



GenomeCanada

CORPORATE PLAN 2014–15

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SECTION I

About Genome Canada

Established in February 2000 under the *Canada Corporations Act*¹, Genome Canada is a not-for-profit organization that invests in genomics² 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 fostering 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 plan³ which included two new sectors of strategic and economic importance to Canada – energy and mining. The strategic 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. Furthermore, the strategic plan recognizes genomics as a key enabler for driving the bio-economy of Canada.

To this end, Genome Canada will place a greater focus on the translational aspects of the genomics research that lead to economic and social benefits. It will engage with users from the public, private and not for profit sectors to identify challenges or opportunities. In order to prime the “pipeline of innovation”, Genome Canada will continue to fund discovery research and support cutting-edge technology. Thus, a seamless portfolio of programs will be developed with partners to support the end-to-end integration of research and its application for societal benefit. Underpinning the research efforts is a sustained commitment to the ethical, environmental, economic, legal or social aspects of the research undertaken. Recognizing and enhancing the value and impact of genomics in society is a core tenet of the 2012–17 strategic plan.

¹ In December 2012, Genome Canada received new Articles of Continuance under the *Canada Not-For-Profit Corporations Act*

² Genomics means the study of genes and their functions, namely genomics, proteomics, metabolomics, bioinformatics and other related fields of research.

³ The strategic plan can be viewed on Genome Canada’s website (www.genomecanada.ca).

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.

THIS NEW EMPHASIS IS SIGNIFICANTLY CHANGING THE WAY GENOME CANADA DOES BUSINESS IN TERMS OF:

Setting Strategic Priorities

Future funds will be invested in the seven sectors of economic and strategic importance to Canada that are identified in Genome Canada's strategic plan – health, agriculture, environment, forestry, fisheries, energy and mining.

The Genome Centres were given the mandate to lead the development of the roadmaps for each strategic sector. These roadmaps included information on:

- the importance of the sector to the Canadian economy;
- challenges, gaps, opportunities and issues faced by the sector;
- the role of genomics in mitigating the challenges and creating the opportunities;
- the socio-economic impact of successful genomics-enabled solutions; and,
- capacity, leadership and strengths in the sector in Canada.

The exercise involved the establishment of advisory committees and the organization of workshops from February 2013 to April 2013. The workshops served as consultations with key stakeholders and potential users from provincial and regional governments, industry, sector-based regulators, policy-makers and researchers.

The sector strategy roadmaps and collateral communications material have been, and will continue to be, communicated to a broad audience of potential stakeholders to inform them not only of the potential transformative role that genomics can play in each sector, but also to drive partnership creation, encourage investments by others (in particular the private sector) and influence policy/regulation development.

This strategic prioritization approach is also evident in the international arena. Here, Genome Canada seeks to participate in specific international genomics research consortia, when it is deemed that it can significantly contribute expertise and leadership or that Canada will derive substantial benefits from Canadian participation. Thus, Genome Canada has funding commitments as part of several major international projects, including the International Rare Disease Research Consortium (IRDiRC), the Cancer Stem Cell Consortium, the Structural Genomics Consortium (SGC), the International Wheat Genome Sequencing Consortium, the International Barcode of Life Project (iBOL), the International Cancer Genome Consortium (ICGC), and the International Mouse Phenotyping Consortium (IMPC).

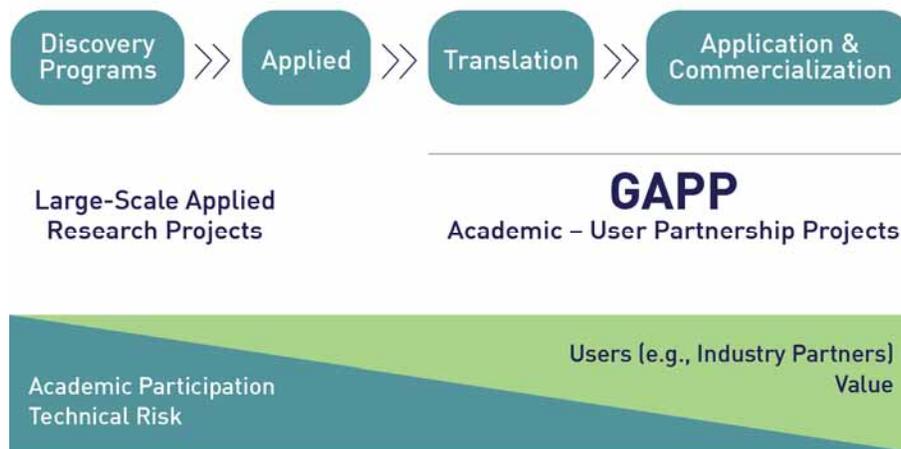
Translational Programs

Genome Canada will continue to support both 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. However, increased emphasis will be placed on understanding how to apply this new knowledge to the benefit of Canadian society. Thus, Genome Canada has developed programs that promote entrepreneurship and innovation in the research community; as well as programs that create and foster a more productive interface between academia and users.

In 2013–14, Genome Canada launched the *Genomic Applications Partnership Program (GAPP)*, a translational “user-pull” program designed to bridge the gap between academia

and users (defined as a company, industry consortium, government department or agency, not-for-profit or other organizations) and increase the socio-economic value of genomics research to application or market. The GAPP aims to:

- promote the application of genomics-derived solutions to address key sector challenges or opportunities facing users “user pull”;
- promote commercialization of genomics technologies by facilitating the advancement of genomics-driven solutions from academia to users and incentivizing follow-on investment from public and private partners;
- increase the socio-economic impact of genomics research by accelerating its translation to application or market; and,
- create and foster a more productive interface between academia and users.



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. 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.

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 five Science and Technology Innovation Centres (STICs), creating unique and innovative public outreach

programs, and most importantly, working with projects to secure co-funding 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.

Genome Centres and S&T Innovation Centres



Genome Canada, in collaboration with the six Genome Centres, has raised over \$1.2 billion in co-funding commitments to supplement the \$1.2 billion committed by the Government of Canada over the past 13 years. In addition, Genome Canada has committed to raising over \$280 million in co-funding to supplement the \$165 million committed by the federal government in federal Budget 2013. Co-funding partners include provincial governments and agencies, international organizations and research institutes, industry, universities, and research hospitals. This collaborative effort has resulted in funding commitments to support over 200 large-scale research projects and S&T Innovation Centres, and six regional Genome Centres.

Genome Canada Portfolio – 2000 to 2013

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	6	5	2	1	1	18
Energy	2	1	1				4
Environment	4			5	3	1	13
Fisheries	2					2	4
Forestry	5			1	3	1	10
Health	24	5	2	31	30	3	95
CROSS-SECTOR INITIATIVE							
Large-Scale GE ³ LS	2	1	2	3	2		10
Entrepreneurship Initiatives	1			1	1		3
Technology Development	3	1	2	10	2		18
S&T Innovation Centres	4	2		2	1	1	10
Bioinformatics and Computational Biology	7			7	2	1	17
Total	57	16	12	62	45	10	202

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

Nurturing the 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 community exists as a virtual enterprise representing 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 continue to work collaboratively to enhance this virtual enterprise by building bridges and strengthening connections among and between public and private sector constituencies. Genome Canada and the Genome Centres 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. 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, in 2013–14, Genome Canada partnered with:

- the Natural Sciences and Engineering Research Council (NSERC), the Canadian Institutes of Health Research (CIHR) and the Canada Foundation for Innovation (CFI) in NSERC's 2013 Discovery Frontiers Program call for proposals – *Advancing Big Data in Genomics Research* – on the exploration and exploitation of genomics data;
- the Canadian Institute for Advanced Research (CIFAR) on its *Global Call for Ideas* program that addresses complex questions of importance to humanity; particularly, grand challenges in the areas of genomics;
- the Global Alliance, an international network of over 70 leading health care, research and disease advocacy organizations, dedicated to the responsible sharing of genomics and clinical data across international borders; and,
- the Canadian Institutes of Health Research (CIHR) on its “CIHR Rare Disease Research Catalyst Network” which is focused on expediting collaboration between basic and clinician scientists in functional studies of novel rare disease genes.

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 performance audit and evaluation studies, peer review and interim review processes, annual attests audits, continuous risk management assessment and effective oversight by the Board of Directors, and in particular, the board's Audit and Investment Committee, provide a high level of assurance. Genome Canada rigorously monitors its expenditures in order to manage operations in a fiscally prudent manner.

