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DLR in Planning

FERC 1920 and beyond

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Content

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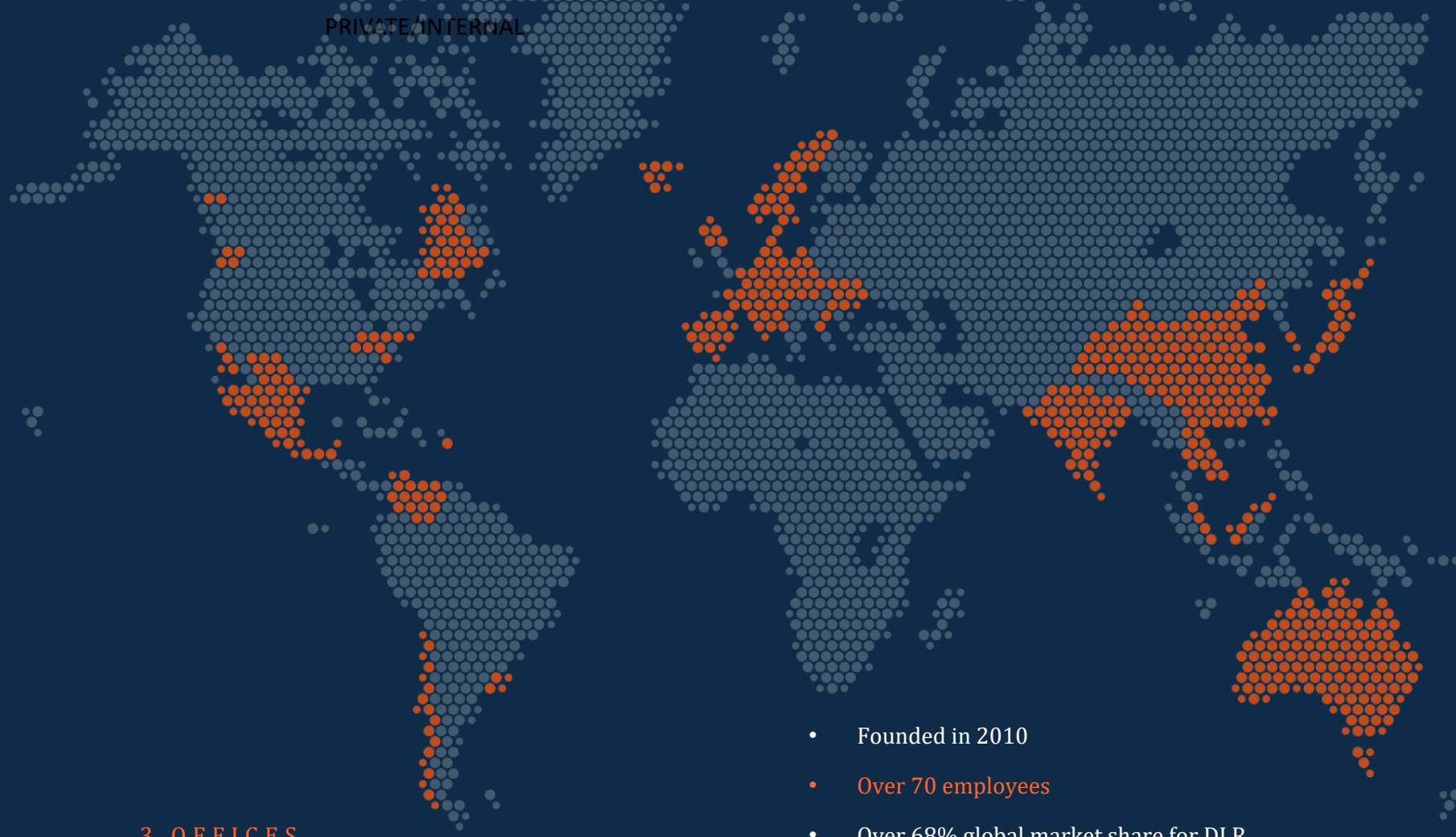
WORLDWIDE

We are Ampacimon

KEY CUSTOMERS

Statnett, ppl, Iberdrola, red eléctrica, nationalgrid, creos, exelon, elia, 50hertz, EDF, ENERGINET, Hydro Québec, Terna Driving Energy, BC Hydro Power smart, amprion, edp, SDGE, Rte, Ameren, isa CTEEP, New York Power Authority, aps, TenneT, SVENSKA KRAFTNÄT



