

LESSONS DRAWN FROM THE ENVIRONMENTAL FOLLOW-UP OF THE 735-kV DES CANTONS–HERTEL LINE FROM A LANDSCAPE PERSPECTIVE

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Hydro-Quebec TransÉnergie has 30 years experience in EIA and follow-up. A follow-up study is a tool to measure a significant environmental impact and the effectiveness of a mitigation measure.

The environmental follow-up study for the 735 kV transmission line called Des Cantons-Hertel on landscape focused more specifically on the second section.

Among the main findings, the line has reduced the attractive interest provided by the "Monteregian Hills" landscape and the juxtaposition of the line to the highway appears irrelevant as a siting criteria. Despite the efforts deployed to lighten the massive structures, the residual visual impact of the line remains twofold. First, the impact perceived by local residents is similar to that of any transmission line in the countryside, irrespective of the location of the highway. On the other hand, for motorists travelling on the freeway, the impact becomes kinetic and in a pernicious way can affect local, regional and foreign travellers.

The lessons of the follow-up recommend to begin the environmental evaluation with an analysis of the spatial organization, to include new parameters such as the integrity and the identity of the landscape.

Finally, these lessons suggest : 1) to consider tower design at the very beginning of the project, 2) while taking study area particulars into consideration, 3) to focus the consultation towards reaching harmonious integration of the new infrastructure, thus taming individual requests 4) to seek a "straight line" route as much as possible.

Keywords: environmental follow-up, highway, mitigation measure, landscape, transmission line, tower design

Introduction

In January 1998, after a major ice storm deposited more than 50 mm of ice on transmission structures, many lines were down in the southern part of the province of Québec. This represented a major emergency.

In the region Montérégie located east of Montreal on the south shore of the St. Lawrence River, the ice storm hit hardest. Some people were without power for 42 days. Planners decided to build a new 735 kV transmission line between Des Cantons and Hertel substations. To accelerate the process, the project was divided into two sections. The planned line was to run an estimated 150 kilometres between the two substations. The first section (106 km) did not undergo the normal government approval process because it was an emergency; this fact was highly contested by the communities affected and was the subject of a 5-month moratorium.

After this moratorium, the second section was obliged to follow the regular procedure laid out by the province's Environment Quality Act, so that public hearings could be held.

For this second section of line, the planners first tried to lay out a route about 1 kilometre from the highway. This route ran entirely through farmland.

But because the decision at the time was to use conventional, four-footed lattice towers, all the farmers requested that the route follow the highway, since they thought the towers would mean substantial losses of farmland. The thinking was also that along the edge of the highway, the line would have a smaller footprint and be less visible to area residents. Of this 44-kilometre

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section of line, most—37 kilometres—was therefore built along the highway. The line crosses the highway five times.

Finally, the tower adopted for the second section was a lattice portal structure specially designed for the project, as no such tower yet existed for 735 kV. This choice was made well after the government approvals were received.



Figure 1. The line route was defined next to the highway for 37 km and it crosses it five times.

The environmental impact assessment report on the Hertel–Point Saint-Césaire section of the 735-kV Des Cantons–Hertel line project anticipated that the line would have a major impact on the landscape for motorists using The Eastern Township Autoroute.

A follow-up study on the territorial structure and landscape was requested to analyze this significant impact. This follow-up consequently focused on the section of line where a new lattice portal structure was used and where the route runs next to the highway.

The study comprised three separate but complementary parts:

- A **survey of motorists** (200 questionnaires) using the Eastern Townships Autoroute;
- **Focus groups** with area residents living less than 1 kilometre from the line;
- An **urbanistic and landscape analysis** intended to better define the principles of harmonious line integration.

Observations

To begin with, the major impact on the landscape described in the impact assessment proved to be as significant as expected. This impact is felt by both motorists and area residents, despite the effort made to lighten the appearance of the very large 735-kV towers.

One of the arguments that justified building the line next to the highway was that it would reduce the impact on residents. Quite the opposite has happened. The actual visual impact has turned out to be twofold and affects both residents and motorists driving on the highway. First of all, the route has had the same impact on the local population as a route in the middle of farmland because the highway was imperceptible until now. Secondly, motorists also feel the impact of the line which passes by in the visual foreground for 37 kilometres.

The analysis that emerged from the three parts of the follow-up study yielded various convergent observations.

- ***A reduction in the distinctive character of the Montérégie landscape***

Because the line, seen from the highway, is located in the foreground, it has diminished the distinctive character of the Montérégie landscape. The depth of field of the panoramic views that used to carry the eye far into the distance, where the mountains are outlined against the sky, is

now blocked by the towers in front. The resulting impression is that the horizon line has been brought closer, into the foreground. The construction of the line has consequently altered this symbolic landscape, taking away from its integrity and weakening its identity.

- ***A study area that was too small***

To respond to the emergency situation after the ice storm, phase one of the draft design¹ usually required for a project this size was eliminated. The definition of the study area was based largely on the presence of the highway, without any in-depth analysis of the territorial structure. The NIMBY phenomenon was exacerbated by the requests made at the public consultations, when people asked that the line be built far away from their property and next to the highway, without consideration for integrating the line into the landscape. The attraction of the line to the highway might have been avoided if the study area had been large enough to allow various corridors from Hertel substation to Des Cantons substation to be examined, and to afford greater flexibility in the choice of site for Montérégie substation.

