



# Productivity through Innovation

## Applied Research at Canada's Colleges and Institutes



Association of Canadian  
Community Colleges

February 2011

*Cover photos (clockwise from top left):*

*Sustainable Housing Design at Nova Scotia Community College*

*Producing Low Carbon Electricity and Liquid Fertilizer at Collège communautaire du Nouveau-Brunswick*

*Lethbridge College's Aquaculture Centre of Excellence*

*Algonquin College's Temporary Shelter for Disaster Relief*

# Executive Summary

Applied research at Canada's colleges and institutes has expanded rapidly over the last five years. This report provides an overview of the current context and positions colleges and institutes as key players in Canada's innovation system.

The report builds upon findings of previous research and reports on the results of the 2009-2010 *Applied Research Environmental Scan*. Data for 94 institutions were collected.

Previous analyses found that college applied research is an extension of the traditional partnerships colleges have with industry and community partners. It is institutionally focused, requiring the mobilization of different college resources, whether human, material or technological, to deliver applied research services to private sector and community partners.

The key findings of the 2009-2010 *Applied Research Environmental Scan* provide evidence of increased applied research activity by colleges, institutes, polytechnics, cégeps and universities with a college mandate across the country.

## Expansion of Institutional Mandates

- All colleges have applied research in their institutional mandate.
- Provincial/territorial governments with legislative recognition for college applied research: British Columbia, Alberta, Ontario, Yukon, Northwest Territories, Nunavut and Quebec.

## Applied Research Partnerships

- 3,795 companies participated in applied research projects during 2009-10, a five percent increase from 2008-2009 and more than seven times the figure reported in 2005-2006.
- Colleges identified 158 research networks at local, regional, provincial and national levels.

## Promotion of Applied Research Services and Areas of Research Specialization

- Over 100 institutions promote applied research services through their websites.
- Colleges identified 304 areas of research specialization, most within the four priority areas of the federal government's Science and Technology Strategy.

## Applied Research Structures

- 83 institutions have a dedicated applied research division or unit, more than double the number reported in 2005-2006 and 24 percent more than in 2008-2009.
- Between 2005-2006 and 2009-2010, institutions reported more full-time than part-time research staff. In 2009-2010, there was a total of 637 full-time positions and 127 part-time positions.
- In 2009-2010, 1,196 faculty and staff and 8,329 students participated in applied research projects.
- 94 colleges identified over 196 specialized research centres, up significantly from 72 in 2005-2006.

## Core Budgets and Funding for Applied Research

- Colleges reported a total of \$28 million in base budgets for applied research units/divisions or centres.
- Colleges also reported \$7 million in targeted funding for applied research projects.

## External Funding

- \$103 million in external funding from the following sources:
  - ♦ Private sector: \$45 million (\$4.2 million in 2005-2006)
  - ♦ Federal government: \$28 million (\$28 million in 2005-2006)
  - ♦ Provincial governments: \$29 million (\$13 million in 2005-2006)
  - ♦ Foundations: \$840,000
  - ♦ Community organizations: \$168,000

## Measuring the Impact of Applied Research

- 69 percent of colleges have performance measurement tools in place for tracking the impact of research activity based on college-specific indicators which measure outcomes and provide direction for framing public sector programs and funding mechanisms.
- Colleges reported on the impact of applied research:
  - ♦ Institutions have strengthened partnerships with industry and more recognition for the broader mandate to include R&D;
  - ♦ Students acquire advanced skills including technical and problem-solving skills and are better prepared for employment;
  - ♦ Faculty remain current in their areas of expertise; teaching, curriculum and the learning experience of students is enhanced;
  - ♦ Industry partners have improved or new products, processes, services or policies, can access R&D services and resources they normally would not access, and begin to increase investment in R&D;
  - ♦ Community organizations have improved or developed new services, processes, policies or practices, and improved services for disadvantaged groups.

## Summary of Key Findings Applied Research Activity

|                                              | 2005-2006           | 2008-2009            | 2009-2010            |
|----------------------------------------------|---------------------|----------------------|----------------------|
| Investment                                   |                     |                      |                      |
| • Private sector                             | \$ 4,000,000        | \$ 45,000,000        | \$ 45,000,000        |
| • Colleges                                   | unknown             | 35,000,000           | 35,000,000           |
| • Provincial/territorial governments         | 13,000,000          | 25,000,000           | 29,000,000           |
| • Federal government                         | 28,000,000          | 27,000,000           | 28,000,000           |
| • Foundations                                | unknown             | unknown              | 840,000              |
| • Community organizations                    | unknown             | unknown              | 168,000              |
| Total investment                             | <u>\$45,000,000</u> | <u>\$132,000,000</u> | <u>\$138,008,000</u> |
| Faculty engaged in Applied Research          | unknown             | 1,209                | 1,196                |
| College students engaged in Applied Research | unknown             | 2,500                | 8,329                |
| Partnerships with companies                  | 515                 | 3,602                | 3,795                |
| Research centres                             | 72                  | 140                  | 196                  |
| Areas of specialization aligned with         |                     |                      |                      |
| Canada's Science & Technology Strategy       | unknown             | 142                  | 304                  |
| NSERC eligible institutions                  | 13                  | 51                   | 64                   |
| Research networks                            | unknown             | 97                   | 158                  |

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# Innovation through Prosperity

## Applied Research at Canada's Colleges and Institutes

*“Colleges make important contributions to advancing Canada’s innovation capacity by working with businesses and playing a key role in translating knowledge into practical applications that open new markets and create high-value jobs. The applied research and training capacity at colleges and polytechnics is a tremendous resource for building a more knowledge-driven economy.”*

Government of Canada, Budget 2010

### 1. Introduction

Canada's publicly-funded colleges, institutes, polytechnics, cégeps and universities with a college mandate have a pivotal role in provincial and territorial post-secondary education systems, providing a wide range of learning opportunities for Canadians to develop advanced skills for employment. Traditionally, business, industry and community partners turned to colleges<sup>1</sup> for the training and development of highly qualified employees. Over the last decade, these partnerships expanded to include applied research services for product and process innovation and commercialization for business and industry, as well as social innovation by providing quality research and front-line services in community development, health care, Aboriginal engagement, education, the environment and the economy.

For the purposes of this report, the definition of innovation is drawn from the Science, Technology and Innovation Council (STIC) as being “the process by which individuals, companies and organizations develop, master and use new products, designs, processes and business methods. These can be new to them, if not to their sector, their nation or to the world. The components of innovation include research and development, invention, capital investment and training and development.”<sup>2</sup>

STIC has recognized the need to strengthen collaboration with business and industry sectors, increase business expenditures to research and development (BERD) and improve Canada's performance in the commercialization of research.<sup>3</sup> Colleges' extensive partnerships with business and industry, as providers of applied research and commercialization services, make them an important component of the innovation system that can be used effectively to enhance innovation capacity and the productivity of business and industry.

The Social Sciences and Humanities Research Council (SSHRC) has aligned its new program architecture to forge stronger links between industry-driven and social sciences and humanities research. This will build knowledge and support partnerships that will inform discussion on critical social, cultural, economic, technological and environmental issues and bring the benefits of research to the larger society. Colleges' strong ties with community partners position them as key players to facilitate research partnerships and knowledge-sharing across sectors and move Canada's innovation agenda forward.

ACCC is the national voluntary membership association, which serves publicly-funded colleges, institutes, cégeps, polytechnics and universities with a college mandate. Applied research is a means to meet the innovation needs of private sector and community partners in a comprehensive manner – both by providing applied research and commercialization services and support and by supplying graduates with the advanced skills required to support innovation.

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<sup>1</sup> “Colleges” is used in this report as an omnibus term representing the diversity of publicly-funded institutions represented by the Association of Canadian Community Colleges (ACCC): colleges, institutes, collèges d'enseignement général et professionnel (cégeps), universities with a college mandate and polytechnics.

<sup>2</sup> Science, Technology and Innovation Council, *State of the Nation 2008 – Canada's Science, Technology and Innovation System*. 2008/2009. pg. V.

<sup>3</sup> As STIC (2008/2009) has indicated, the most recent data available on expenditures in research and development is for 2005/2006 and although Canada ranked 2nd in the OECD for higher education expenditures in research and development (HERD), it has ranked much lower, 15<sup>th</sup>, for business expenditures in R&D (BERD).



The number one priority of the ACCC 2009-2012 Strategic Plan is to *promote the excellence of members as the prime providers of advanced skills and applied research for social and economic development.*

Since 2002, ACCC has collaborated in studies on applied research activity and has convened member institutions around exemplary practices through national symposia. ACCC has two strategic committees which provide leadership and advice on advocacy related to applied research: the Presidents' Science, Technology and Innovation Committee (STIC) and the National Research Advisory Committee (NRAC). The role of the Presidents' STIC is to further position colleges within the federal government's Science, Technology and Innovation agenda. Committee members also initiate dialogue at the local and provincial levels to move the college applied research agenda forward. NRAC, which is comprised of directors of applied research from across Canada, provides feedback on the implementation of college-specific research programs, identifies barriers in the system and supports the work of the President's STIC.

This report updates the state of applied research presented in the ACCC background paper released in February 2010, *Partnerships for Productivity and Advanced Skills – The Role of Colleges in Canada's Innovation System*, hereafter referred to as *Partnerships for Productivity Paper* (2010). This report reports on the results of the *2009-2010 Applied Research Environmental Scan*, an on-line survey conducted between May and June 2010. Data for 94 institutions were gathered through the survey and a list of participating colleges is provided in Appendix 1.

The 2009-2010 results show increased growth in college research partnerships, the number of research areas of specialization, centres and labs and investment by colleges, and provincial/territorial governments. It describes new federally-funded research programs for colleges set to begin in 2011. This report also captures new data collected through the *2009-2010 Applied Research Environmental Scan* on applied research activity in social innovation and the impact of applied research on institutions, faculty, students and industry and social innovation partners. Social innovation partners include social and community organizations, non-governmental organizations and public service agencies and departments in areas such as health care, policing, firefighting and economic development.

## **2. Background**

This section provides an overview of the key reports and analyses, which have laid the groundwork for the development of the college applied research process framework described in section 3 of this report.

### **2.1 An Initial Assessment and Typology of College Applied Research**

The first comprehensive analysis of college applied research was completed in 2005 by Jim Madder, formerly Executive Vice-President Academic at Red Deer College. Entitled *Innovation at Canadian Colleges and Institutes*, Madder's report provides an overview, including access to funding, college governance and institutional policies, human and financial resources and student involvement in applied research. A key contribution of the report is a typology, which outlines four stages of applied research at colleges from *Colleges With No Formal Innovation Policies and Structures* to *Novice Innovation Colleges*, *Established Innovation Institutions* and *Integrated Innovation Colleges*. This typology, provided in Table 1, suggests a progression towards increasingly formal governance structures and more significant human and financial resource allocations to applied research activity.

Madder indicated that these four stages should be viewed as a continuum rather than being discrete in nature and identified some of the key factors which impact upon where colleges are in this continuum:

- significance of innovation in the current institution vision, mission and strategic direction;
- historical mandate and history of innovation at the institution;
- availability and development of the human, physical and fiscal resources to support innovation;
- credentials offered and models of academic delivery used e.g. project-based delivery, work placements;
- nature of relationships with the public and private sectors;
- the focus of the local and regional economy.



**Table 1**  
**Typology of Stages of Applied Research at Colleges**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Colleges with no Formal Innovation Policies &amp; Structures</b></p> <p>Characteristics:</p> <ul style="list-style-type: none"> <li>• Undecided institutional commitment to applied research (AR) and no related policies, structures, human resources allocated or dedicated to AR, and no active support by senior administration.</li> </ul> <p>Activities:</p> <ul style="list-style-type: none"> <li>• Focused on project-based delivery and/or student placements with employers; developed and implemented as “side of desk” activities for faculty, or associated with graduate studies of faculty or staff.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <p><b>Novice Innovation College</b></p> <p>Characteristics:</p> <ul style="list-style-type: none"> <li>• Recent launch of AR activities with support from senior administration, with Director of Research appointed &amp; reports to senior VP.</li> <li>• Initial policies developed often for compliance with funding agency requirements and ad hoc fiscal &amp; HR systems in place but incomplete, as institutional acceptance of AR activity as part of college mandate is not widespread and some cultural conflict on how AR is related to college mandate.</li> <li>• AR activities are done by faculty with some release time or temporary staff allocations and initially more funds are available for capital equipment but less operating capital.</li> <li>• A transitional and unstable stage of 3 to 7 years with little active support by administration. Time spent in this stage can be reduced by hiring experienced Director of Research or with intensive PD for college staff responsible for AR.</li> </ul> <p>Activities:</p> <ul style="list-style-type: none"> <li>• Potentially all as in the first state.</li> <li>• Formal AR activities are usually project-based in collaboration with industry partners, with combination of industry support (cash or in-kind), and are limited in number, scope and framed as pilot projects.</li> </ul>                                                                                                                                                                                                                                       |
| <p><b>Established Innovation Colleges</b></p> <p>Characteristics:</p> <ul style="list-style-type: none"> <li>• Comprehensive policies in place related for AR, including fiscal management, human resources and reporting, and facilities and equipment are established but may require renewal.</li> <li>• AR human resource policies support more full-time longer term positions and resulting in less turn-over of AR-related personnel, with Director of Research reporting to senior VP Academic, Contract Training or Continuing Education. The systems and HR policies of AR activities have many parallels with those that support contract training.</li> <li>• Increased access to operational funding than can be managed by the existing AR administration and academic and service divisions support AR activities as part of the college mandate and mission.</li> </ul> <p>Activities:</p> <ul style="list-style-type: none"> <li>• Potentially all aspects of the first state.</li> <li>• AR teams led by faculty conduct multiple projects that interrelate and faculty and staff may be seconded and fully funded to conduct AR activities on a continuing basis.</li> <li>• AR activities may support both local and regional needs and may be integrated with business support services.</li> <li>• Funding and AR activities involve multiple public/private sector partnerships.</li> <li>• As colleges progress through this stage there is greater focus on longer multi-year projects that provide sustainability for AR activities and greater stability in human resources.</li> </ul> |
| <p><b>Integrated Innovation Colleges</b></p> <p>Characteristics:</p> <ul style="list-style-type: none"> <li>• These colleges have integrated AR and business support systems that provide both business development support integrated with AR activities that may be regional/national or international in scope. These colleges are often relatively large with long-standing AR and business development activities.</li> </ul> <p>Activities:</p> <ul style="list-style-type: none"> <li>• Potentially all aspects of the first and third models/states.</li> <li>• These colleges house business incubators, accelerators or business parks that are supported by and provide support to the college. Companies on campus may access research and development resources to conduct their own AR activities or may sub-contract AR activities to the college.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

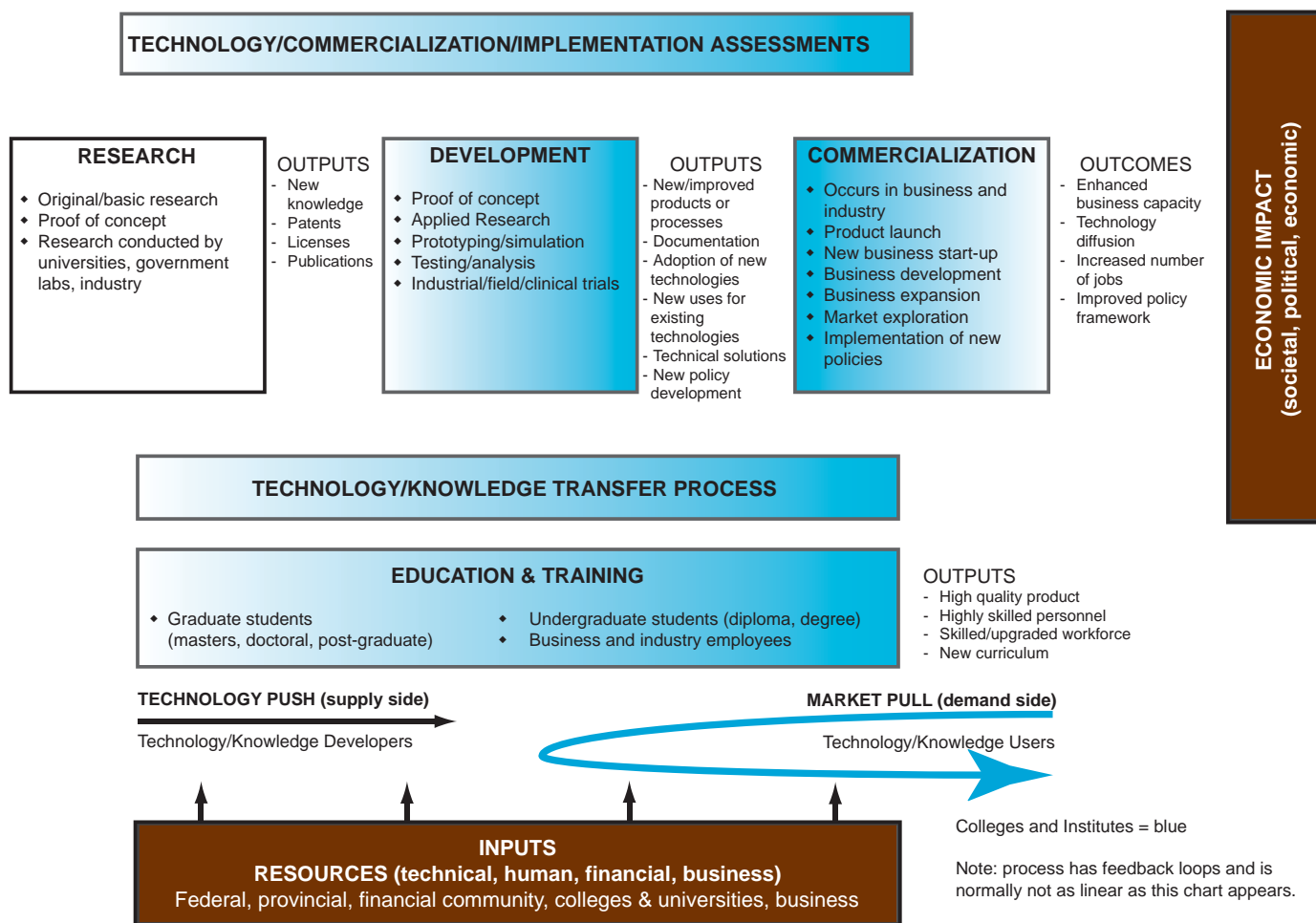
Source: Madder 2005

The Madder report did not provide any indication of the number of colleges that would consider themselves to be at each of these four stages. However, subsequent studies indicated that colleges were increasingly engaged and are structuring themselves accordingly. (Fisher 2008b, ACCC 2005-2006; ACCC February 2010) This trend will be examined in more detail in Section 5. The typology continues to be relevant and is a foundational piece for the development of a college applied research process framework that highlights the key elements institutions require to provide effective applied research services for industry, business and social innovation partners.

## 2.2 Colleges' Role in the Research Continuum

The research and analysis led by Marti Jurmain, former Director, Research and Innovation at Niagara College, in collaboration with NRAC, has also been instrumental in framing the role of colleges in applied research. The development of a model depicting the role of colleges in the research and development continuum has been key to identifying where and how colleges relate to other actors in the innovation system. This model (Figure 1) provides an overview of the research, development and commercialization process and shows that college research is driven by market pull, or the demand side, and by the users of technology or knowledge, who need to improve, refine or adapt technology to meet client needs. Colleges are positioned at the development, commercialization and knowledge transfer stages of research. This analysis is central to the development of the college applied research process framework, driven by demand from industry and community partners.

**Figure 1**  
**Canadian Colleges' Role in Research, Development and Commercialization**



## 2.3 Colleges and Small- and Medium-Sized Enterprises (SMEs)

The ACCC/Niagara College report entitled *College and Institutes and Canada's SMEs: A Partnership for Innovation*, reinforced the importance of business and industry partners and stressed how colleges can be instrumental in supporting SME investment in research and development, contributing to this under-served sector of the innovation system. This report defined innovation as “applying new ideas in a way that produces new value for the organization. New ideas do not mean “new to the world”. New ideas mean “new to the organization...”<sup>4</sup> Applied research within the context of SMEs may not have as broad an impact as research led by large corporations, but has the potential to introduce new products or processes which can increase productivity, preserve or create jobs, contribute to the growth of a company, thus supporting community and regional development.

## 2.4 College Research Capacity

The 2008 report prepared for Industry Canada by Roger Fisher, entitled *The College Advantage: Private Sector Innovation & Highly Qualified Personnel* provides an update of college capacity in applied research, including the status of provincial legislation, operating grants, research and development (R&D) programs and faculty agreements. The report provides evidence of increased capacity and performance of colleges when compared to the 2002 Industry Canada review of college applied research. The doctoral thesis of Roger Fisher, *A Conceptual Framework for Research at Canadian Colleges* was also informative. The analysis was used for the development of the process framework presented in this report.

## 2.5 Performance Measurement and Impact

Madder, Jurmain and Fisher all emphasized the importance of assessing the performance of applied research and the need to develop measures and indicators. The traditional measures used for basic and scholarly research conducted by universities, such as number of peer-reviewed journal publications and citations, patents and licenses are not relevant for measuring the performance of college applied research. A college-appropriate performance measurement framework and approach is presented in Section 7.

In November 2010, the Conference Board of Canada released a report on Ontario colleges' applied research, one of the first studies to consult with business and industry partners on the impact of college applied research. The results confirm that Ontario colleges are emerging as innovation catalysts and accelerators that help businesses overcome barriers and stimulate new research and innovation activities that otherwise would not occur. The results of this study improve upon the performance measurement framework presented in the *Partnerships for Productivity Paper* (2010).

# 3. College Applied Research Process Framework

The work of Madder, Jurmain and Fisher concluded that college applied research and innovation are institutionally-focused which means that colleges bear the responsibility for the research, compared with university research which is delivered largely by individual researchers. This institutional approach involves the mobilization of different college resources, whether human, material or technological to support the delivery of client-based services for business, industry and community partners. To illustrate this institutional approach, the College Applied Research Process Framework (Figure 2) was developed to provide a visual overview.

The process framework begins with the “Partnerships” box, the point of departure for college engagement. The arrows to the right highlight how these partnerships drive applied research. The arrows also signify that these activities contribute to community and regional economic development, which in turn, through knowledge development and transfer, fosters new college-private sector partnerships.

The process framework also indicates that the business, industry and community partnerships have led colleges to build capacity. The key capacity elements, the types of applied research services offered and the performance measurement of these services are shown in the centre.

