

QUESTION & ANSWER

Does this affect Capacity Allocation Exempt Projects?

In the case of something like short circuit capacity where there may be limitations, I would feel that yes, this will affect capacity allocation exempt projects. Short circuit limitations are there for a good reason. It's to protect staff as well as the public, and for that reason we don't want to exceed those limitations and it may be something that impacts capacity allocation exempt projects as well.

Will Hydro One infrastructure improvements consider the long feeder length problems by making it less onerous for the DG's to connect?

I think that question is best suited for the Economic Connect Test process, which the OPA is going to run later in the year. As the name suggests, we are looking for economic solutions and I imagine that would depend on the number of generators that will connect. I don't have all the details on that process yet, but I expect that it is at the point in the ECT process that your question would be addressed.

Does it not make sense to establish a DG only grid which doesn't have the same impact on consumers of power and wouldn't it be better to leave DG's online during a Hydro One generator failure?

This is an important question and it is something which Hydro One had considered. I think that one of the factors which come into play when one considers dedicated feeders or a DG only grid, as you have termed it, for generators is that the expense to the generator could be significant, in particular, when one looks at the equipment at the transmission station. I think that that's probably the single biggest factor that limits us. That doesn't mean that we are not considering dedicated feeders or other dedicate equipment where that can help solve a problem and hopefully get more generators connected.

If there is a fault level issue on a TS, and a solar generator wishes to attach, is the fault contribution from inverters (as compared to rotating machines) small enough to allow attachment?

Solar invertors being inverter-based generators certainly produce a small amount of fault currents than do classical rotating machines and we consider that when we are doing the CIAs. It does allow more generation to connect to a particular station, but it still does have a contribution and there is still a limit. I hope that answers your question.

Is this a concern for microFIT systems or only FIT systems? If the latter, how large before it becomes an obvious concern?

For microFIT we don't see this as a concern, and at this point for any FIT project. We want to examine it to ensure that there are no issues. Any FIT project, the question isn't specific around

which concern it is, so I'll answer it as if it addresses any of the concerns. With any FIT project short circuit limitations could be an issue, as well as station capacity could be an issue and if you are referring to feeder distance limitations, we would examine each project for that to ensure that it isn't going to cause problems to the existing load customers.

Other than the OPA fees.....Is Hydro One putting a fee in place for TAT, DAT assessments/consultations before the CIA stage? If TAT, DAT not passed or approved will there be a fee? If for some reason at CIA stage we run into a problem and project is not able to proceed, are there fees?

Just to clarify, so the TAT process and the DAT tests are done within the confines of the OPA's part of the process, so I believe there is an application fee to apply and that application fee is provided to the OPA and they conduct the TAT and the DAT. Now if you were awarded a contract and you came to Hydro One and we did a CIA study for you, there would be a fee for that study. The fee is just so that we can recover costs for the people that we would have our planners to do that study. So if it came out at the end of the study, the results came out that your project infeasible, we wouldn't be able to reimburse you the fees because the costs have been incurred to conduct the study.

Most inverters react to short circuits faster than your reclosures react, this eliminates the contribution of short circuit contribution to your Transfer Station. Would this eliminate the short circuit issue when inverters are involved on these projects?

Yes, we are aware of that claim and unfortunately we studied the system assuming the worst case scenario, which means that there could be a breaker opening for some other reason at the exact moment that there is a fault and it's the contribution of the invertors that pushes the fault level above the limits of that breaker then it could cause an issue and we cannot knowingly put ourselves in that situation.

What is the timeline for replacing the most problematic transformers?

We have some transformers that are already being replaced for sustainment reasons as early as 2010, but that doesn't mean that replacement is the only option. Hydro One is currently studying the transformers and the nature of the problem to see if there are other alternatives.

Why not allow generators to disconnect when reverse flow exceeds 60%; otherwise designing to minimum load?

At this point that's not a consideration that we have. I think that if the generator community sees that as a viable option then Hydro One will consider it.

Can we expect each LDC to adopt similar technical limitations on feeder stations and is the transformer change out program driven by Hydro One policy only?

When we are discussing the dual secondary whining transformers; we are referring to those transformers at stations that are owned by Hydro One transmission. I cannot speak for what other distributors who own their own stations may be doing. I just want to stress that we are discussing the transformers at stations owned by Hydro One transmission.

If there is a problem in TAT and DAT with a certain project, will OPA or Hydro One contact the project proponent regarding that before OPA issues contact during the launch period?

