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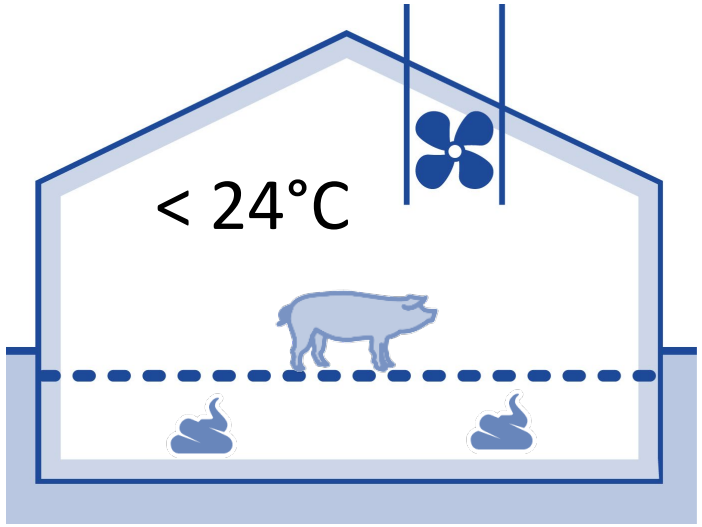
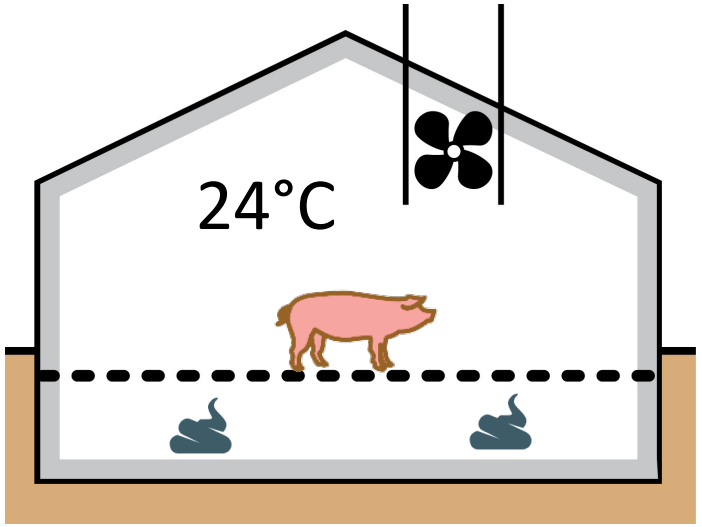
Designing a thermoregulated unit for studying the impact of temperature on zootechnical and environmental performance of growing pigs

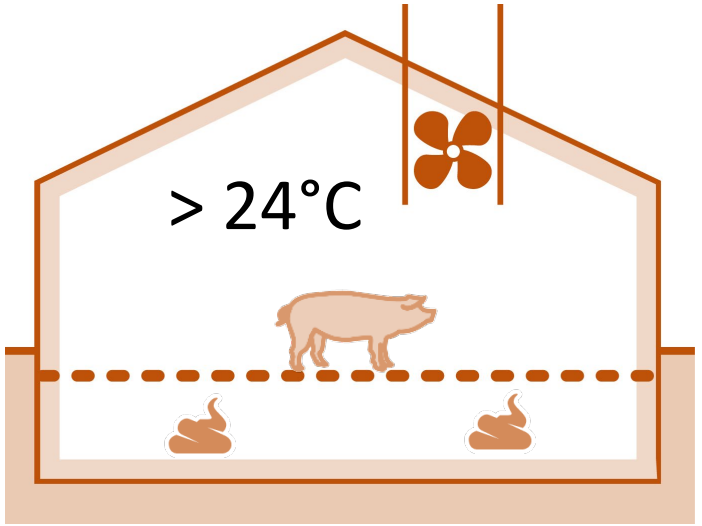
Yvonnick ROUSSELIERE

Context & History

Air quality ?

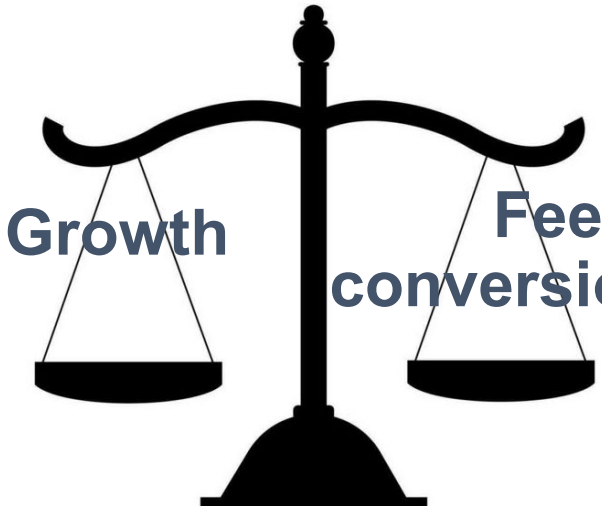






1990 – 2000

Feed conversion rate



Growth and feed consumption

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Solution to continue to work on it

Pig farm in Romillé (France)

