ONTARIO ENERGY BOARD

EB-2016-0160

IN THE MATTER OF the *Ontario Energy Board Act*, 1998, S. O. 1998, c. 15, Schedule B;

AND IN THE MATTER OF an application by Hydro One Networks Inc. (Hydro One) pursuant to section 78 of the *Ontario Energy Board Act*, 1998 for electricity transmission revenue requirement and related changes to the Uniform Transmission Rates beginning January 1, 2017 and January 1, 2018.

SUBMISSIONS OF ENVIRONMENTAL DEFENCE

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Overview

1. Transmission losses cost Ontario energy consumers hundreds of millions dollars every year. Precise figures are unknown, but ballpark estimates range from $280 million to $390 million in 2015 alone.[1] Despite these high costs, Hydro One does not systemically or transparently assess potential cost-effective measures to reduce these costs. Nor has it done anything to implement the government's *Conservation First* policy with respect to its transmission business. Environmental Defence believes this needs to change, and therefore requests that Hydro One be directed to develop Transmission Loss Reduction Plans to identify all cost-effective loss reduction measures. Consistent with *Conservation First*, Environmental Defence also asks that Hydro One be directed to implement all cost-effective loss reduction measures (i.e. measures that would reduce bills because $1 invested would save consumers over $1 in avoided costs).

2. Environmental Defence also requests that Hydro One be directed to incorporate a metric relating to transmission system energy losses into future scorecards and incentive rate mechanisms. Hydro One's proposed scorecard provides a disincentive to invest in cost effective measures to reduce losses because it accounts for the costs of these measures but not the benefits. If a loss related metric is not included in the future, Hydro One will have an incentive to cut costs by cutting corners with respect to transmission losses, resulting in higher bills for consumers. A loss reduction metric is needed to align Hydro One's interests with the interests of consumers.

Transmission Loss Reduction Plan

Large Sums at Stake

3. Transmission losses are worth hundreds of millions of dollars each year. This alone is reason enough to measure and manage losses in a transparent and systematic manner by way of Transmission Loss Reduction Plans.

[1] See paragraph 5 below.

4. There was debate during the hearing about the annual cost of losses to consumers. Although the loss-related amount in the net energy market settlement uplift was said to be $66.3 million in 2015, that figure is calculated based only on a fraction of the total wholesale electricity commodity price (i.e. including the HOEP but excluding the global adjustment).[2] By excluding the global adjustment, the figure excludes over 75% of the actual electricity costs.[3] Therefore, the figure does not reflect the total cost of transmission losses to consumers.[4] This is not to suggest that the IESO's figure is wrong for the purposes for which it is calculated (i.e. market settlement), simply that it does not represent the true cost of transmission losses to consumers. As stated by Board Staff, "Staff accepts that there is merit in considering the full cost of losses, including energy costs as well as generation, transmission and distribution capacity costs."[5]

5. If the total wholesale commodity price is applied to the volume of losses included in the settlement uplift, the total cost of losses is over $280 million.[6] If losses are estimated at 2.5% of throughput per the IESO's estimate of average annual losses, the cost is over $389 million.[7] These ballpark figures still likely underestimate the actual cost because they do not account for the fact that losses are highest when the cost of electricity is highest.

6. Although we know that losses cost consumers in the range of hundreds of millions of dollars each years, the precise cost is unknown. Despite repeated requests from Environmental Defence,[8] Hydro One and the Independent Electricity System Operator were unable to calculate a precise figure. It is clear that more work needs to be done to measure losses, calculate their economic costs, and develop solid protocols in relation

