

MICROGRID DEMONSTRATORS OF THE drive2X PROJECT

Delivering Renewal and Innovation to Mass Vehicle Electrification Enabled by V2X Technologies

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Introduction

DriVe2X implements advanced artificial intelligence techniques that capture the flexible energy potential from bidirectional electric vehicle charging in building parking lots, private homes, and charging stations, matching it with distribution networks' localized needs, effectively creating a dynamic marketplace for local trading of EV flexibility.

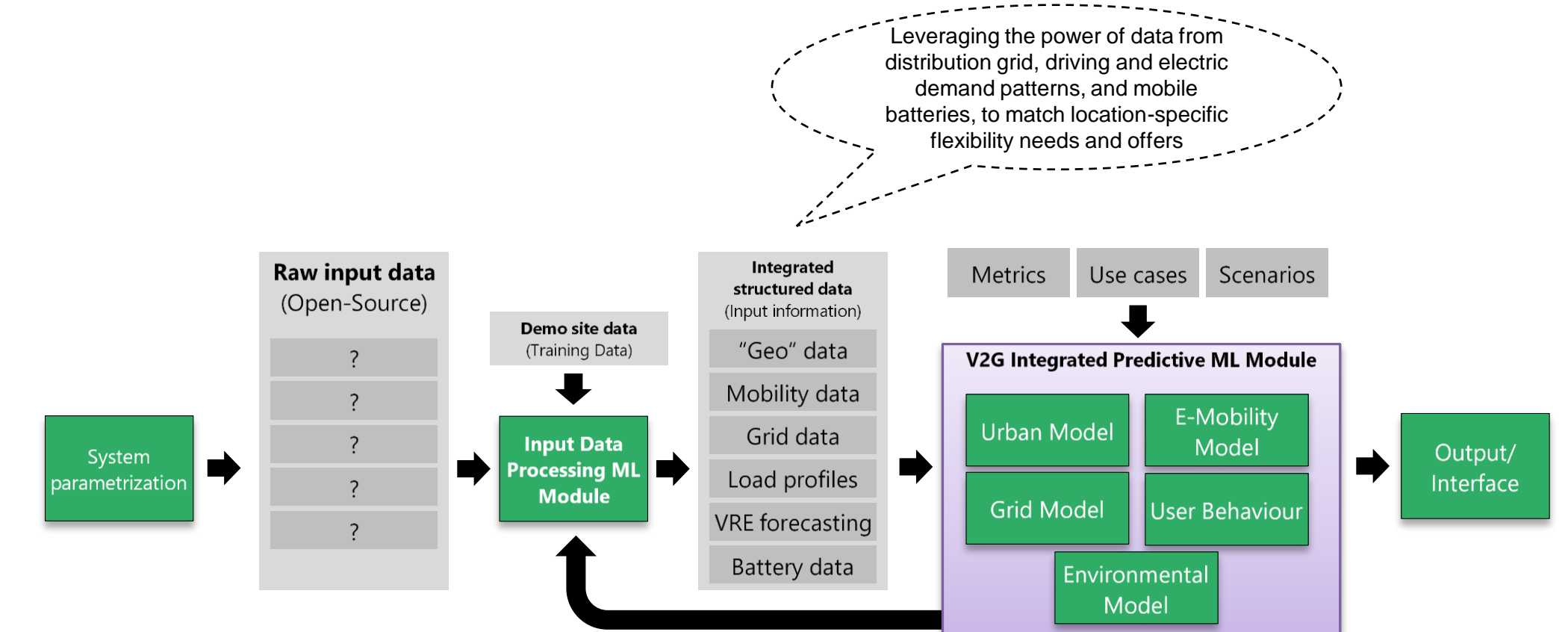


Figure 1. Optimizing energy and mobility at smart-city level using short-term integrated predictive modeling.

