local plants, all maintained using permaculture principles to make the operations more sustainable and productive. All of these green initiatives are led by the Ecovision Club, which is made up of students committed to project-based learning.

Community hubs provide a central access point for a range of needed health and social services, along with cultural, recreational, and green spaces to nourish community life.



Designing schools to accommodate change

Flexible designs will be important for learning facilities so they can remain sustainable even as learning needs change over time. For example, classrooms will need to be designed to prepare them for the integration of new technologies. Diversity amongst student populations may demand new types of places and spaces, such as smudging rooms and quiet rooms. Modular classroom design will be important for accommodating changes in student populations without costly over-building of major structures. Education facilities may also incorporate greater use of green and resilient materials, helping to reduce operating and maintenance costs. As urbanization continues, school facilities in larger cities may need to be built upwards instead of outwards.

For example: Modular classrooms are a flexible way to create larger school facilities and accommodate population growth. More than 50 per cent of all Alberta schools have at least one modular attached to the facility, and over the past 14 years, the majority of school construction projects included modular classroom components, which assist schools to stay right-sized in a timely and cost-effective manner. Enabling the infrastructure to be adaptable and flexible will prevent costly underutilized and/or closed school buildings as populations shift and neighborhood demands change. Innovations in modular design are especially beneficial to the sustainability of school facilities. Future classrooms could be created through new and innovative pre-fabrication technologies like 3D printing and automation, resulting in greater efficiency and cost savings.

Enabling tech-integration and remote learning

The integration of technology in classrooms will have a number of implications for how we build schools. In classrooms where students are uploading multimedia content, videoconferencing, and using virtual tools there will be a continuing need for up-to-date, tech-based working stations, individualized technology tools, accessible chargers, and other necessary equipment to support a digital environment. The opportunities and challenges presented by the shift to remote learning due to the COVID-19 pandemic will need to be explored and assessed, and any decisions for educational infrastructure will be based on research. Broadband services will be a key enabler for students across the province, with rural broadband a key investment area.

Classrooms of the future: what can we expect?

Modern technology such as smartboards, iPads, and personal laptops are already the norm in some Alberta classrooms. Over the next few decades our province may need to build to accommodate newer and emerging technologies, such as:

- Electronic screens
- Interactive whiteboards
- Data projectors
- Reactive materials and furniture
- 3D printing
- Retinal screens
- Holography
- Immersive virtual reality
- Adaptive learning software

For example: Virtual reality is an increasingly important learning tool that enhances student learning and engagement. The technology immerses students in their environment and allows for visual learning as opposed to static reading and writing exercises. A pilot program brought augmented reality technology into the Alberta classroom in late 2019. The educational mobile gaming platform allowed students to visit and learn about various places and historical objects across the province, including the Alberta Legislature and Banff Gondola.

SECTOR TWO

Repurposing schools

Given anticipated shifts in where Albertans choose to live, there are likely to be ongoing challenges with under-utilized or closed school buildings. The Government of Alberta will continue to explore the potential to repurpose existing facilities when making capital investment decisions in other policy areas, especially when there is a life cycle business case to repurpose instead of replace. Repurposing enables capital budgets to go further and, done creatively, could spur new economic activity and job creation.

Pursuing the potential of partnerships

Working collaboratively with partners is of particular importance in further pursuing ideas such as community use of school facilities. Since schools are major public assets, enhancing the broader use of schools raises questions about how, when, and by whom they should be used. This may involve building on existing models, such as joint-use planning agreements, and pursuing creative new partnerships amongst non-profit organizations, school boards, and municipalities. Further partnerships will also be explored with the private sector, particularly when it comes to school construction. Between 2010 and 2020, 40 new schools in Alberta have been constructed under P3 agreements, enabling them to be constructed faster and affordably for taxpayers. A new Public-Private Partnership Framework and Guideline, released by the Government of Alberta in December 2020 will help broaden the options available for school construction projects while providing transparency for Albertans.

See [Strategy Four](#) for more on municipal partnerships.

For example: As urbanization continues in Alberta, we will need to continue to consider building school facilities up instead of out within our larger cities. Schools in urban areas can take advantage of existing unused space to build new and modern learning environments while making space for more students and a variety of facilities on the same plot of land. Locating schools close to or within business areas creates the chance for students and staff to make connections with surrounding businesses, opening the door for cross-pollination, potential partnerships, and joint projects.



For example: Five new high schools will be constructed through a P3 arrangement with a consortium. The bundled project will see the successful consortium design, build, and provide maintenance and renewal for high schools in Blackfalds, Edmonton, Langdon and Leduc. The new high schools are expected to open in September 2024 with a collective capacity of almost 7,000 students.

Through these and other approaches, our province will continue to benefit from a modern, innovative, and high-performing K-12 education system that effectively prepares our young people to be well-rounded and competitive thinkers, creators, and leaders of tomorrow.



Sector three Positioning our post-secondary sector to compete in the changing global economy

Alberta's vision for the future of post-secondary infrastructure over the next 20 years.

- > Albertans in all areas across the province have access to high-quality, student-centred, and personalized post-secondary education facilitated by effective infrastructure.
- > Alberta's post-secondary institutions are resilient to changes in the economy by having flexible, efficient, data-focused, and life-cycle-driven facilities that facilitate cutting-edge research and innovative skills training.
- > Post-secondary institutions provide virtual learning opportunities that increase accessibility and inclusivity, creating opportunities for Alberta learners throughout their lifetimes.
- > Post-secondary institutions collaborate and enhance partnerships between industry and academia to optimize relevant training, labour market outcomes, and innovation.



SECTOR THREE

Post-secondary institutions play powerful roles in stimulating economic growth and innovation. Investments in higher education infrastructure enable key post-secondary activities such as research and innovation, and the development of talented graduates prepared for the future economy.

A high number of Albertans in highly skilled, knowledge-based occupations are anticipated to leave the workforce by 2028. While the supply of workers by 2028 will meet replacement requirements, it may not meet diverse labour needs resulting from diversification and expansion of the economy. Consequently, Alberta's post-secondary institutions will play pivotal roles in producing the highly skilled workers needed for our province's fast-developing knowledge-based sectors.

The graduates of today and tomorrow must have skills that are relevant, adaptable, and transferable across occupations and sectors. Moreover, they will need to keep those skills fresh and current through upskilling and reskilling development programs. This calls for a nimble, responsive, and relevant post-secondary education and skills training system.

► **Did you know?**

According to a recent study undertaken by Information and Communications Technology Council for Alberta in 2019, difficulty sourcing digitally skilled talent proved to be a considerable hurdle to business growth. A lack of digitally skilled talent was seen as the biggest obstacle to business growth by 36 per cent of employers in Alberta.

How, what, and where post-secondary students learn is changing to reflect evolving trends in the economy, the workforce, and technology. The COVID-19 pandemic has accelerated social, technological, and economic trends that already stood to reshape how post-secondary institutions operate. Against this backdrop, innovation and responsible spending in the post-secondary sector will be vital to maintain the long-term sustainability, quality, and relevance of institutions. Policy makers and leaders of these institutions will be increasingly challenged to evolve traditional models to keep pace with quickly evolving demands in society.

The global and local trends driving change in post-secondary education are transforming the nature of innovation itself, and new models for institutions and research organizations are bubbling up around the globe. These are increasingly featuring sites that enable advanced applied research, interdisciplinary and multi-partner collaborations, and shared spaces with digital infrastructure that enable deliberate collaboration amongst industry, policy makers, academic institutions, and students.

► **Examples of capital in this context:**

- Academic buildings
- Research facilities
- Campus life facilities
- Student housing

Key Considerations:

- The Government of Alberta invests in post-secondary infrastructure and research to drive job creation, innovation, and the development of skilled talent, which all contribute to a competitive and resilient province.
- Alberta has 26 publicly-funded post-secondary institutions.
- The Government of Alberta provides student loans, grants, scholarships, and awards that support Albertans' access to post-secondary learning opportunities.

The capital investments involved in post-secondary education can be significant. In some cases, post-secondary campuses operate akin to small cities, with a complex mix of physical and digital assets, such as office spaces, lecture halls, research labs, recreation facilities, health services, student residences, and other assets that offer safety, security, and livability for those who learn, work, and live on campus.

The Government of Alberta is committed to ensuring the post-secondary sector is modern, relevant, and effectively contributing to Alberta's competitiveness. To do this successfully, we need to examine the trends shaping higher education and explore how capital investments can support the evolution of post-secondary institutions so they are future-ready.

Increase in institution-industry partnerships

> **Impact: Near- to mid-term**
> **Probability: High**

Post-secondary institutions are increasingly pursuing partnerships with other entities, including private industry and non-profit organizations. These partnerships are key to ensuring that students have skills and training that are in-demand and aligned with labour market trends. These partnerships have the potential to facilitate dialogue, identify opportunities for better alignment, and tap into additional sources to support operating and capital budgets.

Post-secondary research communities have long had productive linkages with private and non-profit entities. This trajectory is expected to extend across all facets of our post-secondary institutions. This will create opportunities for public capital investments to leverage private capital contributions toward shared goals, helping bring about financial sustainability.

▶ **Did you know?**

The University of Alberta's nanoFAB laboratory is a centralized, open-access research facility that specializes in micro and nanoscale fabrication. The lab is home to more than \$110 million worth of equipment and infrastructure, as well as staff for training and on-site technical assistance. The nanoFAB laboratory is also open to industry and researchers looking to explore advancements in nanotechnology.

Changing demands from lifelong learners

> **Impact: Mid-term**
> **Probability: High**

Lifelong learning is the active pursuit of education throughout a person's life. It can vary from the traditional approach of earning a one-time post-secondary credential, to other approaches such as experiential and self-directed study, micro-credentialing, and employer training programs. As technology and knowledge continue to evolve rapidly, there will be an increasing need for Albertans to upgrade skills and explore new learning opportunities.

Lifelong learning requires post-secondary institutions to reinvent traditional learning to meet the ongoing needs of learners, including those already in the workforce, those pursuing unconventional career paths, and those in the gig economy. For example, Albertans who are already pursuing full-time careers while raising families will need approaches that offer greater flexibility than a traditional degree or diploma program.

▶ **Did you know?**

In 2021 Alberta announced its Labour and Talent Strategy, which will increase work-integrated learning opportunities, expand the apprenticeship model and micro-credentials, and enhance connection between post-secondary and industry. Additional funding for CAREERS: The Next Generation will also support government's commitment to building skills and helping young Albertans explore careers in the skilled trades.

Part of the solution will be greater use of virtual learning methods, which can enable institutions to serve a broader range of learners at more points throughout their lives. This will require post-secondary institutions to confront questions about program delivery, value for money, and the intangible benefits of the traditional on-campus experience, such as social interaction, career guidance, and hands-on lab-based learning.



For rural and Indigenous communities, virtual learning presents an opportunity for more Indigenous students to stay in their communities while undertaking post-secondary education, and to build the skills needed to participate more fully in the economy. Indigenous Peoples want to have access to training and good-paying jobs in or near the communities where they live. This keeps family units and support structures intact and helps decrease the trend of moving to urban centres due to the need of higher education or employment opportunities.

Realizing the benefits of virtual learning, however, will require investments in broadband and connectivity infrastructure. It will be imperative that this type of infrastructure is supported.

► **Did you know?**

Athabasca University provides flexible and accessible post-secondary education to Albertans through online and distance programs and courses. The university is accredited by all post-secondary institutions in Alberta, as well as those in 17 U.S. states. In spring 2020, the university successfully migrated its entire IT operations infrastructure to a database hosted by Amazon Web Services, which increased access to education for international learners as well as students in rural communities.

Technology-integrated and digital literacy

> **Impact: Near- to mid-term**

> **Probability: High**

Technological advances are resulting in new and niche industries that require new skillsets. Economic sectors are increasingly adopting AI, robotics, and digital fabrication, driving demand for digitally literate workers with up-to-date expertise. To ensure Alberta's graduates can compete, post-secondary infrastructure investments will need to focus on enhancing resources and curriculum that boost students' digital, data, cybersecurity, and analytical skills. This will need to be done across the entire continuum of an institution's programs, recognizing that technology is being incorporated into every line of work and facet of society.

Investments in these forms of infrastructure are expensive. Where possible, facility renewal projects should incorporate technology and flexible designs to leverage investments that are already being made.

In navigating these trends, the Government of Alberta will explore approaches such as the following:

Transforming the adult learning system

In summer 2020, government launched the development of the Alberta 2030: Building Skills for Jobs strategy. This initiative is engaging employers, industry, students, post-secondary institutions, and other stakeholders to develop practical solutions that will ensure our higher education system is affordable, accessible, and reflective of our economy's future needs. The Alberta 2030 initiative focuses on providing the high-quality education, skills, and training needed to get Albertans back to work, meet current and future labour demands, and drive innovation to make Alberta competitive in a 21st century global economy. To support these outcomes, investments in post-secondary infrastructure will need to align with this initiative. The Alberta 2030 strategy was released in the spring of 2021.

SECTOR THREE

Collaborating for better outcomes

Post-secondary institutions can move away from being the sole owners of campus infrastructure and move toward a model that uses collaboration with other institutions and the private and non-profit sectors. This would see post-secondary spaces being used not only for post-secondary teaching and research, but also in partnerships with businesses and other organizations. Creative arrangements could enable spaces to be used by partners during off-peak hours or vacation breaks and enable more industry-post-secondary research collaboration.

These types of initiatives would reduce the cost of building new physical spaces while fostering research collaborations that can lead to new breakthroughs and innovations. Investments in infrastructure related to learning spaces will enable the academic and business communities to test solutions in real-world settings, such as:

- Test beds, which are a platform for conducting rigorous, transparent, and replicable testing of scientific theories, computational tools, and new technologies.
- Living labs, which are user-centred, iterative, open-innovation ecosystems operating in a territorial context, such as in a city, region, or campus. Living labs allow researchers to integrate concurrent research and innovation processes within a public-private partnership (P3).

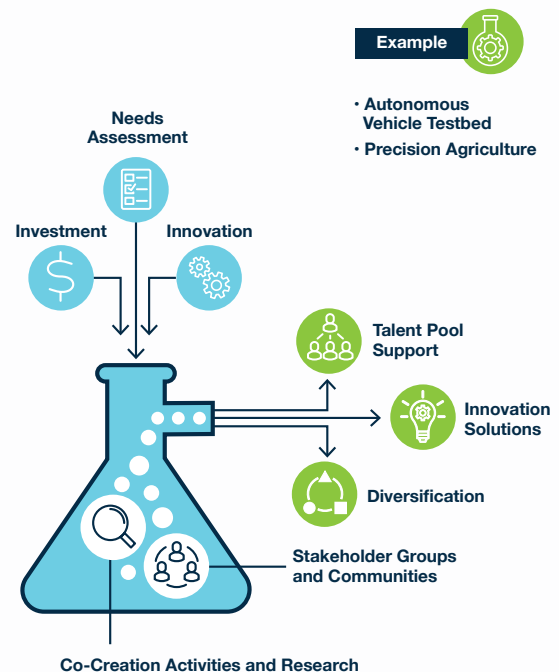
These types of new and innovative spaces provide a learning environment other than the typical classroom, and can be a co-investment venture by a number of partners. They are fundamental to maintaining Alberta's competitive advantage as they support the cultivation of a strong workforce and attract students, faculty, and research investment from around the world.

► **Did you know?**

In early 2021, the University of Alberta partnered with TELUS to establish a 5G "Living Lab" that will contribute to a pipeline of new research and technology with commercial application, starting with precision agriculture and autonomous vehicle systems.

Living labs support innovation in a wide range of sectors across Alberta

This approach allows stakeholders to collaborate and co-create solutions, and to test and try ideas and products in a real-life environment. Living labs enhance access to real life research opportunities and innovation that grow our talent and contribute to the diversification, recovery, and growth of Alberta's economy.



SECTOR THREE

► **Did you know?**

Alberta Innovates offers funding to researchers at Alberta post-secondary institutions to support activities such as workshops, conferences, and competitions. These activities advance Alberta's research and innovation in the emerging priority areas of information and communications technology, nanotechnology, and omics technologies. Emerging technologies offer the promise of new industries and transformative solutions to challenges across Alberta's key sectors. Bringing together groups of Alberta researchers, graduate students, industry, and others is an important part of building on ideas and moving key research forward.

Post-secondary institutions can also enhance collaboration through more work-integrated learning opportunities both on- and off-campus, such as internships, field experience, and applied research projects. These opportunities enable faster transitions for graduates into the workforce while increasing program relevance for everyone involved.

These also help learners build key competencies and soft skills such as entrepreneurial thinking, problem-solving, critical thinking, team participation, communication, and leadership. For these valuable experiences to remain effective and applicable into the future, they will need to continue to integrate new methods and technology, including digital based industries.

► **Did you know?**

The Distributed Energy Management Initiative is a partnership between the Northern Alberta Institute of Technology (NAIT), utilities company ATCO, technology firm Siemens, and the Future Energy Systems research program at the University of Alberta. The initiative established the Centre for Grid Innovation at NAIT, which provides a "plug-and-play" micro grid where energy companies can test and validate their technologies under realistic field conditions. This helps technology innovators overcome the high costs of entry into research and development within their fields.

► **Did you know?**

In September 2019, the Government of Alberta launched the Skills for Jobs task force. The task force was appointed to strengthen apprenticeship education and skilled trade opportunities to address the labour shortage predicted for Alberta's future. Government found business and industry are both facing significant labour shortages as nearly 45,000 skilled workers are set to retire over the next 10 years. The task force focused on building awareness of what skilled trades are and how people can begin working in them while also exploring how and where apprenticeships can be increasingly implemented in traditional and emerging sectors.

For example: The Government of Alberta is working with the Northern Alberta Institute of Technology (NAIT) to explore the development of a new high school collegiate in Edmonton, with the potential to expand the model in the long term to Calgary and other centres.

Embedding technology in post-secondary learning

Many organizations are already "going digital", jobs of the future will be rooted in, or rely even more upon, technology and digital innovations. Post-secondary institutions will need to provide programming in growth areas such as AI, robotics, cybersecurity, data analytics and management, virtual/augmented reality, and other emerging technologies. Meanwhile, traditional programs will need to be modernized to help cultivate digitally-literate, tech-savvy graduates. This may include capital investments in computational power, networking, bio-informatics, and other IT and digital assets. Capital investments to improve broadband connectivity in rural and remote communities may also be required so that the potential of virtual learning can be fully realized by Albertans.

