



THE CANADIAN BLUEPRINT

BEYOND MOOSE AND MOUNTAINS

HOW WE CAN BUILD THE WORLD'S LEADING BIO-BASED ECONOMY



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ABOUT THE “CANADIAN BLUEPRINT”

What do compostable plastic bags, cold water laundry detergent and life-saving vaccines all have in common? They are all biotechnology products that make our lives healthier, safer, cleaner and better.

Biototechnology is creating products and processes that improve our quality of life. Just as importantly, biotechnology is also creating high-quality jobs for Canadians in every part of the country; rewarding, knowledge economy jobs.

No matter where we live, we all have a stake in the bio-based economy.

The “Canadian Blueprint” is a strategy that will enable us to take full advantage of all the opportunities biotechnology has to offer, provided all stakeholders do what is required of them.

This document is a call to action. The Canadian Blueprint is vitally important because, the fact is, biotechnology is critical to Canada’s future prosperity and economic security.

“Critical” is not an exaggeration. Canada’s bio-based sector, which includes all those businesses that are active in biotechnology, use the products of biotechnology or supply firms active in these areas, is now estimated to contribute roughly \$78 billion to Canada’s GDP.⁷ The bio-based economy is now larger than the auto industry, it towers over the Canadian aerospace industry, and is gaining ground on our oil and gas sector.

However, as strong as it is, it is also quite vulnerable to foreign competition. Understandably, given biotechnology’s tremendous potential, global competition is growing increasingly fierce. More and more countries are aggressively investing to build their biotechnology portfolios and strengthen their economies. Canada’s current top-ten position is now slipping.

The Canadian Blueprint will change this. If all of us – industry, governments, academia and ordinary Canadians – pull together, we will reverse Canada’s slide, and put our country on track to become the world’s leading bio-based economy. At the same time, if any partner delays or falls short, we will all suffer.

The Canadian Blueprint sets a transformational course that focuses on three interdependent priorities: people, capital, and the operating environment. As Canadians watch other nations move quickly, we see that urgent, simultaneous action is required in these three areas over the next five years in order to realize the benefits of a leading bio-based economy. The Blueprint proposes tactics that will create wealth for all Canadians. But it should be stressed that the Canadian Blueprint will only lead to success if all partners are willing to do their part. If partners – from the research sector to industry to all levels of government – don’t act, we will continue to fall behind.

Traditionally, Canada has been known around the world for its rich stores of natural resources, breathtaking landscapes and impressive wildlife – in other words, “moose and mountains”. But Canada is more than that. Canada is also a leader in science and innovation, learning and growth, development and technology. We have given the world insulin, canola, the walkie-talkie, the anti-gravity suit, the BlackBerry, and much more. Now, biotechnology and the bio-based economy can be the catalysts for the next wave of innovation and prosperity. Together, they can – and must – take Canada beyond moose and mountains to establish itself as a leader in the latest technological advances delivering sustainable benefits today, tomorrow and far into the future. Canada’s future is a bio-based economy that is sourced from our own innovation, discovery and resources.

THE BIO-BASED ECONOMY: ALREADY SHAPING CANADA'S SOCIETY

In the words of two experts in the field, "Canada's bio-based economy is already the backbone of the country's national economy." Through the firms it has helped create, and the revolutionary products it has introduced to the world, biotechnology is already transforming Canada's economy and society.

A bio-based economy is one that focuses on biological tools and products in the production of treatments, diagnostics, foods, energy, chemicals, and materials. A bio-based economy relies on sustainable sources of renewable goods, thereby protecting the environment. At the same time, the bio-based economy seeks to create products with a reduced carbon footprint, further enhancing the environment.

The bio-based economy is made possible by the continuing surge in scientific knowledge and technical abilities that can be used to harness biological processes for practical uses both in Canada's traditional industries, and in exciting new areas.² Dr. Ralph Hardy, an international expert in the field of agricultural biotechnology, postulates that the bio-based economy can — and should — be to the 21st century what the fossil-based economy was to the 20th century.³

Given the essential impact that biotechnology and the bio-based economy will have on our long-term prosperity, Canadian decision-makers have a critical choice to make: we can either foster bio-based innovations here at home — and reap the substantial benefits that flow from those innovations — or we can buy innovative products and processes from abroad, and enrich our competitors while impoverishing ourselves. It's that simple.

Other countries that are successfully building bio-based economies have acted boldly and decisively to create fiscal, investment and regulatory environments where biotechnology can flourish. For example, in other jurisdictions there has been talk of granting tax holidays or fast-tracking visa applications to attract key biotechnology researchers. France has tripled its research tax credit "le crédit impôt recherche" to up

to \$159 million over five years. The credit is fully refundable for a period of 5 years, plus more for certain emerging companies like biotechnology. India has announced plans to become one of the "top five global pharmaceutical innovation hubs" and create 500,000 new jobs in biotechnology within the next four years. These countries and others like them have not attempted to "select the winners," as governments have done in the past. Instead, governments have removed the tax, regulatory and other obstacles that stood in the way of the industry's growth. As a result, market forces are now flooding these economies with high-value companies and jobs, creating successful careers and industries that deliver long-term value to the host nations and their citizens.

