



April 8, 2024 Total Solar Eclipse Impacts to PJM Footprint

Kevin Hatch

Michael Stewart

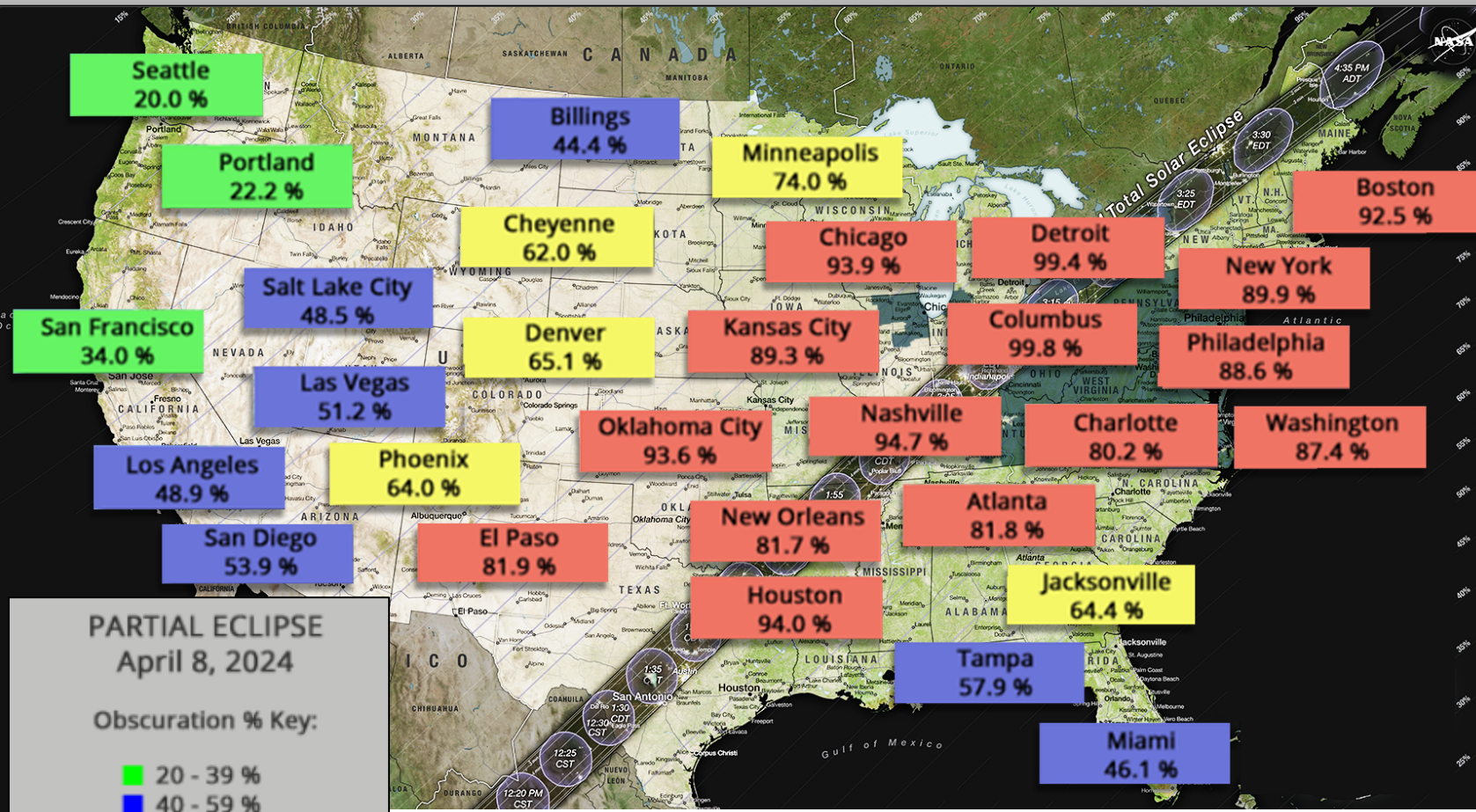
Market Implementation Committee

April 3, 2024

Total solar eclipse across South-Central and Eastern United States Monday, April 8, 2024



Total solar eclipse across South-Central and Eastern United States



PARTIAL ECLIPSE
April 8, 2024

Obscuration % Key:

- 20 - 39 %
- 40 - 59 %
- 60 - 79 %
- 80 - 99 %

(Percentages shown are only representative samples)

Source: Map adapted by NationalEclipse.com from original at eclipse.gsfc.nasa.gov. Eclipse predictions courtesy of Fred Espenak, NASA/Goddard Space Flight Center.

Monday, April 8, 2024

85-100% Obscuration
Mid-afternoon | During spring

Different from past:

October 2023
<40% Obscuration
Early morning | During fall

August 2017

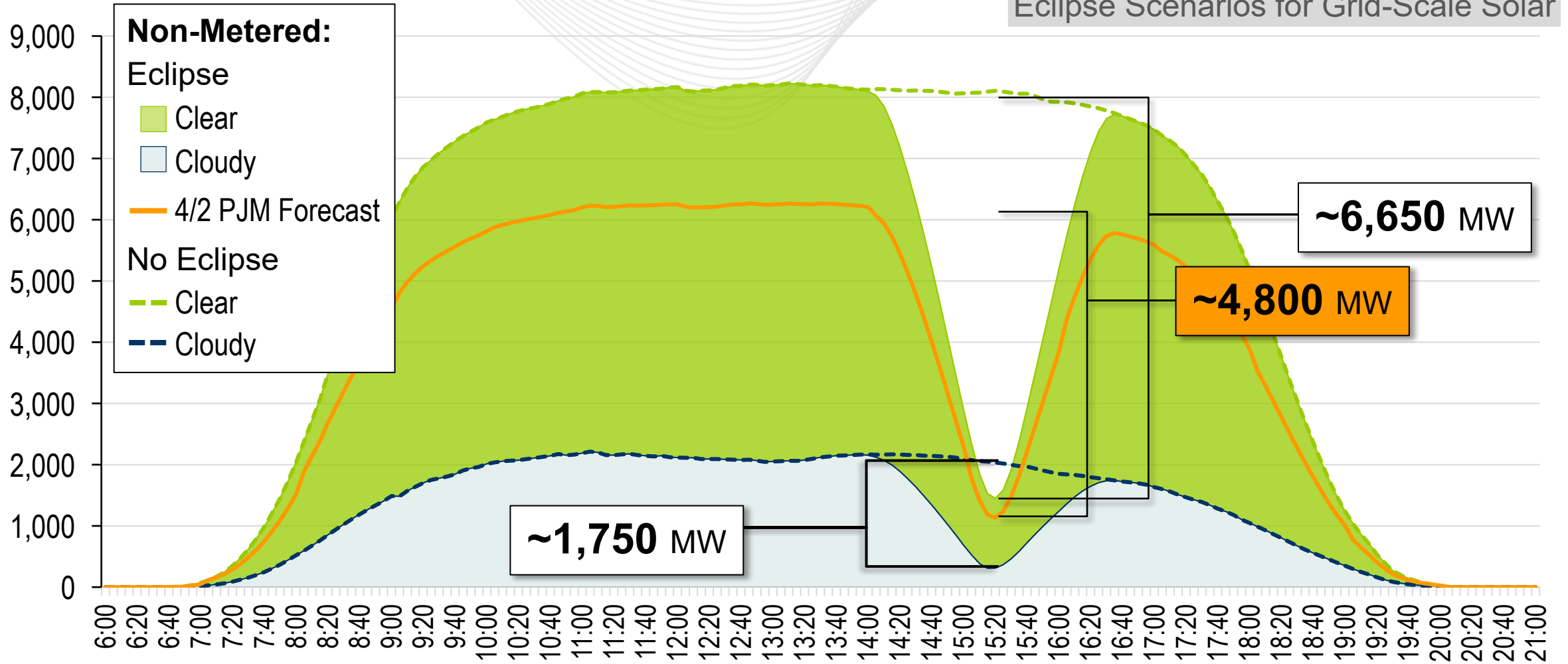
70%-90% Obscuration
Early afternoon | During summer

Installed capacity solar and grid-connected MW:

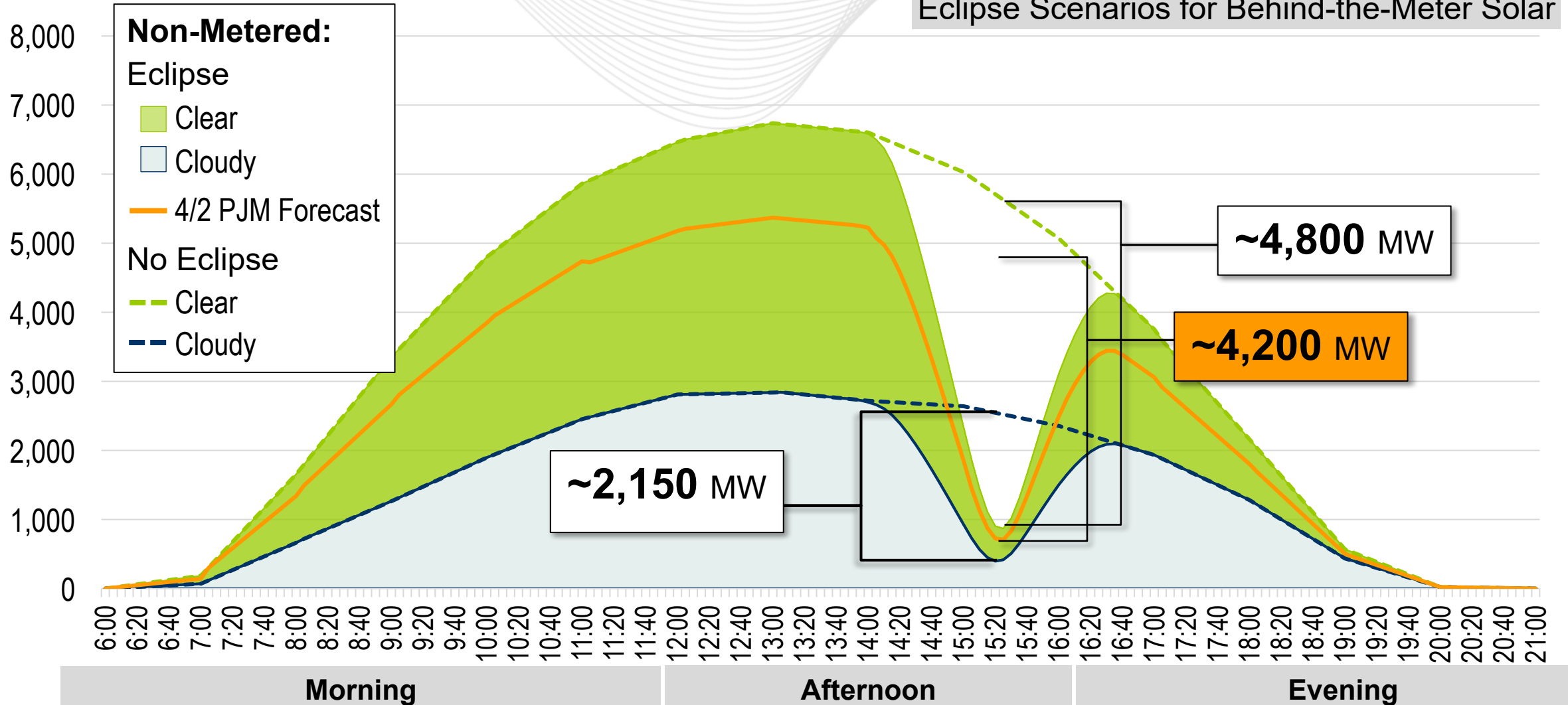
13x increase
for grid-connected

2.7x increase
for behind-the-meter

Eclipse Scenarios for Grid-Scale Solar

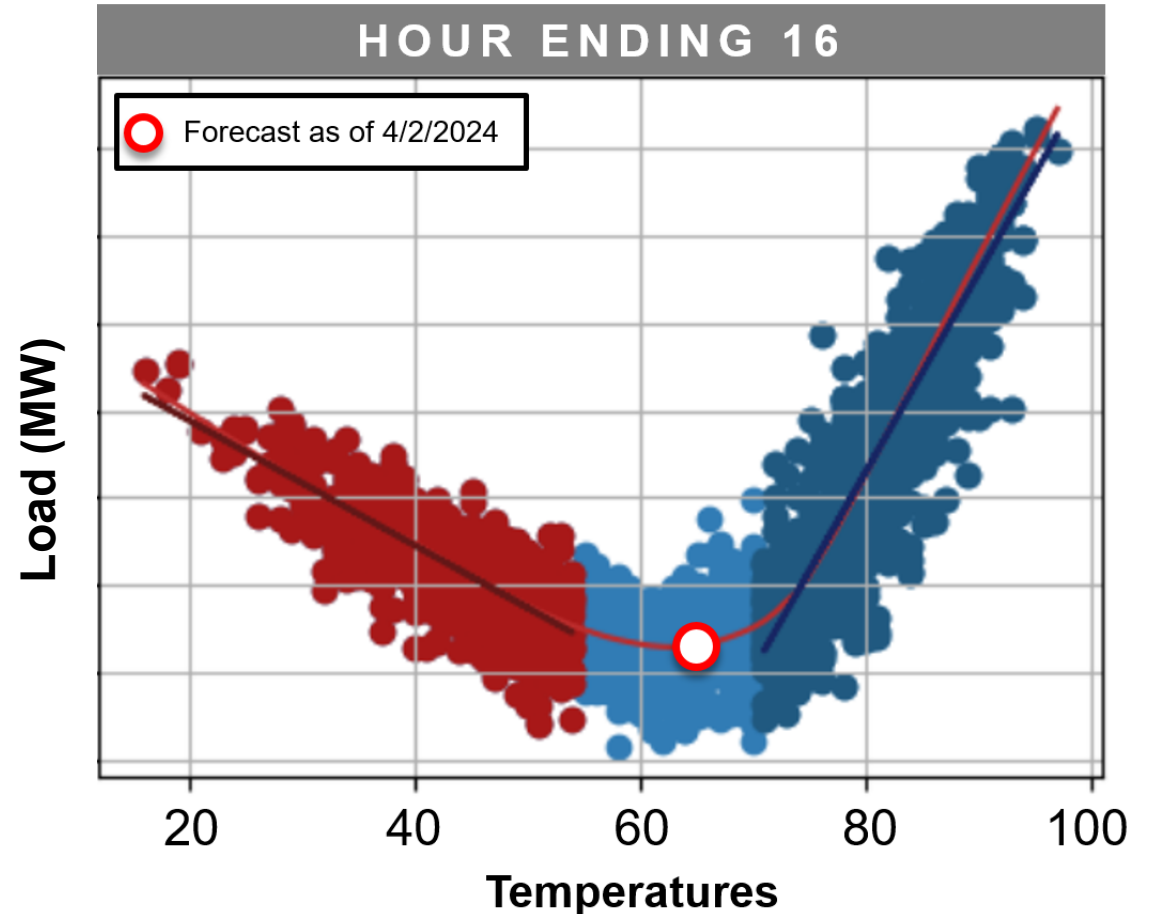


Eclipse Scenarios for Behind-the-Meter Solar



The preceding is an excerpt of a more complete Work Product.
 Source: data and analysis provided by UL Services Group LLC

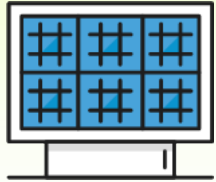
- Current temperature forecast for April 8th in mid-60s
- Load impact due to temperature decrease not significant
- Temperature forecast will continue to be refined as forecast date approaches





- Anticipating variables that could impact load
 - School closures (decrease)
 - Travel to locations of totality (decrease/increase)
- Not a holiday, but not a normal Monday

Generation



Metered solar
(grid-connected)

4,800 MW

Load



Non-metered solar
(behind-the-meter)