For example: Organizations including post-secondary institutions are no longer managing systems in a single data centre. They are managing the mobile network, "internet of things" devices, and the cloud. This necessitates building more complex digital infrastructure. This trend was already underway, but COVID-19 has shifted business models. Organizations that already used cloud infrastructure benefited from being able to scale down or re-adjust workforce infrastructure costs, or increase resources where they saw more demand. There may have been other spillover effects such as more distance learners, lower demand for on-campus housing, and reduced pressure on parking and other on-campus facilities.



For example: As technology continues to create a rapidly evolving work environment, the need for evidence-informed, data-driven decision making has increased. To address the accelerated integration of technology into various industries and the constantly changing global economic climate, Advanced Education partnered with an outside vendor to launch the Alberta Tech Skills Data Initiative. Currently, the pilot phase goals include enhancing data-sharing practices, building analytical capacity, and prototyping solutions. A number of interactive data visualization tools are under development, and the initiative has already identified relevant, emerging data sources for analysis.

► **Did you know?**

The Agriculture Technology programs at Olds College leverage the latest technology to enhance food production, increase productivity, and build skills for the future. The Government of Alberta is investing \$21 million in Olds College's James Murray Building and Lachlin McKinnon Building to accommodate a state-of-the-art agriculture technology learning hub for students and researchers. The learning hub has the potential to be a world leader in integrated agricultural, technological, and data sciences learning experiences.

Ensuring the right mix of flexible and sustainable structures

COVID-19 has accelerated remote learning; however, it will not replace the long-term need for investments in traditional post-secondary infrastructure. The challenge will be to accommodate in-person learners while guarding against the risk of over-built and under-utilized facilities. Learning spaces of the future will need to be built with flexibility so they can adjust to the evolving needs of students, researchers, industry, and other partners and users. Post-secondary institutions will need to strengthen their capacity to manage, repurpose, or enhance the sustainability of their physical assets.

New funding for post-secondary infrastructure may consider integrated and shared infrastructure in the future. For example, post-secondary labs could be shared between institutions or be co-shared with industry or government. As infrastructure and capital maintenance pressures increase, a new lens may need to be applied as to how post-secondary institutions and their campuses could be better organized and utilized to ensure a smaller infrastructure footprint and/or consider opportunities for shared infrastructure.

By making use of these and other approaches, Alberta can ensure that its post-secondary sector continues to be relevant and innovative, and that it empowers Albertans with the skills they need to be globally competitive in a rapidly transforming economy.



Sector four Planning a modern, efficient transportation network

Alberta's vision for the future of transportation infrastructure over the next 20 years.

- > Strategic investments in transportation support economic growth and recovery by developing safe, resilient, efficient, and sustainable transportation systems and by enabling opportunities for innovation.
- > Alberta's transportation networks support economic development and improve market access through the development of strategic corridors and multi-modal hubs.
- > Albertans are supported by inclusive and accessible transportation options that improve connectivity and streamline multi-modal transit for users.
- > Alberta's transportation system adapts to new innovations and technologies.
- > The Government of Alberta works strategically and collaboratively with partners to ensure transportation networks are integrated and aligned to meet the needs of all Albertans.



SECTOR FOUR

Transportation infrastructure connects people, goods, and services while creating strong links within, between, and beyond our communities. In addition to advancing our social well-being, transportation enables a prosperous economy. Accessible and efficient road networks and transportation systems play a key role in the functioning of Alberta's economy.

Over the next 20 years, a number of factors will challenge the transportation sector, including population growth, urbanization, and the need for maintenance and renewal of existing infrastructure. Growing numbers of residents and businesses in Alberta's major urban areas will challenge municipalities to address traffic congestion, safety concerns, and explore new options for moving people and goods around and between communities.

The Government of Alberta will need to adopt long-term strategies for investing in transportation assets that support a thriving economy, balance affordability and accessibility, and deliver high quality, safe transit options for Albertans.

► Examples of capital in this context:

- Roads, highways and bridges
- Airports and heliports
- Rail lines
- Buses and light rail
- Trails and active pathways

Key Considerations:

- The Government of Alberta maintains 31,400 kilometers of provincial highways (approximately 64,000 lane kilometers), of which over 28,000 kilometers are paved roads and almost 2,500 kilometers are four and six-lane divided highways. This network also includes nearly 4,600 bridges and interchanges.
- On average the Government of Alberta paves 800 kilometers of highways each year and rehabilitates or replaces approximately 60 bridges.
- The Government of Alberta also provides capital grants to help municipalities develop and maintain their transportation systems.

Capital investments in transportation networks are not only about keeping pace with Alberta's needs. They can also be powerful catalysts. Made strategically, transportation-related capital can help our province attract investment, spur greater economic activity, and foster more job creation. This includes the development of corridors that enable the efficient flow of products within and beyond Alberta's borders, helping our province reach into more markets, achieve better prices, and generate more wealth for Albertans.

How to best make strategic transportation investments will be influenced by several trends that will impact the way individuals, commodities, and other freight move around.

See [Strategy Three](#) for more about how the Government of Alberta is approaching corridors.

Transportation as a key competitive advantage

> **Impact: Mid- to long-term**
> **Probability: High**

The continuous shift toward a globalized economy is deepening the interconnectedness of markets and making economic diversification all the more important. A recent downturn in Alberta's economy has highlighted the need for better market access and for investments in transportation infrastructure that facilitate economic development.

To maintain our province's competitive edge over the long term, Alberta will need to invest in transportation assets across all vectors, including roads, rail, sea and sky, to enable goods and people to move as quickly and smoothly as possible. The overriding objectives of these investments must be to improve market access, create supply chain efficiencies, and increase harmonization across our economic sectors. Improving road networks can increase road transport productivity, decreasing the cost of transporting goods, and providing better access to world markets.

- ▶ **Did you know?**
*Transportation infrastructure is one of the most important factors that contributes to decisions about where to locate businesses and industries. In 2020, the Government of Alberta released *Selling Alberta to the World: An investment and growth strategy*, which committed to identifying and addressing strategic transportation, infrastructure, talent gaps and industry supply-chain barriers that deter investment.*

Addressing the need for new assets and rising maintenance

> **Impact: Near-term**
> **Probability: High**

Alberta has one of the most extensive highway networks in Canada, with nearly 64,000 lane kms of roads throughout the province. Over time, this network experiences wear and tear, and will continue to require maintenance over the next two decades. Urban areas are likely to see more intensive use of their transportation assets due to growing populations. Rural areas will not escape this challenge, however, particularly in areas with considerable natural resource development and other industrial activity.

The fact that Alberta experiences all four seasons is also a factor. Our transportation infrastructure is exposed to wide swings in temperature and precipitation each year, which can contribute to frost heaves, cracks, and potholes. Episodes of extreme weather and the impacts of natural disasters compound this challenge.

- ▶ **Did you know?**
Highway improvements are critical to ensuring unimpeded commercial and private passenger vehicle movement. Inefficient links in the provincial highway network add significant time and cost to the movement of goods where every hour of added travel time for commercial trucks results in an added cost of \$100 to \$150, depending on the industry.

All of this means that decisions around transportation infrastructure must consider growth-related pressures, cost-effectiveness, life cycle costs, sustainability, and resiliency in order to balance capital demands. While addressing new transportation-related needs, our province must be diligent in maintaining existing assets.

Rising urban transportation demands

- > **Impact: Long-term**
- > **Probability: High**

Alberta's major urban centres will experience increasing transportation demands. This will result in greater commuter congestion and contribute to greater wear and tear on assets such as roads and public transit vehicles. Cities will be challenged to support the efficient and safe movement of people and goods within their boundaries and surrounding metropolitan regions, while also ensuring affordability for taxpayers.

An emerging outcome of transportation demands is rising prevalence of peer-to-peer and platform-based ride sharing. These options can help reduce congestion and wear-and-tear on road networks. Growth of affordable ride-sharing options may result in lower demand for private vehicles in Alberta. Additional specialized services emerging from ride sharing, such as food delivery, are likely to result in urban residents making fewer trips to access goods and services. Through the automation of ride-sharing vehicles, increased vehicle safety, and efficiency may also result in decreased capital costs for expanding infrastructure as traffic volumes are reduced and vehicles move more effectively. This would aid in mitigating the increasing demands and congestion anticipated in urban centers should conventional modes of transportation continue into the future. Increased vehicle safety measures may also create opportunities for sharing roadways with other types of vehicles, such as micro-mobility devices (e.g., e-scooters), to create greater integration across different modes of transportation and better utilization of existing infrastructure.

Streamlined access to public transportation between and within communities will also be important. Residents and businesses will have greater expectations for accessible and integrated transportation systems that allow for seamless transfer between modes and providers. Meeting these expectations will require planners and funders to closely examine ways of enabling multi-modal options that connect public transportation (buses, LRT, rail) with active transportation (biking, walking, etc.). Active transportation will be an ongoing part of discussions on how to support inclusive and accessible transportation options that improve connectivity and streamline multi-modal transit for people. The province may also want to consider innovative solutions such as high speed rail or hyperloop. Success on these fronts could offer users more efficient travel options while reducing road congestion and wear and tear.

Transportation networks within municipal boundaries, such as local roads and transit systems, typically fall within the purview of municipal governments. However, the Government of Alberta provides capital grants to municipalities to support capital investments in these transportation networks. Given the economic importance of municipalities, the province has a shared interest in ensuring urban transportation systems are structured to meet local needs while supporting Alberta's overall competitiveness.

See [Strategy Four](#) for more on municipal partnerships.



Self-driving and remote piloted vehicles

- > **Impact: Long-term**
- > **Probability: High**

The rise of autonomous vehicles stands fundamentally to change approaches to transportation. As advances in AI continue, the reality of self-driving vehicles on Alberta's roads is no longer a far-fetched concept. A study by the Boston Consulting Group predicts that, by the year 2035, an estimated 12 million fully autonomous vehicles and 18 million partially autonomous vehicles will be sold globally each year.

Autonomous vehicles have the potential to meet the needs of rural, underserved, and mobility-challenged populations where ride-sharing is not available. Such vehicles may also provide access to transportation for those who cannot afford conventional public transportation, such as taxis.

In addition to making transportation more accessible, this technology is expected to improve traffic, driver safety, and convenience. Some studies estimate the traffic of 10 private vehicles could be replaced by each autonomous vehicle.

▶ **Did you know?**

Autonomous vehicles are predicted to prevent 90 per cent of traffic collisions. Between 2014 and 2018, there was an average of 140,726 collisions and 315 deaths per year in Alberta. Based on this information, autonomous vehicles could reduce fatalities from one every 1.2 days to one every 12 days.

▶ **Did you know?**

Canada's first automated commercial truck pilot is happening in Alberta. With support from the Government of Alberta and other partners, the test project began in March 2021.

Meanwhile, the use of autonomous and remote-piloted drones will change the types and levels of freight that are moved on highways and roads. International shippers of goods are exploring how to expand their use. Some Alberta firms have already incorporated drones in their businesses, reducing the importance of road access.



These technologies will enable capital investments in transportation to be more targeted and effective in reducing bottlenecks and barriers. Given Alberta's strength in AI assets, autonomous vehicles may also serve as a potential source of new economic activity and job growth.

For example: The Government of Alberta partnered with the federal government, City of Edmonton, academic institutions, and several industry partners to develop Canada's first Connected Vehicle Testbed. The ACTIVE-AURORA testbed features over 70 roadside units, providing real-world test zones in three congested roadway corridors: a rural freeway, an urban expressway, and an urban arterial road within the cities of Edmonton and Calgary. ACTIVE-AURORA has tested new vehicle connected systems, applications, and services, and has analyzed road safety warnings, pedestrian detection alerts, vehicle-to-vehicle safety messaging, and transit signal control. Significantly, the testbed has supported partnerships with industry and the federal government to explore testing in areas such as traffic sign recognition, security management credentialing, and clean technologies. An Industry Research Chair program is also under development, which will support fundamental and applied research.

SECTOR FOUR

In navigating these trends, the Government of Alberta will explore approaches, such as the following:

Prioritizing projects to catalyze economic development

Roads and bridges are key assets that enable economic growth. Placing priority on certain kinds of transportation projects can help attract industrial and commercial developments that attract investment and create jobs. For instance, the development of additional transportation corridors (to complement the existing Oversize Overweight Corridor and Queen Elizabeth II Corridor) would enhance the availability of seamless high-speed links to markets within and outside of Alberta from existing and emerging areas of industrial development. Capital investments could also be made in the expansion of multi-modal hubs that increase the transferability of goods between roads, rail, and air.

For example: The implementation of Alberta's Recovery Plan includes the development of strategies that will focus on developing the province's potential as a logistics hub. The combination of two international airports, two Class I railways, an extensive highway network, and the Trans-Canada-approved aircraft-testing range in Foremost, position Alberta to become a true leader in logistics capacity and innovation. To support this work, the Government of Alberta is undertaking a rail capacity assessment to explore advancing resource corridors and expanding rail capacity. Modern logistics focuses on management of cargo and associated finance and information flows where innovative services, technologies, and concepts are widely developed and applied.

Developing strategic transportation corridors

As a land-locked province, the road, rail, air, and pipeline connections within Alberta and between its neighbouring jurisdictions are essential. Developing key transportation corridors is therefore crucial. Multi-modal corridors face challenges when crossing provincial boundaries, because each province has different processes by which it zones corridors. In concept, a right-of-way that is uniform across jurisdictions and allows for the development of various transportation infrastructure would greatly reduce challenges regarding market access. Strategic engagement of Indigenous communities and of key stakeholders offers one potential pathway for identifying, designating, and championing the development of economic corridors. Partnerships with First Nations and Métis communities will be essential for success.

► *Did you know?*

The University of Calgary Canadian Northern Corridor Program is examining a network of multi-modal rights-of-way across middle and northern Canada to address Canada's unique geographic, political, legal, and economic challenges to trade infrastructure development. Any future corridor work will benefit from considering the findings of this multi-year, multi-disciplinary research study.

See [Strategy Three](#) for more about how the Government of Alberta is approaching corridors.

Supporting tourism development

Transportation infrastructure will play a key role in successfully expanding Alberta's tourism industry. Placing greater focus on areas outside of over-capacitated regions (including the Rockies) will help disperse traffic and expand the range of experiences available to visitors. This will require specific investments aimed at moving people safely and efficiently to tourism areas, including:

- The continued development of air travel;
- Light rail transit within the Edmonton and Calgary regions; and
- The maintenance of roadways that will see increased tourism traffic.

Making use of technology and data

Traditional transportation sectors are increasingly embracing the use of technologies that drive efficiencies and enable logistical adaptability. The Government of Alberta can explore investments in intelligent transport systems, which integrate sensors and other technology into roads, bridges, and vehicles to collect and share real-time information such as road conditions, traffic volumes and delays. This would empower businesses and others with information they can use to save time and costs, while also helping extend the sustainability and longevity of Alberta's transportation infrastructure.

► *Did you know?*

The Alberta Spatial Economic and Transportation (ASET) model is a computer-based simulation of Alberta's provincewide economic land-use and transportation systems and their interactions. Developed through recent collaboration between the Government of Alberta and the urban planning firm HBA Specto, ASET offers an innovative way to optimize investments in transportation. It does this by comparing the projected economic benefits across different projects to ensure Alberta is investing in the right projects at the right time. For example, ASET looks at how a trade corridor improvement can support the efficient movement of goods and services while also providing social benefits such as accessibility for Albertans to commodity and labour markets. The model is able to evaluate potential impacts of environmental factors and disruptive technologies such as autonomous vehicles and intelligent transportation systems.

SECTOR FOUR

Increasingly, information technology (IT) and “big data” are being used in transportation to better understand goods movement, improve supply chain tracking, and address bottlenecks. The Government of Alberta can explore investments in intelligent transport systems, which integrate sensors and other technology into roads, bridges, and vehicles to collect and share real-time information, such as road conditions, traffic volumes, and delays. This would empower businesses and others with information they can use to save time and costs, offering another advantage to investing in Alberta. It would also better inform government decisions about the need for construction and maintenance of provincial transportation assets.

► **Did you know?**

In 2020, 511 Alberta updated its mobile app to show the locations of active snowplow trucks across the province. These locations are then tied to an audible alert notification in the mobile app that notifies drivers that there are active maintenance vehicles in their area – increasing awareness and, hopefully, decreasing incidents involving snowplows.

For example: The province collects data on Alberta’s provincial highways to inform Albertans of current emergency and road conditions through two key mechanisms:

Smart Roadside Inspection System (SRIS): SRIS is an electronic management and enforcement system that automatically identifies high-risk and problematic commercial vehicles from the side of the road without interfering with traffic flow. Using sensors, cameras, and business rule-based screening, SRIS enables enforcement to focus more effectively on commercial vehicles that pose the most risks to transportation safety.

Road Weather Information System (RWIS): Alberta is one of Canada’s leaders in the use of the Road Weather Information System (RWIS). More than 100 RWIS stations have been installed on the provincial highway network and that number continues to grow. These stations house sensors and cameras that track and gather road and weather conditions in real-time reports to generate current conditions and forecasts. The Government of Alberta has also deployed 20 mobile versions of RWIS to record road conditions. Weather and road conditions forecasts are dynamically matched with road treatment plans to recommend snow plowing action and applications for expected conditions. Work is also underway to explore how mobile RWIS could be integrated into 511 Alberta for real-time, enhanced situation awareness of road conditions.

Collaborating on policy and planning

Building robust, efficient, and innovative transportation networks will require collaboration with municipal governments, the federal government, Indigenous communities, and industry stakeholders. For example, the Government of Alberta will need to work with technology and municipal partners to adapt legislative frameworks for the effective and safe use of autonomous vehicles. Collaboration on planning can reduce duplication and develop a shared vision for the evolution of Alberta’s transportation networks, helping to maximize capital budgets and improve affordability for taxpayers. The Government of Alberta will continue to maximize the use of partnerships at a municipal, provincial, and federal level to make investments in strategic transportation corridors.

► **Did you know?**

The Alberta government passed the Strategic Aviation Advisory Council Act in 2020, which enables the establishment of a Strategic Aviation Advisory Council (SAAC). SAAC will make recommendations to government on how aviation-related services and activities can support economic growth in Alberta.

