

# Single Schedule Market – Phase 1, Session 2

## June 2, 2017

### Minutes of Meeting

<b>Date held:</b> June 2, 2017	<b>Time held:</b> 9 am – 2 pm	<b>Location held:</b> Four Points Hotel, Toronto
<b>Company</b>	<b>Name</b>	<b>Attendance Status</b> (A)ttended; Attended via WebEx; (R)egrets; (S)ubstitute
Amp Solar Group Inc.	Luukkonen, Paul	R
Amp Solar Group Inc.	Cibuku, Olta	A
AMPCO	Anderson, Colin	A
AMPCO (behalf of)	Wright-Hilbig, Rhonda	A
APPrO	Butters, David	A
Bruce Power	Whitehead, Paul	A
Bruce Power	Dalzell, Pat	A
CanSIA	Johnston, Wesley	WebEx
CanWEA	Giannetta, Brandy	A
Capital Power	Villiger, Kurtis	WebEx
Capital Power Corporation	Jessa, Riaz	WebEx
Centre Lane Trading Ltd.	Nikkel, Jonathan	A
City of Toronto	Koff, Chaim	WebEx
Customized Energy Solutions	Tinkler, Mark	WebEx
Enbridge	Jayaraman, Jay	WebEx
EnerNOC, Inc.	Griffiths, Sarah	WebEx
ENGIE Canada Inc.	Hiltz, Bonnie	A
FTI Consulting	Harvey, Scott	A
FTI Consulting	Pope, Susan	A
Goreway Power Station	Sutherland, Christopher	A
H2O Power	Medina, Ron	WebEx
H2O Power	Somerville, Stephen	WebEx
Hydro Quebec	Belanger, Frederic	WebEx
Manitoba Hydro	Penner, Audrey	WebEx
Manitoba Hydro	Wells, David	WebEx
Manitoba Hydro	Bertholet, Kelly	WebEx
Ministry of Energy	Weir, Ben	WebEx
MIT Power Canada Investment Inc.	Koizumi, Shigeru	WebEx
MIT Power Canada Investment Inc.	Iseki, Madoka	WebEx
Nalcor Energy	French, Davin	WebEx
NextEra Energy	Tuck, Jennifer	R
Northland Power Inc.	Samant, Sushil	A
Northland Power Inc.	Khan, Shahid	A
N-Sci Technologies Inc.	Reid, Robert	WebEx

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Ontario Energy Association	Hrab, Roy	A
Ontario Power Generation	Wizniak, Lynn	A
Ontario Waterpower Association	Norris, Paul	WebEx
Open Access Technology International, Inc.	Rahimi, Farrokh	WebEx
Peak Power Energy	Sachs, Matt	A
Power Advisory LLC	Chee-Aloy, Jason	A
Power Advisory LLC	Cumming, Alison	A
Powerful Solutions	Inman, Peter	A
RBC Capital Markets	Doolittle, Robin	WebEx
Resolute Forest Products	Degelman, Cara	A
Rodan Energy Solutions	Holowatsky, Yuri	A
Rodan Energy Solutions	Goddard, Rick	A
Rodan Energy Solutions	Quassem, Farhad	R
Shell Energy	Kerr, Paul	WebEx
SMS Energy Engineering	Soufi, Safouh	WebEx
Suncor Energy Services Inc.	Scott, Christopher	R
Sussex Strategy	Simmons, Sarah	WebEx
Tetra Tech - Power	Krishnan, Sanjay	R
TransAlta	Nguyen, Thanh	WebEx
TransCanada Energy	Kuntz, Margaret	A
Workbench Corp.	Jayapalan, Jennifer	WebEx
WSP Canada	Krause, Don	A
	Cary, Rob	WebEx
IESO	Bellomo, Corrina	WebEx
IESO	Agavrioloai, Ioan	A
IESO	Ellard, Barbara	A
IESO	King, Ryan	A
IESO	Matsugu, Darren	A
IESO	Movchovitch, Emanuel	A
IESO	Sapona, Ingrid	A
IESO	Scratch, Jonathan	A
IESO	Zhao, Serena	A
Scribe: Ingrid Sapona. Please email any corrections, additions or deletions e-mail to the scribe ( <a href="mailto:ingrid.sapona@ieso.ca">ingrid.sapona@ieso.ca</a> ).		

All meeting material and a recording of the session are available on the IESO web site at: <http://www.ieso.ca/en/sector-participants/market-renewal/market-renewal-single-schedule-market>

**Meeting Started at 9 a.m.**

## **Introduction – (Ryan King, Darren Matsugu, Jonathan Scratch, IESO)**

IESO welcomed participants to Phase 1 – Session 2 of the Single Schedule Market (SSM) stakeholder engagement process.

