

# Renewable Energy for a Sustainable Future

The City of Boomtown in southern Alberta is situated within historical and present-day lands of Indigenous Peoples, as well as the homelands of the Métis Nation. The city is designing a new tourism-based resort community, EcoCity, on a patch of city-owned land. Ecotourism is a potential new industry for the region. The goal is that this community will be designed to be net-zero.

**Your company, as expert city planners, has been invited to submit a proposal to the City at the next public meeting regarding the design of this ecotourism community.** You need to incorporate community design (transportation, electricity, buildings, etc.), and consider how you will address the impacts of this community on wildlife, aquatics, forestry, soils and land use.

The population of the new resort community is aimed to be 250 people, focusing on year round nature-based tourism. Current primary industries are agriculture, manufacturing, retail, and transportation of goods.

The land that Boomtown is planning to build on is in the southern end of the city and is native grassland with patchy cover of shrubbery such as willows (*Salix* sp.), skunkbush (*Rhus trilobata*), and red-osier dogwood (*Cornus sericea*). Patches of hounds-tongue (*Cynoglossum officinale*) have been noted along the quad and walking trails that are throughout the area designated for EcoCity. This area is known to have Indigenous traditional medicines such as White sagebrush (*Artemisia ludoviciana*) and Prairie sagewort (*Artemisia frigida*), growing amongst grasslands and in open areas. These plant medicines must be undisturbed and accessible to Indigenous people without limitation.

The Young River valley nearby is covered with mature plains cottonwood (*Populus deltoides*) which rely on the springtime floods that fill the river valley each spring to regenerate. The steep side

sloped coulees that enter the river valley are classified as Regosolic soils with a coarser texture than those in the upper landscape positions. The lowest landscape positions are classified as Gleysolic soils due to periodic water saturation.

The land that surrounds Boomtown also consists of native prairie grassland. Local ranchers have used this area for decades as pasture to graze cattle. The cattle enjoy the shade provided by the willows and access water from the river. Soils of the region under pasture management predominately belong to the Dark Brown Chernozemic soil order. Chernozemic soils are formed due to mean annual water deficits and have relatively thin topsoil horizons in this area.

Besides the native prairie grasslands, surrounding areas in this region have a saline topsoil due to the saline parent material that created the soil. This poses a challenge for EcoCity, as regulations in Alberta require that topsoil is salvaged and replaced on any project that disturbs soil. Use of the saline topsoil may require remediation, and as city planners you will need to incorporate this into your plan.

The grassland is overrun with gophers (*Urocyon richardsonii*) that have created a maze of tunnels which pose a hazard to cattle and other livestock. Local landowners have recently noticed small bones and dead insects near some of the tunnels as well as several stick nests in the river valley and among the shrubs. A high school class set up game cameras and noticed hawks and some tiny owls on the footage. They're wondering if these owls could be a species at risk. Boomtown locals are aware that Swift foxes (*Vulpes velox*) reside in the area and the community falls within Burrowing owl (*Athene cunicularia hypugaea*) habitat range.

Recently, provincial biologists reported a suspected sighting of Piping plovers (*Charadrius melodus*) on beaches at a nearby saline lake, but

have not yet confirmed the plovers' presence. The biologists also alerted the town to an active Sharp tailed grouse (*Tympanuchus phasianellus*) lek and offered to take interested locals to view the unique annual mating show.

Your company understands the importance of urban forestry and aims to incorporate in EcoCity. Boomtown currently has beautiful mature Elm and Ash along the city streets, but they have noticed a few Elms have been infected with Dutch Elm disease. The nearest city 100 km to the east has just reported that they've found Emerald Ash Borer in their trees.

There are a few semi-permanent and permanent wetlands, a shallow saline lake, and a man-made lake in the surrounding watershed. The man-made lake has been stocked with rainbow trout (*Oncorhynchus mykiss*), however winter fish kills have negatively impacted the fishery. Some very large goldfish have been found in a similar lake in an adjacent county. In the summer, significant algae blooms have been linked to recent dog mortalities. There is noticeable erosion along some of the shoreline and many spots where anglers access the lake have been eroded down to mineral soil.

Boomtown is currently on the grid, however, they are considering going off-grid in this new resort community. That is something you should consider in your proposal - remaining tied into the grid or being off-grid. Being currently sourced by the grid (and according to the Alberta Utilities Commission), electricity generation in Alberta is primarily from fossil fuels. In 2022, ~84% of electricity was from natural gas and coal, with the remaining primarily from wind and some smaller sources of hydropower, biomass and solar energy. While Boomtown is considering going off-grid, there is some concern regarding the reliability and storage capacity of renewable energy, with concerns related to renewable energy infrastructure costs as well.

In Boomtown, 90% of homes are single family dwellings and the majority of homes have 2 or more vehicles associated with them, primarily running off of hydrocarbon-based fuels. Public transportation is available in Boomtown using diesel fueled buses. It is expected that there will be a greater proportion of electric vehicles in the area upon opening the resort. Boomtown is concerned about the increased electricity needed to recharge these vehicles, especially due to the inconsistent nature of EV charging and potential power supply fluctuations for existing residents. Boomtown is also concerned about the high costs associated with EV infrastructure.

Increased severity of summer storms, variability in weather patterns, and greater occurrence of high risk air quality events and heat related illnesses have been noted in Boomtown and the surrounding areas. Health practitioners and city planners are concerned about the risks with an increased number of tourists in the area.

The aim of the resort is to focus on ecotourism: getting people into nature, building relationships with nature, and education about our natural environment. Furthermore, the resort values building relationships with local Indigenous communities in multiple ways, such as bridging types of learning, knowledge and supporting communities.

In your proposal to the City, present an initial plan for the design of the new resort community, with the aim of being net-zero. Consider the sources of your electricity, transportation, types of dwellings, building materials, community spaces, recreation opportunities, attractions, etc., in addition to the environmental aspects of the region. Ensure that you consider social and economic impacts. Provide an estimated budget for your plan and include your community engagement plan and how you will get feedback from the current community on the plan.