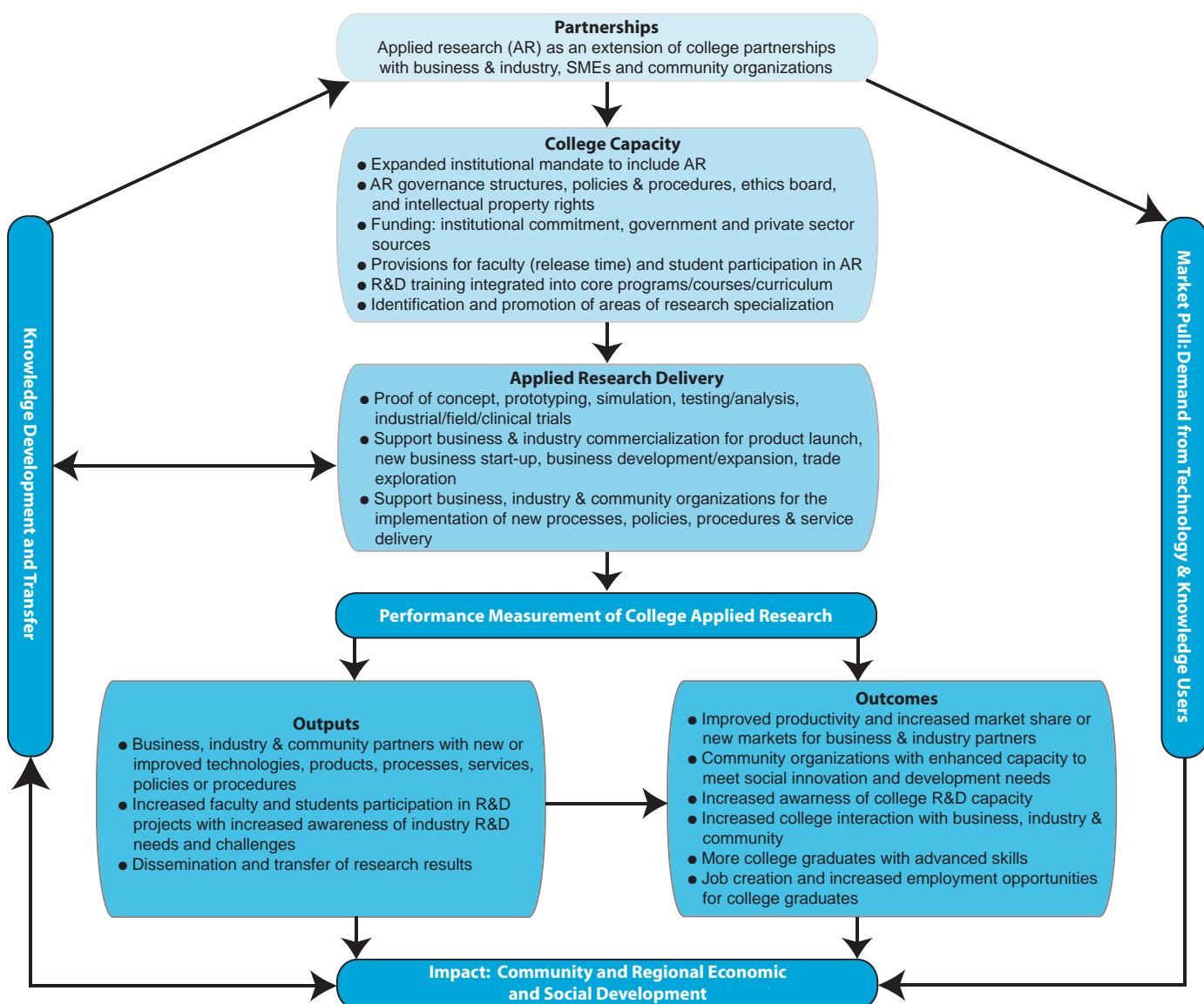
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<sup>4</sup> *Colleges and Institutes and Canada's SMEs: A Partnership for Innovation*, ACCC and Niagara College, 2007, pg. 13.

The framework also highlights the outputs, outcomes and impact of college applied research including improved products, processes, policies, procedures or service delivery, enhanced productivity gains and increased market share. Other benefits include an enhanced teaching and learning experience for faculty and students resulting in more college graduates with the advanced skills and innovation talent employers require. The ultimate benefit is community and regional economic development, which contributes to the development of more partnerships.

Each of the elements of the process framework is described in the following sections, with further details and updates on college capacity drawn from recent research and the results of the *2009-2010 Applied Research Environmental Scan* (hereafter referred to as the 2009-2010 Environmental Scan). Where relevant, comparisons are made with the results of the *2005-2006 Applied Research Survey* and the *2008-2009 Applied Research Environmental Scan*.

**Figure 2**  
**College Applied Research Process Framework**



## 4. Partnerships

As shown in Figure 2, applied research activities are an extension of the partnerships that colleges have had with business, industry and community organizations. These partnerships were first initiated to ensure educational programs are in line with employer needs and to produce the graduates with the advanced skills required locally. Business, industry and community partners have been engaged with colleges at the governance level as representatives on Boards of Governors and members on Program Advisory Committees formed for the development of new programs and to update existing ones.

The 2009-2010 *Environmental Scan* included questions on the nature and extent of applied research partnerships. The results provide evidence of increased activity. Colleges reported that 3,795 companies participated in applied research projects during 2009-2010, compared to 3,602 in 2008-2009 and 515 reported in 2005-2006.

Colleges are building capacity through research networks. The 2009-2010 *Environmental Scan* identified 158 research networks at local, regional, provincial and national levels, many of which are sector specific, evidence that colleges are making the necessary research connections. A list of the research networks identified by respondent colleges through the 2008-2009 and 2009-2010 Environmental Scans is provided in Appendix 2. Examples include:

- **Local research networks:** Edmonton Regional Alliance, TechAlliance (London, Ont.), Toronto Region Research Alliance and York BioTech, Banff Centre for Aboriginal Leadership;
- **Regional research networks:** Central Alberta Regional Innovation Network, Great Plains and Northern Applied Research Network, WestLink Innovation Network, Northern Region Working Group;
- **Provincial research networks:** British Columbia Applied Research Network, Alberta Association of Colleges and Technical Institutes, Colleges Ontario Network for Industry Innovation – CONII;
- **National research networks:** Alliance for Commercialization of Canadian Technologies, Canadian Association of Research Ethics Board, Canadian Association of University Research Administrators;
- **Sector specific research networks** in accordance with colleges' areas of specialization: Aquaculture Association of Canada, Canadian Inter-professional Health Collaborative, Canadian Council for Animal Care, Canadian Water Network, Photovoltaic Innovation Network, Canadian Association of Water Quality, Canadian Solar Building Resource Network.

## 5. College Capacity

The process framework identifies the main elements colleges need for the effective delivery of applied research services. This section analyzes and updates the status of college applied research capacity by examining each of these elements, drawing on current research.

### 5.1 Expansion of Institutional Mandates

The expansion of the institutional mandate, sanctioned by the college board of directors and in some cases by provincial/territorial legislation, is one of the first steps in building college capacity. Given the institutional approach to college applied research requiring the mobilization of resources from across a college, the need for a clear mandate is essential to ensure buy-in and support from leadership and the broad institution.

In 2005-2006, 71 percent of colleges reported that research and development is included as part of the mission and mandate. Fisher (2008b) provided provincial/territorial profiles of college R&D capacity that provided evidence of further progress. All colleges reporting now include research and development in their mandate. An analysis of Fisher's profiles confirms that there are two main categories of institutions:

- Colleges with R&D in their mandates, approved by college boards and with legislative and provincial government recognition and support. Colleges in the following jurisdictions fall within this category: British Columbia, Alberta, Ontario, Quebec, Yukon, Northwest Territories and Nunavut.
- Colleges with R&D as part of their mandate, approved by the Board of Directors but for which the provincial legislation is silent. This category includes the institutions in Saskatchewan, Manitoba and the Atlantic region.



## 5.2 Applied Research Governance Structures

Madder's typology (2005) highlighted the importance of applied research governance structures with dedicated human resources, responsible for managing the function and developing policies and procedures on matters such as ethics and intellectual property rights.

The *2009-2010 Environmental Scan* asked colleges about current governance structures and the staffing profile of R&D units, divisions or centres. Eighty-three institutions reported a dedicated division or unit, an increase of 151 percent from 2005-2006 and 25 percent from 2008-2009.

In 2009-2010 there were a total of 637 full-time staff positions, up from 566 in 2008-2009 and 127 part-time, up from 108 in 2008-2009. Table 2 provides the staffing profile of college R&D units, divisions or centres.

**Table 2**  
**College Staffing Profile for Applied Research Structures**

| Category of Applied Research Staff | Number of Full-Time Staff | Number of Part-Time Staff |
|------------------------------------|---------------------------|---------------------------|
| Management/Administrative          | 168                       | 58                        |
| Technical and Scientific           | 469                       | 69                        |
| <b>Total</b>                       | <b>637</b>                | <b>127</b>                |

Source: *2009-2010 Applied Research Environmental Scan*

## 5.3 Promotion of College Applied Research Services and Areas of Research Specialization

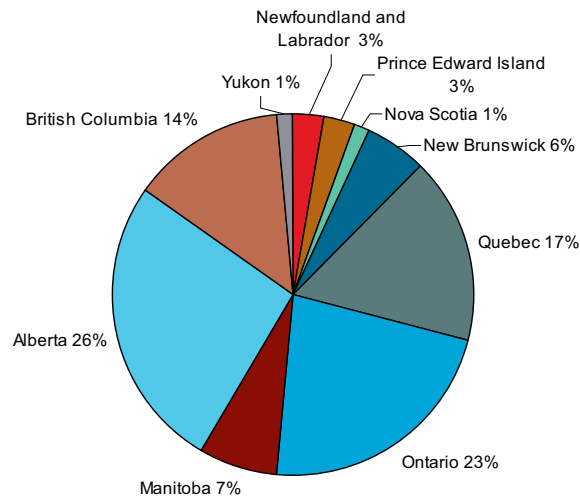
Colleges recognize a need to identify the key areas of research specialization in line with the industries and employers present in the communities and regions served. Colleges must develop outreach and promotional capacity to increase the awareness among employers about the services available.

In the *2009-2010 Environmental Scan*, 88 percent of colleges reported knowledge transfer activities carried out by the applied research unit, division or centre. These activities were diverse, including website content, information booths and presentations at conferences, meetings of professional and sector specific associations and research networks, presentations for local industry and community partners. A review of college websites confirmed that over 100 institutions promote applied research services.

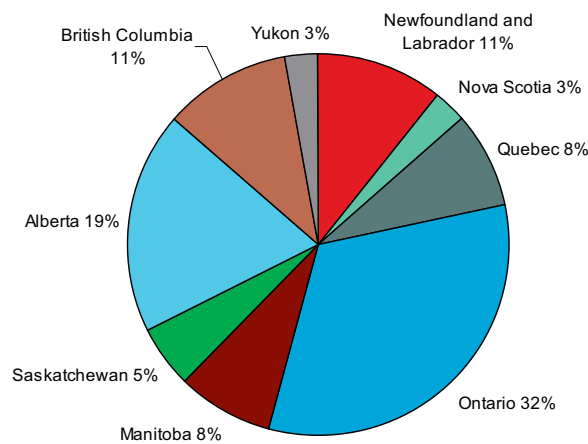
The *2008-2009 and 2009-2010 Environmental Scans* identified 304 areas of research specialization, the majority of which fall within the four priority areas of the federal government science and technology strategy including: 72 in natural resources and energy, 37 in environmental science and technologies; 53 in health and life sciences; 46 in information and communications technologies; 44 in manufacturing and building technology; and, 52 in social innovation. Increases were reported in all areas of research specialization. Figures 3 to 8 show the geographical distribution of the research areas of specialization by priority. The list of all areas of specialization identified by colleges is provided in Appendix 3.



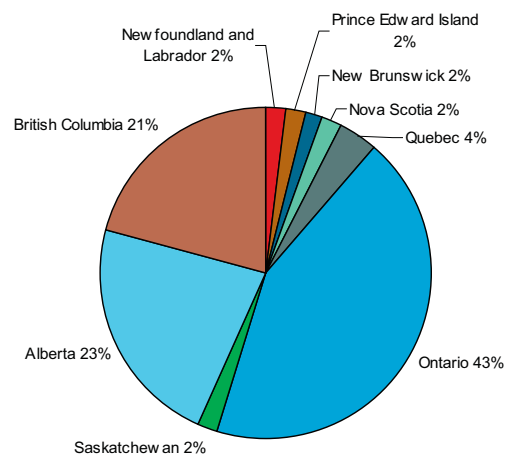
**Figure 3**  
**Geographical Distribution of the Natural Resources and Energy Specialization**



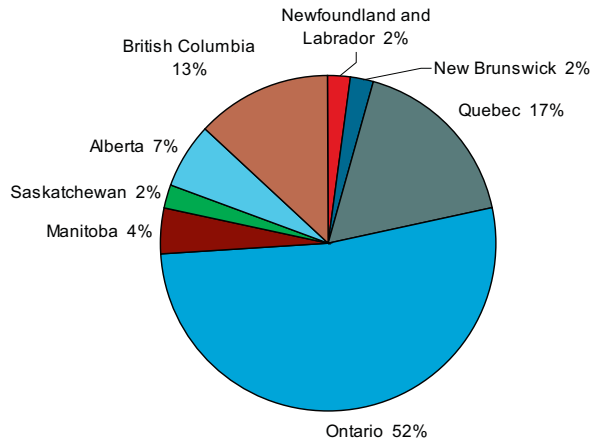
**Figure 4**  
**Geographical Distribution of the Environmental Science and Technology Specialization**



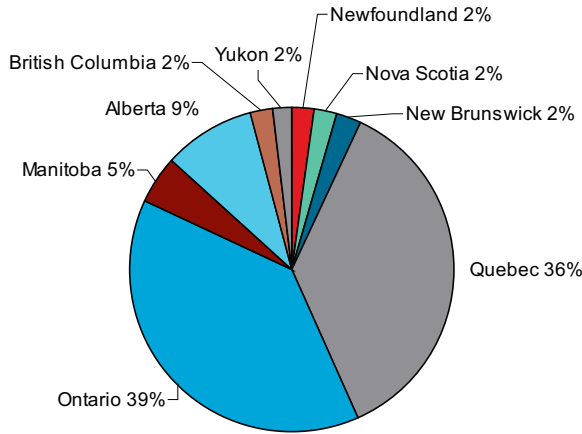
**Figure 5**  
**Geographical Distribution of the Health, Medical and Life Sciences Specialization**



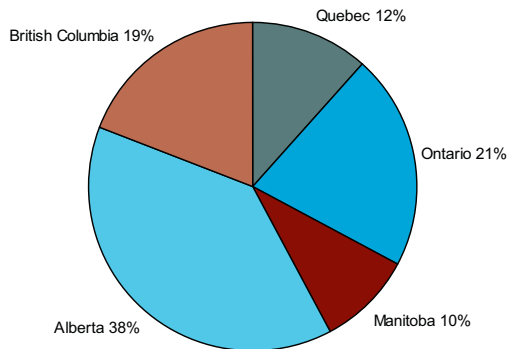
**Figure 6**  
**Geographical Distribution of the Information and Communications Technologies Specialization**



**Figure 7**  
**Geographical Distribution of the Manufacturing and Building Technology Specialization**



**Figure 8**  
**Geographical Distribution of the Social Innovation Specialization**

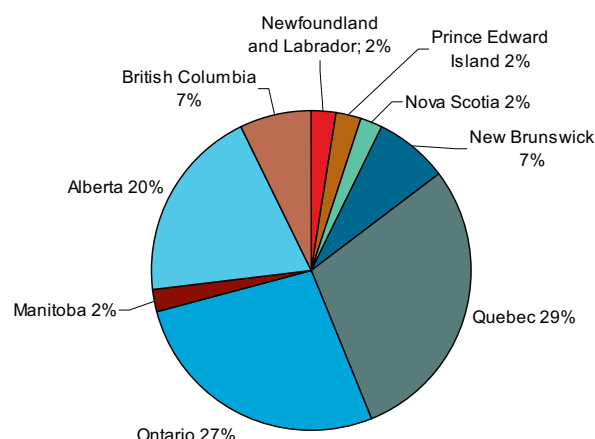


## 5.4 College Research Centres and Specialized Labs

The 2009-2010 *Environmental Scan* asked colleges to identify research centres or specialized research labs at their institutions. Eighty-two colleges (87 percent of 2009-2010 *Environmental Scan* respondents) identified specialized research centres, most aligned with the four priorities of the Science and Technology Strategy. Based on respondent information from 2008-2009 and 2009-2010, a total of 196 research centres were identified: 41 in natural resources and energy, 29 in environmental science and technologies, 28 in health, medical and life sciences, 33 in information and communications technologies, 35 in manufacturing and building technology, and 30 in social innovation. Figures 9 to 14 show the geographical distribution of the research centres by priority. The list of all specialized research centres and labs colleges identified is provided in Appendix 4.

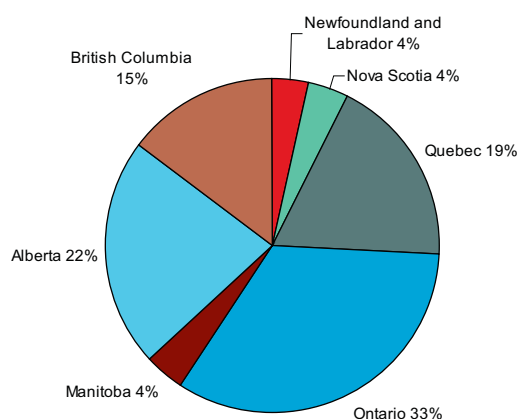
**Figure 9**

### Geographical Distribution of Natural Resources and Energy Research Centres and Labs

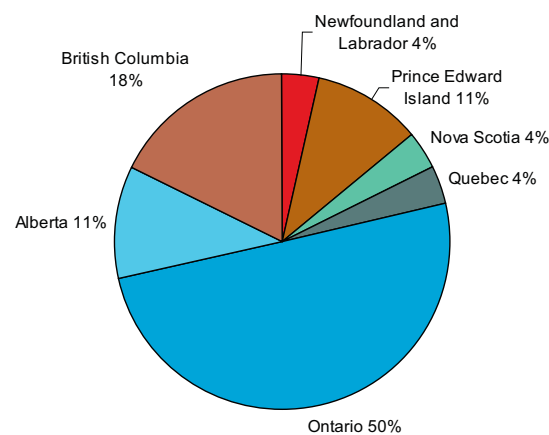


**Figure 10**

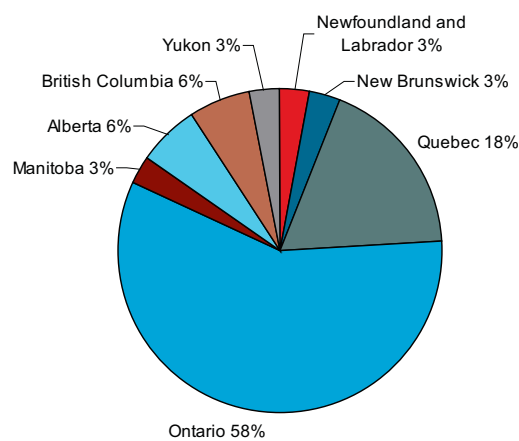
### Geographical Distribution of Environmental Science and Technologies Research Centres and Labs



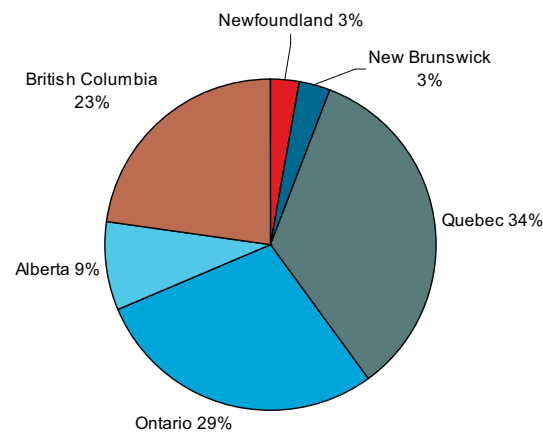
**Figure 11**  
**Geographical Distribution of Health, Medical and Life Sciences Research Centres and Labs**



**Figure 12**  
**Geographical Distribution of Information and Communications Technologies Research Centres and Labs**

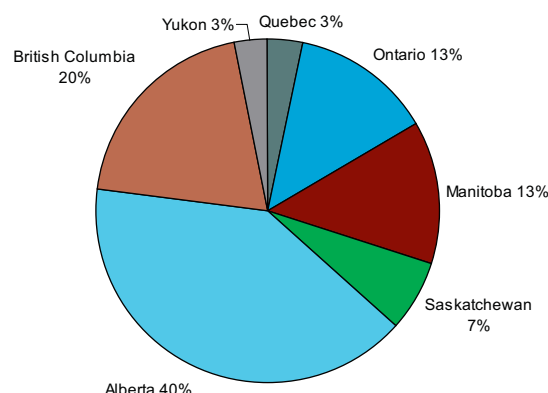


**Figure 13**  
**Geographical Distribution of Manufacturing and Building Technology Research Centres and Labs**



**Figure 14**

## Geographical Distribution of Social Innovation Research Centres and Labs



### 5.5 Funding of College Applied Research

College applied research activities are funded through internal budget allocations and government and private sector sources. Internal budget allocations are key to demonstrating institutional commitment. Resources are increased by marketing applied research services and accessing provincial and federal funding.

#### 5.5.1 College Core Budgets and Project Funding for Applied Research

Since applied research is integral to effective program delivery, colleges are allocating part of their core budgets to applied research units, divisions or centres. Through the *2009-2010 Environmental Scan*, 83 colleges reported a total of \$28 million in base budgets for applied research units, divisions or centres for the 2009-2010 fiscal year. There were significant differences among colleges with some reporting base budgets of \$15,000 to \$20,000 and others reporting base budgets as high as \$700,000. Colleges also reported \$7 million in targeted funding for applied research projects during 2009-2010.

#### 5.5.2 External Funding Sources

Colleges were also asked to provide the approximate value of federal and provincial grants, company funding and in-kind support and funding from foundations and community organizations for the 2009-2010 fiscal year. They reported a total of \$103 million in external funding. Table 3 shows that the largest proportion of the funding came from the private sector, \$45 million, and that colleges are reporting a major increase from 2005-2006 when only \$4.2 million in private sector funding was reported. Colleges are reporting no change in federal grants, with \$28 million in 2005-2006 and 2009-2010, and \$27 million in 2008-2009. Provincial grants increased from \$13 million to \$29 million.<sup>5</sup> Additional funding sources included \$840,000 from foundations and \$168,000 from community organizations.

<sup>5</sup> This is largely due to investments by provinces such as Quebec for the College Centres for the Transfer of Technology (CCTT) and more recently Ontario.

**Table 3**  
**External Funding Sources for College Applied Research**

| Funding Sources                    | 2005-2006      | 2008-2009       | 2009-2010      |
|------------------------------------|----------------|-----------------|----------------|
| Private Sector                     | \$4.2 million  | \$45.5 million  | \$45 million   |
| Federal government                 | \$28 million   | \$27.3 million  | \$28 million   |
| Provincial/territorial governments | \$13 million   | \$25 million    | \$29 million   |
| Foundations                        | unknown        | unknown         | \$840,000      |
| Community organizations            | unknown        | unknown         | \$168,000      |
| Total                              | \$45.2 million | \$ 97.8 million | \$ 103 million |

Source: 2005-2006 Applied Research Survey, 2008-2009 and 2009-2010 Applied Research Environmental Scans

Table 4 shows the sources of federal funding for 2009-2010 identified by respondent institutions. Forty-one percent of federal funding came from the Natural Sciences and Engineering Research Council (NSERC), 33 percent from Western Economic Diversification, which funded research projects at the British Columbia Institute of Technology and Red River College. The Department of National Defence provided a significant amount of funding for research in emergency preparedness at the Justice Institute of British Columbia.

**Table 4**  
**Federal Funding for College Applied Research**

| Distribution of Federal Funding Sources for 2009-2010    |                     |
|----------------------------------------------------------|---------------------|
| Natural Sciences and Engineering Research Council        | \$11,358,016        |
| Western Economic Diversification                         | 9,316,000           |
| Department of National Defence                           | 4,100,000           |
| Federal government funding reported by Réseau Trans-tech | 657,273             |
| National Research Council                                | 515,600             |
| Canadian Foundation for Innovation                       | 300,000             |
| Atlantic Canada Opportunities Agency                     | 275,000             |
| Agriculture Canada                                       | 243,000             |
| Human Resources and Skills Development Canada            | 236,200             |
| Social Sciences and Humanities Research Council          | 223,555             |
| Citizenship and Immigration                              | 157,144             |
| Canadian Patient Safety Institute                        | 112,000             |
| Government of Canada Indirect Costs Program              | 81,325              |
| Environment Canada                                       | 80,000              |
| Indian and Northern Affairs Canada                       | 60,000              |
| Canadian Institute of Health Research                    | 48,030              |
| Rural Secretariat                                        | 40,000              |
| Natural Resources Canada                                 | 25,000              |
| Health Canada                                            | 25,000              |
| Precarn                                                  | 14,000              |
| Parks Canada                                             | 13,000              |
| International Development Research Council               | 4,000               |
| National Centres of Excellence                           | 2,500               |
| <b>Total</b>                                             | <b>\$27,886,643</b> |



### 5.5.3 NSERC and the College and Community Innovation Program

NSERC is a key source of funding, in particular through the College and Community Innovation (CCI) program. One indicator of increased R&D activity by colleges is the increased number of colleges that have acquired NSERC institutional eligibility, with 64 as of December 2010. NSERC also reported that more than 20 institutions are in the approval process. This is an increase of 25 percent from 2008-2009, which saw 51 eligible institutions. In 2005-2006, there were only 13 colleges with NSERC eligibility.