Today's meeting will delve into details more than previous sessions because the IESO thinks it's worthwhile to invest the time to ensure everyone can have the same foundational knowledge before getting into decision making and design issues.

IESO plans on issuing a "Coles Notes" version – a short summary – of each module soon.

## **Introduction to Session Materials – Susan Pope, FTI**

**Participant Question:** If we don't go to day-ahead, will we just develop a single schedule real-time market without a day-ahead price? Can it just replace the current real-time market then?

**FTI:** Yes you can do that. Regions have done that. My understanding is that's not the direction the IESO is looking at right now. Right now the plan is for there to be a financially binding day-ahead market. That will be addressed in a separate stream of the market renewal (MR) process and that will be starting soon. What we wanted to talk about today is that the real-time market will be paired with the day-ahead market because as we discuss the SSM pricing, you'll notice we're really just talking about the pricing as it applies to dispatch; we're not dealing with the unit commitment issue right now in the pricing rules we're going to be discussing with SSM.

**Participant Question:** Referring to Slide 4 (of Introduction), the current constrained schedule will be the basis for SSM pricing? Does that mean that within SSM itself, inputs to the current constrained schedule will be reviewed to see if there is room for improvement as part of this engagement?

**IESO Representative:** Specifically, we're trying to address: transparency and efficiency, to address the lack of transparency with the out-of-market uplift, and unwarranted Congestion Management Settlement Credits (CMSC), which the Market Surveillance Panel (MSP) has spoken frequently about. Those are some of the fundamental issues we're trying to address by producing the alignment between the price signals and dispatch. Once we have alignment there might be further improvements, such as improving the dispatch process and the prices that go along with it. We're trying to manage the scope of today's exercise because it is significant enough.

**Participant Follow-up Comment:** So you're holding the constraint schedule "as is"?

**IESO Representative:** Yes.

**Participant Follow-up Question:** A number of variables affect price – things like composition of offers, forecasts for intermittent, forecast for self-scheduling, composition of bids, and so on – they all affect price and we’re not talking about them in the SSM? When will we talk about them?

**IESO Representative:** We acknowledge they all impact price; however, we need to start at the foundational level – aligning prices with dispatch – before we look at other enhancements. This is a question of priority and practicality.

**IESO Representative:** We recognize people see this as an opportunity to look at a variety of things. We see this as an evolutionary process, not the end of the road – today’s just a stop on the road. The market development roadmap, which will be used as the tool to prioritize future enhancements, will be a public process; we have used a similar model in the Demand Response Working Group (DRWG).

**Participant Comment:** The point from the previous comment is that it’s difficult to address issues of SSM if you don’t start with some assumptions. I gather the assumptions we’re starting with is that the inputs are the same as they are today. Then, later we can circle back and consider different assumptions and the impact of those on the design.

**Participant Comment:** I understand the desire to move away from the two schedule system, but just moving to nodal or zonal pricing does not take you all the way in terms of addressing a lot of those out-of-market issues related to transparency. You aren’t going to get all the benefits with respect to some form of locational issues because there are known flaws related to some of the inputs in the current constrained schedule and dispatch. Last year we were told we’re going to get this in the engagement; we’re here now.

**IESO Representative:** We’re open to having discussion about some of those impacts and things we need to consider. But, we’re generally concerned about scope and how to get market renewal done in a timely manner.

**IESO Representative:** What we’ll see as we go through the education and the options phase we’ll identify enhancements that allow us to maximize and achieve those efficiencies we don’t already have, even on the dispatch side. We’ll look at what we must have to put SSM in place and what are things that would be “nice to have”, but the complexity of those enhancements may delay putting in place enhancements that are long over-due. “Nice to have” versus “must have” will be an important part of the process.

**Participant Comment:** As I understand it, this is meant to be an educational, foundational, series of sessions. I don’t want to get into all the details now, because if we do, we’ll never get ahead. But, there should be some way of identifying these issues – some parking lot for them.

**IESO Representative:** Yes, we’re trying to make sure everyone understands the issues and fundamentals. There will be open dialog about other elements at some point.

**Participant Follow-up Comment:** When I say “parking lot”, I don’t mean it goes into a parking garage never to be seen again. I mean it’s a live issue, we just haven’t gotten to it yet.

