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## 7.0 Assessment Summary and Conclusions

This Registration document includes all the elements for a comprehensive environmental assessment, according to (1) the *Guidance for Registration of Onshore Wind Energy Generation and Green Hydrogen Production Projects*, (2) *Environmental Assessment: A Guide to the Process*, and (3) the *Environmental Assessment Regulations (2003)* under the **Environmental Protection Act**.

For this Undertaking, predictions were developed for:

- The future condition of the environment in the absence of the Project;
- The predicted environmental effects of the Undertaking, including the effects of Accidents and Malfunctions (Unplanned Events);
- The effects of the environment on the Project; and
- The cumulative effects of the Project when combined with the effects of past, present, and planned projects/activities.

The scope of the Project includes a modest Project infrastructure footprint, mostly limited to the private property of the POA. Temporal, spatial and administrative boundaries were established for the Project, terminology was standardized, and the assessment methodology was developed through consultation with appropriate agencies.

Effects predictions for the Project were derived from empirical results. In all cases, conservative assumptions were made, especially where Project details (e.g., final designed turbine and transmission structure siting) are yet to be determined, or where alternatives were still under consideration.

### 7.1 Assessment Summary

The future condition of the environment in the absence of the Project would be a presumed continuation of the status quo for the area. The private land of the Backlands would remain in its mosaic condition of several ecotypes of forest, wetland and scrub, and anthropogenic use would be primarily limited to outdoor enthusiasts. Meanwhile, the Argentia Peninsula would continue to be dominated by industrial anthropogenic use. However, accompanying the status quo would be the forgone benefits of the Project to the region associated with socio-economic benefits to the economy, employment, business, and community health.

The effects of the environment on the Project will be predominantly attributed to climate change predictions for increased variability in storms and storm surges, precipitation, and temperature. These phenomena have been considered in Project design. Meteorological monitoring stations will characterize and model local climate phenomena throughout the Project life.

Several other projects could contribute to cumulative environmental effects for the Project Area, LAA, and RAA. One notable planned undertaking is the Cooper Cove Marine Terminal Expansion (Registration No. 2279) at the POA, which has been released from provincial and federal environmental assessment.

The Project effects assessment (below) incorporated (as a Project phase) the effects of Unplanned Events (Accidents and Malfunctions).

## 7.1.1 Project Effects Assessment

The following text is intended to provide an overview summary of the results from the detailed assessment presented in Chapter 4.0. Refer to Chapter 4.0 for detailed explanations of the interactions with Project phases and activities, descriptions of effects predictions (by KI), details on mitigation and monitoring measures, and the rationale for each effects prediction.

### Atmospheric Environment

This VC comprises airborne contaminants, greenhouse gases, light, noise and vibration. Modelling was conducted to provide quantitative predictions for each. Interactions were identified for all Project phases, including Unplanned Events. A specific Energy and Emissions Study (Appendix H) was conducted to provide emission rates and dispersion for the Construction and Operation and Maintenance Phases. Conservative assumptions were employed throughout.

Greenhouse Gas (GHG) emissions were a high priority for the Atmospheric Environment. Results from modelling indicated that atmospheric levels of GHGs will not be measurably changed because of the Project. From a GHG perspective, the Construction and Operations and Maintenance Phases will have low GHG emissions, with the only possible exception being the marine shipping of the ammonia overseas during Operations. Decommissioning will also have low GHG emissions. Since the primary goal of this Project is decarbonization, the Project will produce ammonia from renewable energy (i.e., instead of using natural gas as is common around the world) and the Project will likely have a net positive benefit concerning GHGs.

The extent to which artificial lighting and sound will affect receptors (including nearby residents) was modelled. Given the Project location, there will be limited potential for interactions of receptors with Project lighting. Modelling results indicate the Project will be in full compliance with applicable guidelines

associated with light emissions. Modelling of turbine blade noise was based on the worst-case scenario (i.e., the largest turbines possible for the Project were modelled, even though their likelihood of being employed was extremely low). Construction noise was predicted to have a minimal to negligible effect on nearby receptors. During Operations, noise levels will also remain within guidance levels.