3 OFFICES

- Liege, BELGIUM
- Atlanta, USA
- Madrid, SPAIN

- Founded in 2010
- Over 70 employees
- Over 68% global market share for DLR
- 24 different countries globally
- over 200 transmission lines monitored with Sensor-based solutions
- Solutions in Capacity Optimization, Asset Health and Grid Reliability

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DLR IN OPERATIONS

DLR in Operations Makes Sense…

Timelines – Now to 3 days ahead

1. **Emergency operations**
   - SCADA/EMS connection
   - Dispatcher actions
2. **Intra-day**
   - Intra-day markets
   - Topology and generation scheduling actions
3. **Day-ahead**
   - Day-ahead markets for generation scheduling

Capacity Optimization

PPL Electric Utilities - Use Case

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PPL Electric Utilities

1 line with DLR saved around $64 Million in congestion costs, in one year!*

*Source: **Motion for Leave to Comment and First Supplemental Comments of PPL Electric Utilities Corporation re Implementation of Dynamic Line Ratings under AD22-5.**
https://elibrary.ferc.gov/eLibrary/filelist?accession_num=20240209-5161

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DLR in Planning

03

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DLR IN PLANNING

3 cases for how DLR can be applied in the Planning horizon

Non-firm Connections

- Connections (typically generation) can be approved with a chance of curtailment
- Curtailment can be automated
- Benefits of DLR are based on reduced curtailment

01

Firm Connections

- Possible if, load increase coincide with DLR gains
  - Wind generation
  - Winter load peaking