CIRI by ifip
International center of Recherche & Innovation

➔ Build a new thermoregulated unit

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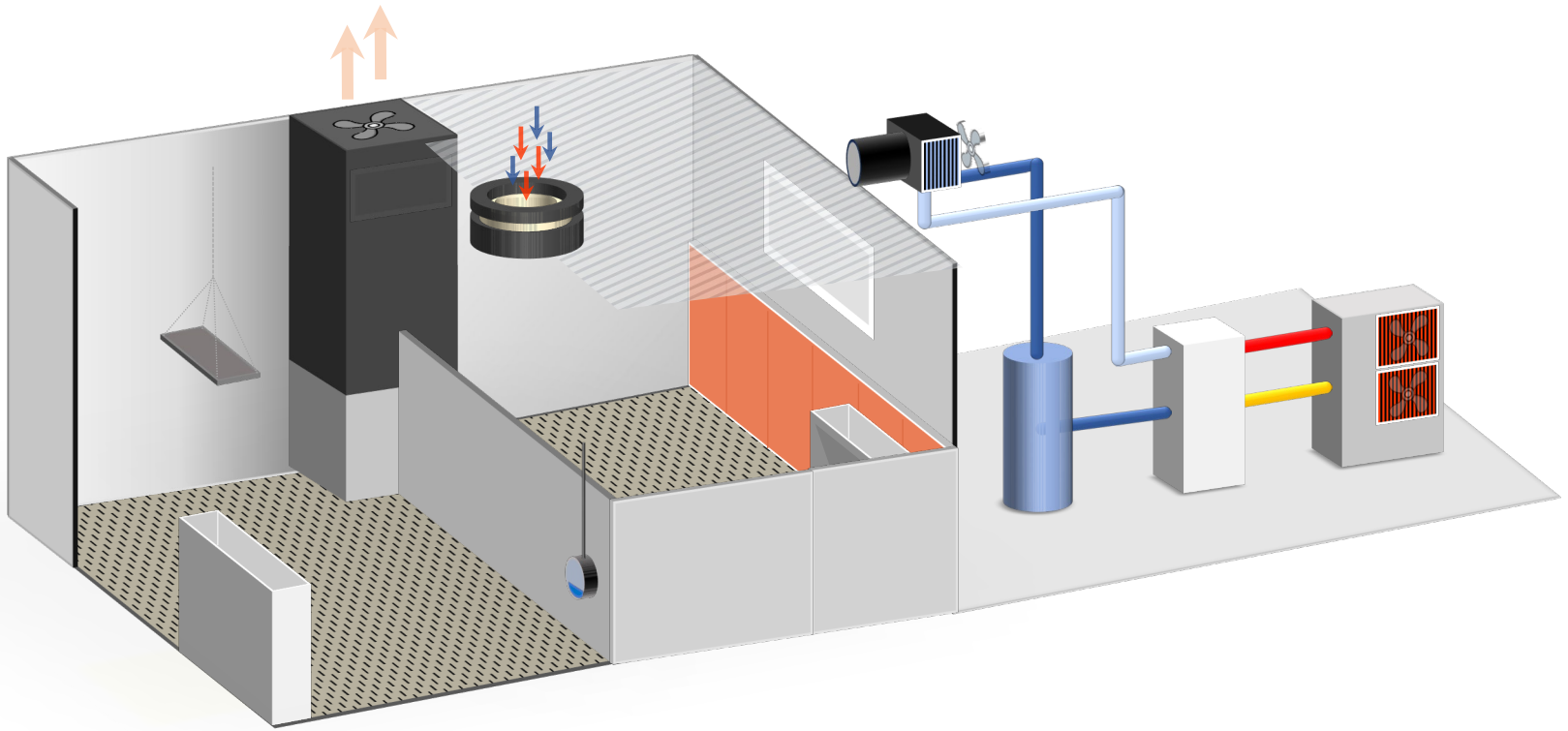
Climatotec : thermoregulated unit

2 separated rooms with same equipment :



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Climatotec : thermoregulated unit