### **Module A: Energy Pricing – Scott Harvey, FTI (64 slides)**

The module is meant to provide context for the SSM pricing rules, including:

- How Locational Marginal Pricing (LMP) compares to Hourly Ontario Energy Price (HOEP)/Market Clearing Price (MCP)
- LMP Defined
- Components of basic LMP formula:
  - Reference location
  - Congestion
  - Loss
- Supplier Pricing
- Intertie Pricing

**Participant Question:** Will there be LMP price on operating reserves?

**FTI:** Yes, and this is consistent with what’s being done in other jurisdictions that are trying to manage intermittent resources.

**Participant Question:** How do they choose a reference location? I think it’s someplace north of Toronto now – Richview?

**FTI:** It’s usually chosen by the operator because it’s a location that makes the software “solve well”.

**Participant Follow-up Question:** Will we be sticking with Richview as the reference location?

**FTI:** Probably. It’s an IESO decision, but unless the operator’s come up with some compelling reason to change it, there’s no need to change it.

**Participant Question/Comment:** Are penalty factors static or dynamic? Depending on weather and wind conditions, solar illumination, and so on, they can change.

**FTI:** The IESO uses static loss factors. Other jurisdictions update the loss factors from time-to-time. That’s a decision you can make and once we get a pricing system aligned, you can make changes and they ripple through.

**Participant Question:** Currently the constrained schedule uses the three components to make up an LMP price, but it may not be settlement ready because it doesn’t include certain price formation features. Can you explain what they are?

**FTI:** Yes, we’ll have a module on that later today.

**Participant Question:** Regarding supplier/generator pricing, how does that work in the context of exports?

**FTI:** We're going to talk about inerties right now.

**Participant Question:** What about loop flows into Niagara, or out of Michigan?

**FTI:** You can use the current model or, over time, you can change it.

**Participant Question:** In Ontario, we have an export transmission service charge that other jurisdictions may not have. Does that stay, or go? How do things like that get factored into intertie pricing?

**FTI:** Many other jurisdictions have a similar charge and it's collected. There is an incremental cost of meeting your export load and there could be a charge for the cost of the transmission system.

**Participant Comment:** When you start to look at this pricing formulation, there are lots of components that are deeply, deeply buried in the Dispatch Scheduling Optimisation (DSO). When a market participant asks the IESO to help them understand their dispatch, it's not a trivial task to go into the output of the DSO. Now, in the new world, prices will be driven by decisions made by DSO. When you start to look at the DSO, it's very complex. Will there be some commitment by the IESO to capture decisions some of these influence on price, so whether it's published or made accessible to IESO staff so that prices can be checked? It's important that people realize it's a complex engine and a lot of the intermediate values DSO uses will be important in the future so people can understand what their bill looks like.

**FTI:** Agreed. A lot of decisions being made are invisible to market participants. Maybe we need to provide more visibility to that. I think you're right, we need to check it.

**Participant Question:** I agree – that's an excellent point. Reference was made with respect to locational pricing and considering the type of mix we have on the supply side, can you comment on thinking going on in the northeast about factoring in emissions and new and different constraints?

**FTI:** There's a lot of discussion in the US about the impact of state actions and subsidies on resource adequacy. We're in between on how we're going to factor in carbon pricing into dispatch. It's just a cost that flows into the dispatch.

**Participant Question:** Doesn't the LMP supplier pricing necessarily have a more significant impact on generation resources that "are where they are"?

**IESO Representative:** LMP has the potential to impact all generation facilities, both existing and in the future, and for future resources it may, therefore, impact where they are going to locate.

## **Module B: Reserve Pricing – Susan Pope, FTI (Slides 1-20)**

In this module we'll look at:

- How the IESO currently operates the reserve market in terms of scheduling and pricing
- How other ISOs operate reserve markets
- How the reserve market would work under SSM

**Participant Question:** Earlier Scott Harvey mentioned reserve pricing would be regional. Seeing your presentation, it sounds like pricing will be nodal. Am I reading that correctly?

**FTI:** One option is that reserve pricing be based on nodal prices. If that's the case, suppliers of operating reserve would be paid the nodal (locational) price of reserves. Recovery of those costs would likely still likely occur through uplift.

**Participant Follow-up Comment:** Limit sets are defined in the System Security Monitor – or SSM – but a different SSM than we're talking about today. I guess we couldn't call this project MSP as there are already too many acronyms. I'm just throwing that in – it's always struck me as funny that they have the same acronym.

