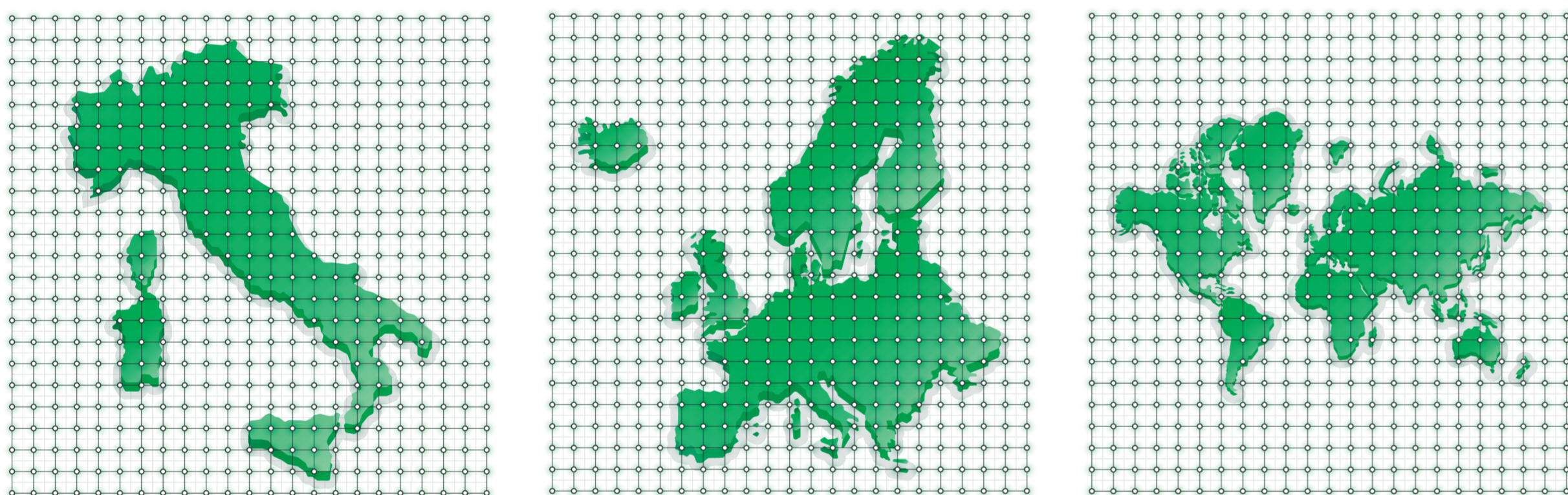


# METEOROLOGICAL SERVICES FOR RENEWABLE AND TSO

Innovative systems and high-resolution datasets integrated into decision-making and forecasting processes in the energy sector