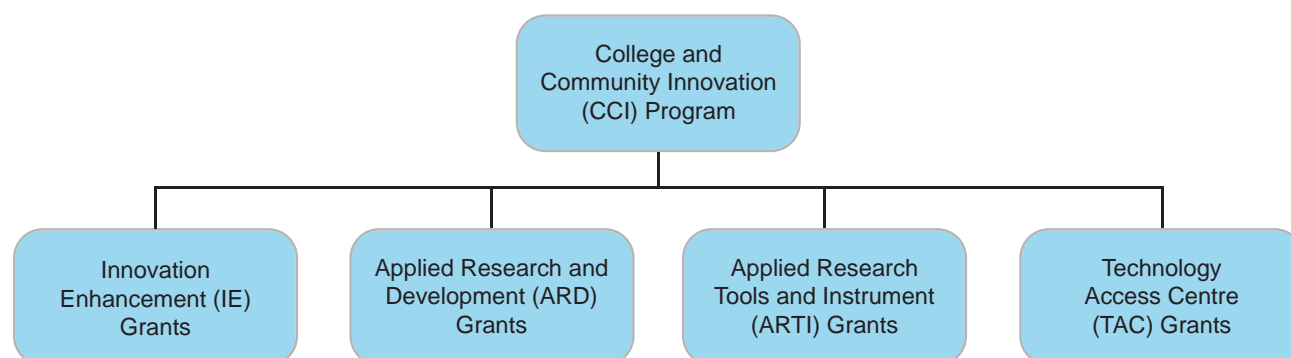
The CCI program aims to increase innovation at the community and/or regional levels by enabling colleges to increase their capacity to work with local companies, particularly SMEs. This program supports applied research and technology transfer in the four Canadian priority areas of research: environmental science and technologies; natural resources and energy; health and related life sciences and technologies; information and communications technologies; as well as in other areas of research that will advance the principles and goals of the Government of Canada's Science and Technology Strategy. The CCI Program is managed by NSERC in collaboration with the Canadian Institutes of Health Research (CIHR) and the Social Sciences and Humanities Research Council of Canada (SSHRC).

CCI provides funding on a competitive basis to strengthen applied research capacity, and to carry out applied research and technology transfer activities in a specific area where the college has recognized expertise and that meets the needs of local industries, particularly SMEs.

There are four types of grants in the CCI program:

- Innovation Enhancement (IE) Grants (formerly the two year Entry Level Grant and the Five Year CCI Grant)
- Applied Research and Development (ARD) Grants
- Applied Research Tools and Instrument (ARTI) Grants
- Technology Access Centre (TAC) Grants (pilot program)

**Figure 15**  
**College and Community Innovation Program Structure**



#### Innovation Enhancement Grants

The Innovation Enhancement Grants (IE) enhance applied research capacity at the college and strengthen industry partnerships. During the course of the grants, colleges are expected to increase their collaboration with local or regional companies, and other existing community resources. There are two types of grants:

- Five-year grant of up to \$500,000 per year for the first three years, and four-fifths of the annual base funding for the fourth and fifth years.
- Two-year entry level grant for a maximum of \$100,000 per year.

Colleges can use CCI funds to cover:

- Salaries for staff carrying out applied research, including limited costs for course load reduction for faculty participation in research activities;
- Knowledge dissemination and networking;
- Research and technology transfer support services; and
- Limited operating and equipment expenses and for overhead and administration costs.

To date, 45 IE grants have been awarded. Table 5 shows the number of letters of intent and full applications received in relation to the total awards, by category.

**Table 5**  
**Areas of Research Distribution of Awards**

|                            | Information and Communications Technology | Natural Resources & Energy | Environment | Health | Other | Total |
|----------------------------|-------------------------------------------|----------------------------|-------------|--------|-------|-------|
| Letters of Intent          | 26                                        | 25                         | 25          | 7      | 25    | 108   |
| Full Applications Received | 17                                        | 16                         | 16          | 5      | 6     | 60    |
| <b>Awards*</b>             | 16                                        | 14                         | 11          | 3      | 1     | 45    |

\* Includes the IE five-year and the entry-level grants

Source: NSERC CCI Program Statistics

Participation in the CCI fluctuated over the first four competitions, with significant drops in the number of Letters of Intent submitted for competitions 2 and 4. One of the factors that may explain this fluctuation is related to college capacity, because colleges emphasized that although this is a capacity building program, in order to be successful colleges need significant research capacity and experience. Many colleges were managing two applications processes for NSERC eligibility at the same time as the CCI application. In addition, colleges were being strategic with CCI program applications in order to ensure as many institutions as possible benefit from the program. The program was small thus institutions and their community and business partners were reticent to spend the time and money to conceptualize and submit the initial letter of intent and, if successful, the full proposal. CCI competition statistics and status are summarized in Appendix 5, and the list of funded projects to date is provided in Appendix 6.

The following three new grants under the umbrella of the College CCI Program were launched in fall 2010:

### **Applied Research Tools and Instrument**

The Applied Research Tools and Instruments (ARTI) grants support the purchase of research equipment and installations to foster and enhance the ability of colleges to undertake applied research, innovation and training in collaboration with local companies. ARTI grants are one-year awards that assist in buying applied research equipment that costs between \$7,000 and \$150,000.

### **Applied Research and Development Grants**

The Applied Research Development (ARD) grants are intended to provide companies that operate from a Canadian base access to the unique knowledge, expertise and capabilities available at Canadian colleges and to train students in essential technical skills required by industry. Projects may range from six months to three years in duration.

Three levels of grants:

- Level 1 – For grants under \$25,000 where the eligible companies have not partnered with the college on applied research (new partnership), cash contributions are not required, but active involvement of the company in the problem definition and subsequent project is required (i.e., an in-kind contribution);

- Level 2 – For grants up to \$75,000 per year and for grants under \$25,000 that involve companies that have previously partnered with the college, eligible company partners must actively participate and contribute at least one third of the total project costs in cash and/or in-kind;
- Level 3 – For grants over \$75,000 per year, the eligible company partner(s) contribution (s) must be at least equal to the proposed NSERC grant in cash and/or in-kind.

### **Technology Access Centre Grants – Pilot**

Technology Access Centre (TAC) grants are intended to enhance the ability of companies to become more productive and innovative by enabling them to readily access college expertise, technology and equipment. TAC grants will provide up to \$350,000 per year for five years in support of the core operations of the proposed centre.

## **5.5.4 Other Federal Funding Sources**

In addition to NSERC, there are other federal departments and agencies which either have the potential to support college applied research or have done so in the past.

### **Canada Foundation for Innovation**

The Canada Foundation for Innovation (CFI) is an independent corporation created by the Government of Canada to fund research infrastructure, including state-of-the-art equipment, buildings, laboratories, and databases required to conduct research. CFI is mandated to strengthen the capacity of Canadian universities, colleges, research hospitals, and non-profit research institutions to carry out world-class research and technology development that benefits Canadians. CFI normally funds up to 40 percent of a project's infrastructure costs.

Since its creation in 1997, CFI has committed almost \$5.2 billion in support of 6,353 projects at 130 research institutions. To date, colleges have received a minimal amount of funding through CFI: \$49 million for 136 projects. In the last round of applications, 16 colleges applied and none were successful. In an effort to identify ways to increase college participation and success, CFI held consultations with colleges across Canada in 2008-2009. In the fall of 2010, CFI conducted a consultation with the college community to seek assistance in defining the framework of a college-specific fund. In December 2010, CFI launched the \$32.5 million College-Industry Innovation Fund aimed at providing colleges with research infrastructure that will enable partnerships with private sector partners to support business innovation. This will boost their applied research and technology development capacity in order to help them expand existing partnership opportunities and attract additional industrial partners. The College-Industry Innovation Fund will offer two competition streams:

#### **Stream 1: Funding for Research Infrastructure Alone (2 competitions)**

Colleges which have received a five-Year CCI-IE grant or research and development funding from provincial, industrial or other sources are encouraged to apply to this stream.

#### **Stream 2: Funding for Research Infrastructure Associated with a Five-Year CCI-IE grant application**

The CFI will accept research infrastructure requests associated with five-Year CCI-IE grant applications submitted to NSERC beginning with the 8th and 9th competitions. This joint initiative allows colleges to apply for a comprehensive funding package supporting both research costs (through a CCI-IE grant) and infrastructure (through CFI College-Industry Innovation Fund-stream 2).

Colleges are also eligible to apply to the CFI Leading Edge Fund and New Initiatives Fund.

### **National Research Council – Industrial Research Assistance Program**

The National Research Council's Industrial Research Assistance Program (NRC-IRAP) is an innovation assistance program for SMEs at all stages of the innovation process. NRC-IRAP helps SMEs understand the technology issues and opportunities and provides linkages to the best expertise in Canada.

NRC-IRAP assists 10,000 firms each year, sharing the financial risks with some 2,800 of these for R&D projects and pre-commercialization activities. NRC-IRAP provides non-repayable contributions to SMEs interested in growing by using technology to commercialize services, products and processes. NRC-IRAP also provides

mentoring and invests on a cost-shared basis for research and pre-competitive development technical projects, upon assessment of a project and firm by a team of Industrial Technology Advisors. NRC-IRAP's partner organizations also receive contributions to provide technical and research assistance to Canadian SMEs.

NRC-IRAP has a national network of more than 100 partners and a field delivery staff of 240 Industrial Technology Advisors through seven regional offices:

- three sub-regions for the West: British Columbia and Yukon; Alberta and Northwest Territories; and Saskatchewan and Manitoba;
- Ontario;
- Quebec; and,
- two sub-regions for the Atlantic: New Brunswick, Nova Scotia and Prince Edward Island; and Newfoundland and Labrador and Nunavut.

The extent of college involvement in IRAP initiatives is not clear at this time. However, IRAP has contacted ACCC for information and there is potential for future collaboration with NRC – IRAP.

### Regional Economic Development Agencies

The federal regional economic development agencies all include applied research and innovation components and are potential sources of funding for college applied research. In the past, colleges in the Atlantic region have accessed R&D funding from the Atlantic Canada Opportunities Agency (ACOA), colleges in Northern Ontario have accessed research funding from the Federal Economic Development Initiative for Northern Ontario (FedNor), and colleges in British Columbia have accessed funds through Western Economic Diversification Canada (WD). Access to funding through the regional development agencies needs to be explored further. A profile of the type of innovation and applied research funding available through these regional development agencies is provided below:

- **ACOA** assists partners with applied research and development through:
  - ♦ the **Atlantic Innovation Fund** which provides financing for R&D projects in natural and applied sciences, social sciences, humanities, arts and culture. In order to qualify for funding, these projects need to be linked to the development and commercialization of technology-based products, processes or services.
  - ♦ the **Business Development Program** which provides unsecured, interest-free loans to help businesses research and develop new or improved products or services.
- **FedNor** provides assistance to organizations for the infrastructure and conditions to facilitate applied research and development and the development, application and transfer of new technologies to the North. Past areas of FedNor support have included state-of-the-art mining technology, medical research and biotechnology.
- **Canada Economic Development for the Regions of Quebec** provides support to SMEs through the Innovation and Natural Resources Testing and Experimentation Support program for the management of a new product, process or service development.
- **Canadian Northern Economic Development Agency**, a new regional development agency, has as its mandate to respond to the unique opportunities and challenges of the North and to coordinate and deliver programs and policies in the three territories. Specifically, the agency is responsible for administering federal initiatives including the Community Adjustment Fund and Strategic Investments in Northern Economic Development, and infrastructure programs.
- **Western Economic Diversification Canada (WD)** supports a strengthened western Canadian innovation system by supporting the creation and growth of knowledge-based clusters in new economy sectors that contribute to an increase in knowledge-driven and value-added economic activities, largely achieved through the Western Diversification Program.
- **FedDev Ontario** is the new federal economic development agency for Southern Ontario. In April 2010, it launched its first call for applications under the Applied Research and Commercialization Initiative. This \$15 million initiative aims to bridge the research and commercialization gap between Ontario's post-secondary academic institutions and small- and medium-sized enterprises. Eleven colleges have received up to \$750,000 in funding for applied research projects in Southern Ontario: Centennial College, Conestoga College Institute of Technology & Advanced Learning, Durham College, Lambton College, Loyalist College, Mohawk College, Niagara College, St. Lawrence College, Seneca College, Sheridan College Institute of Technology & Advanced Learning and Fleming College. The new initiative launched by FedDev Ontario further acknowledges the role of colleges in

supporting the innovation needs of SMEs. Similar programs should be replicated by other regional economic development agencies.

## **Social Sciences and Humanities Research Council**

The Social Sciences and Humanities Research Council (SSHRC) is mandated and funded by Parliament as an arms-length granting council. SSHRC grants and scholarships fund social sciences and humanities research projects which address areas and issues which are important to Canadians, including health care, education, Aboriginal peoples, immigration, the environment, economic and monetary policy, business, justice, human rights, arts, culture and literature.

While colleges and institutes are actively involved in social sciences and humanities research, relatively few college faculty have applied for and been funded by SSHRC. Currently, 24 colleges have SSHRC eligibility, and approximately 50 SSHRC grants have been awarded for an approximate total of \$1.5 million

In October 2004, ACCC submitted a response to SSHRC's national consultation process and outlined a number of issues that impede the participation of colleges in SSHRC programs including but not limited to the full funding of faculty release time. SSHRC's final report on the consultations did not reference the ACCC submission nor did it indicate a change in policy that would increase support for faculty at colleges and institutes.

In 2007, there was some support for colleges and institutes through SSHRC's collaboration with the Canadian Institutes of Health Research (CIHR) and the Natural Sciences and Engineering Council (NSERC) under the College and Community Innovation Program.

Over the past year, SSHRC has renewed its program architecture to create a simpler, more flexible and effective system of application and assessment. The new program architecture features three umbrella programs entitled Talent, Insight and Connection, based on SSHRC's mandate to develop talent, to build knowledge and understanding, and to mobilize knowledge on campuses across Canada.

In July 2010, SSHRC launched its Insight and Connection programs, with calls for proposals for Partnership Development Grants ([http://www.sshrc-crsh.gc.ca/funding-financement/programs-programmes/partnership\\_development\\_grants-bourses\\_partenariat\\_developpement-eng.aspx](http://www.sshrc-crsh.gc.ca/funding-financement/programs-programmes/partnership_development_grants-bourses_partenariat_developpement-eng.aspx)) and Partnership Grants ([http://www.sshrc-crsh.gc.ca/funding-financement/programs-programmes/partnership\\_grants-bourses\\_partenariat-eng.aspx](http://www.sshrc-crsh.gc.ca/funding-financement/programs-programmes/partnership_grants-bourses_partenariat-eng.aspx)) These two programs are potential sources of funding for colleges involved in social sciences and humanities research.

In October 2010, the eligibility criteria for the Aid to Small Universities (ASU) and the SSHRC Institutional Grant (SIG) funding opportunities were expanded to include all Canadian post-secondary institutions that grant degrees in the social sciences and humanities, and which are eligible to administer SSHRC funds. Efforts are being made to ensure that SSHRC public documents are more inclusive of colleges.

## **Canadian Institutes of Health Research**

Created in June 2000, the Canadian Institutes of Health Research (CIHR) is the major federal agency responsible for funding health research in Canada. It aims to create new health knowledge, and to translate that knowledge from the research setting into real world applications.

CIHR consists of 13 institutes, each headed by a Scientific Director and brings together researchers, health professionals and policy-makers from voluntary health organizations, provincial government agencies, international research organizations and industry from across the country with a shared interest in improving the health of Canadians. The works of the institutes embraces the four pillars of health research: biomedical, clinical, research respecting health systems and services; and the social, cultural and environmental factors that affect the health of populations.

Even though colleges are eligible for CIHR funding programs, no CIHR funding is flowing to colleges. The collaboration of CIHR with SSHRC and NSERC under the College and Community Innovation (CCI) Program will provide opportunity for increased participation within CIHR.



## 5.6 Provisions that Facilitate Faculty and Student Participation

Given the institutional approach to applied research and the teaching focus of colleges, the need for provisions that facilitate faculty and student participation in applied research are essential.

### 5.6.1 Faculty Participation in Applied Research

College faculty are first and foremost teachers and compensated for this work. A national survey of college faculty participation in research (Fisher 2008a) confirmed that:

- there is strong interest among faculty to participate in research activities;
- their primary goal for becoming involved in applied research is to enhance the learning experience of students; and
- the lack of faculty release time is the primary barrier to faculty participation and the expansion of applied research in colleges.

This was also reported in the 2005-2006 survey. The *2009-2010 Environmental Scan* found that 1,196 college faculty and staff participated in applied research activities, more or less the same number as in 2008-2009. As this question was not part of the 2005-2006 survey, we cannot assess how much faculty involvement has increased in the last five years.

Given the hands-on and applied nature of the learning experience in colleges, the time required for faculty to be present in the classroom cannot be compromised. Within the college research context, the provision of faculty release time is essential. (Fisher 2008a). Fisher (2008b) also assessed how collective agreements in each of the jurisdictions address the participation of faculty in research. Based on Fisher's assessment the status across Canada is as follows:

- **Atlantic:** Collective agreements are silent on the role of faculty in research with the exception of Marine Institute, Nova Scotia Agricultural College, Cape Breton University and Université Sainte-Anne – Collège de l'Acadie. The collective agreement for faculty at the College of the North Atlantic does not explicitly address research and development, but the college recently launched a faculty research development plan.
- **Quebec:** The Ministry of Education, Leisure and Sport has a faculty release time program recognizing and supporting the involvement of cégep faculty in research.
- **Ontario:** Collective agreements are silent on the role of faculty in research, however the Framework for a Research Policy for Ontario noted that although research is not required under the terms of employment of college faculty, many are interested in research.
- **Manitoba:** The three colleges in Manitoba have negotiated separate collective agreements and applied research is recognized as a faculty activity.
- **Saskatchewan:** Collective agreements are silent on the role of faculty in research.
- **Alberta:** Colleges have the legislated mandate to perform R&D, however information on faculty recognition to participate in research was not included in Fisher's report.
- **British Columbia:** For college faculty collective agreements, research activities are negotiated as a local provision. University colleges and institutes have included language regarding research activities in their local collective agreements.
- **Territories:** The collective agreement of Yukon College explicitly supports faculty involvement in research. Although Aurora College and Nunavut Arctic College both have territorial government recognition to perform R&D, specific information on their faculty collective agreements was not included.

The *2009-2010 Environmental Scan* results indicate that the most commonly identified measure for engaging faculty and staff in applied research was by supporting faculty release time. Other measures colleges identified include: internal proposal calls for college funded research projects, support and workshops to help with proposal writing and a database of curriculum vitae to match faculty expertise with industry and community partner needs.

Although faculty release time is typically not an eligible expense as part of federal granting council programs, as noted in section 5.5.3, the CCI Program does allow for some limited costs for course load reduction for faculty participating in research activities. This aspect of the CCI Program should be examined further to assess how



well it is working from both the colleges' and granting councils' perspectives, with a view to determining how this provision can be expanded through other granting council programs.

### 5.6.2 Student Participation in Applied Research

Applied research projects are designed to include student participation to ensure graduates leave college with the advanced skills, including research and development skills, employers are seeking. Through the *2009-2010 Environmental Scan*, colleges reported that 8,329 students participated in applied research activities, up significantly from the 2,513 students reported for 2008-2009. This significant increase is due to a higher number of institutions reporting student involvement and a more inclusive approach to involving students.

Colleges have adopted three main approaches to include students in applied research: integrating research in the curriculum of college programs; providing financial support for student research projects; and providing student employment opportunities related to research projects. (Madder 2005 and ACCC 2005-2006) These are described below with some examples colleges provided through the *2009-2010 Environmental Scan*.

- **Integration of Research into the Curriculum of College Programs:** Results of past research indicate that employer representatives on college program advisory committees are requesting that research skills and capacity be included as program competencies. (ACCC 2005) Colleges have integrated research competencies into college programs including project-based learning modules, incentives for applied research projects such as awards and senior year research projects. Some examples identified through the *2008-2009 and 2009-2010 Environmental Scans* are as follows:
  - ♦ **Lakeland College** is incorporating renewable energy applied research into the new on-line Renewable Energy and Conservation Program.
  - ♦ **Fanshawe College** has offered six Research Readiness Workshops for faculty and staff on topics such as: *Showcasing and Publishing Research, Writing Funding Proposals, Research Ethics and You, Managing Research Budgets, Engaging Students in Applied Research, Working with Industry.*
  - ♦ **La Cité collégiale** has provided training related to research projects, in particular for two courses that are part of the Biotechnology Degree Program.
  - ♦ **Niagara College** is developing a Student Research Portal that will also be shared with 20 other Ontario colleges.
  - ♦ **Conestoga College Institute of Technology & Advanced Learning** provided training for students on non-disclosure agreements and intellectual property.
  - ♦ **Centennial College** provides students with the opportunity to be involved in applied research through course-based curriculum, along with participation in specific project research through student stipends, co-op placements and graduate placements.
  - ♦ **Cégep de Jonquière** invites researchers from CCTTs<sup>6</sup> to present to students and identifies students to participate in research projects.
  - ♦ **Selkirk College** includes data collection and analysis in its Recreation, Fish and Wildlife program, providing students with key skills to conduct applied research.
- **Financial Support for Student Research Projects:** In 2005-2006 some colleges reported student research grants or competitions with prizes as incentives for students. Through the *2008-2009 Environmental Scan* Olds College confirmed that it offers Student Research Competition Presentations with prizes awarded annually.
- **Student Employment Opportunities in Research Projects:** Colleges offer students research assistant positions, either part-time during the academic year or full-time during the summer months. Some programs include work placements, internships, directed field studies or co-op options. Examples of student employment opportunities identified through the *2008-2009 and 2009-2010 Environmental Scans* include:
  - ♦ **Lethbridge College** offered four student summer research projects in poly-pharmacy, health community of practice, community living and human-animal interactions.
  - ♦ **Nova Scotia Community College** aims to provide the highest level of student engagement possible and foster learning that will build on career success. Students are hired to participate in senior design projects and work as research assistants and associates, receiving training in the applied research field through industry placements.

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<sup>6</sup> CCTTs are College Centres for the Transfer of Technology

- ♦ **Niagara College** paid 63 students this past year as co-op students, interns and part-time research assistants for specific projects.
- ♦ **Algonquin College** offered an in-house orientation for student research assistants that includes a review of all institutional applied research directives.
- ♦ **Seneca College** had 50 students participate in paid work in grant-funded research projects, and an additional 120 students completed research projects for academic credit as required by their degree programs.

## 6. Applied Research Delivery

As highlighted in Figure 2, college applied research services are focused more on the development, commercialization and knowledge transfer stages of the innovation process. The main types of applied research services include:

- Proof of concept, prototyping, simulation, testing and analysis, industrial/field/clinical trials;
- Support for product launches, business start-ups, business development and market expansion, and implementation of policies and procedures;
- Develop or adapt policies, procedures, processes or services for social innovation partners.

These services help business and industry, in particular SMEs, to assess and develop commercial concepts to minimize the resources expended on concepts that have little commercial viability. Commercial concepts that arise from the new application of existing knowledge, the integration of existing technologies or improvements in product/process development are particularly suited to the capacity of colleges. Colleges are also supporting social innovation partners in areas such as early childhood development, social economy, justice and public safety and social services and teaching and learning.

To illustrate the types of applied research services provided by colleges, some examples are provided in the priority areas targeted by the federal Science and Technology Strategy. Additional examples are available in ACCC's publication *Accelerating Innovation - Colleges, Institutes & Polytechnics: Applied Research for Economic and Social Development*.

### College Applied Research Services in Priority Areas of Canada's Science and Technology Strategy

#### Health, Medical and Life Sciences

**Northern Alberta Institute of Technology** (NAIT) faculty is participating in an innovative applied research project exploring the challenges faced by Aboriginal youth entering health careers. In the fall of 2009, NAIT took seven high school students from Amiskwaciy Academy on a tour of Edmonton post-secondary institutes introducing them to health sciences programs. The young women documented the challenges they saw for Aboriginal learners entering health career studies. Their insights are now being analyzed for use by First Nations, governments and post-secondary institutes as part of Alberta's strategy under the Aboriginal Health Human Resources Initiative, a federal program that aims, in part, to increase the number of Aboriginal health professionals.

Groupe CTT affiliated with **Cégep de Saint-Hyacinthe** has developed silver-based medical tissues and anti bacterial bandages for treating infections, wounds and burns. Other existing silver-based products have drawbacks such as poor adhesion and high cost. They are also not reusable or washable. The team has developed expertise in synthesizing silver salt nanoparticles or nanocrystals that can be encapsulated. This enhances their performance, adhesion and durability on tissues. The nanocrystal supports application as an anti-bacterial preparation and can be encapsulated and retained on bandage fibres, generating excellent adhesion and performance of the silver coating.

