

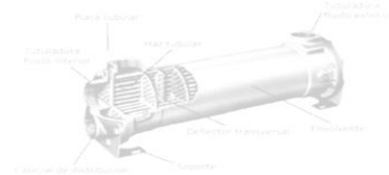
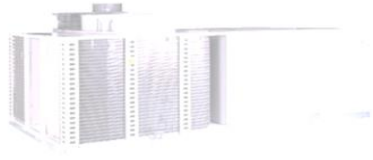
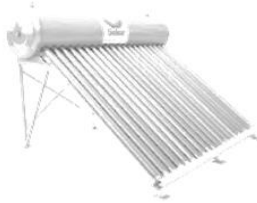
DAIKIN



SAMSUNG



AIRZONE

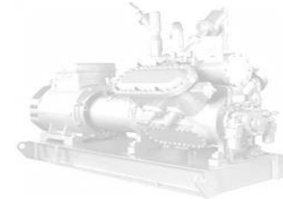


iiTer

Grupo de Investigación
Ingeniería Térmica

PAIDI code: TEP221

<http://iiTer.uca.es>
iiTer@uca.es



CEPSA

ABENGOA
SOLAR

Magtel

AIRBUS

acciona

Energy Efficiency



Passive Architecture

HVAC systems

Refrigeration Technology

Thermal Comfort

Thermal Renewable Energies



Solar Cooling

Geothermics

Aerothermic systems

Photovoltaic glazing

Human resources

Director:

Dr. Ismael Rodríguez Maestre **Industrial Engineer**

Team:



Dr. Pascual Álvarez Gómez	Civil Engineer
Dr. Juan Luis Foncubierta Blázquez	Industrial Engineer
Dr. Fco. Javier González Gallero	Physicist
Mr. Gabriel González Siles	Industrial Organization Engineer
Dra. María Jesús Jiménez Come	Chemical Engineer
Dr. Jesús Daniel Mena Baladés	Chemist
Dr. Francisco José Sánchez de la Flor	Industrial Engineer
Dr. Enrique Ángel Rodríguez Jara	Industrial Engineer
Dr. Álvaro Ruiz Pardo	Industrial Engineer
Ms. Irene Sánchez Orihuela	Mechanical Engineer

Staff (May, 2024) :

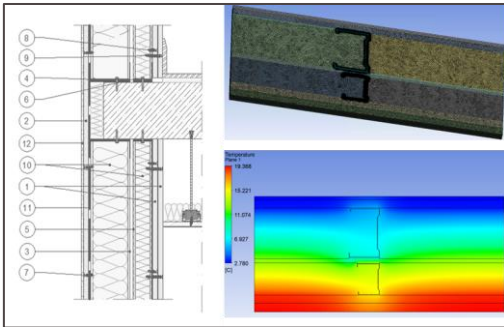
- Full-time professors (10)
- Research professors (3)
- Researchers hired with projects (2)
- PhD students (6)
- Master's students (7)



University (UCA) Technology-based company

Technology Transfer

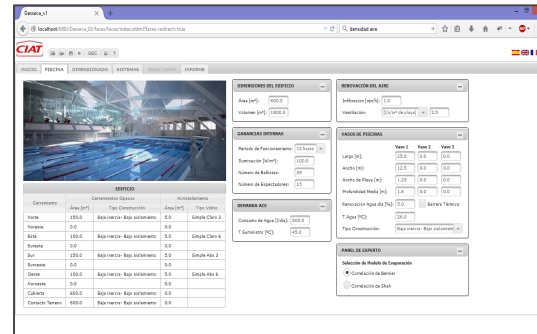
Energy Consulting



Energy audits Industry/Tertiary sector
Thermal and fluid-Dynamic Design (CFD)
Building Energy Regulation
Modelling of energy systems (TRNSYS)
Energy modelling of buildings (eQuest)

- ✓ **Audits:** Blow door, gas analyzer, thermal comfort, heat-flux meter, ultrasonic flow-meter, thermo-hygrometer.
- ✓ **Thermal Design:** ANSYS-CFX, FLUENT.
- ✓ **Modelling of systems:** TRNSYS, EES, eQUEST.

