

## Standing Committee on Finance (FINA)

### Pre-budget consultations 2012

## Genome Canada

### Responses

#### 1. Economic Recovery and Growth

*Given the current climate of federal and global fiscal restraint, what specific federal measures do you feel are needed for a sustained economic recovery and enhanced economic growth in Canada?*

Minister Goodyear and others have noted that innovation is about taking ideas to market and solving problems. It's about turning scientific knowledge into innovation and innovation into strategic opportunities, jobs and prosperity for Canadians. It is well established that Canada's sustainable prosperity is fundamentally linked to science and innovative technologies. In the emerging bio-economy, widely seen as a critical basis for prosperity, progress depends strongly on advancements and breakthroughs in fundamental and applied research in the biological sciences, and on commercial opportunities and innovations in regulatory and business models. To maintain growth in jobs and increase private sector investment, continued fiscal and policy support for Canadian research should remain a priority. However, as noted in the 2012 Economic Action Plan business innovation is essential. To this end, a richer mix of programs and policies are needed, ones that encourage and speed the translation of discoveries into economic or social benefits, foster research connections and collaborations between industry and science, and undertake to mitigate risk in the earliest stages of innovation. In-line with this, certain sciences and technologies are critical foundations for key economic drivers. For instance, in the bio-economy foundational technologies include: genomics, bioinformatics, and nano-materials and fluidic sciences. The rate of development of the bio-economy depends heavily upon the speed of advancement of these technologies and their integration into relevant economic sectors. In terms of sustainable prosperity, the bio-economy encompasses many of Canada's most important economic sectors, including agriculture, energy, the environment, fisheries, forestry, health and mining. Thus, new or expanded programs and policies should be optimized for the special and significant role of foundational technologies and their unique ability to: 1. Advance the science, 2. Speed innovation, 3. Build upon existing Canadian strengths (in natural resources, for instance), 4. Impact the economic development of multiple sectors of the Canadian economy, and 5. Generate high-quality employment across the country. In short, the government can better influence economic development by aggressively concentrating its support on those technologies seen as having the greatest likelihood to shape the overall economy of Canada for years to come.

#### 2. Job Creation

*As Canadian companies face pressures resulting from such factors as uncertainty about the U.S. economic recovery, a sovereign debt crisis in Europe, and competition from a number of developed and developing countries, what specific federal actions do you believe should be taken to promote job creation in Canada, including that which occurs as a result of enhanced internal and international trade?*

Canada is a trading nation. Our ability to maintain or create jobs domestically depends on remaining competitive internationally. Fortunately, Canada enjoys enviable advantages upon which to build. Against a backdrop of global volatility and uncertainty, measures such as the 2012 Economic Action Plan, a national science and technology framework, and steps to improve business innovation forged a relatively robust Canadian economy that preserved and created jobs. We have the economic strength to be able to act. Global demand for natural resources is increasing, driven by diverse factors such as

population growth, rising affluence, climate fluctuations, energy consumption, land use practices, environmental degradation and more. This creates trade opportunities for our economic sectors but is also leading to more intense levels of international competition. Fortunately, Canada is blessed with abundant natural resources that, in combination with productivity increases achieved through integration with new technology, have fuelled industrial development and job creation. Shifting demographics, economies, and other factors are giving rise to new applications, markets and industries built upon existing industrial sectors. Innovation is even more central to international competitiveness and job creation. And innovation is invariably linked to progress in science and technology. Canada has a vibrant record of scientific discovery and achievement but there is widespread recognition that our abilities as an innovation nation need to be better. To preserve jobs today and create jobs tomorrow, the government should help industrial sectors evolve more quickly to address international challenges and opportunities, to become more innovative, for example by creating new demand and uses for Canadian goods and services. Strategies that combine traditional Canadian strengths in key resource sectors with emerging scientific discoveries and technologies with innovation-oriented business models that combine public and private sector strengths are the answer. The goal is to accelerate the bio-economy in Canada, expected to represent about 3.99% of domestic GDP by 2030. Internationally, the OECD forecasts the bio-economy will represent 2.7% of GDP (US\$1 trillion) in OECD countries by 2030. Genome Canada is proving the feasibility of the approach. In ten years, the emerging genomics sector created more than 10,000 jobs. The potential for growth is clear.

### **3. Demographic Change**

*What specific federal measures do you think should be implemented to help the country address the consequences of, and challenges associated with, the aging of the Canadian population and of skills shortages?*

