

The Nemaska Lithium Hydroxide Conversion Plant in Canada: A voluntary ESIA using the Issue-Based Approach

Authors: Julie Dontigny^{1*}, Benoît Gagnon¹, Robert Young², Denis Isabel³, Vincent Perron³

¹Hatch Ltd, 5 Place Ville Marie, Suite 1400, Montreal, Quebec, Canada

²Hatch Ltd, 2800 Speakman Drive, Mississauga, Ontario, Canada

³Nemaska Lithium Inc., 1580 boulevard Port-Royal, suite 250, Bécancour, Quebec, Canada

*Corresponding author: Julie.dontigny@hatch.com

Context

Decarbonization of the economy is a global challenge and governments around the world are taking actions to achieve net-zero target. The provincial government of Quebec, Canada, has made a commitment to develop the Electric Vehicle Battery Market to support the decarbonization of transportation. Hydropower is the main source of energy in Quebec which makes the province an ideal location to attract EV battery industries. The Bécancour Industrial Park and Port was selected to become the main center for development for new EV battery industrial facilities.

Nemaska Lithium Inc. (NLI) has selected site no. 9 to build a plant to produce lithium hydroxide (LiOH) which is an essential component in the manufacturing of EV batteries. The mission of the company is “To be an integrated producer of lithium hydroxide and to ensure a responsible, rigorous, reliable, and profitable transformation of our resource into a high-quality product, while respecting the communities in which we operate”.

A voluntary impact assessment, why?

As many other EV battery projects have been announced, the economic boom is transforming the Bécancour region. Early in the project planning phase, NLI recognized the importance to consider sustainability and revisit decision-making processes to promote societal well-being and successful integration of EV battery projects into their welcoming communities.

The annual targeted production capacity of the new NLI facility is 34,000 tpa which is below the threshold capacity that triggers a formal impact assessment based on the Quebec legal framework [1]. Nevertheless, NLI decided to carry out a **voluntary environmental and social impact assessment (ESIA)**.

Fast development of new industrial facilities to produce EV battery materials is certainly creating enthusiasm within the population. Not only is it a step in the right direction to support the decarbonization of transportation, which account for about 50% of the GHG emitted in Quebec, it is also expected that the new EV market will contribute to the prosperity of the province and country. On the other side, there are concerns with the consumption of finite mineral resources, use of land for industrial parks, and the capacity of the socio-economic systems to accommodate an increasing population of workers relocating to regions where EV battery market is being developed.

The decision to carry-out a voluntary ESIA was part of an effort to de-risk the Project through open dialogues with local communities to address their rights and needs. The voluntary ESIA also helped to determine effective mitigation measures to minimize negative impact and inequitable outcomes on the receiving biophysical and human environment.

NLI hired Hatch Ltd. to manage and deliver the ESIA and Transfert Environnement et Société (TES) to coordinate stakeholder engagement activities. NLI, Hatch and TES collaborated to ensure the ESIA would translate into tangible results that could be incorporated into planning and management activities throughout the Project life.

The ESIA effort focused on the identification of actions that could enhance wellbeing and prosperity for the regional communities, promote Indigenous Heritage, protect biodiversity, and support the objective of NLI to develop a resilient and sustainable industry. The team determined the best approach to meet the objectives would be to carry-out an *Issue Based Impact Assessment*.

Issue Based Approach to Deliver the Impact Assessment

In a context of energy transition and emerging EV market, the issue-based approach was deemed appropriate because it enables an assessment of Valued Environmental Components (VECs) focused on key issues. It was also considered important to prepare an impact assessment report that would be easy to read and understand the linkages between issues and VECs. Impact assessments by issues are recognized to produce summary report that are more friendly to read.

Since 2017, the issue-based approach has been the preferred approach in the province of Quebec to carry-out impact assessment. Although the ESIA was carried-out on a voluntary basis, the provincial guidelines on issue-based impact assessment were followed meticulously [2].