02

Grid expansion enablement

- DLR in operations can improve outage windows and decrease outage costs

03

Capacity Optimization

Capacity Gain Statistics Over 1 Year

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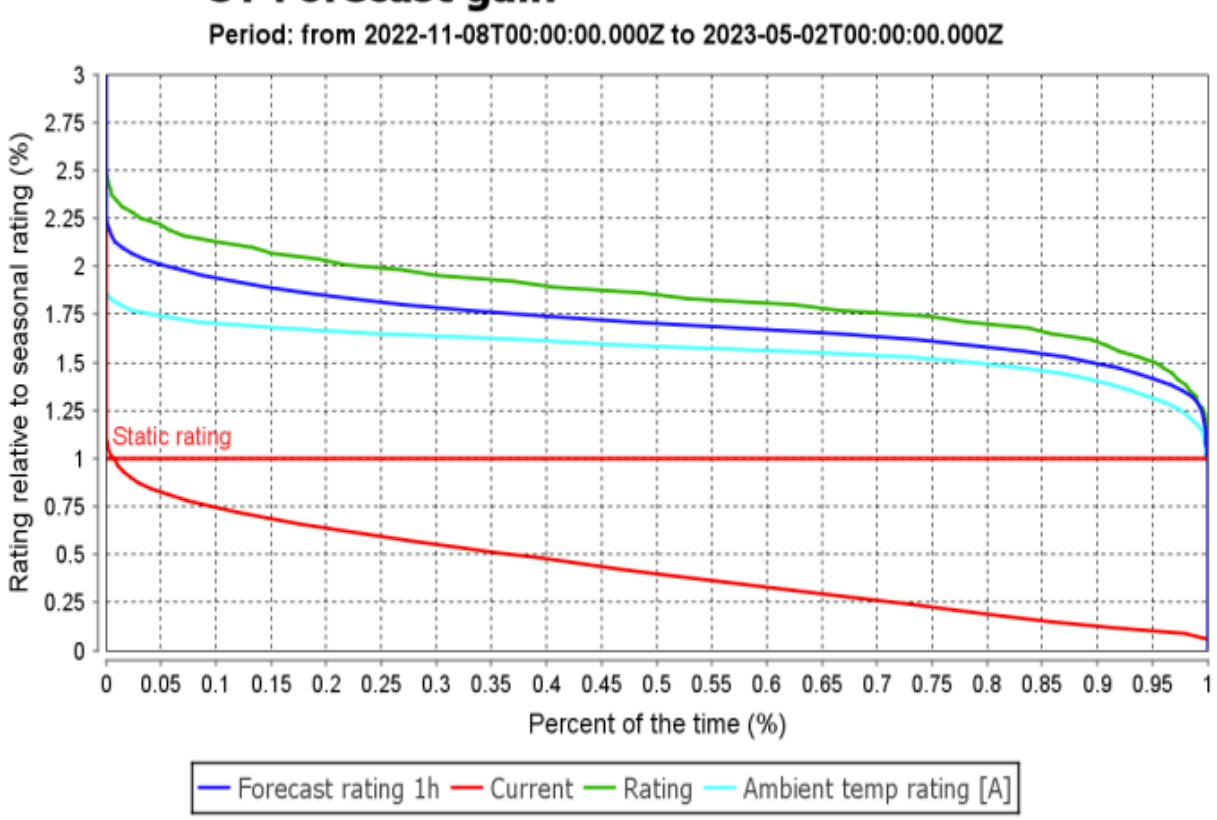
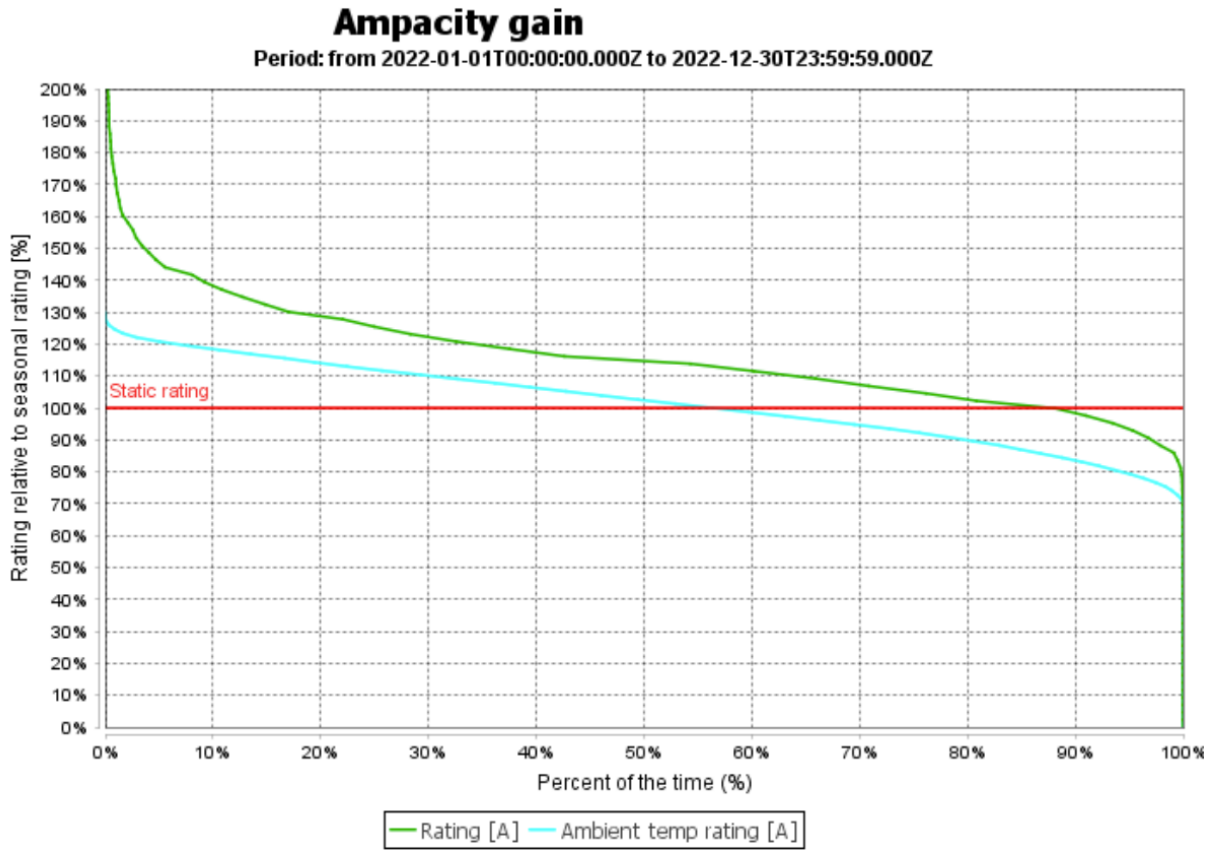
Amazing candidate line

- Cold, windy climate
- Conservative Static Line Rating (SLR)
- No derating
- Up to 250% of SLR
- Over 125% of SLR 99% of the time