Software Development



Energy simulation models:
- Desk and/or web (client/server side)
- Building/thermal systems coupling
- Integration of control strategies
Integration into BMS / digital twins

- ✓ **HPL Computing cluster:** HPC computing cluster: R424E3 V2, comprised of four nodes with two parallel Xeon E5-2620v2 6-core processors at 2.1 GHz, 64 GB of DDR3 RAM, and 256 GB of RAM.
- ✓ **Intermediate workstations:** customised per project/researcher

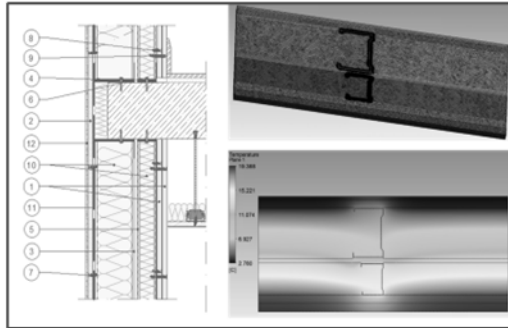
Test/Accreditation of equipment



Testing of prototypes / patents
Certification of thermal performance

- ✓ **Double climatic chamber:** testing of thermal and/or hygrometric performance and test of material permeability..
- ✓ **Hydronic facility:** Testing of heat production or exchange equipment up to 25 kW of cooling/heating capacity. Flow and temperature control.

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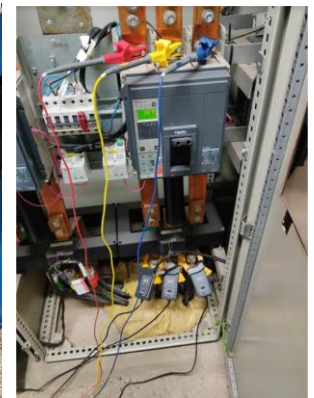
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EC - Example 1

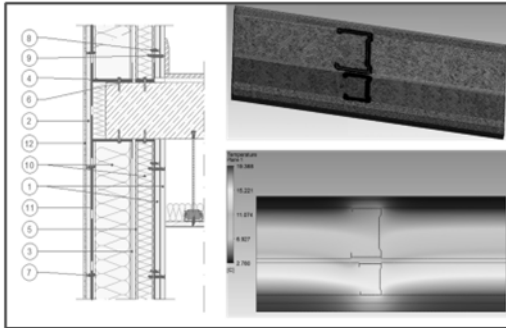
HOSPITAL "PUNTA EUROPA DE ALGECIRAS"

Methodology based on improvements from experimental measurements

- ✓ Boiler efficiency
- ✓ EER/COP of chiller plants (BdC)
- ✓ Quality of power supply
- ✓ Thermal Comfort
- ✓ Air infiltration
- ✓ Thermal Transmittance
- ✓ Ventilation flow rates through conduits
- ✓ Pipe thermal insulation



