

LGP2ES PRESENTATION

Laboratoire de Génie des Procédés pour l'Environnement,
l'Energie et la Santé (LGP2ES - EA21)

IEA SHC MEETING

Paris, 21 - 22 March 2013

le cnam



ESIEE
PARIS



INTRODUCTION

[LGP2ES energy team activities on solar systems](#)

- System: optimisation, integration, LCA, heat pump, CHP, hybridation, etc.
- Component improvement: heat/mass transfer intensification, etc.
- Both compression and sorption based systems

[Involved staff](#)

- 7 researchers (3 Prof., 3 Ass. Prof., 1 Emeritus Prof.)
- Post-doc/Ph. D: 2 (+2 in 2014)
- Engineers: 4

[In-house academic Partnership](#)

- ESYCOM (ESIEE, UMLV, CNAM laboratory): electronics, control design, sensors, etc.

[Industrial Partnership](#)

- System/component: CIAT, CARRIER, CRISTOPIA, DANFOSS, ZAE-BAYERN, ATISYS CONCEPT, ...
- Energy company: EDF, GDF-SUEZ, CLIMESPACE, DALKIA, ...

MAIN INTERETS IN THE NEW TASK

Subtask A: COMPONENTS, SYSTEMS & QUALITY

- Sorption/compression system design
- Thermal storage: strategy (time scale ?), heating or cooling storage
- Integration / hybrid energy conversion system (CHP, μ -CHP, fired with gas or bio-gas)

Subtask B: CONTROL, SIMULATION and DESIGN

- Control strategy/Sensors for PV/ST systems
- Multi-scale simulation: from component to whole system
- Optimisation (exergy/economy/environment)

Subtask C: TESTING AND DEMONSTRATION PROJECTS

- Monitoring procedure
- Data analysis

ONGOING PROJECTS

[Project ECOSS: Compact Evaporator for Sorption System](#)

- Partners: LGP2ES (coord.), CETHIL (INSA Lyon), LOCIE (University of Savoie - INES), CARRIER
- 2 technologies: boiling or falling film with compact HX (plate evaporator)
- Multi-scale experimental approach: from fundamental phenomenon to prototype

[Project ACLIRSYS: Advanced Control Command Innovative Refrigeration Systems](#)

- Partners: LCIS (coord.), LGP2ES, LAGEP, CIAT, CRISTOPIA, DANFOSS, CMDL MANASLU
- New control command approach for low-energy building using storage
- Experimental and numerical approaches

[Adsorber design/Heat and mass transfer intensification](#)

- Development of a non-dimensional model for adsorber design
- Trade-off between transfer intensification and thermal inertia increase
- Specific cooling power (kW/kg and/or kW/m³) as criterion

NEW R&D PROJECTS

EFFICACITY (IEED)

- French Government initiative on low-energy city
- Industrial (EDF, GDF, etc.) and academic partnership
- Work package on waste heat use and decentralized energy production
- District scale: heating/cooling network, hybrid energy conversion systems, etc.
- Solar systems could play a role in the considered technology portfolio
- Similar objectives: design improvement, storage, control strategy, etc.

MID-TERM INTERESTS

- Solar assisted cooling and desalination
- Solar assisted CHP, hybrid system
- Dedicated control/sensors
- Building/district scale

INPUT/RESPONSIBILITIES

Subtask A: COMPONENTS, SYSTEMS & QUALITY

- D-A1: Reference system
- D-A3/A5: State of the art on sorption and compression heat pumps, thermal storage
- D-A6: Energy/exergy analysis, optimisation tool

Subtask B: CONTROL, SIMULATION and DESIGN

- D-B1: Optimised control strategies, sensors
- D-B2/B3: Model development at component and system scale including LCA aspects
- D-B4/B5: Technical report

Subtask C: TESTING AND DEMONSTRATION PROJECTS

- D-C1: Monitoring procedure
- D-C3/C4/C6: Participation to the technical reports