Lower risk candidate line

- Warm, desert climate
- Optimistic Static Line Rating (higher wind speed)
- Derating 10% of the time
- Over 15% of SLR 50% of the time



Capacity Optimization

Non-firm Capacity – Example

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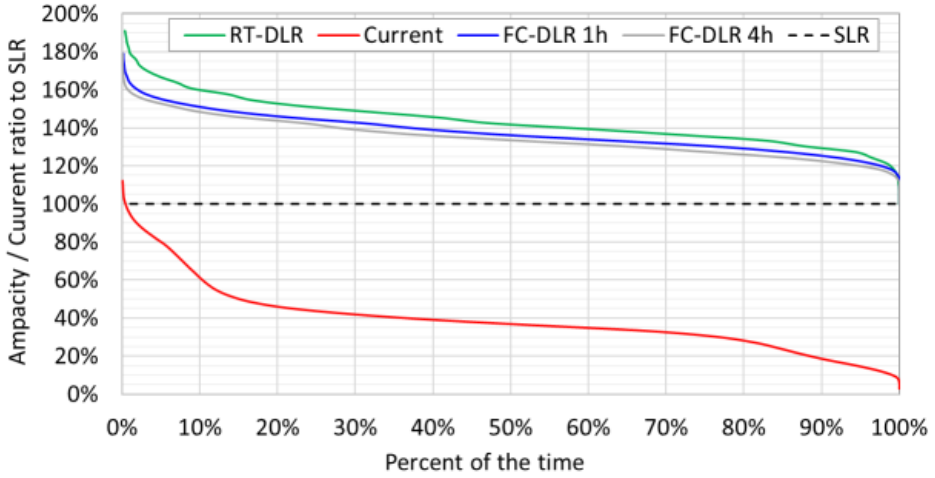
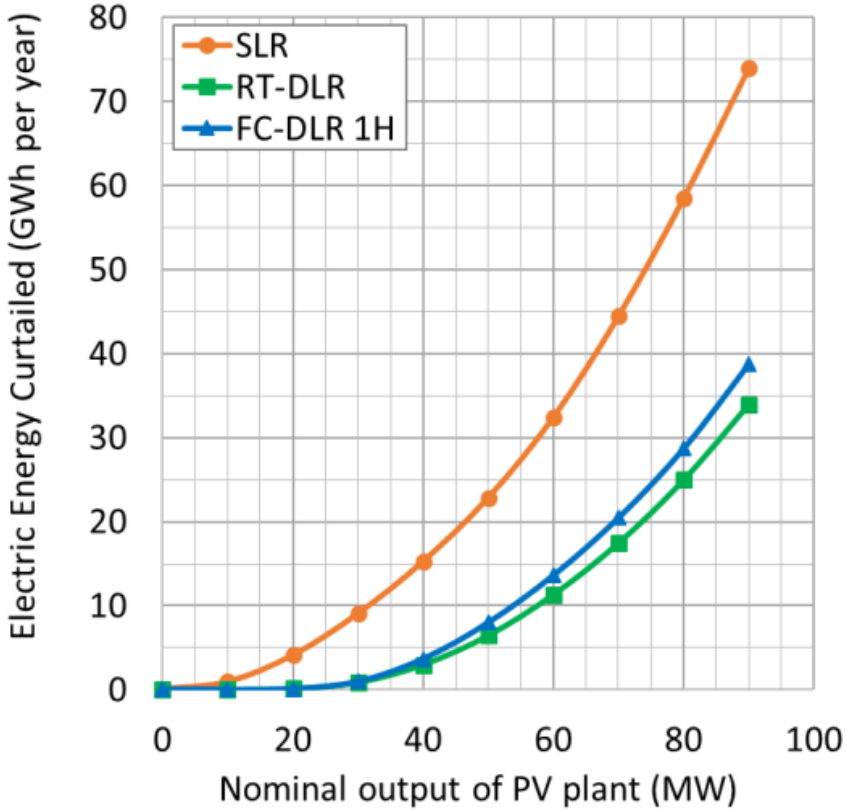
DLR installed on PV plant connection in Japan

- Operationally reduced the need for curtailment to 0
- Planning studies show that capacity can be increased by up to 20 MW with the same or less curtailment





