New Desired MW Metric

MIC

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IMM

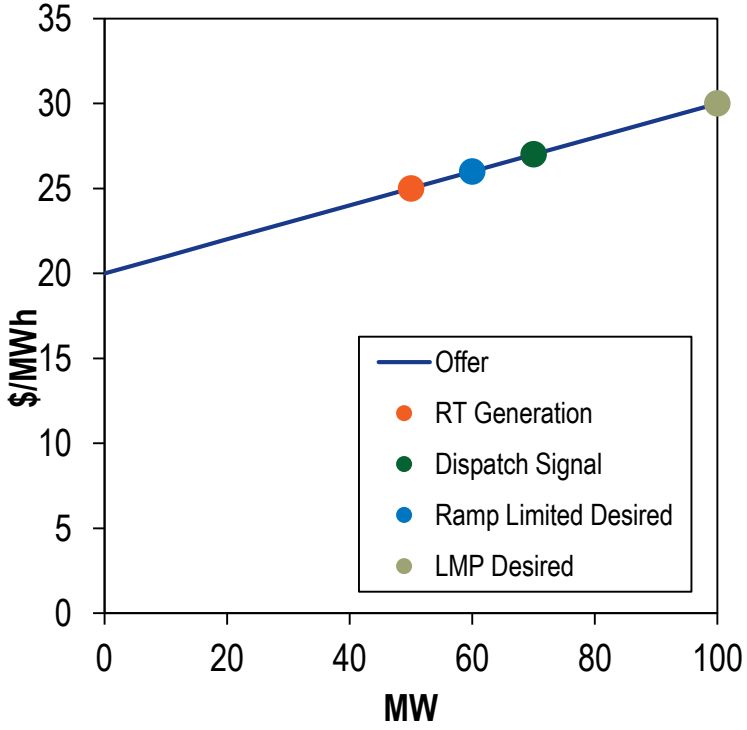
Monitoring Analytics

Status Quo

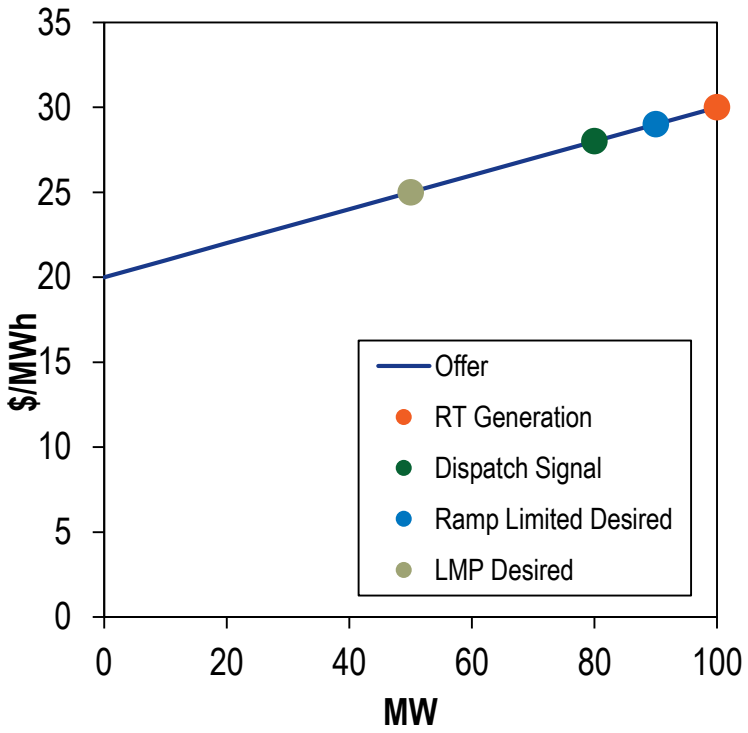
- **Currently PJM calculates how well a unit follows dispatch using three metrics: Dispatch Signal, Ramp Limited Desired and LMP Desired.**
- **The Dispatch Signal, also known as Basepoint, is the MW value calculated by RT SCED and sent to generators.**
- **The Ramp Limited Desired is the MW value that the unit should have achieved between Dispatch Signals.**
- **The LMP Desired is the MW level on the incremental offer curve where the Dispatch Run LMP intersects the offer curve.**