Energy Consulting



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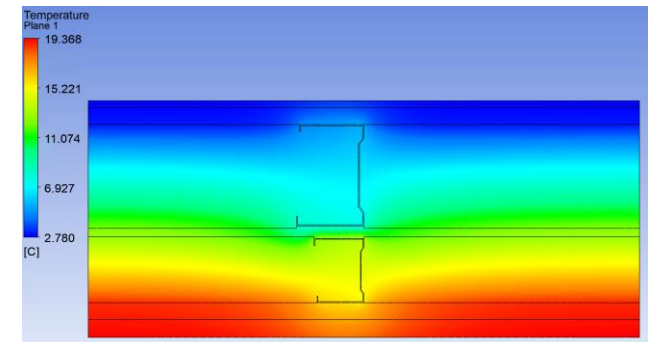
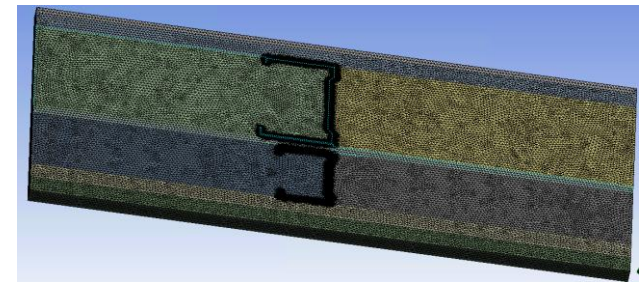
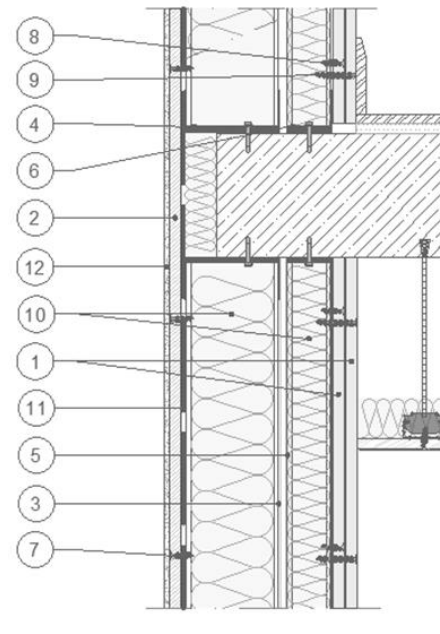
Energy modelling of buildings (eQuest)

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EC - Example 2

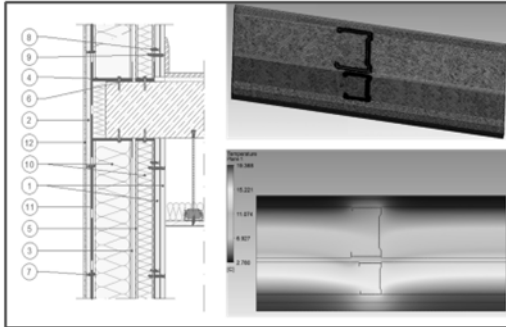
THERMAL-HYGROMETRIC CHARACTERISATION OF THE “INTEGRA-PLACO” SYSTEM (Saint Gobain)

Thermal and hygrometric characterisation of different variants of a façade-enclosure system (called Integra-Placo) and compliance with regulations



EC - Example 3

Energy Consulting



Energy audits Industry/Tertiary sector

Thermal and fluid-Dynamic Design (CFD)

Building Energy Regulation

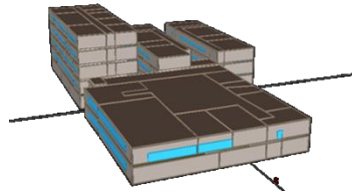
Modelling of energy systems (TRNSYS)

Energy modelling of buildings (eQuest)

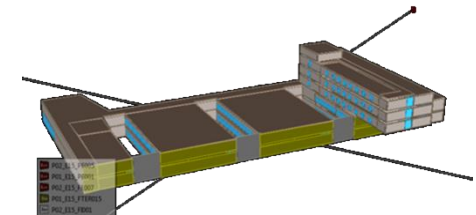
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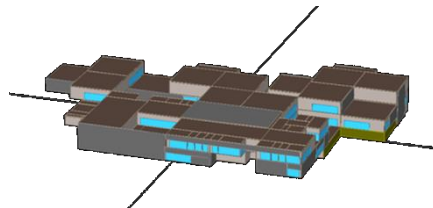
Compliance with CTE-HE and Energy Certification for Large Tertiary Sector



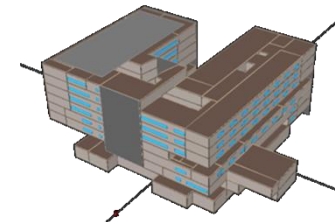
Bio-Science Building
University of Murcia



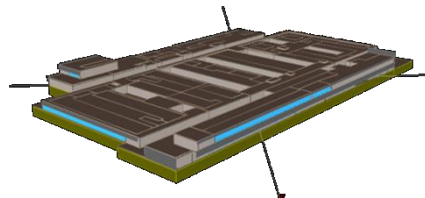
Faculty of Documentation
University of Murcia



