February 7, 2014

The Hon. Greg Rickford
Minister of State
(Science and Technology)
(Federal Economic Development Initiative for Northern Ontario)
Ottawa, ON
K1A 0H5

Dear Minister:

On behalf of the member companies of Canadian Manufacturers & Exporters (CME), thank you for the opportunity to participate in consultations aimed at updating Canada's Science, Technology and Innovation Strategy. CME is Canada's largest industry and trade association representing roughly 10,000 companies across the country in all segments of the economy. In total, our members represent 90 per cent of Canada's industrial output and 75 per cent of all exports.

Canadian manufacturers play a key-role in private sector Research & Development (R&D) in Canada. While manufacturing accounts for 13 per cent of Canada's GDP, the sector (which also includes information technology companies) represents more than 80 per cent of all private R&D expenditures. Year after year, manufacturers account for the vast majority of Canada's top 100 corporate R&D spenders. Beyond R&D expenditures, Canadian manufacturers play a key-role in taking advantage of Canada's post-secondary research and development. Many research chairs and centers across the country rely on the R&D activities of manufacturers form all sectors. A number of government-sponsored initiatives, such as the national network of centers of excellence, rely on the participation of large and small businesses to innovate.

Even more important to successful innovation in Canada, manufacturers are the companies that bring most of the new technologies developed in the country to market. Over 90 percent of all the patents commercialized in Canada are done so by manufacturing firms.

While Canadian manufacturers are active participants in all aspects of R&D across the country, we believe the government's science and technology policy and supporting programs should be modernized and improved to better support industrial innovation and commercialization in Canada. While detailed recommendations follow, CME's recommendations can be summarized as the following:

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1. **Include advanced Manufacturing as a national Science and Technology priority: The S&T strategy should cover both product and process innovation, including mass adoption of robotics and automation, research and adoption of additive technologies and advanced materials. The strategy should also cover breakdown research in fields such as nano-particles and nano-manufacturing technologies;**

2. **Provide an accelerated depreciation for the acquisition of capital assets (Machinery and Equipment) used for R&D purposes;**

3. **Create a program that would allow companies to exchange their SR&ED unused tax credits for direct funding at a percentage of their value, and then put to work on R&D projects;**

4. **Adopt the "patent box model" in Canada;**

5. **Provide more predictability of depreciation rates applied to manufacturing machinery and Equipment and make it at par with the US rates. CME recommends that the depreciation rate should be increased from 30% to 40%;**

6. **Support the establishment of technology development centres, modeled on the UK government's Catapult Centres, Germany's Fraunhofer Institutes, and US Advanced Manufacturing Centres, that would bring industry, start-ups, and researchers together in the development of applications for new platform technologies;**

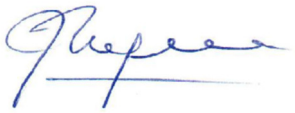
7. **Review and recommend best practices in the management of Intellectual Property Rights to accelerate the commercialization of new products and technologies, adopt those best practices as requirements for federally funded collaborative research projects with industry, and streamline Canada's patent process;**

8. **Increase support for collaborative education and R&D programs involving industry, colleges, and start-up technology companies; and,**

9. **Deliver direct funding programs similar to the FedDev's Advanced Manufacturing Fund (AMF) through all regional economic development agencies to support the application of new advanced manufacturing technologies and new product development mandates across the country.**

Thank you again for the opportunity to participate in the consultation, we would be pleased to meet at any time to discuss these recommendations further.

Sincerely,



Jayson Myers
President & CEO
Canadian Manufacturers & Exporters

Update of Canada's Science and Technology Strategy
CME's Detailed Recommendations

1- Advanced manufacturing as a national S&T priority

The Canadian advanced manufacturing sector must adapt to a whole new era of fast-paced technological change, particularly in the fields of digital technology, materials, bio- and nano-technology, and big data. Companies must maintain high-level investments in developing new and improved products, and at the same time modernize their production processes to make efficiency and productivity gains. As a result, most countries have included advanced manufacturing as a national priority, whether through their respective science and technology policies, or with the adoption of comprehensive industrial policies aimed at growing a sector that makes a significant contribution to their national R&D and economic performance. Canada is no exception – the weight of manufacturing in Canadian R&D is so important that it is imperative for the government to make it a national S&T priority. **Therefore CME recommends that Canada's S&T strategy include advanced manufacturing as a priority (Recommendation no 1).**

In our view, the advanced manufacturing priority should cover the following areas:

- **Advanced processes and methods:** New production technologies employing advanced digital and IT-enabled systems, robotics and advanced automation systems, machine-to-machine communications, additive manufacturing technologies (including 3-D printing), and big-data enabled analytics and control technologies are changing the shape of manufacturing design, prototyping, testing, and production systems around the world. Adoption of these technologies will be critical in maintaining and improving the competitiveness and innovation potential of Canadian manufacturing. The federal government should aim to support the adoption of these advanced technologies in Canada.