Developing transportation in affordable ways

One challenge of transportation infrastructure investments is their high costs. This can make it difficult to pursue multiple projects within the Capital Plan while maintaining affordability for taxpayers. A solution is to make use of alternative financing options, such as P3s and cost-sharing agreements. The Government of Alberta’s Public-Private Partnership Framework and Guideline will help expand the range of P3 options available for transportation projects. The government is also exploring cost-sharing opportunities for projects, such as the Highway 40 Twinning Project south of Grande Prairie, where a cost-sharing agreement is already in place with a municipality. The government is also committed to pursuing funding and financing from federal sources including the Investing in Canada Infrastructure Program and Canada Infrastructure Bank.

See [Strategy Four](#) for more on federal partnerships.

► **Did you know?**

The Canada Infrastructure Bank (CIB) is a federal Crown corporation that provides financial support to revenue-generating infrastructure projects through public-private partnerships (P3).

SECTOR FOUR

User pay options offer another means of alternatively financing transportation projects. The *Financing Alberta's Strategic Transportation (FAST) Act* will enable the Government of Alberta to finance new infrastructure through user fees, making it possible to construct roads and bridges that might not otherwise be built. The FAST Act enables user fees only if there is a toll-free alternative route available, or if stakeholder engagement supports proceeding without a non-toll alternative route. The FAST Act also requires engagement with Albertans before a project is built using user fees. This new legislative tool will enhance our province's ability to accelerate strategic transportation projects, helping encourage investment, economic growth, and job creation.

For example: One of the first projects to be constructed under the FAST Act will be a new Highway 697 bridge over the Peace River to replace the aging La Crete Ferry. Advocated by the Mackenzie County and La Crete Chamber of Commerce, the new bridge will provide a permanent all-season crossing that reduces wait times and increases the productivity of local agricultural, forestry, and trucking industries. A Memorandum of Understanding (MOU) has been reached with the Canada Infrastructure Bank for cost-sharing on pre-engineering work and analysis of viability for private investment.



► **Did you know?**

To maintain the integrity of our transportation throughout its intended lifespan, Alberta will need to explore opportunities to improve resiliency. For future transportation projects, government will consider:

- *Strategic land-use planning that considers high-risk areas for floods and wildfire;*
- *Building egress routes to ensure access to emergency services for all Albertans;*
- *Using innovative materials, such as self-healing asphalt, to reduce maintenance costs and extend the lifespan of assets;*
- *Partnering with industry to leverage technology that improves the quality and effectiveness of our infrastructure.*

Improving accessibility

Transportation options need to be diverse and accessible to accommodate all Albertans. Public transportation systems including transit buses, light rail transit, Disabled Adult Transportation, school buses, and transportation-for-hire all help ensure accessibility for Albertans. Before constructing new infrastructure, it is important to undertake an assessment of how diverse groups of people experience transportation infrastructure. While public transportation is only one component of a transportation system, it benefits the mobility and sustainability of local communities. The Government of Alberta will continue to work with municipalities to expand the range of multi-modal options available to accommodate individuals with diverse needs, particularly in urban areas that will experience significant population growth.

For example: Tools such as smartfare systems, digital mapping and real-time trip planners play a role in making public transportation more accessible and easier to use. Calgary Transit launched the My Fare mobile ticketing app in July 2020. My Fare allows transit users to purchase regular monthly and day passes, airport boarding passes, and single ride tickets directly from a mobile device. The City of Edmonton started working on an account-based electronic fare payment system, with pilot testing starting in summer 2021.

The province also has the opportunity to leverage enhanced data collection and analysis to support greater decision making and ensure that transportation services meet the diverse needs of the population. For example, city planners can use data to ensure that residents of lower-income neighborhoods have accessible transportation options.



► **Did you know?**

The Valley Line West LRT and Green Line LRT projects will increase urban connectivity by improving transit accessibility in Edmonton and Calgary. Both projects will help to support Alberta's economic recovery and create jobs. Key funding partners are the Government of Alberta, Government of Canada, City of Calgary, and City of Edmonton.

Ensuring transportation options in rural, remote, and northern communities

Geography is a big factor that affects mobility, particularly in rural, remote, and northern regions of the province. In some instances, highways are the only route in and out of a community, with alternate detours hundreds of kilometres away. This causes bottlenecks that halt economic activity and can be detrimental in situations of emergency evacuations.

► **Did you know?**

During the Fort McMurray wildfires in Spring 2016, upwards of 88,000 people were forced to evacuate their homes. Tens of thousands of people fled the community at once, becoming trapped on Highway 63, the sole highway out of Fort McMurray.

The Government of Alberta will continue to identify and prioritize opportunities to strengthen connections between communities. This will require defining, designing, and developing accessible solutions. This includes investing in egress routes from remote communities, as well as networks that maintain supply chains during environmental events and emergencies. The province will also continue to work with municipal and other partners to integrate environmental protection with transportation infrastructure, land-use planning, and community needs.

Addressing transportation gaps in Indigenous communities

Given the remoteness by which most Indigenous communities are characterized, they can be particularly dependent on road connections to access goods and services. Secondary access and escape routes are important for emergency services and supplies. Many roads in Indigenous communities are under-maintained. This is especially true for some communities situated in remote and northern areas. The state of transportation infrastructure within and between these communities creates challenges for residents and serves as a barrier to their economic development. Improving transportation within and around Indigenous communities will remain a priority over the next 20 years, with the Government of Alberta taking steps to:

- Continue to work with Indigenous Services Canada to advocate for funding partnerships and greater spending on high-quality transportation systems for First Nations, rural, and northern communities;
- Collaborate with communities to integrate transportation infrastructure and land-use planning to address community needs;
- Work with Indigenous-owned businesses to increase high-quality transportation options between rural and remote communities and large population centres; and
- Explore opportunities to invest in all-weather aircraft landing sites to improve the availability and quality of air transportation in rural and remote areas.

Through these and other approaches, Alberta will benefit from efficient transportation corridors and networks that attract significant investment, drive economic expansion and job creation, and improve the connectedness of our families and communities.



Sector five Powering the world through energy and mineral leadership

Alberta's vision for the future of energy and mineral infrastructure over the next 20 years.

- > Alberta's vast natural resource wealth plays a central role in its economic performance.
- > Our province sees improved market access for Alberta's energy and mineral products through new, optimized and expanded pipelines, and transportation networks to strengthen both provincial and national economies.
- > Alberta is a hub for energy diversification, such as minerals, geothermal, hydrogen, petrochemicals, renewables, and nuclear.
- > Alberta is a competitive and attractive jurisdiction globally for environmentally and socially responsible minerals exploration and development.
- > Alberta supports emissions reduction efforts and circular pathways that extend energy value chains, while also investing in clean technologies that contribute to Alberta's competitive advantage and reduce spending.
- > Our province collaborates with other orders of government, First Nations and Metis governments, and the private sector to establish a balanced and sustainable approach to managing the effects of resource development.



SECTOR FIVE

Energy is synonymous with Alberta. Since the first oil well was struck decades ago, our province's energy resources have been a driver of tremendous economic growth, innovation, and job creation.

Over time, the nature and scope of their development has evolved to feature a mix of non-renewable resources and a growing suite of renewables that take advantage of Alberta's ample wind, solar, and geothermal resources. This evolution has also produced technologies enabling industry to realize cost efficiencies, improve environmental performance and, in the case of the oil sands, give birth to an entirely new economic sector.

► Examples of capital in this context:

- Refineries
- Petrochemical plants and plastics recycling facilities
- Hydrogen production facilities
- Mineral processing facilities
- Pipelines
- Transmission lines
- Wind turbines
- Solar farms
- Carbon capture, utilization, and storage infrastructure

The Government of Alberta manages our province's oil, natural gas, oil sands, and other mineral resources on behalf of Albertans. However, government generally does not own the infrastructure used to extract, process, and transport resources; these assets are owned privately.



Consequently, government's ability to influence the sector's evolution is largely limited to policy, regulatory, and financial levers. This includes public capital investments, which can be strategically deployed to encourage desirable shifts by companies in order to foster the long-term growth and success of our province's energy and mineral industries.

For example: Through the annual Capital Plan, the Government of Alberta makes investments in building and maintaining the provincially owned highway network. This vast network enables energy and mineral explorers and producers to access Alberta's resources and to move the labour, goods, and equipment that are needed to explore for, develop, and process those resources.

Due to its size and scale of development, Alberta's energy industry does not influence global energy markets. Rather, our province is continually challenged to determine the role it can play in global markets and the actions required to do so. Over the past decade, a renaissance in U.S. energy production, new trends in investment, and evolving public and political attitudes have contributed to a more challenging landscape for Alberta's energy sector.

Despite this our province has a kaleidoscope of advantages – including a competitive resource base, a stable democracy, an educated population, and a demonstrated history of entrepreneurship – that suggest our energy and mineral industries have far more to contribute to the story of Alberta.

By finding ways to make these trends and advantages work for our province, we can ensure Alberta's energy and mineral sectors remain powerhouses of job creation, economic growth, and innovation.

Key Considerations:

- The energy sector is the single largest source of private sector employment in Alberta.
- In 2018, Alberta produced 81 per cent of Canada's crude oil.
- Approximately two-thirds of Canada's natural gas production comes from Alberta, helping position Canada as the world's fifth-largest supplier of natural gas.
- Alberta is Canada's largest petrochemical cluster.

Shift to a lower-carbon future

> **Impact: Near-term**

> **Probability: High**

International debates around energy development are expected to continue. Capital market investors are increasingly signing onto the UN-backed Principles for Responsible Investment; in 2018, this covered an estimated \$81.7 trillion in assets under management. There is also growing investor interest in Environmental, Social and Governance (ESG) initiatives, which sees investors looking at factors such as environmental sustainability, social impacts, and corporate and legal frameworks when deciding where to invest. Consumers, meanwhile, are signaling interest in greener products, particularly amongst younger generations. While global energy demand will continue to rise, the overall picture is one in which the globe is gradually shifting toward a lower-carbon future¹².

▶ **Did you know?**

The Government of Alberta has made a commitment to ESG as a lens through which to examine investments. ESG allows both public and private decision-makers to consider non-financial aspects of prospective projects, and determines the immediate, short and long-term effects of their potential investments. The creation of the ESG Secretariat in 2021 signalled the government's dedication to ensuring the long-term sustainability and resilience of publicly-funded infrastructure projects.

Competing in a lower-carbon future means that Alberta must adopt aggressive actions on emissions through innovation, technology development, and adaptation over the longer term. It will require our province to introduce more circular production pathways, in which waste products are turned into feedstocks for new production, such as the plastics circular economy.

Encouragingly, our province has capital assets and opportunities that can be leveraged to do this – including the potential to supply many mineral products that the world will need to successfully transition to a lower-carbon future.

▶ **Did you know?**

The average GHG emissions intensity of an oil sands barrel declined by 22 per cent during the past decade, and leading producers are on track for further reductions of 16-23 per cent over the coming decade. Several projects already boast below-average carbon footprints and many companies have made net-zero commitments and emissions reductions targets. The aggressive actions on emissions are being driven by innovation, technology development, and adaptation in Alberta's energy sector with support from various government agencies.

▶ **Did you know?**

The Government of Alberta has committed \$1.24 billion to two commercial-scale carbon capture projects in the oil sands and fertilizer sectors: the Quest Project and the Alberta Carbon Trunk Line. These projects reduce the carbon dioxide (CO₂) emissions from the oil sands and fertilizer sectors and reduce GHG emissions by 2.76 million tonnes each year. Quest captures over one million tonnes of CO₂ per year and was the first application in the world of carbon capture and storage (CCS) technology at an oil sands upgrader. The Government of Alberta has committed \$745 million over 15 years for this project. The Alberta Carbon Trunk Line system captures industrial emissions from the North West Redwater Partnership Sturgeon Refinery and Nutrien's Redwater Fertilizer Facility, and transports the CO₂ to mature oil and gas reservoirs in central Alberta, for use in enhanced oil recovery. The system is capable of transporting up to 14.6 million tonnes of CO₂ per year. The Government of Alberta has committed \$495 million over 15 years for this CO₂ infrastructure project.

▶ **Did you know?**

Alberta has the potential to produce and process minerals that are highly needed to support the global energy transition such as lithium, rare earth elements, and vanadium. Many of the minerals Alberta can produce are vital for supporting renewable energy and other green technologies.

¹² "World Energy Outlook 2020," IEA, October 2020, <https://www.iea.org/reports/world-energy-outlook-2020>.

Rising global energy demand

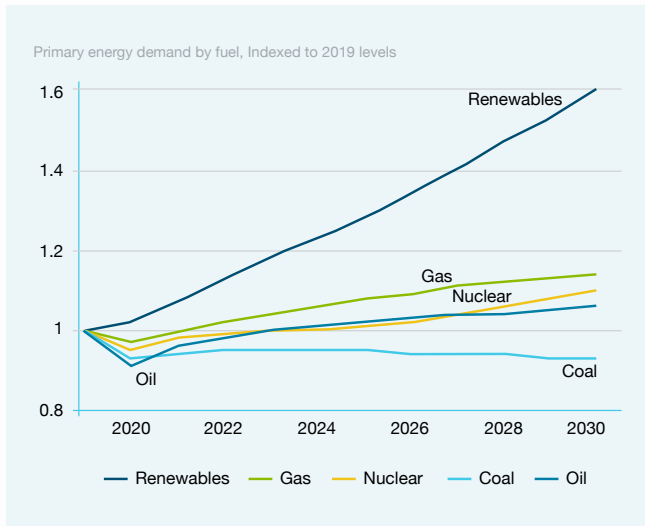
> Impact: Mid- to long-term
 > Probability: High

Global energy demand is expected to increase over the next 20 years.

Against the backdrop of this overall trend, there are likely to be volatile shifts in energy supply and demand from time to time. For example, COVID-19 had sudden and dramatic impacts on global energy use in 2020, leading to sharply lower demands for energy commodities. In the same year, a sudden oil price war between Saudi Arabia and Russia unleashed massive oil supplies onto global markets and sent oil prices plummeting.

Despite such events the global energy appetite will be strong for some time to come. As a stable and secure producer with substantial resources, Alberta can help meet worldwide energy demands. Through strategic use of public capital investments, the Government of Alberta can encourage private investments in energy infrastructure that help Alberta fulfill this role.

Key FUEL trends in the stated policies scenario 2019-2030¹³



Electricity grid modernization

> Impact: Mid- to long-term
 > Probability: High

Several factors driving the shift to a lower-carbon future are also forcing jurisdictions to modernize their electricity grids. For instance, growing consumer interest in green power and electric vehicles will impact how electricity grids need to meet power demands. Grid users are also increasingly inquiring about or investing in renewable micro-generation technologies, such as solar panels, with expectations they will be able to “sell” excess generation to the grid.

At the same time, renewable energy projects will increasingly be coming online, and our province will have an interest in attracting more investment in these types of projects. This will have consequences for how businesses and individuals interact with Alberta’s electricity grid and will require the grid to be technologically capable of meeting changing needs while remaining cost effective, reliable, and stable.



¹³ “World Energy Outlook 2020,” IEA, October 2020, <https://www.iea.org/reports/world-energy-outlook-2020>.

SECTOR FIVE

In navigating these trends, the Government of Alberta will explore approaches such as the following:

Pushing for better emissions performance

The push for emissions reductions remains a central hallmark in the lower-carbon shift. From a policy standpoint, Alberta can build upon its past leadership and position itself as a global sustainable energy leader. Alberta was the first jurisdiction in North America to legislate mandatory greenhouse gas reductions in 2003, and the first in North America to put a price on carbon in 2007. On January 1, 2020, the Technology Innovation and Emission Reduction (TIER) program came into effect as the newest iteration of Alberta's emissions reduction approach. The Government of Alberta is now pricing greenhouse gas emissions from large industrial emitters at \$40 per tonne and has committed to use the first \$100 million in revenues, and 50 per cent of the balance of revenues, for emission reduction projects.

► **Did you know?**

Government investments of TIER funding through Emissions Reduction Alberta include \$3 million for Carbon Corp's carbon nanotube technology (CNT), which is the strongest material known to humans. Carbon Corp's CNT process has the potential to produce cheaper, more sustainable, higher-quality carbon nanotubes made of recycled carbon dioxide. The company's project aims to reduce the amount of cement in concrete, making it lighter, stronger, and less emissions intensive. This technology is being tested at the Alberta Carbon Conversion Technology Centre in Calgary.

With geological formations ideal for the sequestration of carbon, Alberta can extend its current leadership in carbon capture and storage. The Government of Alberta can help stimulate capital investments to connect more carbon dioxide sources with more carbon utilization activities and subsurface storage locations. This would help realize emissions reductions for some of our province's most important industry sectors (e.g., clean hydrogen, petrochemicals, agriculture, forestry, oil, and gas) and also attract investment in emerging sectors such as hydrogen production.

► **Did you know?**

Alberta's energy-only electricity market design, best-in-Canada wind and solar resources, large geothermal potential, and open-access electricity transmission policy are all advantages that can attract investment in non-traditional, greener, and renewable energy technologies.

Implementing the natural gas vision and strategy

For more than a century, natural gas has been the cornerstone of Alberta's energy economy, playing a central role in oil sands production, electricity generation, and petrochemical production. As a cleaner energy carrier, natural gas will be an important transition fuel as the world shifts toward a lower-carbon future. This can translate into opportunities for our province to obtain greater value from natural gas. Growing global markets for liquefied natural gas (LNG), a plastics circular economy, and clean hydrogen can all be supplied by Alberta natural gas. The Government of Alberta's Natural Gas Vision and Strategy is aimed at realizing these opportunities. Where practical, public capital investments can be made to support the strategy's implementation.

► **Did you know?**

Canada is a top 10 hydrogen producer globally, with the majority of Canadian production coming from Alberta. The only by-product of hydrogen as an energy source is water, and the Hydrogen Council expects global hydrogen demand to increase tenfold by 2050. Hydrogen is one of the five key growth areas identified in Alberta's Natural Gas Vision and Strategy. Alberta is well positioned to grow its hydrogen sector to support domestic and international greenhouse gas emissions reductions and improve air quality.