#### Information and Communication Technology

Working in partnership with Toronto-based Spatial View Inc., **Sheridan College Institute of Technology and Advanced Learning's** Visualization Design Institute created a glasses-free 3D game to promote Ontario tourism destinations at Ontario House Pavilion during the 2010 Olympics. The Sheridan IC3D Game is an interactive, real-time application where players use BlackBerry smartphones as game controllers to assemble puzzles

featuring some of Ontario's most popular tourist attractions. Staff from the Visualization Design Institute worked with a team of Sheridan students to take the application from concept to finished product. It was one of three technological innovations selected by the Ontario government to be showcased in the Ontario House Pavilion.

Improvements in instructional design and technology have made it possible to produce appealing and interactive teaching materials. Since the deaf depend on visual modes of communication, technologies that incorporate visual displays of information are highly successful. The **NorQuest College** Reader CDs include video clips, text displays and interactive exercises and are accessible to any student with a computer and CD-ROM drive. The CD also includes hypertext for challenging vocabulary and syntax, interactive pre-reading and post-reading exercises, and American Sign Language video clips of text. The stories reflect essential elements of good narrative and non-fiction to demonstrate literal and figurative English text. Students and practitioners have embraced this innovative resource for adult students.

## Natural Resources

Clearwater Seafoods approached **Nova Scotia Community College** (NSCC) looking for a flexible, accurate and user-friendly device that would help advance the company's research into improving shipping of live lobster. The research analyzes the relationship between a lobster's heart rate and temperature, an important factor when transporting live lobster around the world. Students in the Electronic Engineering Technology diploma program at NSCC developed the Lobster Life Extender for Clearwater as part of their studies. The new device uses optocouplers attached to the crustacean's shell to accurately measure heart rate and temperature. It will be put to use immediately by Clearwater to log data vital to their research.

There is a growing public concern about the presence of antibiotics and hormones in water and soil, and their pathway to the food chain. Sixty to 80 percent of livestock are treated with antibiotics and hormones and much of the dose is excreted unchanged or as active metabolites. A **Grant MacEwan University** research project is developing a practical approach for detecting, tracing and destroying antibiotics and hormones in bio-waste. The project aims to improve methods of producing sustainable and renewable energy, biofuels and other value-added products. MacEwan collaborates with Highmark Renewables Research and other members of Biowaste to Energy for Canada Integration Initiative Corp., a not-for-profit clean energy corporation that brings together institutions and organizations with an interest in the bio-energy sector.

## Renewable Energy

**St. Lawrence College's** new Wind Turbine Maintenance Training facility is boosting the college's resources for programs like Energy Systems Engineering Technician/Technologist, Control Engineering Technician, Wind Turbine Technician and, coming soon, Geothermal Technician. College research projects are developing renewable energy technologies to integrate with one another and with the grid. Projects include analyses of single and dual axle trackers, an energy consumption dashboard in a cold storage facility, enhanced solar wall output, and evaluation of an energy conservation advocacy project. The college offers renewable energy courses in maintenance of offshore, near-shore and onshore wind developments, producing exciting synergies for applied research.

An integrated data logging system was developed and installed in **Lakeland College's** Renewable Energy Cabin, an off-grid demonstration building at the Vermilion campus. The system reads and posts information on the performance of the solar photovoltaic, solar thermal hot water, and wind turbines as well as weather information. This provides detailed performance data from the Energy Cabin website to researchers and students in the on-line Renewable Energy Certificate program.

## Building Technology

As part of an Applied Research and Innovation project, **Algonquin College** students and professors worked with an Ottawa firm, HousAll, to design a larger version of their existing emergency shelter. The new 16' model was intended to be used in refugee camps as medical clinics and classrooms. As soon as the larger version was completed and successfully tested, a major earthquake hit Haiti leaving one million people homeless. HousAll immediately received orders from relief organizations such as Save the Children and CARE Canada. The company flew Algonquin construction students and professors to Haiti to install the shelters and train Haitians to build them. Students and a professor from the documentary film program went along to record the experience.

As a spin-off from research being conducted with Dx2 Technologies and the Kortright Centre on the Archetype Sustainable House, **George Brown College** students installed and tested solar panel systems at the school's Casa Loma location. Electromechanical Technician and Mechanical Design students investigated the possibility of powering lab and classroom lighting without using hydro. The students designed and built the solar panels and a tracker that maximizes sunlight exposure, developed an intelligent switching battery bank to store power in a number of batteries, wired the system from a lab to the roof and tested different lighting systems to find an appropriate match. With ample rooftop space, Casa Loma may be able to develop a fully sustainable lighting installation.

## Manufacturing

As part of **Red River College's** Applied Research and Commercialization initiative, a "shocking" product has been developed. The Shockknife is a molded plastic tool used to train law enforcement officers how to deal with knife attacks. The tool looks like a real knife and delivers an electric charge that simulates the pain of a knife wound, but leaves no permanent damage. Since it was launched in 2006, more than 500 Shockknives have been sold to customers around the world including the FBI, the Norwegian Military Academy, the U.S. Marine Corps, and the Special Protection Group that guards India's Prime Minister. The Shockknife won the prestigious Manning Innovation Award in 2009 and has been featured on the Discovery Channel.

In partnership with the Lycée technique et minier in Senegal, **Cégep de Sherbrooke** mechanical design students have developed, produced and delivered an ore crusher to the West African country. Ore has been traditionally crushed manually and this hammer crusher significantly increases the speed of crushing and reduces dust through more effective control. The crusher is compact, inexpensive to produce, and the manufacturing technologies are adaptable so local tradespeople can make their own hammer crushers. In addition to producing the crusher, the students developed mercury recovery drums that reclaim up to 95 percent of the mercury used to consolidate the gold. Without the drums, the process widely used by Senegalese gold washers evaporated mercury into the open air.

## Social Innovation

A **Justice Institute of British Columbia** project is creating a virtual 'Community of Practice' for disaster management in rural and remote communities. The virtual community will support knowledge generation and exchange, curriculum development, a 'network of networks' connectivity and engagement with policy and public safety decision makers. The project will strengthen organizational resiliency, engagement of stakeholders and response capacities for all hazard threats, including biological threats such as pandemic influenza. The virtual community of practice is intended to foster a culture of disaster preparedness, planning, response and recovery in remote communities.

The Institut de recherche sur l'intégration professionnelle des immigrants (IRIPI), housed at the **Collège de Maisonneuve**, is researching innovative solutions to facilitate the integration of immigrants into the labour market. IRIPI's approach includes analyzing needs and objectives and designing innovative methods and tools which can be adapted and transferred to the workplace. Every stage is carried out in cooperation with local businesses. Research projects have included the development of human resources management tools adapted to cultural diversity and to a specific economic sector or individual business culture, an analysis of staff selection processes to make them free of cultural bias, and an analysis of intercultural conflicts and measures for resolution.

## 7. Performance Measurement of College Applied Research

Just as colleges are accountable to provincial/territorial governments for the success of education programs, they must measure their performance in applied research services. As previous research confirmed, performance measurement approaches for university research are not suitable for colleges given the focus on peer-reviewed publications, patents and licenses. Patents and licenses are not an effective performance measure for colleges because applied research projects are conducted mostly through industry partnerships and the patents and licenses remain with the industry partners.

Colleges are making progress in developing appropriate approaches, metrics and tools. The *2009-2010 Applied Research Environmental Scan* asked institutions whether they had established performance measurement



tools for tracking the impact of research activity. Sixty-nine percent of institutions indicated they had such tools in place. Colleges in Ontario are using the logic model as a measurement framework developed by the College Ontario Network of Industry Innovation (CONII). Described below, the logic model continues to provide the most comprehensive framework for measuring the impact of applied research. In Quebec, Réseau Trans-tech indicated that CCTTs have performance measurement indicators they must track for annual reporting to the Ministry of Education, Leisure and Sport and the Ministry of Economic Development, Innovation and Export, as well as for evaluations conducted every three to five years. Colleges in Alberta reported they are developing tools as part of the strategic plan of their applied research office, including progress reports and feedback surveys to collect qualitative information to tell the applied research story of their college. The types of indicators Alberta colleges identified are similar to those in the logic model described below.

Institutions also reported that federal and provincial research funding programs have reporting and performance measurement frameworks which colleges use for the development of their internal performance measurement tools. The NSERC eligibility process and the CCI Program provide structure and parameters which are useful for identifying performance measurement indicators.

## 7.1 Performance Measurement Approaches and Frameworks

The *Partnerships for Productivity Paper* (2010) identified the logic model as a useful performance measurement framework to measure the impact of applied research on institutions, partner companies or community organizations, faculty, staff and students. This section updates the logic model outlined in the 2010 version of this paper, based on the results of the *2009-2010 Applied Research Environmental Scan* and indicators used in the Conference Board of Canada 2010 report. The logic model framework in Appendix 6 has also been modified to reflect these additional indicators.

The logic model framework for college applied research is a holistic approach that assesses impact by examining the following:

- inputs: resources, contributions and partnerships;
- activities: events and actions;
- outputs: products, processes and services;
- outcomes: results, namely the short-term changes in people, organizations or systems; and
- impacts: social, environmental or economic changes overall.

The indicators for measuring the impact on institutions, company or community partners, faculty and staff and students are described below.

**The impact on the institution** is assessed and measured by examining variables such as whether an institution:

- has an applied research office, core budget, staffing and internal grants, and has been successful in receiving external grants to support applied research projects;
- promotes applied research services internally and externally, offers workshops or events aimed at building internal capacity for applied research, as well as outreach and events to build external awareness of college capacity for applied research;
- has a governance structure and policies and procedures for applied research, provides training for students, and has incorporated R&D training and/or competencies into courses and programs; and has identified institutional areas of research specialization;
- has increased capacity to conduct R&D including more internal support for R&D projects and activities, enhanced curriculum for core college programs and college membership in research networks;
- has positive financial returns from applied research activities;
- has increased student satisfaction through the participation in applied research projects, an enhanced curriculum, the establishment of research centres or specialized labs; and
- benefits from an enhanced reputation within the community and region served and increases its client base.

**The impact on partner companies or community organizations** is assessed and measured by examining the following variables:

- investments of cash or in-kind by partner companies or community organizations;
- college contacts with partner companies or community organizations, as well as direct services such as R&D needs analyses or assessments of new technologies;

- partner companies or community organizations have new or improved products, processes or services;
- partner companies reduce the time before new products or services are brought to market;
- applied research collaborations result in increased sales and revenues for partner companies;
- partners can hire new employees or retain employees;
- partners have improved market share, access new markets or customers and have improved customer satisfaction;
- partner companies have increased capacity and motivation to pursue R&D and increase spending on R&D or confirm plans to do so;
- applied research projects led to new business opportunities for companies, defining new application areas for existing products and identifying new markets;
- partner companies and community organizations have increased awareness of college capacity for R&D and more interaction with colleges; strategies for ongoing relationships between colleges and research partners; and,
- the community and/or region served benefits from economic growth.

**The impact on college faculty and staff** is assessed and measured by examining the following variables:

- whether faculty release time is provided for participation in R&D projects and activities and the types of research resources, facilities and equipment that are available to support R&D;
- training in R&D procedures or new equipment that is available to support research projects;
- the number of faculty participating in R&D projects and whether there is increased participation;
- how the institution supports the dissemination of research project results and enhances program and course curriculum; and
- how involvement in applied research contributes to enhanced professional development of faculty and staff and strengthens linkages with companies and community organizations.

**The impact on college students** is assessed and measured by examining the following variables:

- the types of support and training colleges have in place to facilitate student participation in R&D projects and activities;
- the number of students participating in R&D projects and activities and increased awareness among students of industry R&D needs and challenges;
- students' satisfaction rate with their involvement in applied research projects and activities; and,
- students' employment success with partner companies

Questionnaires have been developed which colleges can use to collect feedback and perspectives from industry partners, faculty/staff and students. These questionnaires align with the key variables in the logic model framework and enable institutions to collect the data needed to report on progress in applied research. They are provided as part of Appendix 7, *Performance Measurement Tools for College Applied Research*.

These key variables are guidelines on the types of data needed to measure the effectiveness of applied research services and capacity. This college-appropriate performance measurement approach provides direction for federal policy makers when considering future programs or funding mechanisms.

## 7.2 Impact of Applied Research

The *2009-2010 Applied Research Environmental Scan* asked colleges to identify the impact of applied research on their institution, industry, faculty, staff and students, as well as social innovation partners. The college responses are summarized in this section and some comparisons are made with the findings of the 2010 Conference Board of Canada report.

### Impact on Institutions

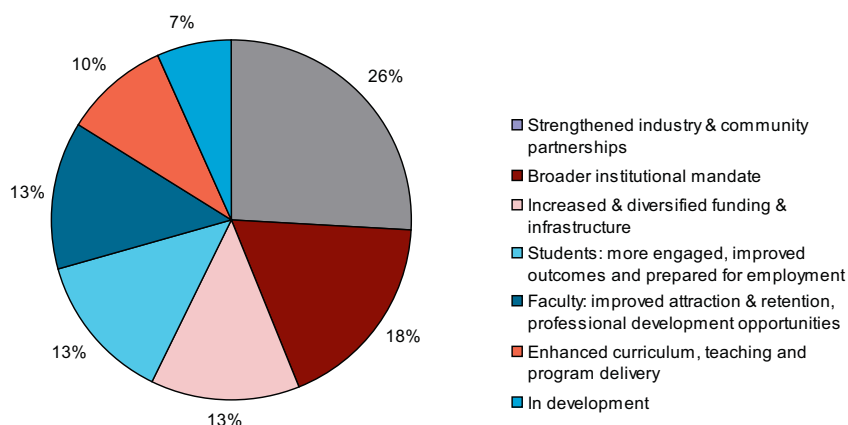
Figure 16 shows the different ways applied research impacts upon colleges as identified by respondent institutions. The most frequently identified impact was strengthened partnerships with industry and community organizations (26 percent). Applied research has expanded college industry and community partnerships and colleges described the collaborative nature of applied research projects as they connect their partners with faculty, staff, students and college facilities and technology. Another way applied research has impacted upon institutions is that institutional mandates have expanded. Respondent colleges indicated that strategic



planning exercises have confirmed applied research as a priority and it has been integrated into college mission statements approved by Boards of Governors.

Other ways applied research impacts upon institutions include: increasing and diversifying funding sources for colleges, helping to attract and retain faculty, and helping students be more engaged, improve their outcomes and be better prepared for employment. Specific impacts on faculty and students are examined below. Applied research also helps to enhance curriculum, teaching and program delivery by providing practical, real-world experience for students. Seven percent indicated that they were unable to report on the impact of applied research as it was still in the developmental stages.

**Figure 16**  
**Impact of Applied Research on Institutions**



## Impact on Faculty

Colleges identified five ways that participation in applied research projects impacts on faculty, shown in Figure 17. The highest proportion of responses, 31 percent, indicated that participation in applied research enables faculty to remain current in the latest developments, trends or technologies in their areas of expertise. This is key for college programs as students need to be work-ready in relatively short timeframes and be aware of technologies and processes used by employers. The following response from Algonquin College captures this well:

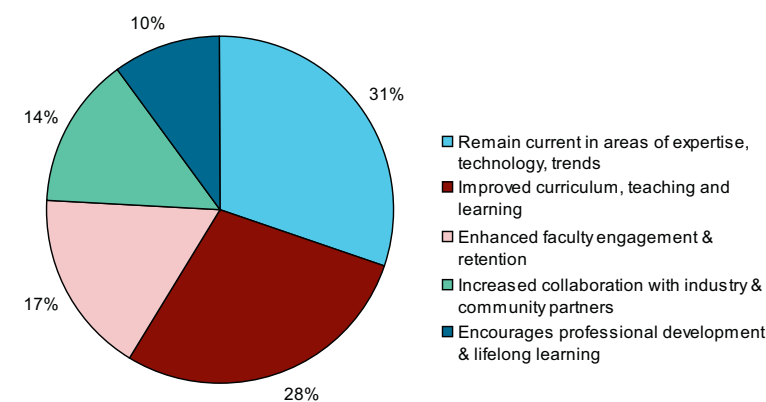
“Professors gain a better knowledge of the state-of-the-art in their field and understanding of the leading edge ideas/technologies in their domain of expertise. They are able to take this knowledge back to the classroom, enabling them to better prepare students for the workplace.”

Almost the same percentage of responses indicated that participation in applied research enables faculty to improve curriculum and teaching and thus enhance the learning experience for students. Faculty can introduce relevant and contemporary materials into the curriculum and their teaching practice is more diversified with practical experiences and hands-on projects.

Colleges also reported that participation in applied research enhances faculty engagement and retention. Involvement in applied research projects expands faculty members’ work experience, skills sets and provides a more interesting, diversified and rewarding work environment. This increases job satisfaction and supports career advancement.

Other impacts include increased collaboration with industry and community partners and motivating faculty to pursue professional development opportunities and lifelong learning.

**Figure 17**  
**Impact of Applied Research on Faculty**

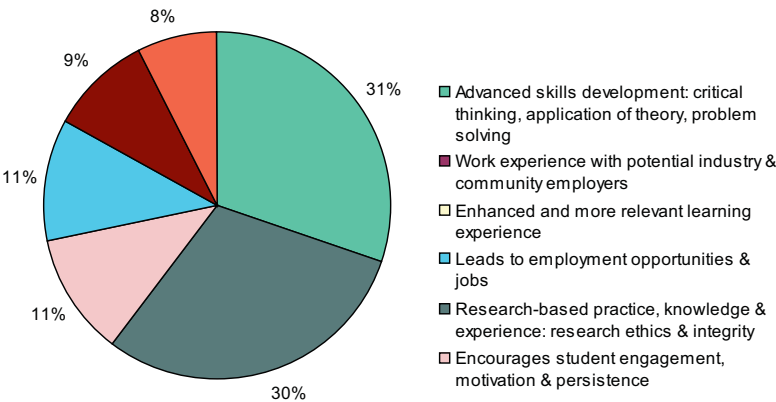


**Impact on Students**

There were six primary impact areas identified by colleges when asked how applied research impacted students at their institutions (Figure 18). Almost one third of colleges indicated that the main impact for students is advanced skills development. In addition to discipline-specific, research and technical skills, colleges emphasized the importance of critical thinking and problem-solving skills. These results are in line with the Conference Board of Canada (2010) study as nearly all Ontario colleges reported they observed improvements in students and that participation in applied research projects improved their learning experience. Colleges reported improvements in students’ technical and employability skills, including communication and problem-solving skills, adaptability, and the ability to work with others.

An almost equal number of responses indicate that work experience with potential employers is another positive impact. Again this is consistent with the perspectives of firms interviewed by the Conference Board of Canada (2010), as a high proportion reported hiring college students as a result of participation in a research project, and others indicated they planned to do so in the future.

**Figure 18**  
**Impact of Applied Research on Students**



*"The engagement of students on senior applied research projects continues to be one of the rewarding aspects of their program. Not only does the student gain from practical experience but in most cases they also learn the intricacies and challenges of the industry environment."*

**Nova Scotia Community College**

*"Students gain real-world experience, stipends, co-op and graduate placements (...) as well as competency-based applied research skills and increased research capacity. Increased research capacity has a profound effect on the innovation, critical thinking and entrepreneurial spirit of our graduates."*

**Centennial College**

*"Through their involvement in research projects, students at the cégep remain current on the latest scientific advances within their disciplines. They are also aware of good research practices, in particular related to research ethics for working with human beings and the requirements of research integrity."*

**Cégep Marie-Victorin**

*"Students have a better understanding of real, as opposed to paper, problem-solving skills and real corporate and workplace issues. They are more engaged, interested and happier."*

**Lethbridge College**

*"Students have access to transformative learning experiences through the application of their work in real situations."*

**Douglas College**

## **Impact on Industry Partners**

Colleges gave a variety of responses when surveyed about how applied research impacts on industry. As shown in Figure 19, the highest percentage of responses, 38 percent, indicated that applied research influenced industry by providing solutions and improving or developing new products, processes, services or policies. This is in line with the findings of the 2010 Conference Board of Canada report, which found that one of the most significant impacts Ontario colleges had on industry partners was the development of a new or improved good, service or process. A significant number of responses (29 percent) indicated that college applied research enables industry partners to increase access to cost-effective R&D resources that they normally would not access, including services and expertise from college faculty and students, technology and equipment and facilities. Colleges reported this is particularly needed for SMEs which often lack the resources to invest in innovation projects. The Conference Board of Canada (2010) also found that many companies reported increased capacity and motivation to pursue R&D projects and one third of Ontario college-industry projects led to companies increasing their spending in R&D.

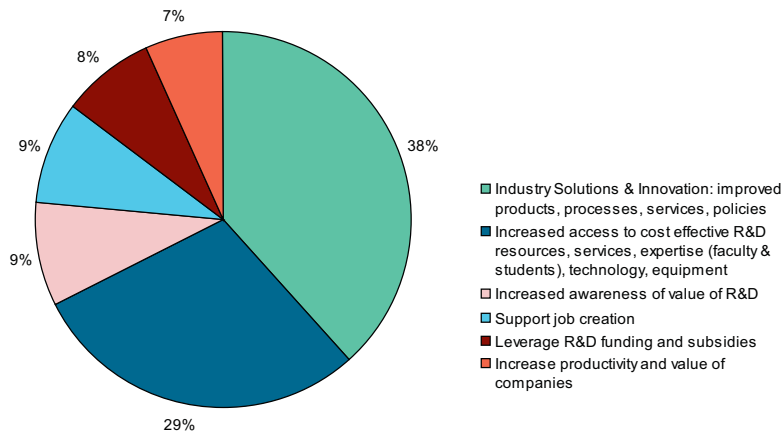
The other ways applied research impacts upon industry partners include: increasing awareness of the value of R&D, supporting job creation for industry partners, leveraging R&D funding and subsidies in particular from government programs, and increasing productivity and commercialization and the overall value of companies. Many of these are also in line with impact areas identified by the Conference Board of Canada (2010). In the Conference Board of Canada study, 80 percent of college-industry research collaborations resulted in, or are expected to result in, increased sales and revenues for the firm. "Firms also reported improved market position (79 percent), new markets (58 percent), new customers (76 percent), and improved customer satisfaction (59 percent)."<sup>7</sup> Improved productivity and revenue also impacted on job creation as over one third of firms indicated that research led to hiring of new employees, 28 percent reported they anticipated hiring new employees (many being college graduates), and some indicated that participation in applied research helped retain employees who otherwise would have been laid off.<sup>8</sup>

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<sup>7</sup> Conference Board of Canada (2010), *Innovation Catalysts and Accelerators - The Impact of Ontario Colleges' Applied Research - Executive Summary*.

<sup>8</sup> *Ibid.* Pg. 29.

**Figure 19**  
**Impact of Applied Research on Industry**



**Impact on Social Innovation**

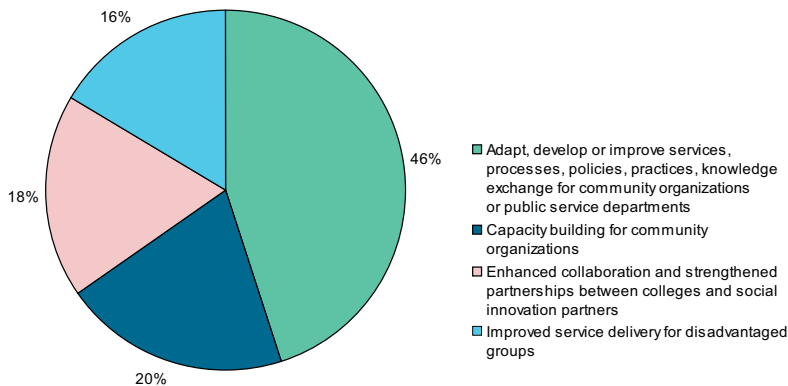
The 2009-2010 Applied Research Environmental Scan asked colleges to report on how applied research impacts upon social innovation.

As with the impact on industry partners, the highest proportion of responses, 46 percent, indicate that college applied research is supporting the development or improvement of services, processes, policies, practices or knowledge exchange practices of social innovation partners. A related impact is improved service delivery for people from disadvantaged groups, including Aboriginal people, seniors, children in vulnerable situations due to family or health challenges, immigrants and people with disabilities. This is identified separately in Figure 20 as colleges play a key role in supporting people from disadvantaged groups.

