

The Partnership Group for Science and Engineering (PAGSE) recommends that the federal government:

- **ITEM 1. Support the coordination of scientists, engineers, and economists to estimate and communicate the cost of climate change to Canadians.**
- **ITEM 2. Work towards decarbonization of the electricity supply by 2030**
- **ITEM 3. Support smart grid technologies in northern communities**

BACKGROUND

The Partnership Group for Science and Engineering (PAGSE) is an association of twenty four professional and scientific organizations (see attached) representing more than 60,000 experts from academia, industry, and government sectors. PAGSE's mandate is to speak for the Canadian science and engineering community to the Government of Canada and to advance research and innovation for the benefit of all Canadians.

Our flagship program, the monthly Bacon and Eggheads Breakfast lecture series, brings together experts in science and engineering with parliamentarians and others to showcase outstanding Canadian research and to inform and provide insights on timely scientific issues. Many of our members are contributing to research on climate change mitigation and adaptation, as well as in clean tech and innovation. For example:

- members of the Canadian Federation of Earth Scientists (CFES) are actively involved in research and education through workshopsⁱ and initiatives such as the Atlantic Research Institute for Sustainable Energy (ARISE).
- CFES members also have extensive expertise in CO₂ capture and storage, working on projects such as Boundary Dam CO₂ capture in Saskatchewan, Carbon Management Canada's field research station in Alberta, etc.
- Canadian Academy of Engineering recently worked with the David Suzuki Foundation and the Trottier Family Foundation to address in a quantitative manner the challenge of large Greenhouse Gas emissions reductions in Canada.ⁱⁱ

Given that the topic of anthropogenic climate change is both complex and controversial, no individual can represent all of our organizations and their members. Nevertheless, this submission is based on consultations with the participating societies of PAGSE.

DISCUSSIONS & RECOMMENDATIONS

ITEM 1. Estimating and communicating the cost of climate change

Reduced dependency on fossil fuels means life style changes – how we live and how we view energy conservation and efficiency. To enable these transformations, the cost of climate change should be made clear to all Canadians. A coordinated approach among economists, scientists, and engineers would provide a comprehensive view. The impacts of climate change are well known in broad terms, but what is missing from the general discourse are concrete estimates of economic cost, not just globally but closer to home.

- ❖ *PAGSE members recommend that the federal government allocate resources to support the collaboration of these groups to come up with reasonable estimates on cost, and*

then to help communicate this information to all Canadians.

ITEM 2. Decarbonizing the electricity supply

The 2016 report from the Trottier Energy Futures Project described that carbon free electricity is one of the most cost-effective options for quickly reducing combustion emissions. This would entail replacing existing fossil-fuel fired generating facilities (coal and natural gas) with low-carbon facilities, and installing high-voltage interconnections between jurisdictions. Furthermore, interjurisdictional transfers of electricity between provinces and territories that have an abundance of hydroelectric capacity and associated storage with those that do not will need to be facilitated. Canada is positioned to be one of the very few countries that can produce emissions-free electricity at a globally competitive cost.

- ❖ *PAGSE members recommend that the federal government sets a goal of decarbonisation of electricity production by 2030.*

ITEM 3. Developing renewable energy resources for Canada's North

Remote Northern communities in Canada are not connected to the large electrical power grids available in the south. They operate as small isolated micro-grids supplying residential, business and industrial (e.g. mines) customers. Diesel fuel is used for generating electricity. Such fuel is expensive to produce and transport, and high generation costs are then passed on to Northerners. Furthermore, diesel's substantial environmental footprint, including greenhouse gas and black carbon production, compounds the problem in a region where climate change and its impact are especially troubling.

Rapid growth in the use of renewable energy sources like solar, wind, geothermal and hydro would offset such impacts. Combinations of renewable sources can be tailored to each community's needs and local availability of the energy source. For example, the Yukon and the Northwest Territories have abundant hydro potential but the large investments needed for hydro power projects are a barrier to their development in the North. Energy storage technologies, from hydro to large-scale battery storage, are the key limitation on renewable use. Smart grids are intended to work around that limitation by optimizing generation, delivery, and load of electricity.

Federal leadership in constructing smart grids is critical. Territorial governments have insufficient resources for exploring, testing and deploying renewable energy options.

- ❖ *PAGSE members recommend investment towards renewable energy in Northern communities to improve energy efficiency, enhance the reliability of energy supply and reduce costs of living in the North. This change to northern infrastructure would also help to reduce greenhouse gas emissions, facilitate new economic developments, contribute to creating jobs and training opportunities for Northern residents, in particular for Aboriginal communities, and generally support the transition to sustainable development in the North.*

Partnership Group for Science and Engineering (PAGSE) – MEMBERS

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http://www.cspg.org/CSPG/Conferences/Fall_Forum/Carbon_Capture_Storage_and_Utilization_Workshop/Conferences/Fall_Forum/CCSU.aspx?

ii <https://www.cae-acg.ca/projects/trottier-energy-futures-project/>