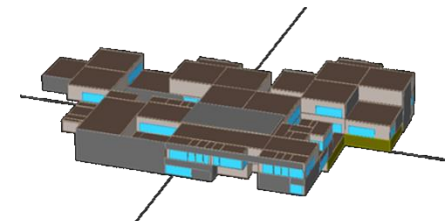
Medical centre «Cruz Humilladero»
Malaga



Maternal & Child Hospital
Málaga



Hospital
Roquetas de Mar



PTA Building
Malaga

SD - Example 1

Software Development



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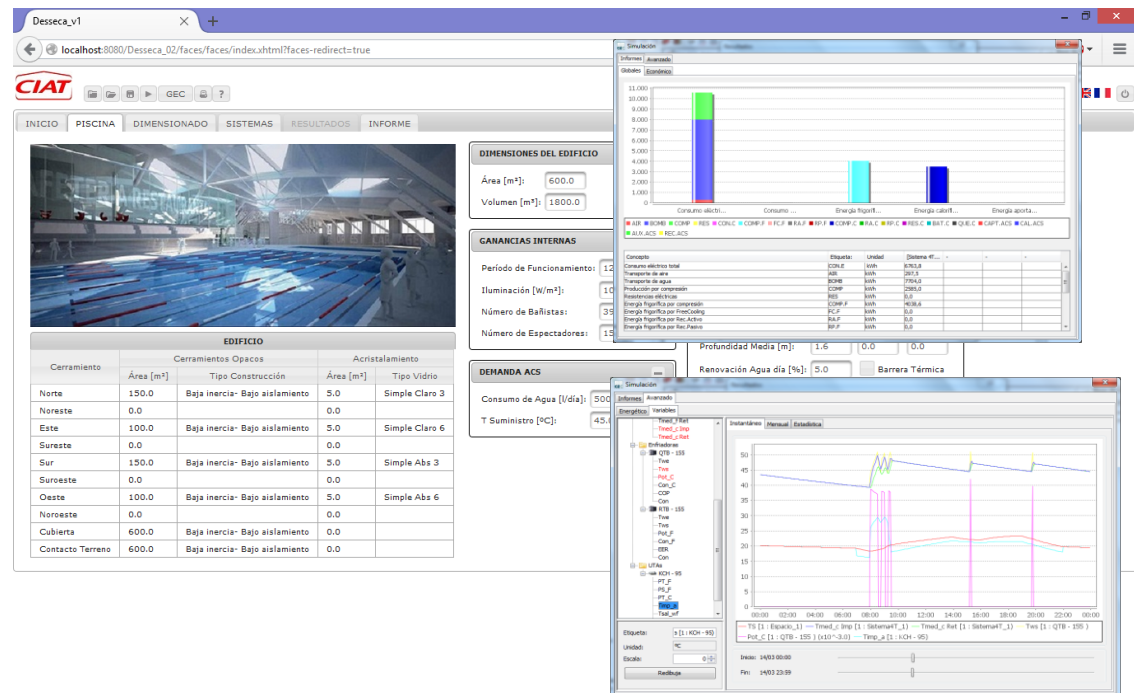
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Modelling and programming of a simulation tool for indoor swimming pool equipment and air conditioning systems (DESSECA)

Funded by:
Period:

CIAT, CTA, IDAE
2012-2014 (2 years)

Software for sizing and simulation of dehumidification equipment for indoor pools.



SD - Example 2

Software Development



Energy simulation models:

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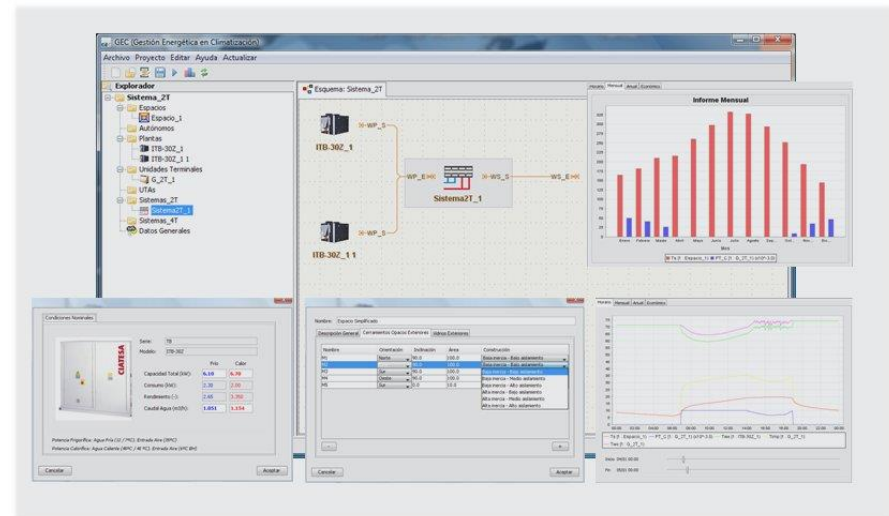
Energy Management in Air Conditioning (GEC)

Simulation program of Air Conditioning systems

- Annual simulation with a time-step of 5 minutes
- Building model
- Stand-alone A-A & W-A systems
- Convection correlations
- Showcase tool

✓ HPL Computing cluster: HPC computing cluster: R424E3 V2, comprised of four nodes with two parallel Xeon E5-2620v2 6-core processors at 2.1 GHz, 64 GB of DDR3 RAM, and 256 GB of RAM.

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Patent development

Test/Accreditation of equipment

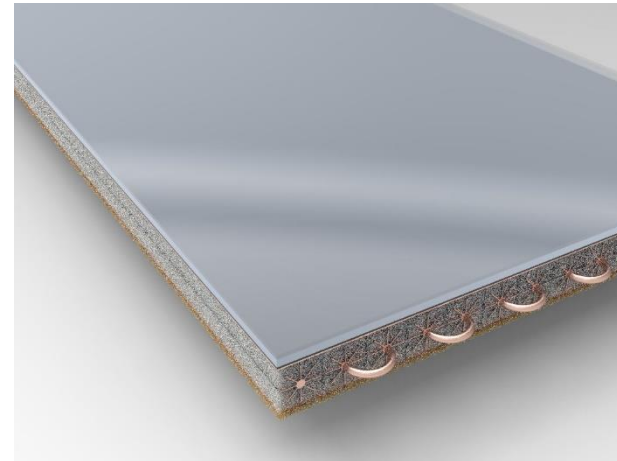
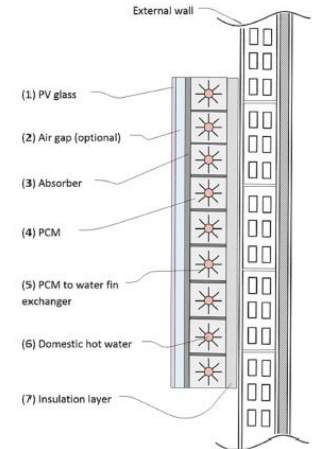


Testing of prototypes / patents

Certification of thermal performance

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- ✓ **Hydronic facility:** Testing of heat production or exchange equipment up to 25 kW of cooling/heating capacity. Flow and temperature control.

- Integration of photovoltaic and electrochromic glasses in thermo-electric solar energy generation devices with phase change materials for buildings (SMART-PVT).



Cooperation interests

PhD Theses

- **Integration of photovoltaic and electrochromic glasses in thermo-electric solar energy generation devices with phase change materials for buildings (SMART-PVT).** Grant Ref. PID2021-123562OB-I00 funded by MCIN/AEI/ 10.13039/501100011033 and by the European Union.
- **New control system for a ventilated façade by using PV and EC devices:** Numerical and experimental validation of a new patent (patent under review).
- **Concentrated solar power plant for green H₂ production:** Sizing, modelling, and simulation of alternative principle schemes
- **High-temperature aerothermal energy for the decarbonization of tertiary sector buildings.**

Research Project

- **Integration of renewable electric energy generation and storage systems and DHW in multi-family residential buildings: Demonstration Building**

Call: UE (Jan 2025)

Members: 6 universities + 4 companies

Contact

Director:

Dr. Ismael Rodríguez Maestre ismael.rodriguez@uca.es



THANK YOU