Capacity Optimization

Firm Capacity – Example 1 Wind generation

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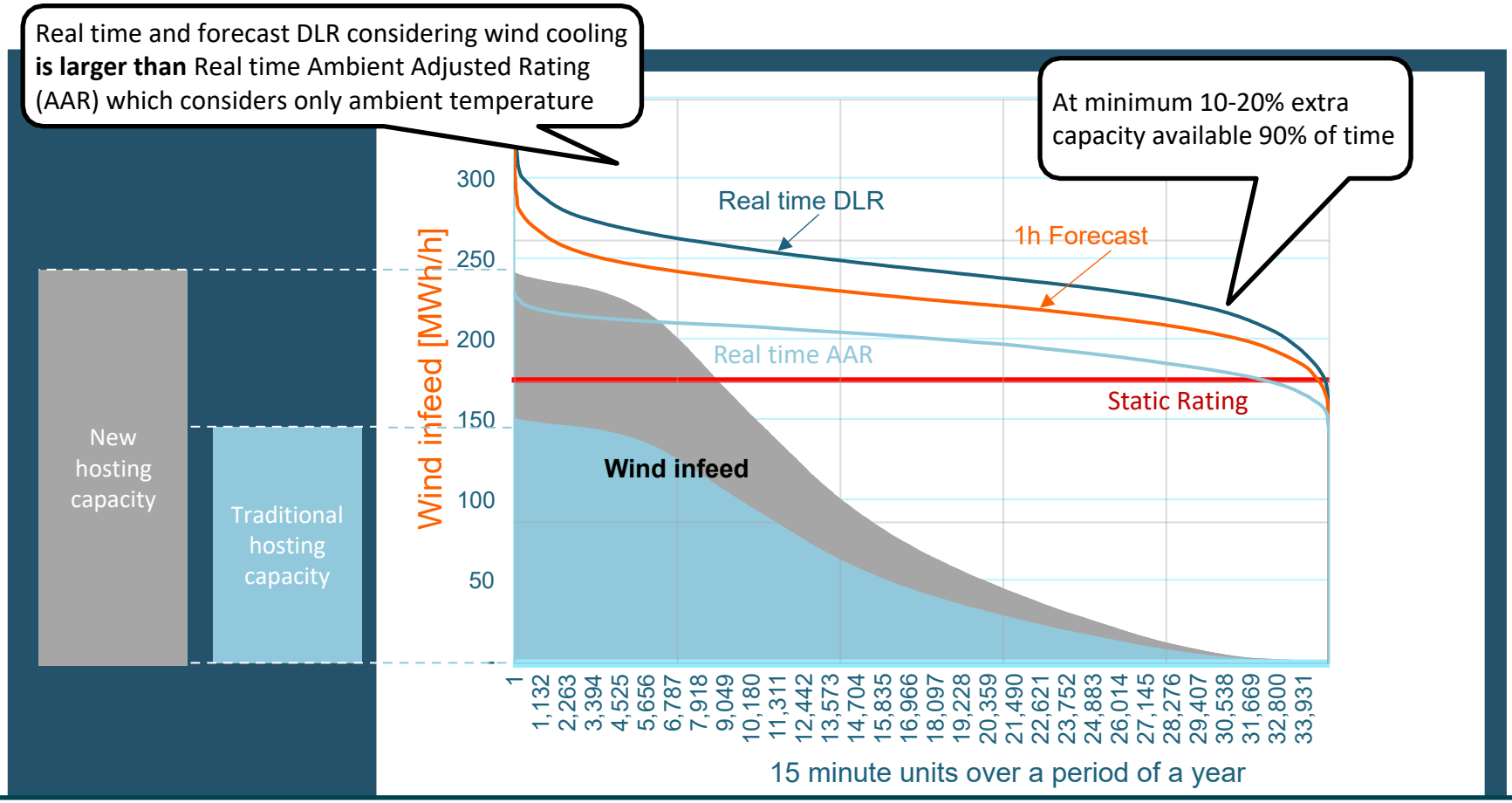

✓ **Hosting capacity can be increased up to 50% without need for reinforcement**

Capacity Optimization

Firm Capacity – Example 2 Winter Load

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Challenge / Pain Point

- French Alps resort with growing ski-season consumption
- Peak only seen in some months of the year
- Mountain area makes upgrade works dangerous and costly