Due to the establishment of minimum setback distances of at least the greater of 600m or 3.0 times the blade tip height of the wind turbines sensitive receptors will not be impacted by vibration, therefore vibration was considered negligible.

### **Aquatic Environment**

The Aquatic Environment encompasses both freshwater and marine environments, with the freshwater environment likely experiencing more interaction with the Project given that the only marine interactions would be through the shipping of product and the outfall of wastewater.

Surface water will be required for the Argentia Green Fuels Facility and will interact with construction activities. Therefore, both surface water quantity and quality were considered for the assessment. The assessment was based on regulatory standards and guidance to protect water quality, including for outfalls and discharges. Surface water resources will experience disturbance associated with civil construction, especially in the Argentia Backlands where access roads and tower foundations will be constructed. By applying proven mitigation measures (e.g., stormwater controls, Project drainage plan), there will be minimal and ephemeral effects on water quality. During Project Operations, there will be a steady extraction of freshwater for the Argentia Green Fuels Facility. Approximately 80% of the inflow water will be released for marine discharge, with minimal change in water quality and adherence to provincial regulations. An examination of hydrological cycles confirms the capacity of the selected watersheds to provide this quantity of water without compromising other uses. Argentia Renewables commits to the curtailment of water use if water quantity becomes a concern for the other users.

Groundwater in the Project area is not planned to be utilized to meet Project requirements and there will be few aspects of the Project that will interact with groundwater. The potential effects of the Project on groundwater are considered minimal.

Small portions of the watersheds within the Project Area will be affected by habitat alteration and changes in streamflow rates during the construction of access roads, transmission lines, and turbine foundations. These short-term disruptions will be subject to a set of standard mitigation measures to avoid or minimize negative effects. During the Operations Phase, there will be minimal to negligible interactions.

Interactions with marine fish and fish habitats could result from surface runoff during Construction (although that interaction is unlikely to be significant) as well as freshwater discharges at an industrial outfall. Compliance with regulatory standards will reduce or eliminate potential negative effects.

Local fisheries and aquaculture operations in the LAA and RAA will not be meaningfully impacted by Project construction or the monthly product shipments during Operations. The FFAW has been consulted and was not concerned with the level of marine interaction of this Project.

Several freshwater and marine SAR were identified as present or potentially present in the RAA. However, there were no interactions identified that would affect these species or the areas containing habitats of conservation concern.

Aquatic invasive species can be present in ballast water or attached to vessel hulls. Several such species are currently present in Placentia Bay, and DFO has taken measures to limit their spread. All appropriate precautions will be taken during vessel operations to prevent the introductions or spread of invasive species.

## **Terrestrial Environment**

The major biophysical interactions resulting from the Project will be with the Terrestrial Environment. Extensive field surveys were conducted on several KIs to support the effects assessment. First, an Ecological Land Classification (ELC) was conducted to serve as the foundation for assessing habitats for KIs and for stratifying field surveys by habitat type. Interactions with flora and fauna could then be assessed according to the habitats present within the Project Area (or LAA, if necessary). While many of the interactions with the Terrestrial Environment VC will occur during the Construction Phase of the Project, several will continue during Operations and Maintenance, including perhaps the most important interactions, with avifauna and with SAR bats and avifauna.

Some areas of vegetated land will be altered, lost, or fragmented due to the development of Project infrastructure like roads, transmission lines, and turbine foundations. Any habitats known to contain SAR plants or lichens will be avoided during site planning (e.g., the yellow birch stands known to contain blue felt lichen).

Wetlands are primarily represented by many bogs and fens (and complexes of each) in the Backlands portion of the Project area. Planning the road routes and turbine locations to avoid and minimize effects on wetlands will help minimize any direct wetland loss, and special precautions during construction near wetlands will avoid or minimize interactions.

