

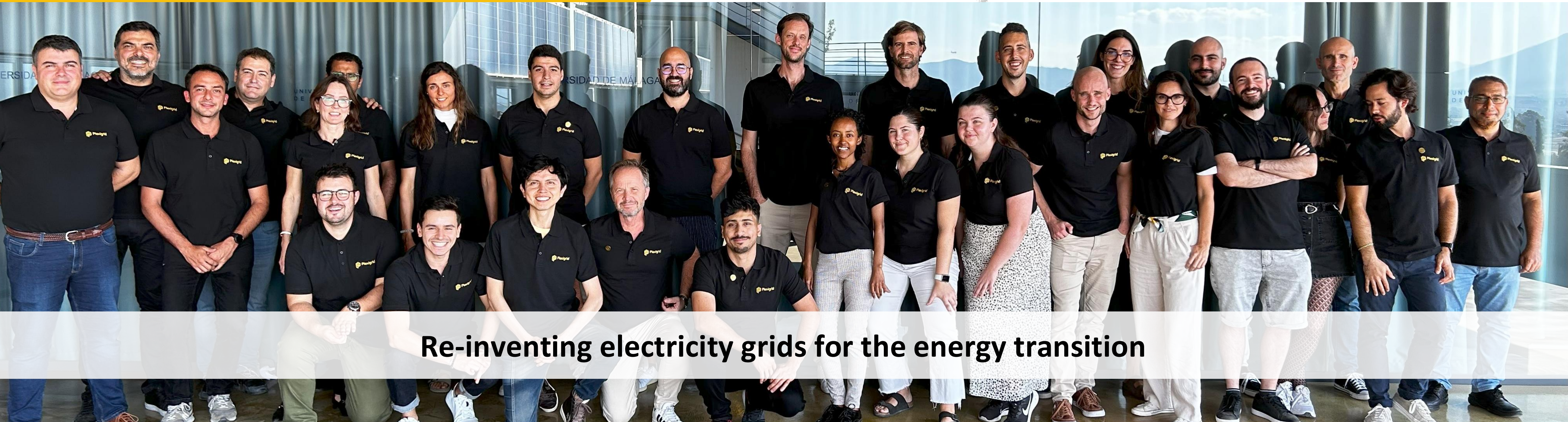
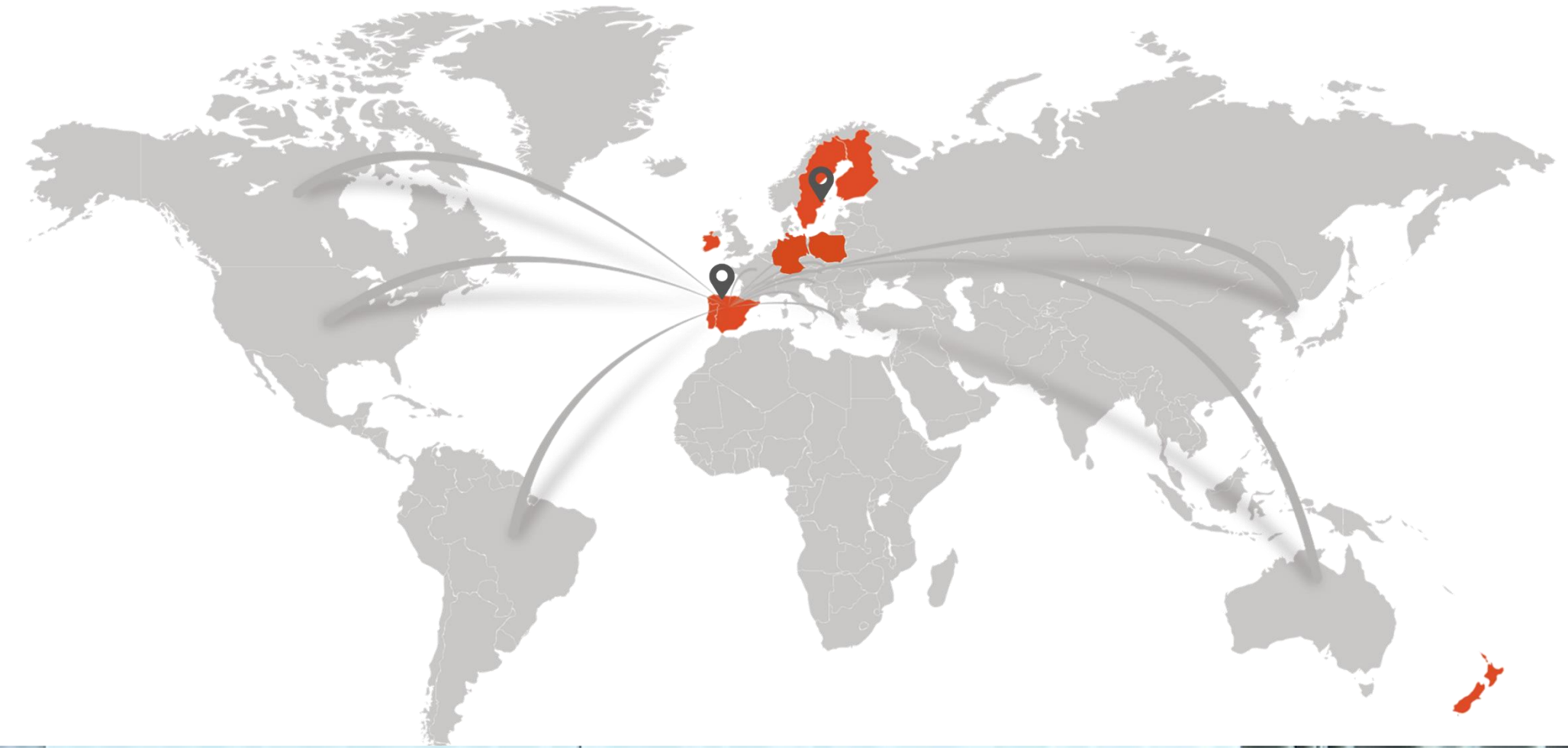


Plexigrid

AI för analys och prognoser av elnät och  
värdet av datakvalitet

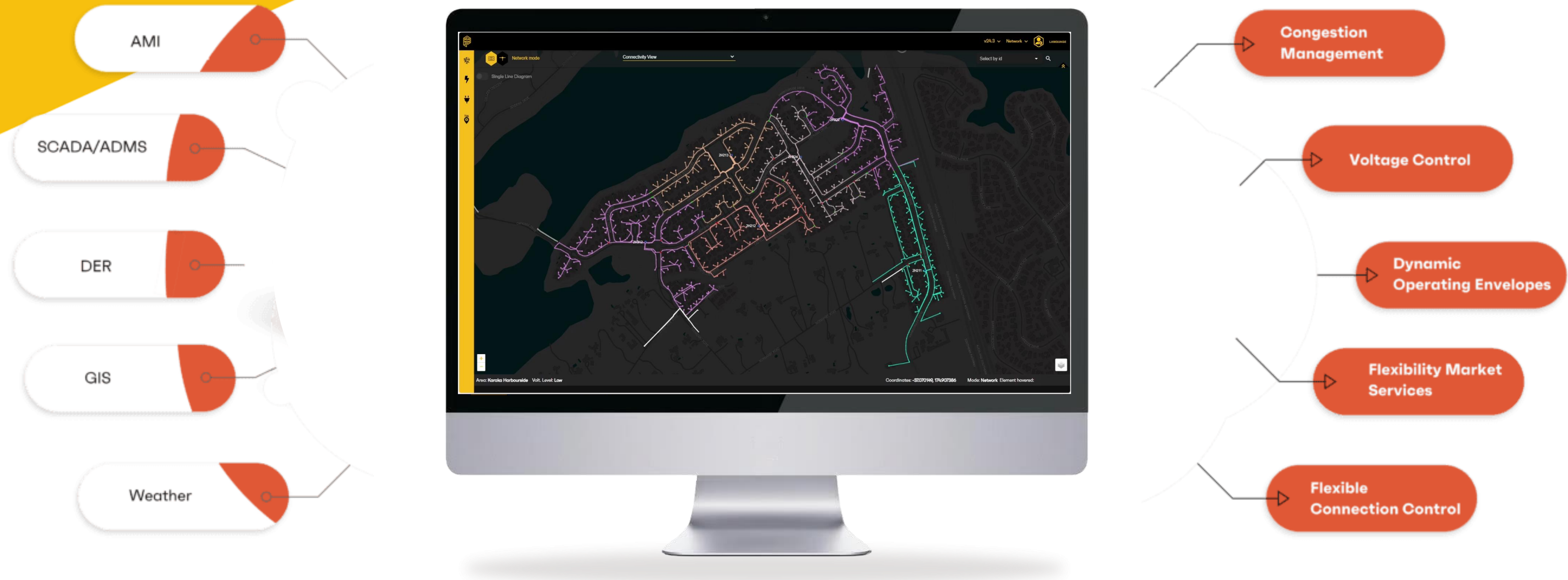
# Who are we?