Solution

- Preliminary evaluation : 40% gain in the winter seasons
- DLR System installed Nov 2012 (just before season start): 4xSensors + Real-time Monitoring + Forecast

Outcome

- Smooth operation during winter load peaks
- After 4 years of monitoring, no reinforcement needed
- Avoided new line investment

2012 DLR deployment in French Alps

Capacity Optimization

Expansion Enablement

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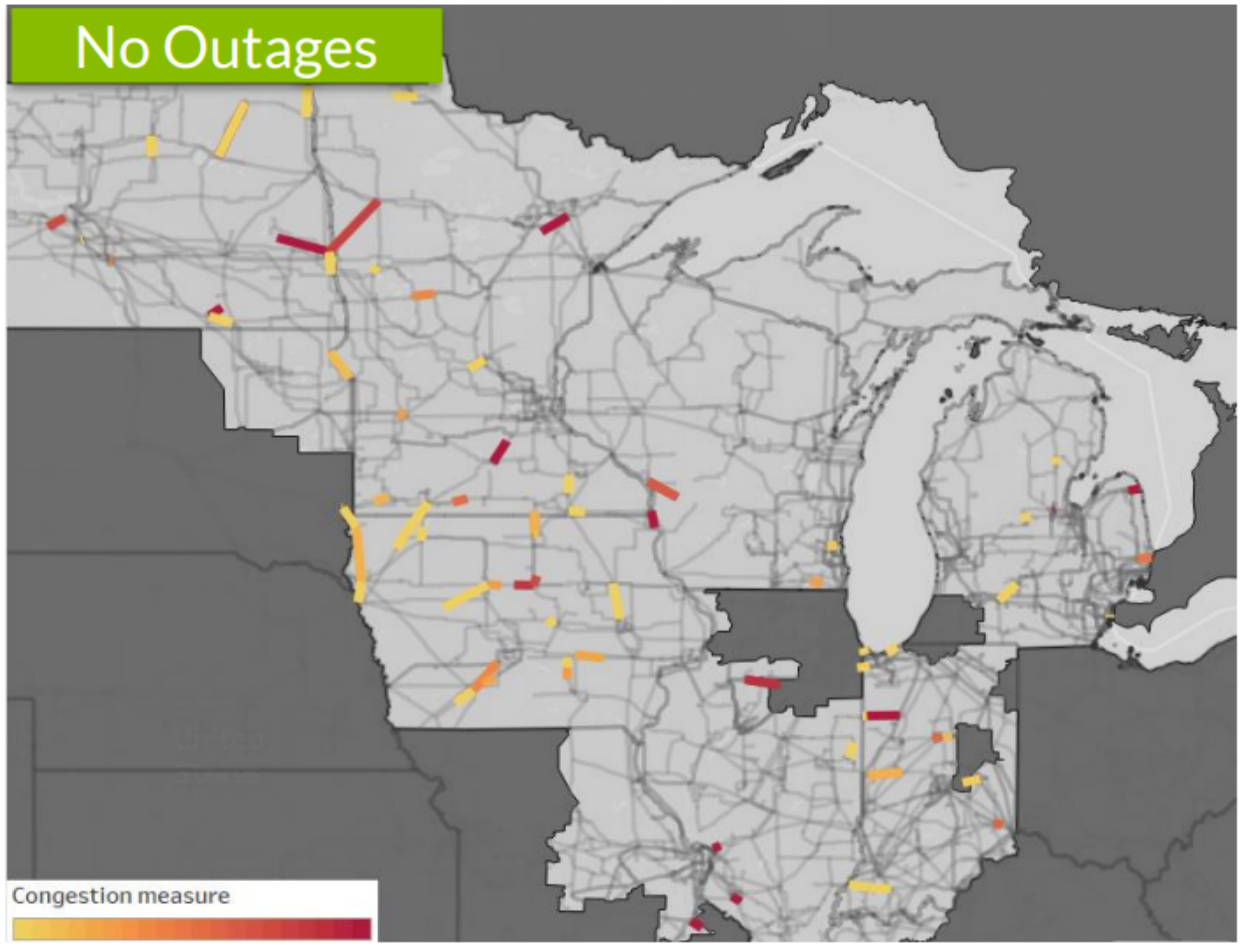