Fig. 1: Canada's bio-based economy has reached almost \$78 billion a year or 6.4% of Canada's current GDP.

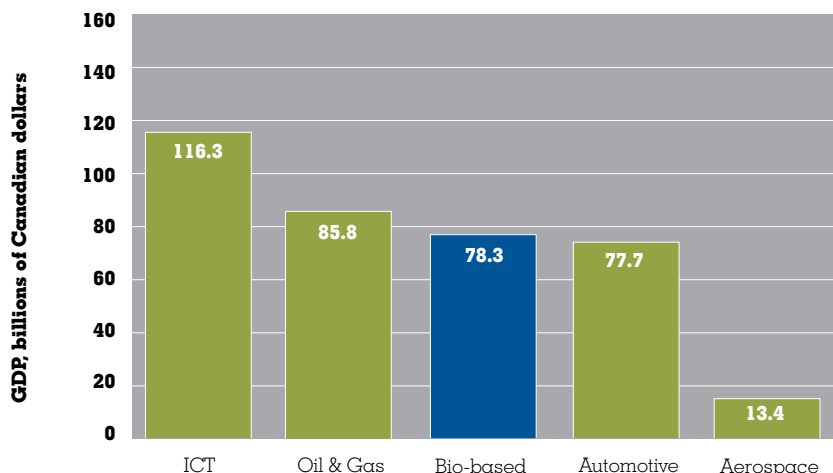


Figure 1 highlights the Biotechnology contribution to GDP over the past four years and compares it to the aerospace, automotive, oil and gas, and information and communications technology sectors in Canada.

BIOTECHNOLOGY: IMPROVING OUR QUALITY OF LIFE

You may not know it, but thousands of products that Canadians manufacture, export, use and rely on every day are a result of biotechnology. As the following examples illustrate, biotechnology is already hard at work, making our world a better place.

The “clot buster” treatments that patients receive for heart attacks and strokes are a result of biotechnology, joining more than 150 other medicines that have been developed over the past 20 years to treat diabetes, cancer, HIV and arthritis, to name but a few. Vaccines are another biotechnological advancement, credited with saving lives, eradicating some illnesses in Canada and protecting children from a variety of potential health risks.

There may be some Canadians who say, “I don’t have a research institute or a pharmaceutical facility in my community, why should I care about biotechnology?” That kind of thinking is mistaken. Whether our local economy is based on farming, forest products, manufacturing or some other sector, the fact is the economy affects all of our lives.

Our country’s long-established industries benefit from biotechnology. Canada’s multi-billion dollar plastics industry is benefiting from bio-products, and innovative bio-processes are opening up new markets for the forest products industry. The automobile manufacturing industry is moving toward products developed through the application of biotechnology to breathe new life into this traditional pillar of the Canadian economy by adopting green technology approaches.

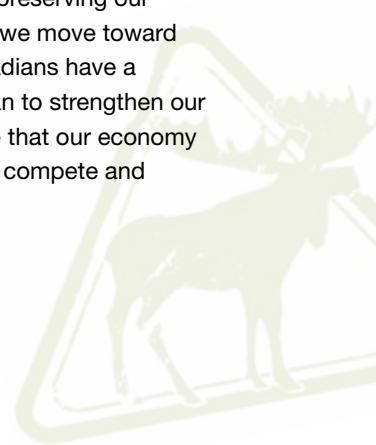
Agriculture is one of the areas where biotechnology is having the greatest impact, improving nutrition, while protecting and enhancing our environment. Breakfast cereal today is produced from grains grown using less pesticides thanks to insect- and disease-resistant corn varieties resulting from advances in biotechnology. Biotechnology has even developed plant varieties that can flourish in arid soil or contain extra nutrients.

A feed additive that enhances disease resistance in shrimp was developed in Canada to protect the US aquaculture industry worth over \$7 billion in the United States alone. Clothing can be made from cotton plants engineered to resist pests. Canadians brew coffee using coffee filters produced with less chlorine and energy, and wash their clothing with cold-water detergents that use enzymes, saving water and energy.

The goal is simple and worth repeating: “Let’s build it here.”

Our homes are built using roofing tiles, linoleum, cabinets and carpeting manufactured from agricultural produce or from bio-mass or recycled products. All of these revolutionary products lead in turn to more transformative innovations. And let us not forget the patent lawyers, financial service providers, accountants and others who enable the growth and development of the numerous firms directly involved in the bio-based economy.

