PCDG

Positive Cities and Distribution Grids

PCDG v1.0 User Guide

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Trondheim, Saturday 17th April, 2021

1 Summary

Deployment of distributed generation technologies, especially solar photovoltaic, have turned regular consumers into active contributors to the local supply of electricity. This development along with the digitalisation of power distribution grids (smart grids) is setting the scene to a new paradigm: Peer to Peer (P2P) electricity trading and the emergence of local flexibility markets. Microgrids, small communities or individual buildings can become net positive producers. This has led to create multiple mathematical models and simulation environments to represent the interactions of positive buildings and distribution grids.

In this regard, Positive Cities and Distribution Grids (PCDG) mod provides a user friendly window to analyse:

- End-user benefits on engaging in P2P trade

- Role of battery storage

- Showcase and quantify P2P trade benefits among buildings

- Analyse the overall benefit for the community

In short, with PCDG, you can analyze your neighborhood's electricity trade, as well as investigate the economic benefits of investing in renewable power generation for your home. To use this app, you need some data from your neighborhood, specifically the electrical demand of each house over a time period and the electricity price in this period. Additionally, you can specify if any houses have installed solar panels or wind turbines as well as their electricity generation in the period. Batteries may also be included.

The model is based on the optimization model developed in **"Local electricity market designs for peer-to-peer trading: The role of battery flexibility „A Lüth, JM Zepter, Pedro Crespo del Grenado, R Egging Applied Energy 229, 1233-1243.**

This document serves as an user guide for the PCDG application. Each chapter will cover the features present in each of the tabs in the application.