With respect to any feeder distance limitation problems that are discovered during the DAT – the Distribution Availability Test – and in these cases for projects that apply during FIT launch, when we are asked as a distributor to perform the Distribution Availability Test and we find that there may be an issue with feeder distance limitation, we are not failing the project, we do allow the project to proceed, but we are asking the OPA to contact that proponent and to let them know that their project could be impacted by feeder distance limitation and we also ask the OPA to ask the proponent to contact us because we want to start working with them as soon as possible.

Up to how much generation capacity falls under Low impact zone?

This again is a similar question to the earlier ones. It depends on the nature of that feeder itself. It depends on the size of the project. All of these questions are specific to trying to get a single number for either the distance from the station, the amount of generation or a specific point at which a project would fail feeder distance limitation or would impact the voltage performance criteria. None of the questions can be answered with a single number; it depends on the nature of the system.

Have you discovered any new single solution smart grid technologies that may be able to all three issues of fault tolerance, voltage and reverse flow?

At this point, I myself am not aware of it. However, we have numerous groups in Hydro One that work with smart grids. We are definitely in contact with them and we are also seeking input from an external party. This is something that we would have to look further into. It's something that we plan on looking further into, but right at this instant, no; I have not found a single solution.

Are there test networks available to test all the possible scenarios that seem to have some mystery around them so that the answers can be uncovered; (e.g. the last example given of two events happening simultaneously)?

Hydro One is currently in the process of trying to identify test facilities that we can use and which we would like to not just simulate or theorize, but do actual functional tests of equipment that is proposed. To test the scenarios, to test the capability of the equipment and to determine whether something is feasible or not or whether additional problems arise, and so thank you for that question.

What needs to happen to encourage Hydro One or the OPA to consider looking at minimum load levels in load centres as part of the reverse flow consideration issue?

Load levels are always considered when we are looking at reverse flow consideration issues.

In slide 14 the step following the CIA appears to be an ultimatum based on the options listed in the CIA. Will this be a one way process or will Hydro One be working with the generators on finding solutions. How long will this process be allowed to continue before a yes or no decision must be made?

What we are foreseeing is that in the CIA phase we will take steps that are different than a typical CIA, so the way it will work is that if your project is impacted by distance as described in the workload you will get a letter, which will indicate that to you. If you decide to go forward, secure your FIT contract, come to us for a CIA. At that point, during the CIA, we'll sit down with you one-on-one and go over the different alteration possibilities, so we will work with you as a partner to look at the different options that might be available to help you make your project work. So that won't be just a simple do this or you're out sort of thing, it will be working with the generators to help try to make your project work and then the last decision block is really understanding all those various options the generator can make the decision I'm going to go forward with my project now or I prefer to wait on reserve until potentially other solutions come along and go forward at a future point.

Not a question. A comment. Your answers on distance are sounding vague. Can you let people know there is a matrix that will help explain the variables?

Thank you. I agree it is very difficult to give specific answers when there are so many variables, and I am sorry about this. We end up sounding vague. That's why I would encourage you to contact Hydro One if you have project-specific questions. Contact us at a later point and we are happy to answer how feeder distance limitation may affect your project. I want to stress however, that for those projects that came in during FIT launch, we are not failing them on feeder distance limitations and Mark Fukazawa spoke about that. They will be passed through on the distribution availability test and Hydro One has made arrangements with the OPA to contact those proponents to let them know that their projects would have been impacted by the feeder distance limitations and to ask them to work with Hydro One so that we can get their project connected such that they fall in the low impact zone.

Hydro One will allow the "project geographical" move as a way of moving the PCC closer to the TS during the CIA. This said, has Hydro One received confirmation from the OPA that this will be allowed within OPA rules, or will a project location move be considered a "Material Change" thus require the generator to cancel their contract and resubmit a new FIT application?

We have discussed this with the OPA and we intend on working with the OPA within their rules so that you can get a CIA that will identify connection requirements that allow you to connect to

the distribution system and at the same time not impact existing customers. So yes, the OPA is aware of it.

Is this going to reduce the 2,500 MW of transmission capacity available for renewable? If so, by how much?

No. These concerns do not reduce the 2500 megawatts of transmission capacity except possibly in the area of short circuit limitations, which would only be discovered during the CIA. However, let me say that the distribution capacity that's available far exceeds the transmission capacity that's available, so I am not sure that this is such a huge concern.

What is TAT defined as?

The TAT is Transmission Availability Test and this is a test that the OPA is doing as part of its bid application process. The Transmission Availability Test looks at transmission capacity available for each FIT application going through the process. So, it examines things like station capacity as well as transmission circuit capacity and the transmission area capacity.

On slide 22 or 23, comment on the 60% was made and a point about if one transformer was out of service. What happens if the transformers are of different size - a 15 Mva and a 8 Mva?