Governance

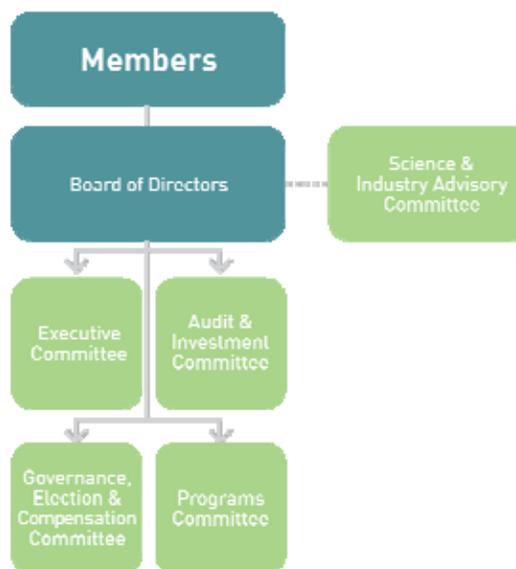
Genome Canada operates within a governance framework that is reflective of its not-for-profit corporation status and it adheres to governance best practices. Genome Canada is committed to achieve the highest operational and ethical standards and compliance with the laws, regulations, policies and procedures 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 strategic plan. The Board has also established and seeks strategic advice and expertise from its Science and Industry Advisory Committee (SIAC). Furthermore, as non-voting, ex-officio advisors to the Board of Directors, 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), can be called upon to offer advice whenever deemed necessary.

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

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. In 2013–14, the Board of Directors appointed five new directors in June 2013 and has put in place a succession plan for the recruitment of new directors to be appointed in 2014–15. Furthermore, the organization took the necessary steps in terms of revised General By-Laws and articles of continuance for the purpose of transitioning the organization to the *Canada Not-for-Profit Corporations Act*.

Governance Structure



About this Document

Genome Canada’s Corporate Plan 2014–15 reports on activities and performance for the fiscal year 2013–14 and outlines anticipated activities for fiscal year 2014–15.

The reporting of activities and performance is organized around the three activities stated in Genome Canada’s mission, and is aligned to the organization’s logic model; namely, activities, outputs and immediate outcomes.

SECTION II

Performance for 2013–14

ACTIVITY #1

Connecting ideas and people across public and private sectors to find new uses and applications for genomics

OUTPUTS

1—Research/investment strategies in various sectors of the Canadian bio-economy

Sector Strategies—The development of road maps or strategies for each of the sectors (health, agriculture, environment, forestry, fisheries, energy mining) of strategic and economic importance to Canada is a key initiative of Genome Canada’s strategic plan. The development of the sector strategies will not only serve as a primary means of identifying areas for future investments, but will also inform key stakeholders of the potential transformative role of genomics in these specific sectors and guide the creation of future partnerships and funding programs. The Genome Centres, with the support of Advisory Groups, were mandated to lead the development of the strategies, pairing to co-lead the process as appropriate. Each strategy would describe:

- The importance of the sector to the Canadian bio-economy,
- Challenges, gaps, opportunities and issues faced by the sector,
- The role of genomics in mitigating the challenges and creating the opportunities,
- The socio-economic impact of successful genomics-enabled solutions, and
- The capacity, leadership and strengths in the sector in Canada.

In 2013–14, workshops were organized in support of the development of each strategy. These workshops were consultative and involved key stakeholders, including federal, provincial and regional governments, industry, sector-based regulators and policy-makers, and researchers. These workshops resulted in the development of four sector strategies: Agri-Food; Energy and Mining; Forestry; Fisheries and Aquaculture. An appropriate set of communications tools and activities has been developed to connect and communicate these sector strategies to the stakeholder communities. The sector strategies will be distributed and promoted broadly to a variety of key stakeholders and be used to enhance the recognition of the value of genomics by

IMMEDIATE OUTCOMES

1—Funded genomics research projects are relevant to sectors of the Canadian bio-economy

The Workshops and the sector strategies have set the stage for what is anticipated to be a fruitful and productive engagement process with key stakeholders in each sector with the following anticipated outcomes: increased breadth and depth of genomics knowledge in economic sectors important to Canada; applications that have positive impacts on policies, regulations, economic development and the quality of life; increased investment in genomics research by a broad range of stake-holders, in particular the private sector; and increased stakeholder appreciation of the potential of genomics and its impact on society.

The sector strategies developed over the past year provide the framework for two Large-Scale Applied Research Project Competitions which will be launched in 2014–15 and the subsequent year on the themes of *Feeding the Future* and *Natural Resources*. Due to the engagement of the Genome Centres, the sector experts and “users” in the sector strategy process, the competitions will be informed by sector and user needs, ensuring key economic drivers are targeted and focus is placed on areas with a high potential for translation into practical applications.

At its September 2013 meeting, the Board of Directors approved the theme of the first LSARP competition, provisionally titled *Feeding the Future*, to be launched in the spring of 2014. This competition will support large-scale applied research projects focused on addressing challenges related to global food safety, security and sustainable production. This is an area that is not only of extreme importance to the global community, but one where Canada has the ability to be a leader and to reap social and economic benefits.

Connecting ideas and people across public and private sectors to find new uses and applications for genomics

OUTPUTS

IMMEDIATE OUTCOMES

increasing stakeholder appreciation of genomic science, its applications and its implications as it relates to key sectors of the Canadian economy. The strategies and other derivative documents will also be used to engage developers of genomics research and potential users in further dialogue about the potential of the technology for their sector of interest and will help position genomics in a leading role in the development of Canada's growing bio-economy. An economic analysis of the impact of genomics in each of the sectors will be conducted. The first study will be on the forestry sector.

2–Relationships and partnerships with the national and international genomics community in areas of strategic interest to Canada

International Barcode of Life—The International Barcode of Life (iBOL) project 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.

In 2013–14, an inaugural meeting of the International Scientific Collaboration Committee (ISCC) was held in Guelph on July 5–6, 2013. Representatives from all members of the ISCC were present, bringing perspectives from 13 nations and providing an effective forum for the discussion of challenges and potential solutions. IBOL's Research Oversight Committee (ROC) met with the iBOL Project Team in Guelph on August 28 to assess the progress being made and to provide advice and guidance to the project team. Overall, the ROC determined that the iBOL project was on target to meet its funded goals of building the DNA barcode reference library and developing applications. Paul Hebert, iBOL's Scientific Director, his colleagues in Guelph and the ISCC, were key players in the organization of the 5th International Barcode of Life Conference held in Kunming, China in October, and Canada was well represented. The second meeting of the ISCC was held during the conference, leading to the 'Kunming Declaration'.

Genome Canada has allocated \$5 M of the \$165 M received in Budget 2013 to fulfill its revised total of \$16.1 M commitment to iBOL.

2–New opportunities arise for research collaboration in strategic areas of interest to Canada, within Canada and at the international level

As of mid-November, the project has generated more than 2.6 million barcodes representing more than 194,000 species; thus, on track to meet its targets for building the library. The US FDA is using and applying DNA barcoding for seafood identification and CFIA is considering it. 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. A pilot project with a mining company is underway in an effort to use barcoding to monitor site bioremediation.

A significant paper by Dr. Hebert and colleagues describing their DNA-based registry for all animal species, what they call the Barcode Index Number (BIN) System, was accepted for publication in the journal PLOS ONE in July.

Building on the achievements of the first decade of DNA barcoding, and with the Consortium for the Barcode of Life, and iBOL having reduced resources available for community coordination, the barcoding community decided to formulate a statement of shared community values, direction and ambition and to provide a coordinated response to the UN Decade of Biodiversity (2011–2020). As such, the delegates agreed to the "Kunming Declaration" intended to result in the formation of a self-governing society dedicated to DNA Barcoding before the time of the next international meeting in the Fall of 2015.

