Feedback Form

Long-Term 2 (LT2) RFP – February 15, 2024

Feedback Provided by:

Name: Brandon Kelly

Title: Senior Manager, Regulatory and Market Affairs

Organization: Northland Power Inc.

Date: February 15, 2024

To promote transparency, feedback submitted will be posted on the Long-Term RFP engagement page unless otherwise requested by the sender. If you wish to provide confidential feedback, please mark "Confidential".

Following the LT2 RFP February 1, 2024, engagement webinar, the Independent Electricity System Operator (IESO) is seeking feedback from stakeholders on specific items discussed during the webinar. The webinar presentation and recording can be accessed from the engagement web page.

Please submit feedback to engagement@ieso.ca by February 15, 2024.

Revenue Model

Topic	Feedback

Do you have any additional comments regarding the revenue model, particularly with regards to the following: Deeming energy market revenues based on real-time locational marginal prices (LMP), as opposed to the IESO's recommendation of basing this on the day-ahead LMP. (Slides 19-21)

- The optionality of using either a simple average day-ahead price or weighted average LMP, with the latter including hours where the resource was scheduled day-ahead in a given month. (Slides 22-23)
- Including monthly production factors that on average equate to the annual production factor, in order to further account for seasonality. (Slides 24-26)

Day-Ahead to Real-Time Risk

Market Renewal will introduce a financially binding day-ahead (DA) market to Ontario. Resources scheduled in the DA market will be responsible for any deviations in their DA to real-time (RT) schedules; To the extent a resource produces less in RT than scheduled DA, it will be responsible for buying back the difference at the RT market price. In the context of this Enhanced PPA discussion, this is what's defined as DA to RT ("DA/RT") risk.

DA/RT risk is particularly pronounced for variable generators like wind and solar. Unlike gas-fired and storage resources that can reliably plan their operations day-ahead, variable generators must rely on forecasts of wind speed and solar irradiance to estimate future production. As recognized by the IESO, these forecasts are largely unreliable until the hours directly leading up to real-time, if at all. As a result, variable generators can offer little to no certainty on their production volume for the following day. Nevertheless, under the DA market these resources will be asked to provide the same production certainty as other controllable resources. If resources over-forecast production DA, they will need to buy-back the shortfall at RT prices that are potentially far higher.

The DA market is about providing operational certainty to the IESO and controllable resources. Variable generators are incapable of providing that certainty; In other words, they're incapable of mitigating DA/RT risk. Nevertheless, the Enhanced PPA as proposed misallocates DA/RT risk to project proponents by calculating Deemed Energy Revenue based on the DA market price, with no consideration for the RT price. This leaves proponents with two options:

1. Offer all forecasted production into the DA market, increasing the likelihood that DA market revenue will roughly match Deemed Energy Revenue under the contract. While this has the benefit of better aligning market operations with the hedge provided by the contract, it exposes the project to maximum DA/RT risk. Forecasting the extent of this risk is not possible given the absence of experience with Market Renewal and the absence of an analog in

the current market to approximate future impact. To protect against this difficult to forecast DA/RT risk, the proponent would need to increase its RFP bid price.

2. Projects can hedge against DA/RT risk by offering an amount into the DA market that is very conservative, decreasing the likelihood the project will need to buy back unrealized production in RT. While this serves to reduce, albeit not eliminate DA/RT risk, it comes at the cost of structurally misaligning market operations from assumed contact operations, thus reducing the efficacy of the contract as a hedge. Furthermore, the intentionally conservative approach to DA offers provides the IESO with a distorted supply/demand picture DA, necessitating costlier resources to be scheduled.

Having project proponents accept DA/RT risk under Option 1 necessitates higher RFP bid prices, while leaving project proponents to hedge against this risk under Option 2 decreases the utility of the contract and leads to market inefficiencies. These outcomes strongly suggest that allocating DA/RT risk to project proponents would be a misallocation of risk.

The IESO, with its 10+ years experience centrally forecasting variable generation in Ontario, is better suited to forecast DA/RT production risk for variable generators. Furthermore, even if the IESO and project proponents were equally skilled at this type of forecasting, recall that the DA market is about providing operational certainty to the IESO, not variable generators. The IESO is naturally incented to mitigate DA/RT risk, variable generators are not. So, while the IESO could allocate DA/RT risk to project proponents, it comes at the cost of higher RFP bid prices and inefficient offer behaviour, whereas it comes at no additional cost to allocate this risk to the IESO.