4,200 MW



Temperature

< 500 MW



Consumer behavior

< 500 MW

• Operations Solar Eclipse Planning

- Evaluated operational strategies for clear sunny RTO wide, cloudy & stormy days
- Rescheduled generation outages to have flexible, fast resources available to dispatch
- Evaluated transmission outages that could cause system congestion
- Production Change Freeze will be in place for entire day of April 8th
- Discussed planning and forecasting strategies with NPCC, SERC and neighboring RTOs / ISOs

Real Time Dispatch

- Increase regulating resources to 1600 MWs
 - 525 MWs is typically scheduled during off peak period, 800 MWs during on peak period
- Prepare synchronous condensers to be online and ready to generate if needed
- Utilize online dispatchable generation to compensate for solar resources that are ramping down
- Coordinate with hydro electric facilities to ramp resources up quickly
- Focus on combustion turbines to be online if needed with a short time to start & min run

Presenter/SME:

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**April 8, 2024 Total Solar Eclipse Impacts to PJM
Footprint**



Member Hotline

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Appendix

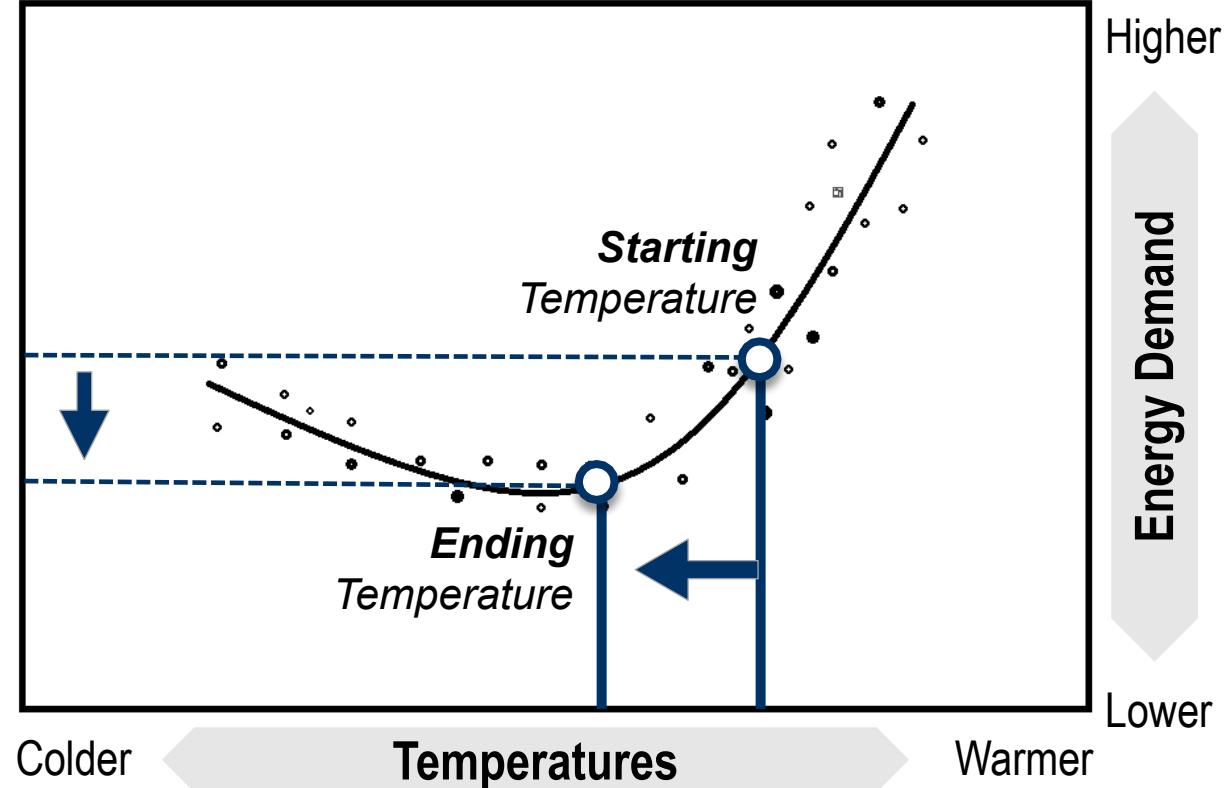
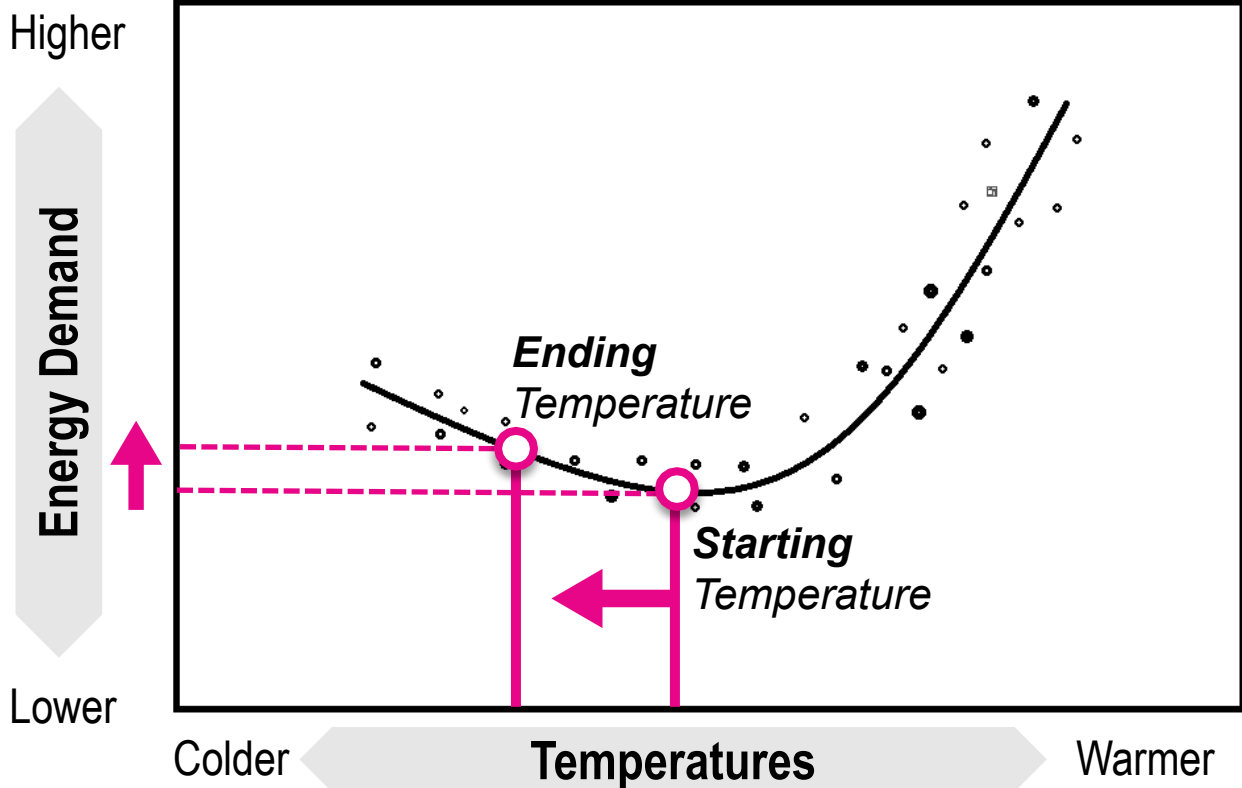
- <https://nationaleclipse.com/maps.html>
- <https://cires.colorado.edu/news/noaas-model-predicts-how-solar-eclipse-will-shift-weather>
- Trees, V.J.H., de Roode, S.R., Wiltink, J.I. *et al.* Clouds dissipate quickly during solar eclipses as the land surface cools. *Commun Earth Environ* **5**, 71 (2024). <https://doi.org/10.1038/s43247-024-01213-0>