Connecting ideas and people across public and private sectors to find new uses and applications for genomics

OUTPUTS	IMMEDIATE OUTCOMES
<p>Structural Genomics Consortium— The Structural Genomics Consortium (SGC) is an international public-private partnership of nine 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. A total of \$78.1 million has been committed to Phase III by funding partners, of which \$37.9 million is from the public sector (and \$40.9 million from the private sector, including GSK, Pfizer, Novartis, Lilly, Life Technologies, Abbott Laboratories, Takeda Pharmaceuticals, Boehringer Ingelheim, Bayer Pharma AG and J&J). The pharmaceutical companies are also providing about \$8M of in-kind support.</p> <p>In 2013–14, Genome Canada contributed \$5M to SGC to support its operations for two years.</p>	<ul style="list-style-type: none"> ▪ ~2 peer-reviewed publications/week (>64 papers to date in 2013) ▪ solved and deposited >1000 novel human structures (~15% of the yearly and overall global output) ▪ solved and deposited 6 structures of 3 human integral membrane proteins in the last 24 months ▪ Phase III deliverables against targets are on track: 147/200 novel structures; 206/200 recombinant antibodies; 18/30 chemical probes ▪ deposited first SGC human ion channel ▪ determined the long sought after protein kinase G structure, relevant to malaria ▪ more than 250 active collaborations worldwide
<p>International Rare Disease Research Consortium— The International Rare Disease Research Consortium (IRDiRC) is an international initiative on rare diseases. Genome Canada, along with CIHR, represents Canada on the Executive Committee due to investments in rare diseases as a result of support for special initiatives such as FORGE, and as a result of support for the following research projects -Care for Rare and IGNITE. Three scientific committees have been established, along with several working groups that support each of the committee.</p> <p>In 2013–14, the IRDiRC Executive Committee met in September and November. The three Science Committees – Diagnostic, Therapies and Interdisciplinary – provided status reports on their activities, including the work being undertaken by their respective Working Groups. The IRDiRC is currently developing a strategy for liaising with the Global Alliance. Two new countries have joined the initiative – China and Korea, bringing the total to 36 members.</p>	<p>IRDiRC members have developed 64 new therapies, towards their goal of 200 by 2020.</p>
<p>International Mouse Phenotyping Consortium— The International Mouse Phenotyping (IMPC) aims to develop an internationally coordinated approach for phenotyping the mouse mutants being developed. 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>Increased international coordination of mouse phenotyping research which can lead to a better understanding of human diseases.</p>

Connecting ideas and people across public and private sectors to find new uses and applications for genomics

OUTPUTS	IMMEDIATE OUTCOMES
<p>In 2013–14, an IMPC meeting was held in October in Toronto. The meeting included a meeting of the IMPC Panel of Scientific Consultants (PSC) who will evaluate the progress of the initiative. A meeting of the IMPC Steering Committee, on which Genome Canada sits, was also held as a part of the meeting. The IMPC and Infrafrontier (a resource centre for mouse models in Europe) also hosted a meeting in December 2013 in Rome that included a session on Rare Diseases, an overview of IRDiRC, and FORGE, a Genome Canada project funded through the Advancing Technology Innovation through Discovery (ATID) program.</p>	
<p>Cancer Stem Cell Consortium— The Cancer Stem Cell Consortium (CSCC), a consortium of Canadian funders, aims to coordinate an international strategy for cancer stem cell (CSC) research. Through a partnership with the California Institute for Regenerative Medicine (CIRM), two projects have been funded, led by Canadian researchers. As part of the overall oversight and monitoring of the Disease Team projects, a Clinical Development Advisory Panel (CDAP) provides expert advice on the projects' strategy, progress against milestones and go-no-go decision points. The key challenge with this program is to connect and transition the activities in research and discovery into clinical translation and product development.</p>	<p>By the end of the granting period the two Disease Teams should deliver the following:</p> <ul style="list-style-type: none"> ▪ Development of a CSC biomarker capability/platform ▪ INDs for clinical trials for which trial designs were helped by biomarkers for the drugs. Some trials would be investigator-lead, others sponsored by the biopharmaceutical companies. ▪ Developed three novel drug candidates for Leukemia and solid tumour cancers <p>Partnerships with Genome Canada in respect to funding a stem cell research projects from the 2012 Large-Scale Applied Research Project Competition on Genomics and Personalized Health, and a partnership with the Terry Fox Research Institute to support efforts in respect to cancer treatments.</p> <p>Development of a special initiative bringing together clinicians, researchers, industry funding stakeholders for the purpose of improving outcomes of hard-to-treat cancers.</p>
<p>International Cancer Genome Consortium— The International Cancer Genome Consortium (ICGC) 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. 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>In 2013–14, the 8th scientific workshop of ICGC was held from Sept 30–Oct 2 in Toronto, with a number of ancillary meetings on data coordination, management and bioinformatics analysis; cancer genome projects and a symposium on breast and prostate cancer genomics.</p>	<p>ICGC has received commitments from funding organizations in Asia, Australia, Europe and North America for 64 project teams in 16 jurisdictions to study over 25,000 tumor genomics. Canada is supporting three projects: prostate (in collaboration with Germany), pancreatic (in collaboration with Australia) and pediatric brain (in collaboration with Germany).</p>

ACTIVITY #1

Connecting ideas and people across public and private sectors to find new uses and applications for genomics

OUTPUTS

IMMEDIATE OUTCOMES

CIHR Research Catalyst Network— The Research Catalyst Network has an overarching goal to establish a national consortium that will enable clinical geneticists who are identifying rare disease gene mutations to connect/collaborate with model organism researchers with expertise in the cognate gene's function. CIHR is the key driver of this initiative and will support a single national network organized to identify instances where Canadian model organism expertise is relevant to a newly discovered disease gene, and when such instances are found, a research project would be initiated to explore the functional characterization of the gene. It will also develop and implement innovative knowledge translation strategies/activities to link the clinical genetics and model organism research communities together.

In 2013–14, GC partnered with CIHR through a commitment of \$200K to support the Research Catalyst Network. This investment re-affirmed GC's support of, and interest in, the Rare Disease program.

Building on an international reputation for being a leader in rare disease gene identification, this program will help extend Canada's leadership into treatment and therapeutics for rare diseases.

Canadian Institute for Advanced Research— The Canadian Institute for Advanced Research (CIFAR) is a private, not-for-profit institute of advanced study that brings together unique individuals to focus on important questions with the potential to improve human health and the environment, transform technology, build strong societies, understand human culture and even chart the universe.

In 2013–14, Genome Canada signed an MOU with CIFAR, defining the parameters of a partnership with the organization's *Global Call for Ideas* program – a call for proposals to create one or more new research networks that will address a complex question of importance to humanity.

Genome Canada has committed \$50K to help support development workshops for successful Letters of Intent (LOIs) submitted to the Global Call for Ideas. Development workshops were organized in late 2013 early 2014 and full proposals will be submitted for review and consideration in 2014–15. Based upon the advice of SIAC, Genome Canada will consider partnering with CIFAR on a successful network in an area of strategic importance to Genome Canada and that aligns with Genome Canada's strategic plan.

In partnership, Genome Canada has an opportunity to advance knowledge in the selected genomics area and provide additional opportunities for a research community to think beyond their current frameworks.

ACTIVITY #1

Connecting ideas and people across public and private sectors to find new uses and applications for genomics

OUTPUTS

Global Alliance for Genomics and Health— Over 70 leading health care, research, and disease advocacy organizations involving colleagues in over 40 countries have taken initial steps to form an international alliance dedicated to encouraging widespread access to genomic and clinical data by developing a common framework of international technical, operational and ethical standards needed to ensure the interoperability of genomic research platforms in a secure and responsible manner.

In June 2013, the GC Board of Directors approved an allocation of up to \$1M as a signal of GC's support of this initiative, and to allow Canada to take a leadership role in this initiative. Detailed spending plans for the \$1M will be developed over the 2014–15 fiscal year, and will be applied to the development of analytical tools and applications, shaping the informed consent and regulatory environment, or contributing data or expertise to design the information platform.

IMMEDIATE OUTCOMES

Participation in a global alliance that develops a technology platform with open standards will create new opportunities to gain insight into disease, improve prevention and early detection, define diagnostic categories, streamline clinical trials, and match patient to therapy. The impact can be rapid (e.g. targeted therapy based on genomic characterization) and longer term (discovering molecular targets, leading to new and more effective therapies).

3—Requirements for supported projects to leverage co-funding from various sources, especially the private sector

Through its most recent Contribution Agreement with Industry Canada, GC is committed to increasing its 1:1 co-funding ratio that has been traditionally required for all past agreements. The \$165M Agreement stipulates that as a condition of funding, GC must raise an additional \$280M in co-funding from other organizations including the private sector. This aligns directly with the strategic plan that calls for GC to aggressively partner with other organizations on initiatives that pursue similar innovation goals as GC.

3—Increased level of investment by other partners, in particular industry

As at December 2013, GC's cumulative investments for all programs since inception was comprised of 56% in co-funding and 44% in GC funding.

The \$150M Personalized Health Competition of 2012 resulted in a Co-Funding/GC ratio of 2:1.

In addition, the recently launched Genomics Application Partnership Program requires applicants to bring \$2 for every \$1 of funding requested from GC's pool of \$30M allocated to this program, much of which will be coming from the private sector.

