ClimACT – Acting for the transition to a low carbon economy in schools – development of support tools

University of Seville (USE)

Spain

O Programa Interreg Sudoe está cofinanciado pelo Fundo Europeu de Desenvolvimento Regional (FEDER)

Session I: Introduction of the team

University of Seville (USE). Spain

·Public education institution - http://www.us.es

·Extensive university community:

-More than 70,000 students
-4,400 professors
-and 2,400 service and administrative professionals

·Breakdown of the institution:

Centres:		**Studies:**		**R&D (2014):**	
University Centres/Schools:	26	Degrees offered:	67	Research Staff in Training:	354
Associated Centres:	6	Official Master programs:	79	Contracted Staff (Research Projects):	803
University Departments:	132	PhD. Programs:	152	Doctoral contracts:	2468
Other Centres:	3	Postgraduate Studies:	281	Postdoctoral Contracts:	92
				Annual contracts with companies:	497
				Annual Budget with private companies:	25 mill €
				Excellence Projects Granted (Andalusian government):	47
				Research Projects Granted (Spanish government):	196
				International Actions Granted:	21
				Industrial and Intellectual Property registrations (2014):	59

USE activities are performed by more **than 400 research groups**, and **7,500 yearly scientific publications** with international impact.

Session I: Introduction of the team

University of Seville (USE)
ClimACT-USE Research group:

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JOAQUÍN RAMÍREZ -
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Multidisciplinary group in:

Energy Engineering
Architecture and Building construction
Chemistry
Materials Engineering
Physics

Session I: Introduction of the team

Background & Current research fields

THERMAL ENERGY STORAGE (TES) → *Low-temperature TES for buildings*; *High-temperature TES for solar power plants*

CO_2 CAPTURE → *Calcium Looping technology*

RENEWABLE ENERGIES → *Energy from biomass*; *Thermosolar technology development*; *Microgeneration - Small-scale ORC system*

DISTRICT HEATING AND COOLING → *Hybrid Solar and Biomass DH systems*

ENERGY EFFICIENCY IN BUILDINGS → *Low-Carbon Energy Measures in Buildings*; *Energy Audits - Energy Retrofitting - Building Refurbishment*

NEW MATERIALS → BIOSIC (silicon carbide from wood precursor)

MONITORING AND DIAGNOSIS OF CIVIL INFRASTRUCTURE AND THERMAL SYSTEMS

Session I: Introduction of the team

Background & Current research fields

THERMAL ENERGY STORAGE (TES)
- *Low-temperature TES for buildings*
- *High-temperature TES for solar power plants*

Project (2015-17): Thermochemical Storage for Concentrated Solar Power Plants

CO_2 CAPTURE → *Calcium Looping technology*

RENEWABLE ENERGIES
- *Energy from biomass*
- *Thermosolar technology development*
- *Microgeneration - Small-scale ORC system*

Project (2013-15): Small-scale microcogeneration system based on ORC for solar and biomass sources

DISTRICT HEATING AND COOLING → *Hybrid Solar and Biomass DH systems*

Project (2015-16): Integration of low-carbon economy (LCE) in Urban Solid Waste Plant

ENERGY EFFICIENCY IN BUILDINGS
- *Low-Carbon Energy Measures in Buildings*
- *Energy Audits - Energy Retrofitting - Building Refurbishment*

Project (2013-14): (Re)Programa. Renovation and sustainable management of the Andalusian building stock

NEW MATERIALS → BIOSIC (silicon carbide from wood precursor)

Project (2014-16): Bio-Ceramic filters for Diesel Particulate Engines

MONITORING AND DIAGNOSIS OF CIVIL INFRASTRUCTURE AND SYSTEMS

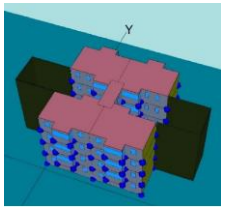
Project (2013-15): New technologies based on composite materials for civil structures

Project (2010-13): Development and implementation of diagnosis systems for power plants

Project (2005-9): Development of a diagnosis system by means of remote monitoring for diesel plants

Session I: Introduction of the team

Previous works in the field of the project:



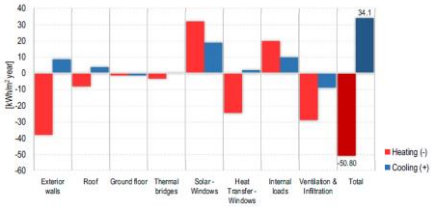


Fig. 6. Thermal losses and gains by elements, and total energy demand.

