



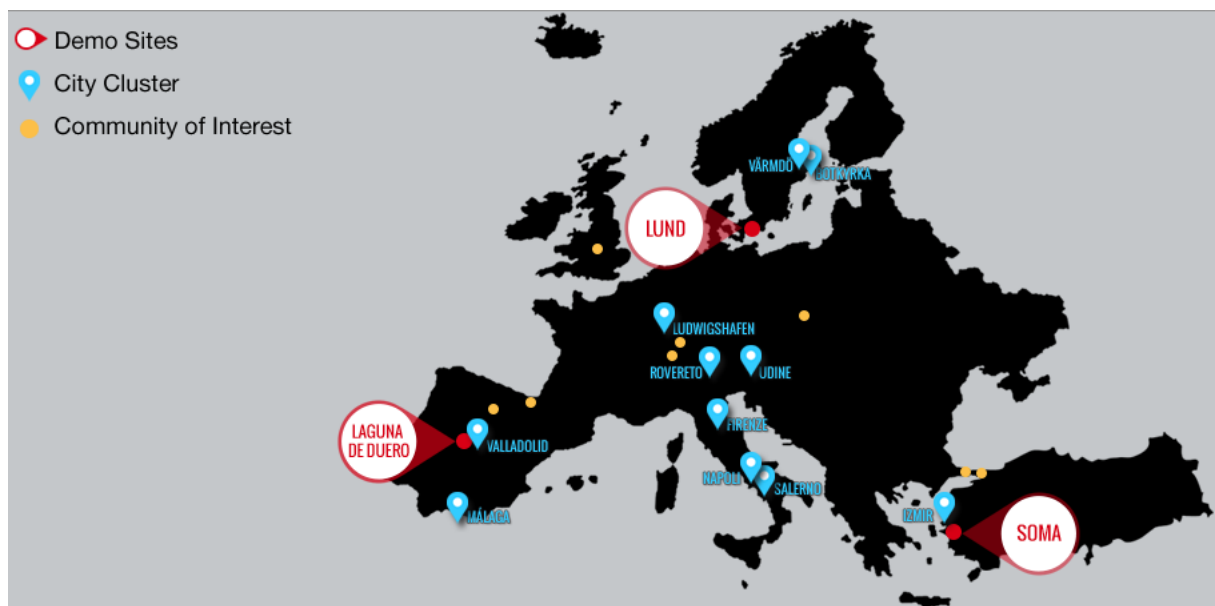
# City of Lund



## CITYFiED

The CITYFiED project aims to develop a replicable, systemic and integrated strategy to adapt European cities into the smart city of the future, focusing on reducing the energy demand and GHG emissions and increasing the use of renewable energy sources by developing and implementing innovative technologies and methodologies for building renovation, smart grid and district heating networks and their interfaces with ICTs. The project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under Grant Agreement No 609129.

Laguna de Duero (Valladolid), Lund and Soma are a set of cities, strategically located around Europe, which represent a variety of demonstrative scenarios of city level refurbishment in terms of district and building typologies, ownership models, district heating and cooling schemes and technological solutions for low voltage electricity distributed generation.



These cities will address a holistic intervention of district renovation, in line with the pillars of the project objectives (large scale demonstration, maximization of the replication potential, development of innovative and cost effective methodologies, dissemination). All of the main technological aspects (retrofitting of buildings, district heating facility and distributed low voltage generation) will be addressed by means of a systemic approach in each city, in order to achieve significant energy savings, very low energy buildings and very low CO2 emissions. Each location has its own entity with respect to the demonstration capability, because the

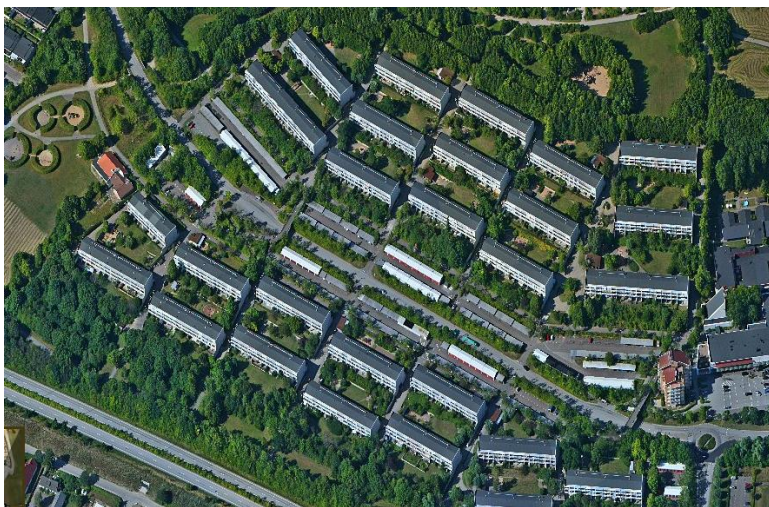
foreseen interventions will be in depth, covering ambitious energy targets and providing very high replication potential.