Investing in large-scale science and technology to fuel innovation

OUTPUTS	IMMEDIATE OUTCOMES
<p><i>1—Support for large-scale genomics research projects in Canadian research institutions, including GE³LS, national and international partnerships</i></p> <p>Large-Scale Applied Research Project Competition 2010 Interim Review— 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 2013–14, an interim review process was undertaken of the 16 funded projects. The Board of Directors at its September 2013 meeting approved the recommendations of the peer review committees to continue funding of all of the projects.</p>	<p><i>1—Enhanced knowledge and HQP capacity in Canada in genomics research including GE³LS</i></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 adaptation 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> <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>Large-Scale Applied Research Project Competition 2012 (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). It resulted in 17 projects receiving a total of about \$45 million in Genome Canada funding.</p> <p>In 2013–14, planning for a National Forum on Genomics and Personalized Health to be held in the spring of 2014 has been ongoing. The objective of the forum is to bring together the 17 successful projects in order to explore ways to help coordinate and enhance key components of the translational aspects of the projects. The Forum will also address the third modality of GE³LS.</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. The projects will focus on the application of genomics to tailor patient treatments and therapies in fields as diverse as epilepsy, autism, HIV/AIDS, cancer, cardiovascular disease, rare neurological diseases, and stroke, among others.</p>

Investing in large-scale science and technology to fuel innovation

OUTPUTS	IMMEDIATE 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 2013–14, the majority of the projects were due to submit final reports by September 2013. However, 11 of the 12 projects applied for one-time no-cost extensions for up to one year in order to allow more time to complete the approved objectives and research activities. It is expected these projects will submit final reports between September and December 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>GE³LS Third Modality— The LSARP 2012 (Personalized Health) competition introduced a new GE³LS research modality, in addition to the already existing “Integrated GE³LS” research components that are conducted within genomics projects and large-scale, stand-alone GE³LS research projects.</p> <p>In 2013–14, an advisory group was established, whose mandate is to provide advice to GC regarding the developments of the Third Modality whereby GE³LS research funded through the 2012 LSARP competition on personalized health can be coordinated or complemented to best meet the goals stipulated. The advisory committee will be undertaking its work over the fall and winter. The development of the Third Modality will be closely coordinated with the organization of the National Forum on Genomics in Personalized Health to be held in the spring of 2014.</p>	<p>The expected outcomes of the GE³LS Third Modality are to promote networking amongst funded GE³LS projects; identify and address overarching research questions; optimize synthesis of all the GE³LS research efforts to facilitate the translation into practices and/or policies; and, identify and address the gaps in GE³LS efforts that may require additional research attention.</p>
<p><i>2—Support for the operations, research equipment, technology development, and networking of Science and Technology Innovation Centres across Canada</i></p> <p><i>3—Support for the development of technologies that enable genomics research</i></p> <p>Science and Technology Innovation Centres Renewal of Operations Support— 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 five Science and Technology Innovation Centres (STICs) across Canada. These Centres provide the entire spectrum of genomics technologies, including DNA sequencing, genotyping, RNA expression analysis,</p>	<p><i>2—Canadian genomics research is enabled through the provision of leading-edge technologies</i></p> <p>The renewal of funding for the five STICs reflects the desire to meet the needs and ensure the continued success of GC-funding projects and to further promote technology development and innovation at the STICs. A new STIC model to be proposed beyond March 2015.</p>

Investing in large-scale science and technology to fuel innovation

OUTPUTS	IMMEDIATE OUTCOMES
<p>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 2013–14, the Board of Directors approved a funding investment of \$29 million in the renewal of the five existing STICS and an additional \$1 million to be applied to STICs networking projects. Furthermore, the Science Advisory Boards for STICs will be replaced by Oversight Committees. (OCs). The OCs will provide the required oversight and will monitor and provide advice on future directions for each STIC. Genome Canada also put into place a Working Group on the Future of the STICS, which will make recommendations for the STIC model beyond March 2015. The first Working Group meeting was an in-person meeting held October 22nd in Toronto with further meetings via teleconference scheduled over the fall and winter. The Working Group's report will be submitted to the Board of Directors in March 2014. A STIC Leaders meeting was held December 18 in Ottawa with key discussions held on future challenges faced by STICs and what type of future model would best help address those challenges.</p>	
<p>Advancing Technology Innovation through Discovery— Advancing Technology Innovation through Discovery (ATID) is a joint collaborative program developed by Genome Canada and the Canadian Institutes of Health Research (CIHR) to bring together Genome Canada-funded Science and Technology Innovation Centres (STICs) with Canadian researchers to focus on applying the latest genomics technologies to identify the genetic causes of childhood diseases. Two (2) consortiums were funded:</p> <ul style="list-style-type: none"> ▪ The Finding of Rare Disease Genes in Canada consortium (FORGE Canada) is a national consortium of clinicians and scientists using next-generation sequencing technology to identify genes responsible for a wide spectrum of rare pediatric-onset disorders present in the Canadian population; and, ▪ The Canadian Pediatric Cancer Genome Consortium's (CPCGC) overall objective is to use next-generation sequencing to uncover drivers of high-risk pediatric cancer including metastatic medulloblastoma and osteosarcoma, and three other pediatric brain tumours including pediatric glioblastoma, diffuse intrinsic pontine glioma, and atypical teratoid rhabdoid tumour. 	<p>The FORGE project identified 149 disease genes (out of 371 disorders) with 52 being novel genes that were not previously linked to human disease. Thirty-three of these discoveries have now been published with ten GE³LS publications and twenty additional manuscripts are accepted or under review. Successful completion of the activities of the FORGE Canada project combined with follow-up with the “Care for Rare” project is resulting in a coordinated and sustainable Consortium focused on the investigation of the genetic basis of human disease.</p> <p>The CPCGC project has completed whole genome sequencing (WGS) of pairs/trios, for each of the four pediatric cancers: Medulloblastoma, Osteosarcoma, Diffuse Intrinsic Pontine Glioma (DIPG), and Atypical Teratoid Rhabdoid Tumours (ATRT) is complete and the list of candidate SNVs in all pairs and trios have been selected and finalized. Candidate SNVs have been validated for Medulloblastoma, ATRT and DIPG, with Osteosarcoma validation ongoing in the final quarter. Several manuscripts are also in preparation or under review.</p>

Investing in large-scale science and technology to fuel innovation

OUTPUTS	IMMEDIATE OUTCOMES
<p>In 2013–14, the FORGE project completed its activities on June 30, 2013 and submitted its final reports.</p> <p>The CPCGC project submitted its final report at the end of September 2013.</p>	
<p>Bioinformatics/Computational Biology 2012 Competition— This bioinformatics and computational biology competition was launched in June 2012 in partnership with the Canadian Institutes of Health Research. The objective is to support the development of next generation bioinformatics 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 and provide broad access of these new tools to the research community. The competition resulted in 17 projects (8 large-scale applied projects and 9 small-scale innovative projects) receiving a total of \$5 million in Genome Canada funding.</p> <p>In 2013–14, Genome Canada and CIHR publicly announced the results of the competition in April 2013. An iterative process to ensure that all conditions for the release of funds are met before funds flow to the successful projects was completed in the summer and fall of 2013.</p>	<p>The outcomes of the projects funded through the Bioinformatics/Computational Biology Competition will not only help support the development of next generation Bioinformatics 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>Advancing Big Data Science in Genomics Research— Genome Canada partnered with the Natural Sciences and Engineering Research Council (NSERC), the Canadian Institutes of Health Research (CIHR) and the Canada Foundation for Innovation (CFI) in NSERC's 2013 Discovery Frontiers Program call for proposals (launched in February 2013) on the exploration and exploitation of genomics data. NSERC, Genome Canada, CIHR and CFI plan to award one DF grant through this call, at a total funding level of up to \$1.55 million per year for four years.</p> <p>In 2013–14, a total of 11 Letters of Intent were received in May with subject matters including human health, public health microbial genomics and environmental sciences. The LOIs were peer reviewed in June 2013 of which 6 LOIs were approved to submit full applications to NSERC in November 2013. Review results will be available in February 2014.</p>	<p>The competition is designed to further advance this area by supporting the establishment of a national initiative with strong international linkages and the mandate to develop tools and methodologies for integrating multiple 'omics' datasets generated from other disciplines of biological sciences, as well as phenotypic data collected for different organisms of study. A wide range of computing and mathematical approaches and techniques will be addressed, including, but not limited to, creating new algorithms, information systems, web technologies, artificial intelligence, software engineering, data mining, image processing, modeling and simulation. Clear linkages to the international community must be demonstrated through for example, the participation of international scientists in the initiative, international collaborations and participation in relevant international initiatives. First tri-lateral partnership with federal research funding agencies.</p>

