Covenant of Mayors for Climate & Energy EUROPE

CASE STUDY

COUNTRY	CITY	POPULATION	LAST REPORTED EMISSIONS	MITIGATION OBJECTIVE
CROATIA	ZAGREB	806,341	2,930,000 TCO_2 (BUILDING, TRAFFIC, AND PUBLIC LIGHTING SECTORS, 2015)	-40% BY 2030 (BASELINE YEAR: 2008)

The City of Zagreb fights energy poverty through a University teaching programme

In 2018, the City of Zagreb set up a multi-stakeholder partnership to fight energy poverty in an integrated manner: delivering positive social outcomes while reducing energy consumption and contributing to the city's greenhouse gas reduction target of 40% by 2030. To do so, it partnered with the Faculty of Electrical Engineering and Computing at the University of Zagreb, and with the Croatian civil society organisation DOOR (Society for Sustainable Development Design), to initiate the 'Fair (FER) solutions for a better community' project. The project involved DOOR training students to carry out simple energy audits and implement low-cost energy improvements in energy-poor households in Zagreb. With a total amount of kn1,167,759.73 (around €156,000), the project was funded through the European Social Fund and Croatian state budget via the Government Office for NGOs.

As per the Baseline Emissions Inventory carried out in 2008, and the Monitoring Inventory of 2015, the building sector accounted for more than 66% of the energy consumed in the city, and accordingly was among the largest contributors to emissions, followed by the transport sector. In this context, the building sector is a key area of focus of the city's climate action plan.

Engaging students to tackle energy poverty

The project focused on engaging students to help vulnerable households reduce energy consumption, while developing their skills as part of a university programme. The project had multiple objectives: mapping energy-poor households in Zagreb, implementing low-cost energy-efficiency measures, and providing advice on how to reduce energy use. During an initial mapping and training phase, a group comprising fifteen students, researchers and university teachers was trained by experts to carry out social field research and energy audits, as the topic of energy poverty was not part of the engineering curriculum at the time the project started. The city council identified vulnerable households to target and solicited statements of interest from them for participation in the project. Students conducted field visits to carry out simple, low-cost energy efficiency interventions and gather data through surveys.

In the timeframe of two years, 102 household visits resulted in improved living conditions via simple low-cost energy-efficiency measures such as energy-efficient LED bulbs, draught-proofing of windows and doors, water-saving aerators, timers for electric boilers, etc. that were installed by students at no cost. Using standard calculations, these measures can save households around 200 $kgCO_2$/year, and more than 1200 kWh/year in electricity and heat. The students also advised households on the most cost-efficient and energy-saving measures, based on a model for wall-retrofitting investments developed as part of the programme. The model showed wall-retrofitting investments with external thermal insulation to be cost-effective for 40.3% to 58.1% of households (depending on heating systems and wall materials) with a payback period of under 10 years, and with other ancillary benefits such as improved human health due to better living conditions.

The social benefits of energy efficient housing

These social benefits were complemented by insights from the household survey that allowed researchers to get a picture of energy poverty in Zagreb. The data analysis revealed that most of the households visited live in buildings without any thermal insulation, a significant percentage of which are heated with electricity. This confirmed that a significant percentage of citizens live in low-energy-efficient dwellings, with reduced heating during winter and with draught and mould problems. In terms of demographics, the energy-poor households visited consisted mainly of elderly people, people with disabilities, and users of various social services. With regard to their occupation status, the two most-represented groups were retirees and the unemployed. Another key finding confirmed that the main conditions for energy poverty were present in most households: low household income, high energy prices and inefficient dwellings.

On top of providing increased visibility for this topic, the project has provided educational benefits for current and future students, integrating energy poverty into the university curriculum. Teaching students to carry out simple energy audits and implement field research methods, and improving the transfer of knowledge and skills by university staff will help engineering students become change agents for a fair energy transition.