



Ampacimon

PRIVATE/I

DLR in Planning FERC 1920 and beyond



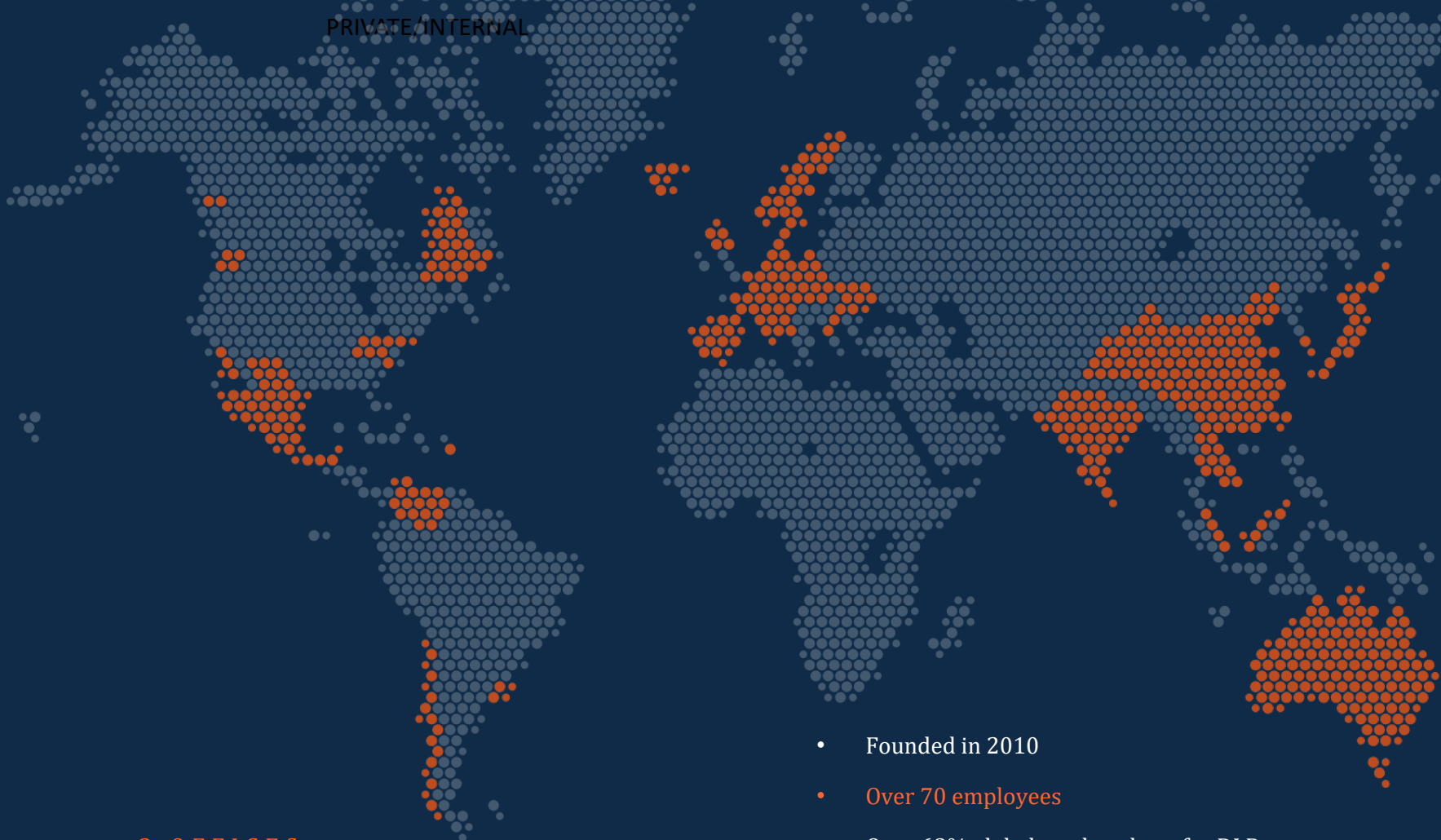
- 01 Who is Ampacimon
- 02 DLR in Operations
- 03 DLR in Planning
- 04 Conclusion

