

ASHRAE
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ENERGY IN BUILDINGS

EMEA 2024

Europe, the Middle East & Africa

FRIDAY - SATURDAY

NOVEMBER 22-23, 2024

@ 9:00-18:00

SESSIONS:

- SUSTAINABILITY
- HEALTH & SAFETY
- DECARBONIZATION
- TECHNICAL SOLUTIONS
- DIGITAL ENVIRONMENT
- POLICIES & LEGISLATION
- ENERGY EFFICIENCY FIRST
- RESILIENCE TO CLIMATE CRISIS

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Field Assessment of Indoor Environmental Quality and
Energy Consumption in a Hellenic Dwelling

Indoor Environmental Quality

- Thermal comfort
- Indoor Air Quality
- Energy Consumption

Field assessment in an urban residence

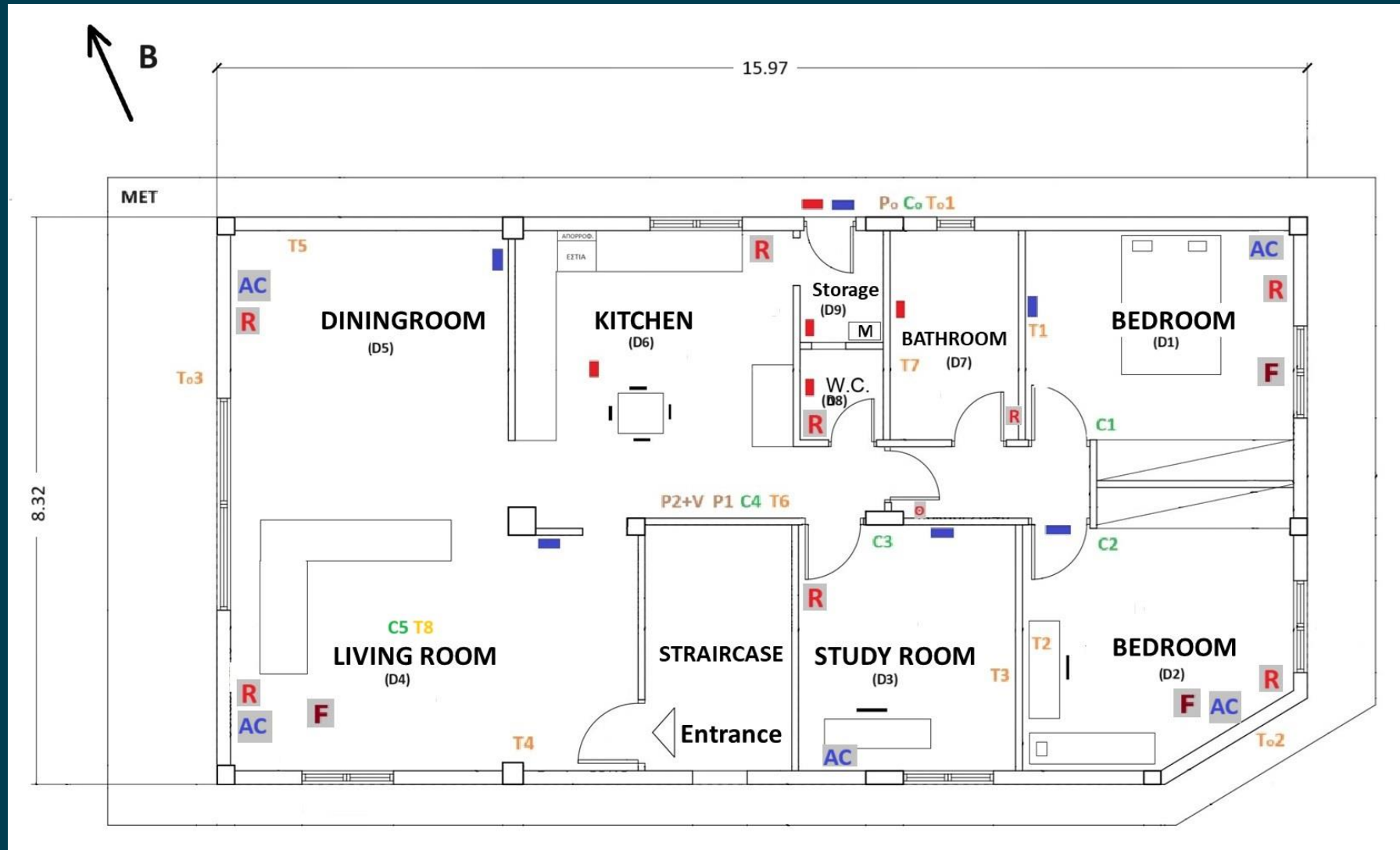
DATA recorded for a year (min, hour, day)