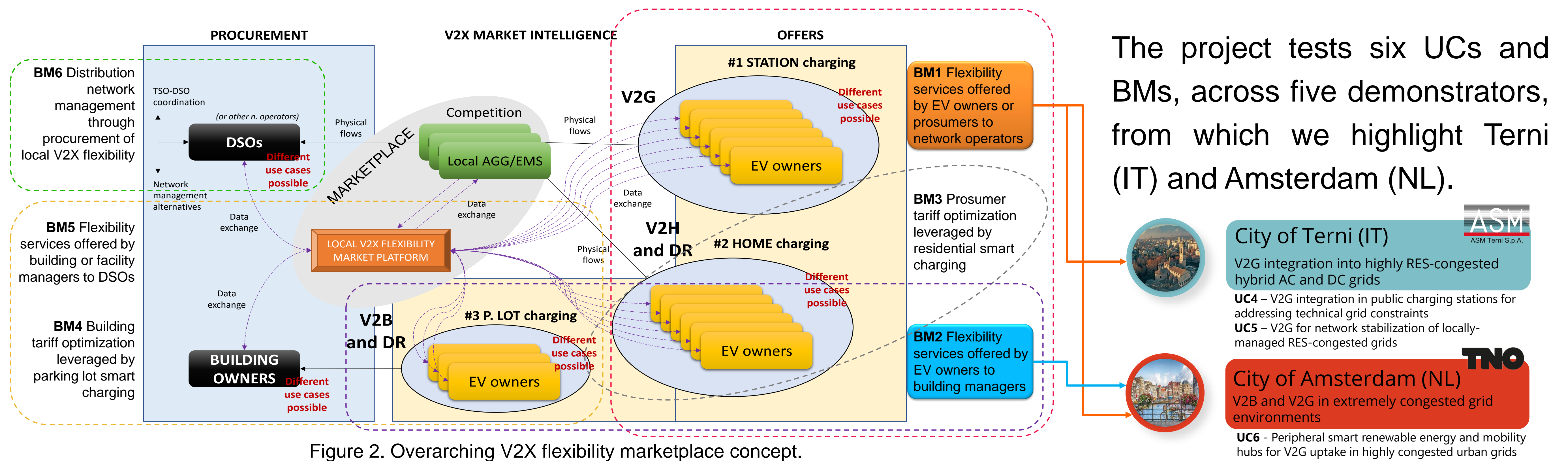


Figure 2. Overarching V2X flexibility marketplace concept.

The project tests six UCs and BMs, across five demonstrators, from which we highlight Terni (IT) and Amsterdam (NL).

- City of Terni (IT)** (ASM Terni S.p.A.)
 - UC1 - V2G integration into highly RES-congested hybrid AC and DC grids
 - UC4 - V2G integration in public charging stations for addressing technical grid constraints
 - UC5 - V2G for network stabilization of locally-managed RES-congested grids
- City of Amsterdam (NL)** (TNO)
 - UC2 - V2B and V2G in extremely congested grid environments
 - UC6 - Peripheral smart renewable energy and mobility hubs for V2G uptake in highly congested urban grids

ASM Terni's suburban microgrid facility

The Terni power grid faces mounting stability issues due to growing shares of intermittent distributed generation and new loads, such as energy storage and e-mobility. To emulate this rapid change of operating conditions, ASM is testing the role flexible V2G services could play in the stability management of a hybrid AC/DC DER-powered VRE-rich microgrid. The pilot will further demonstrate a local flexibility marketplace platform for aggregators and EV owners.