## Data on high resolution grids

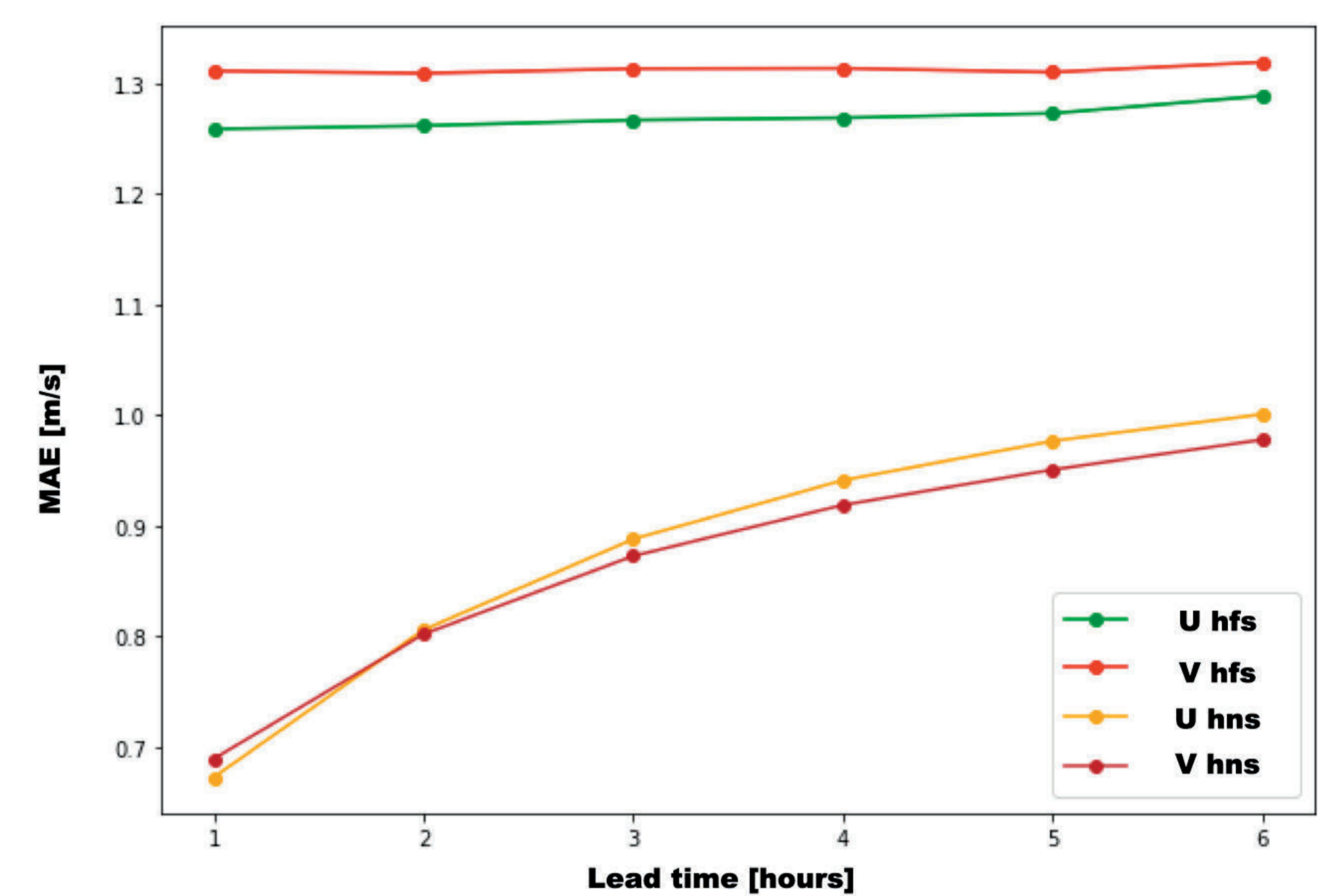
- Up to 1 km of resolution for local grids (Italy, France...)
- Up to 5 km of resolution for the Europe grid
- Up to 25 km of resolution for the world grid



## Weather variables

- Solar radiation (global, direct, diffuse)
- Wind speed & direction
- Precipitation
- Temperature
- Relative humidity

Comparison of MAE between HFS and a specific HNS algorithm for the wind speed



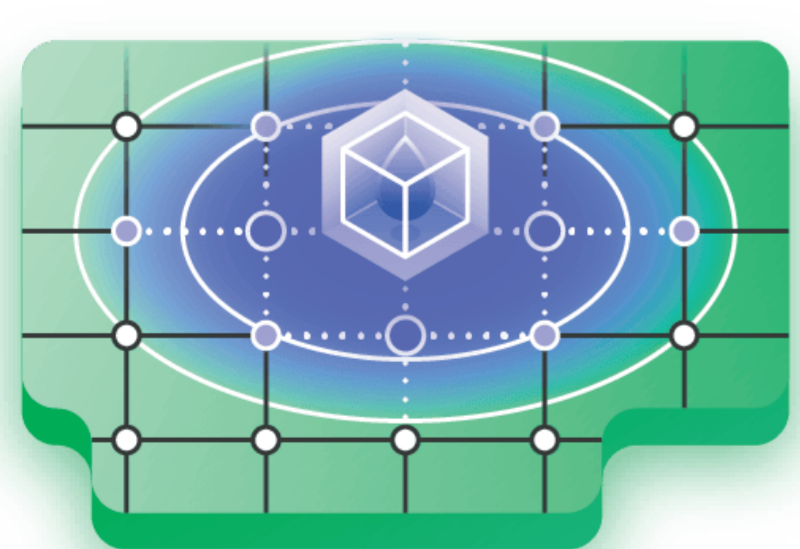
The figure displays the significant reduction of the MAE thanks to the development of nowcasting system (HNS) integrate both model forecasting and real-time measurements.

