



Clean Technology in Canada's Natural Resource Sectors

Input to Natural Resources Canada (NRCan)
on the Contributions of Canada's Colleges,
Institutes, Cégeps and Polytechnics

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Colleges and Institutes Canada is the national and international voice of Canada's publicly supported colleges, institutes and polytechnics. We work with industry and social sectors to train 1.5 million learners of all ages and backgrounds at campuses serving over 3,000 urban, rural and remote communities in Canada. The Association operates in 29 countries via 13 offices around the world.

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Input to Natural Resources Canada (NRCan) on the Contributions of Canada's Colleges, Institutes, Cégeps and Polytechnics

Colleges and Institutes Canada (CICan) is pleased to provide input on behalf of its members to the federal government's consultations on Clean Technology in the Natural Resources Sector. This submission supplements what CICan has already provided in its responses to the consultations on the Innovation Agenda and the Fundamental Science Review.

CICan is the national membership association of Canada's publicly-funded colleges, institutes, cégeps and polytechnics. Known previously as the Association of Canadian Community Colleges (ACCC), CICan and its members are committed to driving Canadian prosperity by being global leaders in applied education and partnered innovation.

Canada's colleges and institutes are playing a central role in the transition to a cleaner future in two key areas:

- 1. Green skills:** equipping the workforce of tomorrow with the education and training required to meet Canada's ambitious goals to address climate change and drive clean growth. Green skills have been defined by the European Centre for the Development of Vocational Training (Cedefop) as "the knowledge, abilities, values and attitudes needed to live in, develop and support a sustainable and resource-efficient society" (Cedefop, 2012).
- 2. Clean tech R&D:** performing applied research and commercialization activities with partners in all sectors, particularly SMEs, capitalizing on the expertise, facilities and talent that colleges and institutes can provide. These activities enhance competitiveness and the sustainability of our natural resources sectors by improving products, processes and services that reduce emissions, open access to new markets and create clean jobs.

Skills and applied research are two of the areas included in a broader framework for greening technical and vocational education (TVET) developed by the UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training. The UNESCO-UNEVOC framework is a whole-of-institution approach that encompasses campus management, curriculum, community relationships and leadership, research and culture.

Colleges and Institutes Canada recently commissioned a study titled, *"The Role of Canadian Colleges and Institutes in Advancing Education for Sustainability in Canada and Overseas"* which includes an overview and assessment of current activity in furthering education in support of sustainable development. The report includes examples and case studies relevant to each of the five dimensions of greening TVET, drawn from CICan member institutions across Canada. CICan is pleased to provide Natural Resources Canada with a copy of this report, to supplement the material provided in its submissions (see Appendix 1).

Green Skills

“Green skills are those skills needed to adapt products, services and processes to climate change and the related environmental requirements and regulations” (OECD, Greener Skills and Jobs).

Colleges and institutes respond to the constantly evolving needs of the labour market for graduates with the skills and experience required to work in clean tech and the green economy. This response is developed in close collaboration with employers through mechanisms such as Program Advisory Committees, local and regional employment consultation bodies and long standing relationships that support work-integrated learning and graduate placement services.

Colleges and institutes develop green skills by embedding them in the learning outcomes associated with the curriculum of existing programs, and by developing new programs specifically focused on the green skills required by individual industrial sectors. A few examples of the many targeted programs that have been developed and launched to meet the current and future needs of the green labour force include:

- Sustainable Construction Management (Okanagan College, BC)
- Alternative Energy Technology (NAIT, AB)
- Applied Environmental Studies (Red River College, MB)
- Applied Planning – Environmental (Fleming College, ON)
- Environmental and Wildlife Management (Vanier College, QC)
- Technologie de l'environnement (Collège Communautaire de Nouveau-Brunswick, NB)
- Environmental Engineering Technology (College of the North Atlantic, NF)

CICan notes with some concern that the need to identify and develop skills to support innovation in clean technologies is not addressed in NRCan's Discussion Paper.

Recommendation:

That NRCan work with Employment and Social Development Canada and stakeholders to develop a green skills strategy that will support Canada's goals in relation to clean technology. The current and future need for green skills and jobs in clean technology should form part of the work of the new Labour Market Information Council.

Clean Tech R&D

Companies investing in clean innovation turn to Canada's colleges and institutes for applied research services that help them develop, test and bring new products and processes to market. The results of CICan's 2014-15 survey of applied research activity (see Appendix 2) revealed that more than one-third of both college and institutes' applied research centres and their areas of research specialization, and one-quarter of their research partnerships fall in the areas of environment, natural resources, and energy.

Colleges and institutes play a particularly important role in supporting the R&D activities of SMEs, which comprise 99.7% of all Canadian firms. In 2014-15, colleges and institutes worked with over 5,100 SMEs to develop and improve products, processes and services.

Many examples of clean technology R&D projects led by colleges and institutes across Canada can be found in searchable CICan's Applied Research Showcase.

They include:

- Precision Agriculture and Environmental Technologies (Niagara College, ON)
- Treating Mine Tailing Effluents in Northern Wetlands (Yukon College, YK)
- Zero Emissions Public Transit (Red River College, MB)
- Wave Energy Research (College of the North Atlantic, NL)
- Tackling the Effects of Climate Change on BC Forests (College of New Caledonia, BC)
- Sustainable Energy Technology and Energy Efficiency (Cégep de Jonquière, QC)
- Growing Microalgae for Biofuel (Nova Scotia Community College, NS)
- Electrical Vehicle Research (Georgian College, ON)

Recommendation:

That NRCan support Colleges and Institutes Canada's recommendations related to applied research, including that the government increase the funding envelope available to colleges and institutes from \$75M to \$300M per year, ramped up over five years, to support NRCan's proposed strategy related to technology development (Clean Technology Discussion Paper, p.14).

