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Independent Electricity System Operator
120 Adelaide Street West
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Subject: IESO, 2016 Price Review Questionnaire July 16, 2015

This is in response to the July 17, 2015 Price Review Questionnaire posted on the IESO's Feed-in Tariff website. I would like to start by thanking you for the opportunity to provide feedback in this process on behalf of the OSEA membership.

While this submission mainly relates to the setting of prices for the 2016 FIT and microFIT Price Schedule, OSEA would like to stress that there are numerous opportunities for programmatic changes to both the FIT and microFIT Programs which could lead to lower costs to developers and thus lower prices set by the IESO.

With respect to future FIT and microFIT procurements, OSEA recommends reconsidering the application windows and proposes having a year-round acceptance of projects. While yearly targets can still be implemented, OSEA believes that by having a year-round acceptance process a better quality review process could be implemented, reducing the risk of mistakes and less well-planned and executed projects.

Economic and financial considerations

1. What are the costs of capital (both debt and equity) required to develop a renewable energy generation project and how do these costs vary with technology and project size? a. Describe and quantify any anticipated economic and financing trends that may substantially affect these costs.

> **Response:** One-off small solar projects have a high cost of debt based on accessing the money from mezzanine lenders. Consider the cost to be in the range of 8-10%. In fact there may not be any debt available for these projects if they are stand-alone, since banks are not in the business of lending $500,000 - $1,000,000 for 15-18 years. Only when such solar projects get aggregated into a portfolio of 2-3 MW are they eligible for debt financing and the cost of capital in this case is in the range of 4-6%.
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> There is almost no financing available for small wind projects, for reasons similar to the above. But a 10 MW wind project can be financed with leverage in the range of 25:75 and the cost of capital in this case is in the range of 4-6%.

2. Do the current FIT prices allow a renewable energy developer to earn a reasonable rate of return? If no, please describe recommended adjustments and provide supporting evidence.

> **Response:** Since there is no wind technology available in the 500 KW size range that makes sense at low wind speeds, the previously posted FIT rates for wind are not sufficient to allow a "small" wind developer to earn a reasonable rate of return. At project scale in the range of 4-5 MW, wind is commercially feasible at the previously posted rates and possibly as low as 9-10 cents per KWh depending on where the project is located and the connection costs.
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> For solar energy developments, the previously posted rates allow for a reasonable return, in most cases.

a. What is considered a range of "acceptable" rates of return on equity for a renewable generation contract in Ontario's current financial market? Please provide an explanation for your answer, including worked calculations where possible.

Response: Co-op's perspective: Considering the question from a co-operative's perspective, the aim of most co-operatives, who are mainly developing solar projects at the moment, is to provide returns of 5-6% per annum to their community investors. In order to do so they need to generate project returns in the range of 10-11%; this is a reasonable rate, given the risks within the FIT process, and the sunk costs in unsuccessful applications. However, due to the complexity of the FIT contract terms for community projects, co-operatives are unable to obtain debt financing readily and must pay significantly higher than market rates on debt, making it virtually impossible to achieve higher returns through leveraging.

Developers' perspective: The range of acceptability to a private developer is 9-10% in unlevered return, assuming taxes are payable and CCA shelter is available. This level of unlevered ROE is capable of providing positive leverage and the resulting levered ROE could be 15-18%-ish. If the unlevered return dips below 8%, then positive leverage ROE gain evaporates due to too much cash going out the door to service debt, even with low interest rates on the debt. At unlevered return rates of 7%, there is no benefit from borrowing money as the return on the equity remains at about the same level. At this level of economic performance, the main advantage that borrowing offers is in providing sufficient capital to undertake the project. But the risks to the project owner go up as well, since the debt must be serviced and there is consequently less ability to tolerate variable financial performance of the project.
Taking into account comprehensive cost of projects, there is very little room for profit (and profit sharing) as soon as one considers bidding down to Tier 2. Depending on what can be secured for construction financing, Tier 3 is a relatively scary proposition, but likely necessary for many parties to garner a contract.

It is important to note that the devaluation experienced between September 2014 and August 2015 (~ 19% drop) results in up to 24% increase in module prices and up to a 12% increase in the total cost of major equipment (depending on the provider). OSEA understands that the IESO cannot expect to predict the extent of changing exchange rates, however, given the devaluation currently being experienced, the forecasted continuation of that devaluation and the severe impact that reductions can have on project costs, it is reasonable to maintain current targeted rates of return of at least 9% in order to provide some degree of flexibility to developers to cope with this variability.

b. For solar PV: The cost of solar is declining dramatically. Recent procurements in other jurisdictions have seen prices for solar PV at or below US$0.04/kWh. Where does Ontario fit into this trend? Should solar prices in Ontario be set this low? Please explain why or why not?