Biotechnology is already a key component of our economy. Every day, our society is integrating biotechnology in an ever wider variety of applications and uses with products that make our lives safer and easier, while protecting and preserving our environment. For this reason, as we move toward a fully bio-based economy, Canadians have a responsibility to do all that we can to strengthen our biotechnology sector and ensure that our economy has the home-grown capacity to compete and succeed in the 21st century.



BIOTECHNOLOGY: POWERING CANADA'S ECONOMY TODAY, AND INTO THE FUTURE

The Conference Board of Canada notes that biotechnology is a critical technology platform essential to Canada's ongoing prosperity.⁴ Canadian companies developing biotechnology products and applications are creating a success story we can all take pride in: the market capitalization of our public biotech companies was over \$20 billion, and revenues have grown to \$4.2 billion annually.⁵ Biotechnology has not been immune from the economic downturn of late. At the time of writing, many biotechnology companies have massively scaled back, gone dormant or out of business. This could have been avoided.

Canada provides approximately 4% of the global biotechnology industry revenues. To get a sense of what that means, it is worth noting that Canada represents just 1.8% of the global economy.⁶ At the same time, Statistics Canada reports that the biotechnology industry sector achieved a remarkable 13% growth in employment over the last two years.⁷

In Canada and elsewhere, biotechnology and the bio-based sector are increasingly part of the mainstream, with economy-wide impacts. As was stated in a New Zealand White Paper on the subject, "In many respects, analogous to the innovation and diffusion patterns of the information technology era, the biotechnology industry is moving from a specialty, high technology area to an increasingly ubiquitous, imbedded, and enabling technology with sweeping commercial applications throughout all sectors of the global economy."⁸

Canada is helping to lead global scientific discovery and providing world-class corporate leadership in many sectors of biotechnology uses, from agriculture and health to environmental technologies, and industrial and manufacturing solutions. Canada's

public sector has invested billions of dollars in infrastructure and academic research programs over the last decade.

The Canadian biotechnology industry plays a pivotal role in our country's productivity, working to turn excellent Canadian research and scientific discovery into commercialized products and new processes for the global marketplace.

When we calculate the footprint of companies developing biotechnology and consider other companies using biotechnology or providing support, we see that Canada's bio-based economy has reached almost \$78 billion a year, or 6.4% of Canada's current GDP.⁹

An excellent illustration of the impact of biotechnology, and the growth of the bio-based economy, is our agricultural sector. Agriculture and crops is the second most important component of Canada's bio-based economy. Our crop-production sector GDP is nearly \$14.7 billion. That comes from 17.3 million acres of genetically modified crops out of 74.6 million total acres.¹⁰

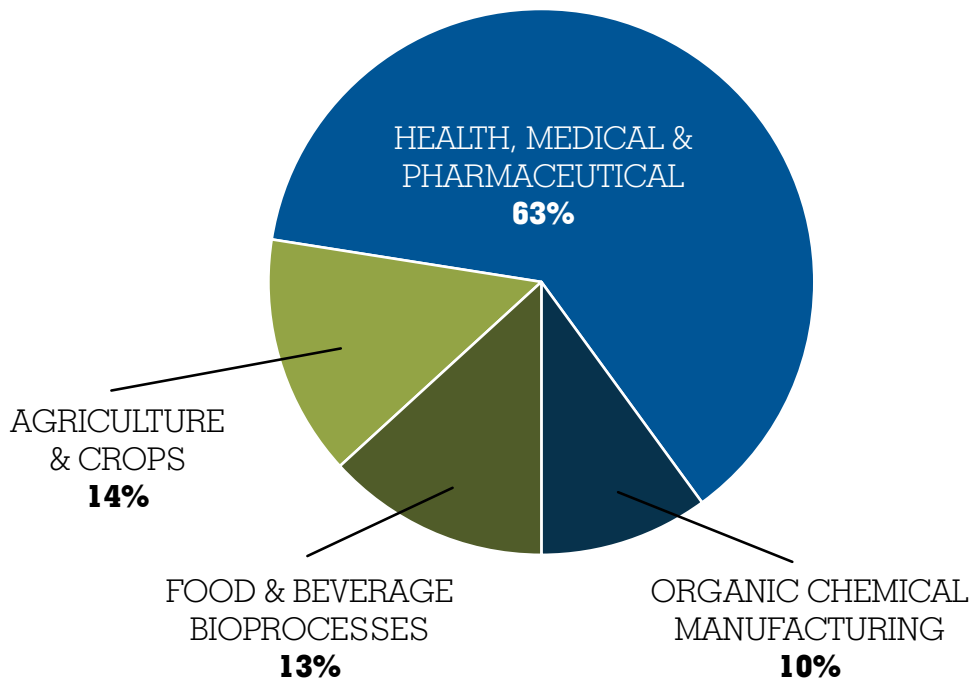




Taken together, biotechnology is delivering impressive results to Canada in terms of economic performance, environmentally-friendly products, and new applications and markets for established industries. Biotechnology is in the vanguard of the science and technology economy and is the key to future and sustainable growth of the Canadian economy.

