

Corporate Plan

2013–14



GenomeCanada

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GenomeCanada

Corporate Plan 2013–14

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SECTION I – About Genome Canada

Established in February 2000 under the *Canada Corporations Act*, Genome Canada is a not-for-profit organization that invests in genomics¹ research in key sectors of strategic and economic importance to Canada, and fosters networks of expertise across Canada and globally with a view to generating economic and social benefits for Canadians.

The first 10 years of Genome Canada focused on delivering its inaugural mandate – to develop, implement and maintain a national strategy in genomics research in sectors of strategic and economic importance to Canada – health, agriculture, environment, forestry and fisheries. It achieved this by building research capacity and technological capability, funding large-scale genomics research, cultivating Canadian scientific expertise, establishing international leadership and building partnerships.

In 2012, Genome Canada launched a five-year Strategic Plan (*The Way Forward: Building a bio-economy through innovation and partnership*). This plan recognizes the growing influence of genomics as a transformative technology that will play a key role in addressing the most pressing challenges facing society in the 21st century. The strategic plan can be viewed on Genome Canada’s website.

See

<http://www.genomecanada.ca/medias/PDF/EN/GC/Strategic-plan-full-version.pdf>

To this end, Genome Canada has committed to concentrating its future investments in research programs and initiatives which will bring the greatest economic and social benefit to society, by placing a greater focus on the translational aspects of the genomics research it supports. This new emphasis will significantly change the way Genome Canada will do business in terms of:

Setting Strategic Priorities

Funds will be invested in seven sectors of economic and strategic importance to Canada: agriculture, energy, environment, fisheries, forestry, health and mining. Sector strategies are being developed for each sector in close collaboration with key end users so as to identify the best opportunities for genomics applications to advance each sector’s economic competitiveness and growth.

This prioritization approach is also evident in the international arena, in which Genome Canada seeks to participate in specific international genomics

Strategic Plan Vision

Harness the transformative power of genomics to deliver benefits to Canadians

Strategic Plan Mission

To lead the Canadian Genomics Enterprise by:

- Connecting ideas and people across public and private sectors to find new uses and applications for genomics;
- Investing in large-scale science and technology to fuel innovation; and
- Translating discoveries into applications to maximize impact across all sectors

Strategic Plan Objectives

- Respond to societal needs by generating genomics discoveries and accelerating their translation into applications
- Attract greater investment in genomics research from a broad range of stakeholders, in particular the private sector
- Enhance the impact of genomics by transforming knowledge of the ethical, environmental, economic, legal and social challenges and opportunities into sound policies and practices
- Enhance the recognition of the value of genomics by increasing stakeholder appreciation of genome science, its applications and implications

¹ Genomics means the study of genes and their functions, namely genomics, proteomics, metabolomics, bioinformatics and other related fields of research.

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research consortia, when it is deemed that it can significantly contribute expertise and leadership or that Canada will derive substantial benefits from Genome Canada's participation. Thus, Genome Canada has funding commitments with several major international projects, including the Cancer Stem Cell Consortium, the Structural Genomics Consortium (SGC), the International Wheat Genome Sequencing Consortium, the International Barcode of Life Project (iBOL), and the International Mouse Phenotyping Consortium, among many others.

Re-engineering Programs

Genome Canada will continue to support large-scale and interdisciplinary, internationally peer-reviewed research projects, and leading-edge technology through its Science and Technology Innovation Centres (STICs) in order to maintain Canadian leadership in genomics while placing greater emphasis on understanding how to apply this new knowledge to the benefit of Canadian society. Concurrent to these activities, Genome Canada intends to launch over the five-year period of its strategic plan, subject to the availability of funds, three genomics applications programs:

- **Genomic Applications Partnership Program (GAPP)** - a user-pull program involving academia and user (industry, government or other) project partners with the goal of promoting the application of genomics-derived solutions to address key challenges or opportunities facing users.
- **Research for Innovation in Small and Medium Enterprises (RISME)** - a program that supports innovation by investing in projects led by small and medium enterprises.
- **Entrepreneurial** - programs that foster an entrepreneurial mindset within the research community to undertake innovation activities beyond the science

Underlying these research efforts will be a sustained commitment to the ethical, environmental, economic, legal or social aspects (GE³LS) of the research undertaken in order to facilitate the translation of genomics into society.

Strengthening Partnerships

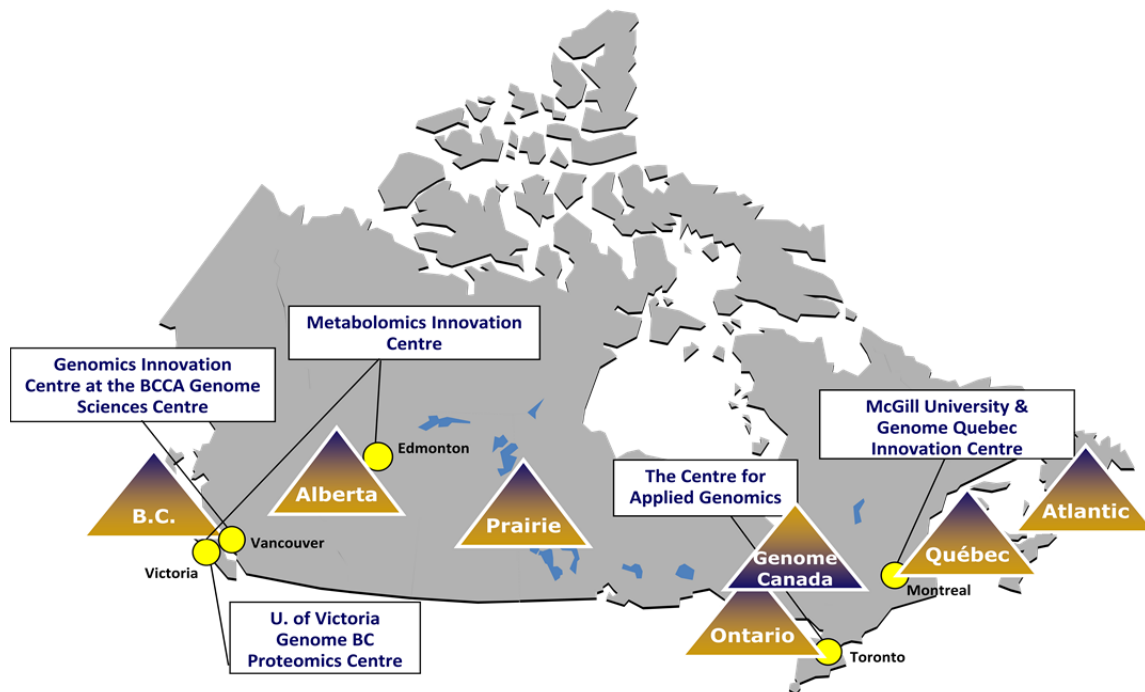
The operating model to deliver Genome Canada's mandate using the six Genome Centres as its primary partners has proven to be highly effective. Collaborative national and regional leadership offers a potent solution to respond to needs and priorities across the country.

The six Genome Centres are located in the regions of British Columbia, Alberta, the Prairies, Ontario, Quebec, and the Atlantic. The relationship between Genome Canada and each of the Genome Centres is defined by means of a funding agreement that not only acknowledges the independence of each Genome Centre, but also specifies the parameters in which each Centre contributes to common national objectives in the realm of genomics research. The Genome Centres play significant roles in fostering regional expertise in genomics research, developing partnerships to strengthen regional leadership and competitiveness, facilitating access to the STICs, creating unique and innovative public outreach programs, and most importantly, securing co-funding for projects from both domestic and international investors. The Genome Centres are also close to private sector receptors with the capacity to "pull" technology from the academic sector.

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In 2011, the Board of Genome Canada commissioned a formal review of the Genome Centres and the current operating model by an external expert panel of reviewers. The final report of the Panel confirmed the continued relevancy and viability of the model, along with recommendations to further optimize operational efficiencies and effectiveness.

Genome Centres and S&T Innovation Centres



Genome Canada, in collaboration with the six Genome Centres, has raised over \$1 billion in co-funding commitments to supplement the \$1.04 billion committed by the Government of Canada over the past 12 years. Co-funding partners include provincial governments and agencies, international non-governmental organizations and research institutes, industry, universities, and research hospitals. This collaborative effort has resulted in funding commitments to support 165 large-scale research projects and S&T Innovation Centres, and six regional Genome Centres.

