



Canadian Renewable Energy Alliance

promoting a transition to renewable energy

Distributed Generation in Canada: Maximizing the benefits of renewable resources

Historically, energy policy in Canada has emphasized large centralized electricity generation and long-distance, high-voltage transmission from centralized sources such as large-scale hydro, coal, natural gas and nuclear power plants. Canada's aging centralized energy infrastructure is becoming more problematic as demand for clean, reliable and affordable electricity generation grows.

North America's centralized grid system, stressed to its limits, has become vulnerable, increasingly brittle, and inefficient. Large, polluting and expensive generation and transmission is no longer an option that Canadians will accept. The centralized model is reaching the end of its period of dominance, and must be phased out in favour of a clean, robust and efficient system. In its place, a new model for electricity generation and distribution is emerging around the world: distributed generation (DG).

The U.S. Environmental Protection Agency defines DG as "small, modular, decentralized [...] energy systems located in or near the place where energy is used." Renewable energy options are typically modular, and better-suited to low environmental impact DG applications than centralized generation. DG and renewable energy are closely linked, as the transition to sustainable energy sources is resulting in a shift towards less centralized generation and grids.

Advances in power electronics and communications technology make it possible for power systems to act as sophisticated but predictable networks that can improve grid reliability through distributed nodes, in a manner similar to the Internet. The smart grid, a concept being put into practice in Europe and studied in the U.S., develops a high-tech approach to energy systems that are reliable, accessible, economical and flexible. Reducing transmission losses through better grid planning increases energy efficiency, while new technologies that utilize demand-side management, such as virtual power plants, represent an integrated approach to energy management in a decentralized electricity system, another important element of DG.

Numerous economic, social and environmental benefits that accompany investment in distributed generation. A distributed approach can improve the reliability of power systems and reduce the risk of system-wide

failure. Producing electricity near its source of use also decreases the need for expensive transmission infrastructure and reduces transmission losses, while facilitating cost-effective technologies that need to be situated near a load for electricity and heat, such as combined heat and power (CHP) applications from renewable, sustainable bioenergy sources. Distributed generation also facilitates smaller-scale siting of renewable generation, typically resulting in reduced environmental impact and increased public acceptance (particularly in the case of wind power). Of key importance to Canada's rural economies, distributed generation also encourages community economic development by allowing for local ownership and local control of energy resources, keeping revenues from generation in the community. Canada is lagging behind in the development of an energy infrastructure more compatible with distributed generation. Fully 25% of new electricity generation comes from distributed resources, compared to 13% in 2002. To be on the leading edge of this growth trend, all levels of government, along with several other actors, must take the following steps.

Recommendations for Joint Provincial and Federal Strategies

To facilitate the rapid deployment of distributed generation, provinces and the federal government must cooperate to:

- ▶ Provide access to development capital and adequate financing through innovative loan, grant and tax-based incentive programs, including low or forgivable interest loans, grants and progressive policy mechanisms to enable the participation of individuals and communities in DG, improve loan repayment and project success rates, and tap into community capital for energy infrastructure.

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- ▶ Implement effective renewable energy policy mechanisms by provincial and territorial governments with federal support, particularly Advanced Renewable Tariffs (ARTs), such as the Standard Offer Contract program in Ontario.
- ▶ Promote public and technical education on, and provide technical support for renewable energy, distributed generation and new technologies, including resources for civil society actors to implement distributed generation and educate the public, decision-makers, and tradespeople and professionals. The coordination of broad deployment and support strategies for DG could be carried out through a national renewable energy secretariat, as recommended by CanREA.
- ▶ Train and educate a skilled technician base capable of supporting integrated power systems and distributed technologies through post-secondary and certificate-based training programs, utilizing existing programs like the Association of Canadian Community Colleges renewable energy program.

Recommendations for Federal Support Measures

To continue to develop a distributed grid that makes sense for the future, the federal government must:

- ▶ Create a collaborative multi-stakeholder consortium to research and implement best practices for a secure, sustainable distributed grid, similar to the GridWise Alliance in the U.S. and the SmartGrids Technology Platform in Europe, to coordinate the development of a grid that is flexible, accessible, reliable and economical. The federal government can utilize Natural Resources Canada's five existing programs targeting interconnection to guide this process.
- ▶ Invest in innovative technologies to maximize the benefits of renewable energy and distributed generation, focusing on the aggressive deployment and commercialization of existing energy storage technologies, advanced power electronics, and other mature technologies, enabling Canadian industries to capitalize on the global transition to an era of distributed generation.

Recommendations to Provincial and Territorial Governments

To facilitate the rapid deployment of distributed generation, provinces and territories must:

- ▶ Remove barriers to grid interconnection for small-scale renewable generators by developing reasonable standards for interconnection that maximize the contributions of distributed renewable energy and ensure the protection of grid operators and maintenance personnel.
- ▶ Streamline planning and permitting processes through the development of standards for embedded generation technologies in regional building codes, reasonable electrical standards, and streamlined siting procedures.
- ▶ Provide incentives for generators and utilities to move away from the traditional motivation of selling more electricity by dissociating revenue streams away from the total kilowatt hours of electricity sold by utilities to build an energy efficient culture focused on conservation.

Recommendations to Municipal and Local Governments

Advance local solutions to multiply the benefits of DG by committing to:

- ▶ Develop community energy plans and land-use policies that support distributed generation, particularly policies and strategies that encourage the siting of distributed generation technologies to provide opportunities for improved energy security and to benefit from the revenue streams provided by distributed technologies.
- ▶ Promote innovative, local solutions to growing energy demand, engaging community members through partnerships in community / municipally-owned renewable generation.

Inspire and educate at the community level, including initiatives to:

- ▶ Lead by example in partnering with community groups to create demonstration projects that educate and encourage distributed generation technologies.
- ▶ Promote awareness and an understanding of energy issues to reduce electricity use and encourage smart energy choices as a key component of a DG vision, and to make local economies more attractive to businesses.

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