Part 1 - Current and consequences: Understanding environmental impacts of transmission lines

June 16, 2023

This is part 1 of a series dedicated to providing insight into the common challenges that can occur in the procurement and construction of electric transmission facility projects.

In 2016, the Canadian government announced that it was going to invest $180 billion in infrastructure as part of its Long-Term Infrastructure Plan. Part of that plan included the Smart Grid Program, a $100 million investment program intended to allow the Canadian government to partner with Canadian companies to accelerate the development of so-called "smart grids," which are meant to reduce greenhouse gas emissions while leveraging current infrastructure to modernize the safe and efficient delivery of electricity to customers. In order to accommodate increased demand for electricity, while reducing greenhouse gas emissions, the size of the electricity system will not only need to grow significantly, but it will also need to become more efficient as well. Accordingly, there will likely need to be significant construction, alteration or expansion of electric transmission facilities to move renewable power from one location to the other. As a result of the environmental impacts that will inherently be suffered as a result of the construction of these electric transmission facilities, contractors are likely to face unique challenges in undertaking such construction.

In this series of articles, we will highlight, explain, and provide insight into some common challenges regarding transmission facility procurement and construction. Each article will focus on key considerations that contractors should be aware of if they anticipate bidding on electric transmission facility projects.

In this first installment, we will provide an overview of the main types of electric transmission facilities and their environmental impacts on land and wildlife, as well as certain legal implications of those impacts.

Types of electric transmission facilities

Electric power is transported through transmission systems used to carry electricity over long distances from generating stations to consumers. There are several components of

electric transmission facilities, including, among other things, transmission lines, substations, and distribution lines.

a) Transmission lines

Transmission lines are the largest component of the electric transmission process. They are large power lines that carry high voltage electricity and deliver power to substations, which redirect that high voltage electricity to consumers through the lower voltage distribution lines. Due to the highly technical nature of the building electric transmission lines, constructing transmission line towers can be an enormous undertaking for contractors, requiring them to adhere to stringent standards and regulations that are further described below.

Construction of transmission lines involves five main steps: transportation, foundations and anchors, assembly and raising, installation and site restoration. These steps can have numerous environmental impacts. For instance, the transportation of large and heavy materials often requires the construction of new access roads, a process which requires the removal of trees, topsoil and brushing. The tower assembly process may threaten plants and animals in wetlands as, oftentimes, steel plates are placed to accommodate heavy duty machinery. Similarly, the installation of conductors and counterpoise wires to ground each tower requires contractors to take precautions around wetlands, heavy traffic considerations, and excavation restrictions, among others.

b) Substations

Substations function as interfaces between transmission lines and distribution lines. Substations serve to step down the voltage that comes in through the transmission lines into suitable voltage that can be used in distribution lines, which distribute electricity to homes and other end users. Substations consist of high voltage electrical equipment such as transformers, switchgear, and circuit breakers. Construction of a new substation involves site preparation, delivery of materials, foundational work, equipment installation, and cleanup.

c) Distribution lines

The installation of distribution lines is the final step in the construction of an electrical transmission facility. These lines consist of low voltage power that transport electricity over short distances and reroute it from substations to local homes and businesses. There are two primary types of distribution lines, namely underground and overhead.

Expected adverse environmental impacts of electrical transmission facility construction

When constructing a project as large-scale as an electric transmission facility, certain environmental adverse impacts are likely to arise. Knowing what those adverse impacts might be can help better position contractors in preparing their proposals, as well as in carrying out the work. Two of the more common environmental impacts that arise on transmission facility projects are related to land and wildlife.

a) Impacts on land

Each province has environmental legislation which prescribes clear rules regarding contaminated lands or sites that have become contaminated. Part 5 of Alberta's *Environmental Protection and Enhancement Act*, RSA 2000, c E-12 (EPEA) governs the release of substances into the environment, and Division 2 of Part 5 prescribes steps that a "person responsible" must take to remediate a contaminated site. Ultimately, remediation is the responsibility of the person(s) (or the current or previous owner of the site) responsible for a substance that is in, on or under a contaminated site. Alberta has implemented a two-tier approach to address contaminated site remediation, with tier-one guidelines being generic in nature and tier-two guidelines applying to contaminated sites that may be more sensitive.

The impact that the construction of a transmission facility will have on the land depends on its topography and pre-existing land uses. For example, forested areas will need to be cleared entirely in order for construction to proceed with a practical Right of Way (ROW). In order to obtain and maintain that ROW, trees have to be cleared and their regrowth must be prevented. On agricultural lands, the construction will require traversing the ROW with heavy machinery, which may lead to a cessation of the land use for agricultural production.