This sector can drive future economic growth, as new Canadian biotechnology firms continue to grow and invest in job creation in communities across the country. At the same time, biotechnology has the power to reinvigorate traditional Canadian sectors like the pulp and paper and auto industries, through the introduction of revolutionary new products that save energy and protect the environment.

Fig. 2: Canada's bio-based economy main components





THE GLOBAL BIOTECHNOLOGY RACE: OUR PROSPERITY IS AT STAKE

Canada is in a global race for biotechnology success. Countries around the world in search of the next technology platform to drive innovation and prosperity are investing in biotechnology.¹¹ This is due in part to the fact that experts are predicting that biotechnology will have a greater impact on the 21st century than information technology had on the 20th century. Solutions in the fields of health, medical technologies, engineering, energy, agriculture, forestry and the environment are all emerging multibillion dollar markets, and our competitors are jostling to position themselves in the front ranks. This race is heightened even more as traditional industries like automotive struggle in the 21st century.

Many nations in every corner of the world are aggressively investing to build their biotechnology portfolios to capture the global economic value offered by this important field. Canada must act now in order to attain and hold onto its share of this rapidly growing global sector. Failure to act now means Canada runs the risk of losing our pioneering biotech companies, which find it more rewarding or simply necessary to relocate to the US or elsewhere. We could become the country that simply provides the raw biomass to others for processing, which we will in turn be forced to buy back at higher prices.¹² We have already seen a number of successful biotechnology firms forced to take their ideas to other jurisdictions, because they were held back by business and regulatory obstacles here in Canada. Those companies represent many thousands of good jobs and billions of dollars in lost tax revenue, not to mention valuable intellectual property that Canadians are now forced to buy like any other foreign customer.

We must build biotechnology at home, instead of buying it from abroad. Leadership, development and courage will take us to new heights, as the world's leading bio-based economy by 2020.

Canada Falling Behind Other Countries

In the global race for biotechnology success, Canada is starting to fall behind other countries. For example, it is alarming to note that biotechnological investment in Canada is less than 1% of what it is in the United States, when it should be over 10%, based on our relative populations.¹³

It is forecast that the social and environmental impact of biotechnology in the 21st century will outstrip the impact of information technology in the 20th century.

And the United States is not the only country moving forward. The global investment picture continues to grow and evolve as more nations recognize the strategic importance of a strong biotechnology sector as an important platform for their future economic growth and stability.

Countries are taking important steps to help their growing biotechnology sectors. For example, new biotech ventures in France grew tax-free for 8 years; the period was 10 years in Malaysia. Australia leads the world in public expenditure on research and development (R&D) as a percentage of gross expenditure.

The EU is forecast to invest CDN \$12.9 billion in the development of people, competitiveness and innovation alone through new strategies that will enable research and development across the region between 2005 and 2009.

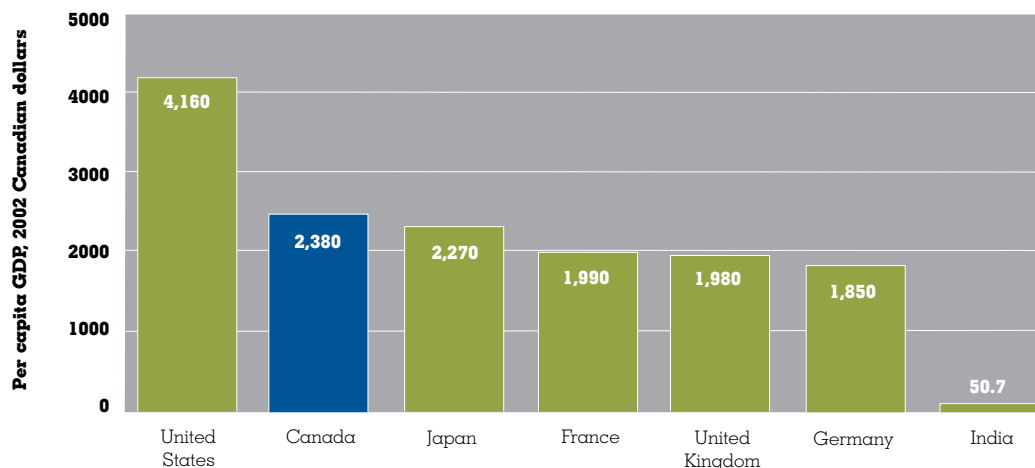
The list of countries active in this area is truly impressive. Brazil, a mid-income nation, has earmarked CAD \$50 billion to grow its biotechnology sector. Ireland has promised CAD \$31 billion over five years for science and technology. Singapore — a very small country — has invested over CAD \$5 billion in their biotechnology efforts.