► **Did you know?**

Helium is a gas that, like natural gas, is found in underground geological formations, and is regulated under natural gas legislation. Not just for party balloons, helium is used in technological applications such as rocket engines and MRI machines. Global demand for helium is increasing and supplies can be hard to locate. With significant helium resource potential in the southeast, our province can capitalize on this opportunity. To encourage helium exploration and development the Government of Alberta has established a stable, competitive royalty rate on helium for five years, after which time the rate will be reviewed. This policy certainty will help attract investment and expand helium production in Alberta over the next two decades.

SECTOR FIVE

Expanding role in petrochemicals and plastics

Alberta is one of Canada's largest petrochemical clusters. Most of our province's petrochemical sector is based on the conversion of ethane into several different products. Our province's abundant natural gas feedstocks present opportunities to further grow the sector, helping to meet anticipated increases in worldwide petrochemical use.

Attracting investment to the sector will expand value chains, helping create a greater range of opportunities. Typically, the products of one petrochemical facility serve as feedstocks for others, and so on. Expanding value chains helps propel the growth of a petrochemical cluster, leading to more investment and job growth.

For example: Launched in October 2020, the Alberta Petrochemicals Incentive Program (APIP) provides direct grants to companies building new petrochemical facilities or expanding existing ones in Alberta's petrochemical sector. APIP is open to almost all types of petrochemical manufacturing plants such as petrochemicals, fertilizer, hydrogen, and fuel plants.

► **Did you know?**

About 95 per cent of plastic packaging worldwide, valued up to \$10 billion, is disposed of after a single use, meaning there is a significant opportunity to recapture that value. Alberta is well-positioned to repurpose waste into new products thanks to our petrochemical manufacturing industry, lower transportation costs, and the development of enhanced recycling technologies within the province. The government has already initiated work on developing a plastics circular economy in the province by being a member of the Plastics Alliance of Alberta. Our province will establish itself as the Western North America centre of excellence for plastics recycling by 2030.

► **Did you know?**

The Alberta Industrial Heartland Association estimates that the province's petrochemical sector has the potential to grow by more than \$30 billion by 2030, resulting in more than 90,000 direct and indirect jobs and more than \$10 billion in revenue for the Government of Alberta from corporate and personal income taxes. With one of the most established petrochemical manufacturing centres in Canada, there is capacity for expansion in Alberta's Industrial Heartland, Grande Prairie, Joffre, and Medicine Hat.

Acting on energy infrastructure

The successful extraction, production, and transportation of Alberta's energy products requires safe, capable, and sufficient infrastructure. Our energy industry will continue to require takeaway capacity for our oil, natural gas, and petrochemical products to reach international markets. As the owners of Alberta's energy resources, Albertans have direct interests in the expansion of this takeaway capacity. Right now, delays in pipeline approvals and legal challenges remain key constraints.

Strategic corridors have the potential to be key nation-building projects that enable the efficient flow of goods and people, spurring economic growth, creating jobs, and stimulating the economy. The first step identified for pan-Canadian economic corridors is a fuller analysis of strategic and regional infrastructure priorities to determine which economic corridors offer the most benefit to Alberta and Canada. Given there is currently no legislative, regulatory, or governance frameworks to support the approval and operation of cross-border economic corridors, any work on these types of corridors needs to be future-looking and consider emerging resources as well as infrastructure needs. Given the complexity of establishing, developing, and managing corridors, along with the expected costs and timeframe associated with this type of infrastructure, it makes sense for Alberta to focus on the development of regional corridors in the near term.

Focusing on liability management

The management and clean-up of inactive and orphaned energy infrastructure remains a key issue that could have implications for Alberta's environmental, social, and governance (ESG) reputation and investment. These liabilities are the result of decades of oil and gas development which has provided billions of dollars of revenue to the province, the country, and hardworking Albertans. This is an issue all energy-producing jurisdictions are facing. While industry is accountable for cleaning up and reclaiming their well sites, the government can play an important role in helping fuel these efforts.

For example, through a \$100 million loan to the industry-funded Orphan Well Association, the Government of Alberta helped accelerate the clean-up of decommissioned oil and gas wells. In addition to the environmental benefits, this will generate economic benefits by creating an additional 500 direct and indirect jobs, including opportunities for laid-off or under-employed oilfield service workers. In addition, legislative changes in 2020 also strengthened orphan site management, including enabling the Orphan Well Association to better manage and accelerate the clean-up of orphan sites.

SECTOR FIVE

In July 2020, the Government of Alberta announced a new Liability Management Framework which includes both short- and long-term initiatives to address the management of oil and gas site closure liabilities. The framework's actions are taking a holistic view to manage site closure obligations throughout the project life cycle – from exploration to decommissioning and closure – helping provide certainty and ensuring that industry will be able to bear the costs of site closure obligations. During its multi-stage implementation, the new framework will begin to shrink the inventory of inactive and orphaned wells across the province, accelerating the timely restoration of land. Many of the framework's actions are already being implemented. Going forward, the Government of Alberta is committed to continuing to improve the liability management system for upstream oil and gas. These and other actions, including the leveraging of federal funding, will be important for maintaining momentum and helping to burnish Alberta's reputation as a responsible energy producer.

For example: The Site Rehabilitation Program, launched in May 2020, provides grant funding to oil field service companies to perform closure and reclamation work on wells, pipelines, and oil and gas sites in Alberta. With up to \$1 billion in funding available for eligible projects, the program is designed to accelerate site abandonment and reclamation efforts while quickly putting skilled Albertans back to work. It is expected to generate almost 5,300 direct and indirect jobs across the province, helping to stimulate further economic activity in many communities. In August 2021, Alberta announced two new rounds of the Site Rehabilitation Program, making the entire \$1 billion provided for the program available for closure work across the province. Alberta provided \$100 million of this funding to clean up inactive oil and gas sites specifically in Indigenous communities in Alberta.

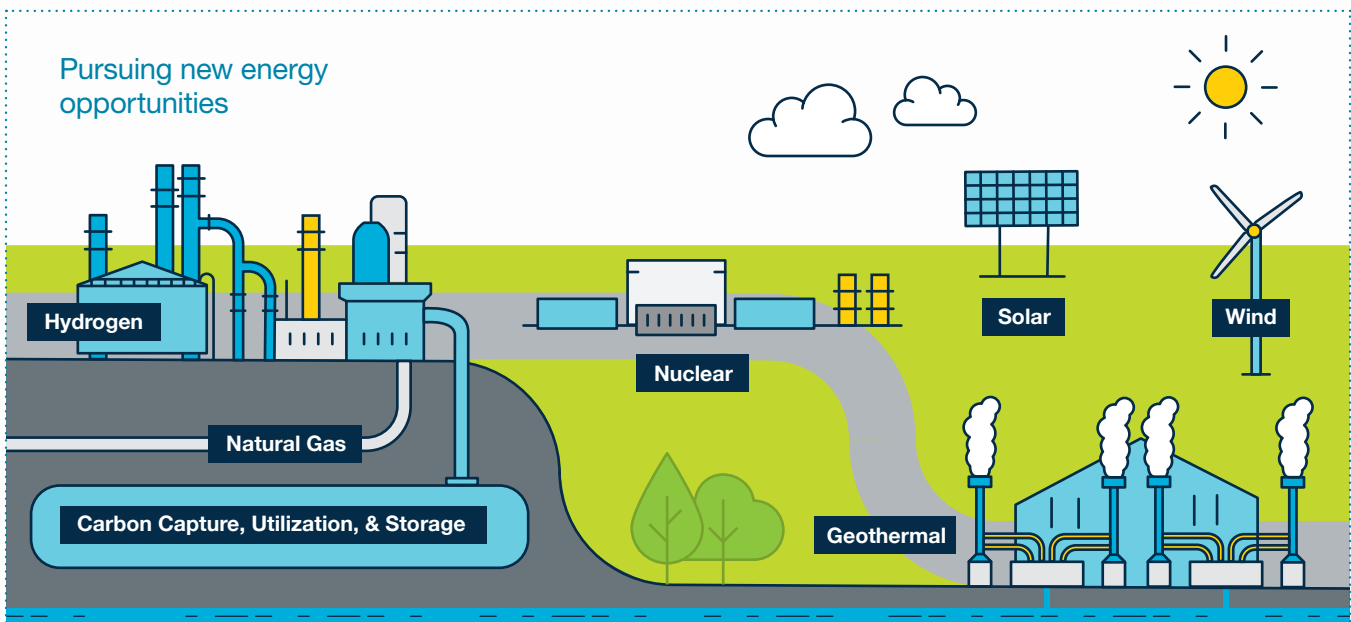
Pursuing new energy opportunities

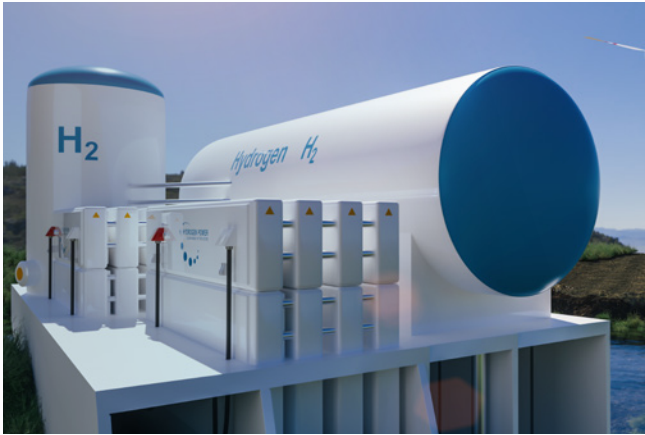
Helping meet the world's energy needs can involve our province moving more fully into new energy opportunities. Through policy and the strategic use of public capital investments, the Government of Alberta, can encourage development in several areas:

Hydrogen

The Hydrogen Council, a global advisory council of corporate executives, anticipates that worldwide hydrogen demand could increase tenfold through 2050, from approximately 56 million tonnes in 2015 to almost 560 million tonnes in 2050, due to an increase in uses. The council also estimates the global hydrogen sector could generate U.S. \$2.5 trillion per year and create 30 million jobs. Since hydrogen can be generated through the use of natural gas, Alberta is well positioned to take advantage of a growing hydrogen industry. Alberta is also noteworthy in that it is already home to some of the world's largest carbon capture and storage projects, which are directly linked to the production of hydrogen for oil sands upgrading and refining. Hydrogen as a fuel source produces only water with no carbon emissions, and has the potential to become a major part of meeting global carbon reduction targets.

By developing and commercializing hydrogen technology in our province, the Government of Alberta can help advance hydrogen as a part of Alberta's integrated energy system, support improved environmental outcomes, and spur the attraction of investment and creation of jobs and economic activity.





As part of the Natural Gas Vision and Strategy, Alberta introduced a provincial [Hydrogen Roadmap](#) to support deployment of clean hydrogen into Alberta, and exports of clean hydrogen across Canada, North America, and globally. This will leverage Alberta's potential to be one of the lowest-cost hydrogen producers on the planet and will support continued and growing employment of highly skilled energy workers, create jobs, and support innovation.

Nuclear energy

In April 2021, Alberta entered into a memorandum of understanding with Ontario, Saskatchewan, and New Brunswick to support the development of versatile and scalable small modular reactors (SMRs). SMRs are smaller than traditional nuclear reactors and scalable to suit local needs with lower upfront capital costs and enhanced safety features. They can be small enough to be built in a factory and shipped by truck, rail, or cargo ship. A typical SMR would generate between two and 300 megawatts of electricity, which could provide power for a village or small city. In comparison, a conventional nuclear reactor can generate 600 to 1,000 megawatts, which can provide power for a large city. SMRs could supply non-emitting, low-cost energy for on-grid and off-grid communities in Alberta, including remote and rural areas of the province, as well as industries with a significant need for steam, such as Alberta's oil sands. Alberta's rich uranium deposits, respected innovation and research sector, and technically skilled and educated workforce could make our province an attractive destination to develop and deploy SMRs.

► *Did you know?*

Canada is the second largest uranium producer in the world, with about 15 per cent of total world production. The Athabasca Basin, which straddles the northern Alberta-Saskatchewan border, contains some of the greatest uranium resources in the world.

Geothermal energy

Geothermal energy can be used for heating and cooling, as well as generating clean electricity. Research from the University of Alberta has identified the potential to develop this resource on a commercial scale with more than 6,100 megawatts of thermal power capacity potential, and more than 1,150 megawatts of technically recoverable electrical power capacity potential across several municipal districts in western Alberta. The extraction of geothermal energy could make use of our province's extensive oil and gas expertise, well established service sector, and existing energy wells, facilitating investment and helping to create jobs while limiting additional land impacts¹⁴. The Government of Alberta is putting a geothermal policy and regulatory framework in place to encourage responsible geothermal development.

► *Did you know?*

Near Rocky Mountain House in central Alberta, Canadian Eavor Technologies Inc. has developed an innovative "made in Alberta" geothermal energy solution. The solution uses existing Alberta oil and gas drilling technology and expertise to harness the Earth's natural heat underground for use in heating and electricity production.

► *Did you know?*

Investments in renewables are forecast to increase and projects are set to begin or resume construction this year – including Greengate's \$500 million Solar Power Project and BHE Canada's \$200 million Rattlesnake Ridge Wind project in Southern Alberta.

¹⁴ "Geothermal Potential" Energy Futures Lab, 2021, <https://energyfutureslab.com/initiatives/geothermal-potential/>.

SECTOR FIVE

Supporting Indigenous engagement and participation

Recognizing that many energy and mineral developments take place on lands covered by a treaty, the engagement of Indigenous communities is a key aspect in the growth of Alberta's energy and mineral sectors. Many Indigenous communities are increasingly interested in exploring partnerships on energy resource development. To help encourage such partnerships, the Government of Alberta has established the Alberta Indigenous Opportunities Corporation (AIOC), which will provide Indigenous communities with access to capital and technical support to invest in natural resource projects and related infrastructure.

► **Did you know?**

Alberta PowerLine undertook extensive consultation with more than 20 Indigenous communities through significant contracts totaling \$85 million, and engaged them as active participants in the Fort McMurray West Transmission Line, which will provide an opportunity for jobs, skills training, and local economic development. Centuries-old culture, histories, and local knowledge helped shape the route taken for the line, and the company's Caribou Protection Program, which has set a new standard for construction.

For example: Suncor announced the signing of two participation agreements for the purchase of equity interests in Suncor's East Tank Farm Development (ETF-D). The agreements with the Fort McKay First Nation and Mikisew Cree First Nation are for the purchase of a 34.3 per cent and 14.7 per cent equity interest in the ETF-D respectively, for a combined equity interest of 49 per cent.

Focusing on electricity modernization

Efforts to modernize Alberta's electricity transmission grids will require collaboration amongst the Government of Alberta, industry stakeholders, the Alberta Electric System Operator, the Alberta Utilities Commission, and the research community. Key efforts will include the development of distribution and transmission-connected energy storage so that the grid can make the best use of intermittent generation sources such as wind and solar. The Government of Alberta can help support these efforts through enabling policy direction and capital supports for research¹⁵.

The Government of Alberta is working with the Alberta Utilities Commission, the Alberta Electric System Operator (AESO), and industry stakeholders to better understand policy, tariff, and regulatory changes to support electricity modernization such as the development of Smart Grids. Continuing this trajectory and encouraging private sector innovations and investments will be key for ensuring Alberta's electricity grid is well positioned for a more complex supply-demand landscape.

For example: Among approved renewable energy projects are the 400 MW Travers Solar project in Vulcan County and Suncor's 400 MW Fort Mile Wind Project. Once completed these will be the largest solar and wind installations in Canada.

Prioritizing mineral development

Alberta's energy sector can be leveraged to help foster the further development of Alberta's minerals sector. Critical and strategic minerals offer particular opportunities as they are essential to the economy and can experience disruptions in supply. Demand for many of these minerals (such as lithium, cobalt, helium, rare-earth elements, titanium, uranium, vanadium, and zirconium) has skyrocketed in recent years. Industry and research institutions have shown growing interest in exploring opportunities to produce minerals in various ways. These include exploring mineral extraction and value-add opportunities along the mineral value chains such as extracting lithium from brines, extracting vanadium from bitumen, and extracting titanium, rare earth elements, and other minerals from oil sands tailings.

To drive efforts to explore these opportunities, the Government of Alberta is developing a new Minerals Strategy for the province. The strategy will set out concrete actions to establish Alberta as an attractive destination for investment in mineral exploration and development.

These and other approaches will lie at the heart of Alberta's drive to be an innovative, competitive, and responsible producer of energy and mineral products for a growing world. In the course of doing so, Alberta's communities will realize significant economic expansion and job creation, as our province is increasingly regarded as a prime destination for energy and mineral investment, and as a preferred source for energy solutions.

¹⁵ "Energy Storage Roadmap," AESO, August 2019, <https://www.aeso.ca/assets/Uploads/Energy-Storage-Roadmap-Report.pdf>



Sector six Expanding opportunities in agriculture and forestry

Alberta's vision for the future of agriculture and forestry infrastructure over the next 20 years.

- > Alberta has strong value-added processing capacity, productive sustainable primary industries, and secure access to domestic and international markets, that responds to changing consumer demands for food and wood.
- > Our province is a leader in innovative alternatives to traditional farming that contribute to greater sustainability and resiliency outcomes and mitigate environmental impacts.
- > The agriculture and forestry sectors are productive and efficient with sophisticated tools and technologies that are calibrated to drive investment decisions.
- > Irrigation infrastructure optimizes economic development and supports effective water management.



SECTOR SIX



Agriculture and forestry are as much a part of Alberta's story as energy. In addition to being key drivers of economic activity, they are woven into the cultural fabric of our province, having given rise to countless communities.

Agriculture and forestry serve as bright lights for our future economy. As they increasingly adopt technologies and cutting-edge practices, these industries are poised to unleash huge benefits in terms of economic activity, innovation, and job creation. To do so they will need greater investment to expand value-added industry, diversify primary production, and increase access to existing and new markets.

Most capital assets in the agriculture and forestry industries are privately owned, yet the Government of Alberta plays roles that can impact both industries' success.

Government can also make public capital investments that influence the choices made by private participants in agriculture and forestry, thereby shaping the overall evolution of these industries.

