

Powering Communities with Clean, Renewable Energy

Over the past 15 years, greenhouse gas emissions in Canada have risen over 35% and the country is currently one of the largest emitters of greenhouse gas in the world. In addition to environmental and economic repercussions, the release of greenhouse gas emissions into the air can have a detrimental effect on the health of Canadians and lead to increased risk of respiratory and cardiovascular complications. People living in Canada's northern communities are especially vulnerable, and face potentially serious consequences to traditional lifestyles, resource development and conservation.

One of the keys to reducing greenhouse emissions is to replace traditional energy sources with cleaner, renewable energy. In light of this, Mainstream Renewable Power is helping communities across the country to fully leverage their renewable energy assets. With over 16,000 megawatts in the development pipeline, they're using GIS to locate potential sites for wind farms and solar energy power plants, as well as to manage projects as they progress through the development process.

GIS for Site Selection and Project Management

Finding optimal locations for development is a juggling act in which many, often conflicting land use issues need to be considered and balanced before a potential site is targeted. For example, it is essential that the grid connection be cost effective for the size of the proposed development and that the site does not encroach on conservation areas or wetlands. Features such as roads and railways, residences, terrain and slope, and existing infrastructure must also be analyzed for currency, accuracy, and completeness to identify any potential conflicts or interference issues.

To conduct this analysis, Mainstream leverages ESRI's ArcGIS Desktop and Spatial Analyst. Through GIS, an array of datasets can be overlaid to quickly analyze information and determine the feasibility of selected sites. Sites are then chosen where the resource is adequate, where grid access is available, and where there is an abundance of suitable land. Map layers also enable Mainstream to identify areas considered undesirable for development such as protected ecosystems or national parks.

"Site evaluation involves an intensive research process that requires many questions to be answered: Where is the energy resource? What is the structure of the terrain? What are the constraining factors? With GIS technology, we can answer these questions through a straightforward layering process and identify sites that are both technically appropriate and economically feasible," observed Craig Weber, GIS Specialist, Mainstream Renewable Power.

Powering Homes in the Prairies

In Kindersley, Saskatchewan, Mainstream has secured over 2,000 acres of private agricultural land for a potential wind farm development. It is anticipated that this project, known as the Flaxcombe Wind Farm, could result in up to 60 wind turbines and potentially generate enough energy to power over 50,000 homes.

The site was originally selected for its wind resource and available grid capacity, and the project has since moved to the measurement phase. GIS is used to identify suitable locations for erecting meteorological masts and deploying SODAR measurement stations, providing a powerful planning tool for Mainstream's Energy Analysis Group.

reveals how the installation will look and how it will be integrated into the surrounding area.

"Without the participation of private landowners, our projects simply wouldn't move forward," said Mr. Weber. "Through meaningful maps, we can clearly communicate our due diligence to potential stakeholders, identify possible constraints and assure land owners that all necessary steps have been taken to ensure the safe and successful development of a wind farm."

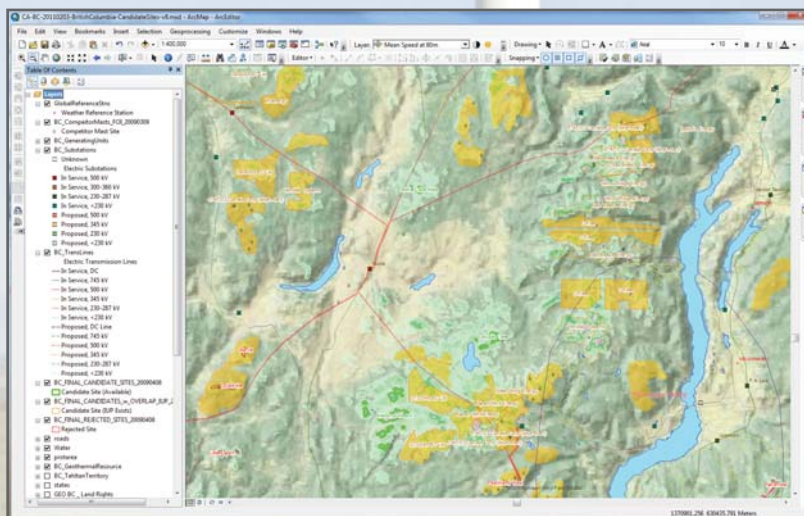
Within the next year, Flaxcombe will enter the environmental assessment phase of the project and GIS will be used to visualize bird and bat migration as well as wildlife habitat and vegetation, to ensure the smallest environmental footprint. As the project advances, Mainstream will be reaching out to local stakeholders and community groups to solicit feedback about the project.

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"We believe that wind energy is a great way to supplement the income of farmers and to contribute to the economic development in rural communities," said Steven Xuereb, Flaxcombe Wind Farm Project Manager. "Typically a project of this size would attract over 100 construction jobs and up to five permanent technical jobs, as well as provide substantial tax revenue to the Municipality."

To more effectively support project management around the globe, Mainstream is currently moving towards a server-based GIS environment. ArcGIS Server has been selected because of its ability to integrate with the organization's document management system. The integration of these two systems will enable project managers, who may be unfamiliar with GIS, to maintain and update data in a controlled and user-friendly environment. ■



A potential development site is identified through ArcGIS Desktop.

ArcGIS 3D Analyst is also leveraged to conduct viewshed analysis. The visibility of new sites should be as unobtrusive as possible with minimal impact on the landscape. For the public, authorities, and landowners involved in a project, this analysis can be very helpful because it