- Swedish-Spanish company
- Founded in 2020
- Spin-off from University of Oviedo

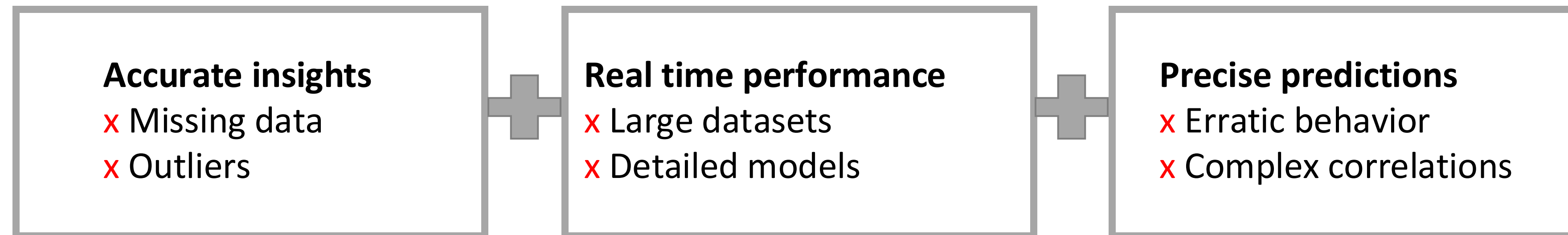


**Re-inventing electricity grids for the energy transition**

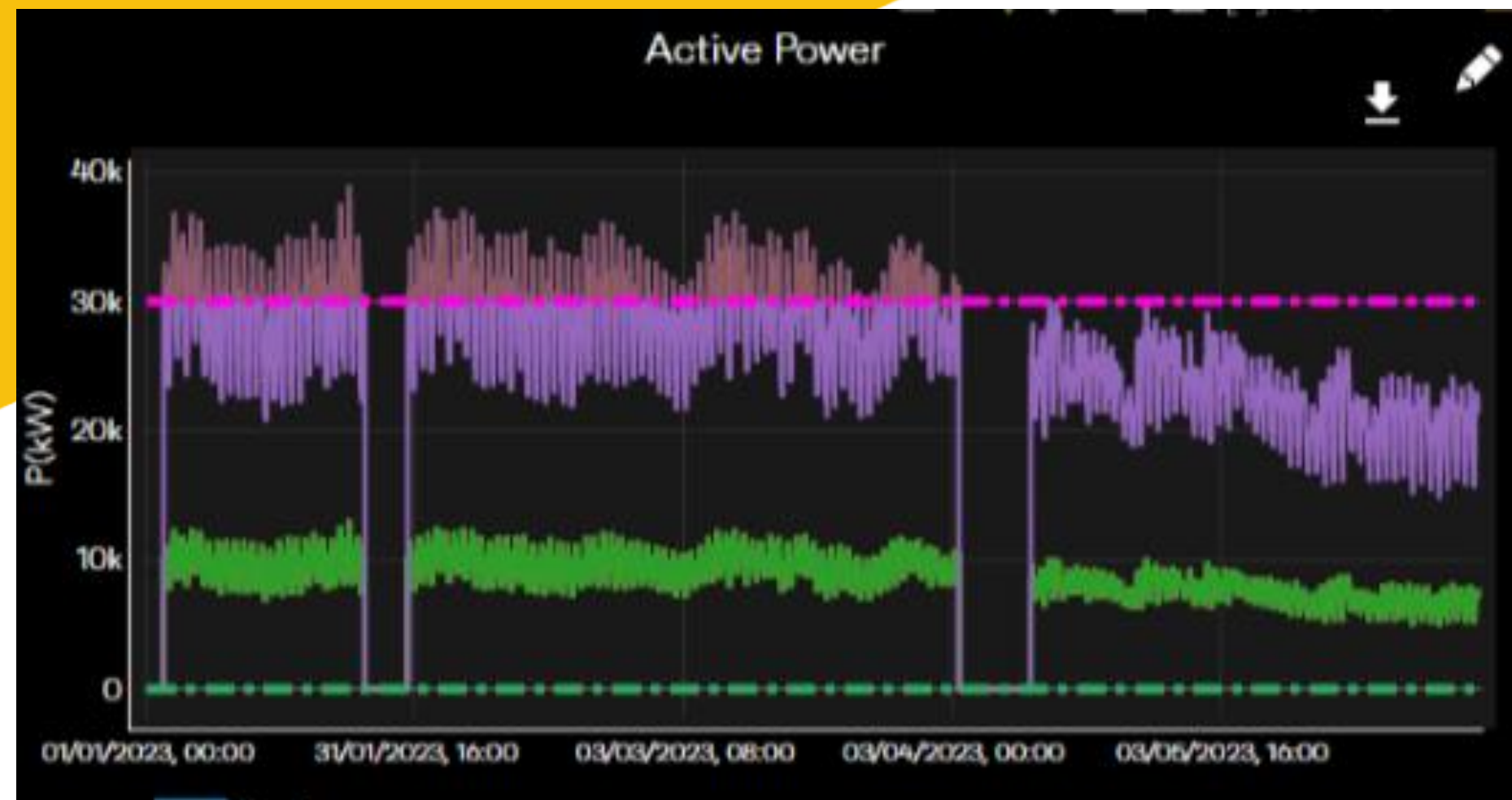
# New tasks for active system operators



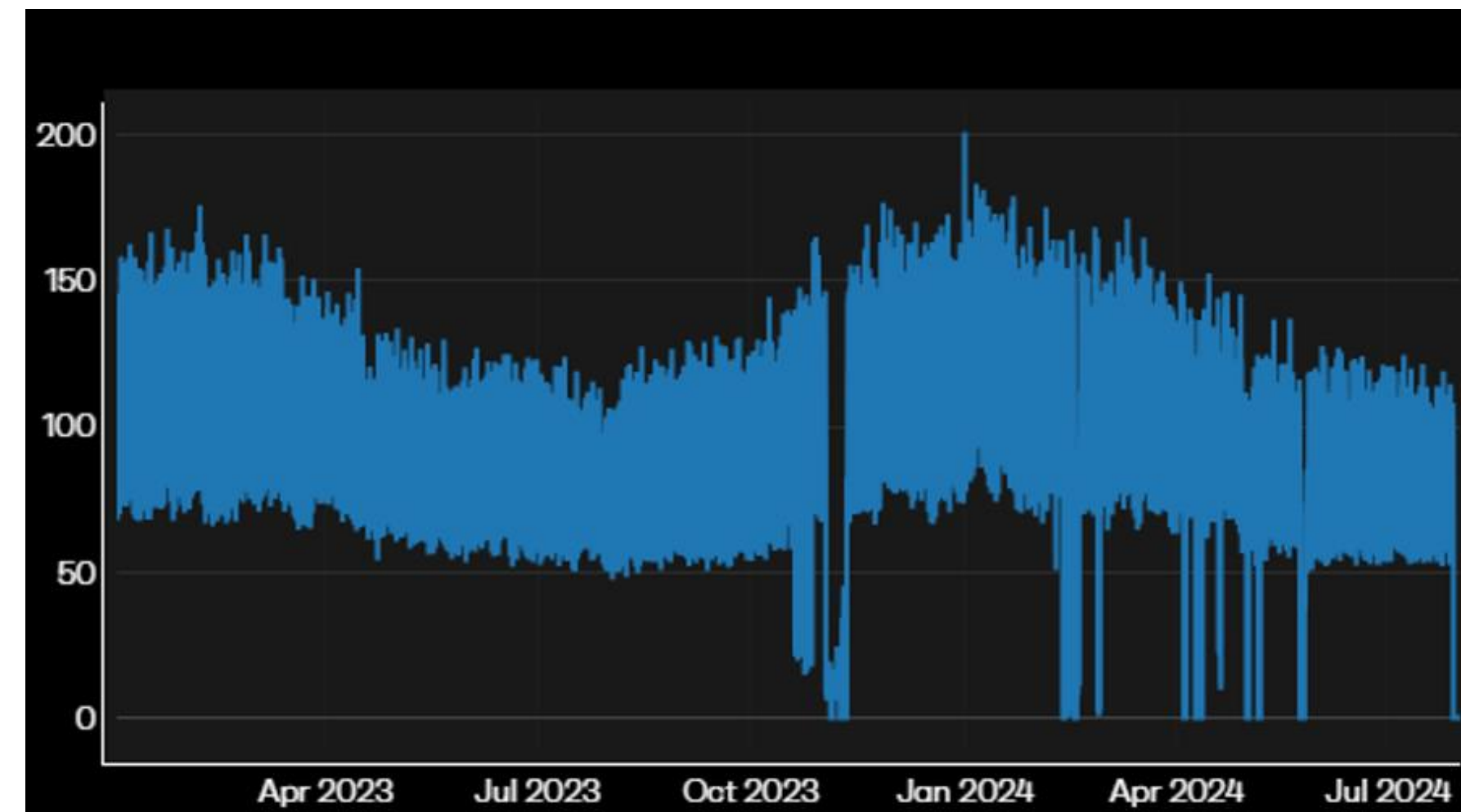
