



DDG Participant Conference Call - November 30, 2015

Agenda

- I. RTU Communications
 - A. Answers for questions received since last conference call
 - B. RTU upgrade and installation readiness
 - C. Other questions on RTUs
- II. General Topics
 - A. Update on Forecast Web Services
 - B. Answers for questions received since last conference call
- III. Project Progress/Schedule
- IV. Discuss potential topics and date for next conference call

I. RTU Communications

A. Verbatim Questions Received since Last Conference Call

1. Current Self Schedule Status - Once DNE Dispatch goes live and a generator becomes a DDG, my understanding was that it would not have the option to be self scheduled. Under what conditions would a DDG have a value of 1?

ISO-NE: DDGs will still have the ability to self schedule as they do today as can other generators. A resource can specify any or all hours in the Day Ahead market to self-schedule. This will commit the resource at its EcoMin for the self-scheduled hours as a price-taker (it cannot set price). Self-scheduled resources forgo any startup and no load costs for these periods. If a resource wishes to self schedule in real-time, it is required to call the control room and request the self-schedule. If there are no reliability issues the self-schedule will be granted and the resource can come online. Real-time self scheduling is primarily used for activities like owner testing. Again startup and no load costs for these self-scheduled periods are waived and the resource cannot set price.

The self-scheduling functionality is not being removed. It may be modified when the resource dispatchability project is implemented in 2017 or 2018. Resource Dispatchability Requirements are currently being evaluated by the ISO's Market Development group and will be discussed at the Markets Committee over the next several months.

2. Deviation - If the deviation is the DNE minus actual generation, if a DDG is operating below its DNE, will it see a positive deviation? If it is operating above its DNE, will it see a negative deviation? Shouldn't it only see a non-zero deviation value if it is operating above its DNE, since it is allowed to operate anywhere between 0 MW and its DNE?

ISO-NE: This is a common field in the RTU protocol for all types of units. You are correct that positive deviations are normal for DDGs, but discussed internally and agreed that returning negative deviations might be useful to the DDG operator as an indication of the available room between a DDG's current output and the DNE limit for the unit. This field is not used in Settlements. It is a real-time indicator only.

3. Area Clearing Energy Price - This is the price from the dispatch solution at the individual generator's node?

ISO-NE: Yes, that is correct.

4. High Operating Limit - Is this the same as the Real Time High Operating Limit? For DDGs, this is not the same thing as the Economic Maximum Limit. A wind farm may have an EcoMax of 20 MW (expected unconstrained output) and a RTHOL of 50 MW (equipment capability). What is the exact source of this HOL data point? Is it the most-recently telemetered RTHOL value sent from the DDG to ISO? ISO had said in its FERC filing that it would "echo back" to each DDG's RTU the most recently telemetered RTHOL value.

ISO-NE: The HOL value will be changed to reflect the most recent RTHOL value for DDGs. An update to the RTU protocol companion document will follow shortly.

5. Manual Ramp Rate - I'm still not sure what this is in the context of a DDG after reading the description. I see where the value comes from, but how is it used?

ISO-NE: The real-time dispatch uses the Manual Ramp Rate in conjunction with the unit's current output to determine what level (up or down) the unit can reach in real-time for maintaining the overall energy balance. For DDGs this is most evident when a unit needs to ramp up or down. For example, in the case of a constrained area with a slow, expensive DDG and a fast, cheaper DDG, the ramp rate would impact the DNE limits. We would not allow the cheaper DDG to ramp up any faster than the slower DDG can ramp down so that we do not violate constraints.

6. Postured - DDGs cannot provide reserves. Looking at the referenced CROP, it looks like units are postured to create reserves or VAR support, so if a DDG is postured it means that it is having its output reduced in order to provide additional VAR support? Does the DDG need to do anything in response to the postured flag? Or does it just need to continue following its DNE?

ISO-NE: The DDG just needs to continue to follow its DNE.

7. It was said on the webinar that DDGs can participate in the regulation market. While ISO's compliance filing removed the restriction against DDGs participating in the regulation market, I had thought that ISO made clear that it does not have the

capability to include these resources in the regulation market. Did I misunderstand that? Would it be possible for a DDG to participate in the regulation market? Wouldn't the regulation market need to be changed to allow for regulation down instructions separate from regulation up instructions or else the DNE algorithm would need to be altered to keep a DDG below its EcoMax such that it can provide both up and down regulation?