- **Advanced Materials:** The development of new advanced materials is leading to the development and improvement of product lines and will create new innovative opportunities for manufacturers in the future. More importantly, the potential of new advanced methods such as additive technologies requires significant levels of R&D in order to develop new commercializable applications. This is why for example the National Research Council has identified printable electronics as one of its priorities: research in new materials will allow additive technologies to change the way we build electronic products. More fundamental research into nano-particles (or nano-manufacturing technologies) and micro-manufacturing is also required to ensure that Canadian industry can compete with the rest of the world in new product and process development.

2- The fiscal environment

The fiscal environment is an important factor influencing any company's decision to undertake R&D projects either in Canada or in another jurisdiction. While the federal government has improved the overall macro-economic fiscal environment for businesses in recent years, with the reduction of corporate income tax rates among other measures, these actions have been offset by unfortunate cuts in the national Scientific Research and Experimental Development (SR&ED) Tax Credit and through the administrative complexity of the SR&ED tax credit system. These cuts, once all implemented, will reduce the amount of tax credits available to business for R&D purposes in Canada by $747 million annually (See table 1).

Table 1: Impact of Changes on Business R&D Incentives:

Budget 2012 Proposed Recommendations	CME Estimated Federal Annual Reduction (2011 BERD)	CME Estimated Provincial Annual Reduction (2011 BERD)	Total Estimated Reduction (combined federal-provincial impact)
SR&ED ITC Rate (reduction of 5%)	$356	$0	$356
SR&ED –Elimination Capital Expenditures	$95	$28	$123
SR&ED Overhead Expenditures (reduction of the proxy from 65% to 55%)	$116	$32	$148
SR&ED Contract Payments	$96	$24	$120
Total	$663	$84	$747

The importance of capital expenditures in manufacturing R&D

Innovation requires not only R&D but capital investments in structures and equipment used in new product development, scale-up, and manufacturing. It is important to note that machinery and equipment acquired for R&D purposes are also used for manufacturing and processing. Therefore, the elimination of all capital expenditures from the SR&ED tax credit, which is implemented this year, will not only have a negative impact on company R&D expenditures, but also indirectly on overall productivity.

When a company makes significant investments in machinery and equipment, the company also hires scientists or employees with scientific and/or technical training background to operate this equipment. In most cases, companies will also invest in a pilot plant or a laboratory in order to run these R&D activities. In addition, machinery and equipment acquired for R&D purposes will, in many cases, eventually end up in an enhanced manufacturing process, therefore closing that gap between invention and innovation. While the financial impact may seem modest, the Government's estimates of the financial impact of eliminating capital expenditures does not take into account this multiplier effect and the broader impact on Canadian productivity.

Globally, this will also make Canada's treatment of capital expenditures related to R&D less attractive. When examining international competiveness in this area we can group countries into three categories: those providing a tax credit for capital expenditure related to R&D activities, those providing an accelerated depreciation rate for capital expenditures related to R&D, and those countries not providing any incentive for capital expenditures.

As Table 5 shows, there are two ways to provide tax incentives for capital expenditures related to R&D activities. The most popular incentive is the inclusion of capital expenditures in the R&D tax credit, or allowing companies to claim the depreciation and/or amortization of tangible and/or intangible assets within their R&D tax credit claims (as in Canada before proposed changes). The eligibility varies from one country to another, some only allowing expenses related to machinery and equipment, others only to lands and buildings, or both. The second most popular tax incentive is to provide an accelerated depreciation rate for machinery and equipment, lands and buildings used for R&D purposes, apart from the R&D tax credit itself. The depreciation is usually over one year (companies can deduct 100% of capital expenditures the same year the expense takes place) or over 2.5 years in the case of South Africa. In another but related area, the Canadian Government has used this model in Canada recently with the Accelerated Capital Cost Allowance (ACCA) that allow companies to deduct 100 per cent of the acquisition of M&E used in manufacturing and processing over 2.5 years. The ACCA however does not include capital equipment used for R&D purposes.