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Genome Canada Portfolio - 2000 to 2012 Numbers of Projects/Innovation Centres by Sector and Region

Sector	Genome British Columbia	Genome Alberta	Genome Prairie	Ontario Genomics Institute	Genome Quebec	Genome Atlantic	Total
Agriculture	3	3	5	2	2	1	16
Energy	2	1	1				4
Environment	4	1		5	2	1	13
Fisheries	2					2	4
Forestry	5			1	3	1	10
GE ³ LS	2	1	2	3	2		10
Health	21	2	2	27	22	3	77
Cross-Sector Initiative							
Technology Development	3	1	2	10	2		18
S&T Innovation Centres	4	2		2	1	1	10
Entrepreneurial Education Program	1			1	1		3
Total	47	11	12	51	35	9	165

GE³LS = Ethical, Economic, Environmental, Legal and Social aspects of Genomics research

Nurturing the Canadian Genomics Enterprise

Genome Canada and the Genome Centres have built a robust genomics research community in Canada, transforming both the quality and quantity of such research. This has led to the emergence of the *Canadian Genomics Enterprise*, a highly complex, informal yet collaborative network of individuals and organizations consisting of those who fund research, those who conduct it, those equipped to translate discoveries into applications, and those who will use them to deliver or derive economic and social benefits for Canadians.

Going forward, Genome Canada and the Genome Centres will work in concert to enhance the *Canadian Genomics Enterprise*, by building bridges and strengthening connections among and between public and private sector constituencies. Genome Canada will play a key role in integrating the pre-competitive aspects of scientific discovery with the drivers and challenges of the seven strategic sectors and the commercial requirements of industry to create a vibrant ecosystem of innovation built upon genomics. Thus, by building better linkages between academia, industry and governments, new connections that increase the scale and scope of genomics activities across the country can be forged.

For example, Genome Canada partnered with:

- the Canadian Institutes of Health Research (CIHR), resulting in additional funding (\$20 million) for the 2012 Genomics and Personalized Health Competition;
- the Canadian Food Inspection Agency (CFIA) and Alberta Innovates Bio Solutions to launch a competition aimed at developing tools for the detection and surveillance of *Listeria monocytogenes*, the type of *Listeria* implicated in issues concerning food safety and security.

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- Genome Alberta, the Alberta Livestock and Meat Association (ALMA), Alberta Innovates Bio Solutions, and other partners to launch a competition to develop genomics technologies for rapidly detecting and monitoring *E. coli*. The results of the competition will have a profound effect on Canadian food safety and security.
- a vast network of partners to create one of the largest investments ever made in Canada to research glioblastoma, one of the most common and deadliest forms of brain cancer. Project partners include the Terry Fox Research Institute, Alberta Innovates Health Solutions, the Alberta Cancer Foundation, the BC Cancer Foundation and Genome BC.
- international funding agencies in the International Rare Disease Research Consortium (IRDIRC), to deliver new therapies and the means to diagnose most rare diseases by the year 2020. The consortium brings together major players such as the U.S. National Institutes of Health and the European Commission.

Commitment to Accountability

In the delivery of its mandate, Genome Canada is committed to applying the highest standards of accountability and transparency to its operations, informing Canadians about the exciting opportunities and promise that genomics holds, and reporting on achievement of results. Mechanisms and instruments such as corporate plans and annual reports, independent audit and evaluation studies, rigorous peer review and interim review processes, and financial audits provide a high level of assurance and oversight. Genome Canada rigorously monitors its expenditures in order to manage operations in a fiscally prudent manner.

Governance

Genome Canada operates within a governance framework that is reflective of its not-for-profit corporation status and, it adheres to governance best practices. It strives to achieve the highest operational and ethical standards and compliance with the laws, regulations, policies and procedures that apply to its operations and activities, as well as to ensure that decisions are based on principles of fairness and integrity that reflect consideration of all its stakeholders.

Genome Canada is governed by a Board of Directors comprising up to 16 individuals drawn from the academic, private and public sectors. These individuals bring unique skills and experiences as well as strong interests and insights to successfully fulfill Genome Canada's mandate. The Board also benefits from the strategic advice and expertise offered by its Science and Industry Advisory Committee (SIAC), as well as the presidents of five federal research funding agencies — the Canada Foundation for Innovation (CFI), the Canadian Institutes of Health Research (CIHR), the National Research Council (NRC), the Natural Sciences and Engineering Research Council (NSERC), and the Social Sciences and Humanities Research Council (SSHRC).

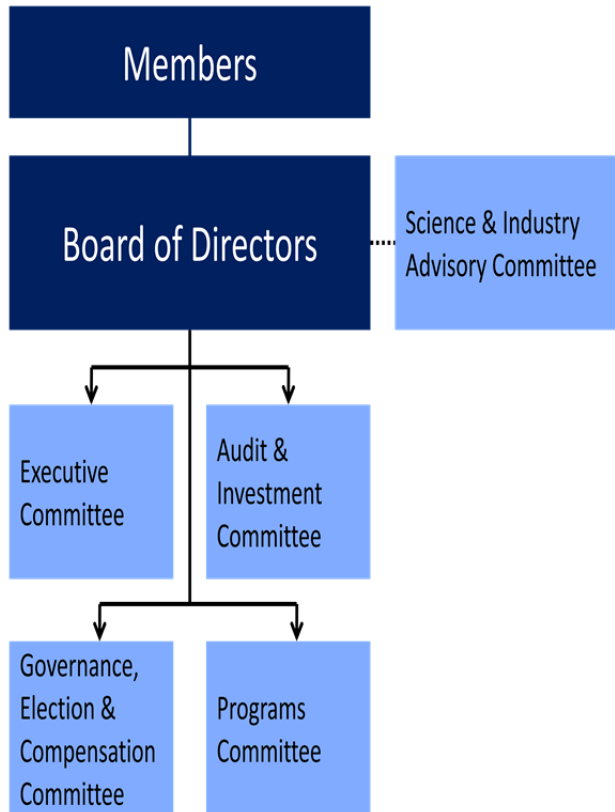
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The Board of Directors has overall responsibility for the stewardship of the business and affairs of Genome Canada, and to help it discharge these duties, has put in place a number of standing committees.

In 2012-13, the Board of Directors put in place a succession plan for a new Chair of the Board. Both incumbent directors and external candidates were identified. In September 2012, a new chair of the board was appointed for a two-year term. The Board continues to place particular emphasis on the recruitment of new directors, ensuring that the skills and experience sought are aligned to the successful implementation of Genome Canada's new strategic plan.

At the June 2012 Board of Directors meeting, and the Annual and Special Meeting of Members of Genome Canada, a new bylaw was approved to authorize the continuance of Genome Canada under the *Canada Not-For-Profit Corporations Act* and to approve the new General By-laws of Genome Canada.

Governance Structure



SECTION II – Performance 2012-13

The reporting of Genome Canada's performance for 2012-13 is organized around the five objectives as stated in Genome Canada's funding agreements²:

OBJECTIVE 1	
The development and establishment of a coordinated strategy for genomics research to enable Canada to become a world leader in areas such as health, agriculture, environment, forestry and fisheries.	
Strategy	
Genome Canada's approach to fulfill this objective is to actively seek out partnerships and collaborations in genomics initiatives with relevant Canadian and international groups which share common interests and goals. Participation and engagement in workshops, conferences, information sessions and symposia provide valuable information to ensure Genome Canada invests in strategic priorities that align with its mandate. The Science and Industry Advisory Committee's advice is solicited in respect to environmental scanning and strategic prioritization. The Genome Centres offer key advice on regional needs. Relevant provincial, federal and international funding agencies are also approached in respect to the development of partnerships and collaborations.	
Activities	Short & Medium Term Outcomes
<p>Structural Genomics Consortium (SGC)—The SGC is an international public-private partnership of eight pharmaceutical companies and private and public funders from Canada and the UK that aims to determine the three-dimensional structures of proteins of medical relevance and place them in the public domain without restriction on their use. The SGC is also leading a program to generate chemical probes and recombinant antibodies to epigenetic targets.</p> <p>In 2012-13, Genome Canada allocated \$2.5M to SGC to support year 2 of Phase III activities from the \$60M provided in Budget 2012. SGC, in collaboration with CEREP, a world-leading biotechnology company, is developing open access biochemical and cell-based assays for the discovery of small molecule chemical probes and drug candidates on epigenetic targets.</p>	<ul style="list-style-type: none"> • ~1.4 peer-reviewed publications/week (>415 so far) • solved and deposited about 1400 novel human structures (~25% of the yearly global output) • solved and deposited structures of 2 human integral membrane proteins in the last 24 months • purified >2000 human proteins • 11 new chemical probes/tools released in the last 24 months • more than 20% of expression clones distributed by the SGC have been requested by industry • more than 250 active collaborations worldwide • spun out 1DegreeBIO, an online resource listing academic and commercially available antibodies • spun out Harbinger Biotechnology + Engineering which has created a bench top bioreactor for expression of recombinant proteins
<p>International Barcode of Life (iBOL)— iBOL, an international consortium, is the largest biodiversity genomics initiative ever undertaken with the objective to construct a DNA barcode reference library that will have practical applications in multiple areas. In the first phase of this project (2009–2015), the iBOL collaborators plan to barcode five million specimens representing 500,000 species.</p> <p>In 2012-13, Genome Canada allocated \$2.5M to the iBOL project from the \$60M provided in Budget 2012. Genome Canada has committed \$11.1M to the consortium since its inception in 2009.</p>	<ul style="list-style-type: none"> • Over 250 researchers from 25 countries, including biodiversity scientists, genomics specialists, technologists and ethicists, are working together on this project • 40-60 new scientific studies utilizing DNA-based identification, mostly DNA Barcoding, are published monthly (>157 so far generated from the iBOL project) • To date, the Project has generated more than 1.8M barcode records representing over 290K species • The barcode library will provide the infrastructure needed to use it in real-world situations such as conservation, ecosystem monitoring, forensics and control of agricultural