► Examples of capital in this context:

- Food processing plants
- Barns and structures
- Harvesting equipment
- Irrigation infrastructure
- Laboratories

Key Considerations:

- Alberta's agriculture and agri-food sector includes crops and livestock, horticulture, bio-industries, food production, and food and beverage processing.
- Food processing was the largest manufacturing employer in Alberta in 2020, employing 24,400 people and accounting for \$15.5 billion in manufacturing sales.
- Alberta's irrigation sector creates about 56,000 full-time jobs and contributes about \$2.4 billion in labour income annually. The irrigation sector also adds \$3.6 billion in annual GDP to Alberta's economy every year.

See [Strategy Four](#) in the Federal Government for more about how the Government of Alberta is approaching irrigation.

Increased global demand for food and wood products

> **Impact: Mid- to long-term**
> **Probability: High**

A growing world will mean rising demand for food and wood resources. International bodies indicate that food security is a growing concern, especially in light of greater international volatility and incidents of severe weather. This will be compounded by an expanding global population; it is estimated that by 2050 there will be another two billion people to feed. At the same time, developing countries are eager to expand the size and welfare of their middle classes, translating into increasing demands for meat and dairy products.

▶ **Did you know?**

The state-of-the-art Food Processing Development Centre (FPDC) and Agri-value Processing Business Incubator (APBI) in Leduc supports start-up companies to develop new products, test markets, and establish their own businesses. These facilities have helped the formation and expansion of 10 new companies that have generated an estimated \$60 million in investment and created more than 500 direct and indirect jobs. With the recent facility expansion, both the FPDC and APBI will continue to attract new start-up companies to enter the value-added sector in Alberta.

Worldwide demand for wood products will similarly be on the rise, helped along by expanding economies. According to the Food and Agriculture Organization of the United Nations, record volumes of wood-based products were produced and traded around the world in 2018.

The growing demand for bio-energy derived from agriculture and forest products will also offer new opportunities for the agriculture and forestry sectors.

Over the next two decades, Alberta can play a major role in helping meet growing global demands for food and wood products. In fact, our province may find itself in an elite group of jurisdictions with the enviable combination of significant land and timber resources, a functioning democracy, and an open economy. This stands to position Alberta as one of the world's most important secure suppliers of agricultural and forestry products. Successfully realizing such opportunities will require these industries to be as productive as possible. Strategic public capital investments can help achieve this.

Shift toward more sustainable and alternative practices

> **Impact: Mid- to long-term**
> **Probability: High**

The global trend toward greater sustainability is influencing the evolution of agriculture and forestry. Alberta supports environmentally sustainable agriculture practices such as manure management, no-till farming, wildlife habitat conservation, grazing, improving carbon sequestration, and ongoing efficiencies in energy, to ensure that farming techniques are economically viable and socially and environmentally responsible. There will be a need for Alberta producers to continue adopting best stewardship practices in the production of food and wood products.

In addition to the environmental benefits, sustainability has economic advantages. Competitive producers have a vested interest in maintaining the long-term health and security of Alberta's arable lands and forests. The use of sustainable and alternative practices also presents an important value proposition about the quality and ethics behind Alberta-made goods. The strategic use of public capital investments may help facilitate the uptake of sustainable and alternative practices.

Climate change will significantly impact forestry. Increased wildfire, drought, insect, and disease are already having an impact on the availability of lumber in Alberta. Mitigation measures may include investing in forest climate adaptation technology, tree breeding programs to support drought-tolerant and alternative (non-native) tree species, and infrastructure to support a more robust wildfire response. Climate change will also impact the agriculture sector as wildfire, drought, insects, and disease also have significant impacts on our crop and livestock industries.

Adoption of technologies

> **Impact: Near, mid, and long-term**
 > **Probability: High**

Increasingly, agriculture and forestry producers are integrating technologies to improve their productivity, lower input costs, and reduce environmental impacts. Precision agriculture, for instance, involves harnessing GPS, drones, data, AI, and other technologies to optimize crop and livestock production and enhance sustainability by minimizing water, fertilizer, energy, and chemical use.

Given Alberta’s strength in AI research and an increasing number of home-grown tech firms, there are incredible opportunities for agriculture and forestry firms to incorporate technologies. Public capital investments can be targeted to facilitate this, leading to major benefits in terms of economic activity, job creation, and innovation.

In navigating these trends, the Government of Alberta will explore approaches such as the following:

Supporting expansion and development

Alberta has the raw materials and workforce to attract value-added businesses in agriculture and forestry, such as food processing and wood product manufacturers. The value of Alberta’s value added agricultural exports recently surpassed primary agricultural exports and have shown steady growth year after year, reaching \$6.7 billion in 2020 (compared to \$4.8 billion in 2015). As increasing numbers of the world’s population join middle-income classes and settle in towns and major cities, the demand for processed and packaged food products will continue to rise – an opportunity for which Alberta must be prepared.

Smart agriculture



Precision agriculture opportunities

Involves harnessing GPS, drones, data, artificial intelligence (AI), and other technologies to optimize crop and livestock production and enhance sustainability by optimizing water, fertilizer, energy, and chemical use.



Smart sensors

- Weather conditions
- Soil quality
- Growth progress
- Livestock health



Automation

- Agriculture robots
- Automated vehicles
- Drones and machinery
- Automated irrigation



Artificial intelligence

- Geospatial imaging
- Monitoring
- Data collection and analysis



The Government of Alberta will support the growth and development of value-added products for local and global markets by continuing to invest in specialized facilities and funding programs that support the development of new products. Through efforts in line with Alberta’s Agri-food Sector Investment and Growth Strategy, the government will also work to attract private investment in value-added processing opportunities. It can also assist small and medium-sized agribusinesses in accessing capital to expand their operations, helping to expand production capacity and create new jobs in Alberta’s agriculture and forestry industries.

For example: Alberta’s Agri-food Sector Investment and Growth Strategy identifies eight areas in the agri-food sector that hold great potential for growth. The Government of Alberta is working to improve Alberta’s investment environment and help investors to overcome challenges and barriers. The strategy sets a target of attracting \$1.4 billion of investment into Alberta and creating 2,000 jobs in the areas of: canola crushing, pork processing, plant protein fractionation, greenhouses, malt, agri-technology, emerging sectors such as industrial hemp and cannabis, and food and beverage processing.

Leveraging technology

Our province’s information and communications technology sector is made up of over 4,600 companies and is establishing itself as a leader in accelerated research, innovation, and entrepreneurship. Consequently, Alberta will not need to look very far to find innovations that can support its agricultural sector – in fact, this work is already underway. For example, through its Smart Agriculture and Food program, Alberta Innovates provides funding to projects that develop innovative farming solutions such as genomics, geospatial imaging, and analytics. Additionally, research notes the potential for GDP increases of up to five per cent in the agricultural sector through increased productivity from broadband investment and the adoption of AgTech.

Farming 4.0: The future of agriculture at the University of Alberta.

Over the next 20 years, agricultural innovation will be a key driver of economic diversification and growth. The University of Alberta has been at the forefront of agricultural innovation and technology for decades, driving developments such as:

- Increasing cattle productivity by 40 per cent, helping Alberta become a world leader in beef production;
- Creating a new canola strain, Quantum, that helped save Canada's canola industry. Today, canola is Canada's most valuable crop, surpassing wheat exports in 2017; and
- Identifying genes that, when bred into rice, doubled yield in drought conditions.

The university is applying its strength in AI, data, and wireless technologies to further push agricultural boundaries, particularly in emerging areas such as precision agriculture, genomics, biotech, and indoor agriculture.

Precision agriculture: Precision agriculture is data- and technology-driven farming. This means harnessing GPS, drones, data, and AI to optimise crop and livestock production and increase sustainability by minimizing water, fertilizer, energy, and chemical use. According to Mordor Intelligence, precision agriculture will be a \$9 billion industry by 2025 and will become the most influential agricultural trend by 2030.

Alberta has significant precision agriculture expertise across its post-secondary system in areas such as autonomous vehicles, wireless sensors, remote sensing, robotics, and information technology (IT). The University of Alberta is one of the province's largest precision agriculture hubs, with world-leading computing science and AI groups added to this mix.

The university has driven many advances in this area, including developing and hosting one of the world's largest remote sensing networks, and spawning start-ups, such as:

- Wyvern Space, which is developing technology to provide farmers with imaging intelligence to optimize yields, detect soil changes, and even spot invasive plants and insects; and
- SN Biomedical, which develops fast, reliable field test results for farmers and veterinarians enabling improved cattle treatment and farming efficiency.

The Government of Alberta is also working collaboratively with both companies as part of the GreenSTEM pilot program.

Indoor agriculture to help feed tomorrow's world:

Due to projected population, climate, land, and water challenges, food and agriculture innovation is expected to become a billion-dollar market. For example, vertical farming is predicted to reinvent agriculture by reducing land and water use, controlling growing conditions, and producing fruits and vegetables year-round inside buildings, warehouses, and shipping containers. An Edmonton-based company, G2V Optics, is poised to play a big role in this sector by bringing the science of sunlight to indoor agriculture. G2V's engineered sunlight technology can mimic light at any time of day, simulate seasons and different geographies, accelerate growth rates, and maximize yields, enabling producers to grow more food year-round using less land, water, and energy. One G2V client recently grew a hard-to-grow saffron crop in Alberta during winter.

This technology first emerged at the University of Alberta in the form of replicated sunlight for scientific applications such as solar cells for aerospace and renewable energy.

G2V's technology will not only help drive the emerging indoor vertical farming sector, but can also help address food production issues and demand. In 2020, G2V was one of only 15 global companies, and one of two from Canada, invited to San Francisco's World Agri-Tech Innovation Summit.



See [Strategy Two](#) and [Strategy Three](#) for more about how the Government of Alberta is approaching artificial intelligence (AI).

Investing in irrigation infrastructure

The Government of Alberta has extensive irrigation infrastructure, which in 2019-2020 helped supply safe and secure water for 80 per cent of the 680,000 hectares of irrigated land in Alberta. Continued investment in water management and irrigation infrastructure will be crucial for providing reliable water supplies for Alberta's agriculture industry, specifically in southern Alberta. As part of Alberta's Recovery Plan, the Government of Alberta committed to expanding and enhancing district-owned irrigation infrastructure. This means investing strategically in irrigation projects that support economic development and sustainable and resilient agriculture industries.

As part of Alberta's Recovery Plan, the Government of Alberta committed to expanding and enhancing district-owned irrigation infrastructure. This means investing strategically in irrigation projects that support economic development and sustainable agriculture industries.

► **Did you know?**

The irrigated agriculture sector represents \$3.6 billion in Alberta's annual GDP. It is estimated that every dollar invested by Alberta in irrigated agriculture or related uses generates approximately three dollars for the provincial economy. Alberta's irrigation industry creates about 56,000 full-time jobs and contributes about \$2.4 billion in labour income annually. Alberta's irrigated land makes up almost 70 per cent of all irrigated acres in Canada.

► **Did you know?**

Alberta's Agriculture Strategy is one of several key government strategies with the objective of creating jobs, building infrastructure, and diversifying the economy. Under this Strategy the Government of Alberta will contribute approximately \$280 million toward a \$933 million investment to expand Alberta's irrigation infrastructure. This investment will result in an irrigation expansion of over 230,000 additional acres within existing irrigation districts in the province and will enable irrigation investment to drive economic growth, diversify the province's economy, and contribute to long-term value-added food processing in Alberta. Through a strategic partnership with the Canadian Infrastructure Bank (CIB) and certain irrigation districts within the province, Alberta is able to accomplish more with funding contributions and cost-sharing for projects that will benefit Albertans for decades to come.

See [Strategy Four](#) Federal Government for more on Alberta Agriculture Strategy.

SECTOR SIX

For example: The Blood Tribe Agricultural Project is a community-owned agricultural operation established in 1997 and is located on Treaty 7 territory in southern Alberta. The operation is the largest irrigation project in Canada, with more than 250,000 contiguous acres and irrigation infrastructure serving more than 20,000 of those acres. The project produces commercial exports of timothy hay, potatoes, alfalfa, and other crops. The Blood Tribe is the largest reserve in Canada, with more than 13,000 members. Access to capital from a private equity firm, Indigena Capital, and Indigenous Relations' Aboriginal Business Investment Fund in 2019 has enabled the Blood Tribe to expand its facilities and equipment, which will create more jobs and economic benefits for the community.

► **Did you know?**

The University of Lethbridge has taken a leadership position in water research because of its strategic importance to agricultural sustainability and the effect it has on the economy and quality of life in southern Alberta. Through its Water Institute for Sustainable Environments, the University's multi- and trans-disciplinary approach to water research explores ways to conserve water, diversify water sources, protect water quality, and mitigate and adapt to the impacts of climate change. The University of Lethbridge's research will enable irrigation districts, producers, industry, and governments to make informed decisions, improve water management practices, and develop climate adaptation solutions that improve sustainability outcomes. (ULethbridge engagement survey written submission)

Infusing innovation into production methods

Investments in research have helped spur innovation and enable agriculture and forestry producers to improve yields and reduce costs. For example, advances in nanotechnology are leading to beneficial applications of nanomaterials, nanosensors, nanopesticides, and nanofertilizers. As a home to major nanotechnology research assets, Alberta is well positioned to leverage such innovations to help improve the sustainability and productivity of its agriculture and forestry sectors.

Addressing consumer demands for sustainable products

Public capital investments can play a role in encouraging Alberta producers to adopt innovations that further support their creation of sustainable products. With consumers increasingly interested in ethical, organic, and sustainable food and wood products, Alberta producers have opportunities to respond to these demands. For example, with a goal of becoming a Western North America centre of excellence for plastics, Alberta also has the potential to lead in the development and use of bioplastics. Replacing traditional plastics used in farming processes with bioplastics is one of many ways Alberta producers can adopt new technology to support sustainable production.

Pursuing these and other approaches will help Alberta seize the opportunity to provide more food and wood products to international markets. Drawing on decades of experience and a rich heritage in agriculture and forestry, our province can become a world-leading, technologically-driven, and sustainable producer meeting the needs of countries across the globe.



Sector seven Sustaining Alberta's environment and building tourism destinations

Alberta's vision for the future of environment, public lands, and parks infrastructure over the next 20 years.

- > Alberta's quality parks and public lands infrastructure provide exceptional recreational opportunities that continue to enable tourism and curate world-class experiences.
- > Alberta utilizes advanced and innovative environmental monitoring technologies to collect high-quality data that is used to support informed decision making on environmental issues.
- > Strategic long-term investments in resilient infrastructure protect communities from the impacts of fires, floods, and other natural disaster events.
- > Alberta's environment is sustainably managed and supported by strategic resiliency measures and infrastructure.



SECTOR SEVEN

Alberta's natural environment puts our province in a league of its own. People from around the world come to enjoy our mountains, landscapes, and other natural assets. Visitors and Albertans seeking recreation opportunities represent major economic opportunities. Alberta's diverse ecosystems and outdoor recreation opportunities are enduring sources of pride for Albertans and represent just some of the many reasons we care deeply about our air, land, and water resources.

The challenge over the next 20 years will be to maintain and enhance these ecosystems even as we experience a rising population, expanding economy, and changing climate. The health, sustainability, and resiliency of our province's land, water, air, and biodiversity are absolutely essential for all of our other goals.

Being good stewards of our lands and natural environment is not only the right thing to do, but will serve as a key competitive advantage in marketing our products and services, in attracting investment and, most importantly, providing a superior quality of life in our communities.

► Examples of capital in this context:

- Dams and reservoirs
- Irrigation canals
- Air and water monitoring stations
- Wildfire facilities
- Parks amenities and trails

Stewardship of our land and natural environment is a shared responsibility of industries, individuals, organizations, and governments. That is why our province has strict legislative and policy frameworks in place to guide the actions of private, non-profit, and public organizations, including where and how they build and operate.

The Government of Alberta works to support and enhance natural capital through the direct delivery of services such as wildfire suppression, water control infrastructure, air and water monitoring, and emergency support services. The government also supports external organizations that serve as partners in activities such as environmental monitoring, reporting and conservation efforts. The Government of Alberta also supports provincial organizations that provide training and leader/guide certification to elevate participant safety and conservation-friendly recreation practices. Enabling all of these efforts during the next two decades will rely on capital investments that navigate several complicating trends.

Key Considerations:

- The Government of Alberta owns approximately \$9.4 billion in water management infrastructure.
- In 2019-2020, there were 200 provincially-owned water management systems, including 535 kilometers of main irrigation canals and dykes, and 1.5 billion cubic meters of storage, and over 100 dams, irrigation diversion works, lake control structures, and pump houses.
- Within Alberta's irrigation districts, which includes municipally-owned infrastructure, there are over 40 reservoirs and 7,600 kilometres of conveyance works, including canals and pipelines, which carry almost two billion cubic metres of water per year.
- Nearly 500 sites in Alberta's provincial parks protect sensitive habitats and wildlife.

Extreme weather mitigation

> **Impact: Near- to mid-term**
> **Probability: High**

A changing climate is resulting in long-term changes in temperature and precipitation, as well as increased frequency and severity of weather events such as droughts, floods, wildfires, and severe storms. Climate change is poised to impact key sectors across the province including agriculture, forestry, and energy. It will increase the pressure on Alberta's biodiversity, ecosystems, and water resources, and it is already putting pressure on our existing infrastructure, all of which will have financial implications.

Preparing for hazards and disasters is critical to maintaining the long-term health and safety of Alberta's communities. Alberta has experienced several large-scale natural disaster events over the past decade: the Slake Lake wildfire in 2011, flooding in southern Alberta in 2013, the Fort McMurray wildfire in 2016, and the Fort McMurray flooding in 2020. This consistency is notable and speaks to how global forces beyond Alberta's sole control can contribute to hazards in our province. Guarding against such hazards will be a necessary part of Alberta's capital planning over the next two decades. As two of the most significant hazards, for instance, wildfires and flooding involve issues around development, forest management, and water management.

The Government of Alberta continually works with partners to manage our province's water resources in ways that accommodate population and economic growth. At times, however, efforts are complicated by extremes in precipitation, with Alberta receiving either not enough or too much all at once. These realities will drive an ongoing need for investments in flood mitigation and water management.

When it comes to Alberta's forests, capital investments will be important for mitigating the risks and impacts of wildfires. Though fires will sometimes occur as part of a forest's natural cycle of renewal, the reality is that human activities are often the cause. An ongoing challenge will be to manage intersections between forested areas, development, and recreation. Alberta will continue to face complex and interconnected pressures that impact the success of wildfire management. These include wildland-urban interface, human-caused wildfires, forest health, critical wildlife habitat, impacts to air quality, public expectations, climate conditions, and management costs.