Solar eclipses cause decreases in temperature (-4 to -10°F)

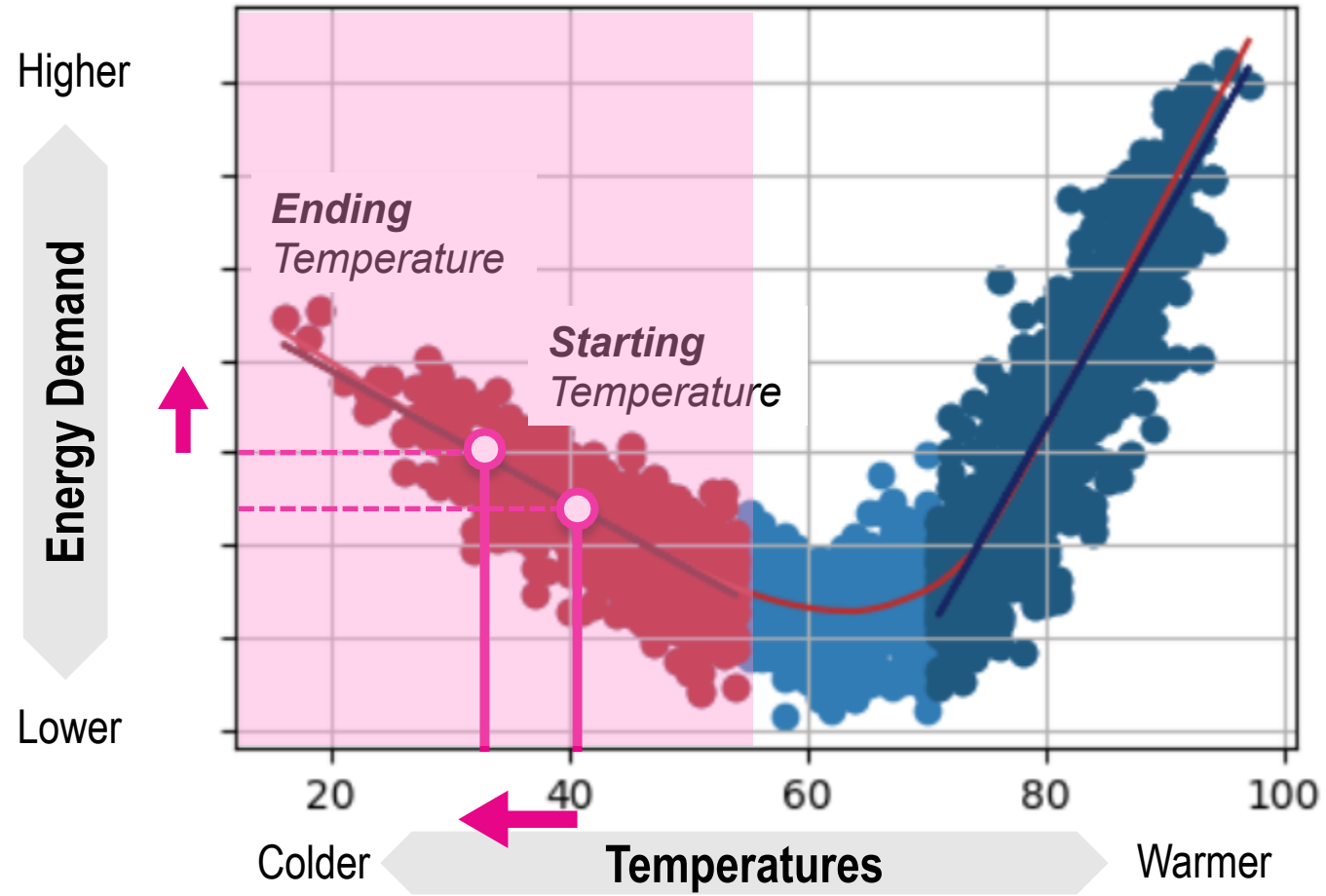
TWO SCENARIOS FOR EARLY SPRING:

Cold spell with heating load could lead to **increased** load

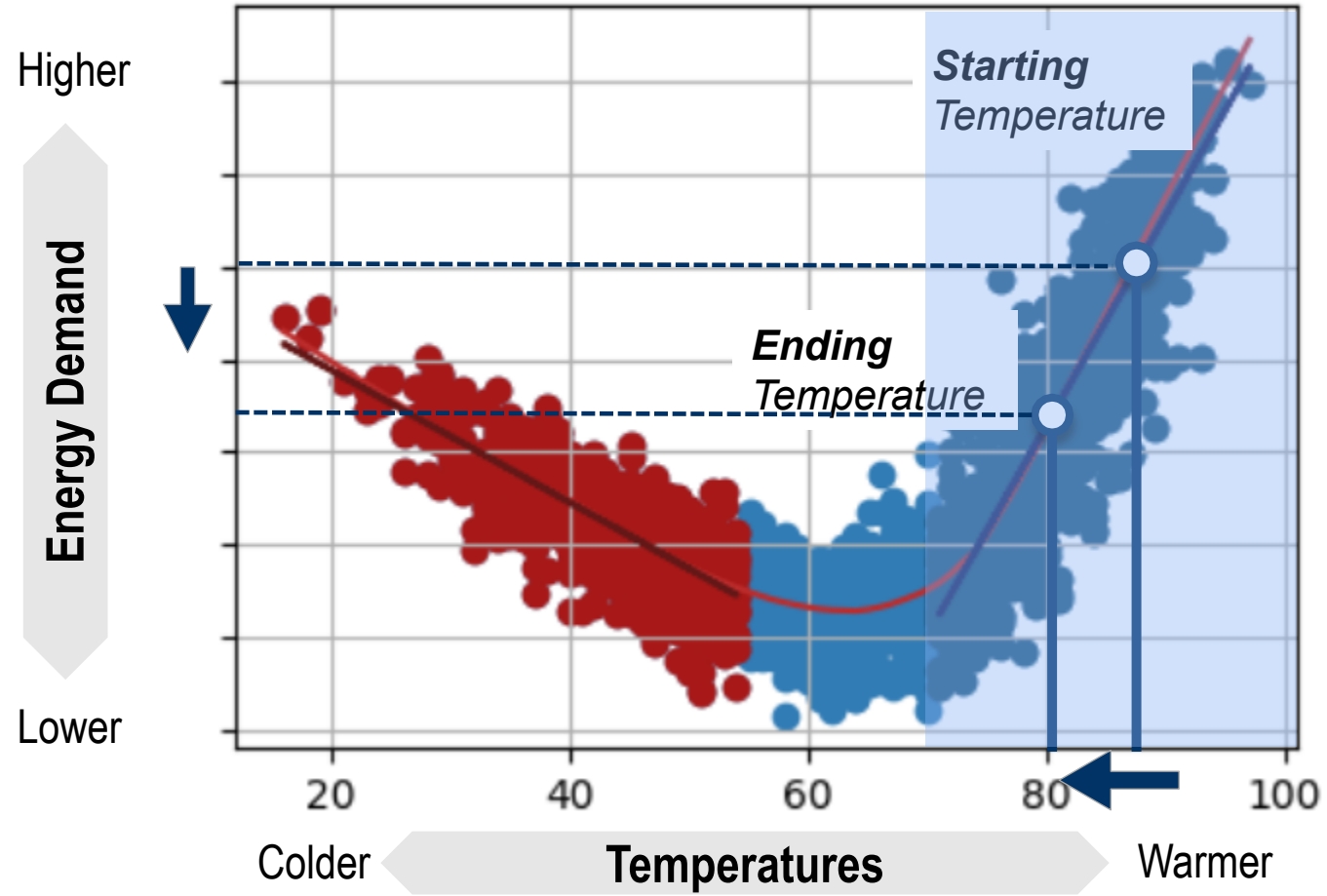
Warmer regime with cooling load could turn back off and lead to **reduced** load