² Source: Genome Canada's Funding Agreement signed March 31, 2008

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	<p>pests and invasive species. For example:</p> <ul style="list-style-type: none"> ○ CFIA and the US FDA are using and applying DNA barcoding for seafood identification ○ DNA barcoding has begun to be used in 14 of Canada's National Parks to provide baseline biodiversity data against which can be gauged success in maintaining ecological integrity and identifying when and where ecological restoration, including species recovery, may be necessary
<p>► Public Population Project in Genomics (P³G)—The P³G, an international consortium, aims to foster collaboration between researchers and projects in the field of population genomics by facilitating the harmonization of samples and data collected from different international bio-banks.</p> <p>Genome Canada allocated up to \$0.5 million of the \$65 million announced in the Government of Canada's 2011 federal budget to P³G, beginning January 1, 2012 for a term of 18 months. This bridge funding opportunity allowed the consortium additional time during 2012-13 to secure new funding for its Phase II projects, which will focus on optimizing access and use and developing new models.</p> <p>Genome Canada has committed \$16.2 million to the consortium since its inception.</p>	<p>P³G is leading the effort to develop a national Data Harmonization Initiative. The concept proposed is a trans-disciplinary data harmonization infrastructure, comprising both research and service functions. The former would strengthen Canada's international advantage in the science of data harmonization and would build greater national capacity in this evolving discipline. The service component would offer open-source software, tools, training, expert advice and other research resources, enabling wider research exploitation of population data.</p>
<p>Cancer Stem Cell Consortium (CSCC)—The CSCC, a consortium of Canadian funders, aims to coordinate an international strategy for cancer stem cell (CSC) research.</p> <p>In 2012-13, the CSCC engaged an external consultant to undertake an environmental scan that informed a consultative workshop as well as the CSCC board of directors in terms of guidance on strategic funding decisions.</p> <p>It formed partnerships with the Terry Fox Research Institute and Genome Canada and CIHR to support CSC projects.</p> <p>CSCC is bringing together a small focus group of interested experts in March 2013 to discuss current opportunities and challenges in the field to help update the CSCC Strategic Plan and provide judicious advice to the Board.</p> <p>Genome Canada has committed \$25 million to the consortium since its inception in 2007, from the \$140 million announced in the Government of Canada's 2008 federal budget.</p>	<ul style="list-style-type: none"> • An environmental scan was presented to the CSCC Board. An action plan for engagement with the broader community to determine future activities is currently being developed. • Support for two Disease team projects in collaboration with CIRM is on-going. • Support for a pan-Canadian project on adult glioblastoma multiforme in partnership with the Terry Fox Research Institute. • Partial support for a project on innovative chemogenomic tools to improve the outcome in acute myeloid leukemia was funded in the 2012 Large-Scale Applied Research Project Competition in Genomics and Personalized Health
<p>International Mouse Phenotyping Consortium (IMPC)—The IMPC, an international consortium,</p>	<ul style="list-style-type: none"> • generated approximately 32 new mouse mutants from the International Knockout Mouse

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<p>aims to develop an internationally coordinated approach for phenotyping the mouse mutants being developed.</p> <p>Genome Canada has membership on the IMPC Steering Committee as a result of one of the successful applications to the 2010 Large-Scale Applied Research Project Competition, “NorCOMM2 - <i>In vivo</i> models for human disease & drug discovery”, being accepted as part of the Canadian and UK contributions to the IMPC.</p> <p>Genome Canada supported this project with \$4.9 million in funding from the \$75 million announced in the Government of Canada’s 2010 federal budget.</p>	<p>Consortium ES cell resource and currently analyzing the phenotypes of 21 mutants</p> <ul style="list-style-type: none"> • NorCOMM2 hosted the IMPC at a workshop in Toronto in November 2012 to showcase the Toronto Centre for Phenogenomics; to discuss topics of interest to members, such as, imaging, production, distribution, and informatics; and to encourage linkages between the IMPC and Canadian researchers through presentations of relevant Canadian-led projects, such as FORGE, the SGC, and the ICGC.
<p>International Cancer Genome Consortium (ICGC)—The ICGC, an international consortium, aims to coordinate large-scale cancer genome studies in tumours from 50 different cancer types and/or subtypes that are of clinical and societal importance across the globe.</p> <p>Genome Canada has membership on the ICGC Steering Committee as a result of one of the successful applications to the 2010 Large-Scale Applied Research Project Competition, “Stratifying and Targeting Pediatric Medulloblastoma through Genomics”, being accepted as part of the Canadian contribution to the ICGC.</p> <p>Genome Canada supported this project with \$4.8 million in funding from of the \$75 million announced in the Government of Canada’s 2010 federal budget.</p>	<p>The ICGC has commitments from funding organizations in Asia, Australia, Europe and North America for 47 project teams in 15 jurisdictions to study over 21,000 tumor genomes. Projects that are currently funded are examining tumors affecting the bladder, blood, bone, brain, breast, cervix, colon, head and neck, kidney, liver, lung, oral cavity, ovary, pancreas, prostate, rectum, skin, soft tissues, stomach, thyroid and uterus. Over time, additional nations and organizations are anticipated to join the ICGC. The genomic analyses of tumors conducted by ICGC members are now available through the Data Coordination Center housed on the ICGC website at www.icgc.org. Canada is now supporting three projects: prostate (in collaboration with Germany), pancreatic (in collaboration with Australia) and pediatric brain (in collaboration with Germany).</p>
<p>International Wheat Genome Sequencing Consortium (IWGSC) —The IWGSC, an international consortium, was established to sequence the wheat genome to enhance knowledge of the structure and function of the wheat genome.</p> <p>Genome Canada has membership on the IWGSC Steering Committee as a result of one of the successful applications to the 2010 Large-Scale Applied Research Project Competition, “CTAG - Canadian <i>Triticum</i> Advancement through Genomics” being accepted as part of the Canadian contribution to the ICGC.</p> <p>Genome Canada supported this project with \$4.1 million in funding from of the \$75 million announced in the Government of Canada’s 2010 federal budget.</p>	<p>By gaining increased understanding of the biology of agronomically important traits and deploying state-of-the-art molecular tools, plant scientists and breeders will be able to accelerate wheat improvement to meet the challenges of the 21st century.</p> <p>The consortium’s efforts related to the development of genetic platforms in wheat are being conducted in both the public and private sector.</p> <p>The Canadian project team has completed an initial survey sequence of chromosome 6D.</p>