Thank you, that's a very good question. As per normal planning criteria, we assume the largest transformer would be out of service when we do that calculation. That's a normal planning standard practice.

Do you have a range where the source would move from the low to high impact zone?

Again, at what point does that source move from the green box, the low impact zone, to the red box, which is the high impact zone? That depends on the feeder and it depends on the amount of generation. When I say it depends on the feeder, it depends on the feeder voltage, the type of conductor and the other factor that I forgot to mention before was that it also depends on that particular station, that transmission station in the transmission system itself. So it may be that for a lower amount of generation closer in on one particular feeder that may move you into the high impact zone whereas for another feeder with a higher voltage at a stronger station and larger conductor it takes much more before a project moves into the high impact zone. The best way perhaps to get an answer about a specific project there might be to contact Hydro-1 with some of your project specifics.

Please define long rural distances?

What would we consider to be a long distance? It depends on the feeder itself. We have a variable system. It is very different across the province, so I am unable to give you a specific number for all feeders. What I can tell you is that it depends on the feeder voltage, they type of conductor that we already have in place, as well as the amount of load that is already on that feeder, and then we would look at how much generation one wants to connect. So, effectively

this means that for a particular feeder in one part of the province a long distance could be 18 km, but on another feeder in a different part of the province 23 km could be considered a long distance and 18 km would not. I Hope that clarifies a little bit. I am sorry it doesn't answer your question in a more specific manner, but given the variables that are at play with feeder distance limitations it is not possible for me to put a specific number to that answer.

If we already had an approved CIA pre-FIT, and get approved by OPA for FIT, what are chances that second CIA by Hydro One will return issues for short circuit?

The chances are that it is not very likely that there would be short circuit issues suddenly arising. However, I do have to point out that short circuit is impacted by existing generators as well as existing load customers, so there is a very small chance that a load customer may have connected in the last little while and that would have impacted the short circuit considerations, but it is not very likely.

Can you provide more detail on the working group being formed to address capacity constraints and potential mitigation measures?

So what we are doing, and we are just launching into this, we've created sort of a scope document and what we are doing with the working group is we are in contact with the various associations, we have given them the scope of work and we are asking the associations to nominate technical representatives, which would come to us and participate in a working group. The working group is led by our special studies team within Hydro One. They will meeting on a regular basis, and basically what its about is taking input from all the different stakeholders, manufacturers and generators and factoring that in, so the group would meet on a continual basis, look at all the various options and take those into consideration sort of in coming to conclusions on what potential options might be out there to help alleviate the problem and allow more generation to go forward.

Has Hydro One observed voltage issues on all Dx connected wind projects on long feeders? Is there a difference between wind generator types?

This is a good question because as we are in the early stages of learning about connecting generators to the distribution system, no, we haven't seen every single type of machine connected. We are trying to make some allowances where we can, in particular where there is a mix of resources, we try to be more lenient and allow more generation to connect. But, this is certainly a situation where we need to see more studies ourselves. We need to see more studies in the way of connection impact assessments and applications as well as more generation connections themselves to our system, so that we can better understand it. We are doing what we can to learn as much early on, hence the need for the working group to form, and we also want to pull in some outside expertise and get their opinions and their knowledge to share with us.

If a generator makes a commitment to a FIT contract that is noted to have a distance issue, what information can Hydro One provide (technical and financial) to allow the generator to quantify the risks it will no doubt have to grapple with at the CIA stage?

I think the challenge that we have is that in order to provide you more specific information, and this would be more specific information that we could provide you within the FIT process or within the OPA's process before and you would sign your FIT contract. We don't have enough information at that point to give you really specific technical and financial details that would allow you to quantify those risks. Now what I would say is once you get into the CIA stage, at that point when we get the more complete package of information, at that point is when we will be able to give you those specifics, and what I would say is that if there did come something in that process where the financial implications to the project far exceeded what expectations were, you would be able to get out of your OPA contract and claim back your deposit. I think the other consideration too would be at that point if it became obvious that the project could not proceed because of the issues, you would be able to re-apply back to the OPA and get into the reserve pool and your project could be considered at a later time.

Why was the release of the revised capacity tables not scheduled earlier to allow generators to make investment decisions prior to FIT launch?

We had been making revisions to the capacity all along. Over the summer we had made revisions to the capacity table to show some of the limitations of the dual secondary (s/l winding) transformers. We were setting the problem and we did not know the exact nature of the problem. We did not have all the information that we needed and even up until FIT we didn't have it and we decided to publish what we knew based on what information we had. As we move along and we study this further, we understand the nature of the dual secondary winding transformers and how they will be able to accept generation connections if any. We will certainly revise those values to make them a little more lenient if we can.