# Time is of the essence



# What data we receive might look like



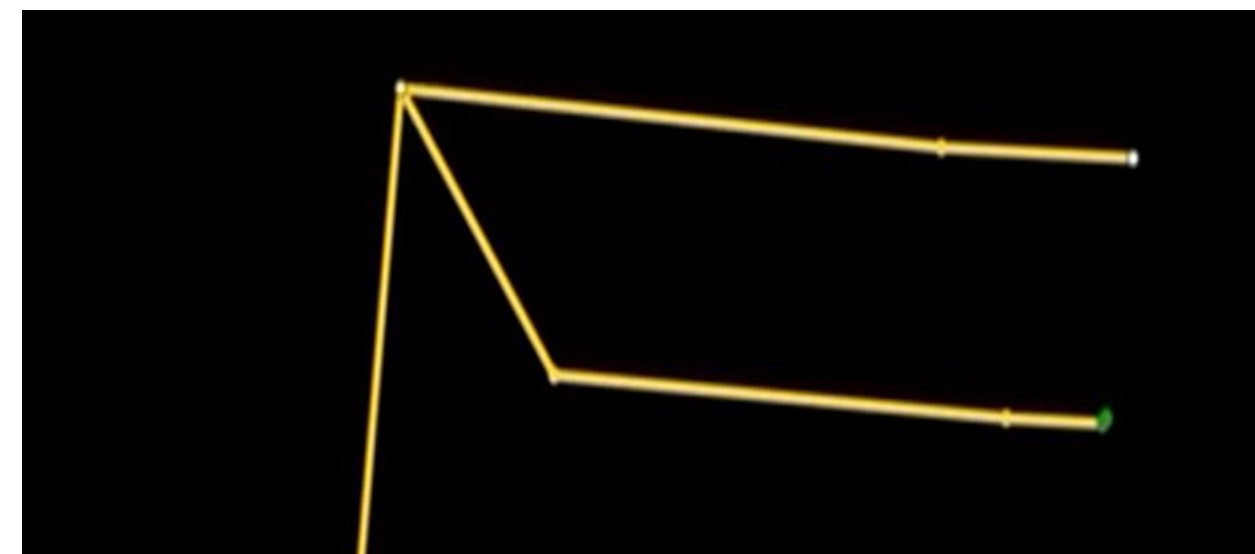
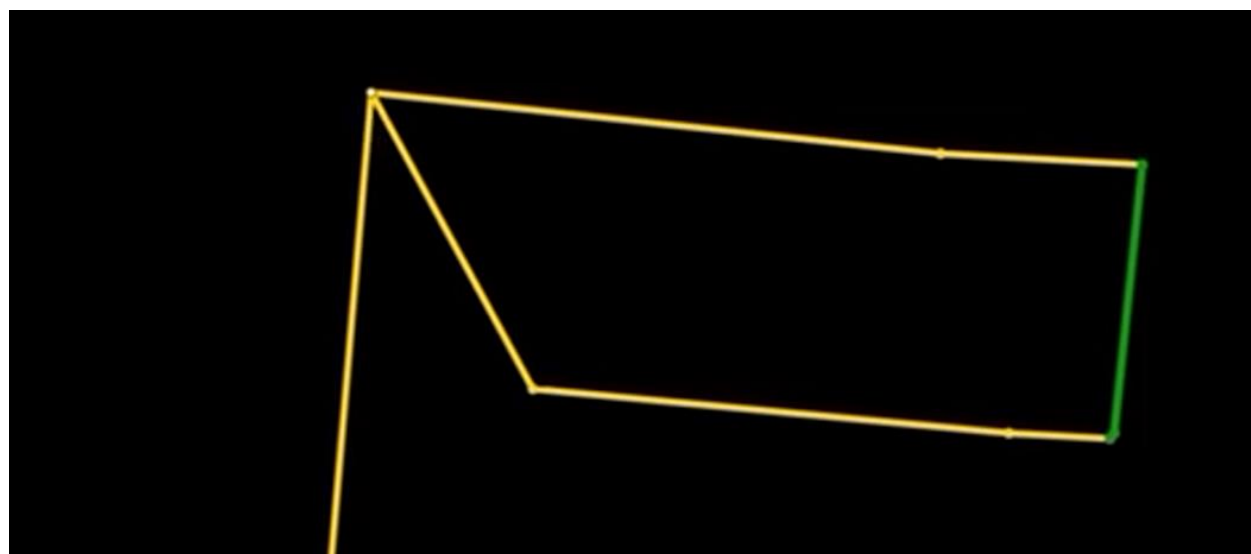
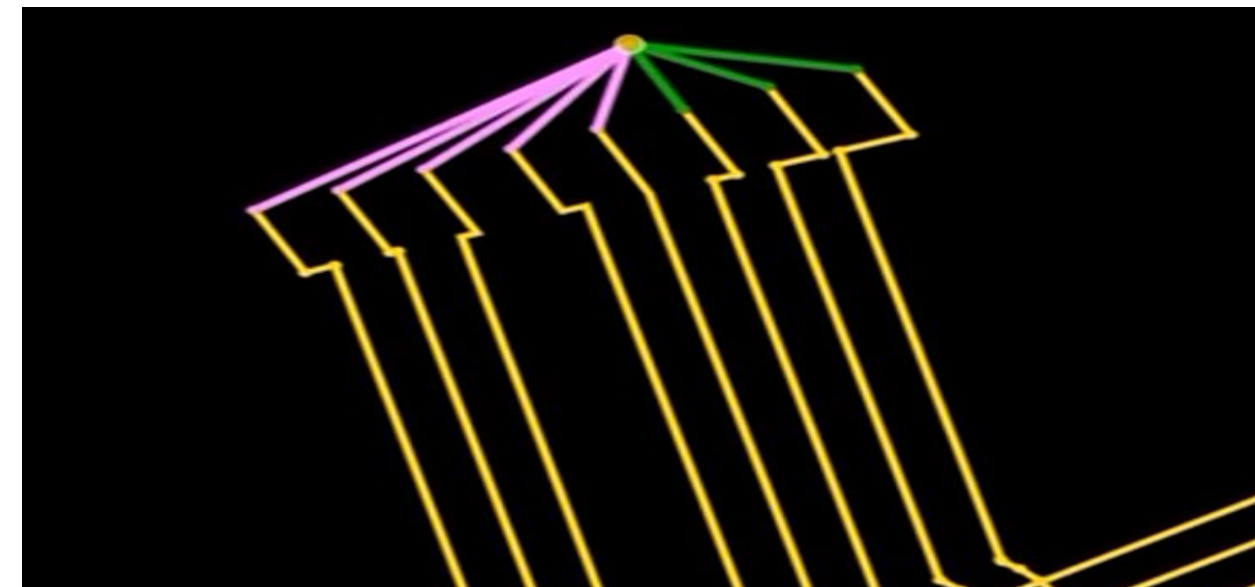
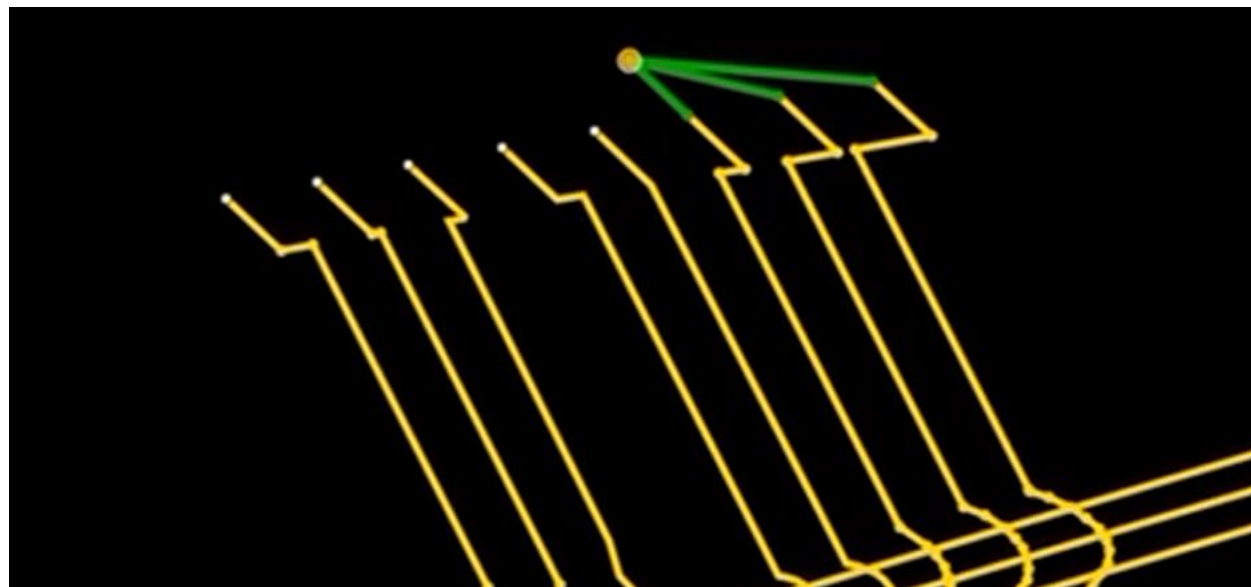
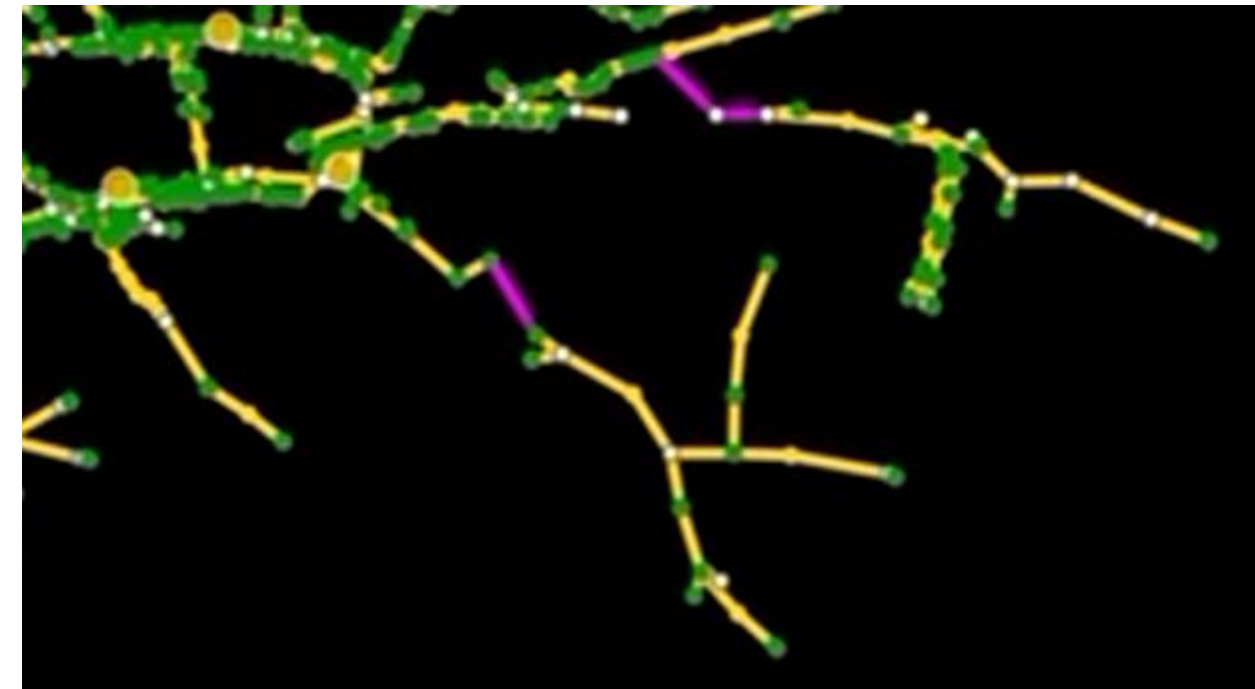
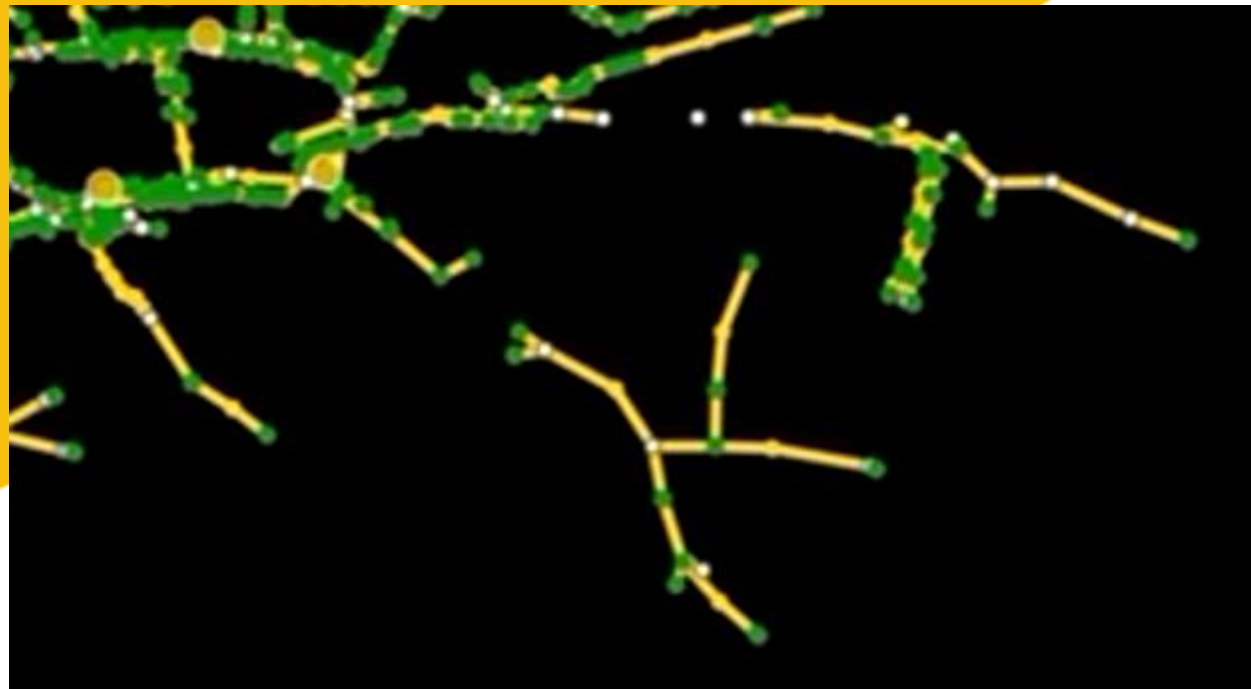
5 months