## THE DATASETS

### HRS

Reanalysis system  
Reconstruction of past events

Integration of multi-source measurements such as meteorological stations, radar, satellite and morphological information through advanced machine learning models.



### HNS

Nowcasting system  
Short term forecast

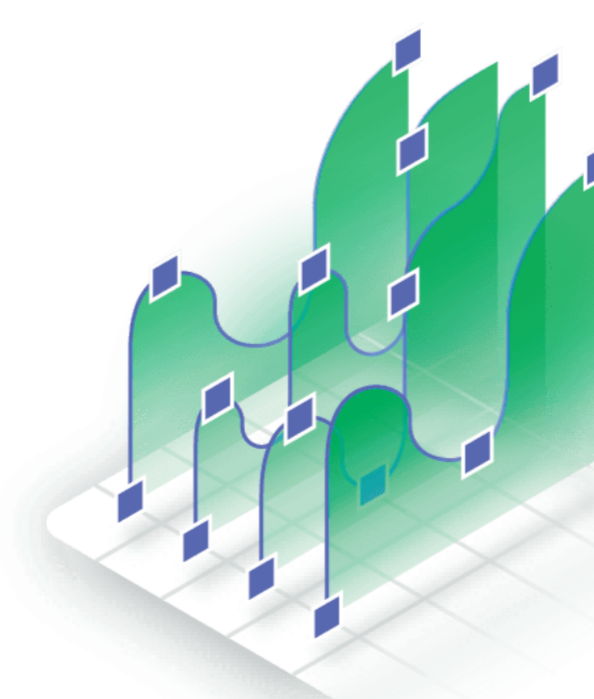
Integration of nowcasting techniques to evaluate the evolution of meteorological state in the near future standard with medium-term forecast and with near past measurements from different sources to minimize bias.



### HFS

Multimodel ensemble system  
Medium term forecast

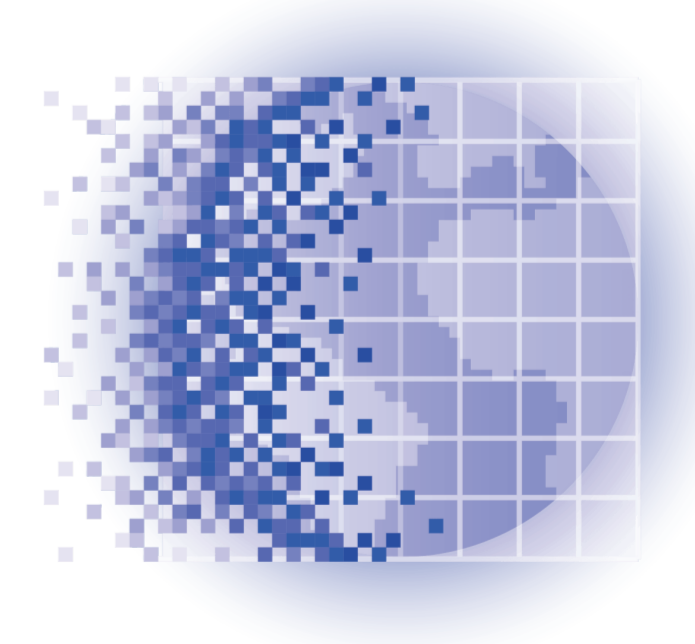
Integration of different medium-term model outputs and post processing through advanced statistical / machine learning techniques based on the HRS dataset.



### CLIMATE SENTINEL

Downscaling of climatic scenarios

Realization of climatic scenarios based on an ensemble of regional climate models, through the application of statistical downscaling techniques, both as a procedure of bias correction and of spatial resolution refinement.



## USE CASE TSO



- HRS data to train producibility model
- HNS & HFS to balance and optimize energy sourcing
- Aggregation of data based on different weights (population, geographic...)

TSO

## USE CASE DSO



Historical energy production data to train ML algorithms  
Forecast of energy producibility

DSO