Pilot 3. Valencia
Final retrofit status

Javier Biosca, (SYMELEC)

Heat4COOL project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 723925

Retrofitting

Pilot building:

- Residential building, 4 floors with 3 apartments at each floor (12 total):
  - 38 m^2
  - 57 m^2
  - 57.5 m^2
- Terrace and double sloped roof
- Orientation: SE (-66º) – NW (114º)
- Located in old city Valencia

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Pre-retrofit

Previous facility

- Building centralized generation system for:
  - Heating
  - DHW
  - Cooling
- Generation system: **3 independent A-W reversible Heat Pumps** (3x15 kW)
- 2 storage tanks for hot and cold water
- Heating/cooling delivery by fan-coils at each apartment

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Post-retrofit

Integrated technologies (retrofitted facility):

- **Solar Thermal** system
- **Adsorption Heat pump** (only cooling mode) supported by heat pumps
- **SCI-BEMS** (Self Correcting intelligent BEMS)
- **Monitoring system**

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Retrofitting

Retrofitting activities

- Installation of:
  - Solar thermal panels (~50 m^2)
  - Solar storage tank
  - Adsorption unit (within ventilated enclosure)
  - Re-cooler (with antifreezing heater)
  - Sensors and meters
  - New fan-coil control screens
  - Z-Wave gateways for net connection of sensors/controls

- Old gas-boiler removal

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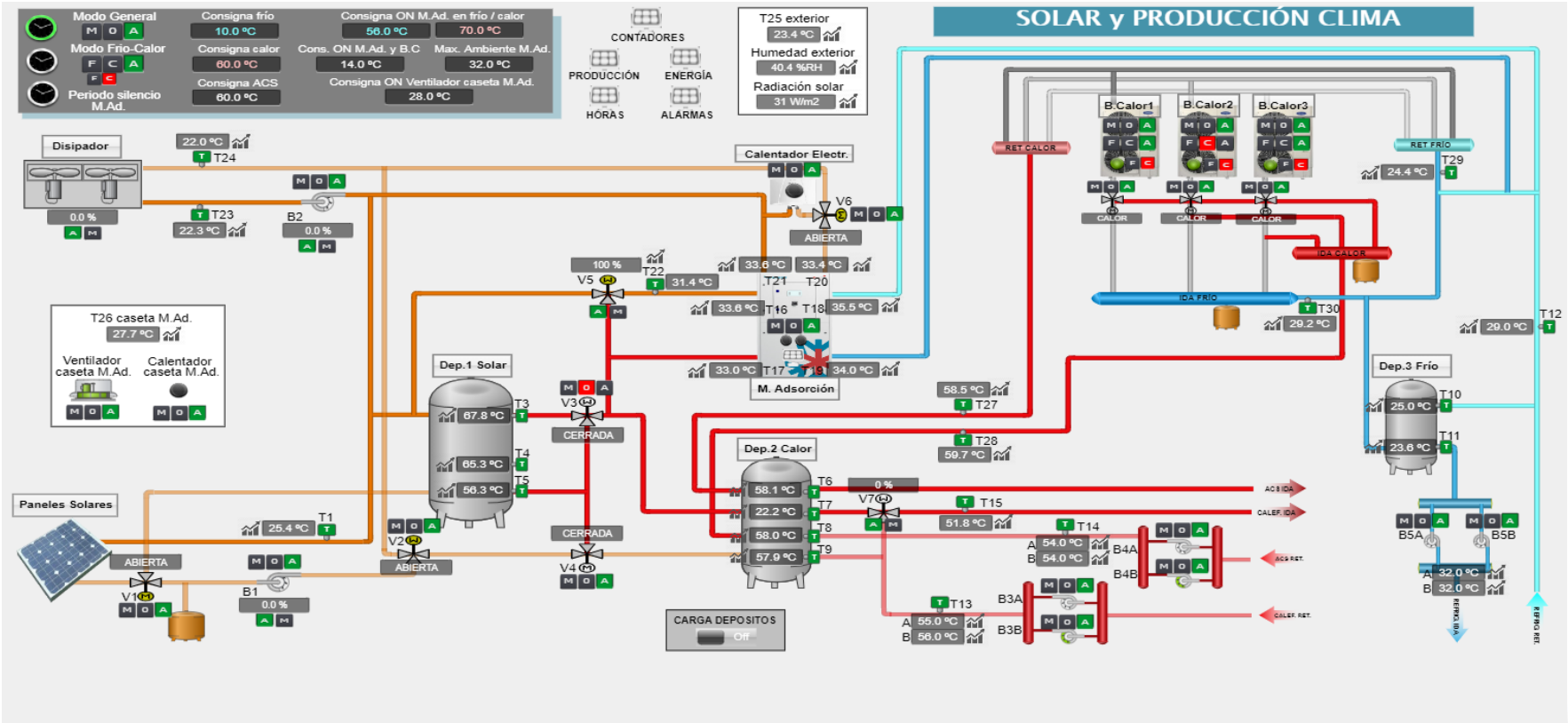
Retrofitting

Monitoring system dashboard:



Monitoring system to assess the system performance. It is still operating although the project is finished and the data is stored at the server and accessible at anytime.