1,5 years

Active power smart meter measurements

# Network model issues

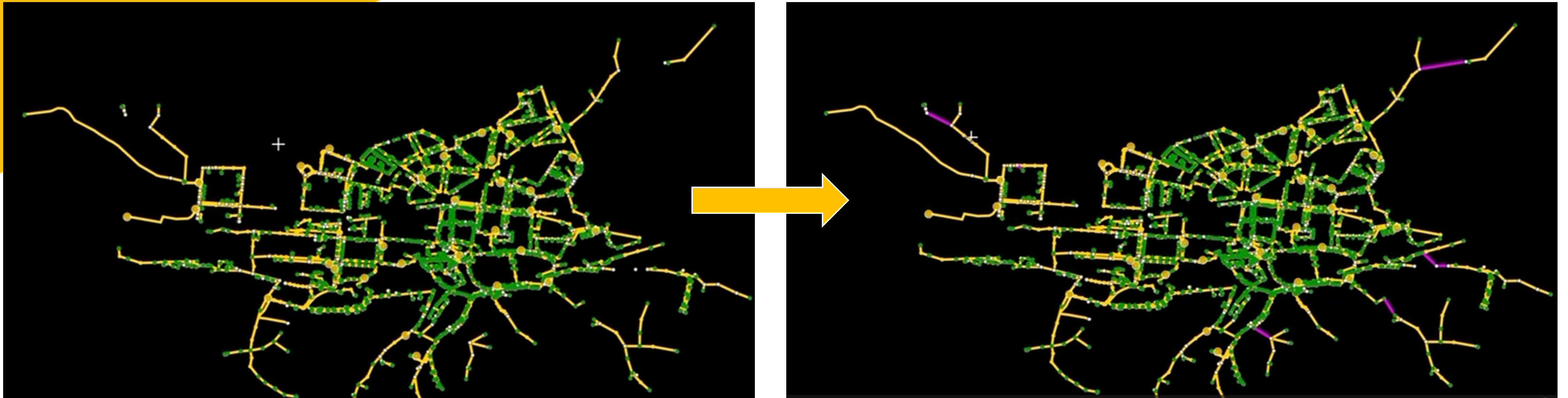


- Islands
- Loops
- Missing connection
- ...

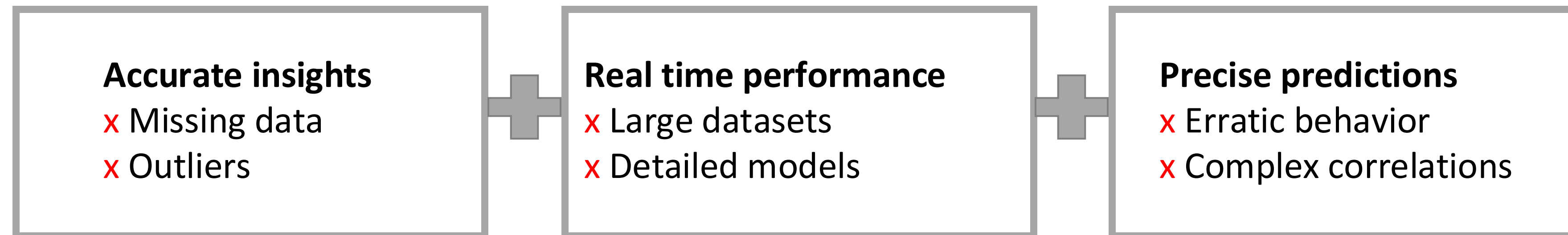
- Missing asset data
- Wrong impedances
- Inconsistent voltage
- ...

- Missing assets
- Wrong asset type
- ...