Response: Such prices have only been achieved by mega watt scale projects in the US and the USD is at a premium vis-à-vis the CAD. Tax treatment and accelerated CCA in some of the States and other RE initiatives make that 4 cent rate higher in terms of net profit (EBIDTA). Furthermore, the best sites in Nevada and Texas permit the development of solar PV to obtain 6.5 kWh/m2/day, or almost double that of the best sites in Ontario.

If Ontario wants to see any more solar built, it can't set prices this low. For a number of reasons the most recent FIT rate schedule is barely sufficient to enable developers to make a reasonable profit. The biggest impact is obviously the Canadian dollar. Our solar developers report that compared to this time last year, equipment is costing them ~15% more. Suppliers have tried their best to manage costs, but prices

increase on a monthly basis. Hence, the cost of solar in Ontario is not declining and the solar industry expects costs to be higher in 2015-16 than in previous years.

Another important consideration is that pricing for solar on commercial rooftops may possibly go down slightly from the FIT 3.5 pricing as long as the holder of the contract is the same as, or related to the owner of the building. Where the building owner and the holder of the contract are arms-length, there is a rental fee charged for the use of the roof, and this rent is currently at a point where few owners are incented to offer their rooftops. But that means the nature of the eligible contract holder needs to be expanded in order to capture the opportunities to lower FIT price levels. OSEA also believes that encouraging roof-top solar developments should also be a priority of the government to address the growing opposition to large-scale ground-mount projects that we have been observing in recent months.

3. What prices would you recommend for 2016, in $/kWh, for each technology and size tranche and why? Provide/attach justifications for differences between your recommended prices and global pricing levels.

Response: Current turn-key rates in Ontario are expected to be around $2450/kW DC for a ballasted system (flat roof); this would also be about the lowest possible cost for ground-mounted systems, and will be much higher (perhaps $1000/kW more) for trackers. Thus there is little justification for lower FIT rates on non-rooftop solar at this point, at least not for smaller systems < 500 kW.

Small wind has long been at a disadvantage; the technology has potential for wider adoption, but will not do so without a differentiated rate to encourage small generators.

Type of Project	**Recommended Price Range**	**Comments, Justification, Concerns**
Solar – MicroFIT, up to 20 KW	$0.37-0.39 per KWh	Open up the eligibility to commercial entities. Doubling the current scale is recommended because margins are too low to incent installers to remain in this market.
Solar – Rooftop FIT up to 100 KW	$0.33-0.35 per KWh	
Solar – Rooftop FIT up to 500 KW	$0.30-0.32 per KWh	
Solar – Ground mount up to 250 KW	$0.26-0.28 per KWh	
Wind - 10-49 KW	$0.32 per KWh	
Wind - 50-249 KW	$0.20 per KWh	
Wind - 250-500KW	$0.14 per KWh	
Wind – FIT 500KW to 3 MW	$0.11 per KWh	Should be allowed a streamlined REA process. Exemption on brown-field lands. Protection and control should be at utility's cost
Wind – FIT 3 to 6 MW	$0.10 per KWh	Should be allowed a streamlined REA process. Exemption on brown-field lands. Protection and control should be at utility's cost
Waterpower	See OWA	With regards to waterpower we refer to the submission by the Ontario Waterpower

		Association and support their recommendations for no price adjustment, for the reasons outlined in the Ontario Waterpower Association's response.
Biogas	See Biogas Association	With regards to biogas we refer to the submission by the Biogas Association and support their recommendations as outlined in the Biogas Association's response to this questionnaire.

A final note, for the largest (i.e. >10MW) utility-scale projects, prices in Ontario can be set lower than where they are today. Using a simple ratio of load factors suggests that a price of about $0.08/kWh might be realistic. That said this would not apply to FIT and microFIT size project and even than many other factors will need to be addressed including the following:

- Exchange rates (higher cost to purchase imported materials in Canada versus the U.S.)
- effect of the U.S. federal input tax credit
- installation differences (Texas and Nevada have weather conditions far more suitable to year-round installations)
- cost of capital
- interest during construction
- economies/diseconomies of scale
- labour costs
- availability of lower cost materials
- supply and installation market competitiveness
- Value of delivered energy (e.g. how synchronous is the energy delivered with peak power prices?)
- interconnection costs

Project development costs

4. The IESO is seeking submissions that include specific cost data with respect to capital costs, operational costs, capacity factors, project financing information (e.g., cost of project and construction financing, debt terms, debt service coverage ratio requirements) and other costs and factors which influence the levelized cost of electricity for the various technologies and size tranches in the FIT and microFIT programs. Please include any data tables or excel spreadsheets, as necessary.

a. Please identify any cost categories that differ significantly between Ontario and other jurisdictions, and explain such differences.