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OBJECTIVE 2	
The provision of leading-edge technology to researchers in all genomics-related fields through regional Genome Centres across Canada, of which there are currently six, one each in British Columbia, Alberta, the Prairies, Ontario, Quebec and the Atlantic.	
Strategy	
Genome Canada's approach to fulfilling this objective is to provide sufficient funding support (through a competitive process) for the Science and Technology Innovation Centres (STICs) for purposes of giving access to the latest technologies, expertise and infrastructure to, not only to Genome Canada-funded researchers, but to all researchers across Canada involved in genomics-related research.	
Activities	Short & Medium Term Outcomes
<p>S & T Innovation Centres—Genome Canada provides state-of-the-art technologies, expertise and infrastructure to Genome Canada-funded researchers as well as other researchers from academia and industry through its financial support of the STICs across Canada. These Centres provide the entire spectrum of genomics technologies, including DNA sequencing, genotyping, RNA expression analysis, protein identification and quantification, metabolomics and the most advanced bioinformatics analyses to manage the vast quantities of complex data produced. The Centres have three main areas of activity: engaging in collaborative research projects, developing technologies and methods, and providing services to Canadian and international researchers.</p> <p>In 2012–13, Genome Canada, in collaboration with the Genome Centres,</p> <ul style="list-style-type: none"> • continued to ensure maximum access and usage of the services provided by the five (5) STICs • developed the terms of reference for a National Network of STICs as a mechanism for the STICs to work together collaboratively and ensure that the highest quality genomics technologies and advice are provided to the research community • updated the STIC Access Policy, which was approved by the Board of Directors at its June 2012 meeting • planned and implemented the renewal process for continued operational support of the current five STICs 	<p>As a result of the ongoing funding support throughout 2012–13 of the STICs, Genome Canada's investments provide access to leading-edge technology and expertise to Canadian genomics researchers. These Innovation Centres are catalysts for Canadian science, not only bringing both business and visibility to Canada but also serving a significant and fundamental role in enabling discoveries. The Centres provide access to new and important knowledge and expertise in the field of genomics and proteomics, allowing researchers and users to design appropriate experimental protocols, receive high-quality, high-throughput genomics data at a competitive price and obtain access to data analysis expertise.</p> <p>The five current STICs are:</p> <ul style="list-style-type: none"> • Genomics Innovation Centre at the BC Cancer Agency Genome Sciences Centre (Vancouver) • McGill University and Genome Quebec Innovation Centre (Montreal) • Metabolomics Innovation Centre (Edmonton and Victoria) • The Centre for Applied Genomics (Toronto) • University of Victoria and Genome British Columbia Proteomics Centre (Victoria)
<p>Advancing Technology Innovation through Discovery (ATID)—ATID is a joint collaborative program between Genome Canada and the Canadian Institutes of Health Research that aims to apply the latest genomics technologies to identify the genetic causes of rare childhood diseases.</p> <p>Two consortia—one focused on rare pediatric cancers (CPCGC), and the other on rare Mendelian diseases (FORGE), were initially approved for 18 months of funding. A June 2012 decision by the</p>	<p>This collaborative venture between Genome Canada and the Canadian Institutes of Health Research is a great opportunity for Canada to be at the leading edge in disease gene discovery; particularly rare childhood diseases. With the introduction of next-generation sequencing techniques, there are now indications of a paradigm shift, with a focus on whole genome sequencing to identify disease-causing genetic mutations.</p> <p>FORGE has studied 167 of the 200 rare pediatric</p>

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Board of Directors resulted in additional funding for FORGE and six-month extensions to both consortia.	diseases selected, and identified 88 genes (1 gene/week), 41 of which are novel. Since the project start, CPCGC has had two Nature publications related to pediatric cancers, one related to high grade gliomas and one related to medulloblastoma.
OBJECTIVE 3	
The support of large-scale projects of strategic importance to Canada by bringing together industry, government, universities, research hospitals and the public	
Strategy	
Genome Canada's approach to fulfilling this objective is to issue calls for proposals in sectors of strategic importance to Canada: health, agriculture, environment, forestry, and fisheries. The strategic focus of each of Genome Canada's calls for applications is the result of extensive intelligence gathering and consultation with the Genome Centres, the Science and Industry Advisory Committee and other external stakeholders. Applications are selected for funding through a rigorous scientific peer review process involving international experts, as well as a due diligence process that examines the quality of the proposals' financial and management elements. Central to Genome Canada's strategy is ensuring that the GE ³ LS implications related to genomics research are addressed as stand-alone proposals or as an integrated component of each proposal.	
Activities	Short & Medium Term Outcomes
<p>Applied Genomics Research in Bioproducts or Crops Competition— This strategic competition on applied genomics research in the areas of crops, bioenergy, and bioproducts (launched in April 2008) resulted in 12 projects receiving a total of \$53 million in Genome Canada funding support.</p> <p>In 2012-13, monitoring and oversight of all successful projects continued. All projects will be completed in 2014.</p>	<p>The outcomes from these projects will have significant impact in the fields of agriculture, bioproducts and bioenergy. Some examples of early outcomes include:</p> <ul style="list-style-type: none"> • the complete sequence and annotation of the spider mite genome which can eventually allow for development of non-pesticide tools to make agriculture more sustainable. • Identification of genes in fungi and identification of novel bacteria that will allow for the development of innovative technologies to convert waste into energy and fuels. • Innovative approaches to shape public policy and streamline regulation in order to move innovation from the laboratory towards practical applications.
<p>2010 Large-Scale Applied Research Project Competition— This strategic competition for large-scale research projects (launched in May 2010) focused on the application of genomics research such that there would be a high potential for benefits for Canada. It resulted in 16 projects receiving a total of about \$60 million in Genome Canada funding. Nine projects were in the areas of forestry and/or the environment and seven projects were in the areas of agriculture, fisheries, and human health.</p> <p>In 2012-13, monitoring and oversight of all successful projects continued. Interim review of these projects will be undertaken in fiscal year 2013-14.</p>	<p>In the forestry sector, the projects are exploring the many ways to make Canada's forests more sustainable, including identifying common tree diseases; using genomics to develop short-rotation, fast-growing trees for use in biofuel production; and to study the genes involved in adaption to local climate conditions.</p> <p>In the environment sector, researchers are exploring how genomic technology can be used to serve as an early warning system for problems in natural environments and watersheds; and, studying the use of phytoremediation, a process that uses plants to clean up pollutants.</p> <p>In the agriculture sector, the research will lead to improvements in the health of our livestock and crops, including conducting research into cattle and pig populations as well as creating the next generation of wheat.</p>

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	<p>Within the health sector, the studies are looking for potential new treatments for cancer and rare diseases, while one project is part of an ambitious international partnership that is working to understand the function of each one of the 20,000 genes found in the mouse genome.</p>
<p>2012 Competition on Genomics and Personalized Health— This strategic competition for applied genomics research in the area of personalized health (launched January 2012) was undertaken in partnership with the Canadian Institutes of Health Research (CIHR), and the Cancer Stem Cell Consortium (CSCC).</p> <p>In 2012-13, the international peer review process of applications was completed in November 2012. The recommendations of this peer review were approved by the Board of Directors at its December 2012 meeting, resulting in 17 projects receiving a total of about \$150 million with close to \$72 million in Genome Canada/CIHR/CSCC funding over a term of four years. Once the projects show that they can meet all the conditions of funding, funds will flow as of April 1, 2013.</p>	<p>This competition is focused on projects with a potential to contribute to a more evidence-based approach to health and potential to improve not only the cost-effectiveness of the health-care system, but also to ensure that discoveries are translated into patient and population benefits.</p> <p>Examples of outcomes of the types of studies and end points that may be expected from this competition include:</p> <ul style="list-style-type: none"> • Determination of molecular markers of disease susceptibility that would allow individual behaviour change • Development of markers that can inform dietary choices in disease prevention strategies • Development of diagnostic tools for screening programs for diseases • Development of biomarker panels to stratify patients so that more targeted treatments can be offered that address the molecular pathology of the particular disease • Pharmacogenomic approaches to improve safety and efficacy of existing drugs
<p>Entrepreneurship Education in Genomics (EEG) Program— The EEG Program (launched in February 2011), aims to support initiatives to educate the Canadian genomics research community about how to create and capture value from their research and translate their discoveries into marketable applications, products, technologies, systems and processes. At the same time, it aims to attract entrepreneurs to apply their skills in the domain of genomics. Three successful projects received a total of about \$1.1 million in Genome Canada funding.</p> <p>In 2012-13, monitoring and oversight of the three successful projects continued. One project ceased operations.</p>	<p>The EEG program will provide genomics researchers with a more comprehensive approach to entrepreneurship potentially leading to the acceleration of the conversion of scientific discoveries into commercial successes or other applications; thereby growing Canada's competitiveness in the global bio-economy. The funded EEG programs will assist researchers in understanding the processes and players involved in commercialization and provide them with the entrepreneurial skills they need to succeed.</p>
<p>2012 Bioinformatics and Computational Biology—The massive and ongoing influx of data from “omics” research, underscores the need for new and large-scale experimental, computational and theoretical tools. Thus, computational biology and bioinformatics have been identified as a strategic area of focus for Genome Canada over the next five years.</p> <p>In 2012-13, Genome Canada undertook the following activities:</p> <ul style="list-style-type: none"> • Launch, in June 2012, of the 	<ul style="list-style-type: none"> • In May 2012 released the report of the December 2011 Bioinformatics/Computational Biology Workshop; the contents offered guidance on the parameters for the bioinformatics/computational biology competition launched in June 2012 and will inform Genome Canada on its bioinformatics strategy for the next five years. • It is expected that the outcomes of the projects funded through the Bioinformatics/Computational Biology Competition will not only help support the development of next generation Bioinformatics