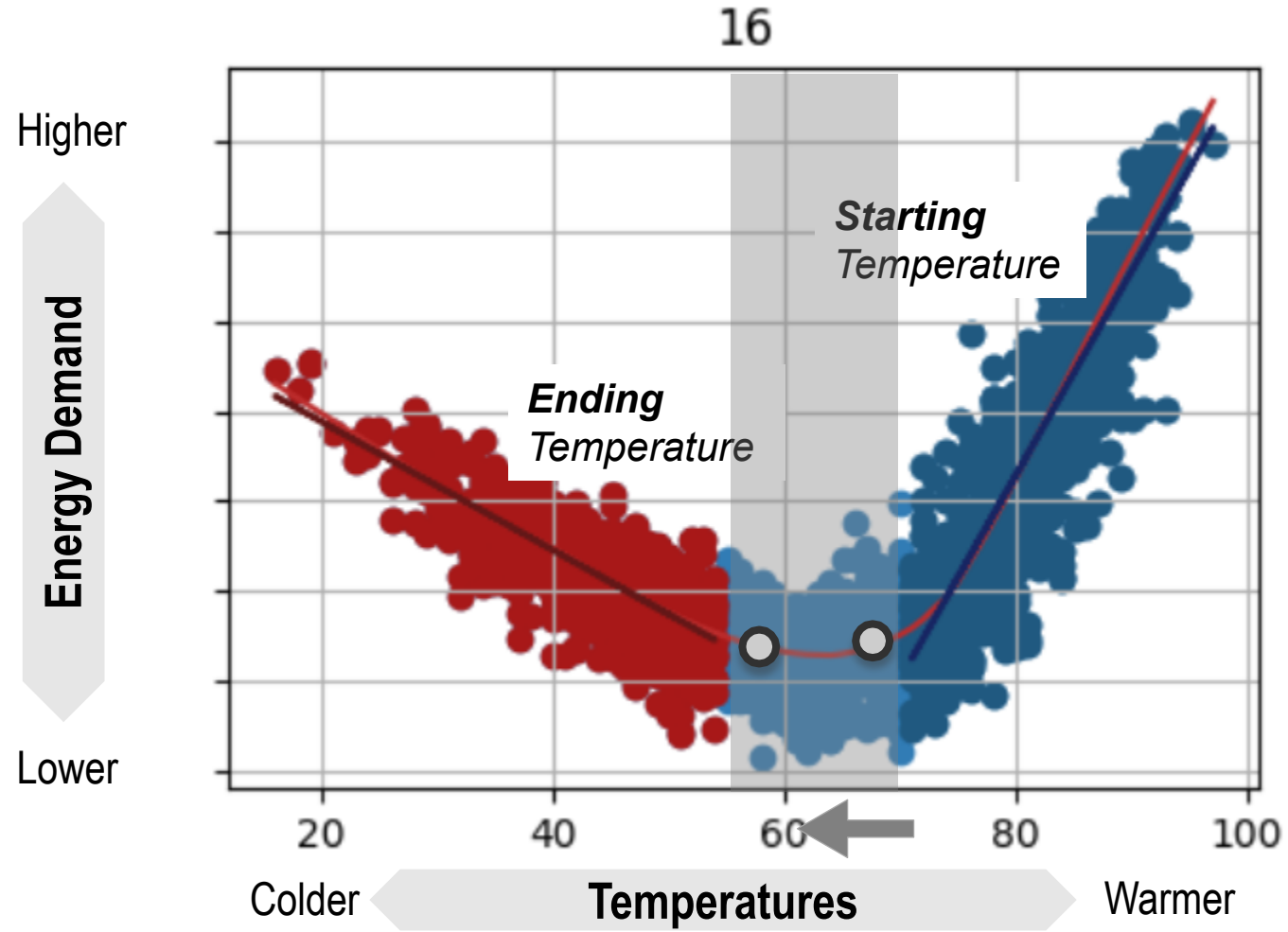


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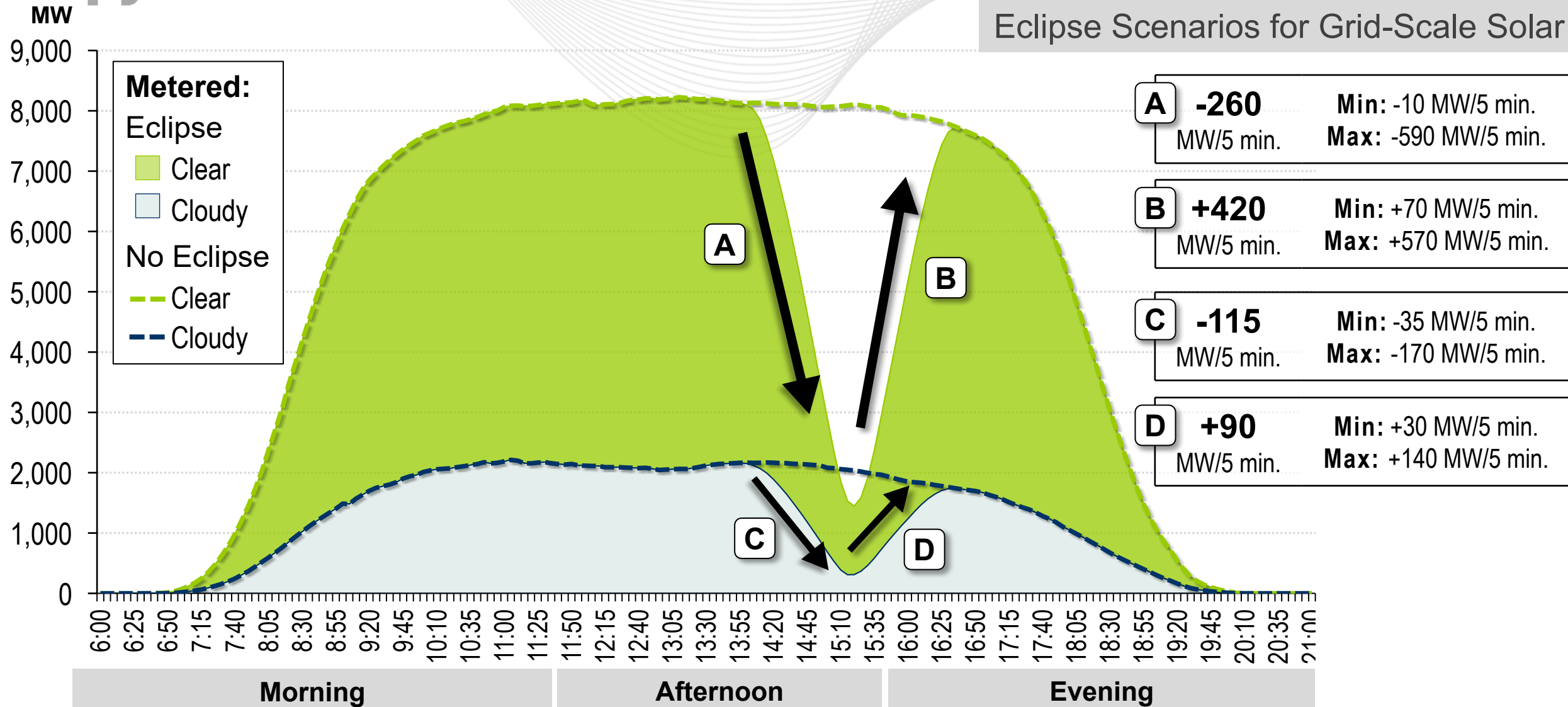


