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## The COOLSUN triple-technology approach to reach high solar fractions for space heating, space cooling and domestic hot water

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### Abstract

Within the framework of the COOLSUN project a triple-technology approach to reach high solar fractions for space heating, space cooling and domestic hot water preparation is being developed. The three core components are a thermo fluid with a low environmental impact and a boiling point above 200 °C, a high efficient adsorption chiller, and an advanced controller. System simulations modelling the transient behaviour of the entire application, i.e. building, hot water preparation and space heating/cooling, show that for Mediterranean locations the solar fraction reaches values up to 100 %; and even in Central Europe remarkable energy savings can be reached. The first prototype of the system is installed since spring 2013 in a building and monitored under real operation conditions.

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*Keywords:* Solar cooling; solar heating; triple approach; adsorption chiller; 100 % solar fraction

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### 1. Introduction

For further reduction of the primary energy demand, which is required in households for space heating, space cooling and domestic hot water preparation, several technological possibilities are already available. Using solar

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