Investing in large-scale science and technology to fuel innovation

OUTPUTS	IMMEDIATE OUTCOMES
<p>National Bioinformatics Strategy— Genome Canada and CIHR are co-leading efforts to develop a National Bioinformatics and Computational Biology Strategy. A Steering Committee comprising the Presidents of the three granting councils, CFI, Genome Canada and NRC is overseeing the development of the Strategy. A Working Group comprised of Vice-Presidents from each organization has been established to oversee the development of the Strategy. CIHR and Genome Canada are establishing a joint Advisory Committee of experts in the field to lead the development of the Strategy.</p>	<p>Through the collaborative and consultative efforts of key players with direct or special interest in the field of bioinformatics, the development of a multi-year roadmap which details the current state and future opportunities in bioinformatics.</p>
<p>Disruptive Innovation— The Disruptive Innovation initiative has its genesis with Genome Canada's Science and Industry Advisory Committee which offered authoritative advice to the Board of Directors on Genome Canada's future role in the area of disruptive technologies. The initiative led to the establishment of a Task Force in February 2013.</p> <p>In 2013–14, the Task Force organized a consultation workshop in Toronto on May 10 to which were invited technology experts (developers and users) in the areas of nucleotide sequencing, proteomics, nanotechnology, synthetic biology, microfluidics, imaging and engineering from Canada and the United States. The recommendation arising from this workshop to continue the development of an initiative on Disruptive Technologies, expanded to Disruptive Innovation (to include both the development of disruptive technologies and the disruptive application of existing technologies) were discussed and agreed to by both SIAC and the Board of Directors at the joint June 2013 meeting. Subsequent to this joint meeting, a Working Group has been established which includes Task Force members, other technology developers (from across all sectors), as well as representatives from the user communities. Its mandate is to develop the funding program, including the scope and scale of the call, the peer review mechanism and the level of funding.</p> <p>A preliminary program description will be presented to SIAC in November and then to the Board in December, through the Program's Committee of the Board. The final proposal will be presented to SIAC in 2014 for input and then to the Board of Directors in June for approval, through the Program's Committee of the Board. The plan is to launch the program in late-2014.</p>	<p>It is anticipated the disruptive innovations will enable the rapid acceleration of genomics research and will mark a significant leap forward for the genetic revolution; for example, enabling the field of predictive and personalized medicine. New disruptive innovations may decrease the cost of research and/or increase the efficiency and quality of laboratory work. Furthermore, they will provide opportunities for commercialization, which will ensure that Canada takes its rightful place in world bio-economy of the future.</p>

Translating discoveries into applications to maximize impact across all Sectors

OUTPUTS	IMMEDIATE OUTCOMES
<p><i>1—Support for entrepreneurial education in genomics</i></p> <p>Entrepreneurship Education in Genomics (EEG) Program— The Entrepreneurship Education in Genomics (EEG) Program was launched as a pilot in February 2011 with a mandate 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. Three projects were funded for a total of about \$1.1 million in Genome Canada funding.</p> <p>In 2013–14, an EEG Forum was held in Vancouver in June 2013 for the purpose of undertaking an interim review of the progress of funded EEG projects; understanding the different models of the projects to look at best practices; and better understanding what is required to foster entrepreneurial mindsets.</p>	<p><i>1—Genomics researchers' entrepreneurial skills are enhanced</i></p> <p>The projects took different approaches in terms of introducing entrepreneurial skills to the genomics research community but some common challenges were identified. Going forward, Genome Canada will explore other approaches to enhance genomic researchers' entrepreneurial skills.</p>
<p><i>2—Support for partnerships between academia and potential users that advance validation, proof-of-concept, and product/tool development stages of genomics research</i></p> <p>Genomic Applications Partnership Program (GAPP) — The Genomic Applications Partnership Program was launched in June 2013 as a key element in Genome Canada's strategic plan towards funding downstream research and development projects that are driven by challenges and opportunities facing Users (industry, government, not-for-profits) of genomics based technologies. The GAPP is designed to increase collaboration between genomics scientists and users of genomics research, as well as to stimulate investment from private and public partners to fund projects that address real world challenges and opportunities in the field of genomics. An amount of \$30M has been set aside to fund successful projects. Expressions of Interest and full proposals are received on a rolling intake basis until all of the funds have been depleted. It is expected that two rounds of submission will be completed by fiscal year end 2013–14. At the Board of Directors' December 2013 meeting, 5 proposals were approved to receive a total of \$29.2M with a maximum of \$6.6 M from Genome Canada.</p>	<p><i>2a—Increased translation of genomics technology research prototypes, early stage products, tools and process emanating from genomics research</i></p> <p><i>2b—Increased research partnerships between academia and potential users of derived knowledge</i></p> <p>The anticipated outcomes of the GAPP include:</p> <ul style="list-style-type: none"> ▪ 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 ▪ Increase in 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 ▪ Increased uptake of genomics research into policy and practice

Translating discoveries into applications to maximize impact across all Sectors

OUTPUTS*3–Support for increasing awareness of the value of genomics in society*

Genome Canada undertook a number of activities to increase awareness among key target audiences of the value of genomics in society.

MEDIA RELATIONS

Press conferences, involving the Minister of State for Science and Technology and other dignitaries were held to announce the results of the Large-Scale Applied Research Projects Competition in Genomics Personalized Health as well as the launch of our new Genomic Applications Partnership Program and renewal of funding for the Science and Technology Innovation Centres.

National and regional press releases were issued to support these major announcements. In addition, press releases were issued to announce the results of the Bioinformatics and Computational Biology competition results, and successful projects resulting from the *Listeria* and *E.coli* research funding competitions.

Furthermore, articles and opinion pieces about Genome Canada's programs and corporate priorities were produced for specialty and trade publications.

PUBLICATIONS AND COLLATERAL MATERIALS

A number of bilingual publications and collateral materials were produced and distributed to a range of stakeholders. These included our Annual Report 2012–2013, published as an online flipbook and as a printed product. Other key documents included a series of sector strategies, relating to Agri-Food, Fisheries & Aquaculture, Forestry and Energy & Mining, as well as fact sheets relating to these sectors. These products have been instrumental in supporting regional, national and international corporate development activities.

A corporate brochure was developed as a brief hand out to tell the Genome Canada story in a concise format. It has been widely distributed at conferences, events and meetings.

A number of other new corporate products are currently under development, including a corporate video, a synopsis report of the sector strategies, and the redevelopment of Genome Canada's website.

IMMEDIATE OUTCOMES*3a–Increased translation of genomics technology research prototypes, early stage products, tools and process emanating from genomics research**3b–Increased research partnerships between academia and potential users of derived knowledge*

Genome Canada's media relations and advertising activities have served to build our corporate profile and convey key messages about the relevance and socio-economic benefits of genomics to Canadians and the targeted stakeholders.

Genome Canada received positive international, national and regional media coverage related to the high profile events and announcements. Of particular note was a cover story in the Globe and Mail featuring the launch of the Genomic Applications Partnership Program, and a CTV Canada AM report on the results of the Genomics and Personalized Health Competition.

Other program announcements resulted in profile within specialty/trade online and print publications.

Genome Canada's publications and collateral materials have been widely distributed and well received among key stakeholders. They have contained useful data, statistics, facts and stories about the impacts, applications and future opportunities for genomics as it relates to sectors of importance to the Canadian economy and society.

Translating discoveries into applications to maximize impact across all Sectors

OUTPUTS
IMMEDIATE OUTCOMES

ADVERTISING

Genome Canada placed targeted advertising in key publications including The Hill Times and the Globe and Mail.

PUBLIC OUTREACH

Genome Canada collaborated with the regional Genome Centres to support DNA Day, an annual initiative led by Let's Talk Science to support high school genomics learning across Canada. This is a full-day bilingual event involving online text-based chats between high school students, teachers and members of the public with genomics experts across Canada. In addition to sponsorship dollars, Genome Canada produced a special bilingual video of its President welcoming students to the event and providing basic information about genomics. An estimated 8,600 participants took part in the initiative.

SPONSORSHIPS

Genome Canada's sponsorship program provides funding support for scientific meetings, conferences, seminars, education programs, and other events that relate to genomics research including its GE³LS aspects, and that support Genome Canada's mission, and strategic goals and objectives.

In 2013–14, funding commitments by Genome Canada to sponsorship opportunities, included:

- 11th Annual Global Biomarker Conference (April 26 – Toronto)
- Canadian Science Writers' Annual Conference (June 6–9 – Montreal)
- Forest Genetics 2013 Conference – (July 22–26 – Whistler)
- 9th Canadian Plant Genomics Workshop (August 12–15 – Halifax)
- 2013 Henry Friesen International Prize in Health Research (Sept 18–19 – Ottawa)
- 8th International Cancer Genome Consortium (Sept. 30 – Oct. 2 – Toronto)
- Canada Gairdner Awards (October 24 – Toronto)

CORPORATE EVENTS

On an annual basis, Genome Canada, often in collaboration with the Genome Centres, is engaged in the organization of select corporate events of national or international import.