- Indoor and Outdoor
T, RH, CO₂, PM, VOC
- Energy consumption

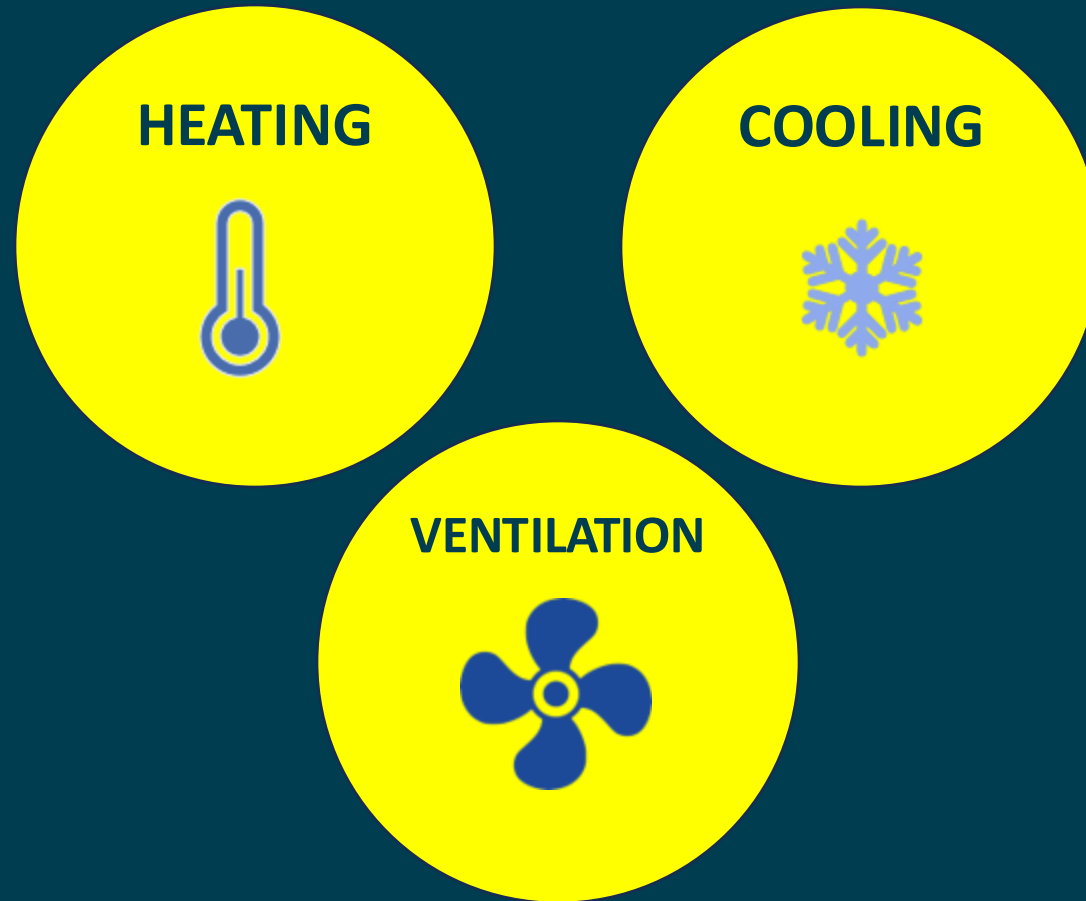
Dwelling

- Typical household – family of three
- 120m²
- Renovated 2021
- Class B+
- Heating: Central hydronic system, natural gas boiler 24kW and radiators
- Cooling: five a/c (split-type) 2,5 -4,2kW plus three floor fans
- DHW: Solar water heater and natural gas boiler
- Ventilation: Central MVHR , MERV13 filter, HR: 92%
- Airtightness: 1,84 ACH at 50Pa (Blower door test)

