

CHARACTERIZATION, OPTIMIZATION AND EFFICIENT IMPLEMENTATION OF ACTIVE FAÇADES IN SOCIAL HOUSING BUILDINGS



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METHODOLOGY

EXPERIMENTAL TEST

SIMULATION ANALYSIS

BUILDING

RESULTS

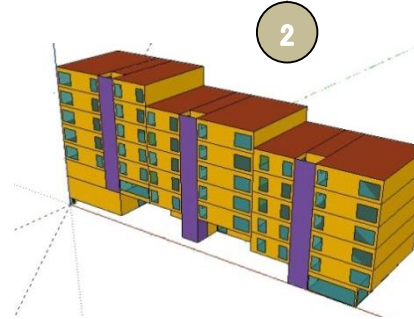
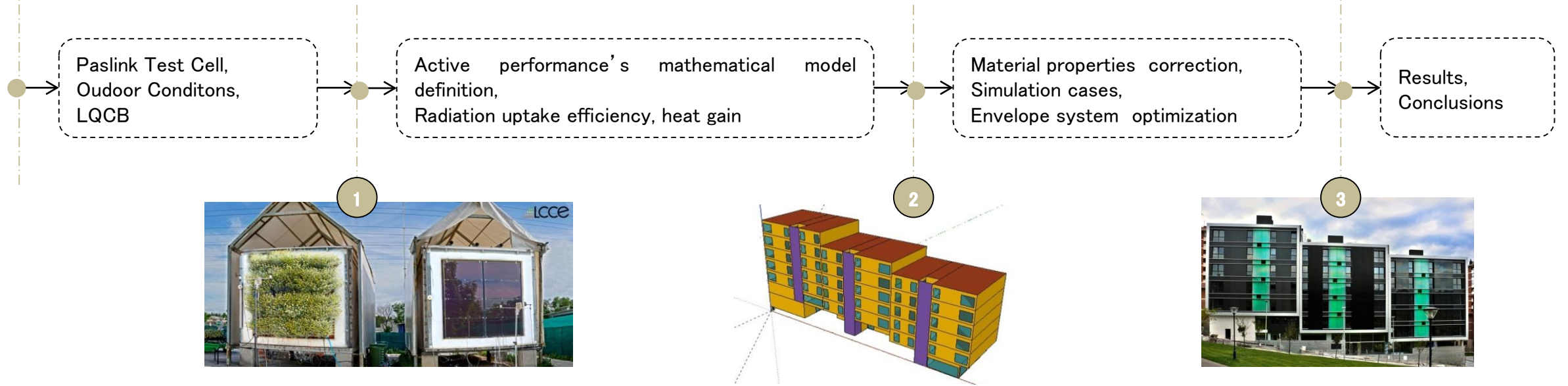
CONCLUSION



Active facades

Building envelope system based on solar energy uptake surfaces and on its use

NZEB Social Housing Building



METHODOLOGY

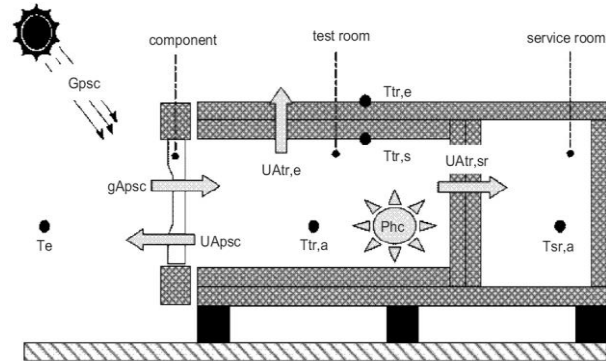
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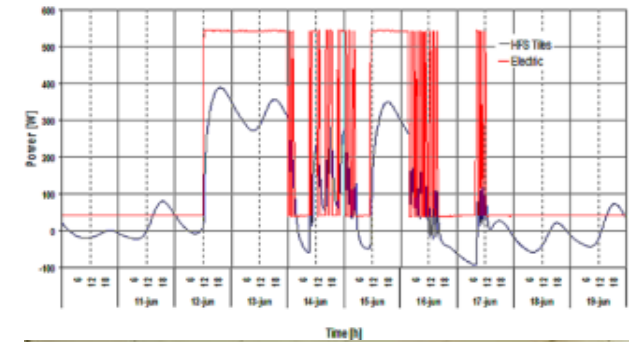
Paslink Test Cells in LQCB