Another impact of applied research with social innovation partners is capacity building in particular for social and community organizations that often have limited resources. Colleges identified capacity building in the following areas: preparation of funding requests and proposals, database development, evaluation tools, human resource development practices and policies and improving evidence-based decision-making.

The other impact identified by respondent colleges is that applied research enhances and builds on partnerships between colleges and social innovation partners. Colleges emphasized the importance of strengthening these partnerships to support capacity development of partners, to enhance college curriculum and offer students opportunities to work with potential employers.

**Figure 20**  
**Impact of Applied Research on Social Innovation**



## 8. Conclusion

This report provides an updated view of college applied research based on results of the *2009-2010 Applied Research Environmental Scan* and presents further evidence that applied research activity is increasing at colleges across Canada. From one year to the next, there has been an increase in the number of colleges reporting applied research activity. Colleges reported a higher number of applied research partnerships, networks, areas of specialization and research centres.

The 2009-2010 results demonstrate that colleges are conducting research in a diverse range of sectors for both industry and social innovation partners. The broader scope of the *2009-2010 Applied Research Environmental Scan* included college involvement in social innovation research. As a result, this report provides further insight into how colleges are engaging with social innovation partners including social and community organizations and public service departments – 52 areas of specialization were identified in social innovation and 30 specialized research centres.

Colleges continue to demonstrate their strong commitment to applied research as even more institutions reported having dedicated human and financial resources and structures which support the delivery of applied research services. Investments in college applied research were relatively stable for all sources from 2008-2009 and 2009-2010. Colleges continue to allocate significant financial resources, totaling more than federal government investment. The impact of the increased funding provided through 2010 announcements by NSERC, CFI and FedDev Ontario will become evident in coming years. ACCC is committed to collecting data from colleges on federal investment and to report on how this is impacting institutions and applied research partners.

This was the first time colleges were asked to report on the impact of applied research on their institutions, including faculty and students, and on industry and social innovation partners. The most significant impacts on institutions are strengthened partnerships with industry and increased recognition for the broader mandate of colleges to include R&D. For students, applied research is largely impacting on the development of advanced skills including technical and problem-solving skills. Applied research projects enable college faculty to remain current in their areas of expertise and enhance their teaching, program curriculum and thus improve the learning experience of students. The biggest impact on industry partners is that applied research provides solutions and improves or develops new products, processes, services or policies. Another key impact on industry is that partners are accessing R&D services and resources that they normally would not access including faculty and student expertise, technology, equipment and facilities. The results of the Conference Board of Canada study (2010) indicate that college applied research projects lead industry partners to invest more in R&D. More research is needed on a national scale to explore colleges' role in increasing business investment in research. Impact on social innovation is largely through improved services, processes, policies or practices for social/community organizations or public service departments.

These findings further substantiate that colleges are key players in Canada's innovation system, whether in industry or social innovation. The federal government has acknowledged colleges' role with increased funding through NSERC, CFI and FedDev Ontario. However, with the significant increase in college applied research activity, colleges have identified the need for further support through the creation of a College Applied Research and Innovation Leaders Program on a cost-shared basis with other levels of government and the private sector. This would build college capacity to identify opportunities with SMEs and community partners to enhance productivity and support regional economic and social development.

There is a need to balance federal government investments in research between discovery research and the practical side of research that helps businesses start, develop and grow and improves productivity and competitiveness. ACCC continues to recommend that federal funding for research be increased by five percent with the additional amount dedicated to colleges and their research partners.

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# Appendix 1

## ACCC 2008/2009 and 2009/2010 Applied Research Environmental Scan List of Participating Colleges

### British Columbia/Yukon

British Columbia Institute of Technology  
Camosun College  
College of the Rockies  
Douglas College  
Justice Institute of British Columbia  
Kwantlen Polytechnic University  
North Island College  
Okanagan College  
Northwest Community College  
Selkirk College  
Yukon College

### Alberta/Northwest Territories

Bow Valley College  
Grande Prairie Regional College  
Grant MacEwan University  
Keyano College  
Lakeland College  
Lethbridge College  
Medicine Hat College  
Mount Royal University  
Northern Alberta Institute of Technology  
NorQuest College  
Olds College  
Red Deer College

### Saskatchewan/Manitoba/Nunavut

Assiniboine Community College  
Collège universitaire de Saint-Boniface  
Red River College  
Saskatchewan Institute of Applied Science and Technology  
University College of the North

### Ontario

Algonquin College  
Canadore College  
Centennial College  
Conestoga College Institute of Technology & Advanced Learning  
Confederation College  
Durham College  
Fanshawe College  
Fleming College  
George Brown College  
Georgian College  
Humber College Institute of Technology & Advanced Learning  
La Cité collégiale  
Lambton College  
Loyalist College  
Mohawk College  
Niagara College  
Northern College  
Sault College  
Seneca College  
Sheridan College Institute of Technology and Advanced Learning  
St. Clair College  
St. Lawrence College

### Québec

Cégep André-Laurendeau  
Cégep Marie-Victorin  
Cégep régional de Lanaudière  
Dawson College

**Data Provided by Réseau Trans-tech for the following cégeps with College Centres for the Transfer of Technology:**

Cégep Beauce-Appalaches

Cégep de Baie-Comeau

Cégep de Chicoutimi

Cégep de Drummondville

Cégep de la Gaspésie et des Îles (individual institutional response also provided)

Cégep de Jonquière (individual institutional response also provided)

Cégep de l'Abitibi-Témiscamingue

Cégep de La Pocatière

Cégep André-Laurendeau

Cégep John Abbott College

Cégep de Lévis-Lauzon

Cégep de Rimouski

Cégep de Sainte-Foy (individual institutional response also provided)

Cégep de Saint-Hyacinthe

Cégep de Saint-Jérôme

Cégep de Saint-Laurent

Cégep de Sept-Îles

Cégep de Sherbrooke

Cégep de Sorel-Tracy

Cégep de Thetford

Cégep de Victoriaville (individual institutional response also provided)

Cégep Trois-Rivières

Collège Ahuntsic

Collège d'Alma

Collège de Maisonneuve

Collège Édouard-Montpetit

Collège Lasalle

Collège Lionel-Groulx

Collège Shawinigan

**Atlantic**

College of the North Atlantic

Holland College

New Brunswick Community College

Nova Scotia Community College

Collège Communautaire du Nouveau-Brunswick

## Appendix 2

### ACCC 2008-2009 and 2009-2010 Applied Research Environmental Scan Research Networks Identified by Respondent Colleges

| Regions                 | Research Networks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| <b>Alberta</b>          | AACTI - Alberta Association of Colleges and Technical Institutes<br>ACCC - Association of Canadian Community Colleges<br>Alberta Rural Development Network<br>CAEP - Central Alberta Economic Partnership<br>Canadian Association of Research Ethics Boards<br>CARIN - Central Alberta Regional Innovation Network<br>CARMA - Central Alberta Rural Manufacturers Association<br>CREBA - Community Research Ethics Board of Alberta<br>Cropping System Platforms for Biodiesel Feedstock Quantity and Quality Network<br>Cybera<br>Edmonton Regional Alliance<br>SAIPN - Southern Alberta Intellectual Property Network<br>WestLink Innovation Network |
| <b>British Columbia</b> | ACCC Applied Research Affinity Group<br>BC Applied Research Network<br>CAURA - Canadian Association of University Research Administrators<br>VICRA - Vancouver Island Community-based Research Alliance<br>Westlink Innovation Network                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Manitoba</b>         | GPNARN - Great Plains and Northern Applied Research Network<br>MZTRA - Manitoba Zero Tillage Research Association<br>TRLabs partnership<br>WestLink                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Saskatchewan</b>     | ACCC National Research Advisory Committee<br>GPNARN - Great Plains and Northern Applied Research Network (3 colleges from Manitoba and SIAST)<br>TRLabs partnership<br>WestLink                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Ontario</b>          | ACCC - Association of Canadian Community Colleges<br>BIC - Bioindustrial Innovation Centre<br>Canada Health Infoway<br>Canadian Association on Water Quality<br>Canadian Council for Animal Care<br>Canadian Water Network<br>CAURA - Canadian Association of University Research Administrators<br>CIHC - Canadian Inter-professional Health Collaborative                                                                                                                                                                                                                                                                                            |

| Regions       | Research Networks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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|               | <p>CNRC - Conseil national de recherche du Canada</p> <p>CONCERT- Consortium on New Media, Culture, and Entertainment R&amp;D</p> <p>CONII - Colleges Ontario Network for Industry Innovation</p> <p>Génome Ontario</p> <p>HAR - Heads of Applied Research</p> <p>HEQCO - Higher Education Quality Council of Ontario</p> <p>Institute for Watershed Science</p> <p>International Polar Year Program</p> <p>MaRS</p> <p>Northern Research Working Group</p> <p>OCE - Ontario Centres of Excellence</p> <p>OCRI - Ottawa Centre for Research and Innovation</p> <p>OnSETT - Ontario Society for Excellence in Technology Transfer</p> <p>Ontario Golden Horseshoe Biosciences Network</p> <p>Ontario Onsite Wastewater Association</p> <p>Ontario Vineland Research and Innovation Centre</p> <p>Photovoltaic Innovation Network</p> <p>Polytechnics Canada</p> <p>SCA - Sustainable Chemistry Alliance</p> <p>SharcNet</p> <p>SOBIN - Southwestern Ontario Bioproducts Innovation Network</p> <p>Solar Building Research Network</p> <p>Standards Collaborative Working Groups</p> <p>TechAlliance (London Ontario)</p> <p>Toronto Industry Innovation Centre of Markham (ISCM)</p> <p>TRRA - Toronto Region Research Alliance</p> <p>York BioTech</p> |
| <b>Québec</b> | <p>ACFAS - Association francophone pour le savoir</p> <p>AQPC - Association québécoise de pédagogie collégiale</p> <p>ARC - Association pour la recherche au collégial</p> <p>Association aquicole du Canada</p> <p>Association des industriels de la pêche du Québec</p> <p>Association des pêcheurs propriétaires du Québec</p> <p>Associations de pêcheurs indépendantes</p> <p>CAPA</p> <p>CAPRES - Consortium d'animation sur la persévérance et la réussite en enseignement supérieur</p> <p>CCDMD - Centre collégial de développement de matériel didactique</p> <p>CIRST - Centre interuniversitaire de recherche sur la science et la technologie</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

| Regions                   | Research Networks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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|                           | <p>Comité d'experts du Programme de recherche et de développement Moule en Gaspésie</p> <p>Comité de développement du programme ACCORD</p> <p>Comité sectoriel de main-d'œuvre des pêches maritimes</p> <p>CORAMH - Corporation de recherche et d'action sur les maladies héréditaires</p> <p>CQRDA - Centre de recherche et de développement de l'aluminium et autres avec des universités (ETS, Sherbrooke, Polytechnique, Laval)</p> <p>CREPAS - Le Conseil Régional de Prévention de l'Abandon Scolaire</p> <p>CRRE - Consortium Régional de Recherche en Éducation</p> <p>CRSNG - Conseil de recherches en sciences naturelles et en génie du Canada</p> <p>CSMOPM - Le comité sectoriel de main-d'œuvre des pêches maritimes</p> <p>Fédération des cégeps du Québec</p> <p>IRSST - Institut de recherche Robert-Sauvé en santé et en sécurité du travail</p> <p>MAPAQ - Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec</p> <p>MPO - Ministère des Pêches et des Océans Canada</p> <p>PARÉA - Programme d'aide à la recherche sur l'enseignement et l'apprentissage</p> <p>Réseau Aquicole Québec</p> <p>Réseau des universités du Québec</p> <p>Réseau Trans-Tech (CCTT)</p> <p>RSTM - Ressources, sciences et technologies marines</p> <p>SADC Rocher Percé</p> <p>SODIM - La Société de développement de l'industrie maritime</p> <p>STEP - Service de technologie en pêche</p> <p>Université du Québec à Rimouski et l'Université Laval</p> |
| <b>Atlantic Provinces</b> | <p>ACCC National Research Advisory Committee</p> <p>ACCT - Alliance for Commercialization of Canadian Technologies</p> <p>APCCC - Atlantic Provinces Community College Consortium</p> <p>AUTM - Association of University Technology Managers</p> <p>C-Clear</p> <p>Comité directeur sur la recherche postsecondaire du Nouveau-Brunswick</p> <p>Conseil sur la recherche et la productivité du Nouveau-Brunswick</p> <p>Flintbox.com</p> <p>NSERC Atlantic Advisory Committee</p> <p>Protocole de collaboration en innovation pédagogique signé en janvier 2008-2009 avec le Centre de recherche et de développement en éducation (CRDÉ) de l'Université de Moncton</p> <p>Sous-comité conjoint (CCNB/Université de Moncton) sur la recherche</p> <p>Springboard Atlantic</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## Appendix 3

### ACCC 2008-2009 and 2009-2010 Applied Research Environmental Scan Areas of Research Specialization by Category and Province/Territory

| Natural Resources and Energy – 72 Areas of Specialization                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                          |
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| Province/College                                                                                                                                                                                                                                                                                         | Area of Specialization                                                                                                                                                                                                                   |
| <b>Newfoundland and Labrador</b><br>College of the North Atlantic                                                                                                                                                                                                                                        | Petroleum Engineering<br>Renewable Energy                                                                                                                                                                                                |
| <b>Prince Edward Island</b><br>Holland College                                                                                                                                                                                                                                                           | Food Production Development<br>Sustainable Energy                                                                                                                                                                                        |
| <b>Nova Scotia</b><br>Nova Scotia Community College                                                                                                                                                                                                                                                      | Energy Sustainability and Environmental Technologies                                                                                                                                                                                     |
| <b>New Brunswick</b><br>New Brunswick Community College – Saint John<br>Collège communautaire du Nouveau-Brunswick                                                                                                                                                                                       | Engineering Energy<br>Biofermentation, Biocarbons and Bio-analysis<br>Fisheries and Aquaculture<br>Forest Product Transformation Technology                                                                                              |
| <b>Québec</b><br>Cégep de Baie-Comeau<br>Cégep de la Gaspésie et des Îles<br><br>Cégep régional de Lanaudière<br>Cégep de L'Outaouais<br>Cégep de La Pocatière<br>Cégep de Rimouski<br>Cégep de Sainte-Foy<br>Cégep de Saint-Hyacinthe<br>Cégep de Thetford<br>Cégep de Trois-Rivières<br>Collège d'Alma | Boreal Forest<br>Wind Energy<br>Fisheries<br>Food Processing<br>Intelligence Territoriale<br>Bio-Products<br>Forest Product Transformation<br>Forestry<br>Agri-Food<br>Metal Technology<br>Pulp and Paper<br>Agriculture                 |
| <b>Ontario</b><br>Centennial College<br>Durham College<br>Fanshawe College<br>Fleming College<br>George Brown College<br>Georgian College                                                                                                                                                                | Sustainable Energy Technology<br>Renewable Energy<br>Alternative Energy & Sustainable Environments<br>Water and Wastewater Treatment Technology<br>Green Technology (computer, construction, architecture)<br>Alternative Energy/Systems |



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| <p>Lambton College</p> <p>Loyalist College</p> <p>Mohawk College</p> <p>Niagara College</p> <p>Sault College</p> <p>St. Lawrence College</p>                                         | <p>Environmental Sustainability Solutions</p> <p>Alternative Energy, Energy Conversion, Storage and Conservation</p> <p>Biodegradable Thermoplastic Vulcanizates (TPV's)</p> <p>CO2 Extraction</p> <p>Energy technologies</p> <p>Horticulture &amp; Greenhouse</p> <p>Viticulture and Wine Making</p> <p>Renewable Energy</p> <p>Agricultural Extension: Artisanal Cheese</p> <p>Renewable Energy</p>                                                                                                                                                                                                                                                                                                               |
| <p><b>Manitoba</b></p> <p>Assiniboine Community College</p> <p>College Universitaire de Saint Boniface</p> <p>Red River College</p>                                                  | <p>Horticulture/Greenhouse/Regional Diets</p> <p>Renewable Energy</p> <p>Land and Water Management</p> <p>Natural Sciences</p> <p>Development and Operation using Renewable Fuels</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <p><b>Alberta</b></p> <p>Grande Prairie Regional College</p> <p>Olds College</p> <p>Keyano College</p> <p>Lakeland College</p> <p>Lethbridge College</p> <p>Medicine Hat College</p> | <p>Bio-Carbon Initiatives (CO2 captures, effluent as irrigant, company response to the green agenda)</p> <p>Improving Survival and Growth of Conifer Species Seedlings</p> <p>Alternative Energy Feedstock Trials</p> <p>Bio-Fuel Production and Testing</p> <p>Feed Efficiency Studies</p> <p>Sustainable Waste Management</p> <p>Reclamation</p> <p>Environmental Sciences</p> <p>Field Crop Trials</p> <p>Grazing Management/Habitat Restoration</p> <p>Livestock Trials</p> <p>Renewable Energy</p> <p>Wildlife Use of Natural Area</p> <p>Biodiesel</p> <p>Solar Thermal Heat Storage</p> <p>Wind Energy</p> <p>Aquaculture and Aquaponics</p> <p>Sustainable Housing</p> <p>Ecotourism and Sustainability</p> |
| <p><b>British Columbia</b></p> <p>British Columbia Institute of Technology</p> <p>Camosun College</p>                                                                                | <p>Energy</p> <p>Ocean and Marine Technology</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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| Justice Institute of British Columbia<br>Douglas College<br>North Island College<br>Northwest Community College<br><br>Selkirk College                                                                                                                                                                                       | Rural Remote Coastal Community Disaster<br>Biological Pest Control in Greenhouses<br>Fish Farm Waste & Reclamation<br>Great Blue Heron Rookery Study<br>Skeena Watershed Euchon Study<br>Shames River<br>Remote Surveillance of Abalone Bed<br>Forest, Ecology, Soils and Restoration                                              |
| <b>Yukon</b><br>Yukon College                                                                                                                                                                                                                                                                                                | Alternative Energies in Cold Climate                                                                                                                                                                                                                                                                                               |
| <b>Environmental Science and Technologies - 37 Areas of Specialization</b>                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                    |
| <b>Province/College</b>                                                                                                                                                                                                                                                                                                      | <b>Area of Specialization</b>                                                                                                                                                                                                                                                                                                      |
| <b>Newfoundland and Labrador</b><br>College of the North Atlantic                                                                                                                                                                                                                                                            | Geo-Informatics<br>Petroleum Engineering<br>Physical Sciences<br>Interdisciplinary Sciences                                                                                                                                                                                                                                        |
| <b>Nova Scotia</b><br>Nova Scotia Community College                                                                                                                                                                                                                                                                          | Geomatics                                                                                                                                                                                                                                                                                                                          |
| <b>Québec</b><br>Cégep de Chicoutimi<br>Cégep de Sorel-Tracy<br>Collège Shawinigan                                                                                                                                                                                                                                           | Geomatics<br>Industrial Ecology<br>Electrochemical and Environmental Technology                                                                                                                                                                                                                                                    |
| <b>Ontario</b><br>Conestoga College Institute of Technology & Advanced Learning<br>Durham College<br>Fanshawe College<br>Fleming College<br>La Cité collégiale<br>Loyalist College<br>Niagara College<br>Sault College<br><br>Seneca College<br><br>St. Lawrence College<br><b>Manitoba</b><br>Assiniboine Community College | Environment<br>Science and Technology<br>Environment<br>Water and Wastewater Treatment Technology<br>Environmental Technologies<br>CO2 Extraction<br>Environmental Management<br>Environmental Technologies<br>GIS<br>Environment<br>Biological and Applied Sciences<br>Biotechnology<br><br>Environmental Management<br>Geomatics |

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| Red River College                                                                                                                                                                           | Sustainable Infrastructure                                                                                                                                                                                                                                                                       |
| <b>Saskatchewan</b><br>Saskatchewan Institute of Applied Science and Technology                                                                                                             | Environment and Natural Resources<br>Urban Development                                                                                                                                                                                                                                           |
| <b>Alberta</b><br>Grande Prairie Regional College<br>Grant MacEwan University<br>Lethbridge College<br>Medicine Hat College<br>Northern Alberta Institute of Technology<br>Red Deer College | Pollution to Products (P2P carbon capture)<br>Detection, Tracing & Destruction of Antibiotics and Hormones Biowaste<br>Environment and Ecology<br>Water Resources<br>Boreal Forest Reclamation<br>Green Chemistry and Engineering<br>Environment and Ecology<br>Human Animal (Bear) Interactions |
| <b>British Columbia</b><br>British Columbia Institute of Technology<br>Selkirk College                                                                                                      | Environment<br>Sustainability<br>Geographic Information Systems                                                                                                                                                                                                                                  |
| <b>Yukon</b><br>Yukon College                                                                                                                                                               | Permafrost                                                                                                                                                                                                                                                                                       |
| <b>Health, Medical and Life Sciences - 53 Areas of Specialization</b>                                                                                                                       |                                                                                                                                                                                                                                                                                                  |
| <b>Province/College</b>                                                                                                                                                                     | <b>Area of Specialization</b>                                                                                                                                                                                                                                                                    |
| <b>Newfoundland and Labrador</b><br>College of the North Atlantic                                                                                                                           | Health                                                                                                                                                                                                                                                                                           |
| <b>Prince Edward Island</b><br>Holland College                                                                                                                                              | Health                                                                                                                                                                                                                                                                                           |
| <b>New Brunswick</b><br>New Brunswick Community College-Saint John                                                                                                                          | Health                                                                                                                                                                                                                                                                                           |
| <b>Nova Scotia</b><br>Nova Scotia Community College                                                                                                                                         | Medical Technologies                                                                                                                                                                                                                                                                             |
| <b>Québec</b><br>Cégep de Lévis-Lauzon<br>Cégep régional de Lanaudière                                                                                                                      | Bio-technologies<br>Food Processing                                                                                                                                                                                                                                                              |
| <b>Ontario</b><br>Algonquin College<br>Centennial College<br>Conestoga College Institute of Technology & Advanced Learning<br>Durham College<br>Fanshawe College<br>Fleming College         | Health Care<br>Health Sciences<br>Health<br>Health Sciences<br>Health & Human Services<br>Healthy Aging                                                                                                                                                                                          |

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| <p>George Brown College</p> <p>Humber College Institute of Technology &amp; Advanced Learning</p> <p>La Cité collégiale</p> <p>Lambton College</p> <p>Mohawk College</p> <p>Sheridan College Institute of Technology &amp; Advanced Learning</p> <p>St. Lawrence College</p> | <p>Nursing</p> <p>Health Services</p> <p>Health Information</p> <p>Prosthetics</p> <p>Orthotics</p> <p>Nutrition and Health Promotion (recipe development, scaling up for industrial production, health ingredient alternatives)</p> <p>Health Technologies</p> <p>Clinical Health</p> <p>Applied Nutrition</p> <p>Healthy Living</p> <p>Biotechnology</p> <p>Health and Wellness</p> <p>Health Informatics</p> <p>Health Sciences</p> <p>Elder Health Research</p> <p>Nursing</p> <p>Biotechnology</p> |
| <p><b>Saskatchewan</b></p> <p>Saskatchewan Institute of Applied Science and Technology</p>                                                                                                                                                                                   | <p>Health Education</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p><b>Alberta</b></p> <p>Bow Valley College</p> <p>Grande Prairie Regional College</p> <p>Grant MacEwan University</p> <p>Northern Alberta Institute of Technology</p> <p>Medicine Hat</p> <p>Mount Royal University</p> <p>NorQuest College</p> <p>Red Deer College</p>     | <p>Health</p> <p>Neuroscience</p> <p>Nursing</p> <p>Nursing</p> <p>Psychology</p> <p>Health Sciences</p> <p>Health</p> <p>Health and Wellness</p> <p>Health Care</p> <p>Health Community of Practices &amp; Independent Living</p> <p>Poly-Pharmacy</p>                                                                                                                                                                                                                                                 |
| <p><b>British Columbia</b></p> <p>British Columbia Institute of Technology</p> <p>Camosun College</p> <p>Douglas College</p> <p>North Island College</p>                                                                                                                     | <p>Health - Herbal Analysis and Evaluation</p> <p>Health - Adaptive Technologies for People with Disabilities</p> <p>Sport Technology</p> <p>Human Services</p> <p>Health Services</p> <p>Food Security</p> <p>Health Sciences</p>                                                                                                                                                                                                                                                                      |