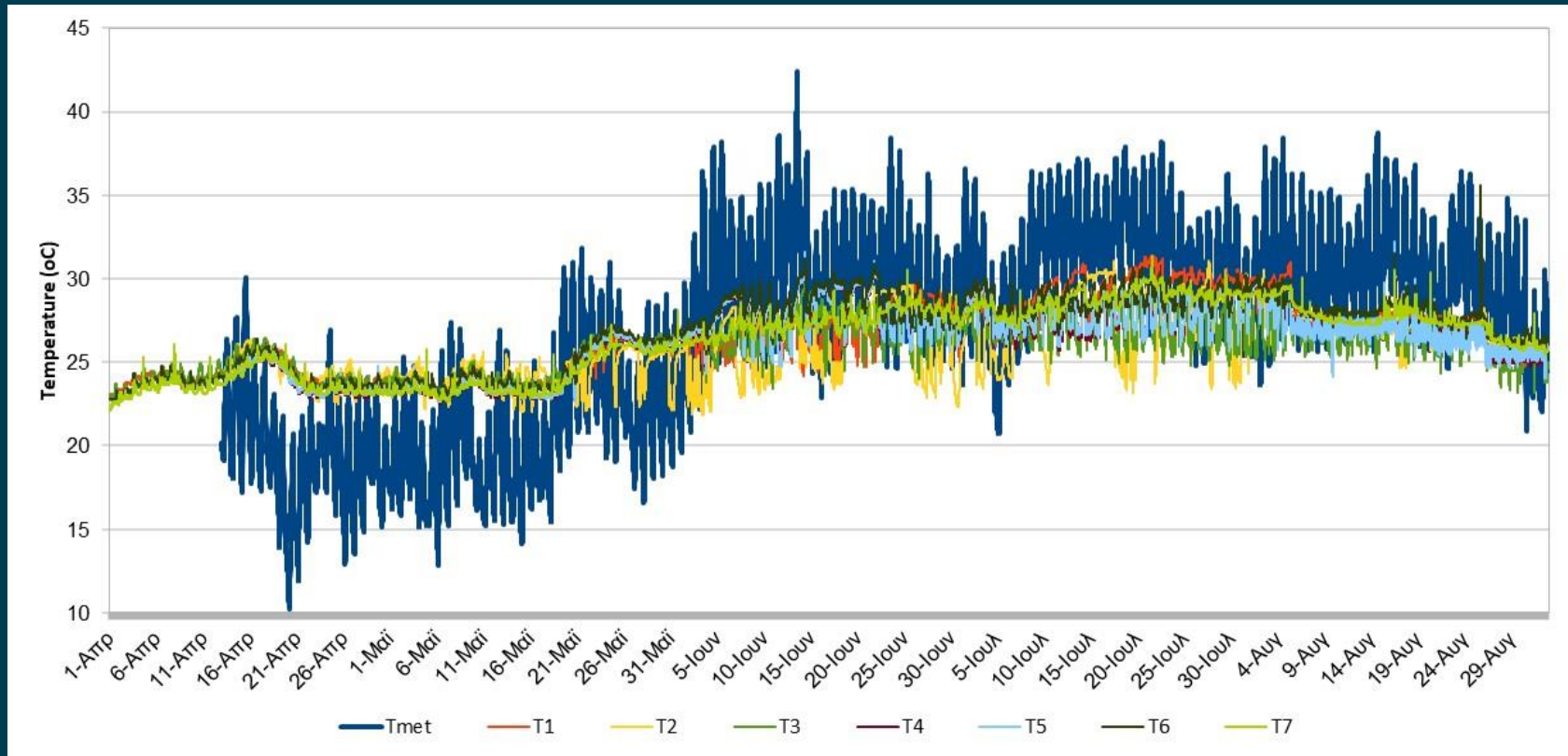
Floor plan



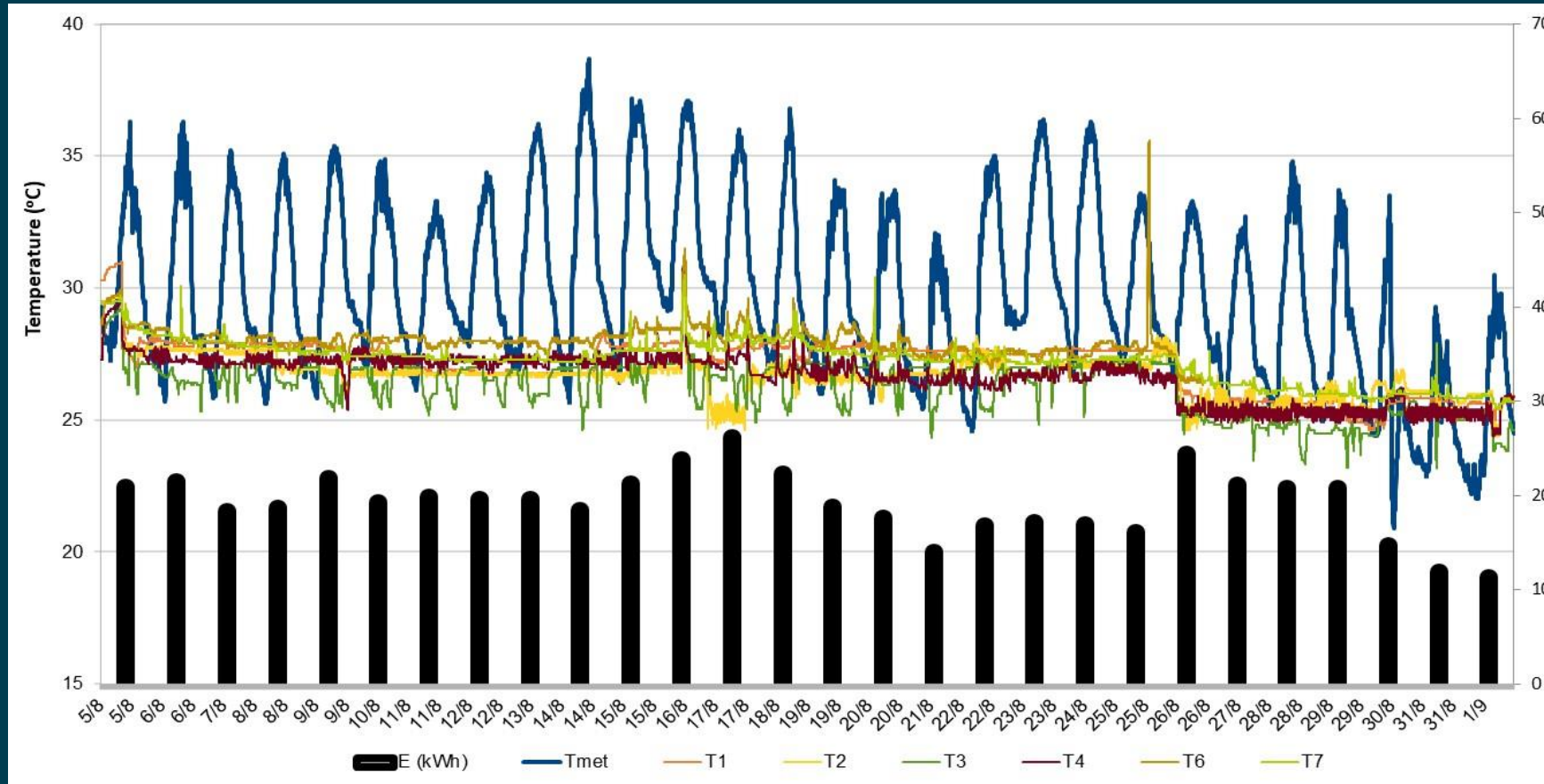
Operating scenarios