Content



WORLDWIDE

We are Ampacimon



KEY CUSTOMERS

Statnett



red eléctrica

nationalgrid



ENERGINET



BC Hydro
Power smart



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

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



02



PPL Electric Utilities - Use Case



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

DLR in Planning

03



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



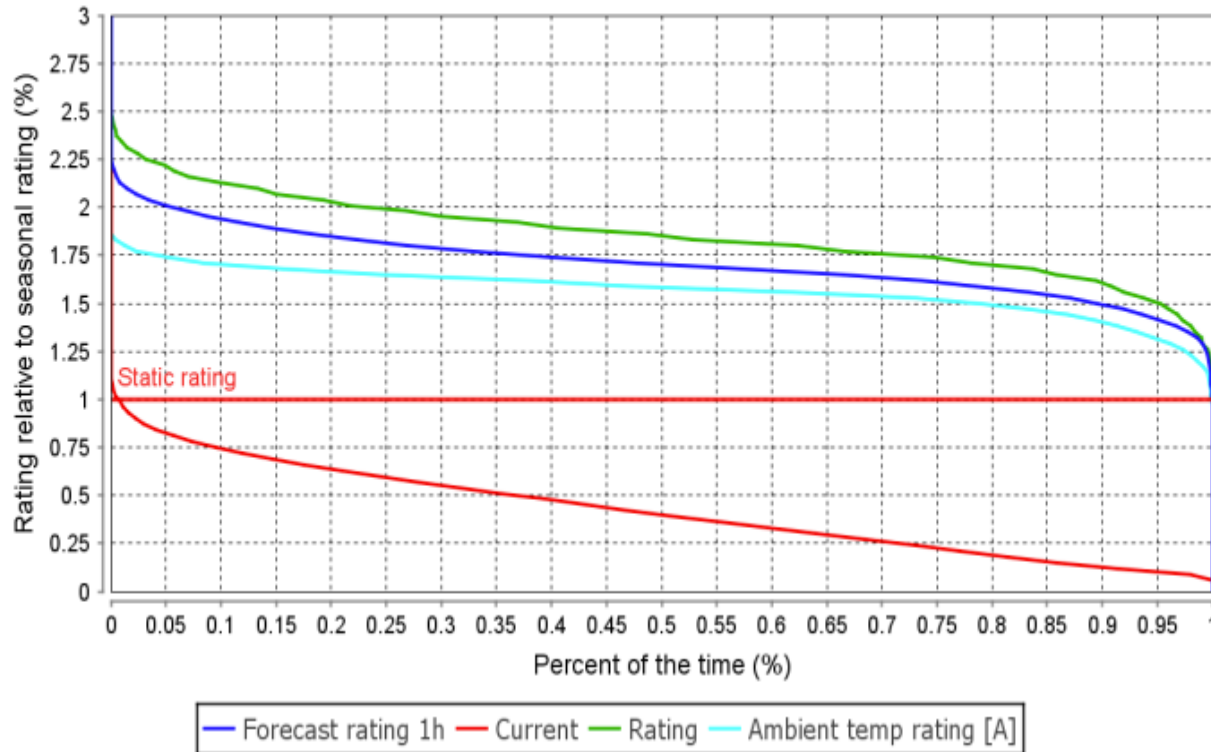
Capacity Gain Statistics Over 1 Year



Amazing candidate line

- Cold, windy climate
- Conservative Static Line Rating (SLR)
- No derating
- Up to 250% of SLR
- **ST Forecast gain** Over 105% of SLR 99% of the time

