

CLEAN TECHNOLOGIES

Wind, Solar and Other Renewable-Energy Sources

- **Hydroelectricity.** Canada is the world's second-largest producer of hydroelectric energy, with total production of 348 terawatt-hours (2010). Canada's status as a leader in hydropower stems from its longstanding, homegrown technical expertise.
- **Wind energy.** Canada's installed wind-energy capacity now exceeds 5.2 GW and supplies more than two percent of domestic electricity demand. In 2011, new projects added more than 1.2 GW to the country's wind-energy capacity; projects currently under development will soon add a further 1.5 GW.
- **Solar energy.** The Canadian solar energy cluster, with a strong presence in Ontario, covers the entire supply chain from raw materials (e.g. high-purity polysilicon) to finished products; it includes system integration as well as specialized parts and components such as solar cells, mounts, inverters and control panels. Ontario's research community is involved in the full range of technologies: thin films, spectroscopy, power distribution and generation, radiation modeling, photovoltaics (PV) energy conversion and silicon refinement, along with system design.
- **Ocean energy.** Canada became active in ocean energy in 1984 with the construction of the 20 MW tidal-energy plant on the Bay of Fundy in Nova Scotia. Canada has since developed a strong reputation for tidal-generating stations and related technology and systems.

Bioenergy and bioproducts

- **Increasing biofuels production.** Production of biofuels is quickly increasing in Canada due to new technologies, an abundance of suitable resources such as corn, wheat, canola and cellulose (wood fibre), as well as supportive government policies. More than 30 ethanol and biodiesel plants already operate in Canada, with another eight at the proposal phase. In Eastern Canada, primary feedstocks are corn for ethanol and animal fats for biodiesel; facilities in Western Canada use wheat for ethanol and canola for biodiesel.
- **Biomaterials.** The development of biomaterials has increased significantly in recent years in Canada. The recent opening of the country's first nano-crystalline cellulose plant indicates that biomaterials are destined to play a significant role in the Canadian bioproducts industry.