# Network model issues



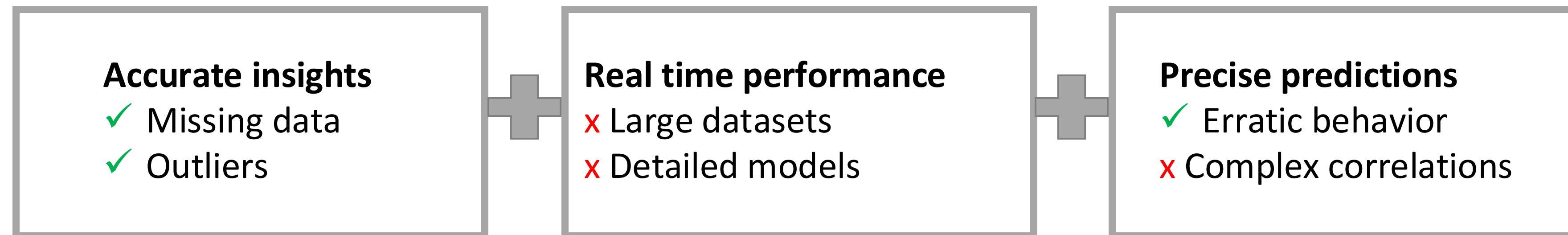
# Time is of the essence





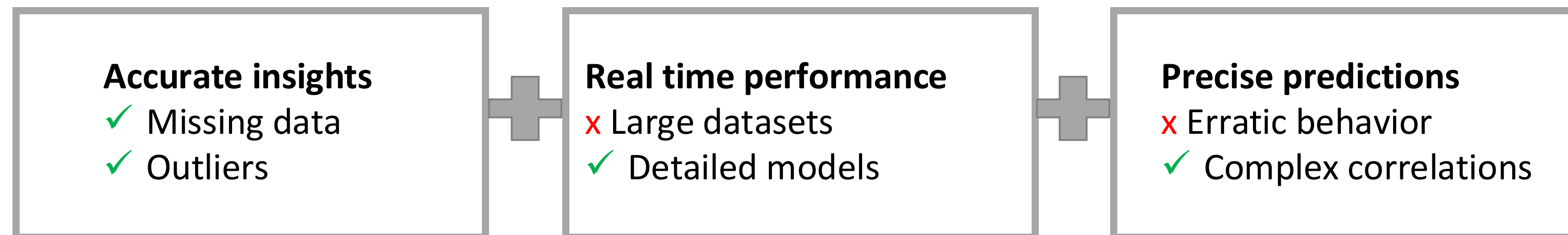
# The optimistic approach

## Fix the data for deterministic models



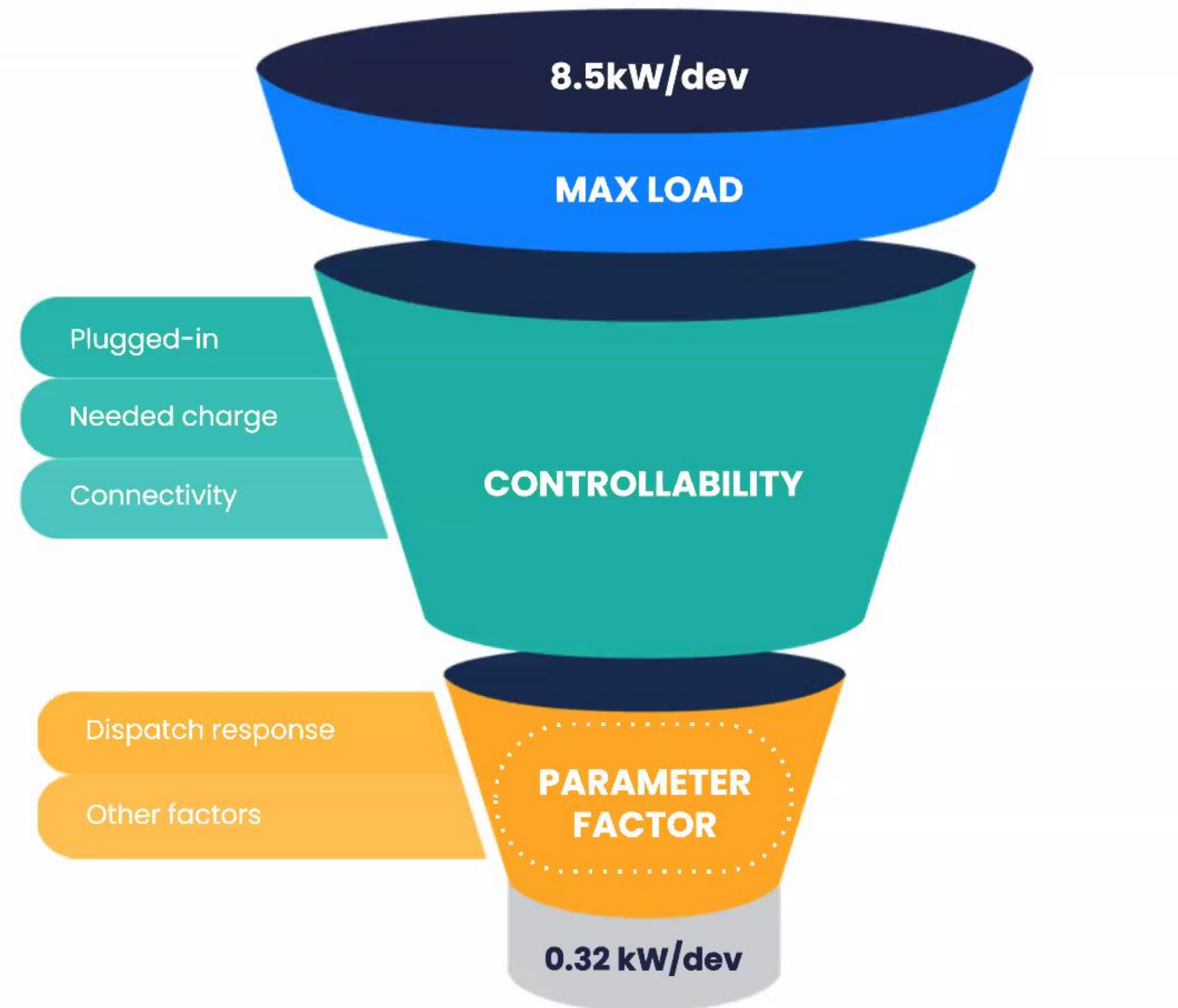
# The fatalistic approach

## Deploy AI algorithms on existing data



# Can we predict the flexibility of a single EV charger?

(The unavoidable approach...)



\* Illustration by EnergyHUB

# Can we predict the flexibility of a single EV charger?



# Can we predict the flexibility of a single EV charger?



# Can we predict the flexibility of a single EV charger?

Substation limit

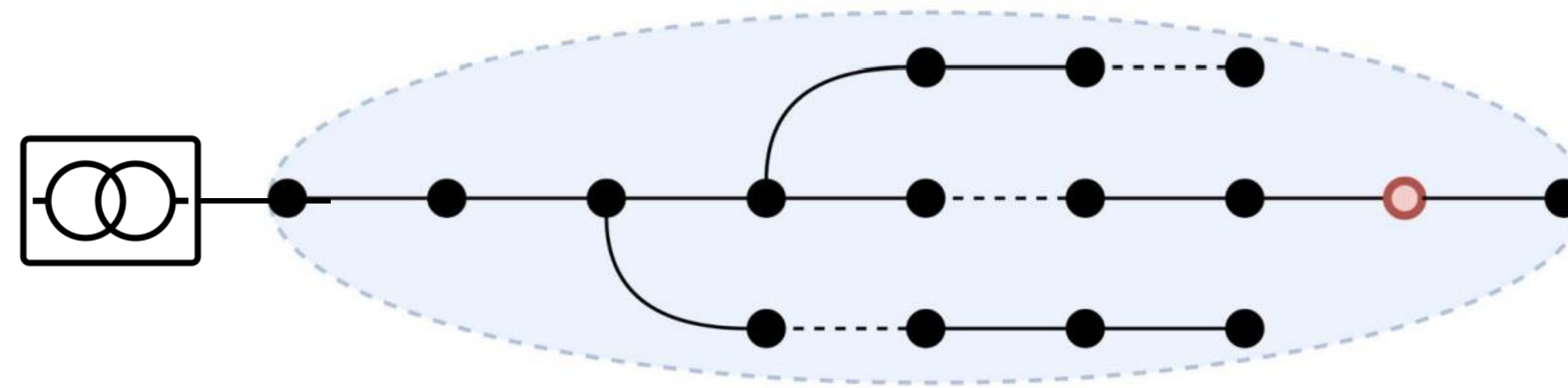
Allowed EV load interval

Non-flexible load

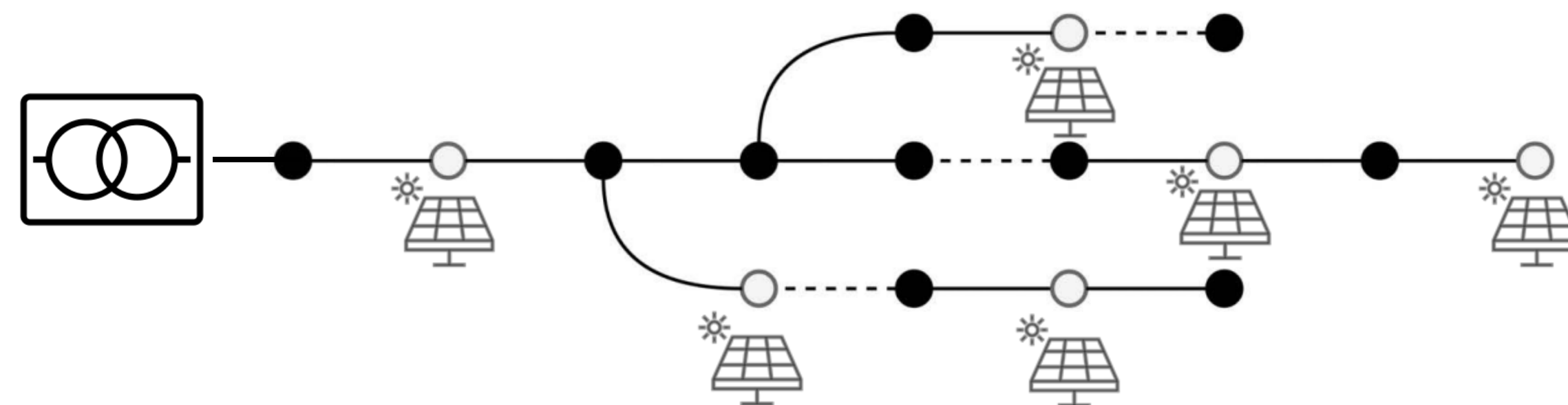


# Rooftop PV voltage control in a low voltage grid

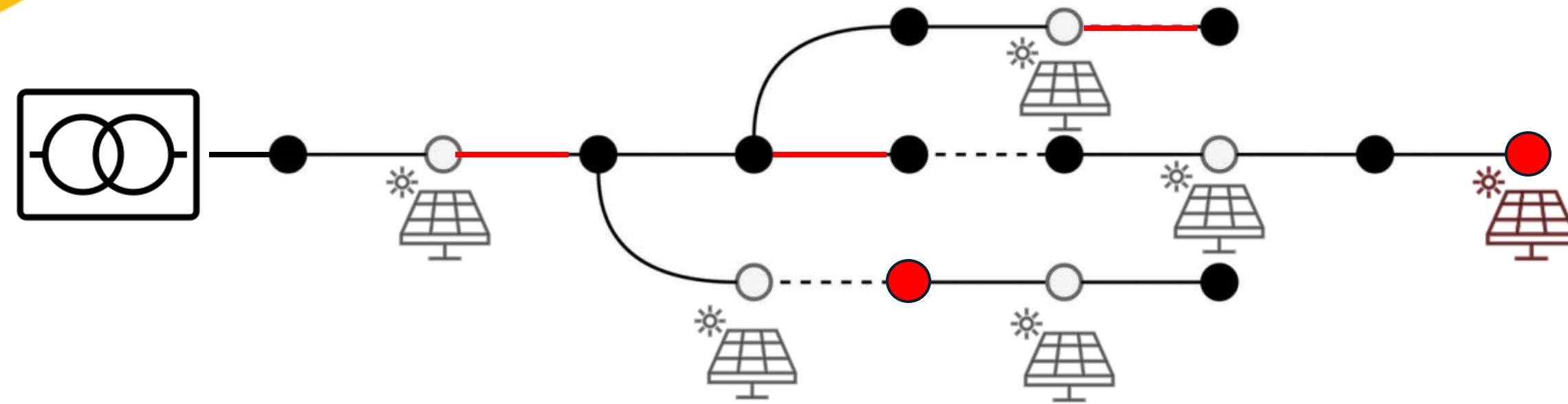
For each customer:  $V_{\min} < V < V_{\max}$