Jurisdictions that have successfully built leading bio-based economies (such as California), and sectors well on the way to doing so (such as the EU), have made a conscious decision to create fiscal, investment and regulatory environments in which biotechnology can flourish. Unlike some governments in the past, they have not attempted to “choose winners”. Instead, their governments are removing the tax, regulatory and other punitive obstacles and are now letting responsive market forces flood their economies with high-value companies and jobs.

Today’s footprint in biotechnology generates close to 6.4% of Canadian GDP and 1,000,000 jobs in Canada.¹⁴ Focused attention on the efficient development and use of biotechnology innovations will increase value and return for Canada. Using the USA as an example, Canada could see an increase in Canada’s GDP contribution to 8.4%, and increase employment by an additional 375,000 high-paying 21st century jobs. This is more important than ever, given the current economic slowdown.

The global community has already recognized that the future is biotechnology. Canada must do the same.

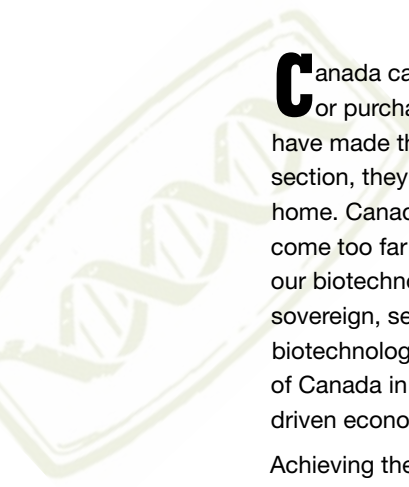
Fig. 3: International comparisons of bio-based economies





BUILDING THE WORLD'S LEADING BIO-BASED ECONOMY: CANADA CAN DO IT

Canada needs to innovate and develop in order to remain globally competitive. If we don't, we will be relegated to “also-ran” status, where we will continue in our traditional role of “hewers of wood, and drawers of water.” That is not how our country will reach its full potential in the 21st century. We can — and must — build our bio-based future with the skills, innovation and intellectual resources of Canada.



Canada can choose to grow its innovation at home or purchase it from abroad. Other countries have made their choice: as we saw in the preceding section, they are growing their own innovation at home. Canada has already invested too much and come too far to fall behind now. We need to grow our biotechnology sector and stake our claim to a sovereign, self-directed future or be swept away in the biotechnology wake of nations who are already ahead of Canada in the race for a developed biotechnology-driven economy.

Achieving the benefits of a bio-based and fueled economy, however, requires a strategy that aligns objectives and creates a successful culture of innovation and excellence.

To thrive in the inter-connected global economy, advanced economies like Canada's must put ever greater emphasis on the knowledge economy.

Industry Canada's *Mobilizing Science and Technology to Canada's Advantage* lays out a course for Canada to ensure continuing prosperity. It notes “Canada must translate knowledge into commercial applications that generate wealth for Canadians and support the quality of life we all want...”, “Canadians must be positioned at the leading edge of the important developments that generate health, environmental, societal, and economic benefits ...”, and “Canada must be a magnet for the highly skilled people we need to thrive in the modern global economy, with the best

educated, most skilled and most flexible workforce in the world.”¹⁵

Clearly, the Government of Canada understands the importance of innovation to our future prosperity, and has identified some concrete goals. The biotechnology industry and its innovations stand out as the best examples of how to achieve these goals. Our workforce is highly educated and Canada attracts some of the best and the brightest minds from around the world. As a result, much has been accomplished already. But that is only the beginning. More can and must be done to bolster our bio-based economy.

To thrive in the inter-connected global economy, where jobs in the natural resources and manufacturing sectors are increasingly migrating to developing countries, advanced economies like Canada's must put ever greater emphasis on the knowledge economy. Transforming our economy from one that is resource-based to one that is knowledge-based — and bio-based in particular — will provide our economy with the long-term rejuvenation it needs to create wealth and maintain our long-standing commitment to social responsibility. At the same time, biotechnology can also help breathe new life into Canada's more established industries, creating good jobs in communities in every part of the country.

THE CANADIAN BLUEPRINT:

THE TIME FOR ACTION IS NOW

The global biotechnology race is on, and Canada can't afford to lose. We can be a winner, but only if we get serious, make some important decisions, and get to work.

B*eyond Moose and Mountains* provides a strategic plan for a successful future. By acting on their recommendations, we will maximize the potential of biotechnology to expand Canada's leading sectors, increase value-added activity, create new areas of economic diversity, provide Canada with a sustainable and green economy, create jobs and — most importantly — create wealth to secure our economic and social imperatives.

BMM proposes a transformational approach in three interdependent areas: people, capital and the operating environment. The actions in all three areas must be initiated simultaneously to realize the benefits of a leading bio-based economy.