Canada is investing in science and technology to create jobs, strengthen the economy and improve our quality of life. In the future, there will certainly be demographic challenges but there is a way forward. In 2011, healthcare spending was about 11.6% of GDP with Canadians aged 65 or older consuming nearly 44% of the cost, despite representing only about 14% of the population. Going forward, the affordability and sustainability of healthcare is being challenged by an increasingly aging population, the rising incidence of chronic disease, and other factors. In the search for solutions, Genome Canada, CIHR and others are developing a \$130 million competition on Personalized Health that aims to show improved clinical and financial outcomes. As our workforce ages, economic development in some sectors may be capped by labour or skills shortages, limited management and leadership expertise, reduced levels of entrepreneurship and other factors. Our workforce challenges are well documented. Critical assessments of economic sectors should be undertaken with a view to identifying each sector's opportunities and challenges for growth, innovation, market development, workforce requirements, competitive dynamics, and so on. This sector-by-sector undertaking should lead to the formulation of national policy and investment priorities, human resource plans, partnership plans, directed research initiatives and other activities that serve to focus the country's energies and resources on those areas that hold the best opportunities for success. To complement basic research, the government should continue to pursue science and technology initiatives that encourage collaboration and innovation, particularly in areas that are seen as "foundational". By this we refer to technologies, such as genomics, that feature several important characteristics, such as: 1. Serving as a core element upon which other sciences or technologies are based 2. Having a robust skill set of Canadian experts and expertise 3. Generating significant opportunities for brain gain 4. Having strong potential to accelerate or impair economic sector development 5. Driving many or most aspects of the economy 6. Are likely to shape the development of social policies and priorities 7. Are likely to impact our quality of life 8. Are sustained with multi-year funding

#### **4. Productivity**

*With labour market challenges arising in part as a result of the aging of Canada's population and an ongoing focus on the actions needed for competitiveness, what specific federal initiatives are needed in order to increase productivity in Canada?*

The life science footprint touches all aspects of the economy. The bio-economy (and biotechnology) is critical to sustainable prosperity. Soon, biotechnology enabled by genomics will design biological tools for specialized tasks and produce advanced materials and products. We anticipate that declining workforce productivity will be offset with efficiencies derived from improvements in tools, processes, materials and other aspects that build upon foundational technologies. Canada must also establish advanced collaborative models to generate the most productive output from intellectual or capacity constraints that we may face. These models will likely encompass multiple axes such as federal/provincial, private/public, national/international, science/innovation, and so on. Fortunately, there are proven models upon which we can build. For over ten years, federal support for genomics - which now exceeds \$1 billion - has been doubled to more than \$2 billion through collaborative programs, led by Genome Canada and the regional Genome Centres. The Genome Canada model is built upon specific requirements related to collaboration, co-funding, scientific peer review, end user needs, and other aspects that collectively have led to the rise of the Canadian Genomics Enterprise. This enterprise is an innovation continuum of genomics discovery, translation and application involving a rich network of research groups, companies, universities, venture capitalists, governments, funding agencies, international organizations and others. With this approach, the whole is much more than the sum of the parts and we are beginning to see a stream of innovative applications offering economic benefit in key sectors. By working together we are able to produce more, more quickly and with more economic impact. There are other keys to maintaining productivity. It is essential that Canada moves quickly, boldly and aggressively in terms of its support for genomics and other technologies by: 1. Finding new ways of engaging with the private sector 2. Supporting early-stage investments in potentially disruptive technologies 3. Applying foundational technologies to cross-sector activities so as to simultaneously drive multiple economic sectors 4. Engaging the public early on to ensure social acceptance of technological innovations. 5. Reaching out globally so that Canadian expertise can be cultivated and benchmarked through international interactions

#### **5. Other Challenges**

*With some Canadian individuals, businesses and communities facing particular challenges at this time, in your view, who is facing the most challenges, what are the challenges that are being faced and what specific federal actions are needed to address these challenges?*

Many of Canada's most important economic sectors are facing serious competitive threats. Here are two examples: The agri-food sector is a key economic pillar representing about \$150 billion in annual activity and employing approximately 9% of the country's workforce. The industry comprises primary production of crops and livestock, value-added processing and advanced food/beverage processing, distribution and marketing. The industry is significant in every region in Canada. However, the world's population is increasing and the amount of arable land continues to be lost to urbanization and climate fluctuations. The sector consumes some 70% of the world's fresh water supply and is a significant source of greenhouse gas. Food safety and security is also of increasing concern as imports increase and more goods move through a global supply chain. In forestry, more than 600,000 Canadians are directly or indirectly employed by the forest industry which in 2010 accounted for some \$22.5 billion, or about 1.8% of GDP (8.3% of manufacturing GDP). The Canadian forest sector is the third largest contributor to the country's economy and the world's second largest exporter of primary forest products. Forests make up 34% of our landmass and face many challenges, such as increased human activity, which fuel

insect and disease outbreaks and loss of genetic diversity. In one case, the mountain pine beetle wiped out almost half of BC's saleable pine, costing tens of billions of dollars. These examples – and there are many more – affect Canadians from coast to coast. However, with the right amount of federal investment maintained over several years, foundational science and innovation can help address challenges to Canadian competitiveness and our way of life. Genome Canada projects are showing the way. Agricultural genomics are improving crop yields, resistance to pathogens, drought and low temperatures, and food safety. Forestry genomics can confer adaptive traits against pest infestation, disease or environmental change, control and monitor invasive species, and improve management decisions. A commitment by the government to support such work with sustained, multiyear funding would underscore to the international community, particularly to private sector investors, that Canada is the place to do business in the future bio-economy.