1



Sample Construction

2



Instrumentation and Test Methodology

3



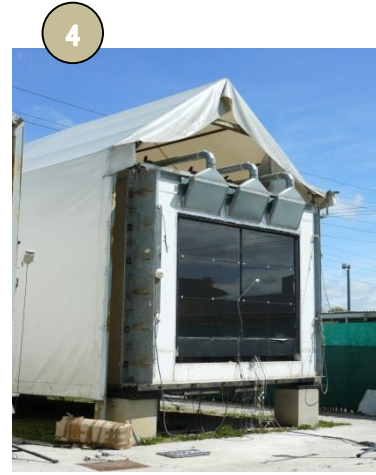
Sheet Ventilated Facade with Air Extraction Forced System



Trombe Wall



Photovoltaic Panels



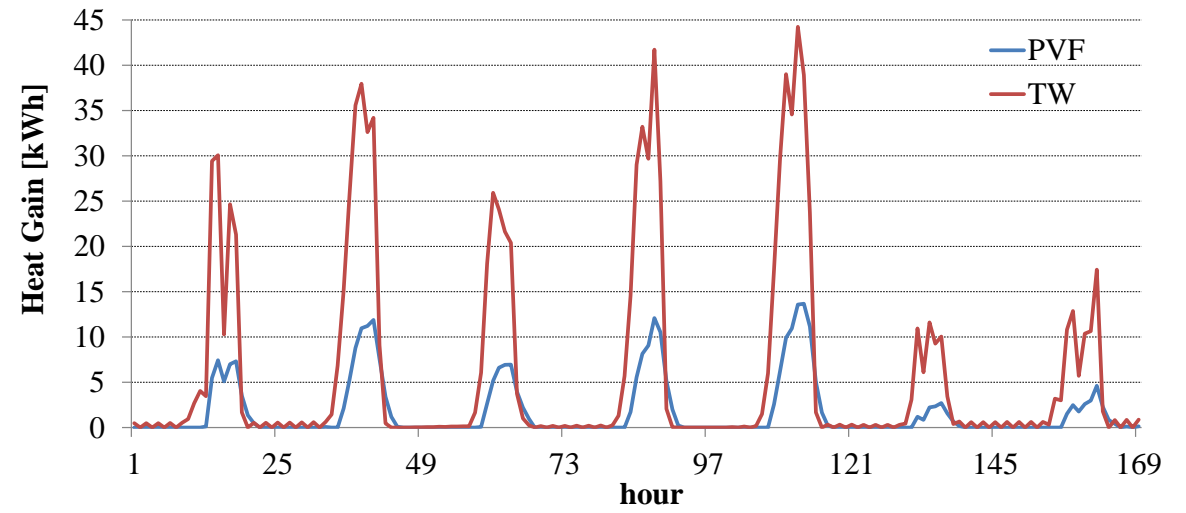
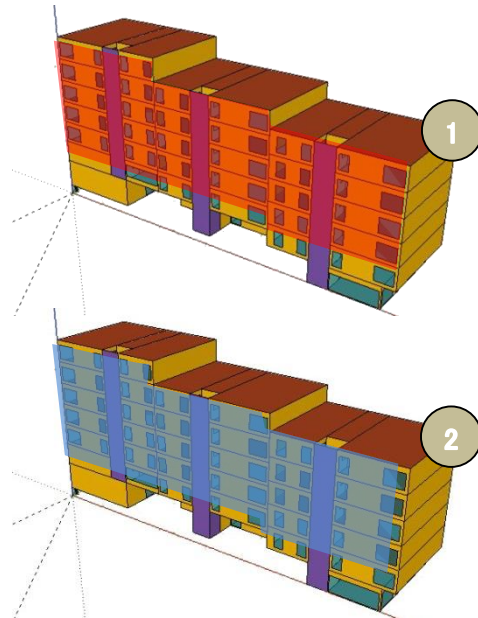
Photovoltaic Panels with Air Extraction Forced System

	Solar radiation uptake efficiency η [%]	Heat gain Φ [kWh/m ²]
1 SVF with AEFS	22	0.90
2 TW	61	2.60
3 PVP	30	1.00
4 PVP with AEFS	89	3.86