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| Selkirk College                                                                | Health Care Delivery & Health Sciences<br>Health Care Education<br>Occupational Health                       |
| <b>Information and Communication Technologies - 46 Areas of Specialization</b> |                                                                                                              |
| <b>Province/College</b>                                                        | <b>Area of Specialization</b>                                                                                |
| <b>Newfoundland and Labrador</b>                                               |                                                                                                              |
| College of the North Atlantic                                                  | Nano Technology                                                                                              |
| <b>New Brunswick</b>                                                           |                                                                                                              |
| Collège communautaire du Nouveau-Brunswick                                     | Computer and Information Technology                                                                          |
| <b>Québec</b>                                                                  |                                                                                                              |
| Collège Ahunistic                                                              | Graphic Communications                                                                                       |
| Dawson College                                                                 | Adaptech – Technologies for Persons with Disabilities<br>Integrating Interactive Technologies and Pedagogies |
| Collège Lionel-Groulx                                                          | Micro-Electronics                                                                                            |
| Cégep André-Laurendeau                                                         | Optic and Photonic Technology                                                                                |
| Cégep de La Pocatière                                                          | Optic and Photonic Technology                                                                                |
| Cégep John Abbott College                                                      | Optic and Photonic Technology                                                                                |
| Cégep de Drummondville                                                         | Sound Technologies                                                                                           |
| <b>Ontario</b>                                                                 |                                                                                                              |
| Algonquin College                                                              | Photonics<br>Design of Virtual Environments<br>Information and Communication Technologies                    |
| Centennial College                                                             | Information and Communication Technologies                                                                   |
| Conestoga College Institute of Technology & Advanced Learning                  | Telecommunications                                                                                           |
| Durham College                                                                 | Media Art Design                                                                                             |
| Fanshawe College                                                               | Advanced Media                                                                                               |
| Georgian College                                                               | Product Prototype and Process<br>Maritime and Marine Simulations                                             |
| George Brown College                                                           | Digital Media Design                                                                                         |
| Humber College Institute of Technology & Advanced Learning                     | Applied Technology<br>Music Technology                                                                       |
| La Cité collégiale                                                             | Multi Media                                                                                                  |
| Mohawk College                                                                 | Mobile Technology                                                                                            |
| Niagara College                                                                | Data Management and Visualization Technology (photonics, electronics, energy)<br>Computer Programming        |
| Sault College                                                                  | IT                                                                                                           |
| Seneca College                                                                 | New Media/Digital Media<br>Open Source<br>Computer Studies                                                   |

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| Sheridan College Institute of Technology & Advanced Learning                                                                                                                                                                                                 | Digital - Gaming<br>High Performance Computing<br>Visualization                                                                                                                                                                                     |
| <b>Manitoba</b><br>Assiniboine Community College<br>Red River College                                                                                                                                                                                        | Wireless Technology<br>Information and Communications Technology, including digital multimedia                                                                                                                                                      |
| <b>Saskatchewan</b><br>Saskatchewan Institute of Applied Science and Technology                                                                                                                                                                              | Information Technology and Communication                                                                                                                                                                                                            |
| <b>Alberta</b><br>Grande Prairie Regional College<br>Keyano College<br>Mount Royal University                                                                                                                                                                | Technology Commercialization<br>Online Learning Systems<br>Web 2.0 Technologies                                                                                                                                                                     |
| NorQuest College                                                                                                                                                                                                                                             | Print Media                                                                                                                                                                                                                                         |
| <b>British Columbia</b><br>British Columbia Institute of Technology<br><br>College of the Rockies<br><br>North Island College                                                                                                                                | Information Technology<br>Smart MicroGrid<br>Adaptive Technologies<br>Internal Tracking of Students<br>Program Review Data<br>Remote Web-based Science Lab                                                                                          |
| <b>Manufacturing, Building Technology and Other - 44 Areas of Specialization</b>                                                                                                                                                                             |                                                                                                                                                                                                                                                     |
| <b>Province/College</b>                                                                                                                                                                                                                                      | <b>Area of Specialization</b>                                                                                                                                                                                                                       |
| <b>Newfoundland and Labrador</b><br>College of the North Atlantic                                                                                                                                                                                            | Manufacturing Engineering                                                                                                                                                                                                                           |
| <b>Nova Scotia</b><br>Nova Scotia Community College                                                                                                                                                                                                          | Mechanical Engineering                                                                                                                                                                                                                              |
| <b>New Brunswick</b><br>Collège communautaire du Nouveau-Brunswick                                                                                                                                                                                           | Metal Manufacturing Technologies                                                                                                                                                                                                                    |
| <b>Québec</b><br>Cégep André Laurendeau<br>Cégep de l'Abitibi-Témiscamingue<br>Cégep Beauce-Appalaches<br>Collège Édouard-Montpetit<br>Cégep de Jonquière<br>Collège Lasalle<br>Cégep de Lévis-Lauzon<br>Collège de Maisonneuve<br><br>Cégep de La Pocatière | Transport Logistics<br>Industrial Residue Technologies<br>Industrial Mechanics<br>Aerospace Technologies<br>Automation Manufacturing<br>Fashion<br>Industrial Robotics<br>Chemical Technologies<br>Food Packaging Technology<br>Physical Technology |



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| Cégep de Rimouski<br>Cégep de Saint-Hyacinthe<br>Cégep de Saint-Jérôme<br><br>Cégep de Sherbrooke<br>Cégep de Victoriaville                                                                                                                                                                                                                                                                                           | Maritime Innovation<br>Textiles<br>Advanced Transportation<br>Composite Development<br>Integrated Production and Manufacturing<br>Wood Manufacturing                                                                                                                                                                                                                                                                                                                                                            |
| <b>Ontario</b><br><br>Algonquin College<br>Centennial College<br>Conestoga College Institute of Technology & Advanced Learning<br>Fanshawe College<br>Georgian College<br><br>Humber College Institute of Technology & Advanced Learning<br>La Cité collégiale<br><br>Lambton College<br><br>Mohawk College<br><br>Sault College<br>Sheridan College Institute of Technology & Advanced Learning<br>St. Clair College | Mechanical Engineering<br>Engineering Technology<br>Manufacturing<br>Advanced Manufacturing<br>Product, Prototype and Process Development<br>Maritime and Marine Simulation<br>Prototype Development<br>Building Technology<br>Engineering Technology<br>Advanced Extrusion Process Identification and Control<br>Process Control and Optimization and Simulation<br>Energy Technologies<br>Engineering Industry Projects<br>Manufacturing<br>Manufacturing & Design Technologies<br>Manufacturing<br>Materials |
| <b>Manitoba</b><br><br>Red River College                                                                                                                                                                                                                                                                                                                                                                              | Advanced Design and Manufacturing<br>Sustainable Infrastructure                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Alberta</b><br><br>Grande Prairie Regional College<br>Northern Alberta Institute of Technology<br><br>Red Deer College                                                                                                                                                                                                                                                                                             | Innovation Services (Technology Commercialization of client driven R&D)<br>Product Development and Prototyping<br>Productivity Improvement<br>Advanced Manufacturing                                                                                                                                                                                                                                                                                                                                            |
| <b>British Columbia</b><br><br>British Columbia Institute of Technology                                                                                                                                                                                                                                                                                                                                               | Building/Construction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Yukon</b><br><br>Yukon College                                                                                                                                                                                                                                                                                                                                                                                     | Cold Climate Construction                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Social Innovation - 52 Areas of Specialization</b>                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Province/College</b>                                                                                                                                                                                                                                                                                                                                                                                               | <b>Area of Specialization</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Prince Edward Island</b><br><br>Holland College                                                                                                                                                                                                                                                                                                                                                                    | Teaching and Learning                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

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| <b>Québec</b><br><br>Cégep régional de Lanaudière<br><br>Cégep Marie-Victorin<br><br>Cégep de l'Outaouais                                                                                                                                        | Social Economy<br>Teaching and learning<br><br>Instruction<br>Social Sciences<br>Social Innovation<br>Instructional Research                                                                                                                                                                                                                                                                                           |
| <b>Ontario</b><br><br>Algonquin College<br>Centennial College<br><br>Conestoga College<br>Durham College<br>Fanshawe College<br><br>Seneca College<br>Sheridan College Institute of Technology and Advanced Learning<br><br>St. Lawrence College | Interprofessional Education<br>Emergency & Disaster Preparedness<br>Teaching and Learning<br>Business<br>Self Advocacy for Students with Disabilities (delivered by Centre for Students with Disabilities CSD)<br>Business & Entrepreneurship<br>Teaching and Learning<br>Competitive Intelligence/Market Intelligence Research<br>Securities<br>Social Innovation<br>Applied Behavioural Analysis<br>Training Methods |
| <b>Manitoba</b><br><br>Red River College<br>Collège universitaire de Saint-Boniface                                                                                                                                                              | Early Childhood Education<br>Education<br>Language and Culture<br>Social Sciences and Humanities<br>Business Administration                                                                                                                                                                                                                                                                                            |
| <b>Alberta</b><br><br>Bow Valley College<br><br><br><br><br>Grant MacEwan University<br>Lethbridge College<br><br><br>Mount Royal University                                                                                                     | Test Workplace and Essential Skills<br>Curriculum Design and Delivery Strategies<br>Support for Distance and Online Learners<br>Literacy and Language Training<br>Advancement of Immigrants<br><br>Business<br>Behavioural Aspects of Worker Safety<br>Public Opinion Polling<br>English as a Second Language<br>Justice                                                                                               |

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| Medicine Hat<br>NorQuest College                                                                                                                                                                                                        | Community Development<br>Workplace Intercultural Communication, Immigrant Integration<br>Supports and Services for Students with Disabilities<br>Aboriginal Learning and Evaluation, Aboriginal Literacy                                                                                                                                                                             |
| Red Deer College                                                                                                                                                                                                                        | Human-Animal (bear) Interactions                                                                                                                                                                                                                                                                                                                                                     |
| <b>British Columbia</b><br><br>British Columbia Institute of Technology<br>Camosun College<br>College of the Rockies<br>Douglas College<br><br>Justice Institute of British Columbia<br><br>North Island College<br><br>Selkirk College | Learning & Teaching<br>Human Factors Analysis<br>Labour Market<br>Social Sciences, Arts and Humanities<br>Business<br>Public Safety and Security<br>Emergency Management<br>Psychosocial Simulation Exercises<br>Homelessness & Housing<br>Distance Education<br>Community Based Research<br>Scholarship Teaching and Learning<br>Hospitality Industry<br>Rural Economic Development |

## Appendix 4

### ACCC 2008-2009 and 2009-2010 Applied Research Environmental Scan Research Centres and Specialized Labs by Category and Province/Territory

| Natural Resources and Energy - 41 Research Centres                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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| Province/College                                                                                                                                                                                                                                                            | Research Centre                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Newfoundland</b><br>College of the North Atlantic                                                                                                                                                                                                                        | Agrifoods Research Centre<br>Centre for Ocean Energy and Aquaculture                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Prince Edward Island</b><br>Holland College                                                                                                                                                                                                                              | Wind Energy Turbine Facilities and Labs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Nova Scotia</b><br>Nova Scotia Community College                                                                                                                                                                                                                         | Energy Sustainability                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>New Brunswick</b><br>Collège communautaire du Nouveau-Brunswick                                                                                                                                                                                                          | Centre d'excellence en sciences agricoles et biotechnologiques (CESAB)<br>Centre d'innovation et de transfert technologique des métaux (CITTM)<br>École des pêches du N.-B.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Québec</b><br>Collège d'Alma<br>Cégep de Baie-Comeau<br>Cégep de la Gaspésie et des Îles<br><br>Cégep de Rimouski<br>Cégep de Sainte-Foy<br>Cégep de Saint-Hyacinthe<br>Cégep de Saint-Jérôme<br>Cégep de Thetford<br>Cégep Trois-Rivières<br><br>Cégep de Victoriaville | Agrinova<br>Centre d'expérimentation et de développement en forêt boréale (CEDFOB)<br>Technocentre éolien<br>Halieutec<br>Corporation du service de recherche et d'expertise en transformation des produits forestières (SEREX)<br>Centre d'enseignement et de recherche en foresterie de Ste-Foy inc. (CERFO)<br>Cintech agroalimentaire<br>Institut de transport avancé de Québec (ITAQ)<br>Centre de technologie minérale et de plasturgie inc. (CTMP)<br>Centre intégré de fonderie et de métallurgie (CIFM)<br>Centre spécialisé en pâtes et papiers (CSPP)<br><br>EQMBO – Entreprises Centre d'aide technique et technologique inc. (transformation du bois en produits finis) |
| <b>Ontario</b><br>Fanshawe College<br>Georgian College<br><br>La Cité collégiale<br>Lambton College<br>Niagara College                                                                                                                                                      | Centre for Sustainable Energy Applied Research Centre<br>Alternative Energy Solutions<br>Green Innovation Centre<br>Biotechnologie Lab<br>ALTE lab - Alternative Energy Research<br>Consumer Research Lab<br>Wine and Viticulture Research Labs                                                                                                                                                                                                                                                                                                                                                                                                                                      |

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| Sault College                                                                                                                                                                                          | Wind Energy<br>GIS<br>Water Treatment                                                                                                                                                                                                                                        |
| St. Lawrence College                                                                                                                                                                                   | Centre for Sustainable Energy and Environments (CSEE)                                                                                                                                                                                                                        |
| <b>Manitoba</b><br>Red River College                                                                                                                                                                   | Advanced Transportation & Energy Centre                                                                                                                                                                                                                                      |
| <b>Alberta</b><br>Lakeland College<br><br>Lethbridge College<br>Northern Alberta Institute of Technology<br>Olds College                                                                               | Renewable Energy Cabin<br>Farm Facilities<br>Aquaculture Centre of Excellence<br>NovaNAIT Boreal Research Institute<br>BioFuels Research Centre<br>BioProcessing Pilot Plant<br>Compost Technology Centre<br>Turner Research Center<br>Grow Safe Research Facility           |
| <b>British Columbia</b><br>British Columbia Institute of Technology                                                                                                                                    | Centre for Energy System Applications<br>Integrated Molecular Biology Lab<br>Internet Engineering Lab (IEL)                                                                                                                                                                  |
| <b>Environmental Sciences and Technologies - 29 Research Centres</b>                                                                                                                                   |                                                                                                                                                                                                                                                                              |
| <b>Province/College</b>                                                                                                                                                                                | <b>Research Centre</b>                                                                                                                                                                                                                                                       |
| <b>Newfoundland</b><br>College of the North Atlantic                                                                                                                                                   | Geospatial Research Facility                                                                                                                                                                                                                                                 |
| <b>Nova Scotia</b><br>Nova Scotia Community College                                                                                                                                                    | Applied Geomatics Research Group                                                                                                                                                                                                                                             |
| <b>Québec</b><br>Cégep de Chicoutimi<br>Cégep de La Pocatière<br>Collège Shawinigan<br>Cégep de Sorel-Tracy<br>Cégep de Thetford                                                                       | Centre de géomatique du Québec inc. (CGQ)<br>Biopierre – Centre de développement des bioproduits<br>Centre national en électrochimie et en technologies environnementales inc. (CNETE)<br>Centre de transfert technologique en écologie industrielle (CTTEI)<br>Oleotek inc. |
| <b>Ontario</b><br>Conestoga College Institute of Technology & Advanced Learning<br>Fleming College<br>Humber College Institute of Technology & Advanced Learning<br>Loyalist College<br>Mohawk College | Built Environment<br>Centre for Alternative Wastewater Treatment<br>Centre for Urban Ecology<br>CO2 Extraction<br>HydroOne Lab<br>Clean and Renewable Laboratory                                                                                                             |

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| Niagara College                                                                                                                                                   | Environmental Research Labs (living labs)<br>Research Greenhouse<br>Land Use Technology Research Lab                                                                                                                                                                                                             |
| Sault College                                                                                                                                                     | Environment Canada Air Monitoring                                                                                                                                                                                                                                                                                |
| <b>Manitoba</b><br>Red River College                                                                                                                              | Centre for Applied Research in Sustainable Infrastructure                                                                                                                                                                                                                                                        |
| <b>Alberta</b><br>Grande Prairie Regional College<br><br>Grant MacEwan University<br>Northern Alberta Institute of Technology<br>Olds College<br>Red Deer College | Carbon Sequestration Pilot Project unit<br>Centre for Research Innovation<br>Specialized Lab for Detection, Tracing and Destruction of Antibiotics and Hormones Biowaste<br>novaNAIT Boreal Research Institute<br>Grow-Safe Research facility<br>Environmental Ecology                                           |
| <b>British Columbia</b><br>British Columbia Institute of Technology<br><br>Douglas College<br>Selkirk College                                                     | Centre for Architectural Ecology<br>Rivers Institute<br>Integrated Molecular Biology Lab<br>Institute of Urban Ecology<br>Selkirk Geospatial Research Centre                                                                                                                                                     |
| <b>Health, Medical and Life Sciences - 28 Research Centres</b>                                                                                                    |                                                                                                                                                                                                                                                                                                                  |
| <b>Province/College</b>                                                                                                                                           | <b>Research Centre</b>                                                                                                                                                                                                                                                                                           |
| <b>Newfoundland and Labrador</b><br>College of the North Atlantic                                                                                                 | Entomology Research Lab                                                                                                                                                                                                                                                                                          |
| <b>Prince Edward Island</b><br>Holland College                                                                                                                    | Bioscience and Environmental Science Lab<br>Canada's Smartest Kitchen (food product development)<br>Simulation Facilities in Health Labs                                                                                                                                                                         |
| <b>Nova Scotia</b><br>Nova Scotia Community College                                                                                                               | Medical Technologies                                                                                                                                                                                                                                                                                             |
| <b>Québec</b><br>Cégep de Lévis-Lauzon                                                                                                                            | TRANS BIO TECH centre collégial de transfert en biotechnologies                                                                                                                                                                                                                                                  |
| <b>Ontario</b><br>Centennial College<br><br>Fleming College<br>George Brown College<br>Humber College Institute of Technology & Advanced Learning                 | Biotechnology/Microbiology Labs<br>Simulation Lab<br>Institute for Healthy Aging<br>Health: Nursing Simulated Practice Centre; Interprofessional Learning Clinic; Prosthetics and Orthotics Lab; Emergency Management Simulation Centre<br>Culinary Labs<br>Exercise Prescription Lab<br>Applied Research Centre |



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| <p>La Cité collégiale</p> <p>Mohawk College</p><br><p>Seneca College</p> <p>Sheridan College Institute of Technology &amp; Advanced Learning</p>                                                                                               | <p>Nutrition: Culinary Studio</p> <p>Biotechnologie</p> <p>Health Informatics</p> <p>Institute for Applied Health</p> <p>Applied Research Centre</p> <p>Bio Chem Applied Research &amp; Training Lab (BCART)</p> <p>Sheridan Elder Research Centre (SERC)</p>                                                                                                     |
| <p><b>Alberta</b></p> <p>Grande Prairie Regional College</p> <p>Mount Royal University</p> <p>NAIT</p> <p>Red Deer College</p>                                                                                                                 | <p>Neuroscience Lab</p> <p>Integrative Health</p> <p>NovaNAIT South Research Lab</p> <p>Rural Health Research</p>                                                                                                                                                                                                                                                 |
| <p><b>British Columbia</b></p> <p>British Columbia Institute of Technology</p><br><p>Camosun College</p> <p>Douglas College</p>                                                                                                                | <p>Herbal Analysis and Evaluation Lab</p> <p>CREATE (Centre for Rehabilitation Engineering and Technology that Enables)</p> <p>Sport Innovation Centre</p> <p>Centre for Health and Community Partnerships</p>                                                                                                                                                    |
| <b>Information and Communications Technologies - 33 Research Centres</b>                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Province/College</b>                                                                                                                                                                                                                        | <b>Research Centre</b>                                                                                                                                                                                                                                                                                                                                            |
| <p><b>Newfoundland and Labrador</b></p> <p>College of the North Atlantic</p>                                                                                                                                                                   | <p>Nano-technology Research Lab</p>                                                                                                                                                                                                                                                                                                                               |
| <p><b>New Brunswick</b></p> <p>Collège communautaire du Nouveau-Brunswick</p>                                                                                                                                                                  | <p>Centre d'excellence en informatique (CEI)</p>                                                                                                                                                                                                                                                                                                                  |
| <p><b>Quebec</b></p> <p>Cégep de Drummondville</p> <p>Cégep de Lévis-Lauzon</p> <p>Cégep de La Pocatière, Cégep André-Laurendeau and Cégep John Abbott College</p> <p>Collège Ahuntsic</p> <p>Collège Lasalle</p> <p>Collège Lionel-Groulx</p> | <p>Musilab inc.</p> <p>Centre de robotique et de vision industrielles inc. (CRVI)</p> <p>Centre collégial de transfert technologique en optique-photonique OPTECH</p> <p>Institut des communications graphiques du Québec (ICGQ)</p> <p>Centre de transfert technologique de la mode (CTTM)</p> <p>Centre d'innovation en microélectronique du Québec (CIMEQ)</p> |
| <p><b>Ontario</b></p> <p>Algonquin College</p><br><p>Centennial College</p><br><p>George Brown College</p>                                                                                                                                     | <p>Design Centre</p> <p>Full Spectra Centre</p> <p>Media Convergence Centre</p> <p>Photonics Lab</p> <p>Wireless Technologies Lab</p> <p>CNC/Rapid Prototyping Lab</p> <p>HDTV Digital Broadcasting and Film Studio</p> <p>Design: Institute Without Boundaries; Game-Design Laboratory; StudioLab</p>                                                            |

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| <p>Humber College Institute of Technology &amp; Advanced Learning</p> <p>Niagara College</p> <p>Seneca College<br/>Sheridan College Institute of Technology &amp; Advanced Learning</p>                                                                                   | <p>Technology: Automated Manufacturing Laboratory; Surface Mount Laboratory; Construction Technologies Laboratories; Computer Laboratories, Including 3D Modeling; Computer Numerical Control (CNC) Lab; Radio Frequency Identification (RFID) Lab; Infrastructure</p> <p>Industrial Design Prototyping Lab</p> <p>RhyTHM Lab</p> <p>Wireless Lab</p> <p>Creative Advertising Centre</p> <p>Technology Research Centre</p> <p>Augmented Reality Research Labs and Centre for Land Use Technology</p> <p>Centre for the Development of Open Source (CDOT)</p> <p>Visualization Design Institute (VDI)</p> <p>Screen Industries Research and Training Centre</p> <p>Sharcnet and Access Grid</p> |
| <p><b>Manitoba</b></p> <p>Red River College</p>                                                                                                                                                                                                                           | <p>Centre for Aerospace Technology &amp; Training</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <p><b>Alberta</b></p> <p>Northern Alberta Institute of Technology</p> <p>NorQuest College</p>                                                                                                                                                                             | <p>Prototyping Laboratory (School of Electrical and Electronics Technology)</p> <p>Centre for Excellence in Print Media</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p><b>British Columbia</b></p> <p>British Columbia Institute of Technology</p>                                                                                                                                                                                            | <p>Advanced Prototyping Hub</p> <p>Dr. Tong Louie Living Laboratory</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>Yukon</b></p> <p>Yukon College</p>                                                                                                                                                                                                                                  | <p>Yukon Technology Innovation Centre</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Manufacturing, Building Technology and Other - 35 Research Centres</b>                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Province/College</b>                                                                                                                                                                                                                                                   | <b>Research Centre</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p><b>Newfoundland</b></p> <p>College of the North Atlantic</p>                                                                                                                                                                                                           | <p>Innovative Manufacturing Lab</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p><b>New Brunswick</b></p> <p>Collège communautaire du Nouveau-Brunswick</p>                                                                                                                                                                                             | <p>Centre d'excellence en bois ouvré (CEBO)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <p><b>Québec</b></p> <p>Cégep de l'Abitibi-Témiscamingue</p> <p>Cégep Beauce-Appalaches</p> <p>Collège Édouard-Montpetit</p> <p>Cégep de Jonquière</p> <p>Cégep de La Pocatière</p> <p>Cégep de Rimouski</p> <p>Cégep de Saint-Hyacinthe</p> <p>Cégep de Saint-Jérôme</p> | <p>Centre technologique des résidus industriels (CTRI)</p> <p>MÉCANIUM inc (production mechanization and automation)</p> <p>Centre technologique en aérospatiale (C.T.A.)</p> <p>Centre de production automatisée (CPA)</p> <p>Centre spécialisé de technologie physique du Québec inc. (CSTPQ)</p> <p>Innovation maritime</p> <p>SEREX Corporation du service de recherche et d'expertise en transformation des produits forestiers</p> <p>Groupe CTT inc.</p> <p>Centre de développement des composites du Québec (CDCQ)</p>                                                                                                                                                                 |