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[2] Transcript Vol. 5, p. 55, lns. 17-22.
[3] In 2015, the global adjustment rate was 76.7% of the wholesale commodity charge (the HOEP was $23.58, the GA was $77.80, and the total commodity charge was $101.38/MWh). See Exhibit 5.4 (ED Cross Compendium), p. 6 or *http://www.ieso.ca/imoweb/pubs/marketReports/monthly/2015dec.pdf*, p. 22.
[4] According to Mr. Lusley of Power Advisory LLC, the global adjustment cannot be excluded if one is trying to calculate the cost of losses (Transcript, Vol. 12, p. 100, ln. 16 to p. 101, ln 5); Hydro One's witness was not able to speak to whether or not the global adjustment should be included in calculating the cost of losses (Transcript Vol. 5, p. 55, lns. 23-26).
[5] Board Staff Submissions, p. 19.
[6] ED letter dated December 13, 2015 attaching IESO data, which indicates 2015 losses as 2,783,060 MWh, which amounts to $282,146,710 in losses based on the 2015 wholesale price of $101.38/MWh.
[7] See Exhibit 5.4 (ED Cross Compendium), tab 1, p. 1.
[8] See ED Interrogatory #5 (Exhibit I-5-5); ED Notice of Motion, September 29, 2016, paras. 26-28.

to those activities. This is another reason to require the creation of a Transmission Loss Reduction Plan.

Central Role of the Transmission Owner

7. Responsibility for transmission losses is shared between Hydro One as the system owner and the IESO as the system operator. That division of responsibility is another reason to require Hydro One to measure and manage losses in a transparent and systematic way. There are significant grey areas and areas of overlap in the roles and responsibilities of Hydro One and the IESO with respect to transmission losses. Without a systematic and transparent plan, opportunities to reduce losses and lower bills will fall through the cracks.

8. There are many important areas where Hydro One has the sole or primary responsibility to consider ways to reduce losses. For example, Hydro One plans to replace approximately 500 km of its lines annually going forward.[9] For each project, Hydro One would be the entity to consider whether it would be feasible and cost-effective to reduce losses on those lines by means such as "upsizing" the conductors or choosing different conductor materials.[10]

9. The vast majority (over 80%) of Hydro One's capital budget consists of sustaining, operations, and common corporate capital costs, over which Hydro One has primary responsibility and control.[11] Less than 20% of the capital budget is for development capital driven by system planning by the IESO.[12]

10. Hydro One's role in relation to asset replacement is particularly important because its assets are so long lived, often in the range of 60 to 80 years.[13] If an opportunity to cost-effectively reduce losses during line or equipment replacement is missed, that opportunity may not arise again for 60 to 80 years. In the interim, ratepayers will be saddled with a sub-optimal, inefficient, and money-wasting system.

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[9] Transcript Vol. 5, p. 64, lns. 26-27.
[10] Transcript Vol. 5, p. 65, lns. 1-6 & 14-18.
[11] Exhibit A, Tab 3, Schedule 1, p. 13.
[12] *Ibid.*
[13] Transcript Vol. 12, p. 94, lns. 10-21.

11. Hydro One also has an important role to play in areas under IESO responsibility. For example, investment planning for system purposes is done jointly with the IESO and Hydro One.[14] In a variety of areas the IESO has to rely on information and expertise of Hydro One as the transmission owner.[15] Hydro One also has an important role to play in regional planning processes.[16] Hydro One is in a unique position to identify potential options for loss reduction upgrades. For example, a station upgrade may create an opportunity for other investments by taking advantage of the changes being made or the planned station outage.[17]

12. Despite its important role as the system owner, Hydro One seems to suggest that little can be done to reduce losses. However, despite repeated requests, Hydro One did not provide a single document outlining how it came to this conclusion or how it considers potential loss reduction measures.[18] Nor did it provide any details on measures that it considered but would not be undertaking, again, despite an explicit request.[19] Hydro One has not done the analysis necessary to determine whether additional steps could be taken to reduce losses and save money for customers. It clearly has not provided the evidence to establish that in this proceeding.

