PILOT SERVICE DYNAMIC LINE RATING

WHAT IS DYNAMIC LINE RATING?

Traditional ratings miss key variables like wind speed, solar radiation and ambient temperature. These directly affect the thermal capacity of high-voltage transmission lines.

DLR is an advanced method that continuously adjusts the capacity of transmission lines based on real-time weather data and operating conditions.

KEY BENEFITS OF DLR

- Optimized grid operations
- Improved planning accuracy
- Better integration of renewable energy
- Reduced operational costs
- Less curtailment, more efficiency

FROM AN ADVANCED ON-DEMAND DETECTION MECHANISM

EXISTING ASSETS WE WILL USE

The Global Continuous Extremes DT, based on ECMWF's flagship Integrated Forecasting System (IFS) model.
For variables on standard height levels.

The regional On-Demand Extremes DT (Europe)
For variables on sub-kilometre resolutions on a timescale of a couple of days ahead.

WHAT WE WILL DEVELOP

An advanced detection mechanism to automatically trigger high-resolution runs within the Destination Earth Extremes Workflow, based on IFS output.

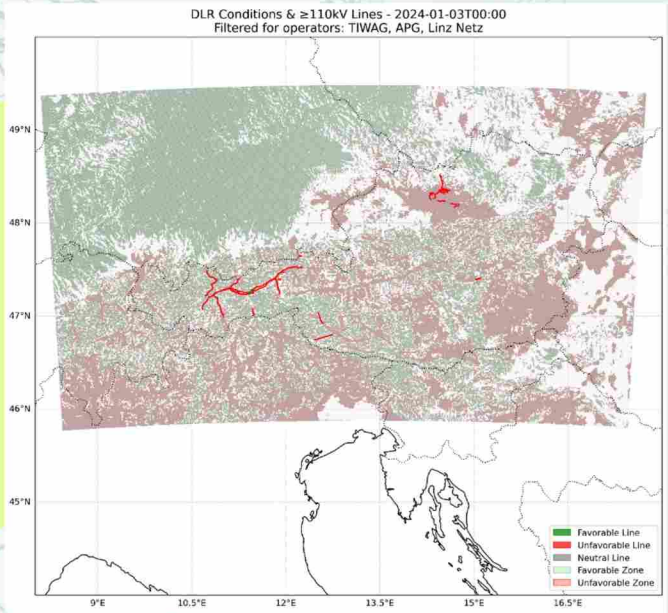
FIRST RESULTS

rule-based classifier over time, grid, and power line segments using

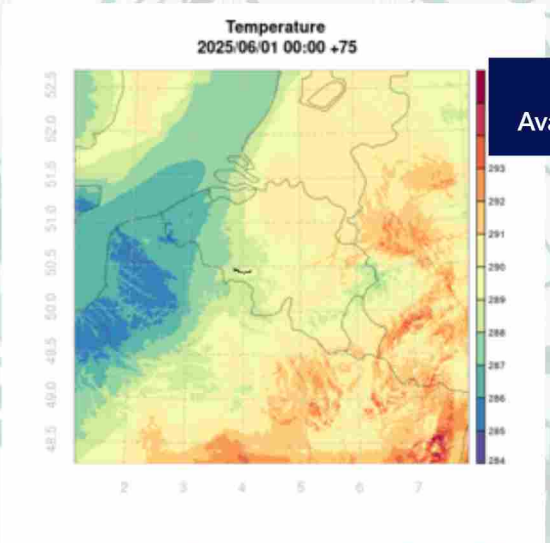
- wind speed (10m): for convective cooling
- Temperature (2m): for conductor heating
- Global radiation: for solar heating

Each INCA forecast timestep is evaluated with a line based status:

- Favourable
- Unfavourable
- Neutral



TOWARDS A HECTOMETRIC DIGITAL TWIN



Global forecast on day X
Availability: DT ~ 12 UTC, HRES ~06 UTC

Use +24h to +48h as boundary files

High detail forecast for day X + 1

INPUT
at adapted height levels (40-60m)
1 - 4 locations

- ambient temperature (°C)
- relative humidity (%)
- wind direction (m/s)
- wind speed (m/s)
- global irradiation (W/m²)

OUTPUT
A 24h run with a set of forecasted values for each hour of the day.

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