Status Quo

Unit Ramping Up



Unit Ramping Down



Monitoring Analytics

Status Quo Issues

- **These three metrics are calculated individually for each interval. These metrics are useful to determine how well a unit followed in each interval, but they are not useful to measure how well a unit followed consecutive instructions. The Dispatch Signal and the Ramp Limited Desired are based on the SE MW. When a unit does not follow dispatch, the Dispatch Signal and the Ramp Limited Desired do not reflect where the unit should have been.**
- **The LMP Desired is not ramp limited. For units with slow ramp rates, this value does not measure how well the unit could have moved in response to consecutive signals if the unit had followed its ramp rate.**

New Desired MW

- **In order to measure how well a unit followed dispatch during an entire commitment, it is necessary to develop a metric that incorporates consecutive market interval conditions.**
- **A new desired MW metric will incorporate consecutive market conditions to create the profile that units should have achieved if they had followed each dispatch signal, based on their ramp rates.**

Equation

- **Generically, the new metric is calculated as:**
  - $D_t = D_{t-1}$ +/- $Ramp_t$
- **Where:**
  - **D = New Desired MW**
  - **t = Calculation interval. When t-1 = 0, D = Actual Output.**
  - **Ramp = Increase/decrease in output based on market conditions. The ramp will be calculated using the dispatch LMPs solved in every RTSCED case and the ramp rates submitted by the units.**

Equation Results

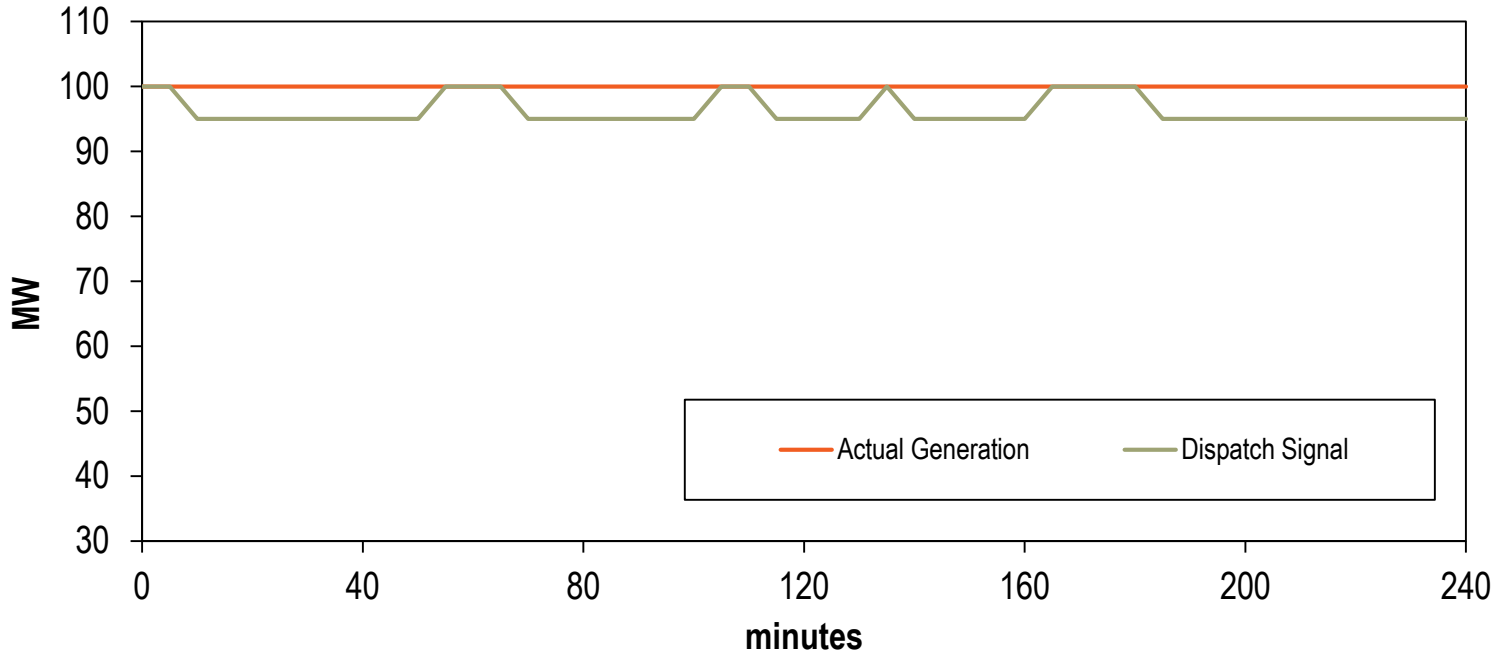
t	Actual Output (MW)	Dispatch Signal (MW)	D (MW)	Ramp (MW)
0	100	90	100	
1	100	90	90	(10)
2	100	90	80	(10)
3	100	90	70	(10)
4	100	90	60	(10)
5	100	90	50	(10)
6	100	90	50	(10)
7	100	90	50	(10)
8	100	90	50	(10)
9	100	90	50	(10)
10	100	90	50	(10)
11	100	90	50	(10)
12	100	90	50	(10)