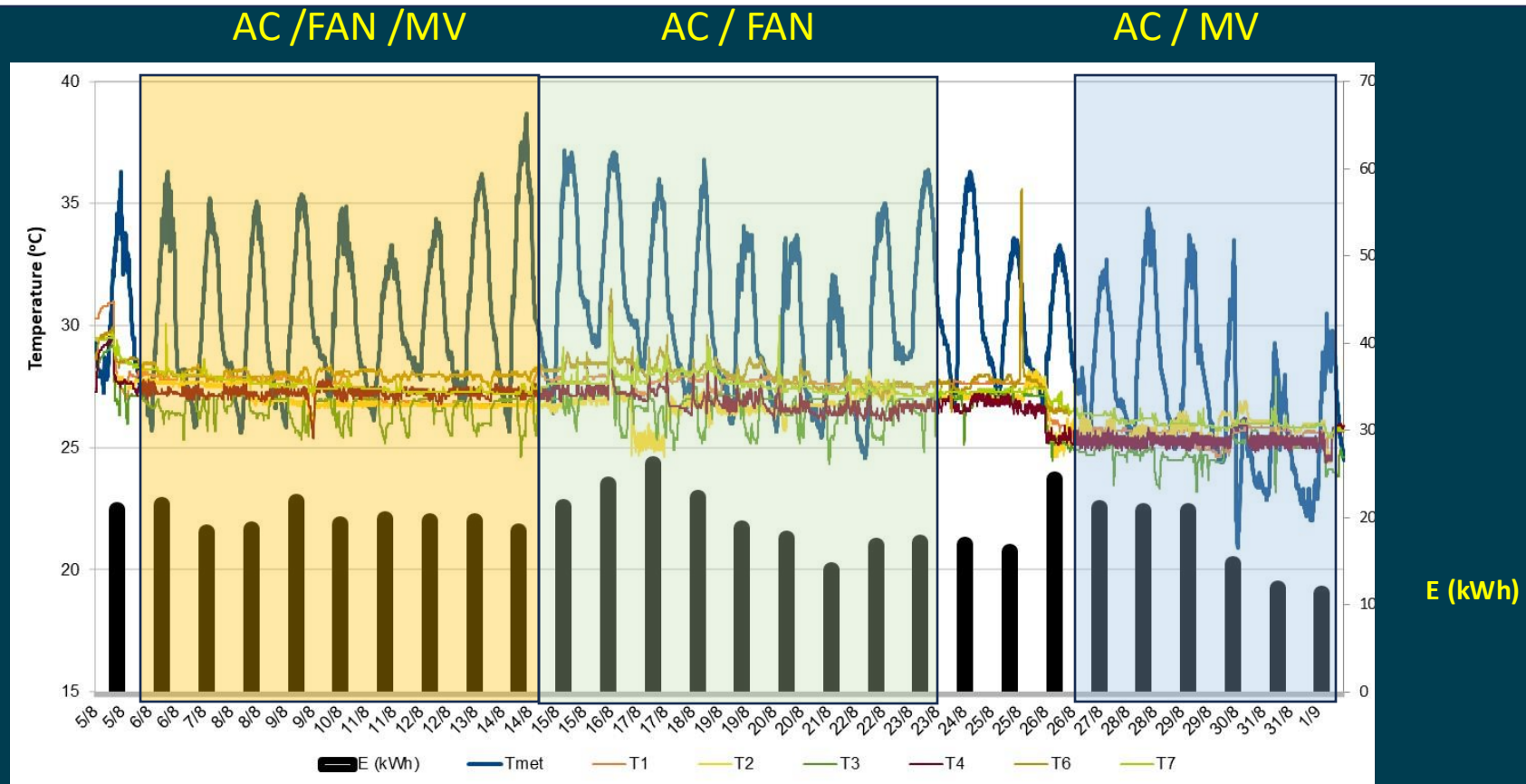
Preliminary data – Indoor temperatures



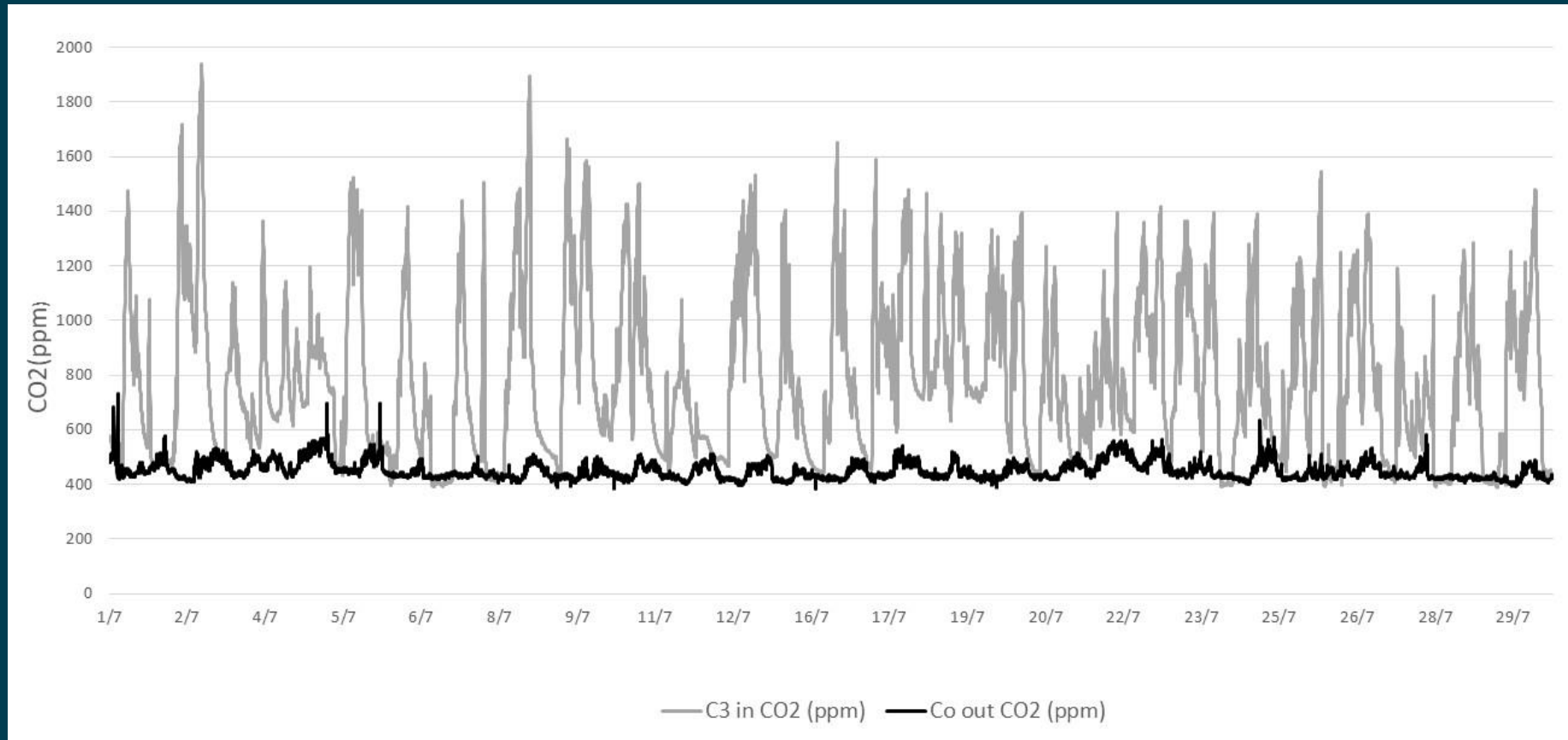
Preliminary data – August Energy