Conclusion

Canada's colleges and institutes are making substantial contributions to mobilizing the skills and solutions that will enhance competitiveness and reduce environmental impact in the natural resource sectors. CICan and its members are fully committed to helping the government reach its objective to successfully move to a greener future. We look forward to discussing the recommendations outlined above, and other opportunities to work together, with NRCan and other departments as the government formulates its action plan in response to the results of this consultation.



Member Colleges and Institutes



Colleges and Institutes Canada
Collèges et instituts Canada

Yukon

- Yukon College

Northwest Territories

- Aurora College
- Collège Nordique Francophone*

Nunavut

- Nunavut Arctic College

British Columbia

- British Columbia Institute of Technology (BCIT)
- Camosun College
- Capilano University
- Collège Éducentre*
- College of New Caledonia
- College of the Rockies
- Douglas College
- Emily Carr University of Art + Design
- Justice Institute of British Columbia
- Kwantlen Polytechnic University
- Langara College
- Native Education College**
- Nicola Valley Institute of Technology (NVIT) **
- North Island College
- Northern Lights College
- Northwest Community College
- Okanagan College
- Selkirk College
- Thompson Rivers University
- University of the Fraser Valley
- Vancouver Community College
- Vancouver Island University (VIU)

Alberta

- Alberta College of Art + Design
- Bow Valley College
- Grande Prairie Regional College (GPRC)
- Keyano College
- Lakeland College
- Lethbridge College
- Medicine Hat College
- NorQuest College
- Northern Alberta Institute of Technology (NAIT)
- Northern Lakes College
- Olds College
- Portage College
- Red Deer College
- SAIT Polytechnic: Southern Alberta Institute of Technology

Saskatchewan

- Carlton Trail College
- Collège Mathieu*
- Cumberland College
- Dumont Technical Institute**
- Great Plains College
- North West College
- Northlands College
- Parkland College
- Saskatchewan Indian Institute of Technologies**
- Saskatchewan Polytechnic
- Southeast College

Manitoba

- Assiniboine Community College
- École technique et professionnelle, Université de Saint-Boniface*
- Red River College
- University College of the North
- Manitoba Institute of Trades and Technology

Ontario

- Algonquin College
- Cambrian College
- Canadore College
- Centennial College
- Collège Boréal*
- Conestoga College Institute of Technology and Advanced Learning
- Confederation College
- Durham College
- Fanshawe College
- First Nations Technical Institute**
- Fleming College
- George Brown College
- Georgian College
- Humber College Institute of Technology & Advanced Learning
- Kenjgewin Teg Educational Institute (or KTEI)**
- La Cité*
- Lambton College
- Loyalist College
- The Michener Institute of Education at UHN
- Mohawk College
- Niagara College
- Northern College
- Sault College
- Seneca College
- Sheridan College
- St. Clair College
- St. Lawrence College

Quebec

- Cégep André-Laurendeau*
- Cégep de Chicoutimi*
- Cégep de Jonquière*
- Cégep de l'Abitibi-Témiscamingue*
- Cégep de la Gaspésie et des Îles*
- Cégep de La Pocatière*
- Cégep de Matane*
- Cégep de Rivière-du-Loup*
- Cégep de Sainte-Foy*
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- Cégep de Sept-Îles*
- Cégep de Sherbrooke*
- Cégep de Thetford*
- Cégep de Trois-Rivières*
- Cégep de Victoriaville*
- Cégep Édouard-Montpetit*
- Cégep Garneau*
- Cégep Limoilou*
- Cégep Marie-Victorin*
- Cégep régional de Lanaudière*
- Cégep Saint-Jean-sur-Richelieu*
- Champlain Regional College
- Collège André Grasset*
- Collège de Maisonneuve *
- Collège LaSalle*
- Collège Lionel-Groulx*
- Collège Montmorency*
- Collège Shawinigan*
- Cégep Heritage College
- Cégep de Rimouski*
- Institut de tourisme et d'hôtellerie du Québec*
- John Abbott College
- TAV College*
- Vanier College

Newfoundland and Labrador

- Centre for Nursing Studies
- College of the North Atlantic
- Fisheries and Marine Institute of Memorial University of Newfoundland

New Brunswick

- Collège communautaire du Nouveau-Brunswick (CCNB)*
- New Brunswick College of Craft and Design
- New Brunswick Community College (NBCC)

Prince Edward Island

- Collège Acadie Î.-P.-É.*
- Holland College

Nova Scotia

- Université Sainte-Anne - Collège de l'Acadie*
- Dalhousie Agricultural Campus, Dalhousie University
- Nova Scotia Community College

Associates

- Association des collèges privés du Québec*
- Association québécoise de pédagogie collégiale*
- Atlantic Provinces Community College Consortium (APCCC)
- BC Colleges (BCC)
- Canadian Association of Diploma in Agriculture Programs (CADAP)
- Canadian Association of College and University Student Services (CACUSS)
- Colleges Ontario
- Fédération des cégeps*
- Forum for International Trade Training (FITT)
- Tra Vinh University

* *Francophone*

** *Indigenous*

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