

### TEPORE project questionnaire

This questionnaire was created to investigate the attitudes, needs and requirements of users on home temperature control systems. It is proposed by a team of researchers from the Politecnico di Milano as part of a project, funded by the Regione Lombardia, in collaboration with research centers and companies operating in the temperature control sector.

The project aims at improving the comfort conditions in domestic environments, minimizing energy use and therefore costs.

The information collected by the questionnaires will be treated anonymously and aggregated to obtain information on the needs and preferences of the residents, in order to guide the development of the project.

1. Write your home address.

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2. How many persons live in the apartment?

- 1
- 2
- 3
- 4
- 5 or more
- I prefer not to answer

### HOME CHARACTERISTICS AND HEATING SYSTEM

In this section, we ask for some information about the house for a first classification.

3. How many rooms compose the apartment, excluding bathrooms and kitchen?

- 1
- 2
- 3
- 4

4. How many rooms are destined to bathrooms and kitchen?

- 1
- 2
- 3

5. Is there a controlled mechanical ventilation device in the apartment?

- Yes
- No
- I don't know

6. How many windows are in the apartment?

- 1
- 2
- 3
- 4
- 5

- 6 or more
7. Are windows effective in insulating the interior of the home from outside thermal conditions?
- Yes, perfectly
  - Enough
  - There are limited heat dispersions
  - Heat dispersion are remarkable
  - I don't know
8. What type of heating system is there in the apartment?
- Floor radiant panels
  - Wall radiant panels
  - Radiators
  - I don't know
9. How is it possible to regulate the temperature inside the apartment?
- It's not possible
  - Centralized thermostat
  - Thermostat in each room
  - Thermostatic valves
  - I don't know
10. Beyond radiant panels and radiators, do you use other heat generators in the home?
- No
  - Electric heater
  - Heat pump/fancoil
  - Thermal blanket
  - Heated towel rails
  - Other (explain)
11. If you use other facilities for heat generation, are they mobile or fixed?
- Fixed
  - Mobile
  - Both
  - No other heat generator at home
12. Are there any thermometers in the apartment to monitor the room temperature?
- One integrated in the thermostat
  - One, in a position other than the thermostat
  - More than one in different rooms
  - No
13. If there is a thermometer to check the internal temperature, how often is it checked?
- Every day
  - About once a week
  - Occasionally, when it feels hot or cold
  - Never
  - No thermometer at home



14. Is there any instrument in the apartment to measure humidity in the rooms?
- Yes, in the main room
  - Yes, in a secondary room (WC or kitchen)
  - Yes, more than one in different rooms
15. If there is an instrument to measure humidity, how frequently is it checked?
- Every day
  - Around once a week
  - Occasionally, when it feels hot or cold
  - Never
  - No hygrometer at home
16. Are there devices to modify humidity in the home?
- Air conditioning with dehumidification function
  - Mobile dehumidifier
  - Mobile humidifier
  - No
17. If there are humidifiers or dehumidifiers devices at home, how frequently are they used?
- Every day
  - Around once a week
  - Occasionally, when it feels hot or cold
  - Never
  - No humidifier or dehumidifier at home
18. If there are humidifier or dehumidifier devices at home, for which purpose are they used?
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#### **USER HABITS AND ENERGY USE**

19. Are usually all heating elements (radiant panels and radiators) switched on during the whole winter season?
- Yes
  - No, several of them are switched off if the indoor temperature gets high
  - No, several remain always switched off
  - I don't know
20. Are the centralized heating systems control settings of the apartment ever changed?
- Every day
  - Often
  - Occasionally
  - Never
21. If it the setting of the heating (radiant panels and radiators) is modified, for which purpose is it done?
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22. If it the setting of the heating (radiant panels and radiators) is modified, for which rooms is it done? Tick all that apply.

- Living room
- Bed rooms
- Kitchen
- WC
- It's never modified

23. Is the heating system ever turned off in winter?

- Every day
- Often
- Occasionally
- Never

24. If you ever do it, for which purpose do you turn off the heating system of your apartment?

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### USER NEEDS AND PRIORITIES

In this section we ask you to specify in how far some functions of the control system would be useful for you.

25. If you had to choose between saving and comfort, what would you prefer?

- Saving as much as possible, also if it's implies some sacrifice regarding comfort
- Safeguard minimal comfort
- Maintain a good balance between comfort and saving
- Have a good comfort despite a light growth of costs
- Obtain maximal comfort
- I don't know

26. If you had to choose between automatic regulation and personalized setting, what would you prefer?

- A fully automatic (smart) control in accordance with my needs
- Set average temperature for the entire apartment over long periods
- Set temperatures for each room over long periods
- Set temperatures for each room over shorts periods
- A complete set of all short-term comfort parameters (also day to day)
- I don't know

27. If you had to choose between constant temperature and personalized comfort, what would you prefer?

- A constant temperature in the apartment with two modes (day/night)
- A constant temperature throughout the apartment with different time slots
- A differentiated temperature for each room with two modes (day/night)
- A different temperature for each room with different time slots
- I don't know

28. Which information would you like to receive from your control system? Tick all that apply.

- Medium temperature
  - Temperature levels in different rooms
  - Min and max temperature levels reached in the season
  - Average humidity level
  - Humidity level in different rooms
  - Min and max humidity levels reached in the season
  - Suggestions on ideal comfort
  - Real-time consumption
  - Estimated consumption for the bill
  - Tips on consumption reduction
  - Statistics on settings over the year
  - Statistics on consumption over the year
  - Other
29. If your system could be controlled in remote way through the phone, would you use this function?
- Often
  - Occasionally
  - Only if really unable to do it form home
  - Never
30. If your system could deliver information in remote way through the phone, would you use this function?
- Often
  - Occasionally
  - Only if really unable to do it form home
  - Never

#### SATISFACTION REGARDING THERMAL COMFORT

31. Which is the satisfaction level of the home residents regarding thermal comfort produced by the central heating system?
- Complete satisfaction
  - Good satisfaction
  - Mean satisfaction
  - Low satisfaction
  - Total lack of satisfaction
  - I don't know
32. Regarding each satisfaction issue listed below, give a judgment on the heating system currently operating in your apartment. Mark only one answer per row (a matrix of answer for each of the enlisted topic)
- Complete satisfaction / good satisfaction / Mean satisfaction / Low satisfaction / Total lack of satisfaction / I don't know
- Consumption/costs
  - Temperature in the apartment
  - Temperature differences in the different parts of the apartment
  - Regularity of the temperature in the home despite outdoor climatic variation

- Possibility to differentiate the temperature of each room
33. Taking in consideration the apartment as a whole (constructive components and equipment) which could be the element to intervene on to improve the heating system?
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