13. Hydro One did provide an illustrative example of the economics of a transmission loss reduction measure.[20] However, that analysis was deeply flawed on its face, casting significant doubt on how Hydro One has been screening out transmission loss reduction projects. In particular, Hydro One discussed the economics of upsizing lines during annual line replacement. It described potential savings of $1 million compared to potential costs of $180 million. But the $1 million savings are *annual* and the $180 million cost figure is the *total project cost*, not the *incremental* cost of upsizing the line that already requires replacement. Over a 60-80 year lifespan, the loss reduction

[14] Transcript Vol. 5, p. 66, lns. 21-27.
[15] Transcript Vol. 12, p. 90, ln. 10 to p. 91, ln. 3.
[16] *Ibid.*
[17] Transcript Vol. 12, p. 92, lns. 15-23.
[18] Response to ED Interrogatory #4 (Exhibit I-5-4); Transcript Vol. 5, p. 84, lns. 11-18; p. 86, lns. 3-14; p. 87, lns. 11-19.
[19] *Ibid.*
[20] Hydro One, Additional Evidence dated November 10, 2016, Q. 30.

savings could be $60-80 million and the incremental cost of upsizing the lines would be a mere fraction of total cost.

14. The analysis in Hydro One's example is deeply and completely flawed. No projects would be deemed to be economic if Hydro One compares a single year of savings with the entire cost of the project, not the incremental cost. Another reason to require that Hydro One produce a Transmission Loss Reduction Plan is to ensure that Hydro One does not screen out potential projects using the kind of completely flawed analysis found in its evidence in this proceeding.

15. Hydro One compared its role with respect to transmission losses to a road builder's role in improving fuel efficiency by building smoother roads.[21] That is a false analogy. The resistance of conductors has far more impact on transmission efficiency than the smoothness of a road has on fuel efficiency. Hydro One's analogy is interesting, but it has provided no evidence to show that it is accurate. A better analogy, in our view, would be with a road builder trying to allow for faster moving traffic. Wider roads allow for faster travel like bigger conductors allow for more efficient electricity transmission.

16. Hydro One's potential role in reducing losses is very important, as outlined above. The fact that it has taken pains to deemphasize this role in this proceeding suggests that direction from the Board is required.

Hydro One is Not Doing Enough

17. Although Hydro One appears to sometimes consider transmission losses as part of its planning processes, it does so in an *ad hoc*, undocumented, unsystematic, and non-transparent way. That is not good enough for an issue worth hundreds of millions of dollars each year.

18. The U.K.'s National Grid Electricity Transmission Plc ("National Grid") provides an example of what can and should be done. National Grid develops a detailed transmission losses strategy as well as annual transmission loss reports.[22] The strategy

[21] Transcript Vol. 5, lns. 6-11.
[22] Evidence of Travis Lusney of Power Advisory LLC (Exhibit K12.4), p. 12-14.

details its plans to reduce losses and the reports discuss the implementation of those plans and include detailed information such as estimates of loss reductions.[23] Hydro One does none of these things. It develops no strategies, no plans, and no reports in relation to transmission losses.[24]

19. Although National Grid is the transmission system owner and operator, the focus of its transmission loss strategy and reports is on its role as the owner (like Hydro One), not as the operator.[25] Therefore, National Grid a good example of a "best practice" that Hydro One should follow.[26]

20. National Grid searches for ways to cost-effectively reduce losses by considering the benefits of losses while assessing options for asset replacement, equipment specification, procurement, and so on.[27] This is done through detailed economic assessments that incorporate the lifetime avoided costs associated with potential loss reductions.[28] In contrast, Hydro One does not have a figure for the avoided cost of transmission losses.[29] Although Hydro One considers losses in some circumstances, it does not conduct the kind of robust economic assessment that National Grid does.[30] It is highly likely that opportunities are being missed.

21. Although Hydro One appears to sometimes consider losses in its planning, there are no documents outlining how or when this is done.[31] Without protocols about how and when losses should be considered, Hydro One cannot ensure that they are considered correctly or consistently. Without transparent documentation, it is also impossible for the Ontario Energy Board to monitor precisely what is and isn't being done and whether any analysis that is undertaken is done correctly. Hydro One is effectively saying to the Board: "Trust us, we're looking after it." That is not good enough.