BMM sets out tactics that will create wealth for Canadians. But to be successful Canada requires actions from companies and the alignment of federal, provincial and municipal governments. And considering the competitive landscape, this strategy will make Canada the next leading bio-based economy in the world only if we implement it now. We cannot rest on our past successes; we must embrace innovation and act today.

Canada can emerge as a leading destination for knowledge industries like biotech if we build a pan-Canadian framework to develop the technology through its entire lifecycle. That means ensuring that scientists and entrepreneurs get the necessary financial support every step of the way, from the laboratory to the trade show floor. It also means ensuring that regulations do not throw up unnecessary and costly obstacles that impede scientific innovation and economic growth.

The biggest challenges facing biotechnology in Canada today are:

- Attracting investment for commercialization
- Building the business case to do more here
- Hastening the pace of biotechnology adoption
- Attracting and retaining the high-quality people necessary to expand our research base to provide the necessary, experienced, entrepreneurial and managerial leadership to grow a bio-based economy

All of these challenges can be overcome if governments, private enterprise and the research community choose action over hesitation — decisiveness over delay. We can use the Canadian Blueprint to build long-term success, if all partners work together and focus their efforts on the three priorities: capital, people and the operational environment.



BLUEPRINT PRIORITY: CAPITAL

Goal: Over the next five years stimulate new capital formation, achieve world-leading efficiency in the use of capital, and create the most bio-friendly tax regime in the world.

Result: This will create the lowest cost of capital to generate innovation, as well as move innovation from the research lab to the marketplace.

Investments by Canadians:

- Generate new investment incentives by exempting investments in Canadian emerging technology companies from the capital gains tax.

Investments by companies:

- Create a world-leading research and development corporate investment program to stimulate new industry investments in domestic research capabilities and infrastructure.
- Enable companies to generate revenues through an expedited, inexpensive means by which tax losses can be monetized for domestic activities (e.g., allow companies to sell tax losses or get a cash advance from government).
- Establish a “bio-credit” program of grants and capital cost tax allowances to encourage companies to use bio-based products and processes, and to support the retooling of traditional industries, as well as offer enhanced credits for bio-based products manufactured in Canada.

Investments by international investors:

- Improve the tax treatment of American and other foreign venture capital and private equity invested in Canadian emerging technology companies to make Canada the world’s most attractive market.
- Forfeit the corporate tax on emerging technology R&D overhead to encourage new and greater investment in R&D. This will create numerous high-paying jobs yielding up to ten times the amount of the forfeited corporate tax in new personal income taxes.

Investments by governments:

- Introduce an intellectual property tax credit for revenues generated from intellectual property based in Canada.
- Reduce the combined corporate income tax rate on biotech companies selling products from its current level of 33.5% to 12.5% to match the lowest level imposed by competitor nations (those identified as aggressively pursuing biotechnology).
- Maintain and grow government funding of proof-of-concept innovation to ensure the long-term viability of a domestic emerging technology sector that moves from the research bench to the marketplace.
- Consolidate and grow investment programs to create a national \$20 billion biotechnology research and development partnership program (BIOPARTNER). BIOPARTNER would directly fund and leverage industry-based biotechnology investments from the research bench to beta-testing, trials, early commercialization and expansion over the next five years in the four bio-industries of health and medical technologies; agriculture, aquaculture and forestry; energy and environment; and resource and food.





BLUEPRINT PRIORITY: PEOPLE

Goal: Over the next five years develop, attract and retain world-class talent in both biotechnology research and the commercialization of innovation.

Result: All Canadians will benefit from domestic biotechnological innovation and commercialization.

Build:

- Establish undergraduate, graduate and post-doctoral scholarship programs and international internships to expand basic and applied life sciences research and education at Canada's post-secondary educational institutions.
- Expand the post-secondary education sector's capacity to increase the number of graduates year over year for the next decade to meet industry requirements for growth.
- Expose Canada's youth to the fundamentals of biotechnology with experiential learning opportunities throughout the K-12 curricula.
- Support graduate business schools in educating industry experts in fundamental business principles, as well as assisting researchers and business people interested in biotechnology ventures to develop the business plans, market opportunities and production facilities for new bio-based products and processes.

Attract and retain:

- Recruit, repatriate and retain the world's best research, product development, managerial and leadership talent to Canada as an immigration priority, with biotechnology becoming Canada's "magnet" sector.
- Provide competitive income tax relief for research and management leaders to relocate and stay in Canada.
- Change work permits from being annual to three or five years, depending upon the situation, and ensure that permits are transferable from firm to firm.
- Provide competitive treatment of stock-based compensation for emerging technology executives to encourage investment and retain talent.



BLUEPRINT PRIORITY: OPERATIONAL ENVIRONMENT

Goal: Over the next five years create a new, enabling operational environment to align all government policies, regulations and research & commercialization efforts.