Period: from 2022-11-08T00:00:00.000Z to 2023-05-02T00:00:00.000Z

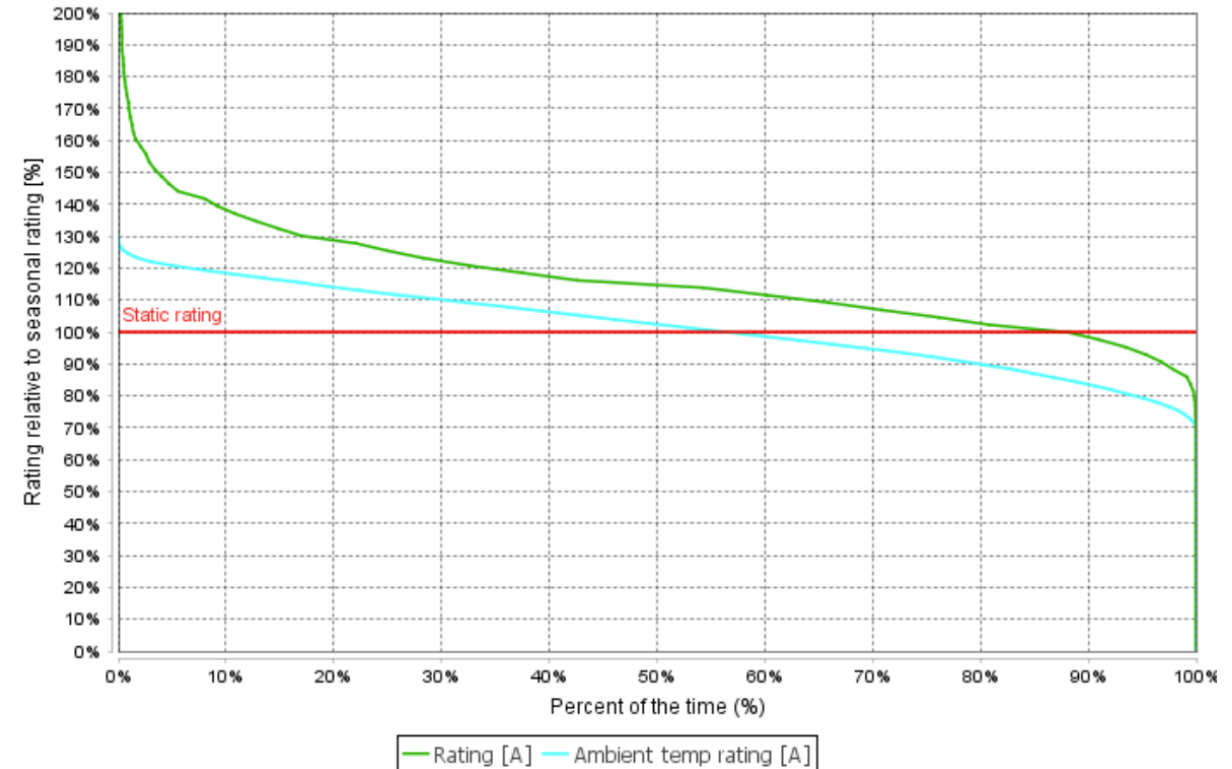


Lower risk candidate line

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

Ampacity gain

