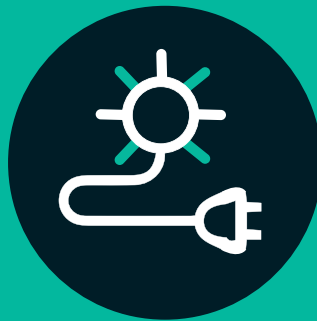


FED

FOSSIL-FREE ENERGY DISTRICTS



POLICY RECOMMENDATIONS

AN URBAN INNOVATIVE ACTION

Urban Innovative Actions (UIA) is an initiative of the European Union that provides urban areas throughout Europe with resources to test new and unproven solutions to address urban challenges.

Approximately 359 million people – 72% of the total EU population – live in cities, towns and suburbs. Urban areas face multiple and interconnected challenges related to issues like employment, migration, demography, water and soil pollution. But they are also engines of new ideas and solutions, dynamic places where changes happen on a large scale and at a fast pace. To address the increasingly complex challenges they face, urban authorities need to go beyond traditional policies and services - they need to be bold and innovative.

The Fossil-free Energy Districts (FED) project is an innovative effort by the City of Gothenburg, Sweden, to decrease the use of energy and the dependence on fossil fuels in a built environment.

Financed by the UIA the FED-testbed, situated on the Campus of Chalmers University of Technology in Gothenburg, has been developed from 2017 - 2019. The total project budget is 5,8 M euro.



FOSSIL-FREE ENERGY DISTRICTS

By balancing the urgent need for energy transition with an ever-increasing energy demand, the FED project aims to play a key role in creating fossil free cities in Europe.

FED has established a district scale innovative demonstrator of a local energy marketplace, uniquely integrating electricity, district heating and district cooling. In line with the aims of the Energy Union and EU energy targets, FED enables a fossil-free and secure supply of energy as well as long-term business models for a future energy market with higher use of sustainable energy sources.

A STRONG PARTNERSHIP

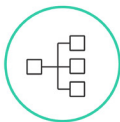
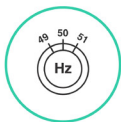
Nine strong partners have collaborated closely and contributed with their expertise and knowledge to make FED attractive for other European cities as well.

The City of Gothenburg, Johanneberg Science Park, Göteborg Energi, Business Region Göteborg, Ericsson, RISE Research Institutes of Sweden, Akademiska Hus, Chalmersfastigheter and Chalmers University of Technology.

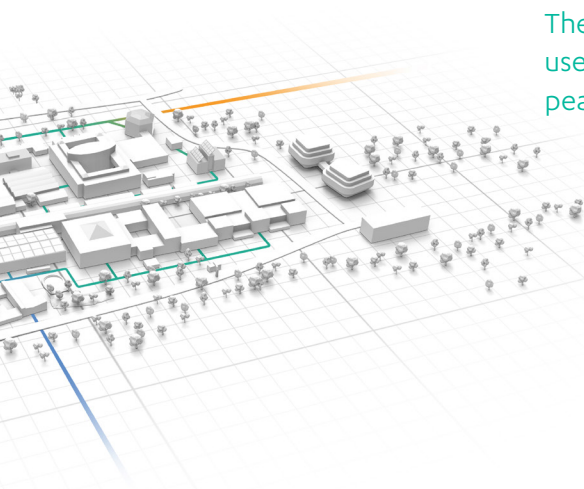


FED develops a local IoT-based marketplace for electricity, heating and cooling.

FED connects over 50 entities (consumers, producers, prosumers and storages) throughout the testbed area.



The AI-agents of FED are programmed to use energy efficiently to avoid fossil fuel peaks on the grid.



○ HEAT
○ COLD
○ ELECTRICITY

FED optimises the use of energy storage.



City of
Gothenburg



Göteborg Energi



Johanneberg
Science Park

RI
SE

FED - FOSSIL-FREE ENERGY DISTRICTS



EUROPEAN UNION
Economic Regeneration Development Fund



AKADEMISKA HUS



BUSINESS REGION
GÖTEBORG



CHALMERSFASTIGHETER



ERICSSON

CHALMERS
UNIVERSITY OF TECHNOLOGY

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FIVE POLICY RECOMMENDATIONS

The FED project has developed five regulatory and policy recommendations supporting the transition into low/no-carbon local energy systems and markets. The aim is to influence regulatory bodies and policymakers to make necessary adjustments in order to enable realisation of local integrated energy systems.