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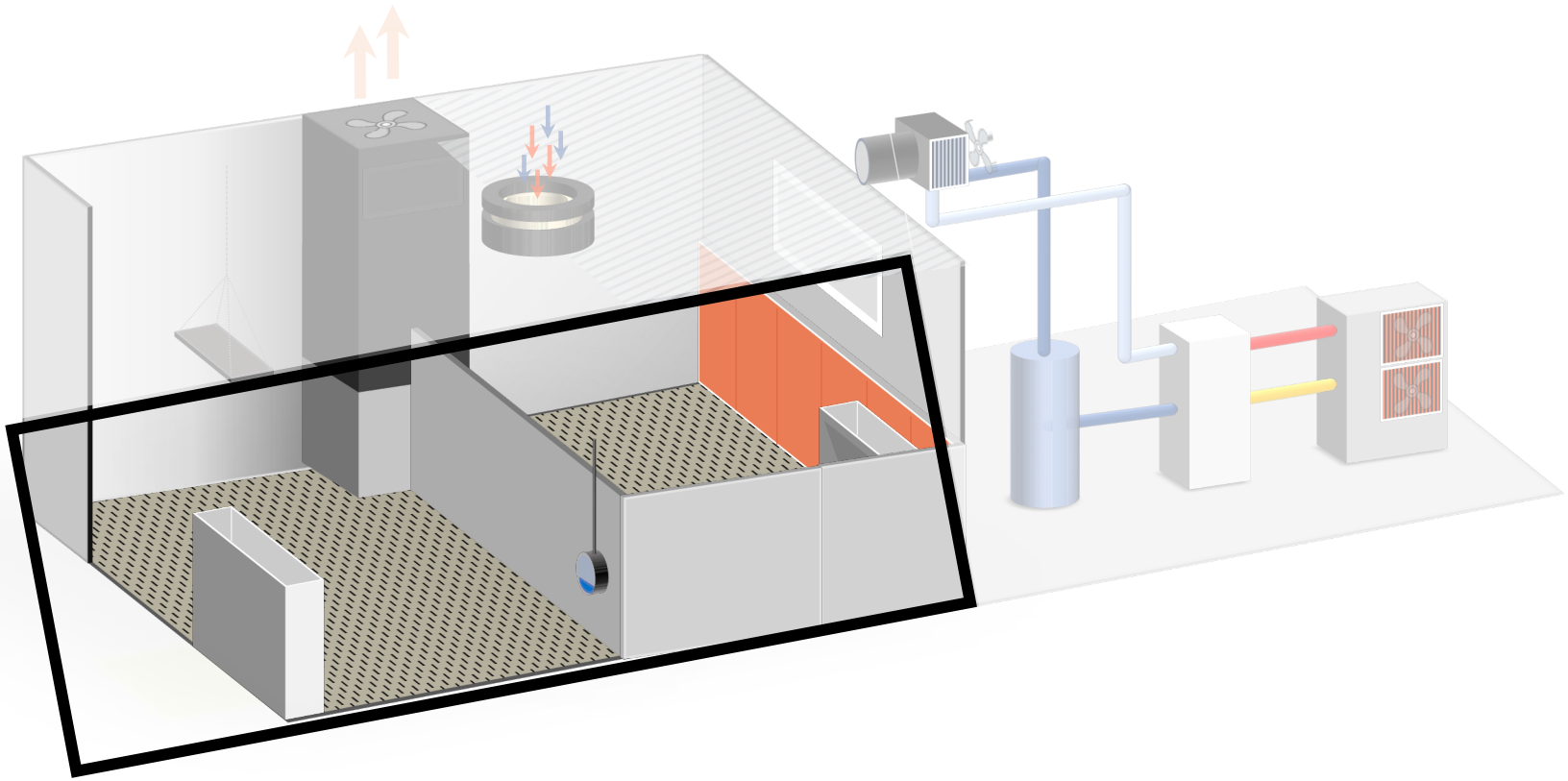

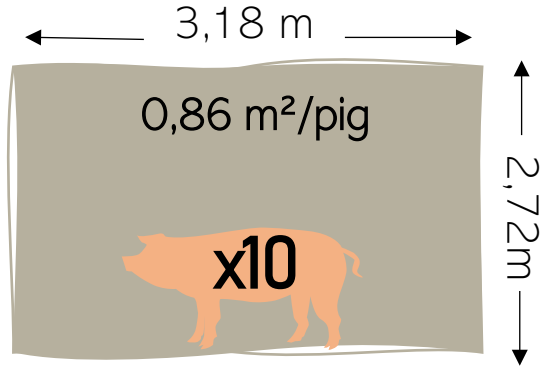

2 pens of 10 pigs

Concrete slatted floor

Pre - pit of slurry (65 cm deep)

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Climatotec : thermoregulated unit