Result: Capture the full potential of innovation.

- Establish a flexible, world-leading regulatory environment that encourages the rapid development, approval and introduction of Canadian bio-based products, processes and technologies.
- Establish a standard pan-Canadian approach of “Leave no innovation behind!” that sets first-in-world adoption of bio-based products, processes and technologies as the primary objective to support and lead commercialization of new technologies.
- Establish additional incentives to recognize domestic work in the field of biotechnology.
- Establish world leading intellectual property and data protection laws to attract and retain innovation, investments, companies, jobs and people in Canada.
- Standardize the process by which publicly-owned intellectual property is disseminated and transferred, to enable the timely access to innovation for development and commercialization.
- Create world-leading government procurement policies that rapidly enable the adoption and domestic market penetration of Canadian products, processes and technologies.
- Bring industry, governments and post-secondary educational institutions formally together as true partners to develop and commercialize solutions in energy, healthcare, agriculture, aquaculture, forestry, industry and the natural environment.



THE CANADIAN BLUEPRINT: HOW WE WILL MEASURE SUCCESS

The ultimate measure of success will be seen in reaching the goal of having Canada become the world's leading bio-based economy. This goal can be quantified in several ways:

- Bio-based economy as a percentage of the Gross Domestic Product
- Growth in Canada's percentage of the world bio-based sector
- The world's adoption and use of biotechnology derived from Canadian effort

Success must be assessed over time to evaluate the implementation of the strategy, the outcomes and the impact for the country. Measures that can be used to track progress of the strategy include:

- Value of industry expenditures in capital and research and development
- Number of employees in the bio-based economy
- Number of companies using biotechnology
- Sales revenue of biotechnology
- Valuation of domestic and foreign public and private investments in biotech companies and bio-based products and processes
- Per capita increase in the transformation of scientific ideas into commercial products, services and technologies
- Percentage and number of graduates in biotechnology and related management programs from Canadian post-secondary institutions taking their first job within Canada and remaining within the country after five and ten years
- Measured public awareness and perceptions about biotechnology and its contributions to Canada's industries
- Shortest times for approval and adoption of biotech products and processes
- Measurable effects on the environment

WHAT A BIO-BASED ECONOMY MEANS FOR CANADIANS

The Canadian Blueprint is a practical, feasible plan that can put Canada in the front ranks of the global bio-based economy, if everyone does their part. Recent advances in the life sciences and other fields are ensuring that the 21st century is indeed the century of biotechnology. A wide range of R&D activities are maturing at a remarkably rapid pace and Canada needs to be poised to reap these benefits.

New treatments and drugs, pest-resistant crops and improved food production, biologically controlled production processes, new materials and textiles, and biologically-based computing may become part of our everyday lives in the future. These advancements will lead to improvements in our health, environment, and industrial, agricultural and energy production. These biotech advances could affect our society as profoundly as information technologies have already done.

Biotechnological techniques, materials and devices promise — especially if they converge with other technologies such as IT, bioinformatics and nanotechnologies — to transform the way a whole host of products are designed, manufactured and used.

The transformation of industry and consumption may provide significant opportunities for sustainable growth in both developed and developing countries. It could also lead to far reaching changes in economic activity and society, as well as to some complex policy challenges.

Biotechnology and bio-based innovations build on Canada's investments in infrastructure and people to help Canada lead at a global level. Biotechnology not only promises new products, technologies and jobs but also the advantages to be gained from making existing products, technologies and jobs more competitive in the world marketplace. Canadian biotech companies — once their products have been commercialized — have been shown to produce a tax recovery ratio over a decade of \$8.00 for every \$1.00 invested.¹⁶

What's more, it is worth noting that many Canadian manufacturing and processing industries currently in decline can be saved by bio-based materials, inputs and processes. Biotechnology can add new, green, wealth-creation opportunities to our existing resource, agricultural, health and processing industries. Canada needs a sustainable economy. And let us not forget the many Canadians working in related fields, like lawyers, accountants, financial service providers, and many others.

Having a sustainable economy and a green economy are no longer mutually exclusive. Biotechnology is the key to having both, and Canada is perfectly positioned to have a sustainable and green economy because it possesses one of the world's largest and most impressive biomass supplies.

Canadians can look forward to sharing in all the benefits of biotechnology and the related bio-economy, but we must act now.





CONCLUSION: WE CAN BUILD OUR FUTURE

The history of Canadian biotechnology — a word not in popular usage until the 20th century — reaches back to the early 1880s and the introduction of smallpox vaccine, and includes the invention of insulin that saved the lives of millions of diabetics.

Many Canadian biotechnology advances would add to the national record of achievement that grew to include pioneering work on DNA, plus the eradication of polio, new life-saving vaccines and a body of scientific knowledge that is shared around the globe.