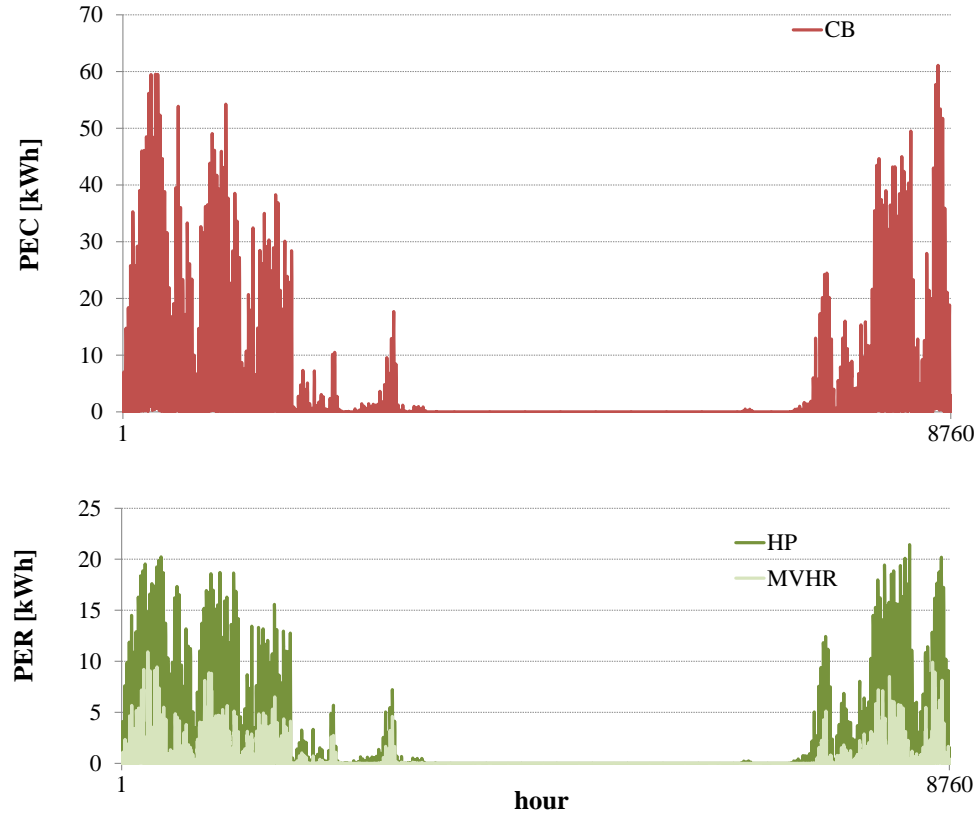
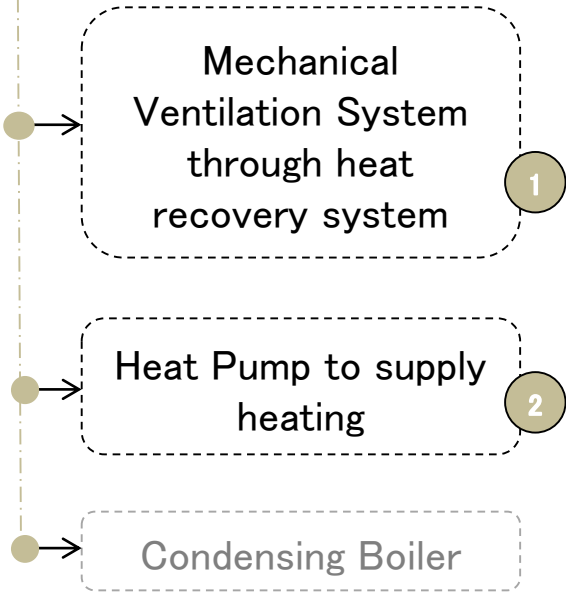
Evaluated Active facades