Each node affects the voltage in the other nodes



# Rooftop PV voltage control in a low voltage grid

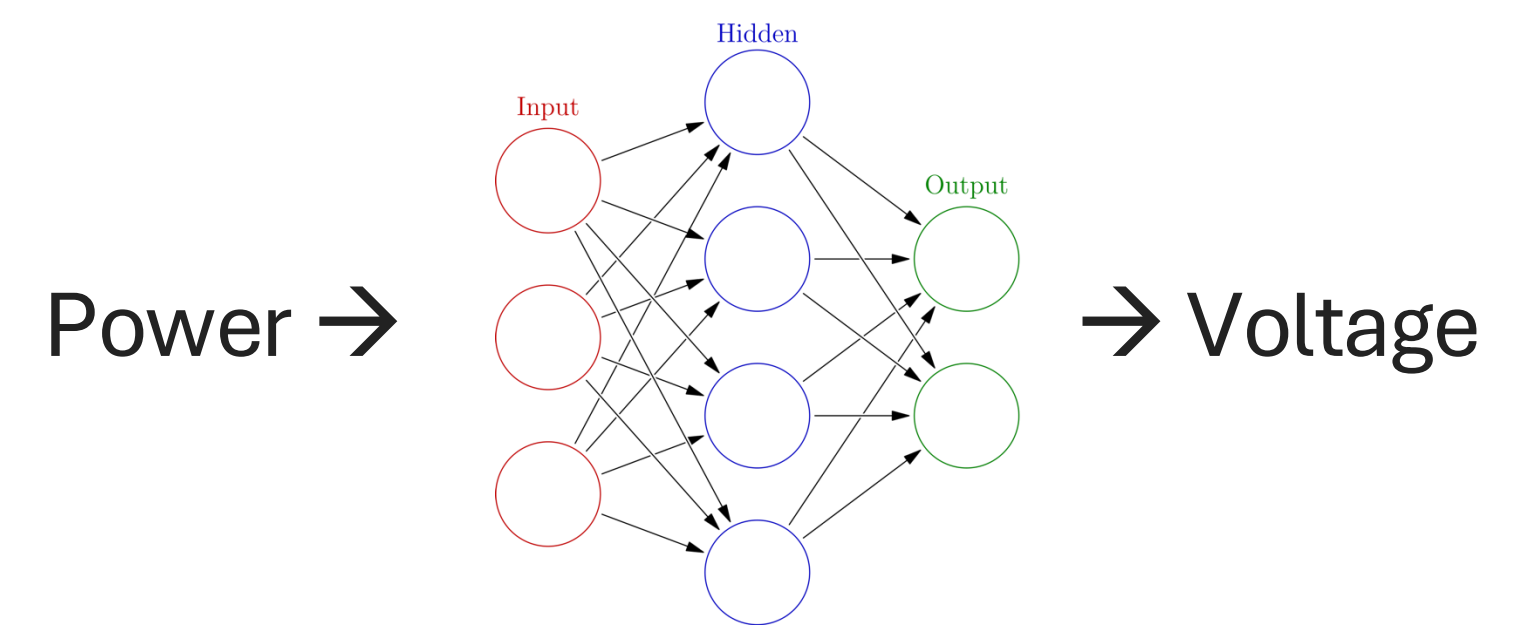


## 100% Analytical methods



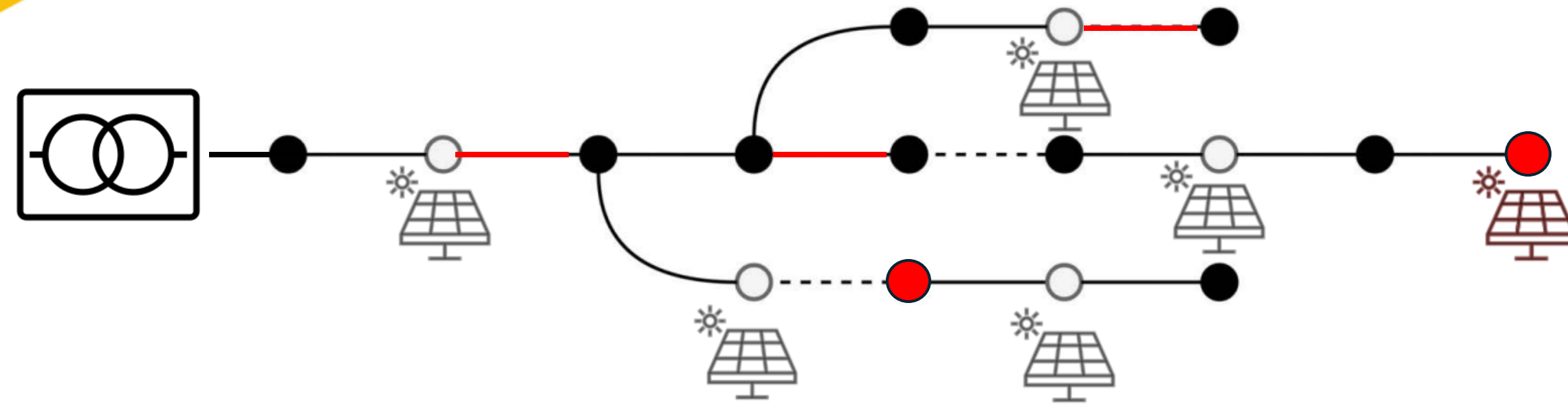
VS

## "Model-free" methods





# Rooftop PV voltage control in a low voltage grid



## 100% Analytical methods

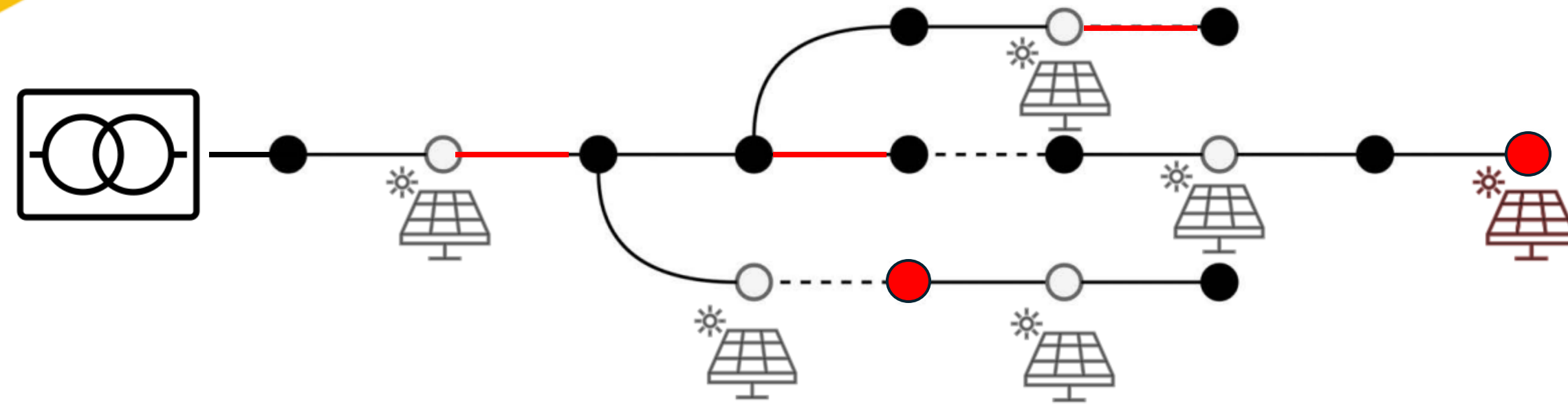
- + Robust in over-determined systems
- + Very exact results
- + Trusted in mission critical control
- Sensitive to data quality issues
- Computationally heavy

VS

## "Model-free" methods

- + Robust in under-determined systems
- + Fast to deploy, limited data cleaning
- + Scales to large systems
- Relies on availability of historical data
- Grid switching increases complexity