## **Module C: Pricing Constraint Violations – Susan Pope, FTI (Slides 1-14)**

Constraints are an issue that is not currently addressed in unconstrained pricing. This module is a natural follow-on to Module B. Here we're addressing all the constraints that exists in the constraint model used in the physical dispatch:

- How reliability constraint violations are currently applied to price in Ontario
- How other jurisdictions deal with reliability constraints
- Pricing choices Ontario may consider as it moves to a SSM

The things we're talking about now are pieces that are not currently addressed in the unconstrained pricing. This is stuff that needs to be in the new pricing model.

**Participant Question:** Regarding development for pricing for penalty violations – are these penalty levels purely arbitrary in the algorithm? Who gets the last call if there are discussions about penalty hierarchy and what that value should be? How did we get these penalty prices in the first place?

**FTI:** In the abstract, you'd like penalty values that relate to the impact of the violation of the reliability of the constraint on cost of the loss of load; what a loss of load costs. In Texas, for example, they have full-blown scarcity pricing. The explicit calculation they use in Texas is the estimates of how much a given level of violation impacts the probability of loss of load and the cost of the loss of load. There's an explicit relationship in Texas and this was FERC approved

**Participant Comment:** Presumably they'll be in the IESO's tariff when it's filed.

**FTI:** Historically, with other ISOs, vendors just set a hierarchy of really big numbers. They used various tricks to make sure it'd be a really big number. But, when you start having a market, you don't want to do that. You want to be more reasonable, so you see continual refinement.

**Participant Follow-on Question:** How do market participants and ISOs work through those discussions?

**FTI:** It tends to be a dialog like this. ISOs talk about what they're trying to achieve. The key is that everyone knows what the number is, so it doesn't get changed overnight. It's a transparent number and people understand operationally why they're doing that.

**Participant Follow-on Question:** Is there a convergence between regions on the amount of penalties?

**FTI:** A little bit, but not really – it depends on each region's reliability constraints.

**FTI:** In Phase 3 we'll look at the penalty factors in different regions and how they've changed over time. There are reasons why they'd be different in different regions based on things like the asset base.

**Participant Comment:** It's interesting. I hadn't really thought about this idea of step-based penalty factors. There are a number of situations where they disregard the limit violations and one of the concerns that participants have always had is the effect on pricing of some of those decisions made by operators during admittedly stressful circumstances. I think this would be a great way for the IESO to remove that burden from the control room. To be able to think these things through in advance; stakeholder them, and be able to remove that concern. Right now you have operators doing crazy things like disregarding an operating reserve number and then fiddling with the demand curve in the unconstrained to make it all hang together as a signal.

#### **Module D: Multi-interval Optimization and Pricing – Scott Harvey, FTI (Slides 1-28)**

This module looked at:

- The role and function of multi-interval optimization in dispatch decisions
- Settlement calculation issues related to multi-interval optimization

**Participant Question:** Is the IESO's system *ex post* or *ex ante*?

**FTI:** The IESO's constrained dispatch system is *ex ante*; the unconstrained is *ex post*.

#### **Module E: Pricing Operating Restrictions and Operator Actions – Susan Pope, FTI (Slides 1-19)**

This module considered two specific types of situations where specific rules may be required to set prices in a SSM:

- Dispatch of suppliers with physical operating restrictions
- Situations where the operator intervenes in the physical dispatch



**Participant Comment/Question:** Looking at Slide 13, when I think about how markets in the US have a higher share of gas and coal generation which brings more inherent flexibility based on those thermal units. Here we have a bunch of hydro, 10-12,000 MWs of nuclear that's always "on", and close to 7,000 MWs of wind and we're serving a minimum load of 10 Gigs at any given time. So I think we need to think about rules about how variable generation comes on, nuke is always on, and then water trying to balance all this. Thinking about that dynamic, what other considerations do we need to think about?

**FTI:** You're getting toward the kind of issues that are for the "maybe we'll talk about it" list – things like: what are the needs for ramping and regulation going forward as the resource mix changes going forward? I don't think the issue is directly on point for this. What we're dealing with here is a very narrow question of how do you set the price on margin when you are choosing to bring on and dispatch a unit? Maybe this will become a bigger issue in the future, and maybe this could be added to the list of things we might talk about.

**Participant Follow-on Comment:** Due to low marginal cost of all the resources described, and because of the higher variable generation, we've got WAY more volatility in terms of when we need to ramp resources and hydro is being asked to pick up that slack. Those units are being banged around all over the place, which is exacerbating the need for the operators to do what they need to do. Therefore, our pricing was already not making sense, based on the two schedule system and it's doubly not making sense because the operator is going in. So, given our suite of resources, we need to think carefully because we're not using a gas fleet in the flexible way other jurisdictions do. So, we're not getting the benefit of a much more sculpted offer curve when we're ranking the units in a certain way and the dispatch is including the attributes and flexibility to the extent they have it, but not to the extent other ISOs can.