ISO-NE: You are correct. While the Market Rule does not prohibit DDGs from participating in regulation, the bi-directional nature of the existing regulation market, as approved by FERC, would make it difficult for wind and hydro DDGs to operate economically as regulation resources. The DDG will have to demonstrate how it ensures the ability to follow AGC dispatch instructions up and down within the offered regulation range prior to participating in the regulation market.

8. ISO had said in its FERC filing that it would "echo back" to each DDG's RTU the forecasted unconstrained energy output value used to calculate the DNE dispatch point. Which of the data points in this list represents this value?

ISO-NE: The Economic Maximum Limit is this data point. Please see the description in the RTU Parameter Companion document.

B. RTU Upgrade and Installation Readiness

- a. Please e-mail iccpadmin@iso-ne.com to schedule testing. Circuit orders can also be sent to iccpadmin@iso-ne.com.

C. Other Questions on RTUs?

II. General Topics

A. Update on Forecast Web Services

B. Verbatim Questions/Requests Received since Last Conference Call

1. I would like to ask/suggest that ISO provide a training session for wind operators relating to the upcoming transition to DNE instructions. I was considering re-taking the WEM 201 class, but find that the bulk of the topics are not relevant, and those that are may not be explored in the depth that would be helpful.

Specifically, I think a 4 hour session or so, going through specific examples, would be of great service to wind operators. Specifically, some topics to cover might be:

- Examples of how price is set on a node, and how the wind bid plays into this pricing
- What occurs when the wind project is setting price
- Reconciliation of day ahead/real time
- Dispatch prioritization

I would be glad to help think through the design of this training. I am guessing that a training session specific to this topic would both be very helpful to the participants, but would also ease the DNE implementation process.

ISO-NE: The periodic phone calls will remain focused on the DNE project itself. The request for market training targeted to intermittent resources has been forwarded to the Supervisor, Customer Training, who will schedule a training needs assessment and reach out for input during December.

2. Also, a question was asked concerning whether a non SOG, non intermittent, non dispatchable hydro was part of the DNE project. I am interested in this answer.

ISO-NE: Only intermittent hydros are included in the DNE project, however please note that a forthcoming project will likely require all non-Settlement Only generators to be dispatchable. No date has been set for that project yet, but it is being addressed at the Markets Committee over the next several months.

3. I had asked about whether there would be any written expectations for when a hydro DDG would be required/expected to redeclare its EcoMax. For wind units, the expectation prior to the wind forecasting program was that they would redeclare whenever a generator's production had or would deviate from the latest schedule given to ISO by more than +/- 10 MW or 20% of the scheduled value in any hour, whichever is greater. ISO expected that redeclarations would be for the remainder of the operating day. ISO could also request more frequent redeclarations as needed. I would imagine that something similar would be helpful to have in writing so that all DDGs are operating under the same expectations.

It was said on the call that hydro DDGs have every incentive to provide accurate schedules to ISO, but that is not the case. They have every incentive to over-forecast and provide EcoMax values that are above their actual generation levels. If there are constraints, the DNE algorithm will weight the DNE instructions given to competing generators by their EcoMax values. If a wind unit's EcoMax is set by the very accurate wind forecast and the hydro DDG submits a too-high EcoMax, the DNE algorithm will instruct the hydro DDG to produce more power and the wind DDG to produce less power than intended. Or if one hydro DDG gives an accurate EcoMax while a competing hydro DDG provides a too-high EcoMax, the first will have its DNE reduced and the second will have its DNE raised.

In addition to setting clear expectations about the accuracy of Hydro DDG's EcoMax values and when redeclarations are expected, it also seems that ISO should have some kind of auditing process to pick up on when this type of behavior is a pattern. For a hydro DDG, if the Participant Submitted EcoMax is higher than the unit's unconstrained output will ISO redeclare the EcoMax value or instruct the DDG to do so? In general, how will ISO audit the participant-submitted values to make sure they aren't consistently too high? In its FERC filing, ISO said that it would be able to provide aggregate data about the accuracy of hydro resource forecasts to interested market participants. I will be interested in this.