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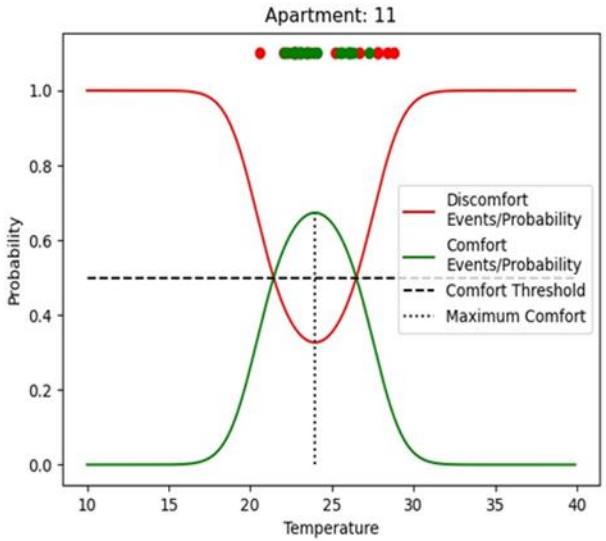
Retrofitting
SCI-BEMS

Set of smart devices that allow:

- Monitoring of apartment conditions
- Recording of fan-coil thermostats status and control actions performed by the occupants
- Remote control of fan coils at each apartment



Since identified events from user actions → **Profiling algorithm** estimates the Comfort probability for a defined temperature.

Set-point control automation algorithm sends lower and upper temperature limits to the fan-coil thermostats as the heating and cooling set-points.

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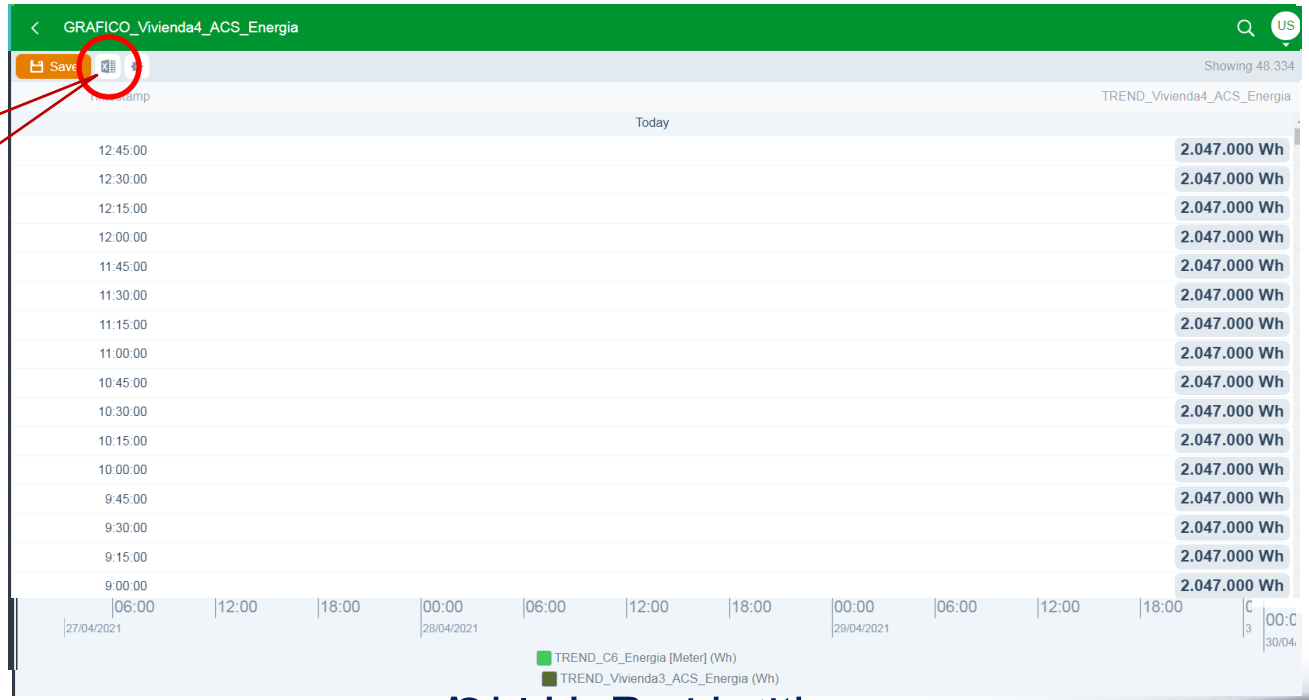
Monitoring system

Monitoring system enables to see and analyze and assess the current and historical performance of building and systems.

Export to Excel



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Lessons learnt

- In the design phase:
  - Municipality regulations must be exhaustively checked in the design phase (re-cooler placement/operation-time, solar thermal collectors placement/orientation).
  - All the equipment requirements should be very carefully taken into account during the design phase (Adsorption unit indoors)
- In the retrofitting phase:
  - It must be taken into account potential delays in third parties. (Delays in equipment deliveries, municipality licenses)
  - The quality, state, wear and reliability of the equipment already existing in the previous facility to be also further used in the retrofitted facility must be very carefully checked.
- In the operation phase:
  - Adsorption unit has better performance at not too warm ambient temperatures. Thus, it could be recommended to schedule its operation better during the coldest hours of the day in summer.

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Thank you

Javier Biosca, (Symelec)
eup@symelec.com

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