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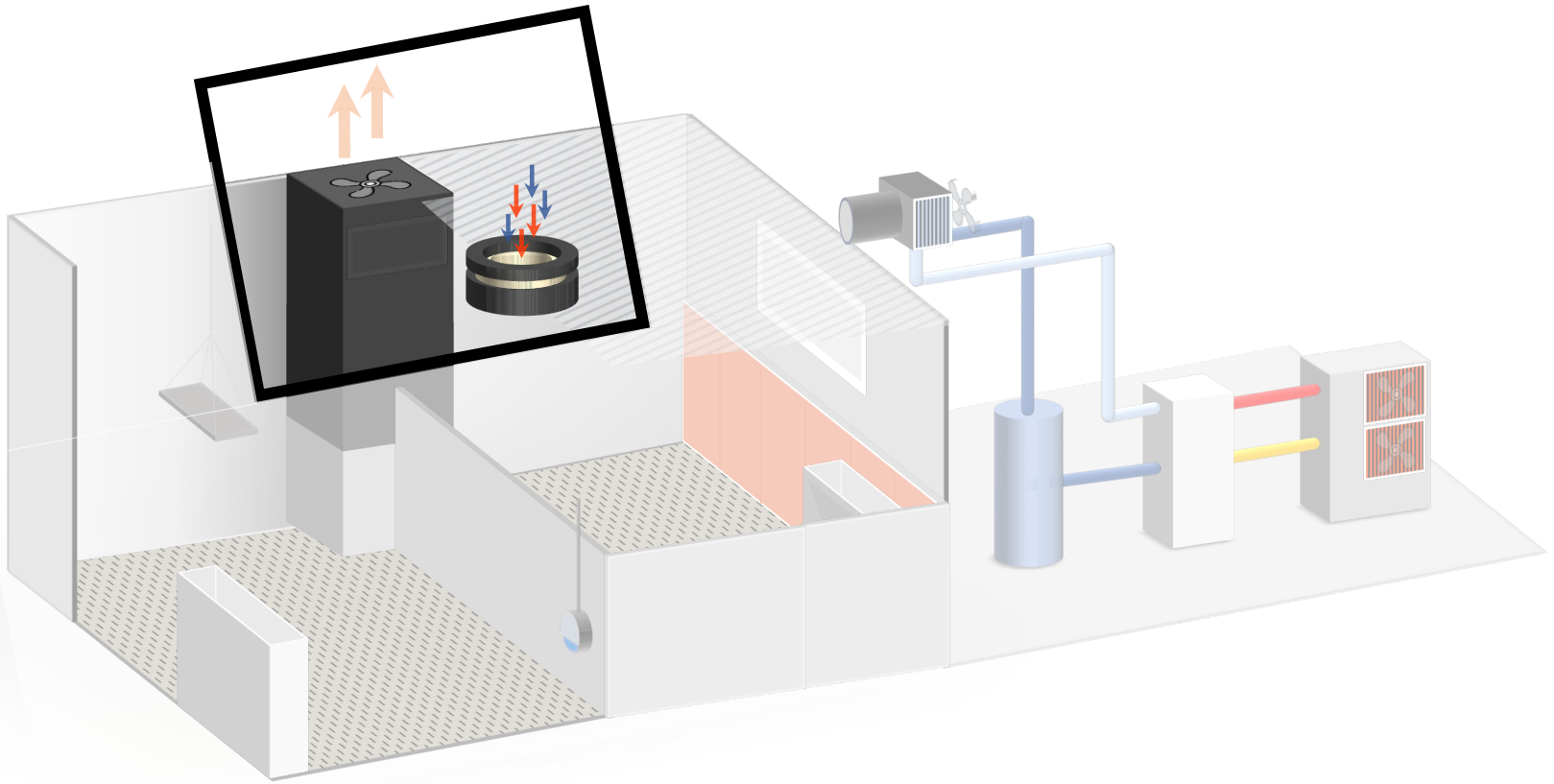
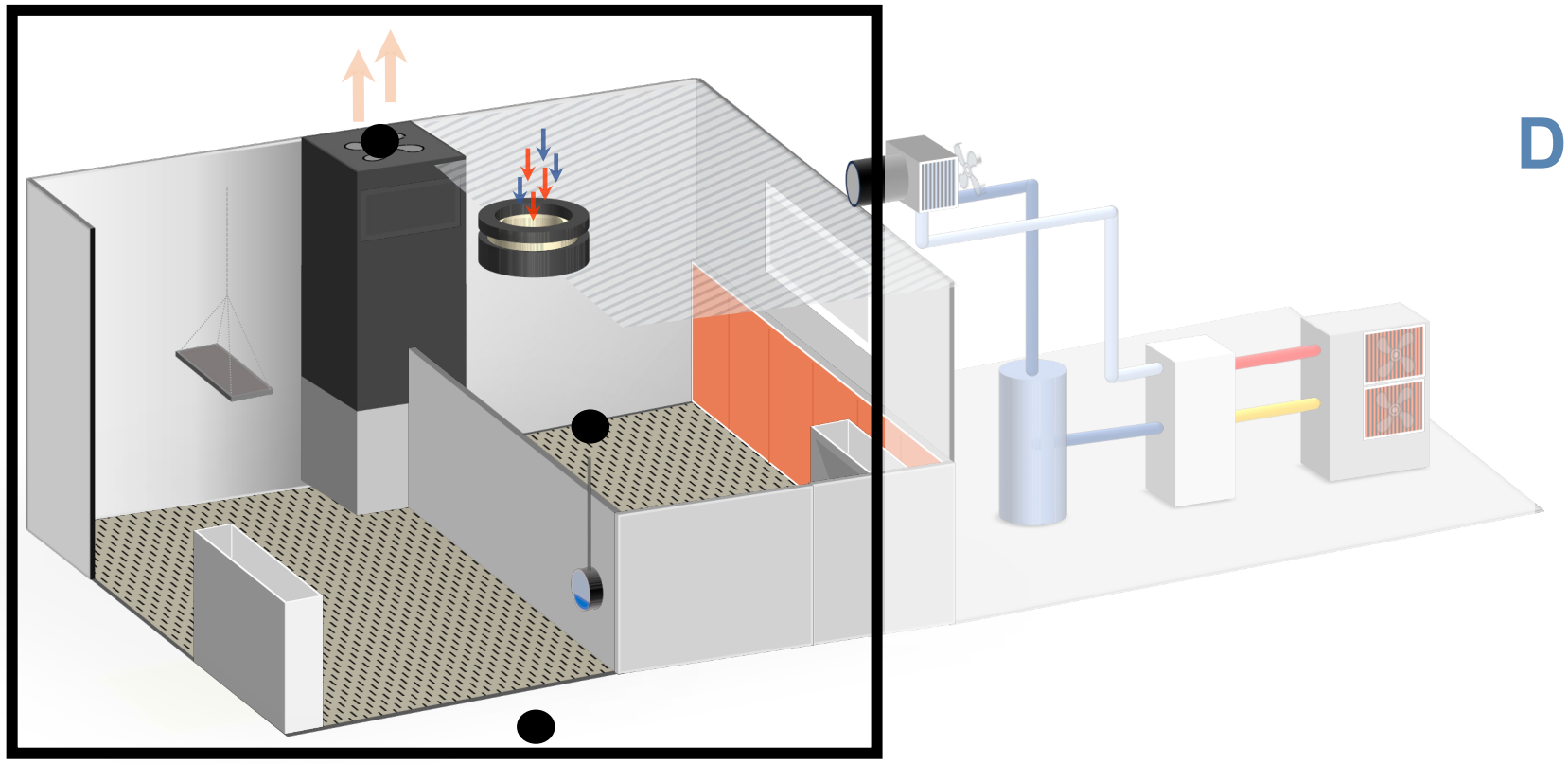