consumption & Temperatures



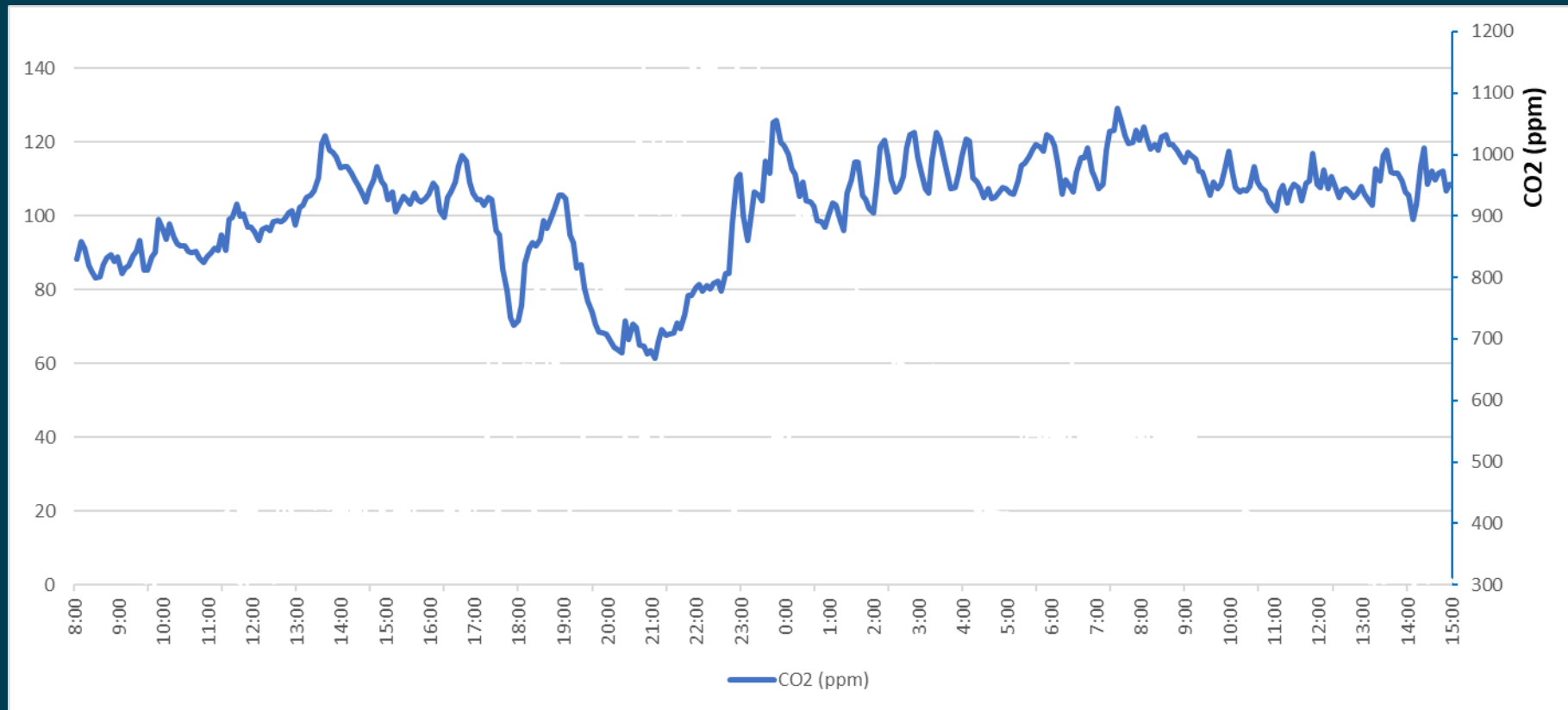
Preliminary data – August Energy consumption & Temperatures