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[23] *Ibid.*
[24] Response to ED Interrogatory #4 (Exhibit I-5-4); Transcript Vol. 5, p. 74, lns. 20-26.
[25] Transcript Vol. 12, p. 88, lns. 1-25.
[26] *Ibid.*
[27] Evidence of Travis Lusney of Power Advisory LLC (Exhibit K12.4), p. 14.
[28] *Ibid.* at p. 12; National Grid Strategy Paper, Executive Summary, September 2014 (Exhibit 5.4, tab 7).
[29] Transcript Vol. 5, p. 74, ln. 27 to p. 75, ln. 3.
[30] Transcript Vol. 12, p. 99, lns. 4-16; Response to ED Interrogatory #4 (Exhibit I-5-4).
[31] Environmental Defence specifically requested any reports or documents regarding losses, Hydro One's plans regarding losses, and a list of the actions it considered but would not be taking. Nothing was provided. See Response to ED Interrogatory #4 (Exhibit I-5-4); Transcript Vol. 5, p. 84, lns. 11-18; p. 86, lns. 3-14; p. 87, lns. 11-19.

Conservation First

22. As noted in Ontario's Conservation First policy document, "conservation is the cleanest and least costly energy resource."[32] The government sees conservation as an important way to reduce electricity bills.[33] That is why this government's policy is to invest in conservation first wherever doing so is cost-effective.[34]

23. Surprisingly, Hydro One acknowledged during cross-examination that it has done nothing to change the way it considers losses as a result of this important new policy.[35] Although it is theoretically possible that Hydro One was already undertaking all cost-effective conservation prior to the new policy, that is highly unlikely, especially in light of the significant changes that were required by electricity distributors and other market participants to implement *Conservation First*. Hydro One almost certainly needs to change its practices as a result of *Conservation First*. To comply with this policy, Hydro One should be identifying and implementing all cost-effective loss reduction measures, which is what Environmental Defence is seeking in this proceeding. This would help achieve the important goal behind *Conservation First* – lower bills for Ontario electricity consumers.

Benefits of a Transmission Loss Reduction Plan

24. A Transmission Loss Reduction Plan requirement would help to ensure that Hydro One is monitoring and managing transmission losses in a systematic, accurate, responsible, and transparent manner. It would also encourage the development of standard methodologies for calculating transmission losses, calculating the cost of transmission losses, incorporating losses into investment planning, incorporating losses into equipment purchasing, incorporating losses into operational decision-making, and so on. It is clear from this proceeding that these standard protocols are sorely lacking. This requirement would also enable the Board and public to scrutinize

[32] Ontario Ministry of Energy, *Conservation First, A Renewed Vision for Energy Conservation in Ontario*, 2013, Minister's Message (http://www.energy.gov.on.ca/en/files/2013/07/conservation-first-en.pdf).
[33] *Ibid.*
[34] *Ibid.*
[35] Transcript Vol. 5, p. 90, lns. 10-21.

these activities and ensure that Hydro One is identifying and implementing all cost-effective measures to reduce losses.

25. Board staff "submits that Hydro One should ensure that it has fully considered the cost of losses when it makes asset design and purchase decisions."[36] Environmental Defence agrees. Transmission Loss Reduction Plans would be the best way of doing so and the only way to do so in a systematic, transparent and accountable manner.

26. For the first plan, Environmental Defence recommends that Hydro One:

    a. Retain Third party consultants to determine best practices from other jurisdictions, especially those jurisdictions with a similar focus on promoting conservation first as a method to reduce energy bills;

    b. Complete the plan in time for its results to be incorporated into Hydro One's next investment and operational planning cycle; and

    c. Consult intervenors on the draft terms of reference for the third party consultants and on the draft report.

27. This would help maximize the benefits of the plan and ensure that opportunities are not missed.

28. It is likely that Hydro One will need to work with the IESO with respect to the development of this plan. This will help increase coordination between the two organizations. Environmental Defence also expects to seek intervenor status in the next IESO hearing on the issue of the IESO's role with respect to transmission losses. Both Hydro One and the IESO need to work together if all cost-effective means to reduce losses are to be implemented. As noted by Board Staff, "Staff agrees that the IESO should have a role."[37] Environmental Defence agrees. However, that role will need to be addressed in a future proceeding.