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| Cégep de Sherbrooke<br>Collège de Maisonneuve                                                                                                                                                                                                                                          | Centre de productique intégrée du Québec inc. (CPIQ)<br>Centre d'études en procédés chimiques du Québec (CÉPROCQ)<br>Institut de technologie des emballages et du génie alimentaire (ITEGA)                                                                                                                                                                                                                                         |
| <b>Ontario</b><br>Conestoga College Institute of Technology & Advanced Learning<br>Georgian College<br><br>Humber College Institute of Technology & Advanced Learning<br>La Cité collégiale<br><br>Lambton College<br><br>Sheridan College Institute of Technology & Advanced Learning | Manufacturing<br>Applied Design & Manufacturing Solutions<br>Maritime Research and Modeling<br>Innovation Humber Centre (business resources for SMEs)<br>Métiers de la construction<br>Génie<br>AMER lab - Advanced Materials Engineering Research<br>APCS - lab - Advanced Process Control & Simulation<br>Sheridan Research - Research Office Special Projects<br>Centre for Advanced Manufacturing & Design Technologies (CAMDT) |
| <b>Alberta</b><br>Grande Prairie Regional College<br>Northern Alberta Institute of Technology<br>Red Deer College                                                                                                                                                                      | Innovation Services - Centre 2000 (leased) (invention development)<br>NAIT Shell Manufacturing Centre (manufacturing and productivity services for SMEs)<br>Center for Innovation and Advanced Manufacturing<br>Innovation in Manufacturing Centre                                                                                                                                                                                  |
| <b>British Columbia</b><br>British Columbia Institute of Technology<br><br><br><br><br>Camosun College                                                                                                                                                                                 | AFRESH Home<br>BCIT Canadian Housing & Construction Centre<br>Building Envelope Test Hut<br>Building Science Centre of Excellence<br>Food Processing Research Centre<br>Smart Micro Grid<br>Vancouver Island Advanced Manufacturing and Prototype Development Centre                                                                                                                                                                |
| <b>Social Innovation - 30 Research Centres</b>                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Province/College</b>                                                                                                                                                                                                                                                                | <b>Research Centre</b>                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Ontario</b><br>Centennial College<br>Georgian College<br>Humber College Institute of Technology & Advanced Learning<br>Mohawk College                                                                                                                                               | Inter-professional Education Lab<br>Centre for Russian Canadian Relations<br>Humber Music Studies<br>Millennium Foundations for Success                                                                                                                                                                                                                                                                                             |
| <b>Québec</b><br>Cégep régional de Lanaudière                                                                                                                                                                                                                                          | Centre collégiale de recherche en économie sociale                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Manitoba</b><br>Collège universitaire de Saint-Boniface                                                                                                                                                                                                                             | Alliance de recherche universités-communautés sur les identités francophones dans l'Ouest canadien<br>Chaire de recherche du Canada sur les identités métisses                                                                                                                                                                                                                                                                      |

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|                                                                                                                                                    | <p>Centre d'études franco-canadiennes de l'Ouest (CEFCO)</p> <p>Presses universitaires de Saint-Boniface</p>                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p><b>Saskatchewan</b></p> <p>Saskatchewan Institute of Applied Science and Technology</p>                                                         | <p>Early Childhood Demonstration Lab Day Care Centre (in process of development)</p> <p>Interprofessional Simulation Learning Centre Labs</p>                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p><b>Alberta</b></p> <p>Bow Valley College</p> <p>Mount Royal University</p> <p>NorQuest College</p> <p>Red Deer College</p>                      | <p>Test of Workplace Essential Skills (TOWES)</p> <p>Foundational Learning Centre</p> <p>Institutional Analysis</p> <p>Evaluation Unit in Learning Resource Services</p> <p>Intercultural Education</p> <p>Child Well Being</p> <p>Non-Profit Studies</p> <p>Teaching &amp; Learning</p> <p>Centre for Excellence in Education in Continuing Care</p> <p>Centre for Excellence in Intercultural Education</p> <p>Centre for Excellence in Learner Supports (CELS)</p> <p>Centre for Excellence in Aboriginal Learning (CEAL)</p> <p>SEARCH Asset</p> |
| <p><b>British Columbia</b></p> <p>British Columbia Institute of Technology</p> <p>Justice Institute of British Columbia</p> <p>Selkirk College</p> | <p>Learning &amp; Teaching Centre</p> <p>Centre for Prevention and Reduction of Violence</p> <p>Centre for Resilient Communities</p> <p>Centre for Environmental Justice</p> <p>Donald B Rix Public Safety Simulation Centre</p> <p>Regional Innovation Chair, Rural Economic Development</p>                                                                                                                                                                                                                                                        |
| <p><b>Yukon</b></p> <p>Yukon College</p>                                                                                                           | <p>Yukon Cold Climate Innovation Centre</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## Appendix 5

### College and Community Innovation Program - Competition Statistics and Status

| CCI Program Competitions                                | Letters of Intent (LOI) & Entry Level Grant Proposals | Invitations to Submit Full Applications                                             | Full Applications | Funded Applications                                                                                                                                                                                                                                                                                                      |
|---------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Competition #1</b><br>May 2008 – February 2009       | 33 LOIs received                                      | 13 invitations sent                                                                 | 13                | Total of 8 funded:<br>Quebec (4)<br>- Cégep de l'Abitibi-Témiscamingue<br>- Cégep de La Pocatière<br>- Cégep de Saint-Hyacinthe<br>- Institut de technologie agroalimentaire<br>Ontario (2)<br>- George Brown College<br>- Niagara College<br>Alberta (1)<br>- Olds College<br>British Columbia (1)<br>- Camosun College |
| <b>Competition #2</b><br>September 2008 – June 2009     | 14 LOIs received                                      | 8 invitations for new projects and 6 invited to resubmit from previous competition  | 7 received        | Total of 5 funded:<br>Quebec (1)<br>- Cégep de Lévis-Lauzon<br>Ontario (3)<br>- La Cité collégiale<br>- Mohawk College<br>- Sheridan College Institute of Technology and Advanced Learning<br>British Columbia (1)<br>- Emily Carr University of Art + Design                                                            |
| <b>Competition #3</b><br>December 2008 – September 2009 | 33 LOIs received                                      | 14 invitations for new projects and 6 invited to resubmit from previous competition | 18 received       | Total of 9 funded:<br>Alberta (1)<br>- SAIT Polytechnic<br>Manitoba (1)<br>- Red River College<br>Ontario (3)<br>- Algonquin College<br>- Fanshawe College<br>- Seneca College<br>Quebec (4)<br>- Cégep de l'Abitibi-Témiscamingue<br>- Cégep de Rimouski<br>- Cégep de Saint-Jérôme<br>- Cégep de Trois-Rivières        |

| CCI Program Competitions                             | Letters of Intent (LOI) & Entry Level Grant Proposals | Invitations to Submit Full Applications                                             | Full Applications | Funded Applications                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------------------------------|-------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Competition #4</b><br>May 2009 – February 2010    | 11 LOIs and 11 Starter Grant Proposals received       | 10 invitations for new projects and 6 invited to resubmit from previous competition | 11 received       | Total of 6 FA* funded:<br>Alberta (1)<br>- Lakeland College<br>Ontario (3)<br>- Lambton College<br>- Seneca College<br>- St. Lawrence College<br>Quebec (2)<br>- Cégep de La Pocatière<br>- Cégep de Thetford<br><br>Total of 6 EL** funded:<br>British Columbia (2)<br>- Douglas College<br>- Selkirk College<br>Saskatchewan (1)<br>- SIAST<br>Ontario (2)<br>- Cambrian College<br>- Centennial College<br>Quebec (1)<br>- Cégep de Matane                                                                                                                                                                                 |
| <b>Competition #5</b><br>November 2009 – August 2010 | 17 LOIs and 11 Starter Grant Proposals received       | 10 invitations for new projects and 4 invited to resubmit from previous competition | 11 received       | Total of 6 FA* funded:<br>Alberta (2)<br>- Grande Prairie Regional College<br>- Northern Alberta Institute of Technology<br>Ontario (2)<br>- Sheridan College Institute of Technology & Advanced Learning<br>- Fleming College<br>Quebec (1)<br>- Cégep de Saint-Hyacinthe<br>New Brunswick (1)<br>- Collège communautaire du Nouveau Brunswick<br><br>Total of 5 EL** funded:<br>British Columbia (1)<br>- Kwantlen Polytechnic University<br>Alberta (1)<br>- Grant MacEwan University<br>Ontario (1)<br>- Georgian College<br>Quebec (1)<br>- Cégep André-Laurendeau<br>Nova Scotia (1)<br>- Nova Scotia Community College |
| <b>Competition #6</b><br>June 2010 – February 2011   | 13 LOIs and Starter Grant Proposals to be received    | 6 invitations for new projects and 7 invited to resubmit from previous competition  | 11 received       | Decision on full applications by mid-February 2011                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

\* FA = Five year grant

\*\* EL = Two year entry level grant



## Appendix 6

### Detailed Listing of CCI Funded Projects (Five-Year Grants and Two-Year Entry Level Grants) 45 Projects

| ROUND 1                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BRITISH-COLUMBIA                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p>Clothing/Textiles Advancements<br/>Sensor Development and Human<br/>Performance Enhancement</p> <p><b>Camosun College</b></p> | <p>This applied research program will build capacity at Camosun College to explore new advancements in textiles and clothing for sport applications through a unique combination of materials development, sensor technology application and human performance factors analysis. The unique approach to this field is made possible by the partnership between Camosun and Canadian Sport Centre Pacific (CSCP) and their co-development of the Pacific Institute for Sport Excellence (PISE), a state of the art 80,000 sq. ft. facility designed to facilitate world leading advances in human performance and wellness. The use of “smart” fabrics or “intelligent” textiles is being investigated in many application areas including sports performance, recreational activities, rehabilitation, patient monitoring (particularly for remote medical treatment delivery), ergonomics, emergency response personnel monitoring and defense.</p>                                                                                                                                                                                   |
| ALBERTA                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p>Biodiesel Production, Alternative<br/>Feedstocks, and Commercial<br/>Adoption</p> <p><b>Olds College</b></p>                  | <p>In May 2007, Olds College added biodiesel to its bio-industry research program and with significant industry support, opened the BioFuel Technology Centre in May 2007. The proposed project represents the second phase of this unique Olds College initiative, designed to address local industry needs, eliminate capacity and knowledge gaps, and support both Federal policies (science and technology priorities and the associated renewable fuel content targets), and provincial policies (Alberta Nine-Point Bioenergy Plan). The expected project outcomes include: (21) increased College and local industry capacity to address the expanding range of biodiesel and bioenergy issues, (2) the development of an applied “biodiesel commercialization cluster” in Alberta, and (3) positive social, environmental and economic benefits that support sustainable rural development in Alberta.</p>                                                                                                                                                                                                                     |
| ONTARIO                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p>George Brown College Research<br/>Labs</p> <p><b>George Brown College</b></p>                                                 | <p>George Brown College (GBC) is developing its applied research, innovation and commercialization capacity by creating the GBC Research Labs to serve the needs of industry and community partners. Our core areas of research are health &amp; information technologies and health promotion, which are well-aligned with GBC’s Strategic Plan and the needs of these significant local sectors. Continuing and proposed projects emphasize multidisciplinary problem-solving and opportunity development for industry in our region, and investigate: health systems change management, utilization and human services; health promotion; medical devices, prosthetics and aids; and, prototyping for health technology development and health informatics. We conduct research in collaboration with SMEs, larger companies, health care agencies and other research institutes. We help foster adoption of new devices and systems, better patient outcomes as well as adaptation and integration of new technologies/practices into health care and health promotion.</p>                                                        |
| <p>Sustain Niagara: Supporting<br/>Innovation in Agricultural Land<br/>Management</p> <p><b>Niagara College</b></p>              | <p>The growing fields of remote sensing, real-time wireless sensor networks, GIS, high performance computing and augmented reality (AR)/Human Computer Interface design (HCI) offer an opportunity to expand Niagara College’s participation in local industry by providing technology and expertise to help manage agricultural land use. The College’s new Land Use Technology (LUT) Centre is studying and using these and other innovative technologies to help local industries collect and correlate data and turn it into useful land management information. It will assist local producers to improve agricultural production processes, adopt new technologies to solve problems or improve crops, experiment with alternative land uses, and ultimately become more competitive and environmentally sustainable. New knowledge, tools and techniques will be shared and transferred through multi-disciplinary student and faculty teams from Niagara College and its academic partners, working hand in hand with industry partners, and linked strategically to sector groups and economic development organizations.</p> |

| QUÉBEC                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| <p>Applied research and support to SMEs in Abitibi-Témiscamingue and Nord-du-Québec for the valorization of biomass residues</p> <p><b>Cégep de l'Abitibi-Témiscamingue</b></p>             | <p>The project involving the Cégep of Abitibi-Témiscamingue and the CTRI aims to help regional SMEs to develop and commercialize products from branches, barks, leaves and tree needles left by wood industries after logging, as well as the transformation of agribusiness residue. Four products are specifically targeted: essential oils and Mouka that could be used for production of natural beef without antibiotics and hormones; ethanol from branches and tree tops that could then be generated at a lower cost; solid combustibles from wood residues; and, methane that could be recycled and used to heat infrastructures and produce electricity.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>Development of laser welding and hybrid laser welding /GMAW optimized platforms for improving products and processes in manufacturing industries</p> <p><b>Cégep de La Pocatière</b></p> | <p>The Cégep de La Pocatière in collaboration with the CSTPQ CCTT, will focus on addressing emerging issues regarding industrial laser welding. The team will investigate the stability of welds performed by laser welding, hybrid welding of thick plates and will develop a new on-line inspection method.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p>Development of innovative firefighter clothing and adapted applications for other workers</p> <p><b>Cégep de Saint-Hyacinthe</b></p>                                                     | <p>Heat stress generated under protective clothing is a growing concern for the health and security of firemen and other workers. In order to reduce heat stress related-health and security risks, the Cégep de Saint-Hyacinthe, with CTT Group and its partners, propose to develop a new bunkersuit concept to improve thermo-physiological comfort, mobility and thermal protection, as well as to confer interactive and adapted functions to ensure optimal health-security of firemen at work. Original material and interactive function will be developed and introduced in the bunkersuit, including a skin temperature-thermoregulation technology and a multilayer composite technology. Moreover, we will develop an autonomous interactive system (with energy management) which will communicate sensitive information such as the temperature inside the garment and on the skin surface, and the heart rate and the relative position of each firefighter. Studies of performance, durability and validation of bunker prototypes will be carried out jointly by CTT Group, teachers, students and partners.</p> |
| <p>Supporting innovation among businesses related to bio-resources</p> <p><b>Institut de technologie agroalimentaire</b></p>                                                                | <p>Over the last ten years, the Institute of Agri-Food Technology has been involved in supporting innovation and technology transfer among small businesses located in Eastern Quebec. The Institute wants to improve its applied research capability by getting more teachers involved while reducing their teaching loads, by recruiting new staff members through an alliance with a university and by putting in place various measures that will promote R&amp;D activities. The applied research activities will focus on bio-products, which are at the centre of various strategic plans both local and regional, such as the ACCORD Program on Peat Moss Products and Agro-environmental Technologies, and development plans from neighboring communities aiming at specialty, agro-industrial and agro-forestry bio-products.</p>                                                                                                                                                                                                                                                                                       |
| ROUND 2                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| BRITISH-COLUMBIA                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p>The Emily Carr Centre for Moving Interaction</p> <p><b>Emily Carr University of Art + Design</b></p>                                                                                     | <p>Emily Carr University researchers will link between the institution and British Columbia's new media industry, one of the strongest in Canada. Applied research projects will focus on the convergence of 3D virtual worlds, games and information representation, and will be based at Emily Carr's state of the art research facility for New Media and Design.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| ONTARIO                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <p>Applied research and technology transfer program to support the regional socio-economical development in biotechnology</p> <p><b>La Cité collégiale</b></p>                              | <p>In 2003, La Cité collégiale became the first French postsecondary institution to establish a specialized four-year bachelor program in applied biotechnology. The program includes a research component that allows students and teachers to work in partnership with industry. The college will build on the strong research foundation of this program and expand its capacity to conduct applied research in biotechnology.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

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| <p>Building the Canadian Electronic Health Records Solution (EHRS) Reference Implementation</p> <p><b>Mohawk College</b></p>                                                                       | <p>Mohawk College will develop a working example of the national Electronic Health Records Solution (EHRS). Once launched, the EHRS program will connect 40,000 health care support systems across Canada, providing health professionals with a centralized system for accessing a patient's complete medical history. Mohawk College's project team and their industry partners will build and demonstrate options to simplify and standardize connections to the EHRS by doctor's offices, hospitals, laboratories, pharmacies, etc. The Mohawk research team will also create a new software development program to train health informatics professionals in Canada.</p>                                                                                                                                                                                                                                                                      |
| <p>Centre for Real-time Production</p> <p><b>Sheridan College Institute of Technology &amp; Advanced Learning</b></p>                                                                              | <p>Toronto is the heart of the Canadian film and television industry, making it an ideal location for Sheridan's Centre for Real-time Production (CRP). The CRP research team will develop new digital media technologies; facilitate innovation and commercialization across screen-based sectors and between content, service and platform companies; and investigate the challenges and opportunities new digital media technologies present for content development companies operating across multiple platforms.</p>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>QUÉBEC</b>                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>Development of platforms for the analysis of the bioactivity of molecules (preventive as well as therapeutic) aiming at the improvement of human health</p> <p><b>Cégep de Lévis-Lauzon</b></p> | <p>This CÉGEP will enhance the industrial research capacity of its technology transfer centre, TransBIOTech. TransBIOTech's team will focus on commercializing research in several fields related to biotechnology, such as immunology, molecular biology, analytical chemistry, microbiology and pharmacology.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>ROUND 3</b>                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>ALBERTA</b>                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>Green Building Technologies Lab: Net Zero Applied Research and Innovation</p> <p><b>SAIT Polytechnic</b></p>                                                                                    | <p>Given that the design and construction industries are embracing green building technologies, SAIT recognized the need for new research to help these industries meet municipal green building targets while simultaneously addressing federal policies on greenhouse gas emission reductions, improved indoor air quality and improved building code restrictions. SAIT Applied Research and Innovation Services established a Green Building Technologies (GBT) program in 2008 with three main goals: to lead industry in implementing green building technologies; to provide training for students in these technologies; and to enhance commercialization of green technologies for Canadian industry. GBT's applied research program focuses on four main research areas: Net Zero Envelope and systems monitoring; architectural ecology; integrated renewable energy/alternative energy; and education and industry transformation.</p> |
| <b>MANITOBA</b>                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>Improving the Energy Performance of Buildings - Sustainable Infrastructure Technology Research Group</p> <p><b>Red River College</b></p>                                                        | <p>The college will establish a Sustainable Infrastructure Technology Research Group to build on the experience of the Centre for Applied Research in Sustainable Infrastructure, the college's first applied research centre. The group will work with Manitoba's emerging sustainable infrastructure cluster on collaborative applied research projects to provide project-related work experience for co-op students and interns, personnel exchanges and/or secondments for faculty and industry professionals, and knowledge transfer to SMEs and other players. This project will increase the number of graduates with applied research experience, create new and enhanced partnerships and improved building and construction technologies, and reduce energy consumption and waste/greenhouse gas emissions.</p>                                                                                                                         |
| <b>ONTARIO</b>                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <p>Algonquin College Design Centre</p> <p><b>Algonquin College</b></p>                                                                                                                             | <p>Through its applied research program, Algonquin College collaborates with industry, government, hospitals, community organizations and NGOs in the area of User Experience Design to develop products, processes and services with human-machine interfaces. The college also provides applied research services to small and medium-sized enterprises in Ottawa's information and communications technology sector. Algonquin College is also providing clients with business development services with a focus on innovation.</p>                                                                                                                                                                                                                                                                                                                                                                                                             |

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| <p>Centre for Sustainable Energy and Environments</p> <p><b>Fanshawe College</b></p>                                                            | <p>The Fanshawe College Centre for Sustainable Environments (CSE) will enhance the college's ability to conduct multi-disciplinary, industry-driven research and development in the area of sustainable environments. CSE will focus on industry-driven projects related to "green" building, energy conservation, alternate fuels, new agri-products, energy conservation, sustainable landscaping and urban design, and other initiatives. Grow Green, CSE's cornerstone project, will make use of collaboration between industry, faculty and students to develop an environmentally-friendly plant production system using reclaimed energy and material from municipal organic waste.</p>                                                                                                                                                       |
| <p>Research and Development for Increased Usage of Flight Simulation in Flight Training</p> <p><b>Seneca College</b></p>                        | <p>Seneca College, along with industry partners, is proposing research into the feasibility of using more simulation technology in pilot training. The research will respond to a decline in the number of student trainees and in the viability of pilot training schools, and to a gap in the skill sets of new pilots. Findings will help revitalize flight training businesses. The research will identify when and how to incorporate simulation into pilot training, the benefits of a move from prescriptive regulations to performance-based outcomes, and the necessity of ongoing "proof of concept" trials for operational efficiency and quality of newly trained pilots. The exercise will help Canada's aviation training industry become more competitive internationally.</p>                                                        |
| <b>QUÉBEC</b>                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>Applied Research and SME support for Industrial Mineral Product Development</p> <p><b>Cégep de l'Abitibi-Témiscamingue</b></p>               | <p>The project being carried out by the Cégep de l'Abitibi-Témiscamingue and its partners will help small and medium-sized businesses in the region to develop marketable products from quarry wastes. This project comprises four components, with the following goals: 1) to develop a process to avoid transporting waste over long distances; 2) to manufacture concentrates of muscovite (mica), garnet, kyanite and silica from quarry waste; 3) to manufacture finished products from the industrial minerals extracted from the waste; 4) to develop products from other types of industrial minerals found in quarry waste.</p>                                                                                                                                                                                                             |
| <p>Eco-construction and Bio-product Applied Research in Quebec's Bas-Saint-Laurent region</p> <p><b>Cégep de Rimouski</b></p>                   | <p>Quebec's Bas-Saint-Laurent region has a number of small and medium-sized businesses that process forest products. The region is also a pioneer in wood heating and in certification of forest products. The project's research team will provide fair, suitable and sustainable solutions for developing the communities of this region. This project's objectives are as follows: to improve the fire resistance of wood construction materials; to improve the physical, mechanical and antifungal properties of soft woods; to use thermocompression processes to add value to soft woods; to manufacture natural insulation materials and sustainable ecomaterials from wood; to improve the process for manufacturing charcoal and to derive value from its by-products; and to conduct applied research on bioproducts and bioenergies.</p> |
| <p>Using Innovative manufacturing technologies to reduce the environmental footprint of composite parts</p> <p><b>Cégep de Saint-Jérôme</b></p> | <p>Composites with a polymer matrix and fibreglass reinforcement are widely used to manufacture parts for a number of industries, including the transportation, construction, marine, sanitary services and recreational vehicle industries. However, at present, the solid wastes from the manufacturing of these composites are not reused, but are sent to landfills. In today's competitive international marketplace, environmental and occupational health and safety requirements are a central concern. The researchers at the Cégep de Saint-Jérôme and its partners will, therefore, be conducting experiments in treating and reusing these wastes so as to reduce their environmental footprint.</p>                                                                                                                                     |
| <p>Advanced Alloys Technology Centre</p> <p><b>Cégep de Trois-Rivières</b></p>                                                                  | <p>The Cégep de Trois-Rivières, through its Integrated Foundry and Metallurgy Centre, plans to conduct R&amp;D for the titanium and advanced-alloys industry cluster. The goal of this R&amp;D will be to develop technologies and products with significant potential for technology transfer to suppliers in the aeronautical and medical markets. The Cégep and its partners have made a strong commitment to this project, because of its usefulness for technical-education purposes, its potential for retaining students because of the high-tech equipment that it involves and its role in the economic diversification of Quebec's Mauricie region.</p>                                                                                                                                                                                    |
| <b>ROUND 4</b>                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>ALBERTA</b>                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <p>Advancing Integration and Efficiency of Multi-Component Renewable Energy Systems</p> <p><b>Lakeland College</b></p>                          | <p>Lakeland College plans to develop synergistic multi-component monitoring, diagnostic and control system arrays for renewable energy technologies. The college also plans to identify and adapt renewable technologies to efficiently store heat energy for seasonal and low temperature space heating applications in the region. The outcome of this program of research will be processes, technologies, prototypes and products of interest to our commercial partners.</p>                                                                                                                                                                                                                                                                                                                                                                    |