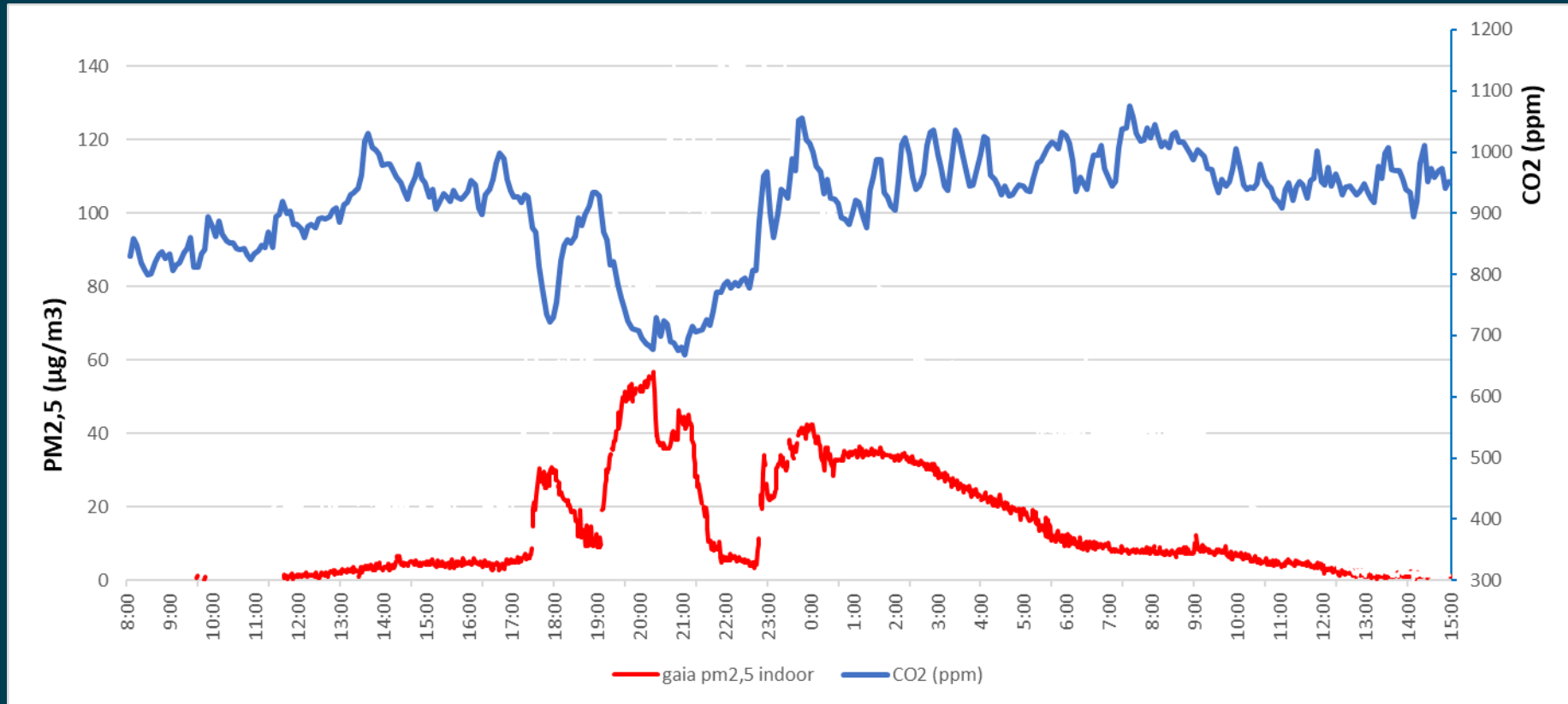
Preliminary data – CO₂ levels in Study room