Nine issues were determined based on:

- 1- concerns expressed by stakeholders and local authorities during the first round of public consultations.
- 2- Findings from baseline studies carried-out to characterize the biophysical and human environment conditions before Project.
- 3- preliminary discussions held between the W8banaki Indigenous community and NLI.

Valued environmental components (VECs) likely to be affected by the project activities were also determined in relation to the issues identified. Table 1 presents the list of issues and VECs considered.

Table 1 List of Issues and Valued Environmental Components (VECs).

Issues	
1. Management of process waste	6. Public health and safety
2. Increase in road and rail traffic	7. Socio-economical expectations
3. Climate changes	8. Biodiversity
4. Protection of wetlands, water bodies and underground water	9. Rights of the W8banaki Indigenous Community
5. Quality of life	
Value Environmental Components (VECs)	
<ul style="list-style-type: none"> • Circular economy • Ambient noise • Greenhouse gases • Soil quality • Quality of surface and underground water • Wetlands • Air quality • Quality of life and public health of non-Indigenous communities 	<ul style="list-style-type: none"> • Quality of life and public health of Indigenous communities • Landuse • Landscape • Health and safety of workers • Regional economic spin-off • Standard of living • Wildlife and Flora of Cultural Significance • Terrestrial and aquatic fauna

For each Project phase, the main sources of impact were identified along with the activities likely to affect the VECs. Mitigation measures were carefully identified to reduce negative effects. Residual impacts were assessed based on: intensity, duration, spatial extent, probability, and reversibility.

Some residual impacts were determined positives while negative impacts were classified as minor, medium or major. For more details, the reader is invited to consult the full impact assessment report [3].

From negative impacts to positive outcomes to create a Just Transformation

The issue-based impact assessment revealed to be a strong tool to support NLI with the implementation of a resilient business that would contribute to local prosperity, well-being of local Indigenous and non-Indigenous communities while improving social acceptability including change in land use. It also helped to minimize adverse effects on biodiversity and enhance Indigenous traditional knowledge.

Below is a list of key issues, potential impacts, and proposed mitigation measures.

- **Issue: Road traffic is expected to increase especially during construction period.** Site layout has been developed to divide workers into 2 parking lots and improve traffic fluidity during entrance and exit periods. NLI is also engaged with the Provincial Regulators to identify improvement measures such as: optimal synchronization of traffic lights and enlargement of certain sections of roads.
- **Issue: About 324 000 tpa of process residues (non-hazardous) will be produced during exploitation phase.** NLI is committed to participate within 5 years after commissioning to the creation of a regional circular economy and has already engaged with the National Research Council of Canada to develop R&D projects and other local partners. Until circular economy is implemented, residues will be disposed in a landfill located at 4 km from the plant. Prior disposal, residues will be dried to reduce weight and stored onsite in closed silo to prevent dust dispersion. All residues will be landfilled in a dedicated cell to facilitate later retrieval.
- **Issue: The project is expected to produce significant regional economic benefits** which creates expectations regarding employment and commercial opportunities. In a context of regional labor shortage, NLI is strategically engaged with regional educational institutions to develop training programs tailored to the needs of the lithium industry and emerging EV battery market. NLI will collaborate with the W8banaki First Nation to offer employment and commercial opportunities to Indigenous entrepreneurs. NLI will also communicate clearly with local stakeholders about future labor needs, commercial opportunities, and timeline to prevent unfair business competition and drainage of labor from small size enterprises to the benefit of large companies. NLI is actively involved in the development a local purchasing policy.
- **Issue: Activities that will take place throughout the Project life cycle have the potential to affect the quality of life of local communities.**
 - o Impact on air-quality and ambient noise levels at sensitive receptors were assessed by performing simulations with specialized software (AERMOD and CadnaA). To reduce negative impacts, NLI opted for low airborne emissions and best abatement technologies. As much as possible noisy equipment and operations will be located inside buildings.
 - o Change in land use will impact recreational activities that used to take place on the site. NLI is engaged with “Vélo Québec” in an initiative to relocate a bicycle path named “Route Verte” located on the site of the Project.
 - o A landscape study confirmed the visual impact of the project would be minor.
 - o The arrival of a significant number of new workers in the region may **increase pressure on health systems and public services**, as well as the need for housing and services for families. It may also lead to an **increase in negative social behaviors and**