Response: Ontario based developers still pay a premium if looking for debt financing in Canada. Some groups don't have access to debt at all, e.g. RE co-ops. OSEA is very supportive of the introduction of the renewable Energy Co-op as a means to stimulate the rural and local economies through the ability to participate in power generation. Yet the current procurement programs LRP 1 RFP and the FIT 4 both put these groups in very disadvantageous positions.

b. Some stakeholders have commented previously on the difficulty of winter installations. While there may be periods in Ontario when weather can impact construction, the IESO would like examples of winter construction challenges that would significantly differ between renewable energy and other infrastructure construction. Please

comment with specific examples and cost implications.

Response: Winter construction can add significantly to project cost. We've received reports where in a 400 KW project built last year, all of the 10% budgeted profit was lost due to cost over-runs associated with harsh construction conditions. Unknown factors such as the physical access to and safety on the rooftop, crane availability and crane functionality, plus workmanship impairment due to cold conditions, snow removal, and other challenges were listed as contributing factors. These issues would have gone be avoidable if the contract holders were allowed another 6 months to achieve their COD, when faced with such issues/delays. Delays are caused by building permit processes and structural design approvals, which in most cases do not add much in absolute time to the project, but may cause the project construction period to slide into December and January, at which point costs can go out of control.

OSEA does not recommend attempting to include these increased costs into the determination of the Price Schedule; however, OSEA strongly recommends structuring the Procurement Schedules/timing of Application Periods and Contract offerings to provide Applicants with the greatest amount of construction time falling within the summer months. Specifically, structuring these periods so the construction and commissioning period (post-NTP) will fall within summer months will aid in ensuring that these avoidable soft cost increases are manageable or eliminated, where possible.

5. Are there any recent technologies or process improvements that have affected costs or may affect costs in the future? If so, please describe.

b. For solar PV: How prevalent is the use of microinverters or power adaptors on commercial scale rooftop systems? Are there other innovations that are being used/considered to optimize central inverter systems?

Response: Some of our developers have decided to not use micro-inverters as they see too many hassles with warranty replacement. Similarly for power adapters, there are issues with compatibility among product lines and replacement challenges if the manufacturer goes out of the market. Our members prefer simple designs where equipment is replaceable in the future by lots of different suppliers.

c. For solar PV: Has the trend to racking standardization accelerated or remained stagnant over the past 2–3 years? What is now the dominant racking type?

Response: This depends on location. In Eastern Ontario with high snow loads and wind loads plus seismic design load factors, lightly built ballasted systems are not allowed. And they don't work very well in winter anyway due to the low mounting pitch angle. The result is the use of sturdier racks with direct mechanical connection to the building roof structure. This is costly to implement.
In the GTA with its warmer climate and lesser snow accumulation, low pitch angle ballasted racking systems are the common (and cheaper) solution.

d. For solar PV: Please comment on the additional upfront and ongoing costs of integrating storage into a system, and the corresponding benefits of doing so. How is the costs expected to decline by 2018?

Response: OSEA would like to requests further information from the IESO regarding the purpose of this question given that installing storage on existing microFIT projects is prohibited by the microFIT Contract. OSEA would support a thorough investigation into the feasibility of changing this restriction for past and future Contracts and would be happy to work cooperatively with the IESO in this endeavour.

6. What is the range of typical connection costs for LDCs across Ontario for each of FIT and microFIT (excluding equipment or system upgrades that are unique to a specific project)?

a. In terms of project interconnection costs, what variance, if any, has been observed for actual costs incurred versus estimates (both initial developer design estimates and those provided by the LDC during early project development)? Have there been any noticeable changes in LDC estimate/actual variances since the inception of the FIT and microFIT programs?

Response: Some projects have been assessed exceedingly high connection costs due to HONI's transfer trip requirement.

We would like the **transfer trip** issue mentioned in the pricing review as these costs, which will be assessed more frequently as the grid fills up, create an uneven playing field, with some projects having to absorb these large costs and others that don't.

A fair approach would be for IESO to provide an adder to offset these costs, in the case where connection costs exceed a threshold of $125/kW.

7. Identify the project development/construction costs anticipated to have the greatest potential for reductions/improvements in the near-term (e.g., 6–12 months) and long-term (e.g., 1–5 years)? Are there specific cost groups that are expected to increase? If yes, what are the drivers of these increases?