For example: To better position our province's ability to respond to wildfires, floods, and other disasters, the Government of Alberta is investing \$3 million to develop a new facility for the Provincial Operations Centre (POC). The facility will provide renovated, expanded space for operations of the POC, which serves as a key command post for responses to large emergencies. To ensure affordability for taxpayers, the new facility will involve the repurposing of an existing provincial asset.

► **Did you know?**

The Government of Alberta is implementing new technology for detecting and managing wildfires across the province such as remote piloted aircraft systems that use drones to help detect hot spots in unsafe conditions. Gel water enhancer systems are used to protect buildings and infrastructure, and water delivery systems are used to protect roads, bridges, and other structures threatened by wildfire. AI and crowd-sourcing will be used as part of the remote camera wildfire detection systems to supplement existing wildfire lookouts.

See [Strategy Two](#) and [Strategy Three](#) for more about how the Government of Alberta is approaching artificial intelligence (AI).

Expanding activities on Alberta's landscape

> **Impact: Mid- to long-term**
> **Probability: High**

As citizens place more importance on active living and personal wellness, urban dwellers will increasingly seek experiences in rural and wilderness settings to decompress and reconnect with nature. New tourism destinations, products, and experiences will be important, and this includes access to parks and public lands. With this in mind, the government is working on a Tourism Strategy.

Meanwhile, new investments in businesses and industries will lead to higher levels of development in rural and urban areas. These developments may feature greater integration as businesses seek to achieve better economies of scale and make use of circular economies. While this may lead to lower footprints, it may also result in greater density. Like all other jurisdictions, our province will continue to face the challenge of enabling economic activity while managing impacts to our air, water, land, and biodiversity.

All of this means our province can expect upward pressure on our landscapes. Alberta will need to explore ways of accommodating a variety of commercial, recreational, and other activities while managing impacts to our air, water, land, and biodiversity. Given the vast geography of our province and the age of existing assets, this will likely require the leveraging of both private and public capital investments.

► **Did you know?**

In 2021 the Government of Alberta committed \$8.4 million to the David Thompson Corridor Upgrades project to improve and renew 12 tourism and recreation support sites along the David Thompson Highway, which will improve safety and support the increased demand for recreation and tourism activities in the area, benefiting the tourism industry, and making the area more attractive for investment.

For example: Government partnered with the Greater Bragg Creek Trail Association to develop public lands with access trails into a significant recreational amenity that draws Albertans and tourists to enjoy recreational opportunities on Crown lands. The trail system is effectively run by the association with support from the province. Capital infrastructure improvements such as a new parking lot and trail improvements have led to an exceptional trail system in Alberta.



In navigating these trends, the Government of Alberta will explore the following approaches:

Committing to resiliency planning and investments

While floods and wildfires are some of the most likely extreme weather and disaster events that pose risks to Albertans, they are joined by drought, wind, and hail events and many other risks that have impacted the province greatly over the past decade. Efforts to mitigate these risks will be crucial for safeguarding developments and communities. Capital investments will play a key role in such efforts – both in developing expanded infrastructure, and in undertaking renewal and expansion of air, water, land, and wildlife monitoring assets. Strategic partnerships with municipalities will be especially important given they are highly impacted by severe weather events and play significant roles in building resilience and mitigating natural hazards.

Investments in well-maintained water management infrastructure can reduce the risks and impacts of floods while providing reliable water supplies to support economic and population growth. For example, irrigation infrastructure will be critical for ensuring effective water management, along with enhancements of water storage infrastructure to capture spring melt and mitigate the effects of drought and flooding. Additional investments in regional water distribution systems will also be needed to ensure access to drinking water and minimize impact on local water supplies, which can be low volume and often require costly treatment. Investments in more on-stream water storage will allow our province to address floodwaters through the hydrologic system, which is key to ensuring the safety of Albertans and the integrity of land.

The development and implementation of a Hazard Identification and Risk Assessment

Albertans know well the lasting and significant impact of natural disasters on their lives and communities. In response to the increasing number and severity of disasters impacting the province, the Government of Alberta is committed to continuous improvement in its ability to recognize, assess, and mitigate disaster risks across the province. That is why the province has started work on a Hazard Identification and Risk Assessment (HIRA). Once completed, the HIRA will help provide government departments and emergency management partners with a more consistent and integrated method to identify disaster hazards and risks in their own emergency management planning and decision-making processes, and provide them a better understanding of the extent of the province's cumulative risk and the potential for cascading and multiple effects of a disaster.

Partnerships in resiliency:

Partnerships are key to establishing integrated disaster mitigation and management programs, and to ensuring that the right infrastructure is in place to keep Alberta's communities safe. Opportunities to partner with industry, municipalities, Indigenous communities, and the federal government must be further established to ensure that emergency policies and procedures align. As the frequency of natural disasters and public health emergencies increase, so will the need for collaboration to ensure emergency services remain effective and responsive to the public.

► Did you know?

From updated digital tools to automated weather stations and drone technology, innovation is at the forefront of the Government of Alberta's wildfire detection and management practices, including:

- *Exploring remote camera, drone, and satellite technologies to help modernize wildfire detection and data collection;*
- *Implementing modern remote automated weather stations that provide real-time or hourly data rather than once or twice per day;*
- *Continuing to evaluate the efficiency and cost-effectiveness of new firefighting tools and practices (e.g., gels, drones, cameras, and water delivery systems, such as large and mobile pumps and sprinklers); and*
- *Researching the best tree and vegetation management practices to help Albertans effectively integrate FireSmart into their communities and build resilience to wildfires.*

Leveraging technology to minimize risks and impacts

The rapid advancement of innovation in areas such as AI and automation are setting the stage for better tracking, monitoring, and responses to extreme weather events and natural disasters. Small low-cost sensors may offer promise in supplementing existing monitoring networks and providing real-time information to Albertans about specific environmental indicators. Tools such as automated drones offer new ways to inform decision making during disasters. Big data analytics are creating a new era of intelligence for disaster response, helping emergency response teams track the geolocations of assets, survivors, and available shelters. To fully integrate these new innovations into Alberta's emergency response systems, our province will need to ensure sufficient connectivity infrastructure, including improved broadband capabilities, communication networks, processing speeds, data storage and security, and power dependencies.

SECTOR SEVEN

For example: Tourists are increasingly relying on online services to assist with their travels. This includes finding inspiration through blogs and social media, researching and scheduling accommodations and activities, wayfinding through digital applications and advisories, and submitting reviews. Government will need to adopt strategies and approaches that leverage online resources and digital wayfinding, such as live maps for trails, campgrounds, and other outdoor spaces to ensure visitors are able to access information online when and where they need it. Not only are digital approaches more accessible, they also reduce costs for physical signage and information booths.

For example: The Government of Alberta has partnered with the Northern Alberta Institute of Technology (NAIT) to help foster and evaluate drone capabilities to support wildfire operations in Alberta. Drones capable of flying beyond visual line of sight will be used to provide various intelligence gathering services on wildfires. This will assist ground crews in identifying priority areas to reduce the risk of wildfire hazards for Alberta's communities and infrastructure. IN-FLIGHT Data Group is an Okotoks-based company that uses drones to spot early signs of wildfires. The drones are able to fly over areas not accessible to humans and track infrared readings in order to map out where wildfires may be burning. Readings typically take place overnight with data processed by the morning. Any hotspots that are detected are communicated to fire ground crews to reduce the risk of spreading wildfire.

Enhancing parks infrastructure

Accommodating more visitors and recreation activities on Alberta lands can be supported through enhancements to provincial parks. In fall 2020, the Government of Alberta announced the investment of an additional \$43 million for this purpose, including capital projects such as site modernization; repairing and replacing infrastructure such as campgrounds, facilities and playgrounds; enhancing trails; and improving water and wastewater infrastructure in parks. Building on these efforts, the Government of Alberta can explore the use of P3 arrangements to develop, improve, and maintain parks infrastructure.

Government can also work to stimulate private investments that expand the diversity and capacity of tourism and recreation activities in provincial parks, helping to meet rising demand.

Consistent with this partnership-based approach, the Government of Alberta has successfully engaged a range of Indigenous communities, municipal organizations, and non-profit groups to serve as partners in the operation of local campgrounds, day-use areas, and other provincial parks sites. This includes more than a dozen sites that previously did not have operating partners. These partnership arrangements will help ensure Alberta's parks remain sustainable for many years ahead.

See [Strategy Four](#) for more on municipal partnerships.

The enhancement of parks infrastructure will also involve strategic investments to expand the capacity of parks destinations outside of Jasper, Banff, and other already-established areas. The development of amenities and other infrastructure in areas with tourism potential, such as Drumheller and Nordegg, will enable Alberta to accommodate a greater number of overall visitors and meet tourism and recreational demands in more balanced ways across our province.



► **Did you know?**

Indigenous Peoples share a deep connection to the land and environment. Tourism market research shows there is a demand for authentic, meaningful experiences for those looking to explore all that Alberta has to offer. Enhancing parks infrastructure presents an opportunity to develop an Indigenous tourism corridor, potentially using existing landmark destinations and facilities as cornerstones of any future development that would allow First Nations and Métis communities to showcase their rich and vibrant cultures to visitors.

Employing comprehensive regional planning

Land-use planning will be important for ensuring capital investments are deployed strategically. The Government of Alberta is committed to returning to a comprehensive, collaborative, and integrated approach to regional and sub-regional planning to manage cumulative effects on the landscape.

Expanding Alberta's tourism industry

In partnership with Travel Alberta, the Government of Alberta is committed to growing the tourism economy. This includes expanding Travel Alberta's mandate to that of a full destination management organization, allowing the agency to take on a more active role working directly with communities, business, and entrepreneurs to develop new tourism destinations, products, and experiences in Alberta. The strategy will further focus on job creation, private investment opportunities, and destination diversification.

Through these other approaches, we will continue to manage and protect our province's natural environment according to Albertans' expectations while also enabling more people to invest in and enjoy the diverse landscapes, wildlife, experiences, and opportunities that Alberta offers.



Sector eight Investing in active, vibrant, and diverse communities

Alberta's vision for the future of community infrastructure over the next 20 years.

- > Albertans have facilities and spaces that support increased community, cultural, heritage, and recreational opportunities and lead to a higher quality of life.
- > The health and well-being of Albertans are maintained through accessible, inclusive infrastructure that fosters community engagement, volunteerism, active lifestyles, and social connectivity.
- > Alberta community infrastructure supports and celebrates the increasing diversity of residents.
- > Vibrant communities are proud stewards of integrated and active design, leading to innovative public-use infrastructure.



SECTOR EIGHT

It is through interactions in our cities, towns, villages, and other communities that we pursue our livelihoods, add richness to our lives, and enjoy a high standard of living. Accordingly, Alberta's communities should enable residents to access and enjoy a range of amenities that feed the mind, body, and spirit.

The Government of Alberta uses capital investments in various ways to support the development of vibrant and lively communities. One way is by direct investment in provincial assets such as the Jubilee Auditoria, museums, and historic sites, as well as storage facilities for collections not on display.

Another way is through grants to municipal governments, non-profits, and others to support the development and maintenance of their capital assets. Examples of this include municipally-owned recreation and cultural centres, and community, cultural, heritage, and recreational public-use infrastructure owned by non-profit organizations.

As Alberta continues to grow, there will be many opportunities to pursue capital projects that can help our communities become more vibrant. However, the financial reality is that not all opportunities can be supported by the Government of Alberta. Already each year the collective value of applications made to government capital grant programs far exceeds the amount of funding available.

With this dynamic expected to continue, Alberta will need to prioritize public capital investments that can have the greatest impacts. An ongoing challenge will be to effectively address new needs in Alberta's communities while working to maintain community assets that already exist.

► Examples of capital in this context:

- Museums
- Provincial archives
- Performing arts centres
- Heritage, historic sites, and storage infrastructure
- Cultural facilities
- Sports and recreation centres
- Multi-use paths, community parks, and sports fields

► **Did you know?**

The #MuseumFromHome trend showed up as a result of COVID-19 and limitations due to physical distancing. The initiative provides entertainment and education to at-home viewers. Alberta's provincial historic sites and museums joined #MuseumFromHome with new digital content that was shared on a weekly basis. Content ranged from educational sessions to exclusive tours by museum staff.

Key Considerations:

- The Government of Alberta owns and operates 22 historic sites, museums, and cultural facilities including the Royal Tyrrell Museum of Palaeontology, the Ukrainian Cultural Heritage Village, Reynolds-Alberta Museum, Head-Smashed-in Buffalo Jump, and the Alberta Jubilee Auditoria.
- Existing community and cultural infrastructure consists of a mix of government-owned assets, municipally-owned assets, and assets owned by others such as non-profit organizations.
- Each year more than half of adult Albertans visit heritage facilities one or more times.
- In the Government of Alberta's 2020 Survey of Albertans, approximately 95 per cent of respondents feel recreation facilities and services are important in contributing to quality of life.
- Alberta has six of Canada's World Heritage Sites, more than any other province.

Changing uses, needs, and interests for community space

> **Impact: Long-term**
> **Probability: High**

Greater diversity in our population will bring about changes in the needs and demands for services in communities. Pressures in urban areas will increase with residents seeking a wider array of cultural, recreational, and other amenities that cater to their interests. Some rural communities, meanwhile, may face sustainability challenges in providing amenities that support community vibrancy.

As the number of citizens over 65 years continues to grow, there may be an increased demand for certain types of community spaces. Studies are finding that culture, recreation, and volunteering are taking more central roles in the lives of those over 65 years of age, and have positive impacts on their health and longevity.

Communities will also need to address evolving preferences and notions of entertainment. The rise of technology in our lives, for instance, will drive expectations for more digitally-based experiences and virtual services. As technology and urbanization continue to permeate our lives, actively connecting to nature in municipal and provincial parks will be critical to our health, productivity, educational, and economic resilience. Balancing all of these considerations while keeping things affordable for taxpayers will require creative capital approaches.

- ▶ **Did you know?**
Government provides funding for cultural and recreation facilities through its annual Capital Plan, as well as through grants such as the Community Facility Enhancement Program and the Municipal Sustainability Initiative. Alberta also supports the development of cultural and recreation infrastructure by facilitating grant funding requests from several different federal programs, including the Investing in Canada Infrastructure Program, the Canada Cultural Spaces Fund, and the New Building Fund – Provincial and Territorial Infrastructure Component.

Facility aging and need for modernization

> **Impact: Mid-term**
> **Probability: High**

An ongoing issue will be addressing maintenance and renewal of existing community and cultural assets. Over the next 20 years, facilities will further age and require more comprehensive repairs, modernization renovations, expansions, or complete replacements.

Many of Alberta's major cultural facilities were developed between the 1950s and 1980s and are either nearing the end of their life cycles, or are heritage facilities or buildings that can be more complicated to maintain and renew. This particularly applies to larger assets such as the Jubilee Auditoria and Glenbow Museum.

- ▶ **Did you know?**
According to Statistic Canada's Culture Satellite Account, in 2019, Alberta's culture, sport, and recreation sector represented \$6.0 billion of the provincial GDP and supported almost 67,000 jobs.
- ▶ **Did you know?**
Recreation facilities in Alberta's communities are relatively new compared to those in other jurisdictions. However, a growing population and higher levels of demand will translate into greater wear and tear on these facilities.

While addressing the need for new infrastructure to meet evolving demands, public capital plans will need to make room for the maintenance and renewal of existing assets.



SECTOR EIGHT

► **Did you know?**

Finding and keeping affordable, sustainable space for cultural activity can be challenging. The province provides ongoing support for the development of community engagement and cultural activity through policies that enable property tax exemptions for properties owned or used by non-profit organizations that benefit the public.

Eligible properties typically provide services related to the advancement of community sports and recreation, education, arts, care for the disadvantaged, religion, culture, and historical preservation. Innovative solutions like this maximize the use of existing capital assets while supporting the development of community and culture organizations in the province.

In navigating these trends, the Government of Alberta will explore the following approaches:

Maintaining a province-wide facility inventory

While there is general knowledge about their status, more detailed information about community and cultural facilities would be helpful in making capital maintenance and renewal decisions. The development of a province-wide facility inventory system can help on this front. Ideally, this would offer data on the age, condition, ownership, and the economic and community impacts of key community and cultural assets.

See [Strategy Five](#) for more on capital maintenance and renewal.

Prioritizing investments in tourism

Tourism is a powerful engine for economic growth that attracts investment and stimulates job growth across the economy. It helps support nearly 72,500 full-time equivalent jobs in Alberta and generates \$1.2 billion in taxes to all levels of government, including \$387 million to the provincial government. Investing in provincial community and cultural infrastructure is critical for maintaining a strong tourism industry in Alberta. These facilities are markers of innovation for an active and creative economy and serve as vehicles for economic growth in Alberta's tourism industry.

► **Did you know?**

Indigenous Tourism Alberta is a non-profit organization that encourages and promotes Indigenous tourism throughout the province. In partnership with Indigenous entrepreneurs, the group offers unique cultural experiences throughout Alberta to showcase Indigenous culture.

Ensuring sustainable, resilient, and adaptable facilities

An important way to improve the sustainability and resiliency of Alberta's community and cultural facilities is repurposing them. Many aging community facilities are under-utilized (or closed), and they could be of more use if refurbished or repurposed, which would also have the added benefit of preserving heritage. This approach may solve shortages of public-use venues and create affordable alternatives to building costly new facilities. Underutilized, closed, and aging facilities that have outlived their original purpose have the potential to find new lives as galleries, performance spaces, or community halls.

Ensuring community amenities and services are both sustainable and resilient can also help lower their operating costs and extend their lifespans, offering better affordability for taxpayers. As capital assets are constructed or renewed, the Government of Alberta can work with partners to explore the incorporation of green, sustainable, and smart-technology approaches.

Supporting technology adoption

Alberta can leverage its technology and innovation sector to incorporate robotics, virtual reality, augmented reality, video walls, and other digital elements into community amenities. Public capital investments in these and other innovations, along with the enabling digital connectivity, can ensure amenities remain relevant, and that they adapt more easily to changing user expectations. As such, technological solutions need to be meaningful, well considered, and driven by content. Given how frequently technology can change, we must also plan for required maintenance and updates in addition to the initial investment.



