

Supercritical CO₂ tri-generation system powered by hybrid solar biomass energy

Dr Jie Zhu
The University of Nottingham

Horizon Europe Matchmaking Event
Energy Research

19 October, 2021.

The University of Nottingham

The University of Nottingham is a research-led University in the UK. It has the largest number of top-rated (by Higher Education Funding Council) Departments in UK Universities for research following Cambridge, Oxford and London Universities. It is the home of many ground breaking discoveries and inventions such as magnetic resonance imaging, and is also ranked among top 10 UK Universities for research grant income.

The Department of Architecture and Built Environment (DABE) at the University of Nottingham, has a worldwide reputation for its innovative research into low energy buildings and sustainable energy technologies. The DABE has extensive research facilities including the Sustainable Research Building and Centre for Renewable Energy, as well as several laboratories equipped with state-of-the-art facilities for research into solar thermal energy technology, ventilation, passive cooling, solar/wind/ground energy systems, absorption technology and heat pump systems. These facilities will form part of the demonstration infrastructure.

Expertise

Dr Zhu research expertise is in applied thermodynamics, heat transfer, refrigeration, heat pumps, sustainable/renewable energy technologies and energy efficiency technology, and has published 95 journal and conference papers.

Dr Zhu has been involved in more than fifteen research projects funded by EU, UK EPSRC, Carbon Trust, the Royal Society and industry. He has been awarded an EU research funding (FP7-IIF 298340) which aims to develop an innovative tri-generation system for building application, and an international collaboration funding (IE150678) by the Royal Society. Recently as one partner for EU H2020 NFRP-2019-2020 (No 945234) project, he is responsible for modelling of turbulent heat and mass transfer. His work has had on the primary aim at reducing CO₂ emissions in the building sector.

Supercritical CO₂ tri-generation system powered by hybrid solar biomass energy

Cost-effective micro-CHP and hybrid heating systems with Topic ID: HORIZON-CL5-2021-D3-03-08

<https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl5-2021-d3-03-08>

The project aims to develop a novel tri-generation system powered by solar biomass energy to produce electricity, heating and cooling, and assess its energy performance, economic and environmental impacts.

Innovative features:

- a) Compact size suitable for domestic application
- b) High efficient supercritical CO₂ electricity generation with less internal power consumption
- c) Small compressor with low inlet temperature
- d) Saving solar storage cost with biomass boiler
- e) Dual benefits with three-way heat exchanger
- f) Double heat recovery with less input energy

Contact details

Dr Jie Zhu
Lecturer in Sustainable Energy Technology
Department of Architecture and Built Environment
The University of Nottingham
University Park, Nottingham
NG7 2RD, UK
Email: jie.zhu@Nottingham.ac.uk
Tel: +44 115 8466141
