

# PRESS RELEASE

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## New Project to Replace Gas and Oil Heating Systems in Multi-Family Buildings with Propane Heat Pumps

**In the new project "LC R290 - Low Charge Heat Pump Solutions", the Fraunhofer Institute for Solar Energy Systems ISE plans to develop easy-to-use solutions that can be propagated to replace gas and oil heating systems in existing multi-family houses. One area of focus is single-story heating systems, in which heat pumps that rely on the natural and climate-friendly refrigerant propane (R290) are to be used. For the practical and rapid implementation of the propane-based heat pump systems, Fraunhofer ISE has founded a project consortium with companies from the heating sector and the housing industry.**

"We need standardized heat pump solutions for the housing industry to replace gas and oil heating systems for all applications. Propane has become a recognized refrigerant for the heat pump industry and is now widely used for heat pumps installed outdoors. What we need now are solutions that can be easily implemented indoors as well," explains Dr. Ing. Lena Schnabel, Head of the Department of Heating and Refrigeration at Fraunhofer ISE. The new joint project with a budget of 7 million euros, which is funded by the German Federal Ministry of Economic Affairs and Climate Action, is intended to close this gap.

### Solutions for Three Fields of Application

Supported by the heating and housing industries, Fraunhofer ISE aims to develop solutions for the following three fields of heat pump application: single-story heating systems, central heating systems installed inside and outdoor heat pumps in higher performance classes.

If propane-based heat pumps are to be used as a replacement for single-story gas heating systems or gas and oil-based central heating systems in the basement, special safety requirements would have to be observed for filling volumes above 150 grams. Already, the Fraunhofer ISE project team has demonstrated that a heating capacity of 7 to 10 kilowatts can be achieved with less than 150 grams of the refrigerant propane in the "LC150" project. This result is the basis for their implementation in a single-story heating concept, in which suitable storage and sources are also being developed as part of the project. Solutions for the connection to the hydraulic and source systems as well as suitable controls are being developed and demonstrated in the laboratory with the support of heat pump manufacturers and the housing industry.

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To replace the central heating system located in the basement, heat pumps with a higher capacity are to be developed. Also here, the results from the "LC150" project will be used to transfer the refrigerant reduction to larger capacities. In addition, concepts for the interconnection and control of several heat pumps will be investigated and widely implementable safety concepts will be identified and tested. Outdoor heat pump systems with higher capacities are also optimized with a focus on refrigerant reduction, optimized defrosting and evaluations by standardized safety tests. The aim is to be able to implement larger outputs with the same footprint and safety zone through refrigerant reduction and improved defrosting, thus facilitating the installation of these systems in urban areas.

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**Platform for Rapid Conversion from Lab to Fab**

For the development, Fraunhofer ISE has chosen a platform project that is accompanied by an advisory board. This allows for broadly supported solutions to be achieved at high speed. The manufacturers can incorporate these solutions into their own product development or continue to work in cooperative ventures. The higher production quantities that are possible as a result offer significant cost reduction potential and can open up further synergies and increase the competitiveness of the manufacturers.

"The LC150 project has shown that working within a platform provides great motivation for suppliers to perform their own services and specific adaptations. Furthermore, the project provides the partners with networking opportunities and enables standardization and market readiness activities, which are often time-consuming and financially expensive, to be bundled," explains project leader Dr. Katharina Morawiec. The participating companies will have access to all project and measurement results during the project period, as well as indirect use of the test facilities and the experience of Fraunhofer ISE in dealing with propane. Ideally, the development advantage for the participating manufacturers is additionally secured by industrial property rights (patents, utility models, design protection).

Since system solutions will be developed in this project, the housing industry will also be involved as a partner. They bring their concrete boundary conditions and preferences directly into the development and participate in adapted system solutions. The direct communication between several heat pump manufacturers and the housing industry allows solutions to be developed in a practical manner and thus implemented more quickly, which accelerates the overall ramp-up to higher unit numbers.



Knowledge on refrigerant charge reduction gained from the LC150 project will be transferred to systems with larger capacity in the new project. © Fraunhofer ISE

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