For example: Technology is opening the door to unprecedented user experiences, including:

Virtual reality exhibitions: Cultural institutions from around the world are catering to modern audiences with tech-enhanced exhibitions that offer interactive and engaging experiences for visitors of all ages.

Immersive augmented reality: Immersive augmented reality allows visitors to interact with virtual holographic 3D objects that have been scanned from a real-life reconstruction of statues and paintings.

Robotics: Long-distance tours can be conducted through telepresence robots, which travel on wheels and can improve the accessibility of museums and art galleries for individuals who are homebound.

Video walls: Large video walls with touch screen capabilities could exist on their own or as an accompaniment to an existing exhibit, utilizing exhibit space more effectively while displaying more objects.

Supporting and reflecting Alberta's diverse communities

All Albertans should have opportunities to enjoy and benefit from vibrant, inclusive, and active communities through cultural and recreational facilities and services that enrich their lives. It is important to design, fund, and deliver infrastructure that reflects and celebrates cultural diversity in Alberta and supports families and communities to come together. There are also opportunities to ensure and enhance consideration of Indigenous Peoples in facilities so that they feel recognized and welcome.

► **Did you know?**

The Government of Alberta is taking steps to ensure that the naming of provincial buildings reflect our province's rich history and culture. For example, in early 2021, the Government of Alberta announced that the Federal Building Plaza in Edmonton has been renamed the Violet King Henry Plaza in honour of the first Black female lawyer in Canada.

Undertaking these and other approaches will enhance the quality of life offered by Alberta's communities. As they become better positioned to adapt to and deliver on the expectations of residents and visitors, our province's cultural and community facilities will contribute to the attractiveness of Alberta as a superior place to live, work, play, and invest.



Sector nine Supporting housing and inclusive living

Alberta's vision for the future of housing infrastructure over the next 20 years.

- > All Albertans have appropriate, accessible, and affordable housing in locations close to amenities such as social services, recreation spaces, and employment areas.
- > Our province boasts client-centred facilities and programs that make life better for vulnerable Albertans, seniors, caregivers, and support networks.
- > Alberta leverages partnerships among governments, housing providers, and the private sector to deliver the best outcomes for affordable and mixed-income housing.



SECTOR NINE

Alberta's communities are much more than collections of houses, streets, stores, and utilities. They are the places where friendships are made, families grow together, and neighbours support each other.

► **Examples of capital in this context:**

- Affordable housing units,
- Emergency shelters,
- Seniors lodges, and
- Supportive housing.

Part of the way our province can build stronger communities is by contributing to the development of more resilient individuals and families. This includes having systems and supports in place that promote the healthy development of children and adults, assist them during tough periods in their lives, and enable them to meaningfully participate in their communities.

Several partners are involved in the delivery of community services and supports. Some are delivered directly by the Government of Alberta. Many others are delivered through municipal governments, non-profit organizations, or Indigenous communities, with the Government of Alberta serving as a key funding partner. Together, they assist Albertans through a range of services and supports, such as:

- Financial supports;
- Child intervention services;
- Employment services;
- Inclusivity and human rights programs;
- Housing programs;
- Emergency shelters;
- Seniors services;
- Youth programs;
- Early childhood services; and
- Family resource networks.

Public capital investments will continue to play an important role in contributing to stronger individuals and families, with capital grants likely to have particular significance. Over the next two decades, the Government of Alberta will optimize these supports to help encourage external organizations to invest strategically in capital assets needed to deliver community services and supports.

Key Considerations:

- Emergency shelters provide critical short-term accommodation and support for people experiencing homelessness or affected by family violence.
- Alberta works with housing management bodies and non-profit and civil society organizations across the province to deliver programs and services that support housing affordability for all Albertans, including seniors.
- In 2020, an average of 2,070 Albertans stayed in emergency shelters, or short- and long-term supportive beds each night during April and December.
- Ninety-one per cent of seniors live in private households, the majority of which are houses. Nine per cent of seniors live in collective dwellings, the majority of which are in health care and related facilities.
- In 2017, an estimated 21.7 per cent of Albertans aged 15+ had a disability.
- Approximately 28,000 adults and 34,000 children received prevention and early intervention services through Family Resource Networks in 2020-21.

Increased need for affordable housing

> **Impact: Mid-term**
> **Probability: High**

Shelter is a basic human need. In light of this, Alberta's communities require an adequate supply of appropriate housing. This includes affordable housing options for individuals and families who lack the resources to access housing at standard market rates. More than 110,000 Albertans currently live in government-subsidized housing, and an additional 24,000 households are on a waitlist for subsidized housing. More than half of those in affordable housing, and one-third of those on a waitlist, are seniors.

The need for affordable housing is increasing partly due to the projected increase in population, but also due to demographic changes within the population. Households are growing older and more diverse, and their needs are changing. Meanwhile, the economic downturn and emergence of COVID-19 have resulted in more financial uncertainty for many Albertans, also driving demands for affordable housing.

▶ **Did you know?**

According to the Canada Mortgage and Housing Corporation, housing is affordable when a household spends less than 30 per cent of its before-tax income on suitable shelter. There are nearly 500,000 Albertans currently spending more than 30 per cent of their household income on housing costs, and 164,275 households in core housing need.

Specialized affordable housing options will be needed to assist Albertans who are at risk of (or are currently) experiencing chronic homelessness. According to the housing first philosophy, people experiencing homelessness are better able to move forward with their lives if they are first housed in accommodation that is affordable and can meet their needs.

Studies have demonstrated that investments in affordable housing provide long-term value for society. Citizens who have housing stability are better positioned to build skills, participate in the economy, and start businesses. By helping prevent and reduce homelessness, affordable housing also helps reduce interactions with the health and justice systems, resulting in net savings for taxpayers. The Government of Alberta will seek to realize these and other benefits by exploring how public capital investments and partnerships can expand the supply of affordable housing in Alberta communities.

Inclusive community design

> **Impact: Long-term**
> **Probability: High**

Over the next 20 years, Alberta will continue to experience demographic changes that lead to greater diversity in our communities. More than half of our province's population growth will come from immigration. The number of seniors will also increase, and Indigenous representation in urban centres is expected to rise. Alberta's communities will be enriched with citizens bringing a variety of skills, perspectives, experiences, and national and global connections. This can have a major impact on the attraction of private investment, the establishment of new businesses and the creation of new jobs in our province. To successfully leverage this potential, our communities need to be designed and built inclusively so that all residents have the opportunity to thrive regardless of their circumstances.

Inclusive communities have the right community services and supports available to effectively assist individuals and families during challenging times and transitions. For example, access to settlement services is important for helping newcomers adjust to life in Alberta. Access to home support services is important for enabling seniors to stay in their homes and communities as long as possible to maintain healthy connections to friends, work places, and volunteer pursuits. Culturally appropriate services that are developed in partnership with Indigenous communities, such as Friendship Centres, are also important for meeting the unique needs of Indigenous Peoples in Alberta. Physical environments play roles in inclusivity. Community roadworks and facilities, wayfinding, and other systems need to be designed to accommodate individuals of all ages, abilities, and backgrounds.

The Government of Alberta can collaborate with municipalities, non-profits, Indigenous communities, and others in deploying targeted public capital investments that support greater diversity and inclusive community design.

Changing housing needs for seniors

> **Impact: Near- to mid-term**
> **Probability: High**

With the population of seniors expected to double by 2040 and the ever-increasing preference of seniors to stay in their homes and communities, Alberta is expected to see a significant increase in demand for a range of seniors' accommodations.

To meet future demands, the Government of Alberta will need to adopt innovative, cost-effective strategies that contribute to a high quality of life for seniors across the province. This will mean exploring creative models for funding the construction and maintenance of affordable seniors housing, and supporting seniors to age in place within their own homes.

The needs and priorities of seniors are changing. Seniors increasingly value autonomy and independence, social connectedness, and healthy, active lifestyles¹⁶. Meeting these expectations will require our province that examine the kinds of capital investments that are made. For example, the Government of Alberta can explore how technology assets might be leveraged to enable seniors to live at home independently for longer than they do now while also supporting their safety and well-being.

In navigating these trends, the Government of Alberta will explore the following approaches:

Unlocking existing equity and building sector capacity

The Government of Alberta owns a substantial portion of affordable housing stock, operated within a regulatory framework governed by the *Alberta Housing Act*. An ongoing concern is the age of the stock and the need for significant capital maintenance.

Recent engagement with key stakeholders and research found that government ownership of affordable housing units limits the development of mixed-income housing models, public-private partnerships (P3s), and participation by both private and not-for-profit organizations in the sustainable development and operation of affordable housing. Because the government owns the assets, operators cannot leverage the properties they operate to finance new development or reinvest in existing units. In addition, the sector cannot implement potential cost and process efficiencies while government continues to own the buildings, which requires adherence to government approval and procurement processes.

To address these challenges, the Government of Alberta will develop a provincial asset management plan as a first step toward shifting the government from being an owner of affordable housing assets to simply regulating and funding housing programs.

Supporting partnerships and integration

Building strong communities with adequate housing and social supports requires integration and partnerships across a variety of sectors, including housing, health, child and family services, and social services.

In many cases, individuals and families who require affordable housing are dealing with complex issues related to physical and mental health, addiction, trauma, domestic violence, or unemployment. In these instances, partnerships are required to deliver holistic approaches to housing, including approaches such as permanent supportive housing or specialized housing designed to meet a tenant's health and safety needs. These approaches typically involve third-party providers supporting individuals and families within the housing environment at various levels of intensity.

Over the next few decades, the Government of Alberta will need to leverage partnerships to ensure appropriate infrastructure and supports are in place for tenants with complex needs.

► **Did you know?**

The Yellowhead Youth Centre and Youth Assessment Centres integrate trauma-informed practices and leading research in a way that supports all youth to reach their individual potential. The Government of Alberta's campus-based treatment facility for youth provides integrated services such as Indigenous cultural supports and resources, crisis intervention and counselling supports, family supports and medical services, and educational and skill-based services, including transitional supports. Providing an integrated wrap-around service requires partnerships among child and youth care workers, contracted pediatricians and psychiatrists, Indigenous cultural resource people, nurses, psychologists, recreation therapists, and teachers. Making improvements to their living space and updating infrastructure will enhance the provision of safe care in facilities that support and improve the well-being of vulnerable youth.

<?> "Cities Alive: Designing for ageing communities", ARUP, 2021, <https://www.arup.com/perspectives/publications/research/section/cities-alive-designing-for-ageing-communities>

SECTOR NINE

► **Did you know?**

The private sector is an important partner in addressing affordable needs in Alberta. Research shows that there are many opportunities to work with the private sector to meet these needs. The vacancy rate for purpose-built market rental housing in Alberta was 5.4 per cent (8,231 units) in 2019. This was mostly consistent in all markets reviewed as part of this study, except for Calgary where the vacancy rate was as low as 3.8 per cent. These vacancy rates are higher than what is generally considered a balanced market (vacancy rates of 3.0 per cent). As such, this presents an opportunity for the Government of Alberta to work with private landlords by providing rent supplements to leverage private stock that is vacant and could be used as affordable housing. This provides an opportunity to assist working Albertans with modest incomes and allow them to move out of affordable housing units into the private rental market. It can also make it easier for people to stay in the private rental market and ensure they don't have to rely on affordable housing supports. Allowing Albertans to exercise more choice in their housing creates direct economic benefits for housing providers while ensuring that families find suitable accommodations near their place of employment or children's schools.

Improving Indigenous housing and supports

People identifying as Indigenous are over-represented amongst those experiencing homelessness. Across Alberta, people who identify as Indigenous make up 26 per cent of those using emergency shelters and transitional housing. At the same time, they make up only seven per cent of the general population. Indigenous individuals are also the fastest growing demographic in Alberta. Having the right housing and accommodation infrastructure to support Indigenous Peoples within their communities and in urban centres is key to maintaining and enhancing their culture, and for supporting their long-term prosperity.

► **Did you know?**

In Northern Alberta, up to 85 per cent of affordable housing tenants have ties to the Indigenous community, and most households have children.

Alberta will need to continue engaging with Indigenous communities in order to close the gap on affordable housing. The Government of Alberta will also need to partner with the federal and municipal governments as well as the non-profit sector. Federal involvement is necessary to address infrastructure shortfalls on-reserve, and all three levels of government, along with non-profit agencies, have roles to play in pursuing regional solutions in more urban and semi-urban areas.

► **Did you know?**

In recognition of the United Nations Declaration on the Rights of Indigenous Peoples, the Government of Alberta established the Indigenous Housing Capital Program. Capital funding is available to support housing developed and managed by Indigenous Peoples.

Over the next 20 years, government will also consider the creation of service hubs that provide more readily-available, culturally-appropriate supports to Indigenous Peoples. One example is Friendship Centres. In Alberta, there are currently 21 Friendship Centres working to improve the lives of urban Indigenous Peoples in their communities. Friendship Centres offer a range of programs and services that respond to the distinct needs of urban Indigenous Peoples, such as alternative schools, daycares, youth centres, employment programs, homeless shelters, cultural camps, and socio-economic, health promotion and prevention, and life skills programs.

Supporting flexible, adaptable, and mixed building forms

A key challenge will be to meet the increasing need for housing with limited capital resources. One solution is to design flexible housing developments that can serve a wide variety of different demographics and users over their life cycle.

Affordable housing, supportive housing, and other facilities that support social services could use modular techniques to develop adaptable facilities quickly and cost-effectively. Mixed-income models offer another form of flexible development. Designed to provide units for households of different income levels, these models expand the availability of social housing while being more financially sustainable.

The Government of Alberta can explore using capital grants to encourage flexibility and adaptability in new developments, redevelopments, and conversions of existing housing.

► **Did you know?**

In December 2020, the Government of Alberta announced a new 64-unit development that helps address the need for affordable seniors housing in Lethbridge. The mixed-income development will include 32 units with rent set at 20 per cent below market rates, and the other 32 will be at market rental rates. The governments of Canada and Alberta invested \$3.4 million through the Investment in Affordable Housing Agreement for the development of the project.

SECTOR NINE

Providing inclusive people-centred integrated housing options for Albertans with complex needs

There continues to be an increasing number of individuals with complex support needs who require a specialized approach to meet their health and safety needs. Permanent supportive housing or other housing first options can help meet these needs. Where needed, additional staffing is provided by third parties to support the individuals in these environments.

Other more intensive housing and support arrangements are specifically designed to provide a customized approach for those who can't be housed or supported in congregate care settings. In some cases, partnerships have been created with AHS to share in the support costs related to these highly complex individuals. Options continue to be limited due to the high level of need, and many individuals remain waiting for appropriate supports.

► Did you know?

The Persons with Developmental Disabilities (PDD) program is part of a multi-agency collaborative including Alberta Health Services, the Government of Alberta, and not-for profit organizations. It helps adults with intellectual/developmental disabilities, mental health concerns/illnesses, and complex service needs receive the care they need through a coordinated and integrated support system. The Complex Needs Residential Building project in Calgary is intended to meet the housing and support needs of highly complex individuals who are PDD-eligible. The project is at the conceptual stage and requires consultation with community partners and other ministries to fully develop the model. The Government of Alberta is engaging with stakeholders to ensure that the design of the model is individualized and community-based, and that it meets the needs of highly complex individuals for a duration tailored to each of their needs.

Housing and mental health - why is housing important for health?

Overall health: Substandard and unaffordable housing is associated with infectious diseases, chronic illness, respiratory infections, asthma, poor nutrition, and mental illness.

Quality of life: Housing improves quality of life and is a key component of recovery for people with mental illness.

Mental health: Affordable and supportive housing reduces hospitalizations, psychiatric symptoms, and substance use while increasing freedom, privacy, dignity, and safety.

Recovery: Supportive housing has been shown to improve recovery for people with serious mental illness, including those who have long histories of hospitalizations and challenging behaviours.



SECTOR NINE

Leveraging innovation to support operational sustainability and efficiency

Over the next 20 years, Alberta's housing facilities will age and require repairs, modernizations, expansions, or even complete replacements. Increasing operational sustainability and resilience will be critical for offsetting the costs of building and maintaining these aging facilities, and for ensuring they can meet the needs of Albertans. The Government of Alberta will need to work with housing bodies and municipalities to explore innovative ways of improving sustainability. Some strategies include:

- Using building features such as solar arrays and rainwater collection systems;
- Using reclaimed materials to keep a low cost of maintenance;
- Organizing units in a linear structure to facilitate cross-ventilation and reduce the need for energy-intensive heating and air conditioning;
- Integrating smart sensors into building systems to monitor physical condition and improve disaster response.

Building age-friendly communities

Age-friendly communities are those where social and physical environments are designed to support active aging. These communities include accessible amenities and services and allow Albertans to remain in their homes and communities as they age. Age-friendly communities also allow individuals to maintain connections and continue contributing their skills, expertise, and experience to their communities. Adopting an age-friendly lens to public capital investments will help ensure seniors, persons with disabilities, and other residents can enjoy a high quality of life in Alberta's urban and rural communities.

For example: Age-friendly communities are key to making aging in place a viable option for seniors. This means looking at how we build infrastructure, the way we get around, and even the way we shop for goods and services. Features of age-friendly communities may include:

- Maintained and well-lit sidewalks;
- Fully accessible public buildings;
- Housing integrated in the community that accommodates changing needs and abilities as people grow older;
- Friendly, personalized services, and information in place of automated answering services;
- Public and commercial services and stores in neighborhoods close to where people live; and
- Well-situated public benches and other supportive surfaces.



Age-friendly communities play a critical role in supporting aging in place (or aging in community). With more seniors choosing to age in place, Alberta could see a surplus of seniors' homes, lodges, and continuing care facilities in some communities. This may present opportunities to re-purpose lodges into higher-level care facilities in communities where housing and health priorities intersect, or in places where it is not feasible to build a stand-alone supportive facility.

► *Did you know?*

The Alberta government approved \$48.8 million to support Lodge Partnership projects in five rural communities.

These projects will integrate supportive living into seniors lodges to allow seniors to age in place as their care needs change while eliminating the need to construct stand-alone continuing care facilities.

The Government of Alberta will also need to work with partners to ensure seniors aging in place have access to community supports and health care. This includes in-home services and supports with daily activities, home maintenance, meal delivery, and physical and mental health services.