Canadian governments have clearly demonstrated that they recognize the importance of scientific research and development, and just as importantly the need to invest resources and adopt new policies to help the knowledge-based economy prosper and grow.

The good news is that we have already achieved a great deal. The bad news is that the competition is getting tougher all the time. We are barely holding our own, while our competitors in Europe and Asia are nipping at our heels. What's more, rapidly rising

economies like China, India and Brazil are also investing increasing amounts in biotechnology.

In 2009, the challenge is to engage all Canadians in building a bio-based economy that becomes the foundation for a safer, cleaner, healthier and more sustainable future. With this document we are issuing a call to action to all elected officials, business leaders, researchers and other Canadians: embrace the Canadian Blueprint and help build a bio-based economy that provides jobs for the 21st century and made-in-Canada scientific advancements that benefit our established industries.

Canada's history is one of innovation, risk, fortitude and determination. Our future is one of economic prosperity, environmental sustainability, scientific discovery and the security of producing the biotechnological advances in Canada using Canadian talent, skill, technical prowess and foresight.

The time is now to move beyond Canada's old image of "moose and mountains" and toward a future we can create for ourselves; a future that stimulates economic prosperity for every Canadian while making scientific discoveries that benefit the world.

Beyond Moose and Mountains is an economic strategy that is based upon Canadian talent and innovation. It is a clear route with specific steps to a new bio-based economy that is sourced from our own talent, drive and innovation.

If you are reading this document, it is because you are one of the decision-makers who can decide if we succeed or fail. The future is in your hands. We ask you to commit yourself today to making this vision a reality.

Biotechnology is our future and we must build it, not buy it. We must create the economy of the 21st century today to ensure our prosperity tomorrow.

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buy it. We
must create
the economy
of the 21st
century today
to ensure our
prosperity
tomorrow.**

BIOTECHNOLOGY MILESTONES

1882

Smallpox Vaccine is made available in Canada.

1910

Rabies vaccine treatment is introduced in Canada.

1919

The word “biotechnology” is used for the first time.

1922

Dr. Frederick Banting and his assistant Charles Best discover insulin as a treatment for diabetes.

1930

Routine immunization with diphtheria toxoid begins in Canada.

1943

Routine immunization for whooping cough is implemented in Canada.

1962

Canada introduces the Sabin oral polio vaccine (OPV) preventing over 20,000 polio cases annually and is one of the first nations on earth to eradicate the disease.

1969

Canada introduces rubella vaccine decreasing incidence of the disease by 60,000 cases annually.

1974

Canola is created by Canadian scientists Dr. Baldur Stefansson and Dr. Keith Downey.

1979

WHO announces the worldwide eradication of smallpox.

1983

The petunia becomes the first whole plant grown from a biotechnology process.

1987

Genetically engineered hepatitis B vaccine is approved for use in Canada.

1988

Vaccines for the prevention of bacterial meningitis decrease the incidence of cases in children by 97%.

1989

Naturally occurring bacterial enzymes are used in the clean up of the Exxon Valdez oil spill in Alaska.

1990

Canadian physician Dr. Lap-Chee Tsui discovers the defective gene causing Cystic Fibrosis at the Hospital for Sick Children in Toronto.

1992

Canada’s human genome project is announced.

1993

Canadian scientist Dr. Michael Smith wins the Nobel Prize in chemistry for work on deprogramming DNA segments.

1997

Since 1986 Canada has contributed \$96 Million in donations toward universal immunization in developing countries.

1998

Canada introduces the first public immunization program for chickenpox.

2000

Canadian scientist Dr. Peter St. George-Hyslop successfully immunizes mice against Alzheimer’s disease.

2003

Canadian researchers become the first to sequence the SARS genome and release their findings on the Internet to help in the development of a potential treatment and possible vaccine.

2005

The Government of Canada announces a donation of \$160 Million to the Global Alliance for Vaccines and Immunization (GAVI).

2007

The Government of Canada announces \$111 Million in funding to the Canadian HIV initiative.

2008

The introduction of Beyond Moose and Mountains by BIOTECanada.



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BUILDING BEYOND MOOSE AND MOUNTAINS

Join the team of industry leaders across Canada who are working to build Canada's bio-based economy.

We welcome your involvement as we move forward on this important initiative.

Visit the website www.beyondmooseandmountains.ca for more information as it becomes available, or contact **Cate McCready** at BIOTECanada:

cate.mccready@biotech.ca

613.230.5585 ext.230



Thank you to all participants in the Beyond Moose and Mountains initiative.



About BIOTECCanada – www.biotech.ca

BIOTECCanada is dedicated to the sustainable commercial development of biotechnology innovation in Canada. It is the national industry-funded association with over 250 member companies representing the broad spectrum of biotech constituents including emerging and established firms in the health, industrial, and agricultural sectors, as well as academic and research institutions and other related organizations.