In 2013–14, Genome Canada was actively engaged in the following corporate events:

These sponsorship opportunities provide a platform to showcase Canadian genomics science to selected audiences around the world. Genome Canada strategically supports initiatives that will raise its profile and raise awareness of genomics research. These events support communications efforts to showcase the results of genomics research to external stakeholders; thereby, helping Canadians understand the relative risks and rewards of the research.

Genome Canada corporate events are marketing and communication tools that are key to strategically position the corporation as a catalyst for showcasing the potential of genomics research and its potential impact on the economic and social wellbeing of Canadians.

Translating discoveries into applications to maximize impact across all Sectors

OUTPUTS	IMMEDIATE OUTCOMES
<ul style="list-style-type: none"> ▪ BIO International 2013 (April 22–25 – Chicago) ▪ Human Genome Meeting (HGM) and International Congress of Genetics (ICG) (April 13–18 – Singapore) ▪ International Symposium on Mutation in the Genome (Banff) ▪ The Agricultural Biotechnology International Conference – (September 15–18 – Calgary) ▪ GPS event “Receptor Capacity for Biotechnology Innovation in Canada – (September 24 – Ottawa) ▪ Canadian Science Policy Conference (November 20–22 – Toronto) 	
<p>GENOMICS IN SOCIETY ENGAGEMENT ACTIVITIES</p> <p>One of the objectives of the strategic plan is to: <i>Enhance the impact of genomics by transforming knowledge of the ethical, environmental, economic, legal and social challenges and opportunities into sound policies and practices.</i> This objective builds on the GE³LS research capacity that has been developed over the years, and extends into more directed efforts to inform science, technology and innovation undertakings related to genomics and its responsible application. Accordingly, the term “Genomics in Society” is being used to refer to GE³LS research and other related activities.</p>	
<p>In 2013–14, the following key Genomics in Society engagement activities occurred:</p>	
<p>Canadian Science Policy Conference (CSPC)— The CSPC was founded in 2008 by professionals from academia, science-based government departments, and the business sector aiming to foster a strong science policy culture in Canada. The conference provides a forum to identify, discuss and offer insights into current Canadian policy. Genome Canada was very engaged and present at this year’s conference, which not only offered a platform to organize a GPS series on personalized medicine and health care policy (see GPS below), but also offered an avenue for Genome Canada and the regional Genome Centres to collaborate on the submission of a proposal titled “Genomics, Canada’s natural resources and public-private collaborations: A case study on the complexity of driving the bio-economy,” which will build on the sectors strategies in agri-food, aquaculture and fisheries, forestry, and energy and mining.</p>	<p>Enhanced stakeholder understanding of the cross-sectoral application of genomics, including science policy community.</p>
<p>GE³LS Research: Workshop at the Annual Conference of the Canadian Bioethics Society— The Canadian Bioethics Society (CBS) is a multidisciplinary society of professionals and</p>	<p>Bridged the disciplinary divide that exists between bioethics and GE³LS researchers.</p>

Translating discoveries into applications to maximize impact across all Sectors

OUTPUTS

IMMEDIATE OUTCOMES

students concerned with a wide range of ethical aspects relating to health, the environment and the life sciences. Its annual meeting is designed to provide intellectual stimulation, opportunities for networking, sharing of learning, and building of community for all interested individuals. It offers a forum that aligns closely with GE³LS research in human health. At the CBS Annual Conference held May 30–June 1 in Banff, Genome Canada led a workshop titled “What Has GE³LS Contributed to the Canadian Bioethics Landscape?” which featured established and up-and-coming GE³LS researchers representing diverse disciplinary backgrounds and affiliated with various research institutions.

GE³LS Research: Workshop on Exploring the Social/Ethical and Health Systems Challenges of Whole Genome Sequencing— Genome Canada collaborated with the Canadian Institutes of Health Research – Institute of Genetics, the X Prize Foundation, the ACOA **Atlantic Innovation Fund and the University of Toronto**— McLaughlin Centre to host a 1.5 day international workshop designed to explore the unique social/ethical and health systems challenges of low cost whole genome sequencing. The event, held on April 19-20, 2013 in Montreal included more than twenty-five Canadian and international GE³LS experts, whose presentations and discussion form the basis of a manuscript published in *PLoS Biology* and tentatively titled “Reflections on the Cost of “Low-Cost” Whole Genome Sequencing: Framing the Health Policy Debate.”

Genomics, Public Policy and Society (GPS) series— The GPS series is intended to: broker a dialogue between federal policy-makers and researchers on issues that arise at the interface of genomics and society; help foster evidence-based public policy; and identify timely and socially-relevant research priorities.

The theme of the series for 2013–14 is “The Innovation Continuum.” The GPS event held September 2013 in Ottawa, focused on receptor-capacity for biotechnology innovation in Canada. As part of the Canadian Science Policy Conference held in Toronto, November 2013, a draft policy brief on personalized health and health care policy was presented.

Identified critical policy aspects to be addressed for low-cost whole genome sequencing to be integrated into clinical care.

Provided evidence-informed policy options that can help advance the uptake of genomic-based innovations across Canadian companies, and improve health care policy-making related to genomic-based technologies.

SECTION III

Grant Management for 2013–14

The federal government, through Industry Canada, has committed a total of \$1.2 billion in funding for Genome Canada since 2000–01. All funding is provided through funding agreements between Genome Canada and Industry Canada. Genome Canada also raises 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 5 funding agreements:

Genome Canada Funding Agreements with Industry Canada

FUNDING AGREEMENT BY BUDGET YEAR	COMPETITIONS AND PROJECTS FUNDED
Budget 2008 (\$140 million)	<ul style="list-style-type: none"> ▪ Competition in Applied Genomics in Bioproducts and Crops. ▪ Two research projects through the Cancer Stem Cell Consortium, the International Barcode of Life project. ▪ Support for the S&T Innovation Centres, the operations of six regional Genome Centres, as well as the operations of Genome Canada through to 2012–13.
Budget 2010 (\$75 million)	<ul style="list-style-type: none"> ▪ Competition in forestry and the environment. ▪ Multi-sector competition. ▪ Competition for Science and Technology Innovation Centre Operations Support.

**FUNDING AGREEMENT
BY BUDGET YEAR****COMPETITIONS AND PROJECTS FUNDED****Budget 2011**
(\$65 million)

- Competition in applied genomics research in personalized health.
- Funding of Phase III of the Structural Genomics Consortium, and the International Barcode of Life project.
- Funding for the Public Population Project in Genomics.
- Competition in the area of bioinformatics and computational biology.
- Contribute to the operations of six regional Genome Centre and Genome Canada through to 2013–14.

Budget 2012
(\$60 million)

- Funding for Genomic Applications Partnership Program (GAPP).
- Funding for renewal of STICs for two years.
- Funding of the Structural Genomics Consortium, and the International Barcode of Life project.

Budget 2013
(\$165 million)

- Two competitions in applied genomics research
- Funding for Science and Technology Innovation Centres in 2015–16 and 2016–17 and technology development.
- Funding for national and international partnerships.
- Contribute to the operations of six regional Genome Centres and Genome Canada through to 2016–17.

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.

Summary of Receipts and Disbursements

DETAILS (IN MILLIONS OF DOLLARS)	PROJECTS FUNDED	ACTUALS 2000-01 TO 2012-13	FORECAST 2013-14	FORECAST CUMULATIVE TO 2013-14
RECEIPTS				
Government of Canada		888.9	56.6	945.5
Investment Income		88.2	0.5	88.7
		977.1	57.1	1,034.2
PROGRAM AND OPERATING DISBURSEMENTS				
Research Projects				
Completed Projects and Programs *	103	508.3		508.3
Applied Genomics in Bioproducts and Crops	12	44.6	7.6	52.2
2010 LSARP: Multi-Sector **	7	14.7	9.0	23.7
2010 LSARP: Forestry and Environment	9	15.0	7.6	22.6
Entrepreneurship Education in Genomics	3	0.4	0.3	0.7
Advancing Technology Innovation Through Discovery		2.4		2.4
2012 LSARP: Genomics and Personalized Health	17		12.8	12.8
Bioinformatics/Computational Biology	17		1.4	1.4
Genomic Applications Partnership Program (GAPP)				0.0
Advancing Big Data Science				0.0
Detection and Surveillance of Listeria, and E. coli	3		0.2	0.2
Structural Genomics Consortium	1	34.8	2.5	37.3
Public Population Project in Genomics	1	16.1	0.1	16.2
International Barcode of Life	1	8.7	2.5	11.2
New Technology Development	13	9.7		9.7
Cancer Stem Cells Consortium	3	6.7	3.5	10.2
	190	661.4	47.5	708.9
Science & Technology Innovation Centres	10	123.7	16.2	139.9
Genome Centres Operations	6	68.2	4.8	73.0
GENOME CANADA OPERATING EXPENDITURES		81.4	7.3	88.7
Total Disbursements	206	934.7	75.8	1,010.5
Excess (Deficiency) of Receipts over Disbursements		42.4	-18.7	23.7
Opening Cash Balance			42.4	
Closing Cash Balance		42.4	23.7	

* These Include Open Competitions I,II,III, Applied Human Health, International Regulome Consortium, Bovine, Canada/Spain, H1N1 and Cdificile.

