

## FACTSHEET

LOW  
ENERGY  
DISTRICT

Cologne

## Climate shell refurbishment

PART OF SMART SOLUTION 1: EFFICIENT AND SMART  
CLIMATE SHELL REFURBISHMENT



Example after refurbishing

- More efficient energy use thanks to networked devices and installations and the possibility to create automatic workflows
- Up to 60 % less greenhouse gas emissions and reduction in primary energy by up to 70%
- Reduction in costs for heating and warm water thanks to usage of photovoltaic electricity for the heat pumps

### Technical partners:

- RheinEnergie: [c.remacl@rheinenergie.com](mailto:c.remacl@rheinenergie.com)
- Dewog: [a.esser@dewog.de](mailto:a.esser@dewog.de)



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## What is the solution?

DEWOG will insulate the building's facade, basement ceiling and roof as well as installing triple glazed windows in some buildings. In the third construction stage, new insulation technology will be trialled.

DEWOG will install modern heat-pumps in all buildings in combination with district heating delivered by RheinEnergie. High efficiency circulation pumps will be used for the heating system. Lifts with energy recovery will help create large savings through the use of new energy efficient technologies. The current staircase lighting will be replaced with LED lamps. All these measures combined will help to reduce energy usage and therefore save emissions.

In order to achieve the goal of an efficient and smart climate shell refurbishment, RheinEnergie will install a self-regulating decentralised energy management system for each building (PV, heat-pumps, district heating and storage).

## How does it work?

The insulation allows the heat to stay in the apartments better. That means that tenants do not need to use so much heating. In addition, the efficient LED staircase lighting will reduce electricity consumption in communal spaces.

The decentralised management system (Siedlungsmanagement) is going to be



placed in every building to monitor the electricity and heat production. It is connected with the "virtual power plant" from RheinEnergie on the automation level.

The data for the management systems comes from the building devices (through the PLC, or programmable logic controller) which are connected.

The PLC collects a lot of data, for example the switching on/off of the heating pumps, the water pressure or the flow and return temperature. With the data the PLC can coordinate and execute complex processes. It acts as a basic control, which is subordinated to the Siedlungsmanagement software.

This system ensures that the plants (for example heat pumps) continue to work independently in the event of a communication breakdown with the virtual power plant.

## Expected impact

Positive impacts of this solution include:

- Reduced green gas emission
- Reduced primary energy consumption
- Reduced heating costs
- Reduced public electricity consumption

## Potential for replication

If efficient and smart climate shell refurbishment achieves its expected results, it has good replication potential. The refurbishment must anyway be done because of the climate objectives which must be fulfilled until 2025.