For the brownfield portion of the Project Area (i.e., the Argentia Peninsula,) the anthropogenically altered landscape limits the potential for many terrestrial species, especially those that are habitat specialists of forested landscapes. Most of the species using the Argentia Peninsula would be limited to habitat generalists (that are rarely of any conservation concern) or those that specialize in disturbed (e.g., water pygmy-weed) or open habitats (e.g., Short-eared Owl). A greater number of interactions are possible in the Backlands portion of the Project Area due to the more forested nature of the area, and the mosaic of different species compositions and age structures provides niches for a diversity of species to use the area. Bird species surveyed were comprised of a typical suite of resident and migratory species. Generally, during the temporal window of Construction, there will be avoidance behaviours exhibited for many species of birds and mammals. Road, transmission line, and turbine foundation construction will fragment habitats for some species, but mitigation measures (e.g., using existing roads and disturbed areas) will help reduce the potential for negative effects. The Operations Phase will likely have an overall reduction in potential interactions from a species diversity perspective, due to reduced activity. However, wind turbine operation will provide the possibility of continuing interactions with some species, including bat and bird SAR.

The SAR observed in the Project Area included four birds, four bats, two plants, two lichens, and one insect species. Additional survey time was allocated to ensure all SAR using the Project Area had a higher probability of detection. A draft Species at Risk Impacts Mitigation and Monitoring Plan (SAR IMMP) (Appendix R) was developed and includes a suite of proposed mitigation and monitoring measures that were developed through consultations with regulatory agencies and scientific literature. As more Project planning and implementation is conducted, adaptive management principles will be incorporated to ensure that appropriate mitigation measures will be applied during all Project phases.

An extensive suite of mitigation measures was compiled in consultation with Newfoundland and Labrador Wildlife Division, and mitigations will be implemented during all Project phases. As a result, there will be no significant negative residual environmental effects from the proposed Project on the Terrestrial Environment VC. Collisions with turbines by SAR bats and birds will be monitored extensively with a Post Construction Monitoring Plan (Appendix S), and a curtailment schedule will help protect SAR bats during their most vulnerable temporal windows.

## **Land and Resource Use**

The Land and Resource Use VC included several KIs, including Zoning, Commercial and Industrial Resource Use, Recreational and Subsistence Resource Use, Protected, Special and Sensitive Areas, and Indigenous Land Use. Given the location of the Project Area (primarily within the boundaries of private property owned by the POA), there were few potential interactions of concern. The Project is within the Town of Placentia municipal boundaries and complies with most existing zoning (applications

will be submitted where changes are required). The Project has the potential to affect access to mineral land tenure, but the location of properties is such that no direct conflict results.

The Canadian Coast Guard Vessel Traffic Centre is supported by a radar system within the POA property. A detailed examination of wind turbine and permanent meteorological tower locations, in consultation with the Canadian Coast Guard, will ensure there is no unacceptable interference with the operation of the radar system. Several consultations have taken place with the Canadian Coast Guard, and it is anticipated that several turbines will be relocated in the final Project wind turbine layout to avoid interference.

Recreational and subsistence activities are common in the Project Area, particularly in the Backlands, but the Project will result in minimal interference with these usages. A planned hiking trail expansion (by Hike Placentia Inc., Registration 2257) is being developed and includes the Backlands. This trail system may avail of Project linear features, with routing selected to ensure safe access along the trail. The Project is working closely with Hike Placentia Inc. to ensure not only mutual compatibility between the Project and the hiking trail expansion but also collaboration (e.g., incorporation of wind energy into educational components of the hiking trail expansion).

### **Heritage and Cultural Resources**

A review of known and potential archaeological resources identified some areas where precautions will need to be taken, but there are no sites in direct conflict with the Project footprint.

### **Socio-Economic Environment**

This VC was assessed in terms of Community interactions, as well as Economy, Employment and Business.

Community population growth, as well as changes in age structure and diversity, were considered. Community health and well-being was examined with respect to education, income, housing, food security, health and social services, and diversity, equity and inclusion. The consideration of community infrastructure and services included water and sewer, waste management, transportation, utilities, communications, emergency and prevention services, and recreation.

The local economy, employment and business were examined in terms of GDP, tax revenue, labour supply, employment equity and diversity, other economic sectors, and capacity and growth.