Response: There may be cost that can be expected to decrease, such as:

- Maintenance & construction cost can be expected to decrease over time as there will be more suppliers competing in the market, while the numbers of systems installed is increasing.
- Legal & financing costs as well as due diligence costs will decrease somewhat due to competition growing amongst financiers in Ontario, although the Ontario debt providers are still hesitant to finance small projects. But as more experience with these types of projects is built in the financing sector, these costs will come down and best practices will emerge and lenders will gain more confidence in the long term.

8. For solar PV: There have been stakeholder requests to increase the FIT DC/AC overbuild ratio beyond 120%. Please provide information about the additional generation which can be achieved by building projects that exceed the 120% limit. How should an increased overbuild limit impact the price? If there were no overbuild limit, what would the ideal overbuild ratio be? What would the percentage increase in generation be for this ratio vs 120%?

Response: There should be no over-build limit. There will be practical limits based on the equipment capacities, but this should be left to the owner to resolve. The over-build feature can be considered a method to make a system perform better in the non-winter months to compensate for systems located where they rarely see sun in the winter due to snow accumulation.

Ongoing project costs and performance

9. How have ongoing operation and maintenance costs for existing facilities tracked relative to estimates assumed during initial project design? Have costs been higher/lower than expected?

Response: Inverter replacements have seen a much higher costs than anticipated and manufacturers are not compensating for the diagnosis or replacement labour costs. Panel and racking O&M costs have been low, as expected.

10. Have any recent technology or process improvements had an impact on generally accepted performance assumptions (e.g., average capacity factors, equipment replacement, maintenance outages) for renewable energy projects? How has ongoing performance of renewable generation projects tracked relative to estimates?

Response: Most developers have been optimistic in regards to their estimates for winter performance. It seems the models underestimate the effect of snow conditions in Ontario. We now assume approx. 50% of modeled results for January and February.

Prioritization costs and other considerations

11. In relation to the items below, please identify and describe any:

a. Administrative (e.g., legal, financial, etc.) costs associated with arranging partnership structures necessary to qualify for a Contract Capacity Set-Aside (as defined in the FIT Rules);

Response: Our co-op members report that they have found it very difficult to obtain debt financing, even though some of them have 51% share in a number of projects. Furthermore, project delays by many months result in a reduced contract term. And legal costs to conclude finance documentation often add up to 10% to the total project cost.

c. Costs associated with obtaining FIT priority points.

Response: Co-ownership with First Nations, co-operatives or municipalities adds additional costs. It takes time and money for a developer to achieve these relationships. Our members are, of course, all in favour of the inclusion of community and aboriginal partners, but there are additional business development and legal costs that go along with a tri-party agreement. Based on the current payout rates, however, many of our developer members do not feel that it is worth the effort to apply.

Furthermore, OSEA understands the policy rationale for including the Contract Capacity Set-Asides and associated Price Adders for Participation Projects within the FIT Program. The additional legal and financial costs associated with bringing one of these partners on-board, coupled with the commensurate drop in project revenues, applies to all developers who form partnerships with one of the three prioritizes groups. It is noted that the Price Adders are intended to compensate developers for these increased costs; however, Price Adders are not available to Applicants proposing Rooftop Solar projects. As supported by the IESO's December 2014 Discussion Paper on Enhancements to the FIT Program, over 80% of Applications and Contracts under the FIT 3 procurement were for Rooftop Solar. This means the majority of Applicants to the program are required to bring on participation from one of these groups in order to have access to the Contract Capacity Set-Aside but are not afforded Price Adders in order to cover the additional costs.

Given the presence of Price Reduction Priority Points in FIT 4, the Price Adder has the potential to create an un-level playing field for Rooftop Solar vs. all other Renewable Fuels. Therefore, OSEA further recommends that Contract Capacity Set-Asides be removed from future procurements in order to lessen

the impact that the Price Adders have on the overall cost of the program and thus reducing the ratepayer impact.

OSEA would like to emphasize, however, that if the Contract Capacity Set-Asides are to be removed, it is important to have a very clear price adder system to compensate for competitive disadvantages encountered by aboriginal and community groups is put in place. Presently these groups are still facing higher interest rates if they get any debt financing at all. Although I believe that many of the co-ops already have built a lot of professionalism in project development and will not be at a disadvantage much longer, but just represent another legal form of developers, with slightly different investor structure.

Additional questions

12. What are the main reasons, if any, for differentials between Ontario pricing and current global pricing for renewable energy projects? Will these differentials remain constant or are changes/reductions foreseen? Please comment, if possible, on each of project development, permitting, equipment, construction, operation and maintenance.