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<p>Bioinformatics/Computational Biology Competition, in partnership with CIHR. Applications were reviewed by an International Review Committee in January 2013 with results of successful projects to be announced in February 2013.</p> <ul style="list-style-type: none"> • Commitment to develop a National Bioinformatics and Computational Biology Strategy • Development of a partnership with NSERC, CIHR and CFI on a competition entitled “Advancing Big Data Science in Genomics Research” to be launched in February 2013. 	<p>and Computational Biology tools and methodologies that will be required by the research community to deal with the influx of large amounts of data produced by modern genomics technologies, but also provide broad access to these tools and methodologies.</p>
<p>Emerging Issues</p> <p><u>Program Partnership with the Canadian Food Inspection Agency (CFIA)</u> — Using the emerging issue program, this competition aims to support an initiative on the integration of genomic technologies for <i>Listeria monocytogenes</i> detection and surveillance. The initiative was launched in July 2012 with the successful project approved for funding in December 2012.</p> <p><u>Program Partnership on <i>E. coli</i> with Genome Alberta, Alberta Livestock and Meat Agency (ALMA), Alberta Innovates Bio Solutions and other funders</u> — The purpose of the Program is to fund research and innovation that will ultimately lead to commercially viable genomics based technologies that can be used for rapid detection of pathogenic <i>E. coli</i> in food production with emphasis on meat and meat production</p>	<p>The results will help early detection of pathogens, especially in food processing industry. Using genomic technologies, the project will identify markers predicting heightened virulence potential and/or the propensity for persistence in a food processing facility with the goal of developing cost-effective and rapid methodologies that allow enhanced screening for specific <i>Listeria monocytogenes</i> genomic sequences.</p> <p>The resulting technologies will be used to assist with food safety regulatory compliance and to contribute to consumer protection. Such a test will be integral to development of national baselines, surveillance and/or monitoring of <i>E. coli</i> to demonstrate pathogen levels in Canadian food and meat products.</p>
OBJECTIVE 4	
<p>The assumption of leadership in the area of ethical, environmental, economic, legal, social and other issues related to genomics research (GE³LS), and the communication of the relative risk, rewards and successes of genomics to the Canadian public.</p>	
Strategy	
<p>Genome Canada’s approach to fulfil this objective is to initiate innovative activities which showcase Canadian leadership in the areas of ethical, environmental, economic, legal, social and other issues (GE³LS) related to genomics research, as well as to develop innovative communication, education and public outreach programs and initiatives aimed at establishing visibility, credibility and awareness.</p>	
Activities	Short & Medium Term Outcomes
<p>In 2012-13, Genome Canada concentrated its GE³LS efforts in the following areas:</p> <ul style="list-style-type: none"> • In preparation for a future targeted GE³LS funding opportunity, considerable effort was placed in reviewing applications from the Genomics and Personalized Health competition in order to understand and assess the integrated GE³LS research components of each application. • In terms of developing innovative models of collaborative research, discussions have been underway with other national funding agencies (i.e., Social Sciences and Humanities Research Council) and other organizations focusing on 	<p>Genome Canada takes seriously the responsibility to consider genomics in a broader context, including aspects that raise ethical, environmental, economic, legal or social challenges, as well as opportunities. This commitment is principally carried out through Genome Canada’s investments in the area of GE³LS research, which helps ensure that a number of disciplinary perspectives are drawn from. This is but one means through which the concerns, needs and expectations of Canadians can be identified and potentially met, and the conditions put in place for genomics and associated technologies to have the optimal impact on Canadian prosperity and quality of life.</p>

SECTION II – Performance 2012-13

<p>science and/or research.</p> <ul style="list-style-type: none"> • Policy briefs arising from the 2011 GPS series have been published: <ul style="list-style-type: none"> ○ <i>Moving Beyond Commercialization: Strategies to Maximize the Economic and Social Impact of Genomics Research</i>; and, ○ <i>The Genomics “Regulatory-Science” Regime: Issues and Options</i> • Genome Canada is an active participant in the annual Canadian Science Policy Conference (CSPC). The November 2012 conference held in Calgary, AB, saw the launch of the 2012-13 GPS series (theme is on the innovation continuum) with the submission of a policy brief entitled: “Moving Promising Technology Off the Shelf”. 	<p>Genome Canada-funded GE³LS research continues to expand across all sectors, such that Genome Canada can be viewed as a leading voice in federal public policy debates related to science and technology beyond life sciences and health, into environmental science and technologies, and natural resources and energy. Thus, leading to,</p> <ul style="list-style-type: none"> • An “issues” map of key GE³LS research questions in personalized health that provides a roadmap for engagement with policy makers and other end-users; • Expanding and deepening exchanges between GE³LS researchers, federal policy-makers and other stakeholders on topics directly related to the Government of Canada’s Science and Technology agenda; and, • Sustained collaboration, through the CSPC, on bringing forth science-based evidence to inform federal, provincial and other institutional policies and practices related to research and related activities in genomics and across the life sciences.
<p>Communications: In 2012-13, Genome Canada undertook the following key activities related to communications:</p> <ul style="list-style-type: none"> • Coordination of the editorial content and writing of Genome Canada’s 2013 submission to the federal government • Development of a communications/government relations plan to support Genome Canada’s federal government submission with activities related to this plan to run until early 2013 • Sponsorship support of the following key events: <ul style="list-style-type: none"> ○ HUGO 2012 ○ Bio 2012 • Interactions with national media, many of which featured Genome Canada’s President and CEO, as well as targeted news releases related to the announcement of various Genome Canada research programs (brain cancer, bioinformatics, Listeria,) • Organization of a signature conference, in partnership with the Gairdner Foundation, entitled: “<i>Genomics: The Power and the Promise</i>”, which was held November 27-28, 2012 in Ottawa, ON • Planning preparations for the Human Variome Conference to be held April 2013 (Banff, AB) • Participation in the Canadian Science Writers Conference June 2012 (Vancouver, BC) 	<p>Genome Canada’s communication and outreach activities in 2012–13 continues to showcase Genome Canada’s partnerships with the Government of Canada and the Canadian scientific community, promote accountability for the investment of taxpayers’ dollars, celebrate scientific achievements of Canadian researchers, and educate the Canadian public as to the relative risks, benefits and successes of genomics research.</p>

SECTION II – Performance 2012-13

OBJECTIVE 5																		
The encouragement of investment by others in the field of genomics research.																		
Strategy																		
Genome Canada's approach is to encourage investment by others in excellent large-scale genomics research projects through development of collaborative relationships with the private, public, and philanthropic sectors, both domestic and international. Genome Canada operates on the general principle that it will fund up to 50% of the eligible costs of research projects, with the remainder secured through co-funding by other organizations.																		
Activities																		
Effective research requires the collective efforts of many people and organizations. Investment by others, through various collaborative mechanisms, addresses research gaps and priorities, and ensures that the investment funds the best research and the translation of that research into results for Canadians. Genome Canada's primary partners, the six regional Genome Centres, have played a central role in this success. Over \$1 billion in co-funding commitments to supplement the \$980 million committed by the Government of Canada over the past decade has been raised, resulting in over \$2 billion of total funding for genomics research across all sectors.																		
<p>Co-funding Sources for Genome Canada-Approved Projects</p> <p><i>Note: Chart below does not include funding and related co-funding of Genome Centres.</i></p> <p style="text-align: right;">(as at November 2012)</p> <table border="1"> <thead> <tr> <th>Source</th> <th>Amount (M)</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>International</td> <td>\$434 M</td> <td>36.4%</td> </tr> <tr> <td>Provincial</td> <td>\$392 M</td> <td>32.9%</td> </tr> <tr> <td>Private</td> <td>\$159 M</td> <td>13.3%</td> </tr> <tr> <td>Other Federal Funding</td> <td>\$121 M</td> <td>10.1%</td> </tr> <tr> <td>Institutional</td> <td>\$87 M</td> <td>7.3%</td> </tr> </tbody> </table>	Source	Amount (M)	Percentage	International	\$434 M	36.4%	Provincial	\$392 M	32.9%	Private	\$159 M	13.3%	Other Federal Funding	\$121 M	10.1%	Institutional	\$87 M	7.3%
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SECTION III – Grant Management for 2012-13

The federal government, through Industry Canada, has committed a total of \$1.04 billion in funding for Genome Canada since 2000–01. All funding is provided through funding agreements between Genome Canada and Industry Canada. Genome Canada can also raise additional co-funding from others, including other levels of the public sector, the voluntary sector and the private sector.

Investment and Management of Funds

The Audit and Investment Committee supports the Board of Directors of Genome Canada in fulfilling its fiduciary responsibilities with respect to the management of funds. It meets quarterly and reports to the Board on the outcome of their deliberations.

The Committee is responsible for:

- overseeing the investment and management of funds received from the Government of Canada according to a Board-approved investment policy that outlines guidelines, standards and procedures for the prudent investment and management of funds; and,
- overseeing Genome Canada's policies, processes and activities in the areas of accounting and internal controls, risk management, auditing and financial reporting.

The Programs Committee brings further oversight to the management of funds by ensuring research funding and activities are aligned to Genome Canada's strategic priorities. The Committee provides advice to the board of directors on research programs and projects, research partnerships and collaborations, competitions, and program evaluation.