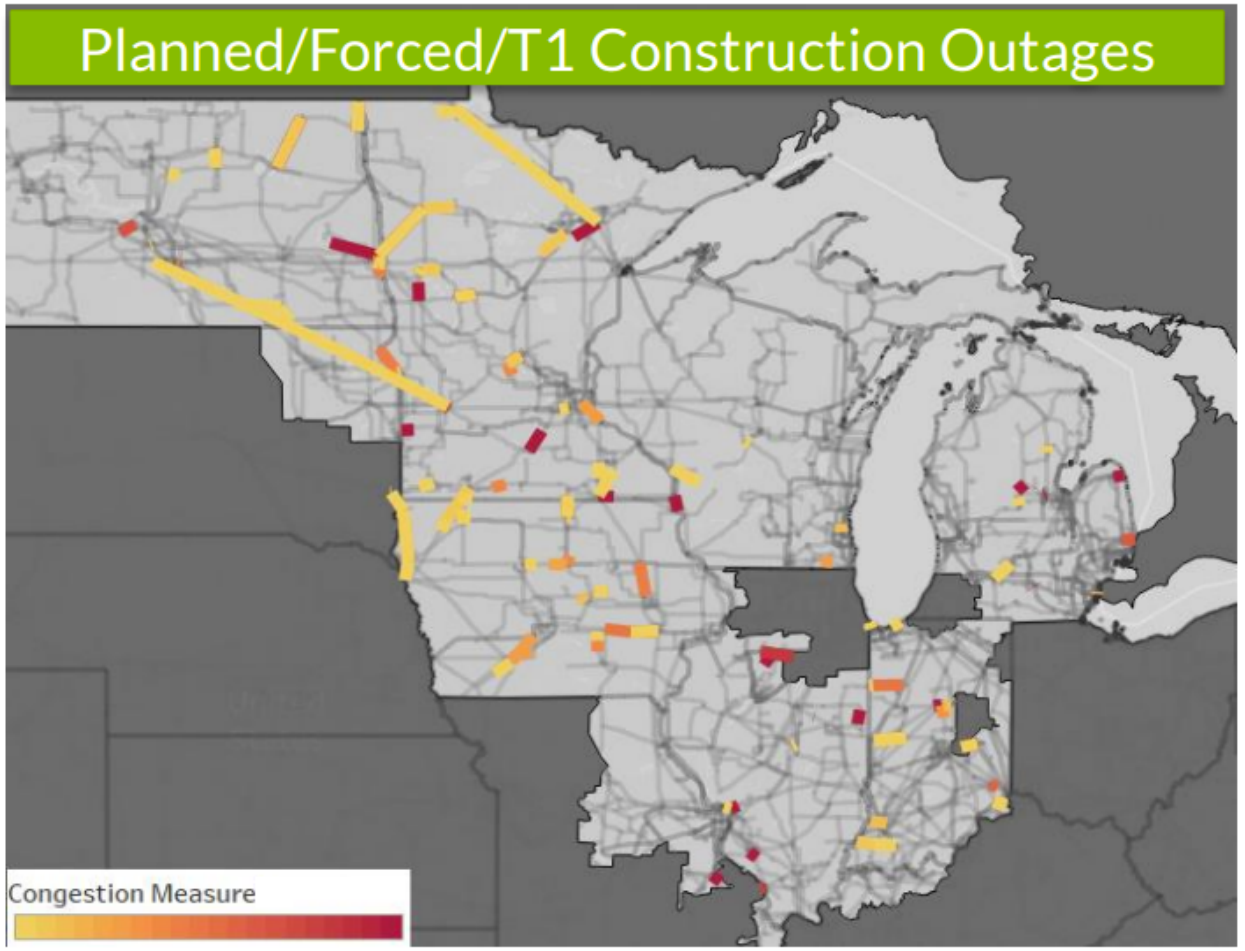

1. Economic congestion is defined as "Congestion measure" ($/MW) and is calculated by multiplying annual Average Shadow Price ($/MWh) by Binding Hours (h)

MISO

Source: https://cdn.misoenergy.org/20240828%20PAC%20Item%2007a%20Near-Term%20Congestion%20Study%20(PAC%202021-1)644462.pdf

CONCLUSIONS

DLR in Planning is Possible

1. Moving away from static ratings is a paradigm shift
2. Statistical analysis of weather and load is required
3. DLR enables grid expansion and upgrades at lower costs by increasing outage windows and decreasing outage costs

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Thank you

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