Trombe Wall + AEFS 1

Sheet Ventilated Facade + AEFS 2



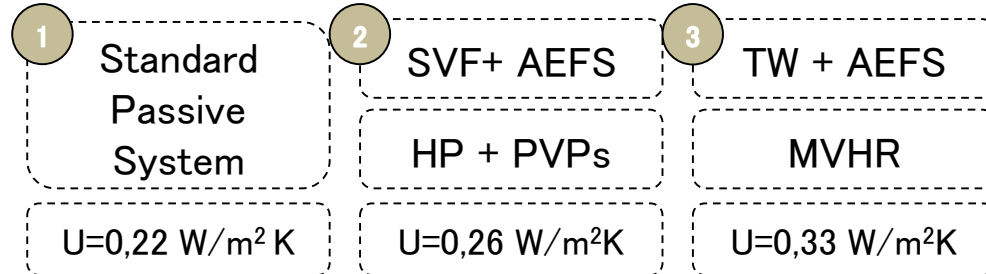
Exploitation of the heat gain



	Primary Energy Consumption [MWh/year]
CV	24,04
1 MVHR	22,00
2 HP	12,86
3 HP + PVP	3,82



Portugalete
(Northern Spain)



DWELLINGS		
SIZE	QUANTITY	SURFACE [m ²]
2 bedroom apartment	16	57,42
3 bedroom apartment	14	86,24
2 bedroom adapted apartment	2	88,39
TOTAL	32	2302,86

2

Sheet Ventilated Facade + AEFS

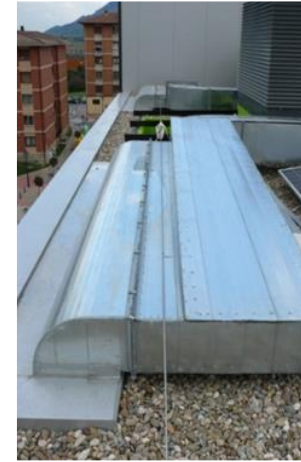
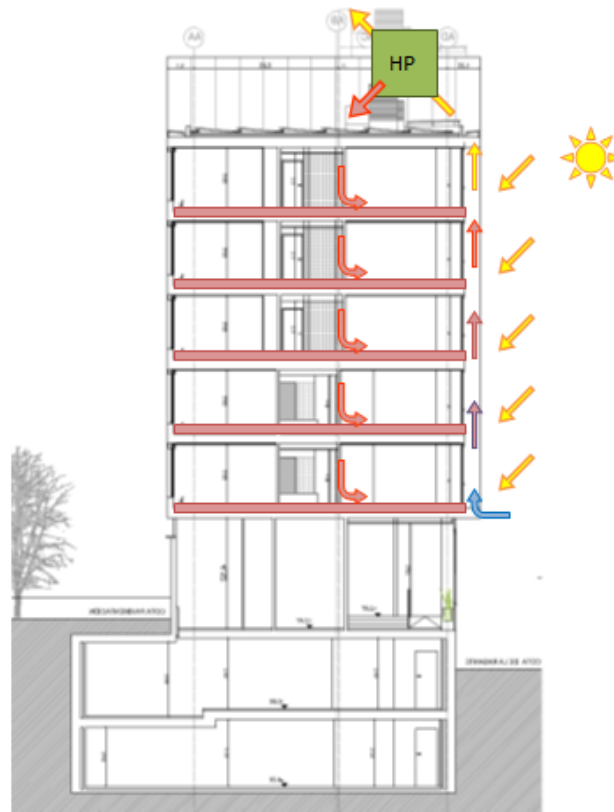
Heat Pump for supply heating