ISO-NE: ISO-NE's Internal Market Monitor will be monitoring the EcoMax values submitted by the hydro DDGs. The exact details for how that will be done is not available at this time.

Once we gain some experience with the hydro forecasts we will be able to analyze the accuracy of forecasts provided by the intermittent hydro operators and present the results of the analysis. The details of when and where that work will be presented will not be determined until after DNE go-live.

4. What is the schedule for bringing a hydro-specific OP-14 appendix to the NEPOOL technical committees? Will it be discussed with this DDG group prior to going to the technical committee?

ISO-NE: After reviewing the information and comments received from participants at the September 2014 VRWG meeting and evaluating potential changes to existing procedures to address hydro-specific concerns, the ISO did not identify any areas that required changes to the existing “generic” procedures used by the Control Room. It was determined there is no need at this time for an additional intermittent hydro-specific appendix.

5. What notifications and training activities is ISO planning as part of the DNE implementation process to make sure that all intermittent hydro operators understand the consequences of waiting until after May 2016 to become dispatchable? In ISO’s filing at FERC it said that it had individually contacted the affected market participants and planned additional notification and training activities to make sure that these hydro operators understood the market implications of delaying their participation (i.e., that their energy would all be offered at \$-150/MWh and would be eligible to set price).

ISO-NE: The project team is going hold periodic conference calls like the one held on October 15. As the go-live date gets closer these calls are likely to become more frequent. We have invited all affected participants to these calls. In addition, the IT group is in the process of reaching out to all affected parties to engage them in their RTU implementation.

6. Currently ISO-NE has an auto-redeclaration process for wind plants, using the wind energy forecast as the wind plant’s EcoMax. A wind plant operator may override this and provide a manual redeclaration of their EcoMax. Once DNE is implemented, will this still be possible and what will be the impact on the DNE calculation?

ISO-NE: The manual redeclaration process is not changing so wind plant operators will still be able to call the control room and manually redeclare their EcoMax, however, once DNE is implemented this has a direct impact on the dispatch as the redeclaration would override the forecast value used in the dispatch. Before the control room operator would enter the redeclaration they would require a compelling reason from the Designated Entity for the redeclaration, such as a failure in the wind forecasting system. The most common need to redeclare an EcoMax value will be unexpected equipment outage at the wind resource, but this information is also provided via the RTHOL values telemetered to the ISO every five minutes, mitigating the urgency, or even the need, for a participant to redeclare EcoMax downwards.

7. Today, I believe the curtailment procedures call for
 - a) real-time dispatchable energy to be curtailed prior to curtailment of

- b) self-scheduled energy that was scheduled after the close of the reoffer period which is curtailed prior to
- c) self-scheduled energy scheduled prior to the close of the reoffer period which is curtailed prior to
- d) self-scheduled energy cleared in the Day Ahead Energy Market.

Once DNE is implemented, DDGs will no longer be able to self schedule generation, is that right?

ISO-NE: See the answer to #1 above under the RTU parameters.

All energy from DDGs above the resource's EcoMin, whether it clears in the DAM not, will be curtailed (dispatched down) in the first step (a) above, correct?

ISO-NE: Yes, that is correct.

If the DDG is not participating in the DAM, is there still any requirement for DDGs to submit their expected schedule into eMarket? Does this submittal have any impact on market outcomes? If the DDG does participate in the DAM, does that change either of the answers to the previous two questions?

ISO-NE: Resources are required to have an up to date schedule in the market system. DDGs with a CSO are required to offer the participant's estimated energy production into the Day-Ahead Market. For a DDG without a CSO, the "valid schedule" may reflect zero energy production. This schedule determines the market parameters for the resource for the market in which they are committed. There can be different schedules for Day Ahead and RT; a single schedule that just carries forward; or any other schedules as determined by the Lead Participant. If no new schedule is provided for a new day, the most recently provided schedule is utilized.

The decision to offer into the DAM influences how the DDG comes/stays online. If a DDG does not have a CSO and elects to not submit a DA offer, that unit will be expected to be offline for the Operating Day unless it requests to self-schedule in real-time, or is committed by the ISO to meet a RT reliability requirement.

III. Project Status

A. Progress to date

B. Upcoming milestones

IV. Discuss potential topics and date for next conference call