Overall, the effects on the local communities will be positive, given the size and duration of the Project. The effects on socio-economic factors will be generally positive for the regional economy, employment

and business. The presence of Argentia Renewables at the POA industrial site will contribute to increased employment through direct hires, as well as associated economic activity, leading to improved stability of demographics, community health and well-being. Additionally, the Project will develop, in consultation with community stakeholders, a community benefit program to advance civic interests in the area that will include not only specific projects (e.g., working with Hiking Placentia Inc., long-term funding of the Cape St. Mary's Ecological Preserve) but also general funds that will be used based on community stakeholder priorities).

### **Human Health and Quality of Life**

Many of the interactions with the potential to affect human health and quality of life were considered under other VCs. Atmospheric Environment included assessments of air quality, GHGs, light, noise, and vibration. The results of modelling concluded there will be no significant negative residual effects from these interactions.

Recreational and Subsistence Resource Use were considered under the Land and Resource Use VC and it was concluded that there will be no significant negative residual effects, and may perhaps result in a net positive given the creation of a new hiking trail and the potential contributions that Argentia Renewables will be able to make to that trail system.

Shadow flicker and ice throw from wind turbine blades during Operations were considered in the Human Health and Quality of Life VC. Shadow flicker occurs when sunlight passes through the moving blades and results in a moving shadow. Modelling indicated only one potential wind turbine location where mitigation measures may be required to reduce or avoid this interaction. Ice throw can occur during changes in air temperature such that accumulated ice on the turbine blades is thrown from the turbines. Modelling produced estimates of ice throw distances under extreme conditions. In no case do the distances reach residences or properties adjacent to the Project Area. Moreover, additional mitigation measures have been implemented on top of residence setback distances (e.g., all wind turbines will be equipped with winter weather and deicing features).

## **7.2 Assessment Conclusions**

There are no predicted significant negative residual environmental effects of the proposed Project on the environment. The two key considerations were concerning SAR (i.e., the collision of SAR birds and bats with turbine blades) and the potential effects of catastrophic Unplanned Events (e.g., hydrogen leak with fire, ammonia leak).

There are several uncertainties associated with the effects on SAR, especially bats. Population estimates are unclear due to a general lack of survey effort in the province, migratory routes for certain species are



unknown, and responses to mitigation measures are unclear. The Province has taken a cautionary approach with curtailment guidelines and Argentia Renewables is committed to adherence to these standards. In addition, a draft Species at Risk Impact Mitigation and Monitoring Plan and Post Construction Monitoring Plan have been included in this Registration document (Appendices R and S, respectively). However, the Project has committed to operational seasonal curtailment to minimize impacts to bats as well as state of the art technology to refine operational minimization of bat impacts (e.g., thermal cameras and acoustic monitoring utilizing machine learning to develop 'smart' curtailment).

Using a risk assessment approach, modelling was carried out for “worst case” scenarios for Unplanned Events. The two possibilities with the potential for severe consequences would be the uncontrolled release of plant products – hydrogen and/or ammonia. Modelling indicated that the effects in both cases would be brief and confined to the Argentia Peninsula. Measures will be taken to ensure that the risk of such incidents would be extremely remote, and a high level of emergency preparedness will be at the core of Argentia Renewables Environment, Health, and Safety Management System.

Overall, most interactions will occur during Project Construction, over a proposed 29 month period. During this time a suite of standard mitigation measures will help avoid interactions, minimize effects, or both. Interactions with VCs will decline during Operations and Maintenance, but some will require monitoring and adaptive measures (in particular to address concerns with SAR). Once in the Operations and Maintenance Phase, there will be minimal other interactions with the biophysical environment but continuing positive interactions with the surrounding communities. Interactions during Decommissioning and Rehabilitation will be similar to, but reduced from, Operations and Maintenance. Unplanned Events are unlikely to result in interactions that result in significant negative residual effects.

The overall conclusion of the Environmental Effects Assessment for this Project Registration is that there are no significant negative residual environmental effects predicted for the proposed Argentia Renewables Project. Given the small spatial scale (relative to other proposed wind-to-hydrogen projects) and the environmental and socio-economic benefits of this Project, it is reasonable to conclude that there are few predicted negative environmental effects but many positive effects.