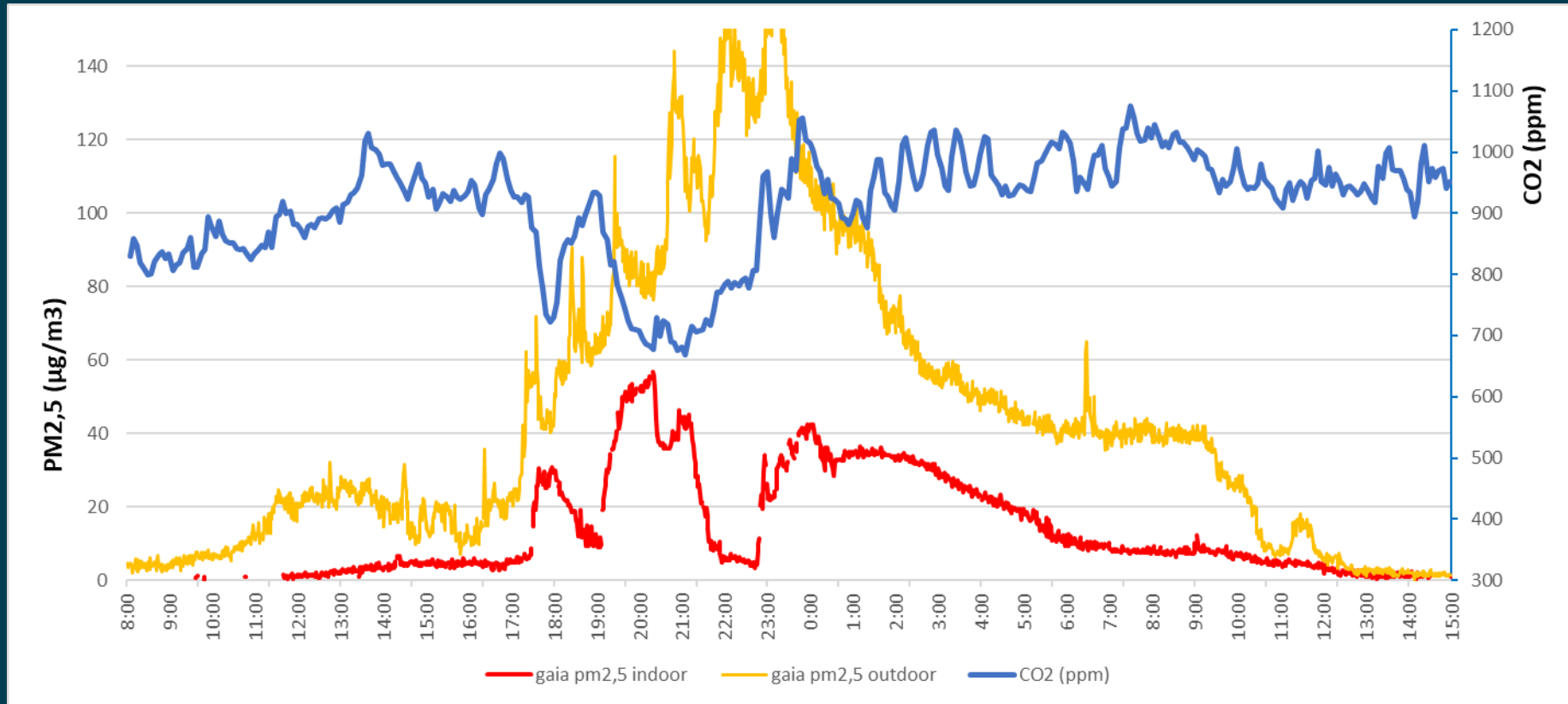
Preliminary data – CO₂ & PM_{2,5} Kitchen



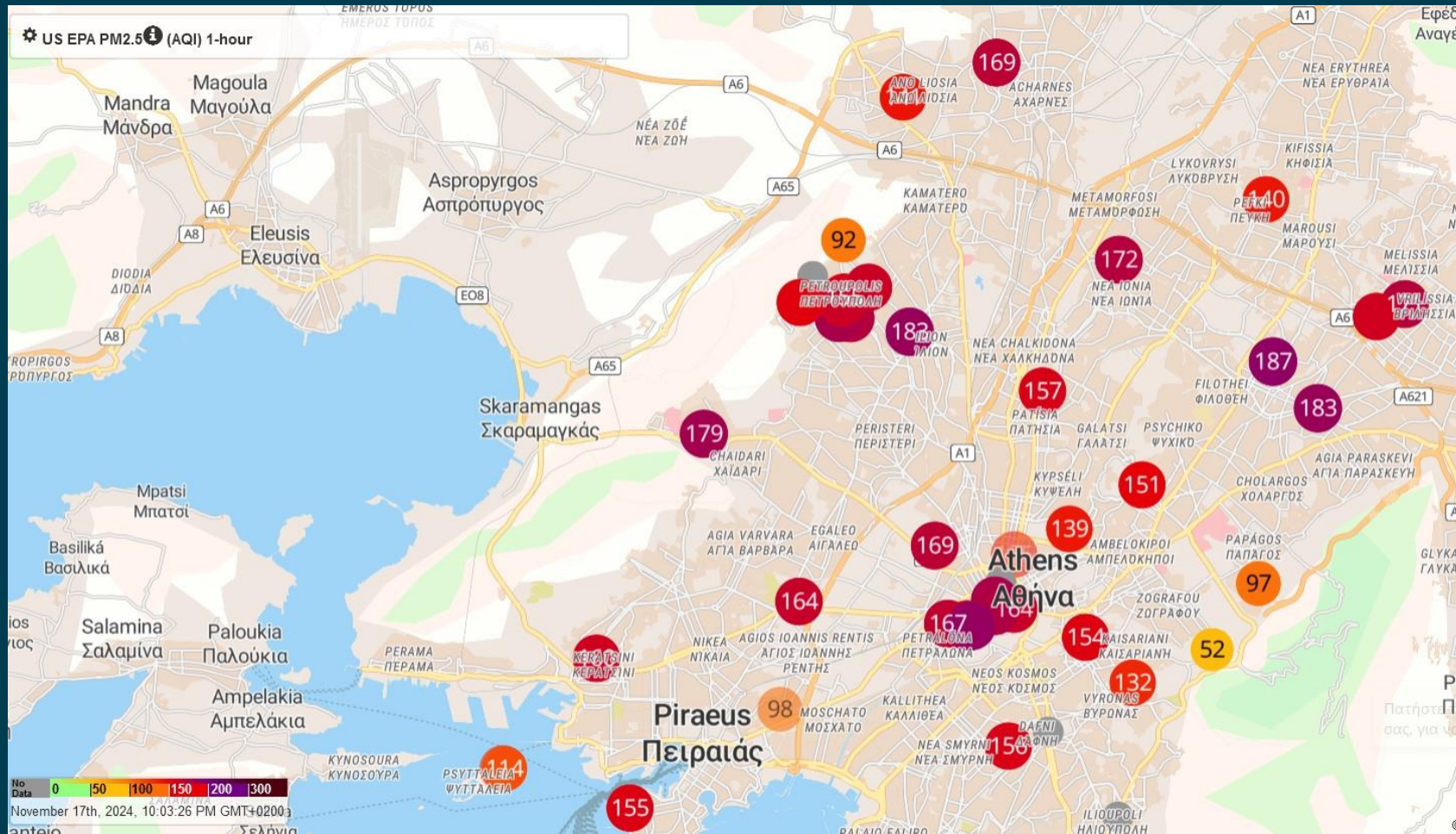
Preliminary data – CO₂ & PM_{2,5} Kitchen