Air entrance by the celling

Fan extraction under the slatted floor

Climatotec : thermoregulated unit

2 separated rooms with the same equipment :



Data collected :

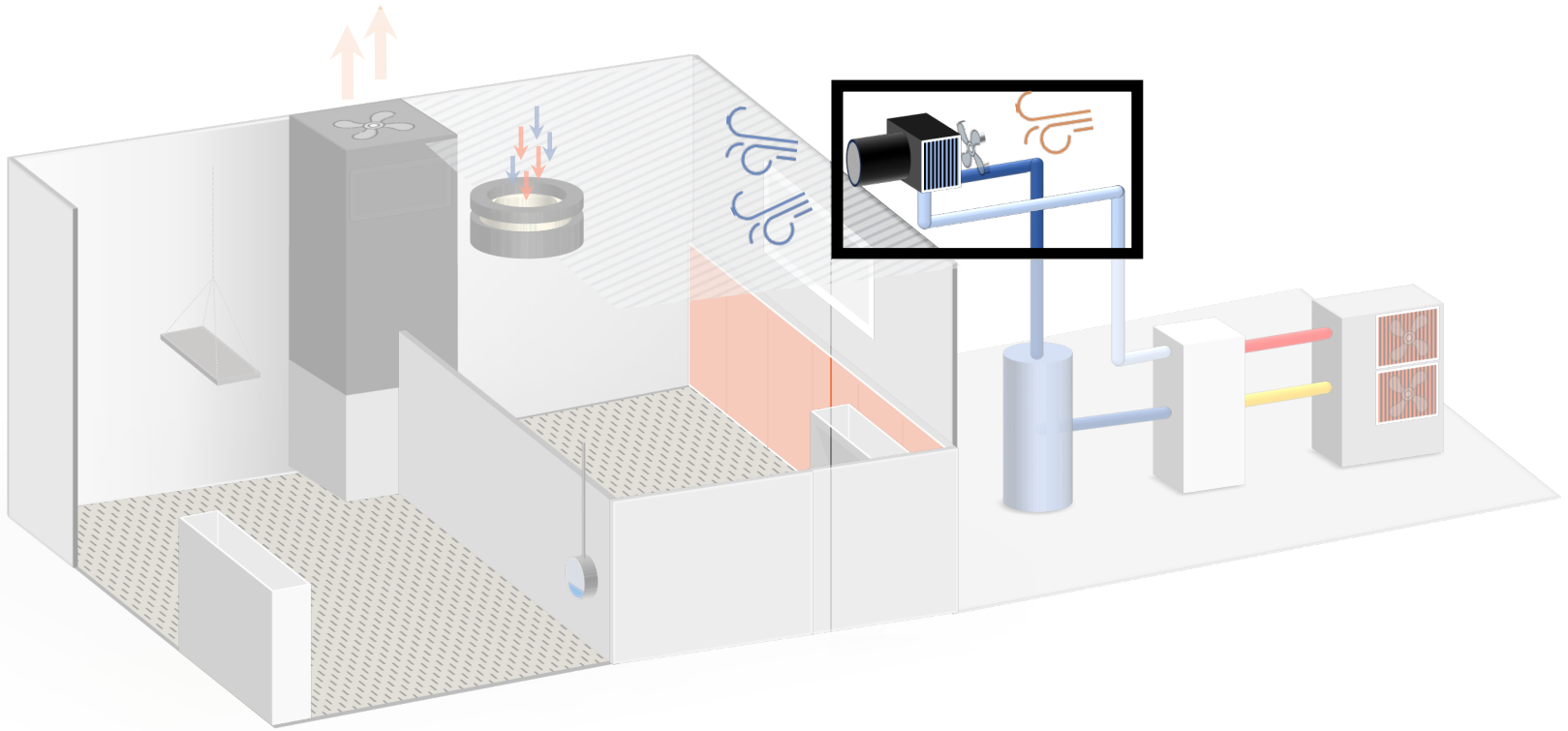
Air temperature before and after contact with pigs