Power 45 kW
Elec. consump. 12,5 kW
COP 3,49

88 PVP

22,4 kW installed

FREE HEATING

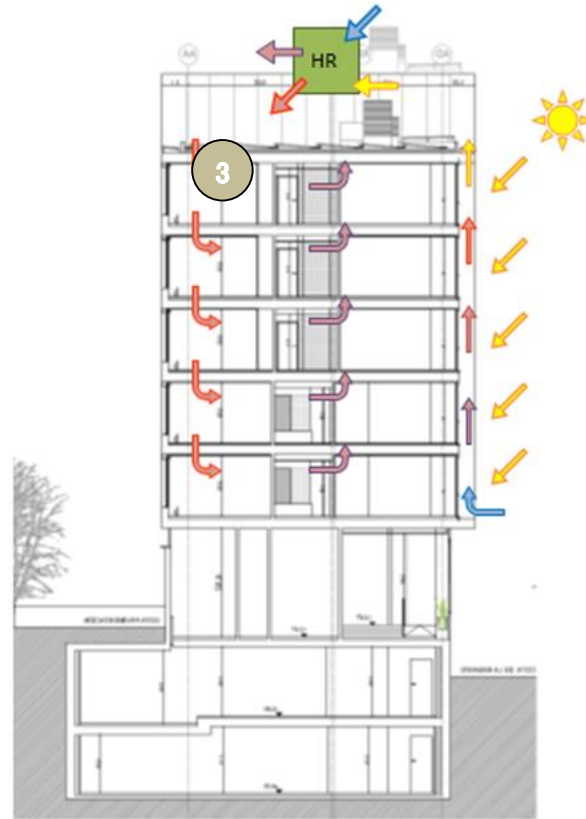


3

Trombe Wall + AEFS

Mechanical Ventilation System through heat recovery system

Nom. airflow 2000 m³/h
Nom. Efficiency 90%



Other systems

CHP for DHW
demand mainly

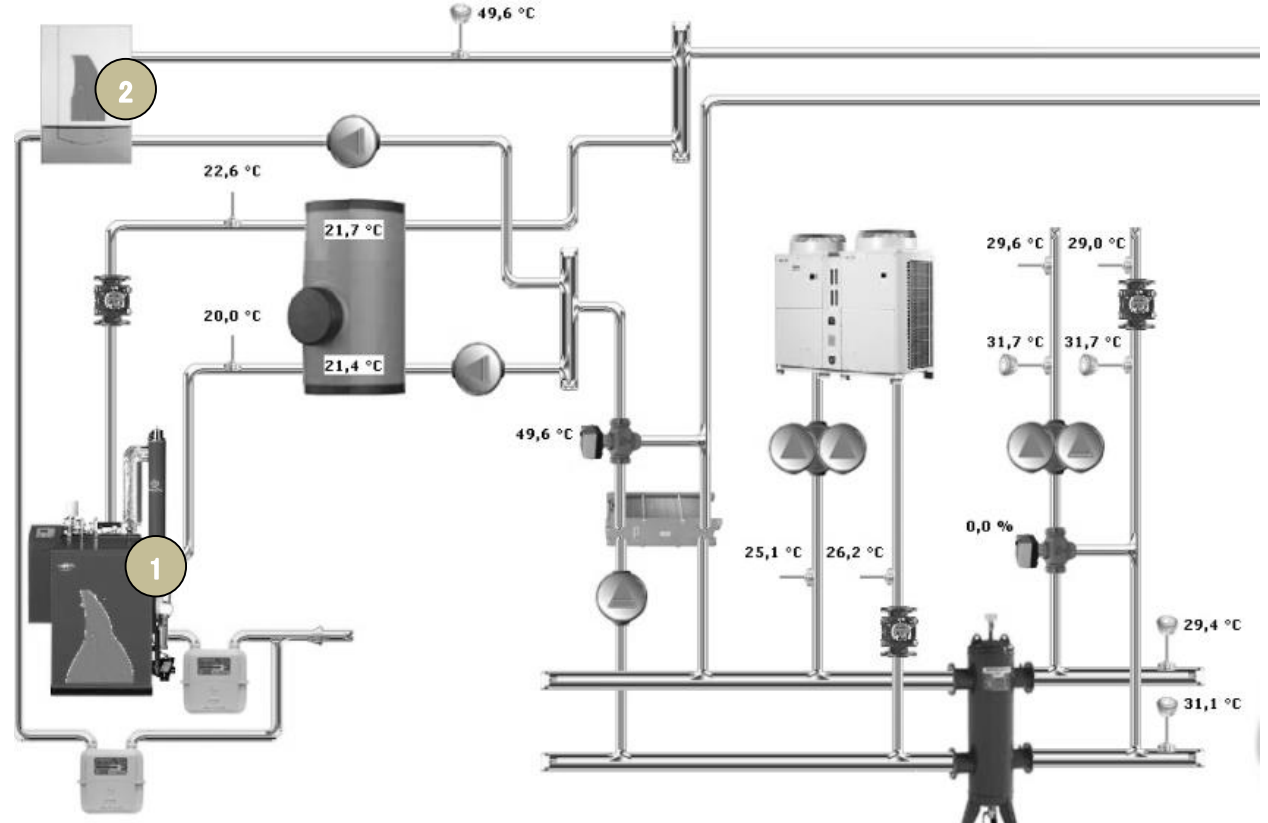
Electricity Power 5,5 kW
Thermal Power 14,8 kW

Condensing Boiler

Rated Heat Output 102 kW

MVHR
(1st and 2nd block)