Table 2: International comparison of tax incentives for capital expenditures related to R&D:

Treatment of capital expenditures	Countries
Capital expenditures not eligible under the R&D tax credit but equipment, machinery, and tools exclusively dedicated to R&D can be fully deducted the same year the expense is paid or incurred (or over 2.5 years in South Africa)	Brazil, United Kingdom, South Africa, Denmark

Building and land and/or M&E are eligible under the R&D tax credit. Some countries in this list allow businesses to claim only the depreciation of capital used for R&D under the R&D tax credit.	China, Czech Republic, France, Belgium, India, Japan, Australia, Austria, Hungary, Ireland, Israel, Poland, Portugal, South Korea, Spain, Turkey, Canada (pre-budget 2012)
No incentives for capital expenditures	Malaysia, Singapore, United States, Netherlands, Canada (post budget 2012)
Not applicable	Germany*, Mexico

*While Germany does not offer an R&D tax incentive, their direct funding programs such as the ones managed by the Fraunhofer Institutes allow companies to include some capital expenditures in their applications.

CME recommends that the federal government provided an accelerated depreciation for the acquisition of capital assets (Machinery and Equipment) used for R&D purposes. (Recommendation no 2)

Offset SR&ED cuts by easier access to unused SR&ED credits

While we understand that the Government has no intention of repealing the changes it introduced past budgets, CME recommends that the Government look at easier ways for large companies to access their unused credits when they need it. The SR&ED program offers large manufacturing firms non-refundable tax credits that can be carried forward until profitable years when their use would reduce a company's overall tax burden. These provisions in the SR&ED program, in conjunction with the difficult economic period of the last decade, have culminated in larger firms carrying nearly $7 billion in unused tax credits since 2001, waiting for a profitable year to redeem them.

Table 3: Estimated pool of unused tax credits in Canada, 2000-2011

	Actual					Estimated					
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Eligible Expenditures for small CCPCs	2,068	2,504	2,758	2,891	3,327	2,997	3,177	3,231	3,165	2,914	2,873
Eligible Expenditures for other firms	10,286	12,447	11,578	11,195	11,028	12,541	13,297	13,525	13,244	12,196	12,022
Total expenditures[a]	12,354	14,951	14,336	14,086	14,355	15,538	16,474	16,756	16,409	15,110	14,895
% of eligible expenditures by small CCPCs[a]	16.7%	16.7%	19.2%	20.5%	23.2%	19.3%	19.3%	19.3%	19.3%	19.3%	19.3%
ITC earned at 35%[b]	724	876	865	954	1,083	1,049	1,112	1,131	1,108	1,020	1,005

ITC earned at 20%[b]	2,057	2,489	2,397	2,239	2,271	2,508	2,659	2,705	2,649	2,439	2,404
	2,781	3,366	3,262	3,193	3,354	3,557	3,771	3,836	3,756	3,459	3,410
Credit Earned and Claimed in current year[c]	1,490	1,800	1,855	1,745	1,990	2,050	2,160	2,255	2,440	2,430	2,580
Claimed in current year but earned in previous year[c]	545	495	440	545	920	580	565	990	770	775	820
Earned in current year and claimed carried back[c]	71	89	99	110	100	90	100	90	195	120	115
Total	2,106	2,384	2,394	2,400	3,010	2,720	2,825	3,335	3,405	3,325	3,515
Total Credits earned and used in either current or carried back to previous year	1,561	1,889	1,954	1,855	2,090	2,140	2,260	2,345	2,635	2,550	2,695
% of ITCs earned and used in current year	0.561	0.561	0.599	0.581	0.623	0.602	0.599	0.611	0.701	0.737	0.790
Accumulated Pools of SR&ED ITCs:											
Opening Balance[d]	545	1,220	2,202	3,070	3,863	4,207	5,044	5,990	6,491	6,843	6,977
Earned in current year but not claimed in year	1,220	1,477	1,308	1,338	1,264	1,417	1,511	1,491	1,121	909	715
Claimed in current year but earned in previous year	545	495	440	545	920	580	565	990	770	775	820
Accumulated Pools of SR&ED ITCs	1,220	2,202	3,070	3,863	4,207	5,044	5,990	6,491	6,843	6,977	6,872

[a] Total expenditures for 2005 to 2011 are estimated to be business expenditures on R&D (BERD). The amound of eligible expenditures for small C based on the average % from 2000. to 2004

[b] Estimated for 2000 and 2001 based on eligible expenditures for small CCPCs and other firms.