Slurry temperature

Ventilation rate

Climatotec : thermoregulated unit

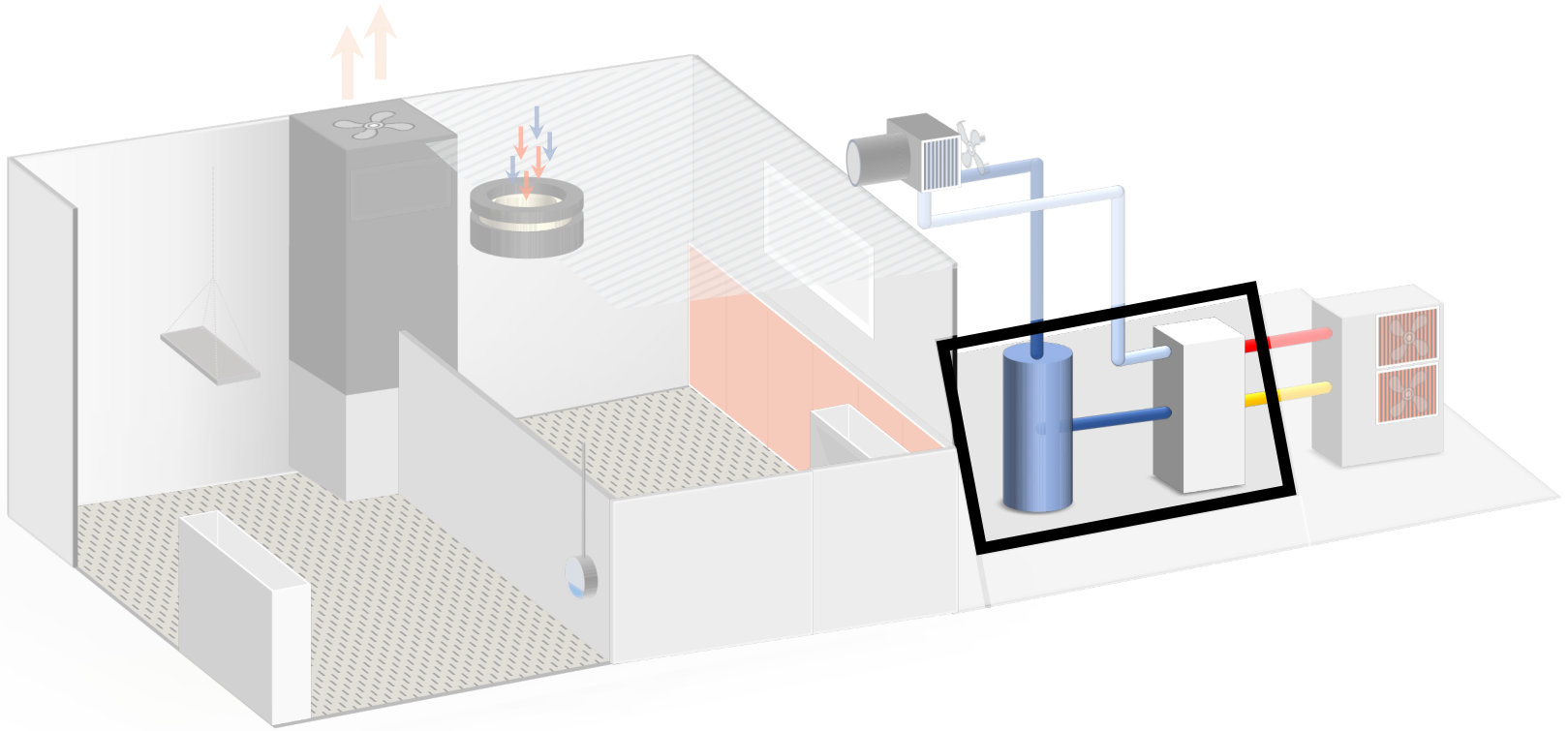
2 separated rooms with the same equipment :



Air fan to draw outside air through a water battery before entering the attic

Climatotec : thermoregulated unit

2 separated rooms with the same equipment :