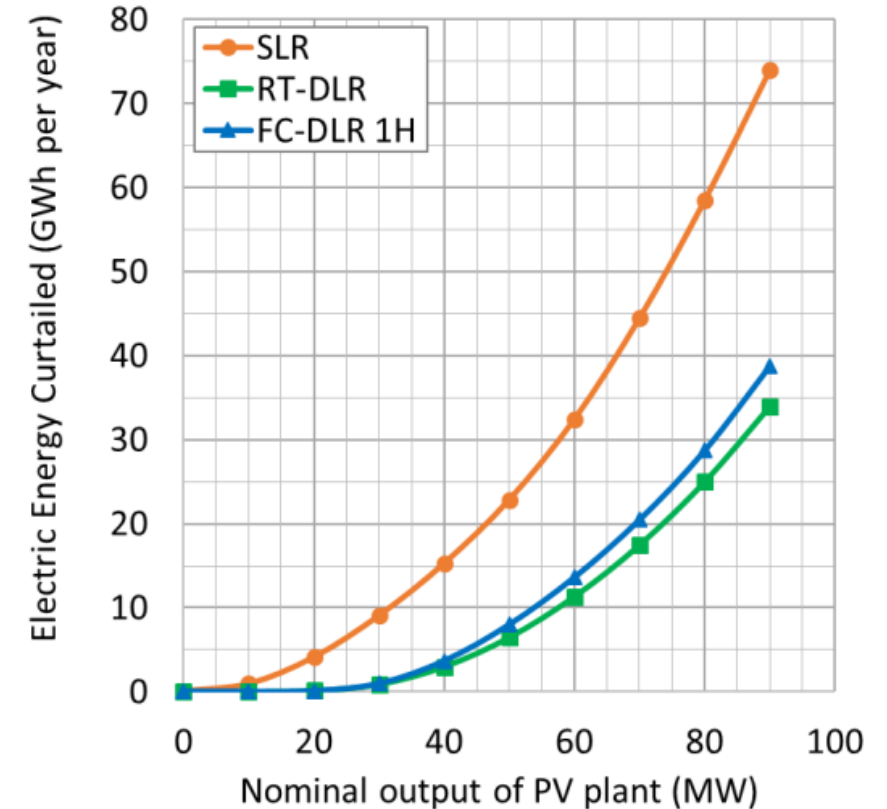
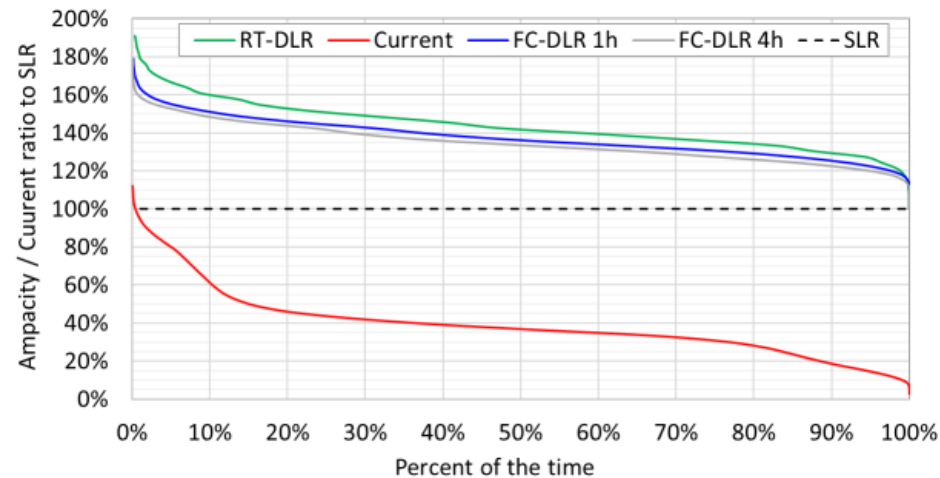
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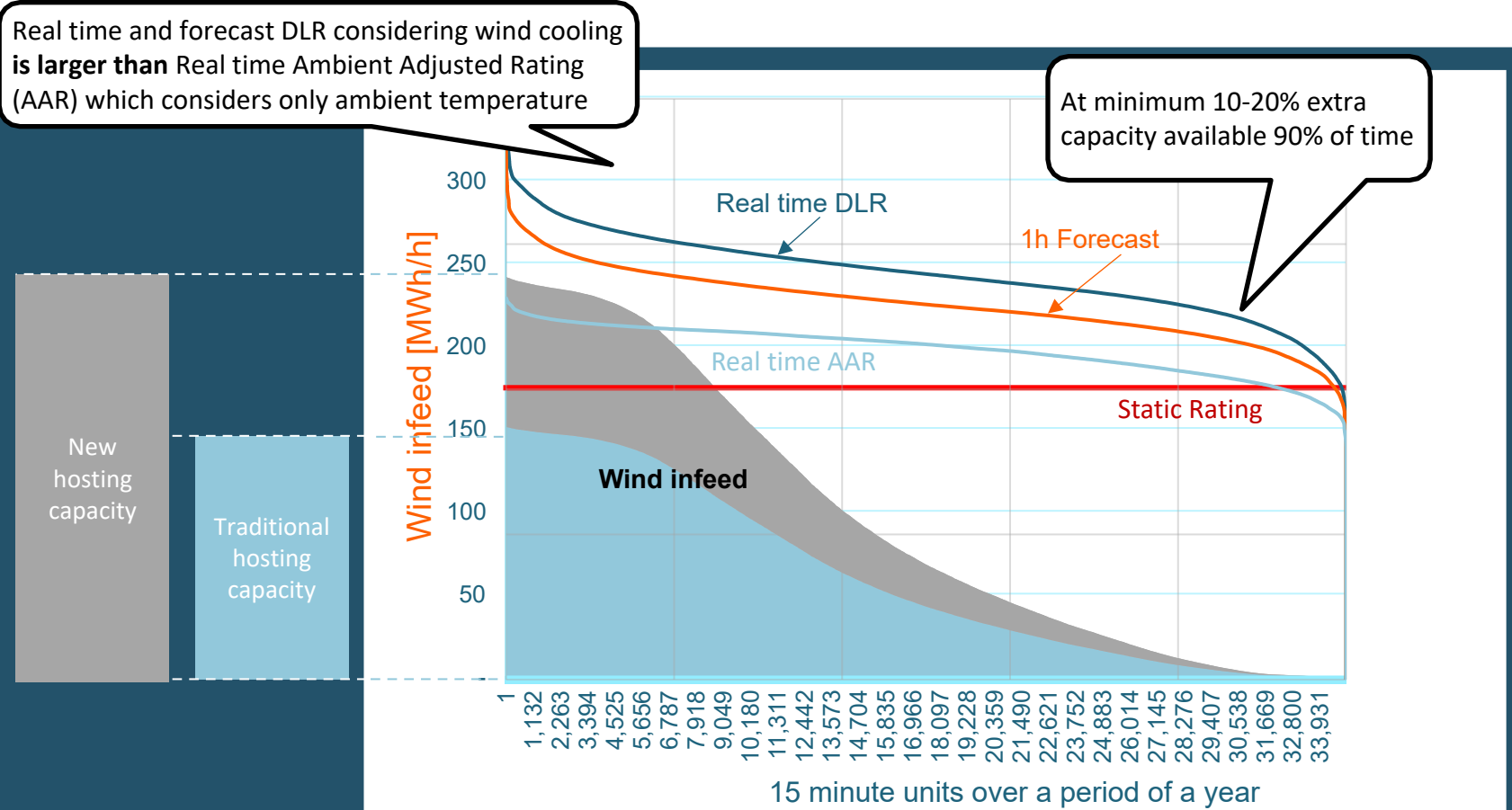
Non-firm Capacity – Example