Source and Use of Funds

Genome Canada currently manages funds arising from the following 4 funding agreements:

- The grant approved by the federal government in March 2008 (\$140 million) funded a competition in Applied Genomics in Bioproducts and Crops, research projects related to the Cancer Stem Cell Consortium, the International Barcode of Life project, the S&T Innovation Centres, the operations of six regional Genome Centres, as well as the operations of Genome Canada through to 2012–13.
- The grant approved by the federal government in March 2010 (\$75 million) was used to fund large scale projects in forestry and the environment through a targeted competition; projects in other sectors such as health and agriculture through a multi-sector competition, and a competition for Science and Technology Innovation Centre Operations Support.
- The grant approved by the federal government in January 2012 (\$65 million) was used to launch a competition in applied genomics research on personalized health; contribute to the funding of Phase III of the Structural Genomics Consortium, and the International Barcode of Life project, provide bridge funding for the Public Population Project in Genomics, development of a competition in the area of bioinformatics and computational biology; contribute to special initiatives deemed to be of potential strategic importance or relevance to Canada, and contribute to the operations of six regional Genome Centre and Genome Canada through to 2013–14.
- The contribution approved by the federal government in January 2013 (\$60 million) will be used to develop the Genomic Application Partnership Program (GAPP), an academic-industry partnered program, with the goal of promoting the application of

SECTION III – Grant Management for 2012-13

genomics-derived solutions arising out of the results of genomics research; continued two-year support of the STICs; and, funding of the Structural Genomics Consortium, and the International Barcode of Life project.

Cash Management

Genome Canada disburses funds on a quarterly basis through the six regional Genome Centres for approved research projects and S&T Innovation Centres. On a quarterly basis each Genome Centre is required to review the expenditures to date and estimate cash requirements for Centre operations and for each project and innovation centre that it manages. It then submits a “draw request” to Genome Canada indicating the cash needs of the Centre for the subsequent quarter. The Genome Centres assess the project/innovation centre needs against the approved budget, actual expenditures, scientific progress to date and co-funding received from other sources. Genome Canada then conducts its own thorough review of the draw request submission before releasing funds.

Annual Audits

As a not-for-profit, incorporated organization, Genome Canada selects external auditors to undertake an annual audit of its financial statements; the external auditors for 2012–13 are Deloitte & Touche, LLP. Auditors are required to submit an audit plan to Genome Canada’s Audit and Investment Committee in February 2013 for review and approval. The audit is conducted within 45 days of each fiscal year-end in accordance with generally accepted Canadian auditing standards. The objective is to express an opinion on whether Genome Canada’s financial statements present fairly, in all material respects, the financial position, results of operations, and cash flow of the corporation. Upon completion of the audit, the financial statements and a summary of audit findings are presented to the Audit and Investment Committee and then in June 2013 to the Board of Directors for approval.

Recipient Audits

Genome Canada has developed and implemented a recipient audit framework in consultation with the Genome Centres. As part of this exercise, a risk assessment tool was developed to enable the Centres to identify projects and Innovation Centres that will undergo a detailed compliance audit. This framework was introduced to bring a common approach to recipient audits across Canada and to improve the management control framework within which genomics research is administered. A total of 15 recipient audits have been undertaken to date.

SECTION III – Grant Management for 2012-13

Summary of Receipts and Disbursements

Details <i>(In millions of dollars)</i>	Projects Funded	Actuals 2000-01 to 2011-12	Forecast 2012-13	Forecast Cumulative to 2012-13
RECEIPTS				
Government of Canada		821.1	67.8	888.9
Investment Income		87.7	0.5	88.2
		908.8	68.3	977.1
PROGRAM AND OPERATING DISBURSEMENTS				
Research Projects				
Competition I	17	80.6		80.6
Competition II	33	146.2		146.2
Competition III	33	204.8		204.8
Applied Genomics in Human Health	14	60.3	-0.4	59.9
Applied Genomics in Bioproducts and Crops	12	34.0	10.6	44.6
Bovine Genome Sequencing Project	1	6.0		6.0
Multi-Sector	7	5.4	10.0	15.4
Forestry and Environment Competition	9	6.2	8.7	14.9
Entrepreneurial Innovation In Technology	3	0.2	0.5	0.7
Advanced Technology Innovation Through Discovery	2	1.7	0.7	2.4
Structural Genomics Consortium	1	34.2	2.5	36.7
Public Population Project in Genomics	1	15.7	0.5	16.2
International Regulome Consortium	1	2.6		2.6
International Barcode of Life	1	6.7	3.9	10.6
Genome Canada–Genoma España Competition	3	7.7		7.7
C. difficile / H1N1	2	0.3		0.3
New Technology Development	13	9.8		9.8
Canadian Stem Cells Consortium	2	4.8	2.0	6.8
	155	627.2	39.0	666.2
Science & Technology Innovation Centres	10	112.7	12.2	124.9
Genome Centres Operations		63.4	4.8	68.2
GENOME CANADA OPERATING EXPENDITURES		75.2	7.1	82.3
Total Disbursements	165	878.5	63.1	941.6
Excess (Deficiency) of Receipts over Disbursements		30.3	5.2	35.5
Opening Cash Balance			30.3	
Closing Cash Balance		30.3	35.5	

* As at January 2013

SECTION IV – Plans for 2013-14

This section outlines Genome Canada’s planned activities for 2013-14. These activities align with the four objectives stated in Genome Canada’s Strategic Plan 2012-2017:

- Respond to societal needs by generating genomics discoveries and accelerating their translation into applications
- Attract greater investment in genomics research from a broad range of stakeholders, in particular the private sector
- Enhance the impact of genomics by transforming knowledge of the ethical, environmental, economic, legal and social challenges and opportunities into sound policies and practices
- Enhance the recognition of the value of genomics by increasing stakeholder appreciation of genome science, its applications and implications

2013-14 Project and Program Planning

For the 2013-14 fiscal year, Genome Canada is developing and putting into place programs and initiatives funded by the \$60 million grant from the Government of Canada which was announced in its 2012 federal budget. Genome Canada’s Board of Directors approved allocation of the Government of Canada funding as follows:

	(in millions of \$)
Large-Scale Applied Projects	
Genomic Application Partnership Program	26.0
Access to Leading-Edge Technology	
Support of Science & Technology Innovation Centres (2013-15)	29.0
Partnerships	
Structural Genomics Consortium (SGC)	2.5
International Barcode of Life (iBOL)	2.5
Total	60.0

► **Genomic Applications Partnership Program (GAPP)** — A total of \$26 million in funding from the \$60 million announced in the Government of Canada’s 2012 federal budget, as well as \$4M in previously unallocated funds, will be allocated to the GAPP, an academic-user partnered program designed to:

- Increase the socio-economic value of genomics research by accelerating the translation of genomics research to application or market;
- Promote the application of genomics-derived solutions to address key challenges or opportunities facing users³;
- Promote commercialization of genomics technologies and help to de-risk future investment from public and private investors; and,
- Create and foster a more productive interface between academia and users.

³ user is defined as a company, industry consortium, government department or agency, not-for-profit or other organization making use of the research applications.

SECTION IV – Plans for 2013-14

A working group of the Board of Directors was established by the Board of Directors in June 2012 to oversee the development of this program. To-date, principles and parameters for this program have been reviewed and approved by the board. The intent will be to launch this program in April 2013. Anticipated outcomes of this program include:

- Increased engagement of user partners;
- Increase in research partnerships between academia and the private sector to stimulate Canadian innovation;
- Increase in socio-economic value of genomics research by promoting application of research results;
- Increased level of investment by others, in particular industry;
- Increase in prototypes or early stage products, tools or processes developed and moved closer to the market or application;
- Increase in the level of recognition by sector leaders of the importance of genomics to their sector;
- Increased number of new receptors/end users involved; and,
- Increased uptake of genomics research into policy and practice.

► **The Science and Technology Innovation Centres (STICs)** — A total of \$29 million in funding from the \$60 million announced in the Government of Canada’s 2012 federal budget will be allocated to support the five current STICs until March 31, 2015. This funding support will allow for:

- the continuation of the essential services provided by the current five STICs offered to the public and private sectors, relating to areas such as genomics, proteomics, metabolomics, and bioinformatics;
- development of cutting edge genomics-based technologies to ensure their international competitiveness;
- support of networking activities that promote the STICs to work together more cooperatively;
- acquisition of new equipment to increase operational efficiencies and remain at the cutting edge; and,
- retention of top scientists in Canada as leaders of the STICs.

The allocation of continued funding to support the STICs for an additional two years will be done via a renewal process which will involve an international committee of experts. This process will provide assurance that the existing STICs are providing leading edge technologies and methods in a competitive manner; and, that there are sufficient resources to manage and analyze the significant amount of data generated by the high throughput technologies. Funding will be provided for core operating support; technology development; and, purchase of equipment. In addition, funding will be used to sustain national STIC networking activities, designed to promote collaboration among and between STICs.