** LSARP = Large-Scale Applied Research Project

SECTION IV

Plans for 2014–15

2014–15 PROJECT AND PROGRAM PLANNING

For the 2014–15 fiscal year, Genome Canada is developing and putting into place programs and initiatives funded by the \$165 million contribution announced by the Government of Canada in its 2013 federal budget. In June 2013, Genome Canada’s Board of Directors approved an initial allocation of this Government of Canada contribution as follows:

	(IN MILLIONS OF \$)
LARGE-SCALE SCIENCE	
Applied Research Competitions:	
▪ Genomics in Society ⁴ Initiative	2.0
▪ Large-Scale Applied Research Project Competition	28.0
▪ Large-Scale Applied Research Project Competition	28.0
Strategic Partnership Programs:	
▪ Structural Genomics Consortium	5.0
▪ International Barcode of Life Project	5.0
▪ New Strategic Initiatives	10.0
ACCESS TO LEADING-EDGE TECHNOLOGY	
▪ STIC Competition (operations)	30.0
▪ Technology Development Competition (Disruptive Innovations)	15.0
TRANSLATION	
▪ Entrepreneurial Program	2.5
▪ Genomics Applications Partnerships Program (GAPP)* *provisional	5.3
OPERATIONS SUPPORT	
▪ Genome Canada	19.8
▪ Genome Centres	14.4
Total	165.0

⁴ Genomics in Society includes GE³LS Research (ethical, environmental, economic, legal and social aspects of genomics research) and related activities that inform science, technology and innovation undertakings related to genomics and its responsible application, and facilitate the translation of genomics and GE³LS knowledge into sound policies and practices.

Large-Scale Science — A minimum of \$50 million in funding will be allocated to the design and launch of two Large-scale Applied Research Project (LSARP) Competitions. The Board of Directors, at its September meeting, approved *Feeding the Future* as the theme for the first LSARP to be launched in 2014. The topic of feeding the future is a global issue that will become more important as the population grows to 9 billion by 2050 in a world impacted by climate change. Canada is well-positioned to contribute to a global effort in this area and will reap social and economic benefits at home.

A total of up to \$2 million in funding will be allocated to a Genomics in Society initiative – the GE³LS Third Modality, which aims to ensure that GE³LS research funded through the 2012 LSARP competition on personalized health can be coordinated or complemented to best meet the goals stipulated in each project.

A total of up to \$10 million (\$5 million to each consortium) in funding will be allocated to the iBOL and SGC consortiums for operational funding support toward the consortiums' activities.

A total of up to \$10 million of funding will be set aside for other strategic research priorities determined by the Genome Canada Board of Directors in 2014–15.

Access to Leading-Edge Technology — A total of up to \$45 million in funding will be allocated to support leading-edge technologies that enable Canadian genomics research, including support for the STICs until fiscal year 2016–17 and a competition in Disruptive Innovation. Working groups of experts will be making recommendations on the future of the STIC Model by March 2015 and the parameters of the Disruptive Innovation Program by June 2015.

Translation — Up to \$2.5 million in funding will be allocated to entrepreneurial programs and up to \$5.3 million in funding may be provisionally allocated to the Genomics Applications Partnerships Program.

Operations Support — A total of \$19.8 million in funding will be allocated to support the operations of Genome Canada and \$14.4 million to support the operations of the 6 Genome Centres until fiscal year 2016–17.

On-going Projects and Programs—Along with the new initiatives mentioned above which will be initiated in 2014–15, Genome Canada will continue the necessary fostering of partnerships, administrative oversight, and/or monitoring of the following major initiatives which were launched in previous fiscal years, including 2013–14:

- 2012 Large-scale Applied Research Project Competition
- 2010 Large-Scale Applied Research Project Competition
- Applied Genomics in Bioproducts or Crops Competition
- Emerging Issue on *Listeria*
- Emerging Issue on *E.coli*
- Bioinformatics/Computational Biology Competition
- Advancing Technology Innovation through Discovery
- Applied Genomics Research in Bioproducts or Crops Competition

- Entrepreneurial Program
- Genomic Applications Partnerships Program
- International Rare Disease Research Consortium
- International Mouse Phenotyping Consortium
- Cancer Stem Cell Consortium
- International Cancer Genome Consortium
- CIHR Research Catalyst Network
- Canadian Institute for Advanced Research Partnership
- Global Alliance
- Advancing Big Data Science in Genomics Research
- National Bioinformatics Strategy

In summary, for 2014–15, Genome Canada intends to continue 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. Genome Canada will focus its efforts in select sectors of strategic importance to Canada – health, agriculture, environment, forestry, fisheries, 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 genomics enterprise.

PLANNED RECEIPTS AND DISBURSEMENTS 2014–15 AND SUBSEQUENT YEARS

The following table provides a preliminary estimate of the receipts and disbursements for 2014–15 and subsequent fiscal years as of January 2014. The Operating Budget for fiscal year 2014–15 will be presented to the Genome Canada Board of Directors for approval in March 2014.

DETAILS (IN MILLIONS OF DOLLARS)	GENOME CANADA				ESTIMATED CO-FUNDING FOR THOSE YEARS	TOTAL GENOME CANADA AND CO-FUNDING	%
	FORECAST CUMULATIVE 2000–01 TO 2013–14	PLANNED 2014–15	PLANNED SUBSEQUENT YEARS	FORECAST TOTAL			
RECEIPTS							
Government of Canada						0.0	0.0%
Government of Canada Previous Agreements	700.0			700.0		700.0	23.4%
Government of Canada March 2008 Agreement	126.2	0.2	13.6	140.0		140.0	4.7%
Government of Canada March 2010 Agreement	66.2	8.8		75.0		75.0	2.5%
Government of Canada January 2012 Agreement	28.1	15.5	21.4	65.0		65.0	2.2%
Government of Canada January 2013 Agreement	25.0	22.5	12.5	60.0		60.0	2.0%
Government of Canada January 2014 Agreement		22.8	142.2	165.0		165.0	5.5%
Investment Income	88.7	0.4	0.7	89.8		89.8	3.0%
Co-Funding					1,690.8	1,690.8	56.6%
	1,034.2	70.2	190.4	1,294.8	1,690.8	2,985.6	100.0%
PROGRAM DISBURSEMENTS							
Research Projects							
Completed Projects and Programs *	508.3			508.3	573.5	1,081.8	36.3%
2010 LSARP: Multi-Sector **	23.7	7.3		31.0	33.1	64.1	2.2%
2010 LSARP: Forestry and Environment	22.6	6.4		29.0	30.3	59.3	2.0%
Applied Genomics in Bioproducts and Crops	52.2	2.8		55.0	62.1	117.1	3.9%
Bioinformatics/Computational Biology	1.4	2.0	1.6	5.0	4.0	9.0	0.3%
Genomic Applications Partnership Program (GAPP)		4.0	31.3	35.3	70.6	105.9	3.6%
2012 LSARP: Genomics and Personalized Health	12.8	13.5	20.8	47.1	107.3	154.4	5.2%
LSARP 2014 and 2015			56.0	56.0	112.0	168.0	5.6%
GE ³ LS Third Modality			2.0	2.0	4.0	6.0	0.2%
Advancing Big Data Science		0.5	1.5	2.0	5.5	7.5	0.3%
Detection and Surveillance of Listeria and E. coli	0.2	0.3		0.5	2.4	2.9	0.1%
Entrepreneurship Education in Genomics	0.7			0.7	1.2	1.9	0.1%
Entrepreneurial Program		0.5	2.0	2.5	5.0	7.5	0.3%
Structural Genomics Consortium	37.3	4.4	0.6	42.3	274.8	317.1	10.6%
Public Population Project in Genomics	16.2			16.2	47.3	63.5	2.1%
International Barcode of Life	11.2	4.4	0.6	16.2	36.6	52.8	1.8%
New Technology Development	9.7			9.7	9.8	19.5	0.7%
Cancer Stem Cell Consortium	10.2	4.2	8.6	23.0	60.8	83.8	2.8%
Advancing Technology Innovation through Discovery	2.4			2.4	4.7	7.1	0.2%
Other Initiatives			11.0	11.0	31.0	42.0	1.4%
	708.9	50.3	136.0	895.2	1,476.0	2,371.2	79.6%
Access to Leading Edge Technologies							
Science & Technology Innovation Centres	139.9	13.5	30.0	183.4	77.1	260.5	8.7%