- increase tensions between certain groups of residents.** NLI is committed to supporting local community initiatives aiming to develop targeted social investment programs. To protect public safety, NLI will develop a code of conduct and training material to educate workers on diversity, gender issues and Indigenous culture.
- A communication plan will also be implemented to keep local stakeholders inform and report complaints.
- **Issue: The construction of an industrial facility on a land previously dedicated to agriculture is increasing pressure on vegetation, fauna and fish habitat, wetlands and surface water.** No species at risk were identified on site, the quality of habitat surveyed was low, and most wetlands were determined of low ecological value. Still some considerations were made to minimize effects on biodiversity and surface water:
- Deforestation activities were planned outside restricted periods.
 - Best design was implemented to manage runoff water and protect fish habitat.
 - Site layout was developed to minimize encroachment on water bodies.
 - One wetland identified with higher ecological value was protected.
- **Issue: The Project site is located on the ancestral land of Ndakina. It was part of the objectives to implement best practices in terms of Indigenous engagement and establish a collaborative approach with the W8banaki Nation** very early in the Project and contributed a dedicated chapter of the impact assessment. In line with the precautionary principle, the W8banaki Nation raised concerns about the impact the Project would have to species with cultural importance for the Nation such as Black Ash and Sweetgrass as well as small game and their habitat. Among others, concerns were also expressed about the loss of access to the Ndakina territory to practice traditional activities and transfer cultural knowledge between generations. The W8banaki also indicated their interest to collaborate on the Project to create positive outcomes for their community. Throughout open dialogue between the W8banaki and NLI, some engagements opportunities were identified to mitigate the impact of the Project on the Rights of the Nation including, without limiting to:
- Participation of the W8banaki technical specialists to carry-out archeological study and small game survey.
 - Plantation of Black Ash for site landscaping.
 - Collaborate with the W8banaki Nation on other projects with a social vocation or dedicated to environmental protection.
 - Develop an Indigenous employment strategy.
 - Develop training material about Indigenous realities and culture to address diversity and inclusion.

Conclusions

The fast development of the new EV battery market in the Industrial Park of Bécancour in Quebec, Canada is raising interests among the local communities and the W8banaki Nation. Early in the Project, NLI recognized that sustainable transformation is possible if communities and stakeholders are consulted to understand how the Project and the development of the new EV battery industry would impact them. As a result, NLI decided to complete a voluntary ESIA as part of an effort to de-risk the execution of the Project. The issue-based approach was selected because it enables assessment of transformation through VECs focused on key issues. This methodology was appealing to share information about the Project in a convivial format that would speak to the reader while remaining technically robust. NLI positioned as a leader in terms of sustainability throughout the

voluntary ESIA and outcomes from community engagement activities contributed to the optimization of the Project.

References

[1] MELCCFP, Regulation respecting the environmental impact assessment and review of certain projects (Q-2, r.23.1)

[2] MELCCFP, « Guide sur la méthode d'analyse des impacts structurée par enjeux », 2021.

[3] Hatch, Usine de production d'Hydroxyde de lithium à Bécancour, Rapport d'évaluation environnementale et sociale préparé pour Nemaska Lithium Inc., 15 chapters, October 2023.
<https://www.consultationsnemaskalithium.com/evaluation-environnementale-sociale>

[4] Nathan J. Bennett, Jessica Blythe, Andrés M. Cisneros-Montemayor, Gerald G. Singh, U. Rashid Sumaila, Just Transformations to Sustainability, Sustainability 2019, 11 (14):3881.