Digital Transformation of Energy Grids
envelio develops a software platform for distribution system operators based on innovative algorithms

Company profile

Founded in April 2017 as spin-off from RWTH Aachen University

Basis for IGP: 5 PhDs in grid planning and operation

60 employees (as of 01.04.2020)

Two financing rounds with High-Tech Gründerfonds (D), Demeter (F) & eCapital (D)

Our customers

WESTNETZ
e.dis
IBERDROLA
Netze BW
edp
ENEL
RNG Rheinische NETZgesellschaft
Stromnetz Hannover
EWE
Regionetz
LEITUNGSPARTNER
BEW 2000
Our team combines IT know-how and power system engineering excellence.
The Challenge
Distribution grids are the key for a successful energy transition

Millions of distributed generators and new consumers have to be integrated into the grid
Workflows and IT-systems at distribution grid operators are not ready for this challenge

- Isolated and inconsistent data silos
- Time consuming manual processes
- No integration of smart grid technologies
The Future
DSO 2.0:
The Digital Distribution System Operator

- Full transparency with digital grid models across all voltage levels
- Automation of grid planning and operation processes
- Complete integration of Smart Grid Technologies
Our Solution
The Intelligent Grid Platform

Digitization and Automation of Grid Planning and Operation Processes
The Intelligent Grid Platform (IGP) is a modular, flexible & digital DSO assistance system

- **IGP DataQuality**: Provide consistency and transparency for grid data by connecting and cleaning isolated data sources with machine learning algorithms.
- **IGP Planning**: Automate and accelerate essential processes and workflows of grid planners.
- **IGP Operation**: Support system managers with real-time information about current and future grid states.
The Intelligent Grid Platform is embedded seamlessly into existing DSO structures

- **DSO legacy systems**
  - GIS
  - ERP
  - SCADA-System

- **IGP Data Shippers**
  - Customized by envelio engineers

- **IGP Backend**
  - Machine Learning
  - Big Data Analytics
  - Optimization Algorithms

- **IGP Frontend**
  - Desktop
  - Tablets

- **Users at DSO**
  - Grid Planner
  - System Manager
  - Maintenance Staff
Reference Projects
Digiplan: Automation of connection requests for new distributed energy resources for e.dis

Challenge
- Evaluation of new connection requests for DER require significant effort by grid planners
- Too many new connection requests to answer them in time with current staff

envelio Solution
- Automatically evaluate new connection requests for DER with dedicated IGP application
- Implement a customer self service for connection requests on e.dis website

Customer Value
- Reduce internal resources required for data preparation and technical simulations
- Improve response times and service level for customers
Coordinate locations for new charging stations between municipalities, citizens and DSO for DigiKoo und Westnetz

Challenge

- Optimal positioning of EV charging points is affected by a variety of influencing factors
- Up to now decision making is not coordinated between all stakeholders (DSO, city etc.)

envelio Solution

- Integrate DigiKoo data layer with potential locations for charging points into IGP
- Automatically evaluate all gathered locations with dedicated IGP application

Customer Value

- Integrate DSO perspective into decision making for new charging station at municipalities
- Quickly identify cost-efficient locations requiring little grid expansion and road works
Create and evaluate scenarios for future supply tasks for Iberdrola

Challenge

- Integration of DER, EV and smart grid technologies will alter traditional planning procedures
- Creation of predefined and static future scenarios is no longer valid for grid planning

envelio Solution

- Generate a series of future scenarios for EV and PV penetration based on historical data
- Analyse & evaluate impact of future scenarios on the grid with dedicated IGP applications

Customer Value

- Create and evaluate future scenarios tailored to the own grid area
- Be prepared for changing supply tasks and the integration of smart grid technology

Main Apps

- Grid Data Inspector
- Grid Study

Grid Area

- 180 Primary Substations
- 20,000 MV/LV Substations
Research project ELBE: Flexible load management of charging points for electric vehicles

Challenge

• Increasing penetration of EV charging points can cause bottlenecks in the distribution grid
• Due to limited resources and lacking acceptance grid expansion should be avoided

envelio Solution

• Connect the IGP to measurement points in the field and to the Emobility Backend of SNH
• Determine grid state in real-time and give recommendations for load management

Customer Value

• Prevent grid expansion by intelligent load management of EV charging points
• Enable extensive roll-out and grid integration of charging infrastructure

Main Apps

Online Monitoring, Congestion Management

Grid Area

15 Primary Substations, 2,100 MV/LV Substations
Working with envelio
Our license-based business model enables an agile collaboration with our customers

- Software-as-a-Service or on-premise deployment
- Onboarding project to create interfaces to DSO data sources
- Extensive support service by envelio engineers
- Continuous agile development
- Automatic upgrades to new IGP versions
A pilot project gives the chance to experience the IGP functionalities

Onboarding (3-4 months)
- Selection of a suitable pilot grid
- Selection of provided IGP modules
- Development of interfaces to the data sources at the DSO by envelio
- Data import, processing and electrotechnical validation of the grid data
- Deployment of IGP at DSO

Pilot utilization (3-12 months)
- Utilization phase of the IGP with the requested modules in the pilot grid area
- Starting workshop to introduce IGP in detail to DSO employees
- Closing workshop to present results and discuss pilot project
- Discussion of potential long-term roll-out to a larger grid area
Digital Electricity Grids for the Energy Transition

For questions and further information please contact us:

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