# Rooftop PV voltage control in a low voltage grid

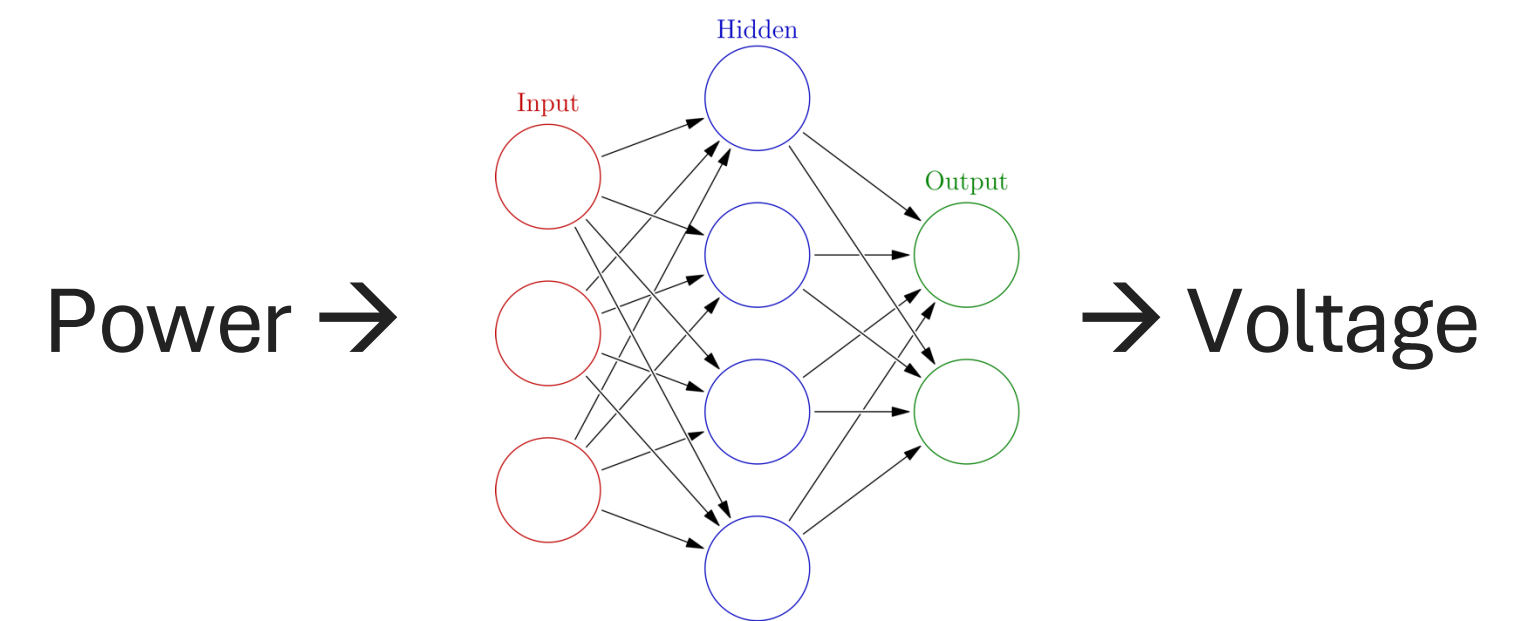


## 100% Analytical methods

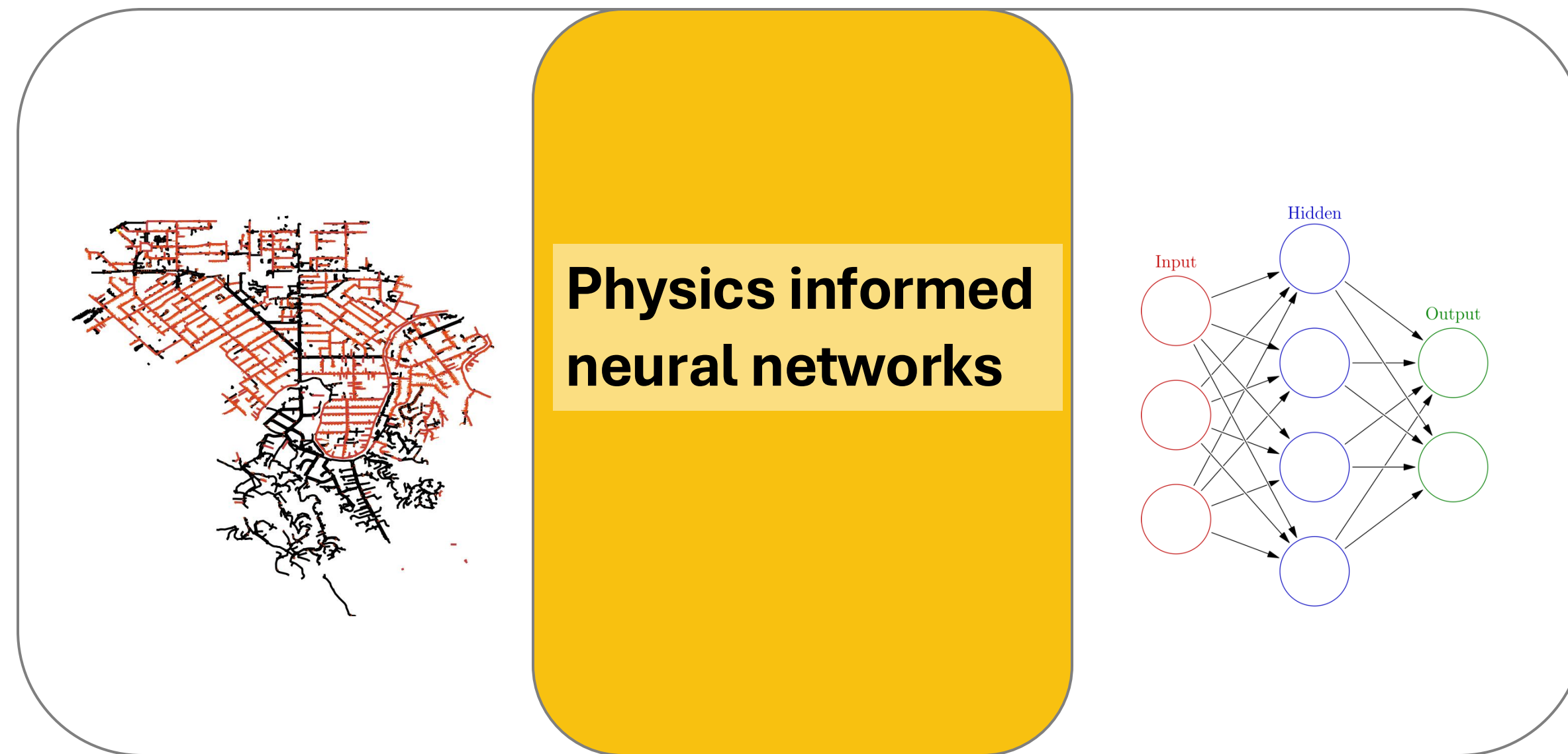
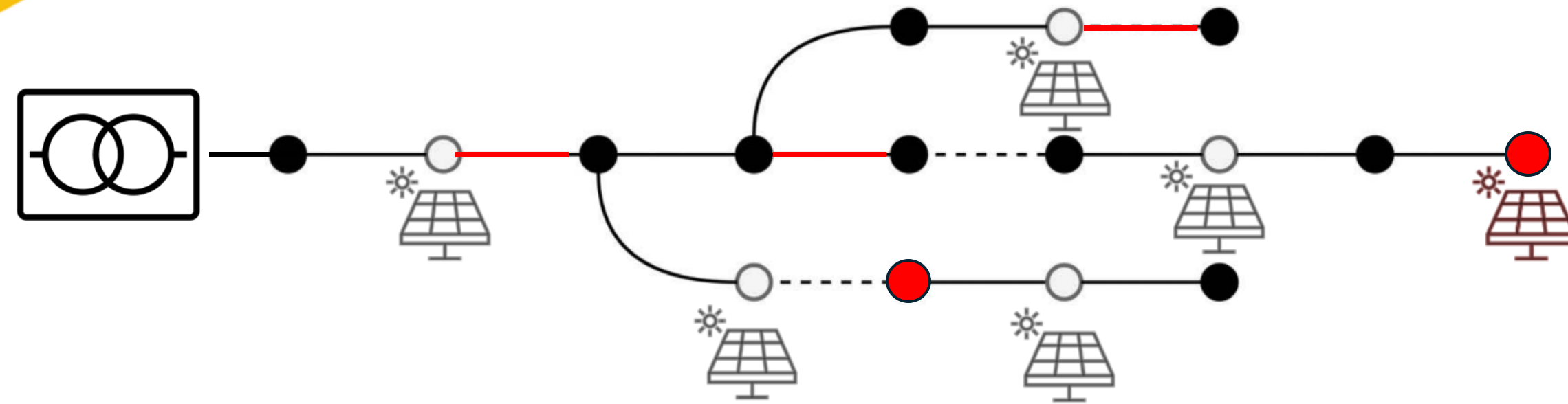