► **The Structural Genomics Consortium (SGC)** — The SGC is an international public-private partnership launched in 2004 that supports the discovery of new medicines through open-accessed research. Its core mandate is to determine the three dimensional structures of proteins of therapeutic importance to humans and place them in the public domain without restriction on their use. The SGC is viewed as “the model for the future of early stage discovery and public-private partnerships”.

SECTION IV – Plans for 2013-14

Phase III of the SGC began July 1, 2011. A total of \$67.7 million has now been committed to Phase III by funding partners, of which \$28.7 million is from the public sector (including \$2.5 million for one year from Genome Canada ending June 30, 2012) and \$39 million from the private sector, including GSK, Pfizer, Novartis, Lilly, Life Technologies, Abbott Laboratories, Takeda Pharmaceuticals, Boehringer Ingelheim and J&J. In addition, SGC has secured at least \$8M of in-kind support from pharmaceutical companies.

A total of \$2.5 million in funding from the \$60 million announced in the Government of Canada's 2012 federal budget will be allocated to sustain the Canadian operational activities portion of the SGC.

► **The International Barcode of Life (iBOL) Project**—The iBOL, established in 2009, is the largest biodiversity genomics initiative ever undertaken. Over 250 researchers from 25 countries are working together to construct a DNA barcode reference library that will be the foundation for a rapid and inexpensive DNA-based identification system for all multi-cellular life. In the first phase of operations (2009-2015), iBOL collaborators plan to barcode five million specimens representing 500,000 species. The resource being generated by iBOL, enables many practical and commercial opportunities related to health, trade, environment, and agri-food, providing significant benefits to Canada.

A total of \$2.5 million in funding from the \$60 million announced in the Government of Canada's 2012 federal budget was approved for an additional year of funding support toward the consortium's activities.

► **On-going Projects and Programs**—Along with the major new initiatives mentioned above which will be initiated in 2013-14, Genome Canada will continue the necessary administration, oversight and monitoring of the following major initiatives which were launched in previous fiscal years:

- ✓ 2012 Large-scale Applied Research Project Competition
- ✓ Emerging Issue on *Listeria*
- ✓ Emerging Issue on *E.coli*
- ✓ Bioinformatics/Computational Biology Competition
- ✓ 2010 Large-Scale Applied Research Project Competition
- ✓ Advancing Technology Innovation through Discovery
- ✓ Applied Genomics Research in Bioproducts or Crops (ABC) Competition
- ✓ Entrepreneurship Education in Genomics (EEG) Program
- ✓ International Rare Disease Research Consortium (IRDiRC)
- ✓ International Mouse Phenotyping Consortium
- ✓ Cancer Stem Cell Consortium
- ✓ International Cancer Genome Consortium

In summary, for 2013-14, Genome Canada intends to focus on designing programs and activities that translate research discoveries into new applications that can lead to economic or social benefits to society. It will continue to fund large-scale research projects and support cutting-edge technology, while also attending to the ethical, environmental, economic, legal or social aspects that arise from these endeavors.

SECTION IV – Plans for 2013-14

Genome Canada will focus its efforts in select sectors of strategic importance to Canada – agriculture, environment, fisheries, forestry, health, energy and mining. It will continue to conduct ongoing monitoring and interim reviews of its large-scale research projects and S&T Innovation Centres in order to ensure progress against objectives as well as the meeting of agreed-to milestones. It will continue to consult and engage its research community and other stakeholders with respect to assessing and staying apprised of international developments in science and research. Genome Canada commits to seek out opportunities to leverage the Government of Canada's investment beyond the 1:1 ratio, through the development of partnerships and collaborations. Working in concert with the six Genome Centres, Genome Canada will continue its leadership role in cultivating the complex and collaborative network of individuals and organizations representing the *Canadian Genomics Enterprise*.

SECTION IV – Plans for 2013-14

Planned Receipts and Disbursements for 2013–14

The following table provides a preliminary estimate of the receipts and disbursements for 2012-13 and subsequent fiscal years as of January 2013. The operating budget for fiscal year 2013–14 will be presented to the Genome Canada Board of Directors for approval in March 2013.

Details (In millions of dollars)	Genome Canada				Estimated Co-funding For Those Years	Total Genome Canada and Co-funding	%
	Forecast Cumulative 2000-01 to 2012-13	Planned 2013-14	Planned Subsequent Years	Forecast Total			
RECEIPTS							
Government of Canada						0.0	0.0%
Previous Agreements	700.0			700.0		700.0	28.4%
March 2008 Agreement	126.2		13.8	140.0		140.0	5.7%
March 2010 Agreement	53.4	12.8	8.8	75.0		75.0	3.0%
January 2012 Agreement	5.5	22.6	36.9	65.0		65.0	2.6%
January 2013 Agreement	3.8	21.2	35.0	60.0		60.0	2.4%
Investment Income	88.2	0.4	0.5	89.1		89.1	3.6%
Co-Funding					1,333.3	1,333.3	54.1%
	977.1	57.0	95.0	1,129.1	1,333.3	2,462.4	100.0%
PROGRAM DISBURSEMENTS							
Research Projects							
Competitions I, II and III	431.6			431.6	431.1	862.7	35.1%
Multi-Sector	15.4	10.9	4.6	30.9	34.8	65.7	2.7%
Forestry and Environment	14.9	9.2	4.9	29.0	31.2	60.2	2.4%
Applied Genomics In Human Health	59.9			59.9	70.2	130.1	5.3%
Applied Genomics in Bioproducts and Crops	44.6	10.4		55.0	60.9	115.9	4.7%
Genomics and Personalized Health		11.3	33.8	45.1	77.8	122.9	5.0%
Bioinformatics/Computational Biology		1.7	3.3	5.0	4.0	9.0	0.4%
Genomics Application Partnership Program (GAPP)		2.0	28.0	30.0	60.0	90.0	3.7%
Bovine Genome Sequencing Project	6.0			6.0	63.4	69.4	2.8%
Entrepreneurial Innovation in Technology	0.7	0.4		1.1	1.6	2.7	0.1%
Structural Genomics Consortium	36.7	0.6		37.3	221.2	258.5	10.5%
Public Population Project in Genomics	16.2			16.2	46.6	62.8	2.6%
International Regulome Consortium	2.6			2.6	0.4	3.0	0.1%
International Barcode of Life	10.6	0.6		11.2	10.7	21.9	0.9%
Genome Canada-Genoma Espana Competition	7.7			7.7	7.8	15.5	0.6%
C. difficile / H1N1	0.3			0.3	0.2	0.5	0.0%
New Technology Development	9.8			9.8	9.7	19.5	0.8%
Canadian Stem Cells Consortium	6.8	5.0	13.2	25.0	60.0	85.0	3.5%
Advanced Technology Innovation Through Discovery	2.4			2.4	4.7	7.1	0.3%
Other Initiatives		1.1	1.5	2.6	3.0	5.6	0.2%
	666.2	53.2	89.3	808.7	1,199.3	2,008.0	81.7%
Science & Technology Innovation Centres							
Genome Centres Operations	124.9	13.0	16.0	153.9	47.1	201.0	8.2%
	68.2	4.8		73.0	86.9	159.9	6.5%
GENOME CANADA OPERATING EXPENDITURES	82.3	7.1		89.4		89.4	3.6%
Total Disbursements	941.6	78.1	105.3	1,125.0	1,333.3	2,458.3	100.0%
Excess Receipts over Disbursements	35.5	-21.1	-10.3	4.1			
Opening Cash Balance		35.5	14.5				
Closing Cash Balance	35.5	14.5	4.2	4.1			

SECTION V – Performance Audit and Evaluation

Genome Canada has a wide array of policies, systems and processes that have been developed over time to address issues of performance, audit and evaluation. In 2007–08, the Board of Genome Canada approved a performance, audit and evaluation strategy (PAES) to ensure that a comprehensive and integrated approach to these functions was established and maintained. The PAES can be viewed on Genome Canada’s website. See <http://www.genomecanada.ca/en/about/accountability/>

Performance Audit

The terms and conditions of Genome Canada’s funding agreements with Industry Canada specify that at the request of Industry Canada, a performance audit can be carried out on Genome Canada to ensure the economy, efficiency and effectiveness with which federal funds were used. In 2008–09, a performance audit was undertaken with the following conclusions:

- mechanisms are in place to ensure transparency and reduce conflicts of interest in the review and approval of applications for funding, as well as to monitor the progress of funded projects;
- funding themes are identified with input from the scientific community and through widespread consultations;
- international partnership opportunities are guided by documented criteria that include consideration of partners’ ethics and values; and
- performance measurement strategies and frameworks include defined performance measures.