[c] Amounts for 2000 to 2011 obtained from Tax Expenditure reports from the Department of Finance Canada.

[d] The opening balance for 2000 is unknown and so includes only the amount that was claimed in 2000 but earned in a previous year.

Sources: *Tax Incentives for Scientific Research and Experimental Development*. Department of Finance Consultation Paper, October 2007.
Parsons, M. and N. Phillips. *An Evaluation of the Federal Tax Credit and Scientific Research and Experimental Development*. Departmer Finance Working Paper 2007-08. *September 2007*

Tax Expenditure and Evaluation Report. Department of Finance Canada. 2005 - 2011.

Research and Development Statistics, Statistics Canada.

CME recommends that SR&ED tax credits should be exchanged for direct funding at a percentage of their value, and then put to work on R&D projects (Recommendation no 3).

To this end, we recommend the creation of a *swap* program to repurpose tax credits for companies seeking to invest in their capital assets used for R&D purposes, therefore providing an alternative to the elimination of capital expenditures under the traditional SR&ED program. Included as a program requirement, any money received through the swap of tax credits could then be used towards company R&D related

projects, including capital assets, either through the upgrading of research and development facilities, the building of entirely new R&D facilities, or the acquisition of machinery & equipment used mostly for R&D purposes.

Commercialization of innovation: CME recommends the adoption in Canada of the "patent box model" (Recommendation no 4)

A 'patent box' is a tax incentive that provides relief from corporate tax on income generated from certain types of qualifying intellectual property (IP), particularly patents. Patent boxes are distinct from other tax incentives such as research and development (R&D) tax credits. R&D tax credits are provided at the front end of the innovation lifecycle, in the years when research and development expenditures are incurred. In contrast patent box regimes provide tax relief at a later stage of the innovation lifecycle, in the years when income is generated from exploiting IP. Relief can be given either as a reduced tax rate or a deduction for a portion of the patent box income. Patent boxes therefore generally target the commercial or manufacturing activities that follow development rather than R&D activities themselves. A patent box tax incentive would support companies at a critical point in their product development and financing cycle and encourage them to commercialize new products in Canada. A copy of CME's paper on the patent box model is attached to this submission).

Accelerated Capital Cost Allowance for the acquisition of Machinery and Equipment (ACCA)

The ACCA for machinery and equipment for manufacturing and processing has been in place since 2007 and is set to expire in 2015. In a recent study published by the Canadian Manufacturing Coalition, we compared the depreciation rules for certain types of assets in Canada versus the US. Our analysis shows that both the ACCA and the bonus depreciation in the US have had strong effect on business investments in machinery and equipment. We also found however that the traditional model of depreciation in the US is much more advantageous for companies than Canada's traditional model of depreciation (30 per cent declining balance). While the ACCA will not expire for another budget cycle, we believe it is critical to provide long-term direction as to the capital depreciation rates so that companies can effectively plan their investments. A copy of the paper is attached to this submission.

CME strongly recommends that upon the expiry of the ACCA, the depreciation rate for manufacturing and processing machinery and equipment should be increased from 30% to at least 40% on a declining balance basis, recognizing the importance of capital expenditures for the future of our sector and for increased productivity in the Canadian economy. This will ensure that Canadian manufacturers are operating on a level playing field with their US counterparts. (Recommendation no 5).

3-Bridging the gaps between research, development, and commercialization

The Government invests billions of dollars every year in research but our record of moving from research to the development of new products and technologies, testing, prototyping, scale-up, production, and successful commercialization is poor. We need to do more to bridge the commercialization gap so that we can do a better job in linking publicly funded research to the needs of industry, identify applications for promising new technology platforms, and lower the risks that star-up and existing manufacturing companies have in adopting new technologies and bringing them to market. The number one challenge that technology start-ups have is not money but finding customers that can apply their technologies; and the number one challenge that existing companies have in keeping pace with the competition and developing new products that meet the expectations of their existing customers is identifying and adapting new technologies that can solve their commercial, engineering, and production problems.