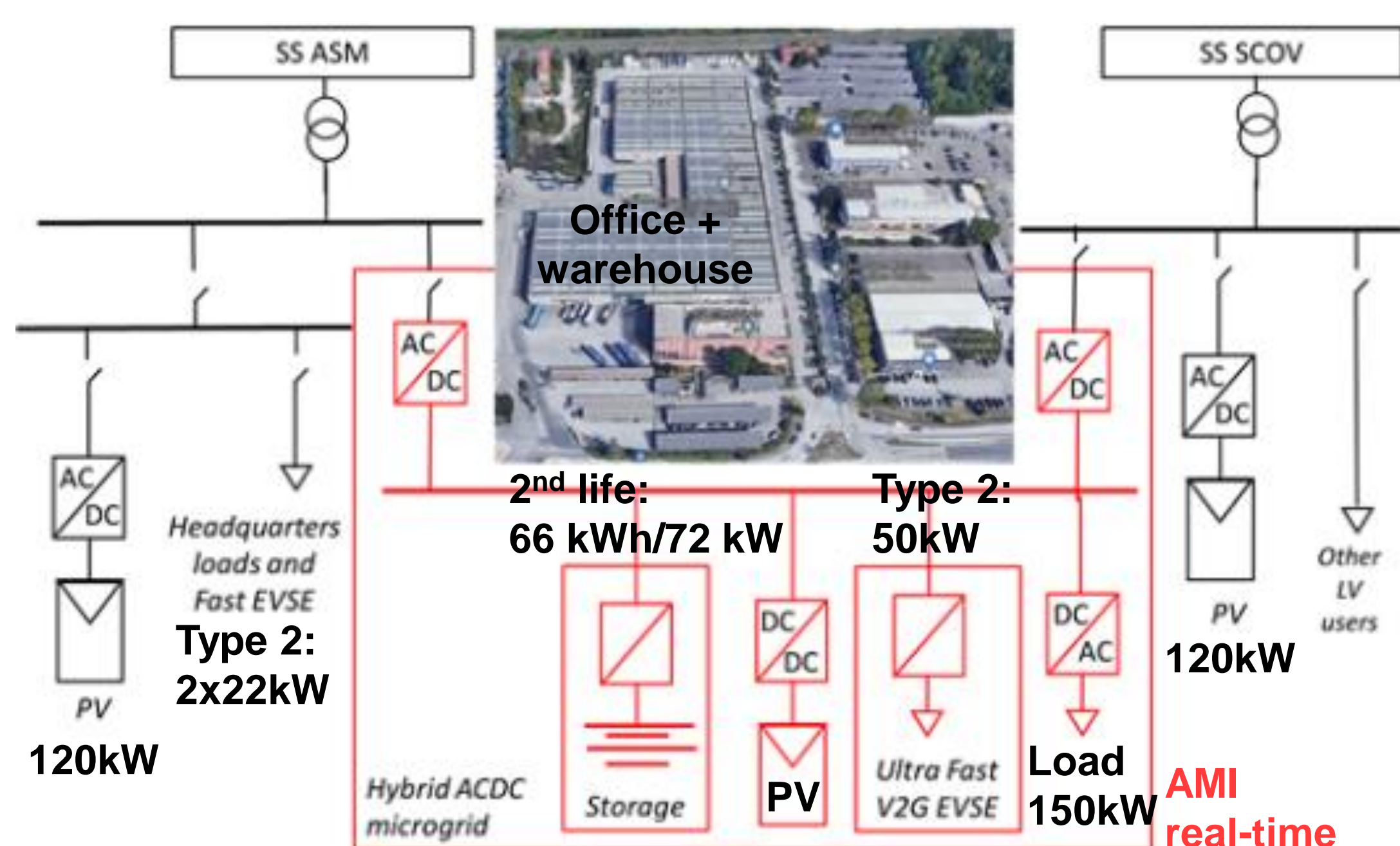


Figure 3. Electrical diagram of ASM Terni's hybrid AC/DC microgrid pilot.

Amsterdam's Smart Energy and Mobility Hubs

E-mobility and RES generation are growing exponentially across Amsterdam. Electric demand will triple in 15-20 years and most substations are already overloaded. To tackle it, the city is piloting integrated smart energy and mobility hubs in its periphery, aimed at reducing both car traffic and power grid congestion. Each autonomous hub is a microgrid equipped with commercial-scale PV and stationary storage, 40 multi-port V2G EVSE units, and advanced EMS intelligence.