VS

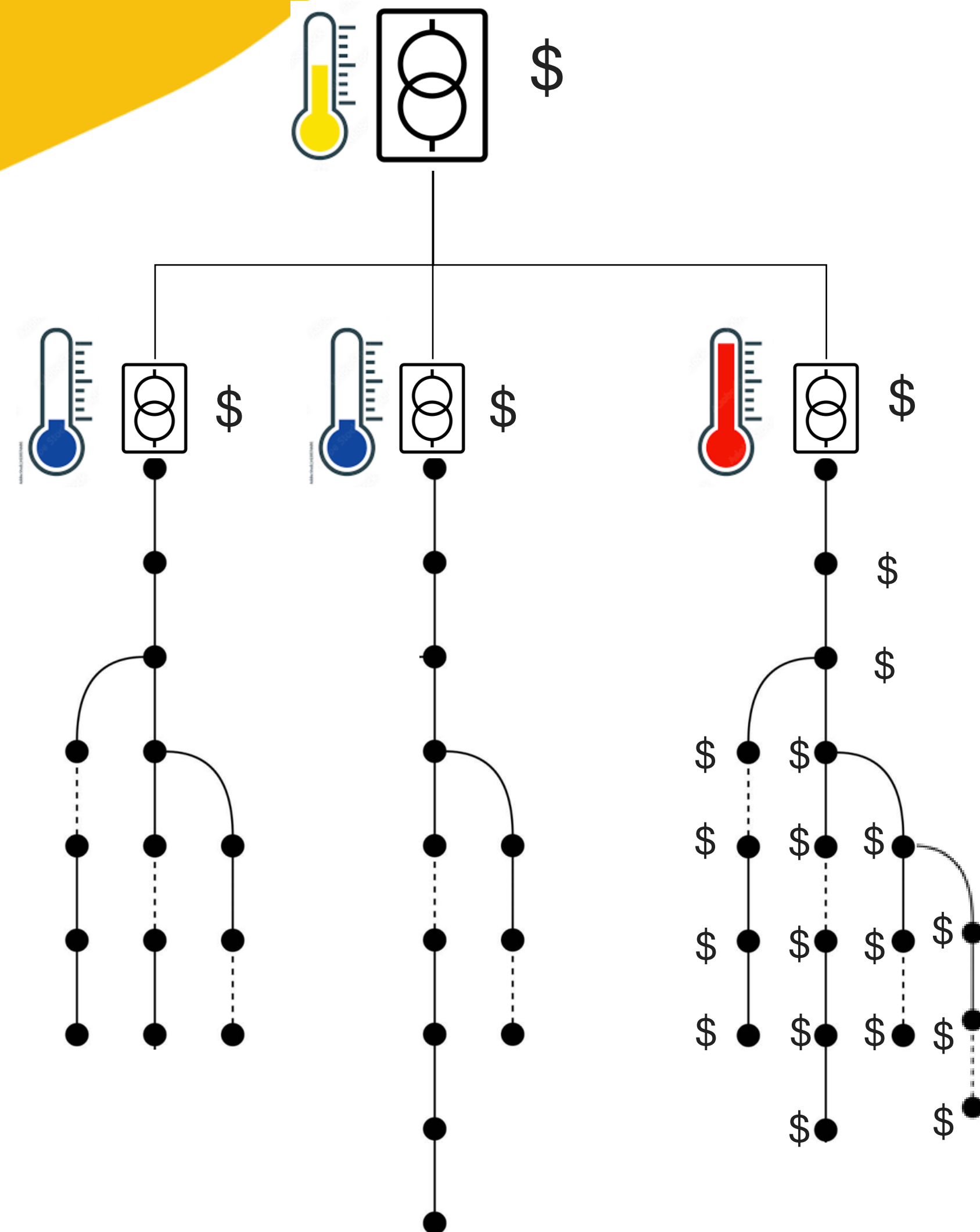
## "Model-free" methods



# Rooftop PV voltage control in a low voltage grid



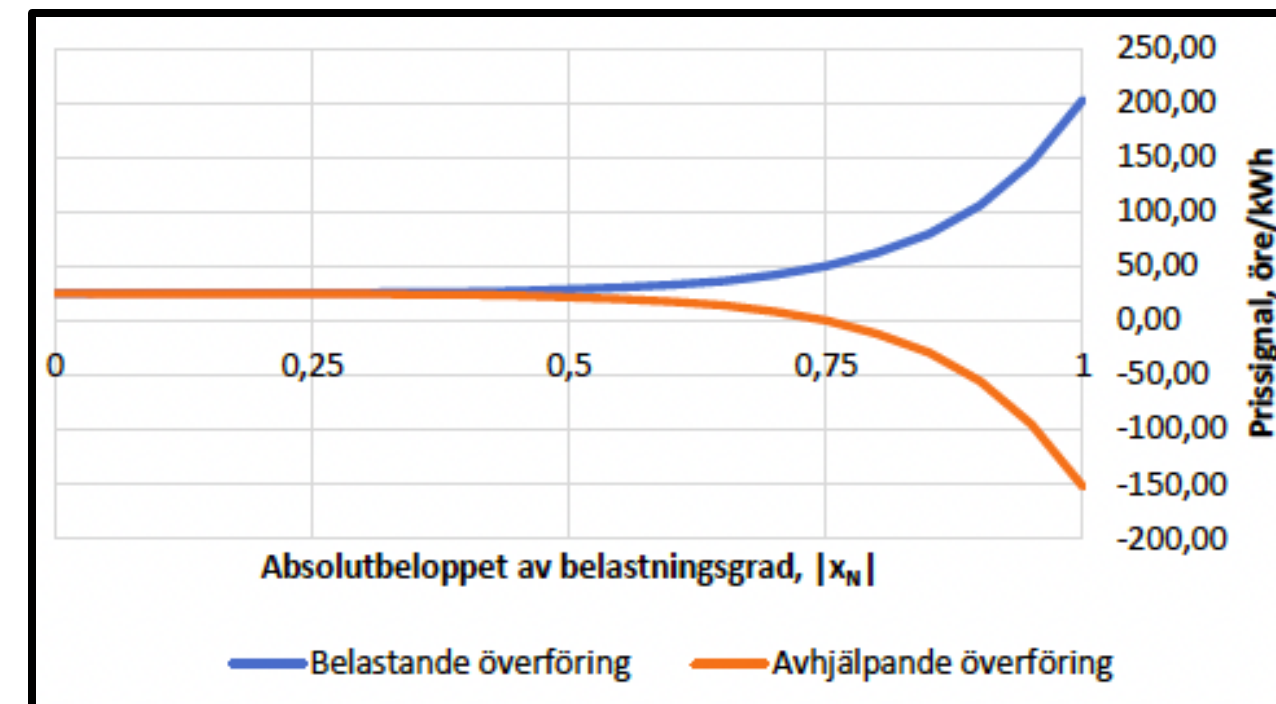
# Dynamic and Nodal Grid Tariffs



# Dynamic and Nodal Grid Tariffs



Substation  
congestion forecast

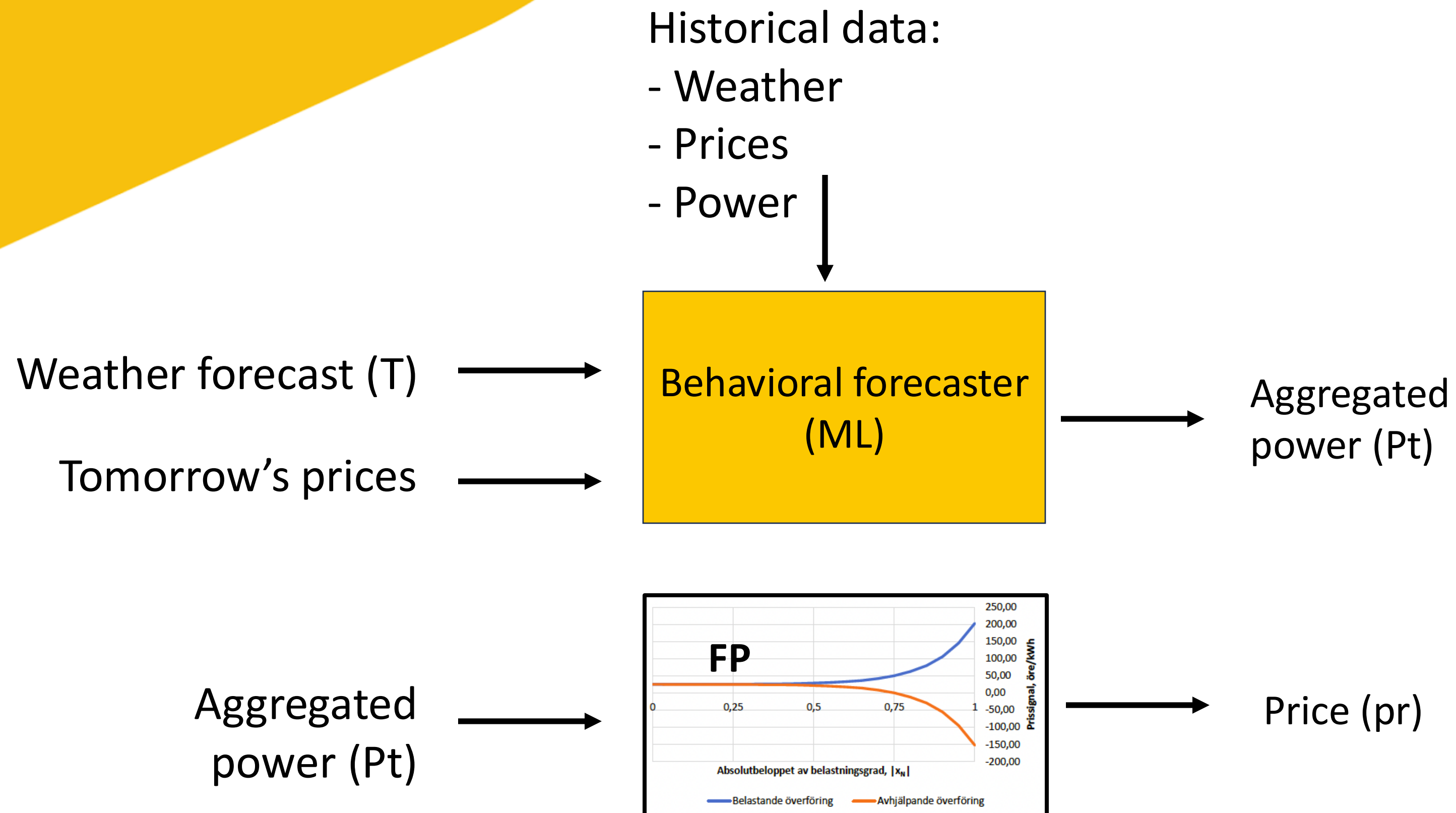


Price signal



Customer  
optimization

# Dynamic and Nodal Grid Tariffs



# New **tasks** for active system operators



# New **tools** for active system operators