[36] Board Staff Submissions, p. 19.
[37] Board Staff Submissions, p. 18.

Future Scorecards and Incentive Mechanisms

29. As noted above, Environmental Defence requests that Hydro One be directed to incorporate a loss reduction metric into future scorecards and incentive rate mechanisms. The scorecard proposed by Hydro One provides a significant *disincentive* to invest in cost-effective measures to reduce transmission losses, even though those measures would lower energy bills and are clearly in the interest of consumers. Hydro One's interests and the interests of consumers are in direct conflict.

30. The problem arises because the scorecard only accounts for the costs of loss reduction measures and ignores the benefits. In particular, the scorecard has three "cost control" metrics, which relate to Hydro One's ability to minimize operational and capital costs.[38] However, the scorecard has no metric to recognize the bill reductions that would result from transmission loss reduction measures (although the scorecard includes a metric to reflect customer survey results, this would not sufficiently reflect the benefits of loss reductions, if at all). An investment in transmission loss reduction will register on the scorecard as a negative in the cost control category (through increased costs) without producing any associated positives in the scorecard results.

31. Compare this to the treatment of safety and reliability investments in the scorecard. Those measures will increase costs but will also improve the six safety and reliability metrics set out in the scorecard.[39] The scorecard creates a balance in this area by including both the costs and the benefits, unlike in the case with transmission losses.

32. One possible loss metric to include would be the annual cost of transmission losses on Hydro One's system.[40] However, Hydro One has argued that this metric is too dependent on factors outside its control, such as levels of demand and the actions of the IESO. To address that concern, another possible metric could be the net savings from loss reduction measures. This would include the net present value of the estimated net savings from incremental steps that Hydro One takes to reduce losses

[38] Proposed Transmission Scorecard, Exhibit A, tab 3, schedule 1, p. 16.
[39] *Ibid*.
[40] The cost of losses would presumably need to be calculated using a methodology that accounts for the differences in cost between peak and off-peak losses seeing as losses are highest at the peak when the cost of electricity is the highest.

(akin to the net benefits calculated for gas and electricity conservation programs). Another option would be to develop a measure of the efficiency of Hydro One's network from a transmission losses perspective focusing on the aspects of the network under the control of Hydro One, such as line resistance and transformer efficiency. Other options likely exist.

33. As for the choice between the potential options, Environmental Defence recommends that this be considered by a third party consultant as part of the development of Hydro One's first Transmission Loss Reduction Plan. The most important thing is that some sort of loss reduction metric be included so that Hydro One's interests are aligned with the interests of consumers.

Conclusion

34. It is highly likely that potential investments to reduce losses and lower electricity bills are being missed, either due to Hydro One's *ad hoc*, unsystematic, undocumented, and non-transparent approach to transmission losses or because some measures fall in grey areas of responsibility between Hydro One and the IESO. This is a problem that the Board is best placed to fix. By requiring Hydro One to produce Transmission Loss Reduction Plans, to implement all cost-effective transmission loss reduction measures, and to include losses in future scorecards and incentive structures, the Board can ensure that losses are being managed effectively, that the various parts of the electricity system are coordinated, and that the government's *Conservation First* policy is being implemented. Most importantly, the Board can ensure that everything is being done that can be done to lower consumers' energy bills in relation to the hundreds of millions of dollars being lost each year due to transmission losses.

Requested Relief

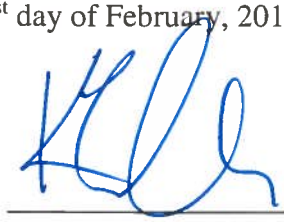
35. For the above reasons, Environmental Defence requests that Hydro One be directed to:

    a. Develop Transmission Loss Reduction Plans to identify all cost-effective transmission system energy loss reduction measures, including an initial plan to be prepared by a third party consultant based on best practices;

b. Implement all cost-effective loss reduction measures; and

c. Incorporate a metric relating to transmission losses into future scorecards and incentive rate mechanisms.

All of which is respectfully submitted this 1st day of February, 2017.



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