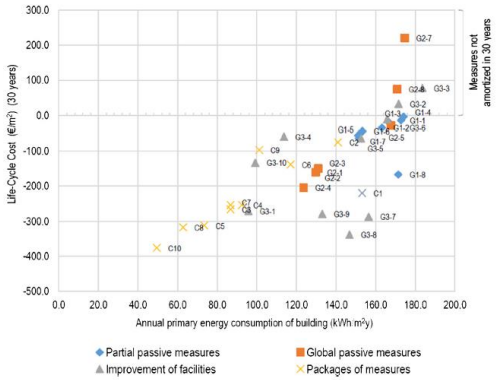
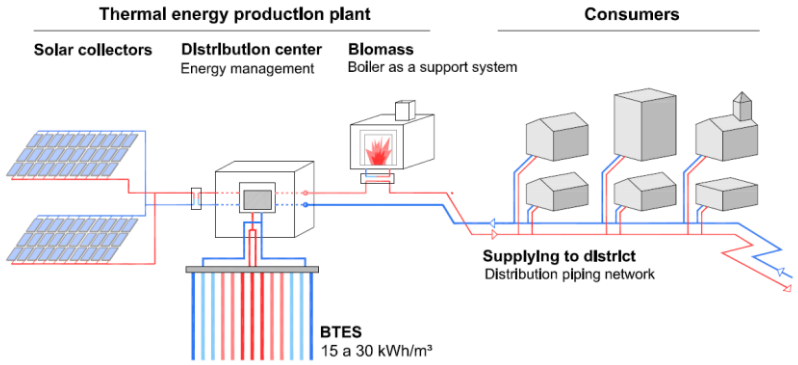


Fig. 9. Results of cost-optimal assessment method for the multi-residential building, according to the EPBD [2].

(Re)Programa Project. Renovation and sustainable management of the Andalusian building stock



Solar DH integration toward low-carbon economy networks (LCE)

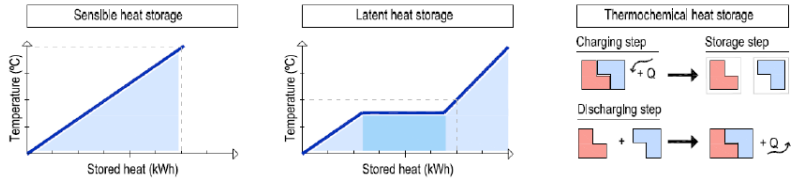


Figure 4. Thermal energy storage methods: sensible, latent and thermochemical storage.

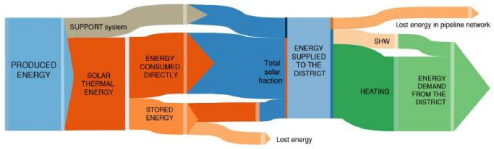
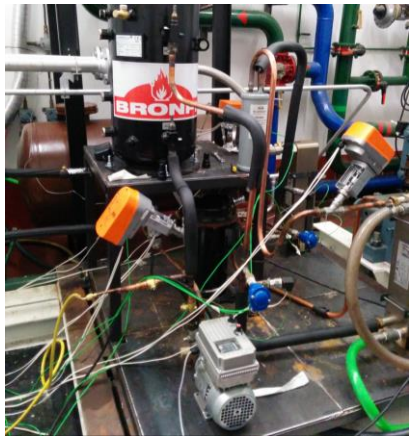


Figure 11. Sankey's diagram of a Solar DH system with large-scale seasonal TES.

Thermal Energy Storage technologies for Low-Carbon Energy Measures



Renewable energy technologies: Small-scale microgeneration – ORC prototype