In order to bridge the gap between R&D and commercialization and reduce the risks and timelines required for developing and adapting new technological applications, Germany, the United States, and the United Kingdom have employed similar models (Fraunhofer, Advanced Manufacturing Centres, Catapult Centres) in which researchers, engineers, colleges, technology companies, and existing manufacturers work together to accelerate the development of commercial applications of platform technologies. A similar approach to pre-commercial product and process development should be adopted in Canada, supported by both public and private funding. This is the model that NRC should adopt in restructuring its institutes. There are opportunities to support the efforts of companies and colleges prepared to open their facilities for collaborative product design, development, testing, and prototyping along with technology companies and manufacturers. The Fraunhofer Centre in London, Ontario is another more direct means of importing best practice in promoting pre-commercial development activities.

CME recommends that the Government support the establishment of technology development centres, modeled on the UK government's Catapult Centres, Germany's Fraunhofer Institutes, and US Advanced Manufacturing Centres, that would bring industry, start-ups, and researchers together in the development of applications for new platform technologies. (Recommendation no. 6)

If Canada is to be a global leader in innovation, we need an internationally competitive intellectual property regime that encourages industry to work with the publicly funded research community, engage in collaborate approaches to pre-commercial technology development, and speedily secure patent protection for new products and processes.

CME recommends that the Government review and recommend best practices in the management of Intellectual Property Rights to accelerate the

commercialization of new products and technologies, adopt those best practices as requirements for federally funded collaborative research projects with industry, and streamline Canada's patent process. (Recommendation no. 7)

Successful innovation depends on people, and specifically on the development, availability, and transferability of design, engineering, and technical skills across institutional boundaries – and especially between colleges, universities, and research centres on one hand and industry on the other. For many manufacturers in need of technical expertise, the collaborative relations they can build with colleges and polytechnics are extremely important in sourcing skilled personnel and solving technical problems that they could not otherwise manage on their own. Similarly, collaborative ventures between technology start-ups and manufacturing firms can lower the risks associated with new product and process development and enable manufacturers to provide their customers with new solutions enabled by unique technologies. Collaborative programs such as these should be encouraged by the Government. They will not happen on their own, without seed investments in relationship-building and joint R&D initiatives.

CME recommends that Government increase support for collaborative education and R&D programs involving industry, colleges and universities, and start-up technology companies (Recommendation no. 8)

4-The need to expand direct funding mechanisms for advanced manufacturing in all regions across Canada

While CME agrees that direct funding is in general a good policy to support business R&D, the new funding programs announced in the last two budgets cannot be seen as replacements for the cuts undertaken under the SR&ED program because either they are sector-specific, as is the case with forestry, aerospace and automotive, or they are accessible only in some parts of the country, like Ontario's Advanced Manufacturing Fund. In addition, many of these new R&D programs contain sunset provisions which have no guarantee of renewal, adding to the environment of uncertainty which already surrounds a great deal of private sector investment and R&D.

CME strongly supported the creation of the Advanced Manufacturing Fund for Southern Ontario. While manufacturing is a critical component of Ontario's economy, it is a crucial sector for the entire country, and manufacturers should be allowed to benefit from government funding across the country.

Therefore CME recommends that all other regional economic development agencies adopt funding programs similar to the Ontario Advanced Manufacturing Fund (AMF) aimed at supporting the development and commercial application of transformative manufacturing, processing, and

materials technologies and new product development mandates across Canada. (Recommendation no. 9).

CONCLUSION

Canada's advanced manufacturing sector has many challenges ahead but also enormous potential based on innovation. It is imperative that the Government uses the tools it has – such as a modern Science and Technology Strategy, an attractive fiscal environment for large R&D projects and investments in new product mandates, and targeted direct funding mechanisms so that manufacturers can grow their R&D capacity and their overall business activity in Canada.

While the need for bigger corporate R&D projects as a percentage of our GDP, more collaborative research between businesses and academic institutions, and a more robust system supporting fundamental research are all important indicators of Canada's overall S&T performance, it is important not to confuse indicators and objectives. In CME's perspective, R&D and innovation must have business objectives, which are to bring new products to markets, make productivity gains to become more competitive internationally, and eventually grow sales and revenues and create high-value jobs. S&T indicators are important to the extent that they help achieving these business results. As a general philosophy, the government can put in place the right conditions and incentives so that businesses have options to conduct R&D the way they think it is the best for their business and commercialize the results for the benefit of Canadians.