Example

- Eco Min: 50 MW
- Eco Max: 100 MW
- Ramp Rate: 1 MW/minute
- Unit Offer
  - Incremental: $50/MWh
  - No Load: $1,000/hour
  - Start: $5,000/start
- Average LMP: $43/MWh
- Ramp Limited Desired MW is used as the Operating Reserve Desired MW for simplicity.

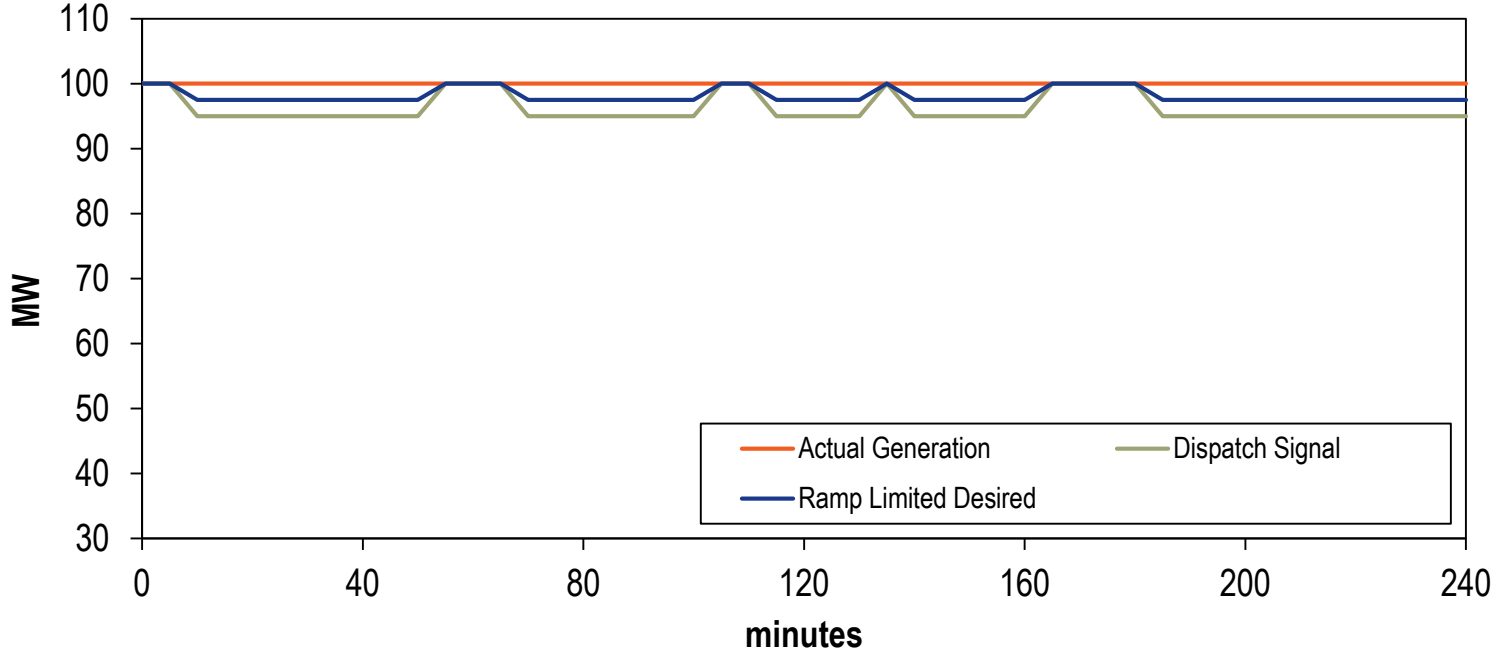
Example

- **Unit is dispatched down several times. Unit does not follow.**



Example

- **The Ramp Limited Desired MW (RLD) is not far from actual. Based on the RLD, the unit appears to follow**