These and other approaches offer a path forward for enhancing the development of communities across Alberta that are inclusive for all ages and help meet the needs of diverse populations. Strengthening our communities this way will help strengthen individuals and families, better positioning them to grow, strive, and live with dignity.



Sector ten Enhancing public safety and access to justice

Alberta's vision for the future of justice and public safety infrastructure over the next 20 years.

- > Alberta's public safety and justice infrastructure helps ensure that Albertans are safe, secure, and have improved access to justice.
- > Integrated services and supports are facilitated by partnerships among Health, Justice and Solicitor General, and Community and Social Services that contribute to greater public safety outcomes.
- > Infrastructure supports public safety and justice services that are people-centred, culturally relevant, and responsive to the needs of Albertans.
- > Alberta enables alternative delivery methods such as virtual services, to reduce pressures on existing assets, reduce wait times, and make justice more accessible to all Albertans.
- > Albertans report and experience high levels of public safety and security in their communities.



SECTOR TEN

A fundamental function of government is fostering public safety and delivering justice services. Providing a fair, impartial, and accessible justice system and ensuring respect for the rule of law are essential for quality of life. These elements help ensure our communities are safe and stable places to live, work, play, and invest. This in turn supports Albertans in leading meaningful and fulfilling lives.

The public safety and justice sector is seeing significant changes on its horizon. Innovations in technology are highlighting the opportunity for a more efficient and accessible justice system, while the emergence of COVID-19 has highlighted the importance of being agile and responsive to incoming threats. Existing and emerging trends in public safety and justice will impact how we plan our infrastructure, programs, and services to meet the evolving needs of Albertans in the future.

► Examples of capital in this context:

- Courthouses
- Patrol vehicles
- Corrections facilities
- Digital record systems
- Police stations
- 911 infrastructure
- Emergency vehicles
- Medical examiners offices
- Law enforcement training facilities
- Law and probation offices

The Government of Alberta has responsibility for the administration of justice, including the operation of courts, providing for local and province-wide law enforcement, delivering provincial corrections, and supporting associated legal and justice services. This significant area of public policy entails complex interactions amongst many different organizations. Some are managed by the Government of Alberta, while others are managed by external organizations.

This adds complexity to capital investment choices. In certain cases, the Government of Alberta will make direct investments in assets that it manages, such as courthouses or corrections facilities. In other cases, the Government of Alberta provides capital grants to municipal governments to assist them in making justice-related capital investments.

As the delivery of public security and justice services becomes more integrated, effective capital planning will require navigating numerous trends.

Key Considerations:

- The Public Safety and Justice sector encompasses wide-ranging areas, most of which are the responsibility of the Ministry of Justice and Solicitor General.
- It includes components responsible for law enforcement and public security, resolution court services, correctional services, and legal and justice services.
- Alberta has 72 courthouses throughout the province, including stand-alone courthouses, provincial buildings, and other leased facilities.
- There are three levels of court in Alberta, including:
 - the Court of Appeal of Alberta, which hears civil and criminal appeals;
 - the Court of Queen's Bench of Alberta, which hears civil, criminal, and jury trials, as well as appeals of Provincial Court decisions; and
 - the Provincial Court of Alberta, which serves as the main entry point into the province's court system and manages civil claims, adult and youth criminal cases, traffic offences, and more.
- There are various police services in Alberta, including:
 - the Royal Canadian Mounted Police, which is funded by the province and provided through the Canadian government;
 - municipal police services, which are funded by municipalities; and
 - Indigenous police services, which stand independently and through multilateral policing agreements with the RCMP.

Holistic public safety and justice

> **Impact: Mid-term**
> **Probability: High**

We continue to expand our knowledge about the linkages between involvement with the justice system and key social challenges, such as homelessness, poverty, addictions, and mental health issues. Many individuals who interact with the justice system often experience such challenges.

Increasingly, justice system partners are collaborating with those in the health and social services sector to take holistic approaches to assisting Albertans. These efforts will help to reduce unnecessary interactions with the justice system while improving the health and well-being of vulnerable and disadvantaged citizens. The result will be decreased pressures on the justice system, enabling us to get more use out of existing justice facilities and other assets.

Policing in a more community-responsive climate

> **Impact: Long-term**
> **Probability: High**

Demographic changes in Alberta will require further adjustments to the delivery of law enforcement and emergency response services. Alberta's increasingly diverse cultural makeup will require greater focus on inclusivity and addressing language barriers, cultural differences, and accessibility. Urban areas will experience rising demand pressures consistent with larger populations, which will stretch limited resources. Rural areas, meanwhile, may face challenges in maintaining sustainable service levels.

Maintaining people-centred services while providing policing in this more complex climate will require Alberta to explore new tools for optimizing resources. These approaches will influence where capital investments are focused, with a view to extending the usefulness of facilities and accommodating a higher degree of collaborative work.

Access to justice concerns

> **Impact: Near- to mid-term**
> **Probability: High**

As a foundational principle of society; it is vital that citizens have access to justice no matter who they are. In Alberta, a growing population and growing economy will give rise to more complex interactions amongst individuals and organizations, leading to more complex legal and justice issues. This will make it even more critical that Albertans can access justice services regardless of their location.

► **Did you know?**

With expected completion in 2023, the new Red Deer Justice Centre will combine court facilities, supports, and alternative services in one location to increase accessibility for Albertans. The Centre will include 12 courtrooms; enhanced security measures to separate prisoner, public and judicial/ staff circulation; justice-related supports, including Crown and barrister assistance and services from external groups, such as probation workers, Indigenous court workers, legal aid representatives, counselling staff, and resolution services that include civil and family mediation, arbitration, and other alternatives to court.

This raises logistical issues as it is not financially feasible for each and every Alberta community to have a comprehensive courthouse fully staffed with judges. At the same time, we cannot have Albertans in smaller, rural, and remote communities be disenfranchised.

Ensuring equitable access to justice will require the Government of Alberta to make use of innovative approaches that change the mix of capital investments. While there will be an ongoing need for certain physical structures, capital assets in the justice system will increasingly shift to the digital realm.



SECTOR TEN

In navigating these trends, the Government of Alberta will explore the following approaches:

Pursuing partnerships in law enforcement and emergency response

Enhancing public safety will require strategic partnerships among the province, municipalities, and private agencies to improve systems and respond to threats. Law enforcement, corrections, security, and crime prevention groups will need to work together to improve communication systems and respond to threats more quickly and with greater ease. Capital investments that support joint-force operations, such as integrated command centres, will be important for enabling these kinds of partnerships. Investments in digital platforms can also play a role in helping law enforcement agencies and other emergency responders collaborate with each other to prevent crime and address public safety concerns.

Collaborating with community

In addition to partnerships amongst governments and public safety agencies, there is a movement toward empowering individuals to participate in making their communities safer. Citizens are becoming increasingly interested in public safety and crime prevention, and law enforcement agencies are increasingly reaching out to community groups for assistance in monitoring suspicious activity. Officials can also leverage community voices to solve crimes and prevent future threats to safety. As Albertans become increasingly aware of gender-based and racism-driven violence, law enforcement and front line workers need to adjust their policies and procedures for interacting with seniors, youth, Indigenous Peoples, members of cultural communities, and vulnerable populations in order to build trusting, supportive networks and ensure the safety of Albertans. The Government of Alberta can explore capital investments that help establish partnerships, frameworks, and arrangements to improve issues in policing, further lower crime rates, and provide solutions for the needs of communities.

For example: In fall 2019, government announced the creation of the Rural Alberta Provincial Integrated Defence Force, or RAPID-Force. RAPID-Force enables peace officers to respond to a wider range of calls and assist the RCMP and other police services in response to rural crime. Through this new model, peace officers are anticipated to spend up to 15 per cent of their time responding to 911 calls and providing backup to RCMP.

► Did you know?

The Alberta Law Enforcement Response Team (ALERT) is an organization of integrated, provincially-focused law enforcement groups made up of over 300 members from various police agencies with expertise in intelligence, enforcement, and support services. In 2019-20, government increased the budget for ALERT by up to \$50 million over the next four years to address organized and serious crime including gang violence, drug trafficking, stalking, and domestic violence.

Integrating technology in policing and public safety

The incorporation of digital tools and other technologies can enable the justice system to extend its reach and effectiveness in affordable ways. Innovations in machine learning and AI are increasing our province's emergency planning, response, and prevention capabilities, while smart technology and sensors are improving surveillance and connectivity. Remotely piloted aircraft systems and drones can be used to enter dangerous environments and facilitate search and rescue, and augmented reality is being tested to improve performance in low-visibility environments. Similarly, sophisticated robots can be deployed in situations too dangerous for emergency responders.

Another area of impact for technology is in data collection. Large amounts of data and information, such as witness accounts, victim reports, and emergency responder insights, are stored in data systems that frontline workers can harness to address public safety issues quickly and effectively. Innovations in AI and machine learning provide opportunities to improve data analysis by drawing reliable and secure correlations, helping to improve decision making. The Government of Alberta can explore opportunities to integrate AI into data libraries and information technology (IT) networks to process large volumes of information and gain meaningful insights.

Capital investments in technology can also aid in the training of front line law enforcement and emergency personnel. For example, augmented reality and virtual reality can be used to simulate disaster exercises and high-risk scenarios. These approaches reduce the need for governments and public safety agencies to build large training centres, enabling funds to be allocated to other areas of need.

SECTOR TEN

For example: Prolonged exposure therapy is a virtual reality tool developed by Alberta Health Services (AHS) in partnership with Dynacor Communications Inc. It allows emergency responders to experience real life scenarios. The program immerses the trainee in different types of high pressure simulations. This helps coach the brain to prioritize the use of its pre-frontal cortex during the critical stress points of an emergency call.

For example: Intelligent street lamps are equipped with environmental sensors and 180-degree cameras that offer a real-time look at pedestrian traffic and developing situations. The lamps collect data that emergency management teams can leverage, even before they arrive on the scene, to respond to threats and communicate essential information to citizens in the area. The City of Lloydminster recently partnered with ATCO to evaluate the performance of intelligent street lights.

Prioritizing and integrating social supports

Individuals in the justice system often experience multiple interrelated challenges, such as addictions, mental health issues, and poverty, and require different types of supports. To deliver people-centred services that address the needs of these individuals, our justice system needs to take a collaborative, multi-disciplinary approach. Cross-functional collaboration with health, community, and social agencies will be critical for delivering services that effectively address the root causes of vulnerability in individuals and communities. Integrated services will also enable Albertans to locate and access the social supports they need, and to address gaps in service delivery related to public safety. For example, in addition to mental health services, AHS also provides direct patient care within holding facilities. Capital investments to support the delivery of integrated social supports will help mitigate demands on the justice system, helping to reduce the need for more expensive expansions to justice facilities.



Enabling virtual courts and digital workflows

The adoption of virtual services will be necessary to reduce pressures on existing court infrastructure and improve access to justice for Albertans. Virtual court services offer a modernized alternative to in-person hearings, particularly for non-violent and lower-impact issues. Virtual court services can free up space and time in Alberta's overwhelmed court facilities by facilitating online dispute resolution, licence granting, fine payments, and other matters. To support the shift to a digital environment, tools such as web services, online portals, and digital applications will be required. While digital services cannot and will not completely replace human interaction, they can provide a platform for enhanced service delivery for Albertans.

In addition to virtual services, the shift to digital workflows will open the door for increased efficiency within Alberta's justice system. The ability to log in to an online portal and access documents can significantly reduce foot traffic in courthouses and law enforcement offices. The shift to virtual and digital platforms also decreases the need for labour intensive, manual, and paper-based processes. Instead, employees and users can access electronic documents quickly and with less risk of loss and damage. Digitalization of traditional justice system processes also introduces the potential to automate responses to public enquiries for quicker response times, and to reduce wait times through automated e-scheduling.

See [Sector One](#) and [Sector Three](#) for more on virtual service delivery.

For example: There are a number of ways that digitalization contributes to more effective and efficient court services:

- Case management can be moved to digital platforms to allow for easy access to client and case information.
- Justice system officials like judges, prosecutors, lawyers, and officers can easily distribute documents and files through digital portals to track and manage information all in one place.
- Legal documents, case bundles, and law libraries become increasingly accessible when available on digital platforms.
- Electronic documents can be provided quickly to prosecutors, judges, and court officers to reduce time spent inside courtrooms.

For example: On September 30, 2019, MyAlberta Fines Search was launched. This enhancement to the existing online payment portal gives Albertans the ability to search for information on outstanding ticket fines, then redirects them to the existing eServices website to pay their fines. Fines Search provides full visibility to Albertans of all outstanding ticket fines, including those that have passed to Fines Collection. More of these older fines are now being collected, resulting in an increase of over \$250,000 in revenue in the first five months since launch.

For example: In response to COVID-19, the Alberta Court of Appeal and Court of Queen's Bench of Alberta quickly shifted to delivering justice services through virtual means. All but a handful of judges began working remotely, and the number of hearings conducted by way of telephone, videoconferencing, and other remote means were expanded. In many ways, COVID-19 accelerated efforts that were already underway to enhance the use of electronic filing, digital resources, and virtual hearings to expand access to justice for Albertans.

Ensuring flexible, multi-use spaces

Public safety infrastructure will need to be adaptable and able to accommodate different purposes and diverse agencies, with spaces designed in ways that are flexible to service delivery changes and the emergence of new technology. This approach can reduce the amount of funding required to build new facilities for various purposes, allowing for greater long-term investment in improved service delivery. For example, joint law enforcement and public safety training centres can reduce the need for separate facilities, reducing operational maintenance costs and realizing savings for taxpayers. Sharing of facilities between AHS and law enforcement bodies, meanwhile, could support the sharing of health information and specialized resources with the potential to provide health care, improve training, expand specialized expertise, and reduce operational and maintenance costs.

Protecting and serving First Nations Peoples in Alberta

Policing services for First Nations (or on-reserve) communities are funded through a federal program called the First Nations Policing Program, in partnership with Alberta. This program provides First Nations communities with the option of either a self-administered police service or dedicated RCMP policing. First Nations communities often rely on the federal government for public safety resources and do not have a tax base that allows for allocation of funding to provide policing services. The Government of Alberta is working to improve the safety and well-being of First Nations Peoples in our province and improve their experiences with the justice system.

In 2019-20, the Government of Alberta:

- Provided over \$12 million in funding through the First Nations Policing Program for First Nations policing;
- Added 16 Indigenous Victims Outreach Specialists to Indigenous communities across the province;
- Facilitated the Family Information Liaison Unit to support families of missing or murdered Indigenous women and girls; and
- Negotiated with Public Safety Canada for additional police resources, and continues discussions on multi-year agreements in an effort to enhance policing services in Alberta's Indigenous communities.

Through these and other approaches, the Government of Alberta can help ensure that our province's communities are safe and secure, and that Albertans of all backgrounds and cultures have access to fair, impartial, and timely justice services no matter where they live.

APPENDIX B: MEGATRENDS FROM GLOBAL INFRASTRUCTURE HUB'S INFRASTRUCTURE FUTURES 2021 REPORT

In its 2021 report, Infrastructure Futures, the Global Infrastructure Hub provides data, insights, and best practices on infrastructure issues for the G20 group of nations, including Canada. The organization outlined 25 large-scale, transformative “megatrends” that have the potential to fundamentally shift the way countries build and use infrastructure.

Those megatrends include:

Urbanization and population growth

Worldwide migration to urban areas will cause planning to focus on the needs of megacities and issues such as congestion.

Aging population and workforce

Aging and inter-industry competition will impact the labour force, potentially causing higher costs and delays in projects.

Environmental, social, and governance (ESG) and corporate social responsibility

These practices may offer investors long-term performance advantages, and stakeholders are increasingly pressing companies for accountability on these metrics and practices.

Sharing economy

The sharing of resources in terms of labour, goods, and services is becoming more prominent.

Pressure for companies to increase efficiency and productivity

These elements are key for global economic growth and improving nations' standards of living.

Rise of health and safety concerns

Aging and inadequate infrastructure around the world pose risks to human health and safety, as well as risks to lost economic opportunity.

Demand shift to emerging economies

Rapidly developing economies are creating rising demands for infrastructure to support their growth ambitions.

Infrastructure financing gap

There is an estimated \$15 trillion gap between worldwide infrastructure needs and the capital expected to be invested by 2040.

Increase in bigger, more complex projects

Megaprojects are on the rise, bringing higher risks and potentially more conflicts.

Private participation in infrastructure

Governments around the world are increasingly partnering with the private sector to help meet their infrastructure needs.

Rise of security risk

Global terrorism, cyberwarfare, and other geopolitical security concerns pose risks to critical infrastructure.

Globalisation and international trade

The interdependence of worldwide economies will drive infrastructure needs to enable capital, people, information, goods, and services to flow smoothly.

Global divide and increased social inequality

Economic and social inequalities between and within countries are widening, potentially causing social and economic problems.

Multipolar world

Emerging economies and new alignments of different states are posing new challenges to established alliances, such as the G7 countries.

Rise of distrust and pressure for increased transparency

Stakeholders are increasingly sensitive about organizations' reputations and trust is getting harder to secure and maintain.

Rise of new materials and substances

The development of advanced building materials may lead to new and more resilient infrastructure designs.

Rise of alternative energy sources

Alternative and green energy sources are growing over time, including geothermal, biofuels, and biomass.

Rise of internet of things, sensors, and smart infrastructure

More objects will be enabled with computer chips and sensors, making buildings, grids, and other infrastructure “smarter.”

Rise of artificial intelligence (AI) and automation

Advances in computing power are pushing these forward, creating new possibilities for analyzing data and changing infrastructure needs.

Autonomous driving and new transport modes

The rise in autonomous vehicles, combined with models such as ride-sharing are changing the picture of transportation.

Digitalization

Organizations are shifting to digital solutions to better connect people, processes, and ideas, including in the planning, design, construction, and management of infrastructure.

Aging infrastructure

Shortfalls in investment and other challenges are leading to more dated infrastructure around the globe, posing social, economic, and environmental risks.

Rise of natural disasters and resilient infrastructure

Greater incidents of floods, fires, and other natural hazards are forcing the need for more resilient infrastructure designs.

Rise of climate change

Contributing to long-term fluctuations in temperatures, humidity, and rainfall, this will impact planning and design of infrastructure needs.

Resource scarcity and rise of the circular economy

Stress on natural resources will lead to greater use of circular solutions that extract maximum value from products and materials.