To minimize these impacts, contractors may implement a myriad of mitigation measures. For example, scheduling construction activities when vegetation is not fertile may minimize impacts to wetland habitats. On agricultural lands, contractors may choose to delay construction until after harvest is over to reduce damage to crops on the lands. Making use of wide-track vehicles and matting can further help reduce soil compaction and rutting in sensitive soils and natural areas. Installing and maintaining proper erosion controls during construction can be used to minimize run-off of topsoil and disturbances to natural areas.

Further, soil samples should be collected from the ROW area before commencing construction. After construction of the line has finished, the soil in the ROW that was used to transport heavy machinery should be checked for compaction with a soil penetrometer and compared to penetrometer readings on soils outside of the ROW. If compaction within the ROW is detected, measures should be taken to restore the soil to bring it in line with the rest of the unaffected area.

b) Impacts on wildlife

The Alberta Utilities Commission, which considers environmental matters in every facility project decision, has issued environmental guidelines for the construction of transmission facilities. As part of the guidelines, those responsible for the construction of a transmission facility must consider whether the project will impact wildlife in the area. Due to the length of transmission lines as well as the fact that they are situated many metres above ground, bird mortality is a foreseeable adverse impact of transmission line construction, which typically occurs because of collision and/or electrocution. This can lead to a significant change in population size. A study undertaken in the United States of America estimated that bird deaths from electrocution are in the range of thousands per year, while collisions are in the range of hundreds of thousands to Environmental regulators try to avoid high bird traffic areas during the planning and routing stages of transmission line construction. In instances

where it is not possible to avoid these high traffic areas, contractors might implement mitigation measures such as:

- installing bird diverters;
- marking the transmission lines with brighter colours to make the lines more visible to birds in flight; and
- modifying the habitat near transmission lines to reduce its attractiveness to birds, such as growing trees near or above the height of power lines to encourage birds to gain altitude to clear the transmission lines;

all of which may result in fewer collisions.

Constructing an ROW can also form a barrier to wildlife movement, particularly small animals who are likely to avoid the ROW, and instead concentrate along its edges. In order to mitigate this impact, wildlife corridors may be constructed in a way to make it easier for wildlife to move around a project site. Construction of an ROW also results in easier access for the public to traverse the land. This can lead to easier trapping, hunting, and fishing, causing an adverse impact on wildlife populations. In order to mitigate this impact, the ROW should be expressly closed to anyone other than those involved in the construction.

From a legal perspective, Canadian courts have considered the impact of constructing electric transmission facilities on wildlife. In the case of *Goodsman v Saskatchewan Power Corp*, [1997] SJ No 204, 144 DLR (4th) 370 (SKQB), aff'd [1997] 152 Sask R 143, 145 DLR (4th) 213 (SKCA), a landowner applied to the Saskatchewan Court of Queen's Bench (as it then was) to restrain Saskatchewan Power from entering upon or expropriating the lands for the purposes of constructing a power line. Among other things, the landowner argued that construction would have a significant impact on migratory birds, and that Saskatchewan Power had failed to obtain approvals under the *Migratory Birds Convention Act*, SC 1994, c 22 (the Act). The Court rejected this argument, finding that the proposed project did not fall within the ambit of the Act or its associated regulations. Specifically, the project in question was not being built in an area which had been prescribed as a protection area for migratory birds, and therefore the environmental process thereunder was not engaged. The Court accepted Saskatchewan Power's evidence that the impact on migratory birds would be minimal. The Court noted that the shield wire marker balls proposed by Saskatchewan Power for use on the power line were effective in reducing bird collisions. The Court found that while there may be some accidental deaths caused to migratory birds colliding with the transmission line, Saskatchewan Power's expert asserted, and the Court accepted, that any such deaths were biologically insignificant. The Court ultimately dismissed the action and allowed Saskatchewan Power to proceed with the construction.

As clarified by the Court in this case, the key to dealing with adverse impacts of this kind is identification and responsive mitigation, as well as ensuring that the project aligns with the relevant environmental regulations. The construction of electric transmission facilities is not a novel undertaking, and as a result, contractors should be able to look to a number of mitigative solutions as described above.

Takeaways

The increasing demand for electricity by homeowners, industry and other end users, will require more investment into Canada's electrical infrastructure. As evidenced by the Government of Canada's massive investment in the Smart Grid Program, the construction of such infrastructure will inevitably increase, which will require contractors to plan ahead to avoid unforeseen environmental challenges. Accordingly, contractors will need to familiarize themselves with the relevant standards and regulations regarding a project's permitted effects on the environment and wildlife.

BLG routinely acts for sector leading businesses in the infrastructure and construction industries. Please reach out to any of our construction and corporate commercial lawyers below if you have any questions regarding regulatory and other considerations that may emerge when bidding on an electric transmission facility project.

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