| ONTARIO                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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| Renewable Energy Asst Optimization<br><br><b>Lambton College</b>                                                                    | The Renewable Energy Conversion and Storage Research project will increase the capacity for Lambton College and its industrial partners to undertake applied research, development and commercialization activities in the areas of renewable energy generation, conversion, storage and supply. Research initiatives will explore how to buffer the resulting electrical output and how to use electrolysis for smart grid stabilization. The R&D activities at Lambton College will examine the integration of renewable energy generation technologies and will explore the viability of a hydrogen-based energy storage and production infrastructure.                                                                                                                                  |
| Applied Research in Open Source Software: Leveraging Community Collaboration for Competitive Advantage<br><br><b>Seneca College</b> | Seneca intends to scale and grow the research capacity of Seneca's Centre for Development of Open Technology (CDOT) to meet the ever-increasing needs of our current and prospective partners. These large partners and potential partners are interested in having the college work with them to develop highly trained individuals for employment, to collaboratively leverage open source technology and to engage them in the network of open source collaboration that benefits the industry as a whole. CDOT will expand to include local small and medium enterprises.                                                                                                                                                                                                               |
| Sustainable Energy Applied Research Centre<br><br><b>St. Lawrence College</b>                                                       | St. Lawrence College will expand its applied research activity in sustainable energy technologies over the next five years, creating a Sustainability Energy Applied Research Centre and partnering with PARTEQ Innovations of Queen's University for commercialization activities. The college will partner with eastern Ontario's fast-growing sustainable energy industries and with local university researchers. Projects will assist prototype development and field testing, improve efficiencies in new and existing technologies, and develop integrations of the variety of emerging technologies concerned with solar, geothermal, wind and biomass energy.                                                                                                                      |
| QUÉBEC                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Developing a safe environment for an aging population using a virtual caregiver system<br><br><b>Cégep de La Pocatière</b>          | The Cégep de La Pocatière and its partners have undertaken a project focused on developing a virtual caregiver system with artificial intelligence. The system will incorporate a number of monitoring technologies that will automatically assume the burden of various tasks and offer significant respite and peace of mind to caregivers and health care workers.                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Developing biodegradable polymers for the plastic and composites industry<br><br><b>Cégep de Thetford</b>                           | The project focuses on two principal paths, the development of bio-based technical thermoplastics, and the development of thermosets, with reduced environmental impact (biodegradable polymers resulting from biomass). Each axis includes several sub-projects intended to meet the specific needs of the industrial partners. This structure will facilitate exchanges between industries, research centres and the training centre, and will lead to the creation of a regional production stream for polymers having a reduced environmental impact.                                                                                                                                                                                                                                   |
| ROUND 5                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| ALBERTA                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Pollutants to Products (P2P)<br><br><b>Grande Prairie Regional College</b>                                                          | The College is very aware of the pollutants and wastes generated by industries and municipalities. The college, its partners and stakeholders have dedicated the last decade and \$1.5 million developing local sustainable solutions through three applied research projects. One project diverts treated municipal wastewater from waterways to a hybrid poplar research grove for enhanced tree growth, increased CO2 capture and the production of industrial wood fibre. Each project contributes to a reduction of the region's wastes and harnesses natural processes to turn atmospheric pollutants to useful products.                                                                                                                                                             |
| Field Technologies for Boreal Reclamation<br><br><b>Northern Alberta Institute of Technology</b>                                    | Industrial growth is putting pressure on Alberta's boreal forest with a growing backlog of almost 50,000 abandoned oil and gas well sites. Land reclamation restores industrial sites to a state similar to their original condition using native boreal plants. The novaNAIT Boreal Research Institute contributes forest ecological knowledge through oil and gas companies, reclamation companies, government, and First Nations and Métis partners. Local enterprises carry out most of the reclamation work. The program develops ties with Aboriginal and Métis communities, and incorporates aboriginal ecological knowledge into reclamation practices. Reclamation will have a positive impact on the boreal forest and the economic outlook for communities in the boreal region. |



| ONTARIO                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| <p>Aging in place: Optimizing Health Outcomes through Technology Design and Social Innovation</p> <p><b>Sheridan College Institute of Technology &amp; Advanced Learning</b></p> | <p>Around the world, older adults are the fastest growing age group, and Canada is no different. While we celebrate the success of increasing life spans, we must respond to the challenges of providing optimum health for older Canadians. <b>Sheridan College</b>, through the Sheridan Elder Research Centre, is spearheading innovative approaches to promoting health and well-being for aging Canadians and their families. By partnering with regional industries, the centre will explore ways to support small and medium-sized businesses as they respond to the significant market opportunities presented by this demographic phenomenon. This initiative will embrace several unique projects to design technology applications that promote cognitive health and social inclusion.</p>                                                                                                                      |
| <p>Advancement and Development of Innovated Waste and Waste Water Treatment Technologies</p> <p><b>Fleming College</b></p>                                                       | <p><b>Fleming College's</b> Centre for Alternative Wastewater Treatment is highly regarded for its advanced research facilities. The centre will maximize the college's ability to engage in high calibre research and to identify, recognize and respond to the applied research needs of local and regional industry; focus research activities on water and wastewater treatment technologies; develop and implement strategies for the integration of student research activities; enhance local economic development by working with local and regional industry to meet the needs of the water and wastewater technology industry; and work with local industry, and governmental and non-governmental agencies and organizations to achieve long-term sustainability for applied research activities at the college.</p>                                                                                            |
| QUÉBEC                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>Developing New Technology for Manufacturing Complex 3D Preforms for the Aeronautics and other industries</p> <p><b>Cégep de Saint-Hyacinthe</b></p>                           | <p>Polymeric materials (textiles, composites, plastics) are expected to provide innovative solutions in many sectors. In particular, the weight optimization of vehicles is a high priority. Pre-impregnated composite fibres are currently used, but they are expensive and require an expensive process. Faster and less expensive infusion processes have potential. However, the production of preforms corresponding to complex forms of 3D composite parts by assembling and superpositioning of multiple thin 2D reinforcement fabric layers is a slow and demanding process. The manufacturing of one piece complex 3D fabrics presents a very promising future. The cégep, in partnership with industries, intends to build research capacity to develop a platform for the manufacture of complex 3D preforms to support the production of composite parts, particularly in aeronautics.</p>                     |
| NEW BRUNSWICK                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>Biorefinery Technolgy Scale-Up Centre (BTSC)</p> <p><b>Collège communautaire du Nouveau-Brunswick (CCNB)</b></p>                                                              | <p><b>CCNB</b> is developing a biorefinery with production scale fermentation equipment manned by staff, allowing university researchers and biorefinery and industrial fermentation companies to scale-up and validate technologies prior to production roll-out or licensing. This commercialization and training centre will play a key role in biorefinery and fermentation research and technology, and product and process development in Atlantic Canada. Regional universities, bioenergy research institutions and small and medium-sized businesses are using bacteria and yeast fermentation to produce innovative biobased products such as biofuels, enzymes and biorenewable chemicals. The refinery fills the current capacity gap between the laboratory scale and full-scale production. The college will act as a technology transfer and commercialization focal point for regional collaborations.</p> |
| Entry Level Grants - Two Years                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| ROUND 1                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| BRITISH COLUMBIA                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>Biological Control of Arthropod Pests in BC Agriculture</p> <p><b>Douglas College</b></p> <p>(Entry Level Grant)</p>                                                          | <p>This initiative will address research needs of the British Columbia agricultural sector regarding management of arthropod pests. In particular, the college and its industrial partners will conduct research on the use of arthropod predators and parasitoids for biological control of key pest species. Management of pests via biological control provides a sustainable ecologically-based alternative to the use of chemical pesticides in agriculture. New biological control products will be developed, and existing products will be optimized to improve management of two key pests in greenhouse vegetable production: tomato psyllids and aphids. Technology transfer of new products and technologies will be optimized by direct involvement of the greenhouse and insectary industries.</p>                                                                                                           |

|                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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| <p>Decision-Support Applications Development for Forest Carbon Management</p> <p><b>Selkirk College</b></p> <p>(Entry Level Grant)</p>                                                                         | <p>This project will focus on development of prototype applications that could allow local small and medium-sized forest enterprises to access evaluate and analyse data and tools related to potential opportunities in forest carbon markets. The overall project goal is the development and deployment of several potentially transferable and commercializable decision-support tools for forest carbon management. A regional partnership, to be called the Decision Support Collaborative, will be established with forestry stakeholders to advise, collaborate with and guide the research team in its efforts to build applied research capacity.</p>                                                                                                                                                                                           |
| <b>SASKATCHEWAN</b>                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>Wastewater Remediation and Recycling to Improve Water Quality in Saskatchewan</p> <p><b>Saskatchewan Institute of Applied Science and Technology</b></p> <p>(Entry Level Grant)</p>                         | <p>This is a joint initiative between the Chemical Technology program of the Saskatchewan Institute of Applied Science and Technology and two local small and medium-sized enterprises. The objective of the research is to develop new technologies to reduce water contamination and to create value-added byproducts by recycling the contaminants into a reusable form. The resulting technologies will be employed in municipal wastewater recycling, water purification, sewage treatment and wastewater management.</p>                                                                                                                                                                                                                                                                                                                            |
| <b>ONTARIO</b>                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>Cambrian College Sustainable Energy Systems</p> <p><b>Cambrian College</b></p> <p>(Entry Level Grant)</p>                                                                                                   | <p>Researchers will undertake a variety of applied research projects which include, for example, Cambrian's Phytoextraction of Heavy Metals from Contaminated Sudbury Soils project which proposes to investigate the technique of phytoextraction for the clean-up of low to moderate concentrations of heavy metals from residential and industrial soils affected by mining and smelting. A second project proposes to develop and assess a more efficient design of an off-grid energy alternative for residential buildings in northern climates. Cambrian's final project aims to develop and optimize the design parameters and construct a prototype of a high efficiency heat battery that will allow the optimal storage of solar energy in thermal form and allow for its use, on demand, for residential application in northern regions.</p> |
| <p>Mobilizing Technology Solutions to Improve Health Care Resource Response &amp; Management During High Stress, Emergency and Disaster Events</p> <p><b>Centennial College</b></p> <p>(Entry Level Grant)</p> | <p>The overall goal of the proposed two-year Mobilizing Technology Solutions project is to engage with industries in the Greater Toronto Area that focus on the area of health care communication technology. The researchers will work with this industry sector to model strategic processes and develop smart technologies to provide timely, accurate and concise data analysis. The result will provide technology applications that maximize the utilization and deployment of health care resources, and enhance situational resilience to decrease the recovery time from critical events.</p>                                                                                                                                                                                                                                                    |
| <b>QUÉBEC</b>                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>Digital Imaging Matane</p> <p><b>Cégep de Matane</b></p> <p>(Entry Level Grant)</p>                                                                                                                         | <p>The Cégep de Matane, in partnership with Simthetiq, proposes to carry out a digital imaging project for the town of Matane. The project includes three parts: (1) implementing a 3D mapping system that uses the GPS capacity of 3G cell phones; (2) generating a 3D model of the town of Matane that will become available through the Google Earth application; and (3) collecting relevant information about the Matane region to make it accessible through an augmented reality application to people who use 3G telephones. The project will allow the town of Matane to develop new services for tourists to help them discover the community through their cell phones.</p>                                                                                                                                                                    |
| <b>Entry Level Grants - Two Years</b>                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>ROUND 2</b>                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>ALBERTA</b>                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <p>Development of a Novel Practical Approach for the Detection, Tracing and Destruction of Antibiotics and Hormones in Biowaste</p> <p><b>Grant MacEwan University</b></p> <p>(Entry Level Grant)</p>          | <p><b>MacEwan's</b> multi-faceted project seeks to develop a practical approach for the detection, tracing and destruction of antibiotics and hormones in biowaste. There is a growing public concern for the presence of antibiotics and hormones in water and soil, and their pathway to the food chain. During their lifespan, 60–80 percent of livestock are treated with antibiotics and hormones, and much of the dose is excreted unchanged or as active metabolites. The project collaborates with Highmark Renewables Research and other members of Biowaste to Energy for Canada Integration Initiative Corp., a unique, not-for-profit clean energy corporation that brings together institutions and organizations with an interest in the bioenergy sector.</p>                                                                              |



| QUEBEC                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Developing Research Infrastructure at Cégep André-Laurendeau</p> <p><b>Cégep André-Laurendeau</b></p> <p>(Entry Level Grant)</p>                                              | <p>CÉGEP André-Laurendeau wants to meet the research and technology-transfer needs of a large number of Quebec industries. One way that it hopes to do so is by supporting its two college centres for technology transfer: Optech, which specializes in optics and photonics, and the Institut international de logistique de Montréal, which specializes in logistics. It also involves establishing close working relationships with local and regional businesses and enabling the Optech College Centre for Technology Transfer to establish a centre of expertise for designing, manufacturing, and testing (including reliability and encapsulation testing) of optical components. With the resources and skills that it has developed over the years, the centre now fields a team of professionals and educators who are ready to meet the challenge of applied research.</p> |
| NOVA SCOTIA                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p>Improving the Economic Performance of Solar Energy Systems Operating in Dynamic Climate Conditions</p> <p><b>Nova Scotia Community College</b></p> <p>(Entry Level Grant)</p> | <p>The Nova Scotia Community College and Green Power Labs Inc. are collaborating on research that will improve the performance of renewable energy technologies. The college has committed to playing a leadership role in advancing the local sustainable energy industry through the establishment of an Applied Energy Research group and new research facilities in the Centre for the Built Environment. This unique green facility is designed to teach, train and showcase energy and environmental technologies for a more sustainable future using building-integrated geothermal, wind and solar energy, and advanced control and monitoring systems.</p>                                                                                                                                                                                                                     |
| ONTARIO                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p>Solar Energy Technology Research Program</p> <p><b>Georgian College</b></p> <p>(Entry Level Grant)</p>                                                                        | <p>Georgian College is investigating specific solar energy technologies that will strengthen and improve the capabilities of its corporate partners and regional manufacturers in the alternative energy sector. Its Solar Energy Technology Research Program will centralize its efforts in applied research and innovation in solar energy technologies, support innovation within Central Ontario, promote collaborations with industry partners, increase faculty expertise, and provide exceptional student learning opportunities in applied research and solar energy technologies. The overall goal is to support projects that emphasize the optimization of solar energy capture/conversion/transfer technology and systems installation.</p>                                                                                                                                 |
| BRITISH COLUMBIA                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p>New microbial bioproducts for Horticulture Phase 1 Fungal Entomopathogens</p> <p><b>Kwantlen Polytechnic University</b></p> <p>(Entry Level Grant)</p>                        | <p><b>Kwantlen's</b> two-year project launches a research and development program for new fungal biopesticides in a bioproduct "incubator" facility, with expertise from the Institute for Sustainable Horticulture at Kwantlen, industry and government. Naturally occurring fungal organisms have the potential to provide environmentally sound biological solutions to pest problems in horticulture and agriculture. Developing local strains will help address the need for biological tools for future food production and landscape preservation. Local small and medium-sized businesses partnered with Kwantlen to bring these products to market.</p>                                                                                                                                                                                                                        |

## Appendix 7

### Performance Measurement Tools for College Applied Research

#### Logic Model Framework Canadian College and Institute Applied Research Performance Measures

Goal: Enhancing Canada's Competitiveness by Building College Capacity to Support Industry Innovation

| AREA OF MEASUREMENT   | INPUTS<br>Resources<br>Contributions<br>Partnerships                                                 | ACTIVITIES<br>Processes<br>Tools<br>Events<br>Actions                                                                                                                                                     | OUTPUTS<br>Products<br>Processes<br>Services                                                                                                                                                 | OUTCOMES<br>Results<br>Changes in people,<br>organizations and<br>systems                                                                       | IMPACTS<br>Social,<br>environmental,<br>economic changes<br>over time                                                                                 |
|-----------------------|------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Impact on Institution | 1. Research office<br>2. Core budget<br>3. Core staffing<br>4. Internal grants<br>5. External grants | 1. Presentations, promotion, workshops, events to build internal capacity for applied research<br>2. Presentations, outreach, events to build external awareness of college capacity for applied research | 1. Governance structure<br>2. Policies and procedures<br>3. Training for students<br>4. R&D training incorporated into core courses<br>5. Identification of areas of research specialization | 1. Increased capacity to conduct R&D<br>2. Increased support internally for R&D<br>3. Enhanced curriculum<br>4. Membership in research networks | 1. Positive financial impact<br>2. Increased student satisfaction<br>3. Establishment of research centres/ specialized labs<br>4. Enhanced reputation |

| AREA OF MEASUREMENT                           | INPUTS<br>Resources<br>Contributions<br>Partnerships                                | ACTIVITIES<br>Processes<br>Tools<br>Events<br>Actions                                                                                    | OUTPUTS<br>Products<br>Processes<br>Services                                                                                                                    | OUTCOMES<br>Results<br>Changes in people,<br>organizations and<br>systems                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | IMPACTS<br>Social,<br>environmental,<br>economic changes<br>over time                                    |
|-----------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| <b>Impact on<br/>Company or<br/>Community</b> | 1. Investments of cash and in kind by companies or community organizations          | 1. Contacts with companies/community agencies<br><br>2. R&D needs analyses<br><br>3. R&D projects with companies/community organizations | 1. New technologies assessed<br><br>2. New products, processes or services<br><br>3. Improved products, processes or services                                   | 1. Increased awareness of college capacity for R&D<br><br>2. Increased interaction of colleges with companies or community partners<br><br>3. Companies or community partners and colleges build strategies for ongoing relationship<br><br>4. Research partner satisfaction with college R&D projects<br><br>5. Job creation<br><br>6. Increased market share or new markets<br><br>7. Companies have increased capacity and motivation to pursue R&D or confirm plans to do so<br><br>8. New business opportunities or define new application areas or new markets for existing products | 1. Economic and/or social development<br><br>2. Positive impact on community                             |
| <b>Impact on<br/>Faculty and Staff</b>        | 1. Faculty release time for R&D<br>2. Research resources, facilities, and equipment | 1. Training in R&D procedures or on new equipment                                                                                        | 1. Faculty participation in R&D projects<br><br>2. Dissemination of research results                                                                            | 1. Increased faculty/staff participation in R&D projects<br><br>2. Courses/curriculum enhancements                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1. Enhanced professional development of faculty and staff<br>2. Close links with companies and community |
| <b>Impact on<br/>Students</b>                 | 1. Support for students to participate in R&D activities                            | 1. Training in R&D procedures and on new equipment                                                                                       | 1. Student participation in R&D projects<br><br>2. Increased student awareness of industry R&D needs and challenges<br><br>3. Dissemination of research results | 1. Satisfaction rate<br><br>2. Students receive jobs with companies resulting from/linked to R&D experiences                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1. Enhanced employability                                                                                |

## Canadian College and Institute Applied Research Survey

### Industry Partner Survey

As an Industry Partner, your feedback is crucial for documenting the outcomes and impacts on the companies of working with Colleges or Institutes on applied research projects. This survey seeks to capture the impacts your organization has realized through collaboration with COLLEGE NAME.

Please review the list below and check those outcomes you believe your company achieved directly or indirectly through your collaboration with COLLEGE NAME.

| Improved Capacity for Industrial Innovation/<br>Applied Research                                                                                | Improved Competitiveness and<br>Sustainability               | Improved Profitability                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|---------------------------------------------|
| Development of new and/or improved products, processes and services                                                                             | Improved strategic and business planning and decision-making | Reduced production/operation costs          |
| Better understanding of the link between innovation and competitiveness                                                                         | Improved supply chain relationships                          | Improved access to financing and investment |
| Increased knowledge of the best practices/processes for industrial innovation                                                                   | More effective marketing efforts                             | Increased profits                           |
| Increased skill in conducting industrial innovation                                                                                             | Job retention/creation                                       | New/renewed contracts                       |
| New corporate goals to increase spending in R&D                                                                                                 | New markets                                                  | Increased value of exports                  |
| Plans to collaborate with COLLEGE NAME on future industrial innovation projects                                                                 | New clients/customers                                        | Reduced R&D costs                           |
| Increased awareness of the value of the expertise and resources available at COLLEGE NAME for supporting industrial innovation/applied research | Reduced sales cycles                                         | Reduced time to market                      |
|                                                                                                                                                 | Reduced production time                                      | Increased sales/revenues                    |
|                                                                                                                                                 | Improved financial and budget planning and management        |                                             |
|                                                                                                                                                 | Increased market share                                       |                                             |

What do you feel is the most important benefit of your collaboration with COLLEGE NAME?

## Canadian College and Institute Applied Research Survey

### Research Staff Survey

This survey is intended for staff involved with managing, administering and coordinating innovation support and applied research at Canadian colleges and institutes. Please check those outcomes you believe have occurred at your institution.

| Improved Institutional Capacity for Industrial Innovation/Applied Research                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Improved skills and competencies for managing, coordinating Industrial Innovation/Applied Research                                                                                                                                                                                                                                                                                                                                                                                                             | Industrial Innovation/Applied Research Recognized as Key Mandate for Colleges                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>New/improved policies, procedures for managing, administering and delivering industrial innovation and applied research</p> <p>New partnerships/collaborations (non-industry)</p> <p>Increased support for industrial innovation/applied research from senior management</p> <p>Increased number of projects</p> <p>Increased awareness and support for industrial innovation/applied research within the College</p> <p>Increased complexity of projects</p> <p>Increased student participation in industrial innovation/applied research</p> <p>Increased faculty participation in industrial innovation/applied research</p> <p>New industrial innovation/applied research jobs (part-time, temporary, full-time)</p> <p>Increase number of staff (non-faculty) involved in managing, administering and delivering industrial innovation/applied research</p> <p>New resources (excluding financial and human resources) for managing, administering and delivering industrial innovation and applied research</p> | <p>Increased skills in managing administering and delivering industrial innovation and applied research</p> <p>Improved access to and use of resources for managing, delivering and administering industrial innovation/applied research</p> <p>Increased understanding of the needs of SMEs for industrial innovation/applied research</p> <p>Increased skill in project management</p> <p>Improved skill in proposal writing</p> <p>Increased collaboration with colleagues at CONII member institutions</p> | <p>Increased external support for industrial innovation/applied research (non-industry)</p> <p>Local political interest/support for industrial innovation/applied research in the College</p> <p>Broader community awareness of College-based industrial innovation/applied research</p> <p>Increased external funding for industrial innovation/applied research</p> <p>Increased industry involvement in industrial innovation/applied research</p> |

Please list the 3-5 most important benefits of your involvement in applied research over the past 2 years.

## Canadian College and Institute Applied Research Survey

### Student Survey

As a Student Research Assistant working with Industry and Faculty on an applied research project, please provide feedback on the outcomes and impacts of this research activity. Please review the list below and check those outcomes/impacts you believe you have achieved directly or indirectly through your research project.

| Improved Capacity for Applied Research                                   | Improved Skills in Applied Research                                        | Improved Linkages to Industry                   |
|--------------------------------------------------------------------------|----------------------------------------------------------------------------|-------------------------------------------------|
| Development of new and/or improved knowledge related to applied research | New/improved skills in conducting applied research                         | Increased knowledge of employment opportunities |
| Better understanding of the needs of industry in research and innovation | New/improved skills in presenting results of research to various audiences | Increased linkages to potential employers       |
| Increased knowledge of the practices/ processes for R&D                  | New/improved training for students in R&D                                  | Increased employability                         |
|                                                                          | Increased student satisfaction with course/curriculum                      | Hired as a result of research experience        |
|                                                                          | New/improved equipment/facilities to conduct research                      |                                                 |

Please list the 3 most important benefits of your involvement in applied research projects over the past 2 years.

**Productivity through Innovation:  
Applied Research at Canada's Colleges and Institutes**

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