DETAILS (IN MILLIONS OF DOLLARS)	GENOME CANADA				ESTIMATED CO-FUNDING FOR THOSE YEARS	TOTAL GENOME CANADA AND CO- FUNDING	%
	FORECAST CUMULATIVE 2000-01 TO 2013-14	PLANNED 2014-15	PLANNED SUBSEQUENT YEARS	FORECAST TOTAL			
Disruptive Innovation			15.0	15.0	30.0	45.0	1.5%
	139.9	13.5	45.0	198.4	107.1	305.5	10.3%
Genome Centres Operations	73.0	4.8	9.6	87.4	107.7	195.1	6.5%
GENOME CANADA OPERATING EXPENDITURES	88.7	6.6	13.2	108.5		108.5	3.6%
Total Disbursements	1,010.5	75.2	203.8	1,289.5	1,690.8	2,980.3	100.0%
Excess Receipts over Disbursements	23.7	-5.0	-13.4	5.3			
Opening Cash Balance		23.7	18.7				
Closing Cash Balance	23.7	18.7	5.3	5.3			

* These Include Open Competitions I,II,III, Applied Human Health, International Regulome Consortium, Bovine, Canada/Spain, H1N1 and Cdificile.

** LSARP = Large-Scale Applied Research Project

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 2013–2014, the Board of Genome Canada approved an updated 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 (www.genomecanada.ca).

ANNUAL AUDIT

The annual audit of the financial statements of Genome Canada 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 to the Board of Directors for approval.

RECIPIENT AUDIT

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 Science and Technology Innovation Centres that would 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.

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 (www.genomecanada.ca).

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 (www.genomecanada.ca).

The next third-party evaluation of Genome Canada is currently being executed for the end of fiscal 2013–14 by an external consultant firm. In preparation for this activity, the development of a Performance Measurement and Evaluation Strategy (PMES), including the identification of specific performance measurement indicators, was completed in 2012–13 and updated in the Performance, Audit and Evaluation Strategy (PAES) in August 2014 in consultation with Industry Canada (see table below for current indicators).

The development and execution of the Five Year Evaluation has been supported by an Evaluation Steering Committee composed of members of Genome Canada’s Board of Directors, independent experts and Industry Canada representatives. The Final report is due to be submitted to Industry Canada on March 31st 2014.

Anticipated research and evaluation activities for 2014–15 include:

- Further development of the national database to collect and report on performance indicators arising from Genome Canada funded projects and internal performance measurement.
- A series of in-house and funded research projects that tackle a number of priority national evaluation issues.
- Dissemination and knowledge translation of the findings and recommendations arising from the Five Year Evaluation.

Anticipated Outcomes and Performance Measure Indicators

STRATEGY AND PARTNERSHIPS

OUTPUTS

PERFORMANCE INDICATORS

1.1 Research/investment strategies in various sectors of the Canadian bio-economy.

Strategies in place for all targeted sectors of the bio-economy, developed in consultation with stakeholders from academia, industry and government.

1.2 Relationships and partnerships with the national and international genomics community in areas of strategic interest for Canada.

Number and examples of competitions, programs, project or funding requests informed by regional, national, international relationships and partnerships.

1.3 Requirements for supported projects to leverage co-funding from various sources, especially the private sector.

Amount and percentage of co-funding leveraged by type of organization, sector, competitions, and investment type (cash, in-kind).

IMMEDIATE OUTCOMES

PERFORMANCE INDICATORS

1.a. Funded genomics research projects are relevant to sectors of the Canadian bio-economy.

Number and examples of competitions, programs, projects or funding requests informed by sector strategies.

1.b. New opportunities arise for research collaboration in strategic areas of interest to Canada, within Canada and at the international level.

Number and examples of new partnerships established by type of organization, sector, and competitions.

STRATEGY AND PARTNERSHIPS

1.c. Increased level of investment by other partners, in particular industry.

Same indicator as 1.3.

INTERMEDIATE OUTCOMES

PERFORMANCE INDICATORS

1.i) Enhanced genomics research support and capacity.

Same indicators as 1.1, 1.a and 2.1. and 2a.

1.ii) Increased international visibility and recognition of Canadian genomics research.

International peers assessment of Canada's contribution to genomics research.

Number of Genome Canada researchers involved in international collaborations.

Number and type of letters of endorsement.

LARGE SCALE GENOMICS RESEARCH AND TECHNOLOGY

OUTPUTS

PERFORMANCE INDICATORS

2.1. Support for large-scale genomics research projects in Canadian research institutions, including GE³LS, national and international partnerships.

Assessment of quality of projects and initiatives through international and national peer review.

Number and \$ value of research projects funded by competition and sector.

2.2. Support for the operations, research equipment, technology development, and networking of Science and Technology Innovation Centres across Canada.

Number, value, of STICs supported.

Assessment of quality and continued relevance of STICs.

2.3. Support the development of technologies that enable genomics research.

Number, value, and examples of projects supported in the development of new technologies to enable genomics research.

IMMEDIATE OUTCOMES

PERFORMANCE INDICATORS

2.a. Enhanced knowledge and HQP (Highly Qualified Personnel) capacity in Canada in genomics research including GE³LS.

Number of HQP by competition/project and sector.

Number of students trained on Genome Canada funded projects.

Number of bibliometric outputs of projects.

2.b. Canadian genomics research is enabled through the provision of leading-edge technologies.

Feedback by projects on the timeliness, quality and efficiency of STICs using a Likert scale.

Number and type of services accessed.

INTERMEDIATE OUTCOMES	PERFORMANCE INDICATORS
2.i) Increased breadth and depth of knowledge in genomics, including GE ³ LS.	Examples of knowledge / discoveries generated from research projects that are relevant to sectors of importance to Canada.
	Same indicators as 2a
2.ii) Genomics researchers are attracted and/or retained to/in Canada.	Same indicator as 2.a re HQP + survey question.

TRANSLATION INTO APPLICATION

OUTPUTS	PERFORMANCE INDICATORS
3.1. Support for entrepreneurial education in genomics	Number of researchers educated in entrepreneurialism.
3.2. Support for partnerships between academia and end-users that advance validation, proof-of-concept, and product/tool development stages of genomics research projects.	Number and value of projects supported that have user partners.
3.3. Support for increasing awareness of the value of genomics in society	Number and examples of knowledge dissemination initiatives in genomics in society.

IMMEDIATE OUTCOMES	PERFORMANCE INDICATORS
3.a. Genomics researchers' entrepreneurial skills are enhanced.	Likert scale to assess the acquisition of entrepreneurial skills by researchers and the usefulness of those skills.
3.b. Increased research partnerships between academia and potential users of genomics derived knowledge.	Number and examples of partnerships between academia and end-users of genomics research, by type of organization. Examples of genomics knowledge or discovery translated to users/stakeholders.
3.c. Increased translation of genomics technology research prototypes, early stage products, tools and process emanating from genomics research.	Number of invention disclosures, patents, licenses. Number of prototypes, early stage products, tools and process emanating from genomics research.

INTERMEDIATE OUTCOMES	PERFORMANCE INDICATORS
3.i) Increased genomics-based innovation in the public and private sectors, including uptake in policy, practices and commercialization.	Examples of knowledge or discoveries used by end-users and receptor organizations to benefit Canadians. Number of companies enhanced or established (number of employees, sector, revenues, and innovation).

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, and regularly reviews the organization's corporate risk profile.
- The Genome Canada internal working environment culture is one that values honesty, integrity and ethical conduct.

CHALLENGES

Co-Funding Challenge

To fully implement its five-year strategic plan, Genome Canada proposed 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 proposed to augment the funding investments it would receive from the federal government to proportions above the traditional 1:1 ratio; namely, a 1:2 ratio. The federal government expects Genome Canada to secure \$280 million of co-funding commitments, either financial or in kind, for the \$165 million it received in the 2013 federal budget, by March 31, 2020.

Multi-year Funding beyond 2017

The 2013 federal budget announcement provided funding support for programs and operations of Genome Canada and the Genome Centres to 2016–17. Because of the long-term planning requirements for the development of new programs and initiatives, Genome Canada must have in place in 2014–15 a series of initiatives (communications, awareness and profile building, partnerships) which yield tangible evidence of return on investment, and thus, allow for a compelling funding submission in the fall of 2014 for multi-year funding beyond 2017.

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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