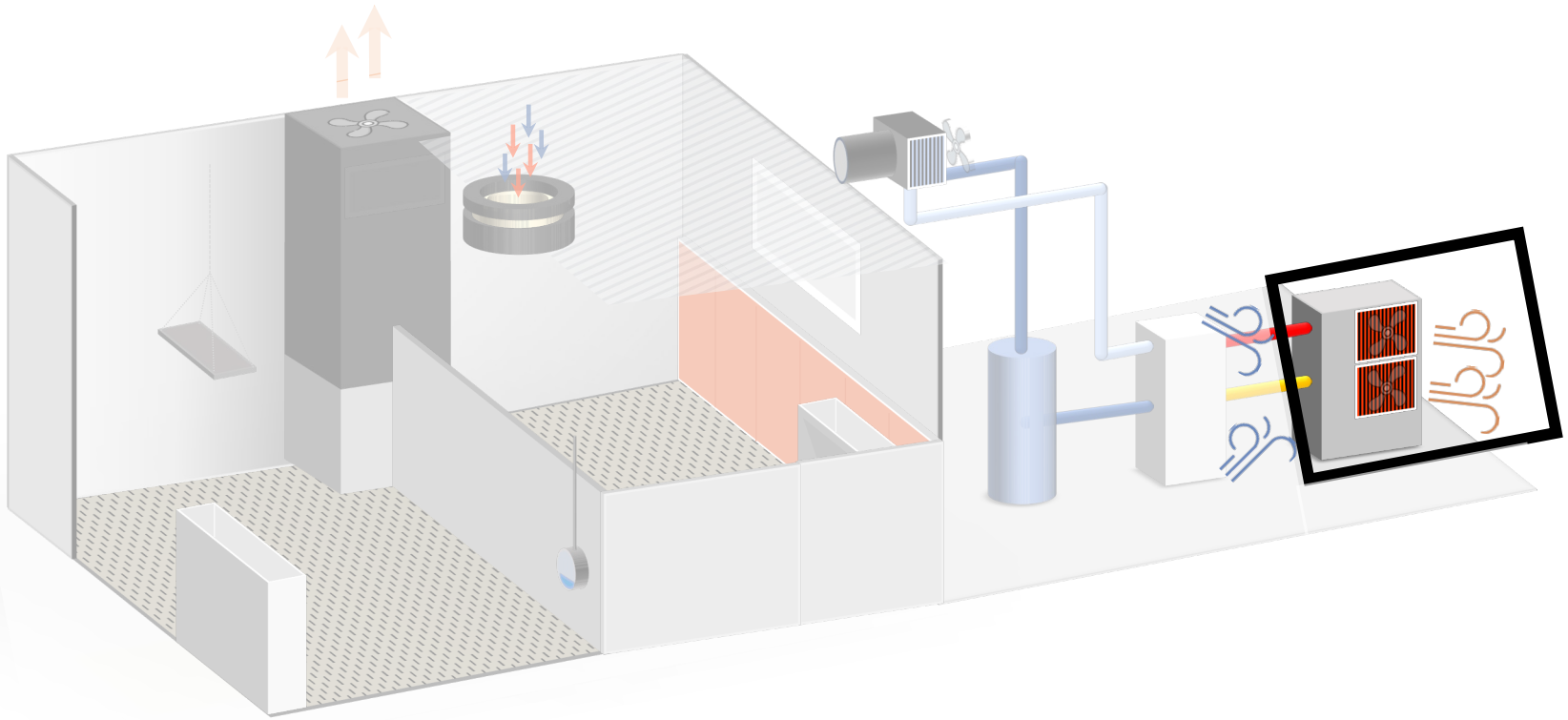


Storage tank (50 l) to feed the battery with cold or hot water

Heat pump with refrigerant fluid in a double circuit

Climatotec : thermoregulated unit

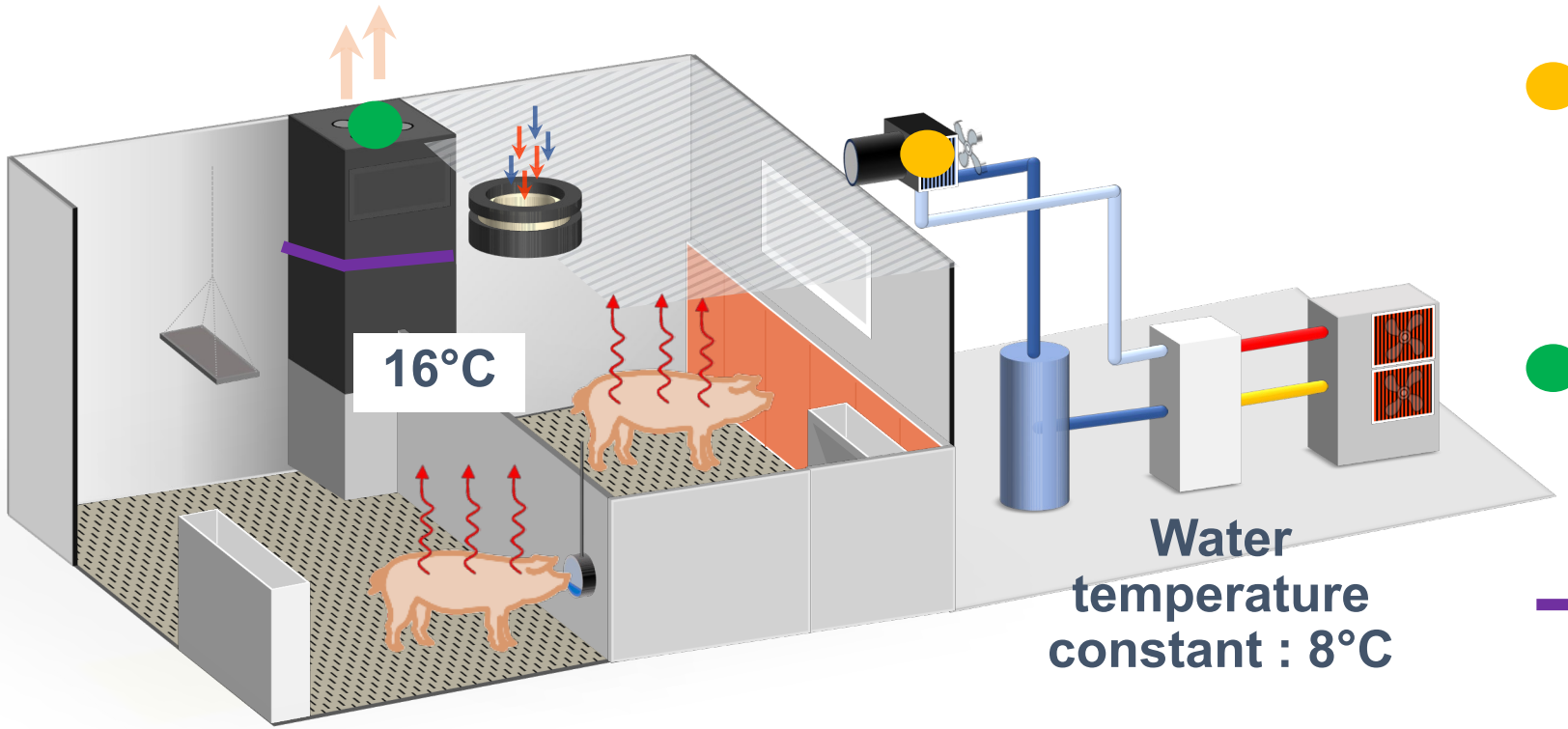
2 separated rooms with the same equipment :



