CINELDI
Centre for intelligent electricity distribution
- to empower the future Smart Grid

Norwegian Centre for Environment-friendly Energy Research

Illustrations

Screenshot from GitLab

(Modelling of active measures)

Open-source code for planning of active distribution grids

PLAN_ADGrid (PLANning of Active Distribution Grids) is a Python open-source code package including optimization model for reinforcement planning of radial distribution grids considering active measures.

Challenge
Active distribution grid planning involves active measures (or operational measures) that entails a closer connection between grid planning and grid operation. In analysis of technical feasibility and socio-economic costs and benefits, it is important to capture the operational benefits and costs of active measures. The planning framework for active distribution grids developed in CINELDI provides guidelines and high-level work flows and methodology to achieve this. But concrete implementations (e.g. code) are needed to demonstrate active distribution grid planning for specific cases and specific examples of active measures.

Solution
A collaboration has been carried out between CINELDI and in-kind projects FuChar and FINE to demonstrate active distribution grid planning considering the active measures 1) reactive power provision from fast charging stations and 2) demand response from local energy communities. New methods are incorporated in the CINELDI planning framework and implemented in Python code, including: an optimization model for the reinforcement of voltage-constrained radial distribution grids, operational models for active measures based on fast charging stations and energy communities; functionality for socio-economic cost assessment; functionality for risk analysis of grid development plans.
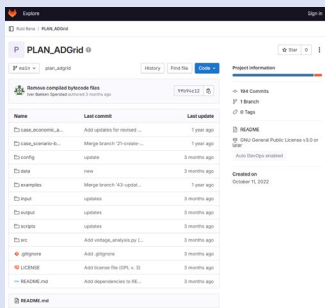
Potential
The code is already used for the research reported in two CINELDI publications, one FINE preprint, and it is being used and extended in a PhD study in the in-kind project FuChar and . The code can serve as a basis for further implementations of active distribution grid planning and is assessed to have medium innovation potential on short-to-medium term.
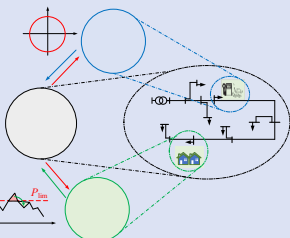
Reference in CINELDI
The code was made available to the public on GitLab through the following link:
https://gitlab.sintef.no/Rubi.Rana/plan_adgrid