**FTI:** We're talking about constrained pricing, so one of the big differences isn't just going to be locational pricing but the impact of ramp constraints are going to show up in constrained prices. The value of ramp is being depressed by the unconstrained pricing system. The whole fiction of minimum load block and other things are creating phantom ramp. The change in pricing is going to provide more value to resources that can ramp fast. Keep in mind, LMP is constrained pricing and another reason it's important is it's going to take into account ramp.

**Participant Follow-on Comment:** Where I'm going with this is that, given the composition of our system, it makes sense to compensate for ramp. But there are still physical limitations as to what OPG can do to provide that ramp – but there are trade-offs. We would need other resources to be able to provide that kind of ramp.

**FTI:** That gets into capacity market resource strain and long-term investment. What do we need and when are you bringing it in? But for now, we're setting up short term pricing signals to maximize the value of the resources we've got now and making sure everybody has the right incentive to bid in an offer with the capabilities they've got.

**Participant Comment:** Another type of resource we really haven't talked about at all today is demand response and dispatchable load. Dispatchable load has forbidden regions, and yet, they aren't modelled that way. This needs to go on the "issues list". To get more responsive load, you need to look at dispatchable load.

**FTI:** Yes, all this needs to be internally consistent.

**Participant Question:** When we implement these pricing rules, do they still need to respect upper and lower ranges?

**FTI:** Usually what we see is that they're going to observe the maximum and minimums, but often they are at the maximum ranges.

**Participant Question:** The shadow prices are raw, but to make them settlement ready you have to do everything on Slide 19?

**FTI:** Yes, this is kind of a short list of what needs to be done.

**Participant Follow-on Question:** Are there quality control things that have to be done too?

**FTI:** Yes.

**Participant Question:** Then there's the question of the Ontario/Quebec electricity trade agreement – how do you treat that in locational pricing, violations, and operator activity, and so on? Where do they fit in? Clearly they have an impact on price and price formation. What can you tell us about what might happen with other ISOs that have such agreements?

**FTI:** Is this an agreement to provide reserves, or emergency imports? I'll need more information on that.

**Participant Follow-up Comment:** You'll have to ask the IESO to provide us with more information because it's a secret deal.

**IESO Representative:** The question is an interesting one. It comes back to what the incentives are and how do counter-parties participate within the energy market?

**Participant Follow-up Comment:** It's germane because we're talking about having an impact on all of this and it's in place for some period of time. It makes all of this a bit messy. It will need to be addressed in some way if we're going to wind up with a less efficient outcome. If we're talking about efficiency, this is not the most efficient way of acquiring these resources and there's a bit of double-talk going on.

**IESO Representative:** Let's separate out what we're trying to solve which is how do we import/export energy, the trading of capacity, called upon exports/imports. That's really, in the long-run, what we're trying to solve. We hear your frustration and we empathize. The previous commenter put clarity there, it's there to displace GHG (green-house gas), but they do have to participate appropriately in the energy market; they have to provide bids and offers, and they are scheduled accordingly. We are trying to figure out how this works going forward, when we are going to continue to trade energy and incent and enable capacity exports. We have to think about that, but let's work through those issues.

**Participant Comment:** What I'm making of the comment is we have a situation that could be off-side from potential rules that may exist at some point in the future. I would expand it and say we have a situation that does exist that, quite likely is offside the rules that exist today. Where the question may be how do we guard against this in the future, I have sympathy for the market renewal folks because it's not a market renewal question – it's a question of the current market being off-side. Perhaps the solution is to pursue a solution to the existing situation in the existing set of rules and then that would inform our approach going forward.

**Participant Comment:** I agree. I raise the question because we're going to do the best we can to move to a single schedule that is as realistic as possible, but if this continues into the future, it will have impacts. This is something that should go onto the parking lot list – we need to think about it. Can we see more of these in the future, if so, we have to think about how that gets addressed in pricing. But yes, we should address the current one because it is improper.

**IESO Representative:** Let's not get the current deal confused with what we're trying to solve in the future.

### **Conclusion**

IESO thanked the participants and reiterated that feedback should be sent to: [engagement@ieso.ca](mailto:engagement@ieso.ca).

Next SSM Meeting is June 29, 2017.

**Meeting Adjourned at 2 p.m.**