A digital twin for resilient infrastructure coupling e-mobility and grid
for Aspern Smart City Research
A digital twin for resilient infrastructure coupling e-mobility and grid

ASCR - Aspern Smart City Research
Explores solutions for the energy future within an urban development zone

CLIENT CHALLENGES
Model the energy demand of electrical vehicles & their impact on the electricity grid

OUR SOLUTION
Merging data sources and streams by creating a graph-based data model (City Graph), enabling planning of network capacities and related expansion

CLIENT BENEFITS
Improved system efficiency & operation by coordinated interaction with the electricity grid

- Up to 15% cost savings on contracted network capacity
- Up to 25% efficiency increase in network utilization
- Up to 20% increase in energy delivery
One of Europe's largest & most innovative Energy Research Projects

Aspern, Vienna

Energy & Smart Infrastructure

Second program phase launched in 2019 by Wien Energie, Wiener Netze, and Siemens

85 million € total R&D expenditure

Over 100 researchers from various disciplines
Exploring charging-management to tap into unused network capacity

THE CHALLENGE

Prediction improvement of charging demand & understanding of the impact on the infrastructure

1. Utilize the electricity network to maximize the supplied energy
2. Communication & information of extra network capacity reserves for electric car users
3. Improve system efficiency & operation by connecting charging points to buildings & their parking lots
OUR APPROACH

Implementing applications for network capacity prediction & providing the information for the end user

1
Data Sources:
Ontology
Electrical network data based on the IEC standard CIM (Common Information Model)

2
Electrical load information:
Publicly accessible & open data platforms provide charging station information

3
Digital Twin: Correlation of transportation & electricity network data, charging stations & electric vehicle consumption by creating a graph-based data model (CityGraph)

Connectivity and visualization of e-cars within district to model exact energy demand
OUR APPROACH

Implementing applications for network capacity prediction & providing the information for the end user

Visualization of correlated data:
Transportation information & traffic flows for end users in an interactive map

Status of charging:
Prediction of charging point usage (occupancy & energy demand)

Implementation of local IoT field devices to reflect the real-world status of network load.
THE IMPACT

Improved system efficiency & operation by coordinated interaction with the electricity grid

1. Enabling e-mobility through better planning of network capacities and related expansion
2. Providing services through open standards & interfaces, with the goal of affordability, monetization enablement & longevity
3. Digital Twin can be extended with any ontology (e.g. heat networks, transportation, buildings) and related for many other business use cases
4. Increasing customer satisfaction & attractiveness of e-mobility through fast availability & transparency of charging capacities, leading to a reduction of emissions from combustion vehicles
5. The system implemented for providing & monitoring network capacity can help to secure the reliability of power supply in large cities
SOCIAL
- Possibility of faster charging, higher capacity & cost reduction
- Optimization of infrastructure & customer needs

IOT AS A KEY DRIVER FOR SUSTAINABILITY

ENVIRONMENTAL
- Flexibility of batteries & controlled charging
- Replacing combustion vehicles in the long term
- Reduction of emission and noise, consequently increase of air quality and quality of life

ECONOMICAL
- Rollout of charging infrastructure
- Measurement of impact and evaluation of availability of additional network reserves
- Planning of network capacities and related expansion

USE YOUR DATA. MAKE TOMORROW COUNT.
“With the City Graph, our partners Siemens Advanta Solution and Microsoft supported us to integrate multiple data sources in an efficient way and we were able to jointly build digital twins of our city district in a very short time frame.”

Roman Tobler, Manager at ASCR and Wiener Netze
Why is Siemens Advanta the best partner for this sort of project?

Benefit from our deep **Domain Knowledge**
Siemens Advanta’s City Graph data modelling supports developers in many ways to create custom domain models of any connected environment using Digital Twins.

Leverage us as a **One-Stop-Shop**
Siemens Advanta offers solutions to multi-faceted challenges all out of one hand. This reduces your project related risks and overall complexity.

Profit from our powerful **Ecosystem**
Siemens Advanta agnostically integrates across various platforms, drawing on an extensive, global partner network to deliver tangible business outcomes for your projects.