- ***A debatable choice to join a line with a highway***

The present follow-up was unable to demonstrate the relevance of joining the line with the highway. The two types of infrastructure do not serve the same purposes and consequently are seldom governed by the same imperatives. Whereas a panoramic highway is designed to allow motorists to move rapidly through the countryside while offering them the pleasure of discovery—hence the interest of introducing curves—the harmonious integration of a line calls for a fairly straight route. Although the Eastern Townships Autoroute is well integrated into the Montérégie cadastral system, the line's tall structures have added a third dimension to the highway, revealing its curves that were imperceptible up to now. This gives off an impression of a lack of order in the towers' location, which spreads confusion and destroys the perception of a highway running in a straight line. The mental picture people form of the land has been irreversibly altered.

- ***Increased zigzags and highway crossings because of specific requests***

The line zigzags first of all because of the curves in the highway, which the line must follow. Here, however, the number of zigzags increased to satisfy specific requests made during the consultations. The requests agreed to meant that the highway had to be crossed several times, and led to a great formal disparity in the structures, in turn increasing the line's visual impact. The route gives the impression that there is practically a whole field of towers on the horizon, or else that there are several similar lines crisscrossing the landscape.

- ***Aesthetically pleasing lattice portal structure with a small footprint***

The new lattice portal structure is aesthetically pleasing in its straight-line version and has a small footprint. It could consequently have been used farther from the highway, out in farmland, to take advantage of the transparency of its lattices and make the best possible use of it without negatively affecting farm activities. When this type of structure is set in the background, it is actually better able to blend into its surroundings. In addition, like all towers, the lattice portal structure becomes bulky and massive when used as an angle structure. This effect is all the more noticeable when the line zigzags and is in the visual foreground.

¹ Phase one of the draft design is intended to define various corridors. This choice is narrowed down to the most preferable one, in which route variants are developed in phase two.

Because of their simpler lines, the four tubular portal structures used for the crossing over the Richelieu River introduce yet another disparity that detracts from the aesthetic value of the lattice portal structures.

- ***Creation of a new landscape unit***

The juxtaposition of the line with the highway has created a new landscape unit that acts to reduce the depth of visual field for motorists driving along it. Because the landscape is perceived from the highway only in motion, the towers flash by at high speed and virtually form a wall of structures. This phenomenon has given greater emphasis to the corridor of the highway, which previously was well integrated into the landscape.

- ***Positive effect of the row of poplars beside the highway***

A row of poplars planted in the 1970s between Sainte-Marie-de-Monnoir and the Richelieu River creates an interesting buffer effect, filtering views of the line from the highway in this area, particularly when the leaves are out.

Lessons drawn and conclusions

A number of lessons can be drawn from these observations and used to improve future environmental assessments of line projects.

- ***Carry out the environmental assessment of major projects in two phases***

The first lesson confirms the value of always analyzing a major project, such as the 735-kV Des Cantons–Hertel line and Montérégie substation, in two phases. Phase one is intended to define various corridors and host areas within a given study area, while phase two allows line routes and substation sites to be developed and compared by gradually reducing the area examined. This step should not be skipped, even in an emergency situation.

- ***Begin the environmental assessment with an analysis of the basic territorial structure and spatial organization***

A new lesson learned from this follow-up brings out the importance of beginning the assessment with an analysis of the basic territorial structure and the spatial organization. The improved understanding of the territory that this yields, coupled with the usual surveys, would allow the line to play a more effective structural role in the territory—a challenge that future projects must meet. A more concrete and comprehensive approach must be developed to incorporate the study of the territorial structure right from the start of the project.

- ***Analyze the landscape as a whole***

New parameters such as “integrity” and “identity” should be incorporated into the analysis of the landscape, in order to reveal its symbolic dimension and better understand the impact of the introduction of a line. Adding these new parameters to the landscape analysis allows its symbolic dimension to be explored more fully and thus facilitates the assessment of the impact of the introduction of a line in a particular environment. They also enhance the analysis of the visible or concrete landscape that is usually included in environmental assessments.

- **Consider tower design from the start of the project**

It is of prime importance to consider tower design, taking the host environment into account, right from the start of the project. Relating specific integration conditions to each chosen design should even be a requirement. The choice of particular tower should not be a mitigation measure, but rather an important element to be considered in developing and analyzing route variants.

- **As far as possible, look for a rectilinear route**

The selection of a fairly rectilinear route helps reduce the use of angle structures that detract from the line's harmonious integration into the landscape. Any deviation from the route should be an exception, in order to avoid the effect of a tangle of towers and the illusion that there is more than one line. A zigzag route leads to incoherence. It also introduces a formal disparity in the succession of towers.

- **Avoid joining a line with a highway**

It is also advisable to avoid joining a line with a highway, unless the highway is very far from a built-up area or runs through very unattractive surroundings. The two types of infrastructure seldom have natural affinities.

- **Guide the consultation process toward achieving a harmonious integration**

The harmonious integration of a line depends on an awareness of the real issues related to the host environment. From the moment certain siting objectives have been determined and the most relevant siting criteria have been chosen, on the basis of the major issues, consultation should be planned in order to present and justify the issues. They should then be discussed, with a view to reaching a consensus, before the process of developing routes even begins. The consultation should be intended, above all, to provide an understanding of the principles involved in siting a route so as to achieve harmonious integration.

Epilogue

Once the line was built, the decision was made to implement a major mitigation measure. Landscaping was planned on either side of the highway, over a distance of 37 kilometres, to create new visual surroundings. The following trees and bushes were planted: 1300 poplars, 450 silver buffaloberries and 200 rosebushes. The planting was completed in mid-October 2007.

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