Response: Long delays and waiting periods in the FIT program and excessive delays by Hydro One, cause capital to be tied up for long periods with no return. Companies cannot afford to focus on FIT projects and so do not gain efficiencies. Environmental compliance for wind projects and non-rooftop solar can be costly, especially under the REA. FIT 1 & 2 domestic content raised rates per KW – now the declining dollar and import duties are eliminating benefits of lower costs, such that the last FIT tariff reductions were larger than the cost reductions.

Small scale solar projects cost more to build, especially if the projects incurs costs such as the rooftop rental fees to compensate host building owners. If host building owners were given the privilege of owning the project themselves instead of renting to qualifying contract holders, these rental costs would diminish. Aggregating rooftop projects into bundles that can be financed results in necessary aggregation costs in order to obtain the scale of capital requirement to which capital markets will respond.

Other self-imposed costs include the DC/AC overbuild restriction which simply lowers capacity factor and limits revenue without rationale.

In summary, the three most important differences between Ontario pricing and current global pricing trends for solar projects, in particular, are soft costs, the current low value of the Canadian dollar, and interconnection costs. While other differences exist between global pricing trends and trends within the Ontario market, OSEA is highlighting these factors as they offer significant opportunities for reduction if addressed collectively by the Ministry of Energy, the IESO, and industry participants.

13. For solar PV: What will the effect be, if any, of the Canada Border Services Agency's recently imposed tariffs on solar panels manufactured by certain Chinese suppliers?

Response: This was a rather short-sighted decision taken by the Canadian federal government. If the Chinese producers are so rock-solid and financially comfortable that they can sustain years of selling at below cost, why should the Ontario rate payer not reap the benefit of such choices made by suppliers? Indigenous supply of equipment into the Ontario solar market is only stable insofar that the procurement program it serves is stable and continuing.

So far and since 2010, the Ontario FIT procurement program that has never been sufficiently stable nor certain in its continuance to warrant sustained investment by suppliers. The departure from the market by panel producers should come as no surprise as a consequence of uncertain demand and not as a result of variance in world component pricing. Local installers are likely to prefer to deal with local manufacturers and will accept premiums over world pricing for the convenience of dealing with local people. This could overcome dumping actions by overseas suppliers, especially if project scale is deliberately kept low and where the local supplier value proposition is enhanced by the convenience of dealing with small order batch size. In contrast for smaller projects, it makes no sense for an installer to organize container loads of unknown product from an unknown supplier in an unknown country and worry that the product is not meeting the quality standards required.

Furthermore, it appears many manufacturers are moving production out of China to nearby export markets (Vietnam, Taiwan). These moves are adding costs, but those costs are still less than the tariffs.

14. For residential rooftop solar PV: The U.S. Department of Energy's SunShot initiative continues to analyze the cost differentials between residential rooftop solar systems in Germany and the U.S. In the past 1–2 years, has there been more alignment between German and U.S. residential rooftop solar costs? To what degree do Ontario system costs (from a homeowner's perspective) align with or differ from both German and U.S. costs? List the main barriers, if any, to matching German costs in the Ontario market.

Response: Cost barriers are associated with the sustainability of the program. Ontario builds too many artificial barriers into accessing the contract, as well as long intervals between contract availability opportunities. A program with more consistent contract opportunities, perhaps with lower annual procurement targets than were reached in the last 5 years, would have been better. Going forward the same idea applies: keep the FIT opportunity open consistently and regularly, allow larger project sizes, allow more range on eligibility in the types of contract holders. Improve the performance of the LDC's in arranging contract grid connections as these entities have become predators with respect to contract holders since their stipulated grid upgrades, design costs, labour costs, and protection scheme specifications are not subject to challenge or review.

The central and most easily addressed barrier to further alignment between cost differentials for microFIT sized systems in the US, Germany, and Ontario is the prohibition of third-party ownership of contracts within the microFIT Program (i.e. the Eligible Participant Schedule). Both the US and Germany allow systems to be installed on a residential property but owned by a third-party (roof leasing). In the US and Germany (which have robust net-metering programs) the model used is often a PPA whereby the third-party sells the generated electricity to the homeowner at a cost lower than the retail rate of electricity. Ontario's market is currently structured differently in that the microFIT Program requires injection to the grid rather than self-consumption, however, third-party ownership of the microFIT Contract would allow greater access to capital, greater economies of scale for purchasing equipment and installation labour, as well as reduced administrative and legal costs.

I thank you for your time and consideration.

Sincerely,

Nicole Risse
Director

Ontario Sustainable Energy Association

Copy: OSEA Board of Directors
OSEA Policy and Regulatory Advisory Committee
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