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



Firm Capacity – Example 1 Wind generation



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

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

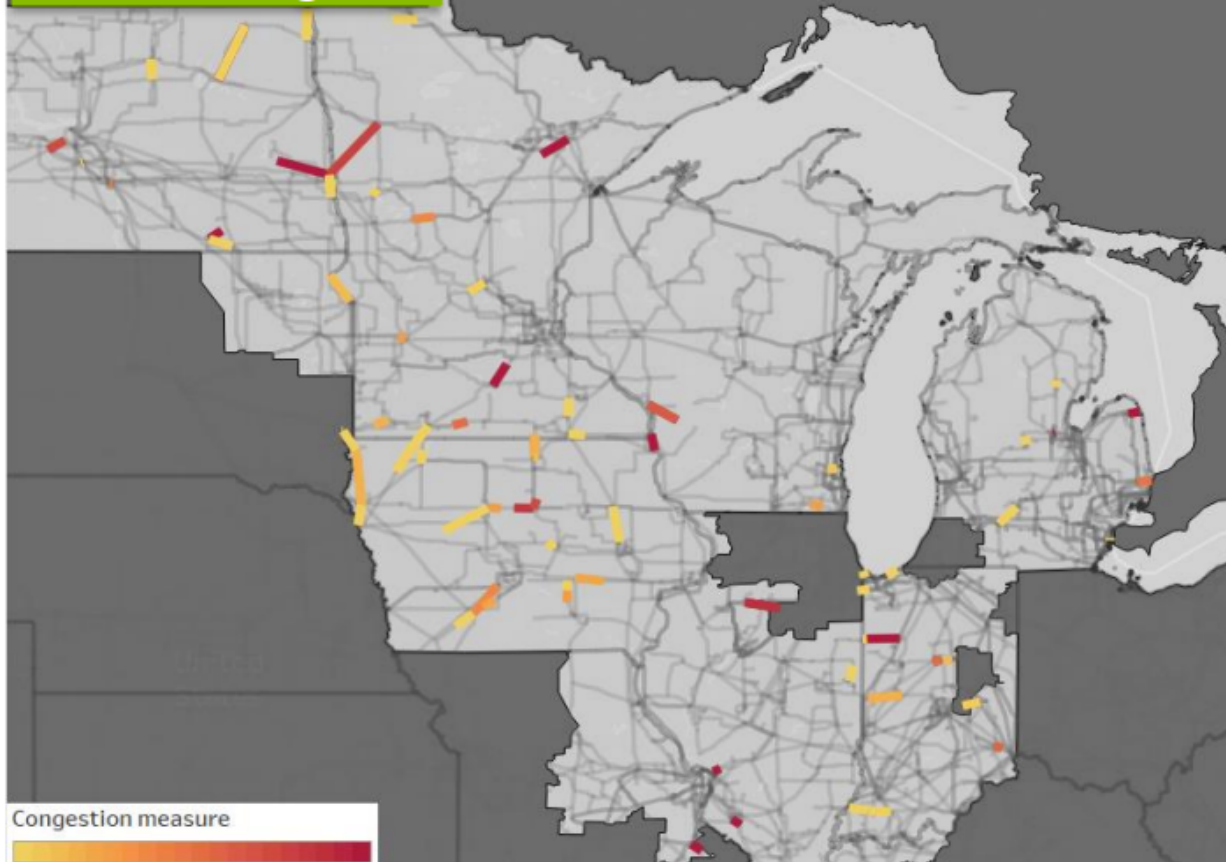
Outcome

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