Without AF' s connection



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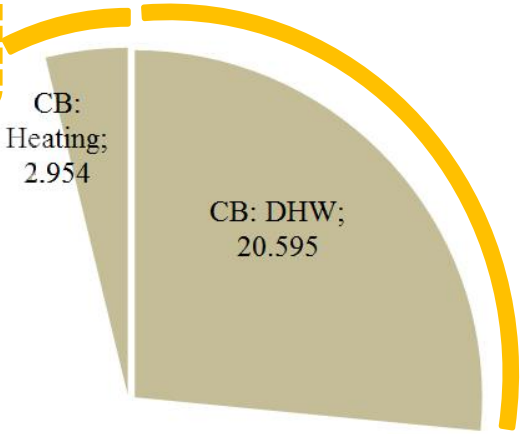
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Heating Demand	17,7 kWh/m ²	%56,2
DHW Demand	13,9 kWh/m ²	%43,8
No renewable Heating Consumption (PE)	2.954 kWh or 1,3 kWh/m ²	23.549 kWh/year or 10,2 kWh/m ² year
No renewable DHW Consumption (PE)	20.595 kWh or 8,9 kWh/m ²	

**PV→HP-Ren
4.260kWh**



**PV Excedente
19.894 kWh**



METHODOLOGY

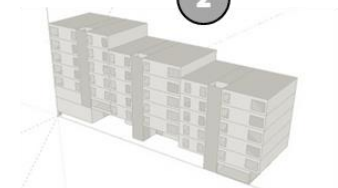
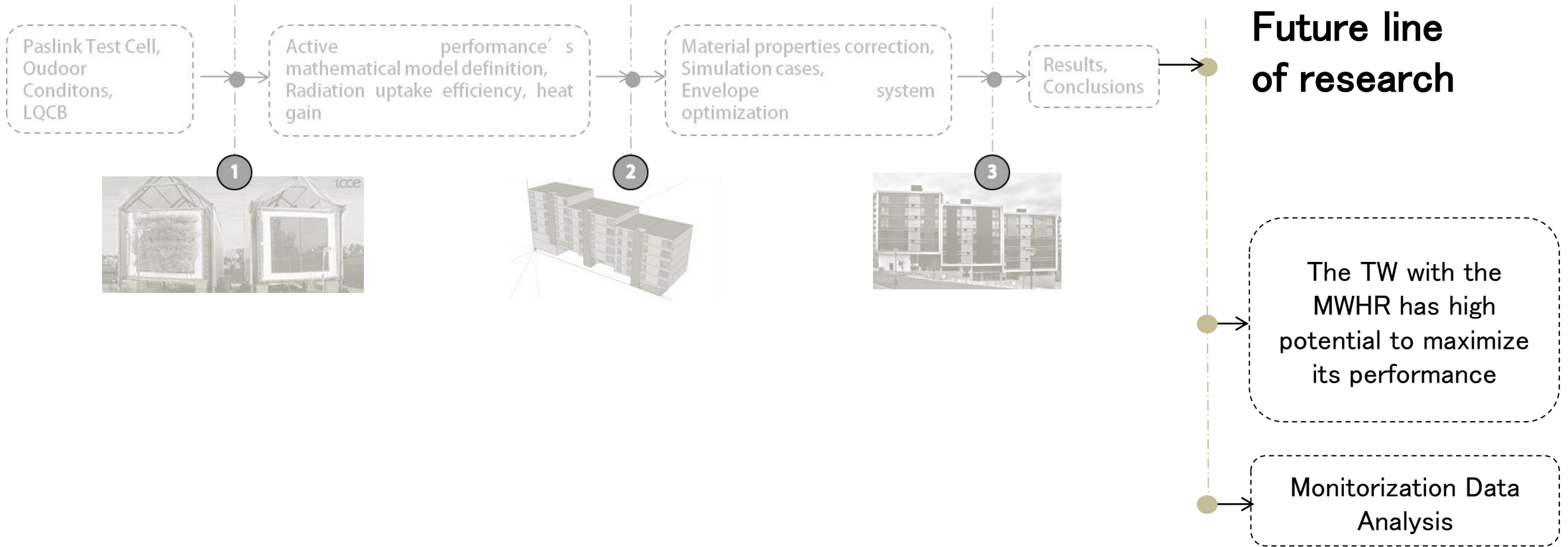
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THANK YOU FOR YOUR ATTENTION

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