The Enhanced PPA misallocates DA/RT risk to project proponents by calculating Deemed Energy Revenue based on the DA market price, with no consideration for the RT price. In order to allocate this risk more appropriately, Deemed Energy Revenue under the contract should be calculated using the RT price. In order for the IESO to get

the most accurate supply picture DA, it could require project proponents to offer their IESO centrally-forecasted production into the DA market, and to the extent DA revenue differs from RT revenues, reverse those revenues via the contract (the same approach as being taken with existing FIT and LRP contract amendments for Market Renewal). The resulting net revenue from the contract, DA market, and RT market would equal the contract bid price, and project proponents would no longer be subjected to DA/RT risk.

Recommendation: To improve operational certainty in the Day-Ahead Market and lower ratepayer costs, Day-Ahead to Real-Time risk should be allocated to the IESO, not project proponents. The Enhanced PPA can achieve this by deeming energy market revenues based on Real-Time, and then reversing the impact of Day-Ahead Market settlement via the contract (the same approach as being taken with existing FIT and LRP contract amendments for Market Renewal).

To the extent the IESO is concerned about this approach distorting or dampening market signals, this is not the case. Adopting a contract structure that incents or requires variable generators to offer their best guess of next day production into the DA market will ensure those able to respond to market signals (storage, virtuals, etc.) will face the correct market signals. A contract structure that incents conservative bidding from variable generators DA, such as the as-proposed Enhanced PPA, will result in inaccurate price signals and ultimately market inefficiency.

Shape Risk

The Enhanced PPA proposes to calculate Deemed Energy Revenue based on the simple average of the relevant average monthly price. Effectively, this contract structure assumes that the project is generating equally across all hours in a given month. Of course, actual output from variable generation can change significantly from hour to hour (even minute to minute), primarily as fuel availability changes. The corresponding difference between the flat production profile assumed under the contract, and the

variable nature of actual production, is what's referred to as shape risk.

Shape risk manifests when the weighted average price realised through the market ("captured price") is less than the relevant monthly average price used to settle the contract. This tends to occur when a project produces more during low price hours than it does during high price hours. Under these circumstances, market revenues and contract revenues sum to something less than the project's contracted bid price. Conversely, a project may benefit from shape risk if it produces primarily during relatively high price hours, increasing its captured price above the relevant monthly average price calculated under the contract, allowing the project to earn more than its contracted bid price.

Given the forecasted diurnal load profile, and the average diurnal production profile of wind and solar resources, it's likely that solar resources will realise a captured price above the monthly DA average price, while wind resources will realise a lower captured price. As such, solar resources will be at a competitive advantage in an RFP, as the potentially higher captured price may allow them to bid a relatively lower contract price, whereas wind resources will need to bid a relatively higher contract price on account of its own shape risk. If it's not the IESO's intention to favour solar over wind resources, it should eliminate shape risk for project proponents.

Of further concern, variable generators are no more able to control or mitigate shape risk than they are DA/RT or curtailment risk. Similar to curtailment risk, long-term shape risk is a function of supply, demand, and transmission dynamics, factors more squarely in the ambit of the IESO. Furthermore, project proponents are no better able to forecast shape risk than the IESO, with its lengthy experience centrally forecasting all the province's variable resources. Given this uncertainty and inability to mitigate, if project proponents are misallocated shape risk, they will need to take a conservative view and price this risk into their RFP bids.