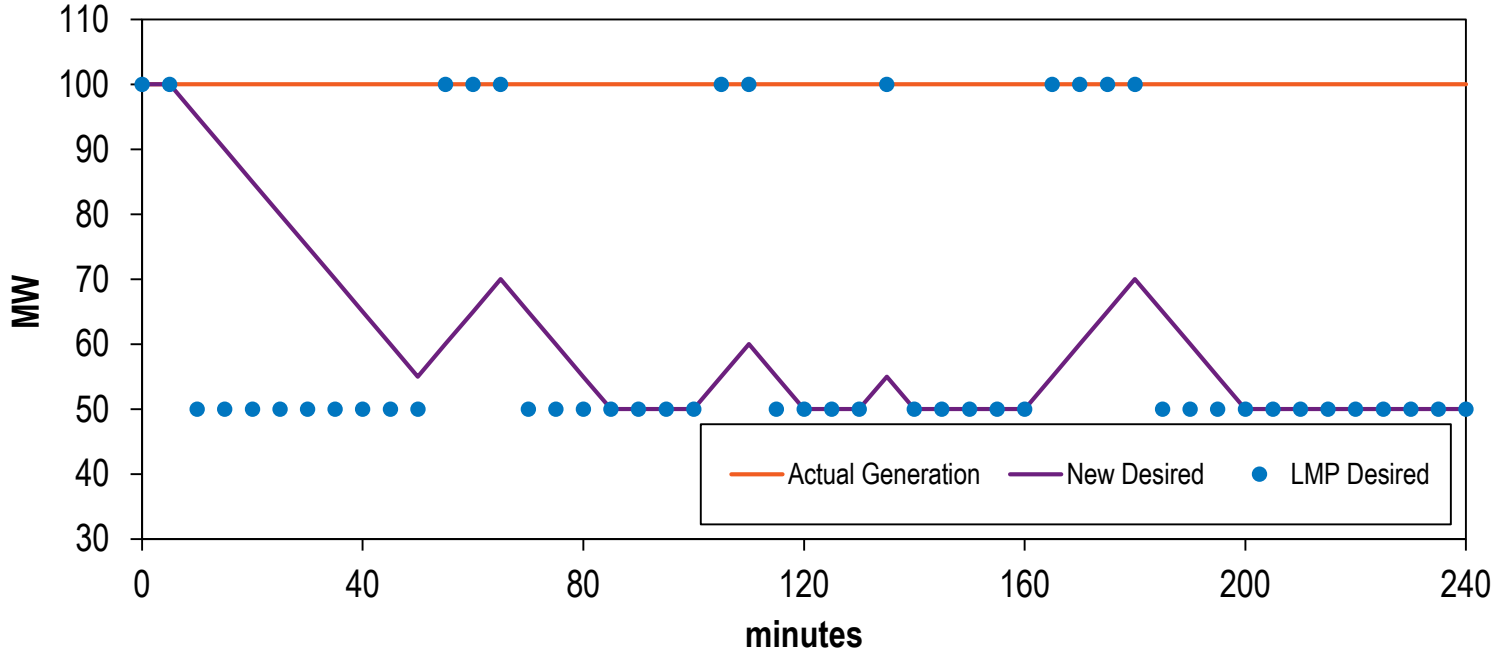


Financial Outcome – Status Quo

- **BOR payment: $11,979**
- **Deviations: 0 MWh**
- **The fact that the unit did not follow dispatch is not reflected in the BOR paid to the unit and it is not reflected in the BOR deviation charges.**

Example – New Metric

- **Using the LMP and parameters, a new desired MW is calculated based on what the unit should have produced.**



Financial Outcome – Using New Metric

- **BOR payment: $3,875**
- **Deviations: 162 MWh**

- **The new metric measures the output the unit should have been producing for each interval during the entire run.**

Next Steps

- **The new metric is a work in progress. The goal is to calculate a desired MW that incorporates consecutive market interval conditions.**
- **More details to be discussed:**
  - **Manual Dispatch**
  - **Regulation / Reserves**
  - **Operating Limits**

Monitoring Analytics, LLC
2621 Van Buren Avenue
Suite 160
Eagleville, PA
19403
(610) 271-8050

MA@monitoringanalytics.com
www.MonitoringAnalytics.com