Air fan to draw outside air through a battery for dissipation or heat recovery

Regulation of air temperature

Cold situation : Fight against pig's heat production with air flow



- Progressive ventilation rate controlled by the room's regulating unit
- Progressive ventilation rate controlled by the room's regulating unit
- Fan flap on extracted flow

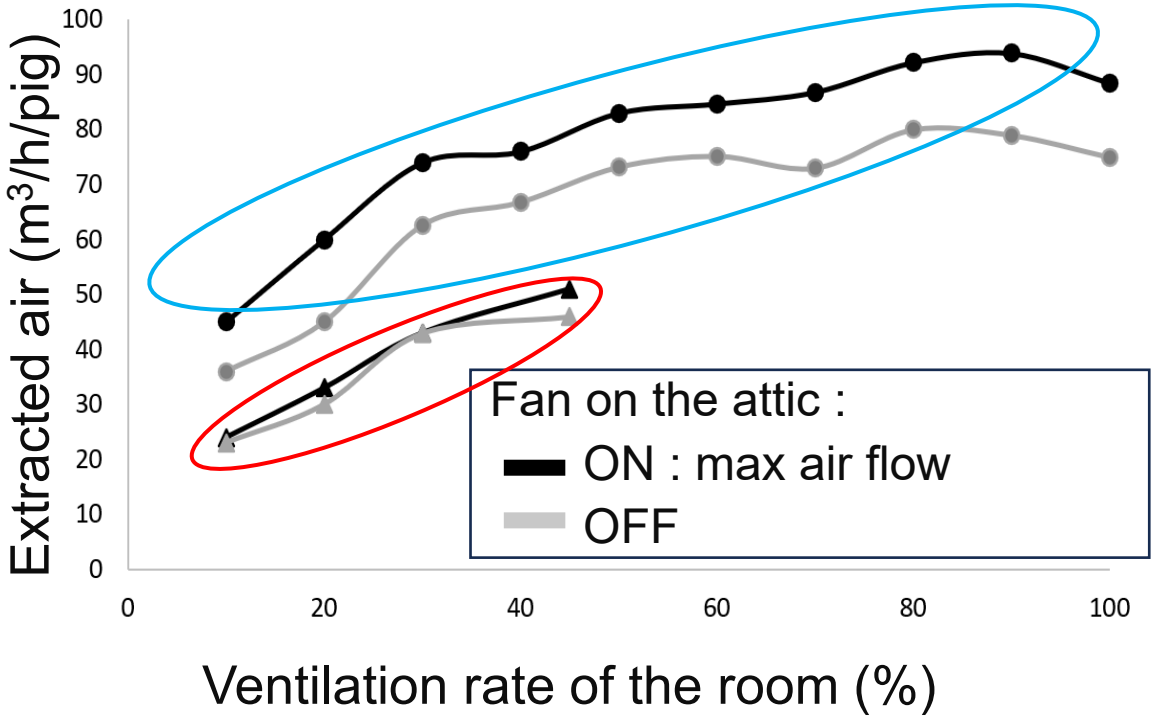
Parameters to maintain temperature

Global air flow of the room :

- Impact of fan flat position
- Impact of the air flow drawing trough the attic

Fan flat : 2/3 closed

Fan flat : 1/2 closed



➔ **Cold situation :**

Temperature close to 16 °C (± 1°C) during all fattening period

Data base & experimental potential

Air temperature before and after contact with pigs

Slurry temperature

Ventilation rate

Individual animal weight and carcass composition

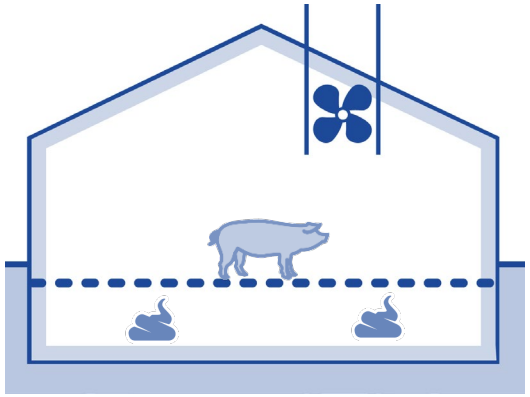
Feed consumption per pen

Greenhouse gas and ammonia emission

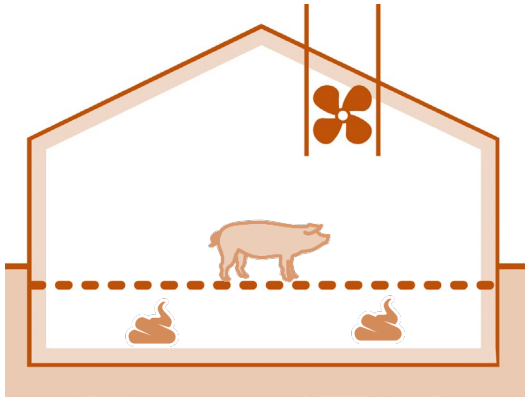
Conclusion and Next step

Use an experimental tool and collect various DATA to work on :

Cold situation (16 – 24 °C) :
- **Solutions to reduce greenhouse gas**



Hot situation (24 – 40 °C) :
- **Impact of global warming and animal's adaptation**



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