Under the Enhanced PPA, shape risk is misallocated to project proponents by calculating Deemed Energy Revenue based on the simple monthly average of the relevant

Topic	Feedback
	market price. In order to allocate this risk more appropriately, Deemed Energy Revenue should be calculated based on the monthly weighted average market price, weighted by the **hourly capability** (actual + curtailed production) of the project. This will ensure alignment between the project's captured price, and its Deemed Energy Revenue under the contract. ***Recommendation: To preserve the competitive balance amongst eligible technologies and to lower ratepayer costs, Shape Risk should not be allocated to project proponents. The Enhanced PPA can achieve this by deeming energy market revenues based on a monthly weighted average market price, weighted by the hourly capability (actual + curtailed production) of the project.*** If the IESO addresses DA/RT risk for Suppliers by deeming energy market revenues based on RT prices, it should consider addressing the additional Shape risk this would introduce. RT production will be compensated in the market based on 5-minute prices, whereas the recommended solution to address Shape risk utilizes an hourly weighting of price. The discrepancy between the hourly settlement granularity of the contact and the 5-minute settlement granularity of the RT market may create further Shape risk. To address this, deeming energy market revenues could be based on a weighted average price, weighted by 5-minute capability (actual + curtailed production) of the project.

DERs

Topic	Feedback
Do you have any comments regarding eligibility requirements for DERs of other general comments?	No comment provided.

Capacity Resources

Topic	Feedback
Do you have any comments regarding considerations for acquiring additional capacity resources, and utilizing a multi-stream approach (energy and capacity streams)?	Northland Power supports the IESO utilizing a separate contract and evaluation process for procuring capacity resources, including the use of the LT1 contract structure. Northland Power encourages the IESO to publish procurement targets and locational preferences related to this procurement as soon as practicable.

LT2 Deliverability

Topic	Feedback
Do you have any comments on early deliverability data and evaluation stage deliverability?	Northland Power appreciates the efforts being made by the IESO to release system data in a timely manner. Northland Power supports the IESO's decision to forgo an initial Deliverability Assessment. For the Deliverability Assessment conducted during the evaluation phase, the IESO should expeditiously provide initial guidance on the threshold for determining "whether the amount of energy expected to be curtailed is acceptable" (i.e. the level of congestion that may disqualify projects from the RFP). This information will be critical for proponents to make the most of the system information provided by the IESO when making siting decisions.

Repowering

Topic	Feedback
Do you have any comments around repowering participation?	Northland Power supports defining repower eligibility based on an existing off-contract facility's ability to meet contract performance obligations. Eligibility should not be determined based on arbitrary thresholds for installed capacity increases or capital investment.

Long Lead-Time Resources

Topic	Feedback
Do you have any comments on enabling long-lead time resources?	The IESO has highlighted long-duration storage as a potentially eligible resource for the long-lead time resource procurement. Long-duration storage projects – as with all storage projects – are a net consumer of electricity. These resources are best thought of as capacity resources, not

	energy resources. As such, a revenue model that compensates for energy may be an ill-fitting structure for these resources.

General Comments/Feedback

Northland Power appreciates the IESO's efforts to address stakeholder concerns related to the Enhanced PPA model.

As proposed, the Enhanced PPA is a novel and complex revenue structure that levies considerable market risk on Suppliers – primarily DA to RT and Shape risk. Suppliers have little to no control over whether these risks materialize, while also possessing little ability to forecast and hedge those risks due to a lack of experience with Market Renewal and a dearth of viable hedging options (internal financial transmission rights, liquid financial hedging markets, etc.). In many cases, there's a more natural owner of that risk, one better suited to manage that risk and keep costs down (e.g. the IESO).

In the above feedback, Northland Power has proposed enhancements to the Enhanced PPA revenue model that would mitigate those risks for Suppliers. In making these changes, the Enhanced PPA leaves Suppliers to compete in the RFP primarily on build costs, while leaving Suppliers to manage the risks they're best suited manage (development, construction, operation, etc.). Doing so will ensure more cost-effective solutions relative to the Enhanced PPA, as proposed.

While the above enhancements are strictly necessary to make the Enhanced PPA a workable and financeable revenue model, the Enhanced PPA would remain a novel and complex revenue structure. Complexity can contribute to an increase in perceived risk as Suppliers and financiers try and get comfortable with a novel revenue structure on a tight timeline. This jeopardizes the success of the RFP at a time when the province is fast approaching an energy shortage and the industry is seeking the social license to build significant renewables for the first time in over a decade. It's probable that a simpler, more proven contract structure would lead to more cost-effective solutions for ratepayers.

To wit, the IESO may consider a revenue model similar to that of the Large Renewal Procurement (LRP) contract. Such a contract structure could have a similar market risk profile to the Enhanced PPA with the aforementioned enhancements, but in a format that is proven and better understood by the industry.