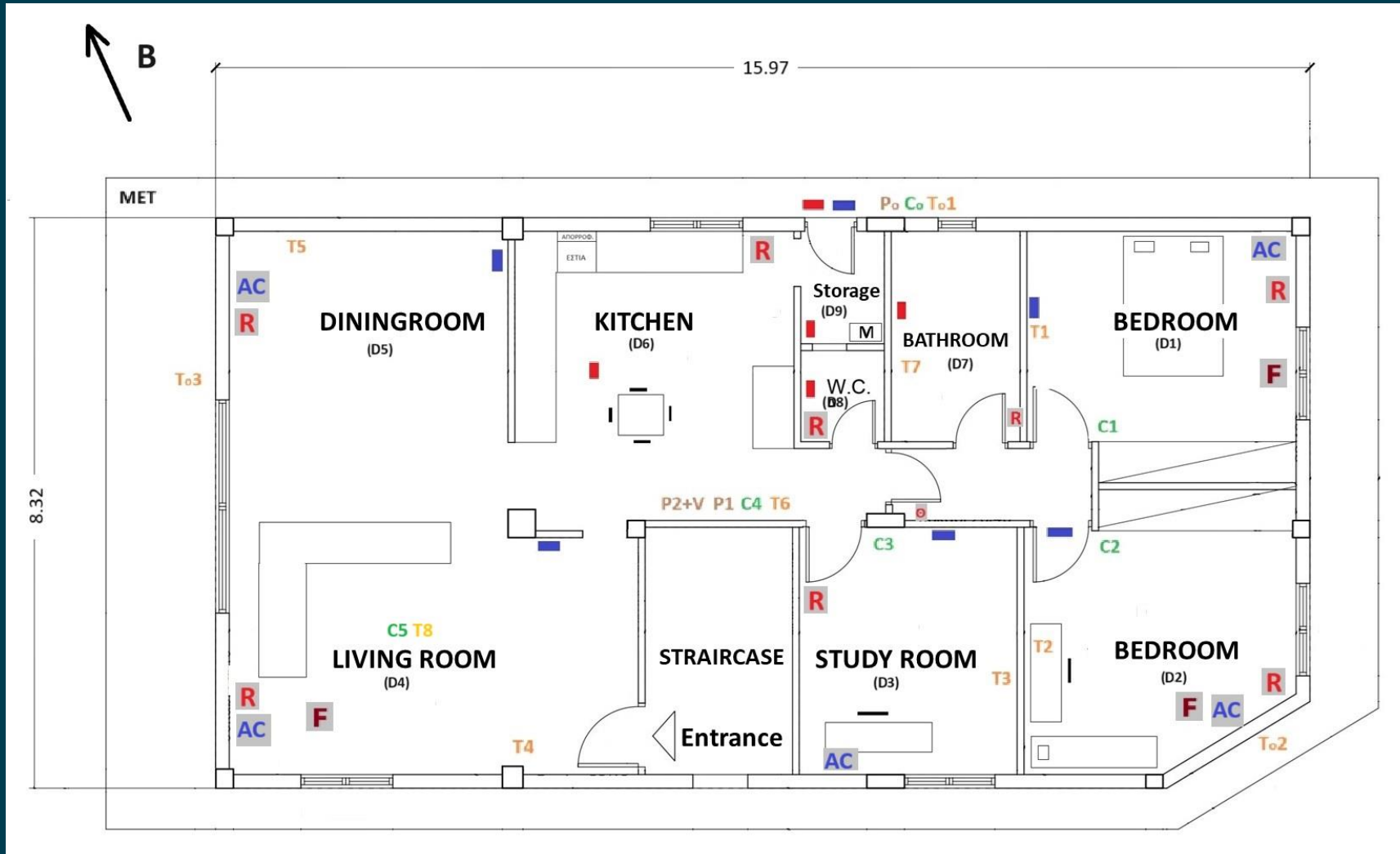
Preliminary data – CO₂ & PM_{2,5} Kitchen



Preliminary data – CO₂ & PM_{2,5} Kitchen



Floor plan



Conclusion

- Monitor operation and indoor conditions
- Assess thermal comfort, air quality and energy consumption, under different operating scenarios
- Find correlations
- Identify proper operating solutions and good practices
- Best indoor conditions – least amount of energy

Part of MSc Thesis in
Sustainable Design of the Building's Indoor Environment
School of Applied Arts and Sustainable Design
Hellenic Open University

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THANK YOU! Q & A

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