## Scope

- More 70 kWh/m<sup>2</sup>yr of energy savings
- A reduction of at least 13,000 tons in CO<sub>2</sub> emissions will be achieved through the retrofitting of 2,300 dwellings
- More than 7,200 citizens involved in the demo sites
- A sound and feasible replication plan, which will be virtually tested in 11 representative European cities
- A network of 40 European cities involved in knowledge transfer and information exchange to support the replication potential of the renovation model
- Training and technology transfer for future users of the retrofitted demo sites for new business potential and the generation of new employment
- Increased social awareness and acceptance towards energy savings and future city renovation projects

## Demo site Lund

Lund is a medium-sized university city with a research-intensive industry. The town dates back a thousand years, but the number of inhabitants has grown largely during the last century and a great stock of the buildings from the 1960s and 1970s now needs retrofitting. Almost 90% of the heat demand in the city is supplied by district heating, and the hospital and some office buildings are connected to a district cooling network.



The Linero district is a housing area where the blocks Eddan and Havamal consist of 28 three-level dwellings built in early 1970s. Today they contain a total of 681 apartments with approximately 2000 tenants. They are owned by the public housing company *Lunds Kommuns*

*Fastighets (LKF) AB*. Only 16 of the 28 buildings are including in the CITYFiED projects 40400 m<sup>2</sup> (conditioned area). The retrofitting of Linero district will focus on reaching a higher energy standard with maintained affordability for the tenants.

### Setting an ambitious pace

+30, 8% total energy savings

-19% primary energy use

-26% greenhouse gas emissions

Demo-site teams in Lund have hit the road running to achieve some significant milestones since CITYFiED began in April 2014.

During the first part of the project, simulations of the energy efficiency measures included in the retrofitting strategy have been carried out. Simulations showed that original energy savings targets cannot only be accomplished – but have even been revised upwards.

After some positive first round of analysis, total energy savings in Linero have been calculated at approximately 52 kWh/m<sup>2</sup>/year, potentially even higher than the original target 30.8 %. Primary energy savings at the site have been established at 19 % and greenhouse gas emissions will be reduced by 26 %, using 2016 conversion factors.

Four indicators for indoor environmental quality in the buildings were analysed: operative temperature, relative humidity, CO<sub>2</sub> levels and the PPD index to measure ambient climate dissatisfaction. None of the indicators show critical levels in the current buildings and no negative effect have been observed from calculations of the renovation measures.

At the heart of reaching these performance targets is the efficiency of an extensive renovation strategy. From replacement windows and balconies, to presence controlled LED lighting in the stairwells, the actions being taken within CITYFiED are meticulously researched and planned.

Numerous full-scale concept solutions to complement structural advantages will include smart grid monitoring initiatives - with visualization tools and demand responsive meters – solar panels, fast charge points for electric vehicles and smart district heating controls.

### **A local partnership approach that delivers: co-operation in Lund**

Four Swedish partners are working to ensure Linero is a close to zero energy-district. On site and behind the scenes, bring the different skills of energy company Kraftringen, public housing company, LKF, Swedish environmental research institute, IVL and the City of Lund together effectively is important to safeguard the systemic approach that characterizes the project.

### **Laguna de duero - Spain**

The Torrelago district demo site involves 31 private multi-property residential buildings, each consisting of 12 floors and apartments. The buildings were built between 1977 and 1981. The

retrofitting will take place in two phases covering 12 and 19 buildings respectively and involving over 4,000 residents.

### **Soma - Turkey**

The pilot demonstrator district consists of a total gross area of 64,971m<sup>2</sup>, including 41,158 m<sup>2</sup> which comprises involved in the demonstration. The buildings are owned by SOMA Electricity Generation & Trading Joint Stock Company (SEAS) and were built in 1982. The demo site involves approximately 1,500 - 2,000 residents.

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