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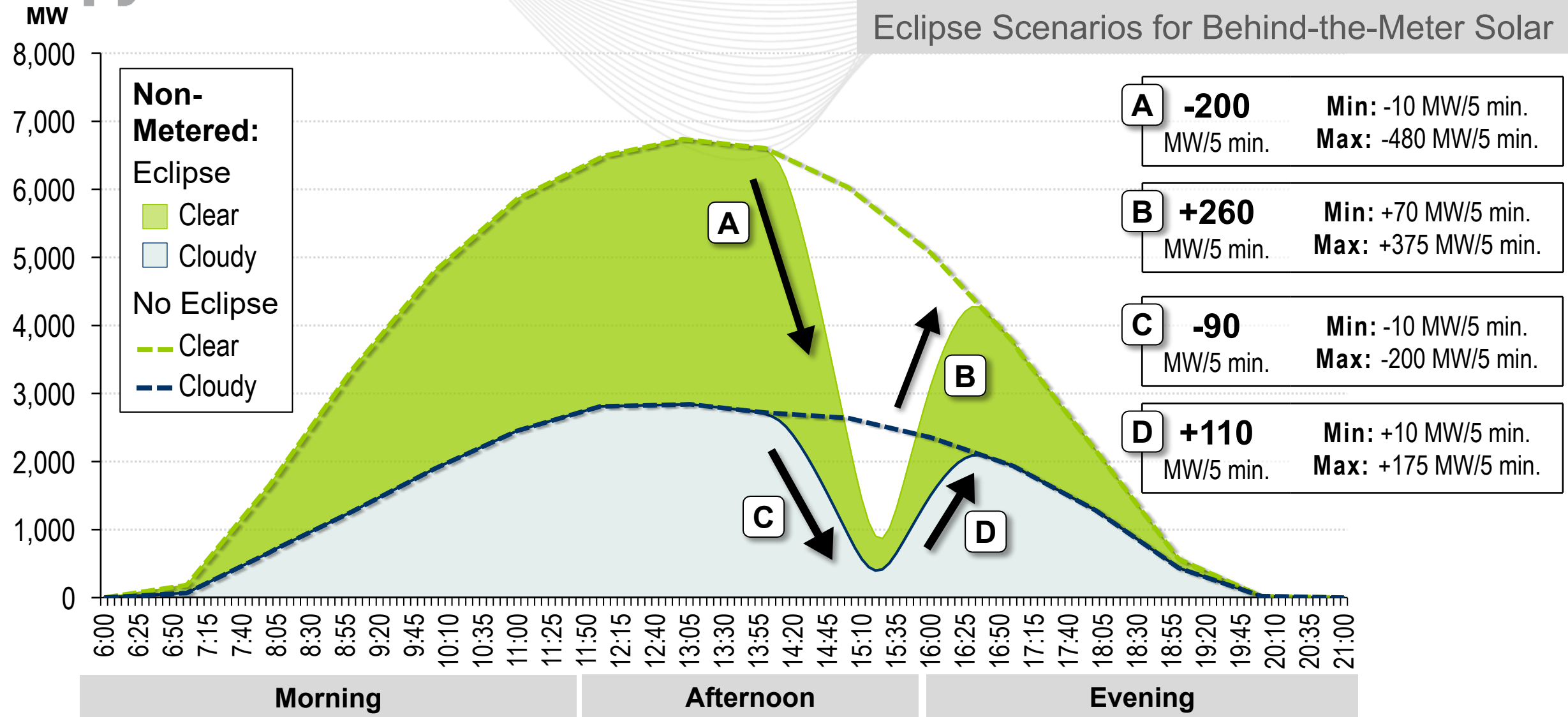


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