

## Decentralized digital heating as a flexibility provider

### Northeast Flow Oy

#### Challenge

As we all probably already know, the consumption and production should be balanced in a modern electric grid. Estimating consumption can already be a challenge by its own, but the increase in intermittent renewable energy like wind and solar further complicates balancing. This calls for innovation in many areas of the electricity markets & its ancillary services, demand side response being one of them.

Electric heating, although *mostly* seasonal, provides an exceptionally well flexible load from the grids' point of view. Buildings itself store heat well, and short pauses in heating with a duration of minutes or even hours have next to no effect for the living conditions, thus being able to go unnoticed.

#### Proposed Solution

Northeast Flow (further NEF) is using computing power locally in places with a need for heat. This doesn't necessarily increase the total energy consumption. In our vision we have a large number of computing sites over a large geographical area and are able to provide customers comfort while also helping the grid to stay in balance.

NEF currently leverages bitcoin-mining due to its location-agnostic properties in building a decentralized data center that uses the by-product of computing, heat, to provide buildings comfortable inside temperatures during cold times. We are able to reduce the use of oil, gas and coal and thus even reduce the absolute CO<sub>2</sub>-emissions. The service-oriented business model also provides an unique opportunity for our heating customers to join in the flexibility markets.

As a result in this project we expect to have a functionality to control our computing units according to grids' needs, while at the respecting the parameters of the building. We are also looking to gain more understanding and knowledge about the flexibility/electricity markets in general.

#### Company description

Northeast Flow provides intelligent heating as a service. The heat is produced and distributed locally at a site using excess heat of computing, so the same energy is used for two purposes, resulting in a double benefit. Currently NEF has one technical pilot and three commercial pilots running in different locations around Southern Finland. The sites consist of commercial buildings and one residential building. NEF also reports its clients about monetary & carbon savings and is developing its concept further.