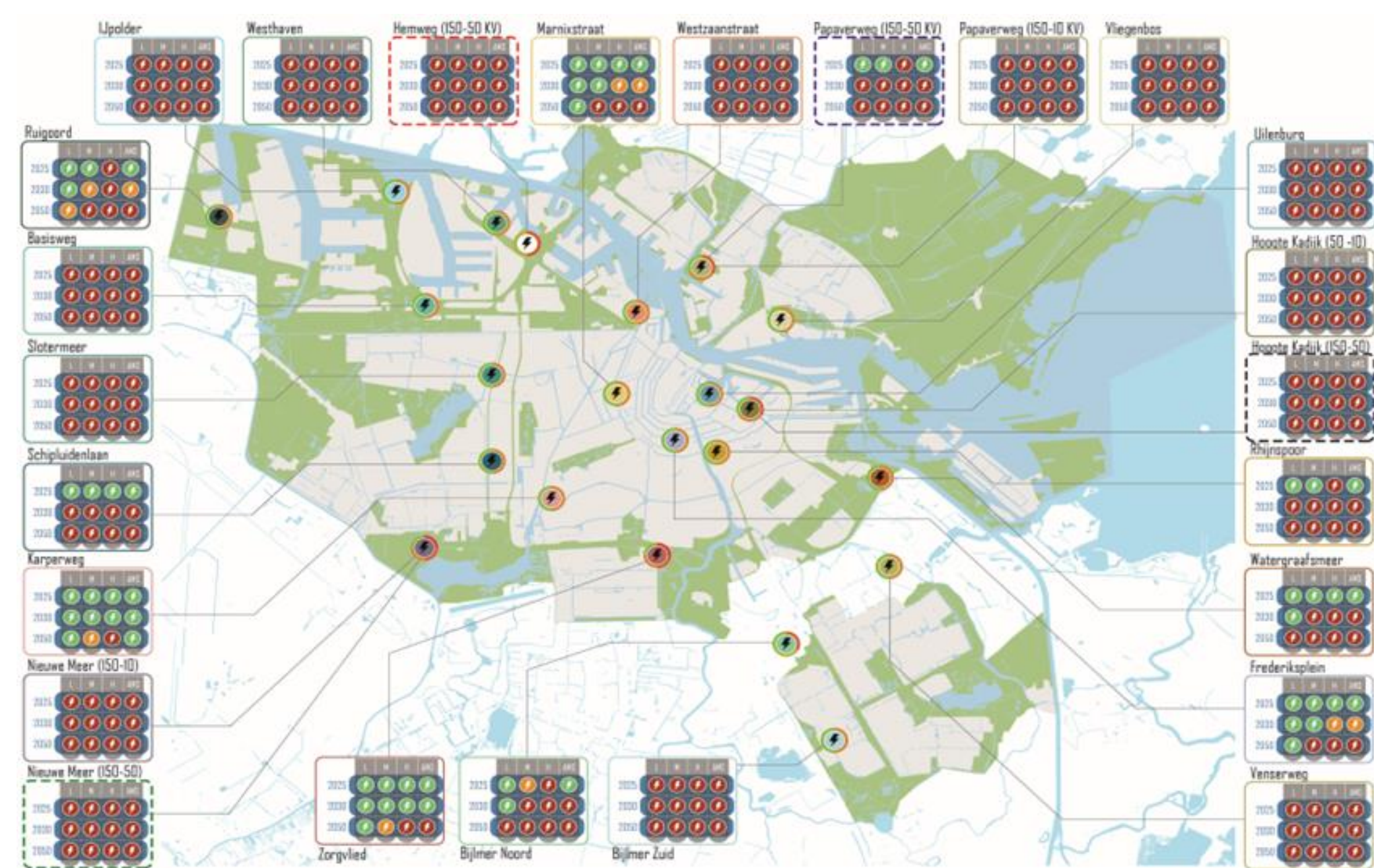


Figure 4. Present day electrical substation congestion in Amsterdam.

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