The auditors’ final report may be viewed on Genome Canada’s website.

See <http://www.genomecanada.ca/en/about/accountability/performance-audit.aspx>

Compliance Audit

In fiscal year 2011–12 Industry Canada, as a routine practice, initiated a compliance audit of Genome conducted by an independent accounting firm. The stated objective of the audit was to assess Genome Canada’s compliance with the requirements of the funding agreement that was in effect in fiscal year 2010–11. The resulting audit report concluded that “...we are of the opinion that GC did comply with the requirements of its funding agreement with Industry Canada”. The auditors’ final report may be viewed on Genome Canada’s website. See <http://www.genomecanada.ca/medias/pdf/en/industry-canada-compliance-audit-2012>.

Evaluation

The terms and conditions of Genome Canada’s funding agreements with Industry Canada specify that every five years it shall carry out an independent third-party evaluation of its grants to eligible projects, including its own activities and projects. It further states that the evaluation will measure overall performance in achieving the objectives identified in the funding agreement. In 2008–09, Genome Canada underwent a full third-party summative evaluation to determine to what extent it had achieved its objectives and mandate. The evaluation concluded that overall, the rationale for Genome Canada remains strong and important and that there has been a “transformative” impact of Genome Canada on Canadian genomics research. The evaluation report, as well as the details of an extensive bibliometric study on genomics research also conducted in 2008–09, can be viewed on Genome Canada’s website.

SECTION V – Performance Audit and Evaluation

See http://www.genomecanada.ca/en/about/accountability/five-year_evaluation.aspx

The next third-party evaluation is scheduled for 2014. In preparation for this activity, the development of a Performance Measurement and Evaluation Strategy (PMES), including the identification of specific performance measurement indicators (see table below), was completed in 2012-13.

Other anticipated activities for 2013-14 include,

- the establishment and roll-out of a national database of performance indicators
- the initiation of a five year work-plan of review, research and evaluation in line with Genome Canada's current strategic plan 2012-2017 of which the first major evaluation activity will consist of the planning of the 2014 Genome Canada evaluation

Anticipated Outcomes and Performance Measure Indicators

Outcome: Applications arising from projects that positively impact policies, regulations, economic development and the quality of life	
Performance Measure	Example Indicators
Uptake of research into policy, regulations and practice	<ul style="list-style-type: none"> • Examples of uptake of research into policy and practice including No. of citations of research and types of publication (guidelines, educational material, policy etc) • Examples of changes in regulation, protocols, resulting from scientific research
Growth and economic development in core sectors	<ul style="list-style-type: none"> • Recognition and feedback by sector leaders of the valorization of genomics in their sector • No. of licensing agreements, disclosures, patents • No. of spinoff companies and valuation • Number of employment opportunities created or preserved (number of jobs)
Involvement of downstream experts and end users in priority setting and program design	<ul style="list-style-type: none"> • End-users involved in the design, development and uptake of research projects
Coordinated development of programs to support the end to end integration of research and its application	<ul style="list-style-type: none"> • Translational plans built into project applications • No. of projects with a clear translational trajectory (pathway to application)
Development of innovative models of public private partnerships	<ul style="list-style-type: none"> • No. of stakeholder organizations actively engaged in GC initiatives • No. and type of new models of collaboration involving stakeholders (e.g. Pharmaceutical and SME's)
Initiatives fostering entrepreneurial spirit in the scientific community	<ul style="list-style-type: none"> • No. and type of approaches to engaging entrepreneurs in Genome Canada funded projects

SECTION V – Performance Audit and Evaluation

Outcome: Increased investment in genomics research by a broad range of stakeholders, in particular the private sector	
Performance Measure	Example Indicators
Establishment of strategic partnerships	<ul style="list-style-type: none"> No. of stakeholder organizations actively engaged in Genome Canada initiatives \$ and ratio of investments by stakeholders including contributions in-kind Strategies developed or co-developed with stakeholders
Creation of programs focused on regional priorities	<ul style="list-style-type: none"> Major sector challenges and opportunities for genomics identified (white papers, workshops, environmental scans etc) Sector strategies developed by the regional Centres in collaboration with GC and stakeholders Competitions, programs and funding requests informed by sector strategies
Support of internationally competitive large scale science	<ul style="list-style-type: none"> No. of internationally competitive large scale science projects
Provision of leading edge technologies to Canadian Scientists	<ul style="list-style-type: none"> Dollar investments from industry and other 'receptors' of genomics technologies Amount of access to, use of technologies and expertise of STICS or derived from technology development or other programs Type of tech infrastructure acquired, adapted, upgraded, maintained
Outcome: Stronger role and influence of ethical, environmental, economic, legal and social aspects in shaping genomics research and its outcomes	
Performance Measure	Example Indicators
Development of innovative models of collaborative research	<ul style="list-style-type: none"> No. and type of new models of collaboration involving stakeholders (e.g. Pharmaceutical and SME's)
Genomics in Society (GIS) initiatives that shape the innovation continuum	<ul style="list-style-type: none"> End-users involved in the design, development and uptake of research projects Translational plans built into project applications
Enhanced accountability through engagement	<ul style="list-style-type: none"> No. and type of engagement event (audience type, purpose and impact) Nature and extent of public and policy media coverage of genomics research Stakeholder perception of genomics benefits in key sectors No. of papers co-authored by genomics scientists and GE³LS researchers

SECTION V – Performance Audit and Evaluation

Outcome: Increased stakeholder appreciation of the potential of genomics and its impact on society	
Performance Measure	Example Indicators
Initiatives that build a world class communications infrastructure using advance models, tools and methodologies	<ul style="list-style-type: none"> • Awareness and reviews of trends in communication tool use • Use of innovative communication methods • Recognition of the quality of the communications approach through content analysis and messaging impact scores, web and social media metrics, awareness and acceptance surveys
Initiatives to communicate the advantages and impacts of genomics research and related activities	<ul style="list-style-type: none"> • Recognition as trusted source of high quality information nationally and internationally through third party endorsements • No. and type of engagement event (audience type, purpose and impact) • Perception changes within “Involved Canadians” • Nature and extent of public and policy media coverage of genomics research
Outcome: Increased breadth and depth of genomics knowledge in economic sectors important to Canada	
Performance Measure	Example Indicators
Initiatives that forge linkages with and among members of the Genomics Enterprise	<ul style="list-style-type: none"> • Growth of genomic networks as detailed in maps of stakeholders particularly within sectors and industry • Nature and extent of public and policy coverage of genomics enterprise • Strategies developed or co-developed with stakeholders • No. and type of new models of collaboration involving stakeholders (e.g. pharmaceutical and SME's)
Partnerships with organizations pursuing similar innovation goals, especially in key sectors	<ul style="list-style-type: none"> • No. of stakeholder organizations actively engaged in joint initiatives • Strategies developed or co-developed with stakeholders • No. and type of new models of collaboration involving stakeholders (e.g. pharmaceutical and SME's)

SECTION VI – Risks and Challenges

Risk Management

Risk management is integrated into all operational, managerial and governance activities of Genome Canada. Strategic risks arising from the external operating environment as well as the internal operational environment are assessed on an ongoing basis.

- At the project selection level, risk is managed and mitigated through a process that restricts funding to only those projects judged to have the greatest probability of success from both a scientific and managerial point of view. The viability of each project's success is further mitigated through ongoing monitoring and interim review.
- At the operational level, officers of Genome Canada identify risks and propose strategies for mitigating and reporting (e.g. due diligence routines for review of draw requests and for interim reviews of funded projects).
- At the managerial level, policies, systems, processes and procedures (administrative, financial, human resource management) are developed, implemented and monitored.
- At the governance level, the Board of Directors and its committees are aware of their risk management responsibilities and exercise modern governance practices with respect to policy approval and oversight.
- The Audit and Investment Committee is responsible for the monitoring of risk and mitigation strategies.
- The Genome Canada internal working environment culture is one that values honesty, integrity and ethical conduct.

Challenges

Over the past decade, and in concert with our stakeholders, partners and six Genome Centres, Genome Canada has created a strong foundation to take the Canadian Genomics Enterprise to the next level of research discovery including translating research findings into utility for Canadians and creating a competitive advantage for Canada.

To fully implement its five-year strategic plan, Genome Canada proposes a multi-year funding approach, as a means of demonstrating to external stakeholders, including the private sector, the federal government's commitment and resolve in supporting genomics and its contribution to Canada's bio-economy. Under a multi-year funding model, Genome Canada will commit to augmenting the funding investments it receives from the federal government to proportions that are well above the traditional 1:1 ratio.

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GenomeCanada

150 Metcalfe Street, Suite 2100
Ottawa, Ontario K2P 1P1
Telephone: 613-751-4460
Facsimile: 613-751-4474
Email: info@genomecanada.ca
Website: www.genomecanada.ca