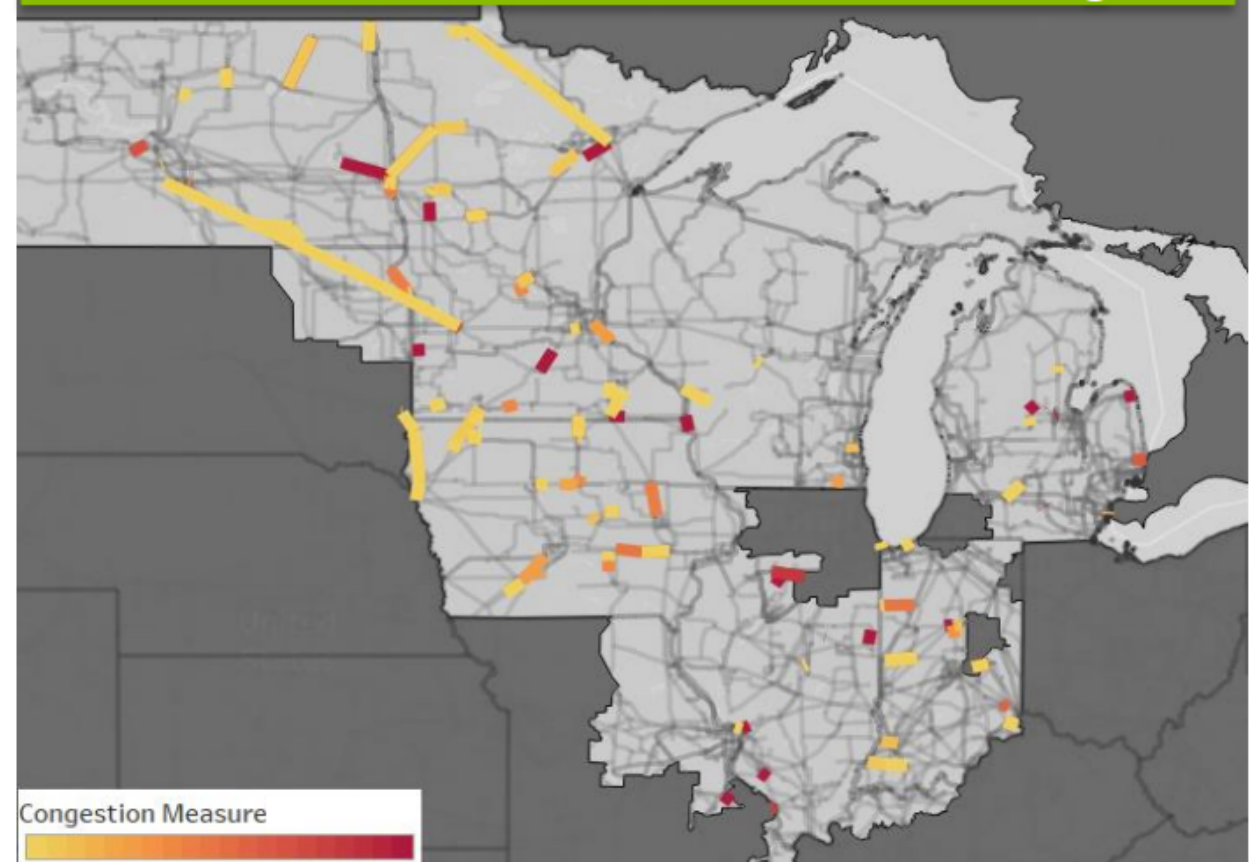
2012 DLR deployment in French Alps



No Outages



Planned/Forced/T1 Construction Outages



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

UNLOCKING GRID POTENTIAL, FUELING RENEWABLE POWER

Thank you



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