1. Strive for **social acceptance**
2. **Direct investments** towards **replication of FED** through the European Investment Bank and the cities and **direct incentives** towards cities in order to **reduce CO₂ emissions**
3. Define the role of the **city/municipality** in decision making processes and **local energy plans**
4. Enable the DSO to **trade with flexibility**
5. Enable the possibility to **test, make demos and proof of concepts** in several places

1. STRIVE FOR SOCIAL ACCEPTANCE

Problem

- A lack of knowledge and understanding of local energy markets – how they would work and the benefits they could create.
- Social acceptance is necessary for successful implementation of new technical solutions and the achievement of changed behaviours.
- Local energy markets can contribute to a more effective use of energy and an energy system with less environmental impact.

Implementation gap

- Regulations to establish a local energy market are missing.
- Possibilities to trade with multiple energy carriers are limited today.
- Incentives to implement an energy communities are lacking.

Policy

- Local and national authorities need to produce material for information and educational purposes.
- Conduct information campaigns clearly expressing the possibilities with local energy communities.
- The member states within the EU should implement regulations according to Article 16 in the Clean Energy Proposal.
- Promoting local energy markets and the creation of energy communities.
- Deliver proof of concept of local energy communities, similar to FED which can be replicated to other cities within the EU.



2. DIRECT INVESTMENTS AND INCENTIVES

Problem

- Cities in Europe are emitting too much CO₂.
- A large share of real estate heating in Europe is individual and consists of fossil fuels as natural gas and coal. These real estates are not a part of the system trading in CO₂ emission rights.

Implementation gap

- A lack of financial instruments for the cities in Europe to invest in solutions similar to FED, aiming at decreasing CO₂ emissions.
- Large financial differences between the heating of larger systems compared to individual heating (individual solutions cheaper, not included in the emission rights system).

Policy

- Direct investments through the European Investment Bank (EIB) and local cities to enable solutions similar to FED.
- Design incentives to cities, which are obtained when CO₂ emissions are decreased.

3. DEFINE THE ROLE OF THE MUNICIPALITY

Problem

- There is a built-in conflict between the goal of creating solutions which benefit the whole and the aim to optimise locally.

Implementation gap

- The municipalities are lacking tools to ensure that local energy communities actually contribute to a robust energy system.

Policy

- Give the cities/municipalities possibilities to influence the design and localisation of local energy communities, so that the overall situation is taken into account.
- Facilitate collaboration between the different stakeholders in the city.

4. ENABLE TRADING WITH FLEXIBILITY

Problem

- There is no flexibility on the energy market today, which is a hindrance to increase the amount of renewable energy and contribute to a fossil-free energy society.

Implementation gap

- A clear set of regulations to enable the realisation of flexibility is lacking.
- The roles for the different stakeholders on the electricity market need to be clarified and there are no incentives to push to increase energy efficiency.

Policy

- Design a set of regulations and incentives for the trade with flexibility services together with stakeholders on the heating market.
- Allow new tariffs and pricing models to enable the use of flexibility services.
- Adapt legislation to new conditions for local energy markets where flexibility will become an important part for the creation of an energy community:
 - Change the Electricity Act in regards to the regulation of the grid in Sweden, allowing for DSO to purchase energy services and including the costs within the revenue framework.
 - Implement exemptions from the concession, as IKN, for local electricity markets.

5. ENABLE TESTING, DEMOS AND PROOF OF CONCEPTS

Problem

Complex system solutions similar to the market solution of FED can be difficult to understand both for potential stakeholders and decision makers because:

- The solutions are comprised of multiple stakeholders.
- They, to a certain extent, aim to solve problems which currently are not perceived as problems by many of the stakeholders.

Implementation gap

- Solutions such as FED need to be made visible to a larger extent.
- There are too few large scale demos.

Policy

- Create conditions for new business models for flexibility services with multiple energy carriers by allowing exemptions from current regulations in selected demo projects, on district or city level.
- Enable demos via financing through national and international programs.