5th AIEE ENERGY SYMPOSIUM ON CURRENT AND FUTURE CHALLENGES TO ENERGY SECURITY – energy perspectives beyond COVID19

17 December 2020 – *VIRTUAL CONFERENCE*

Smart Energy Services to Improve the Energy Efficiency of the European Building Stock

Devising classes of energy efficiency measure for evaluating pay-4-performance rate that energy provider will be willing to offer in pay-4-performance scheme

Omniaé / Arturo Lapietra

SENSEI project has received funding from the **European Union's Horizon 2020 Research** and **Innovation programme** under Grant Agreement No **847066**

AGENDA

- What is SENSEI?
- The Energy Efficiency opportunity
- Pay-for-performance (P4P) business model
- Purposes of the study & approach
- Energy Efficiency Measures (EEMs)
- Categorization of the Measures
- Classes of the EEMs
- Table X results
- The P4P rate concept
- P4P rates for complying with EEOs
- The TSO perspective
- SENSEI Stakeholder Community – Why Join?
- Stakeholder community – How to Join

omnia é

sensei

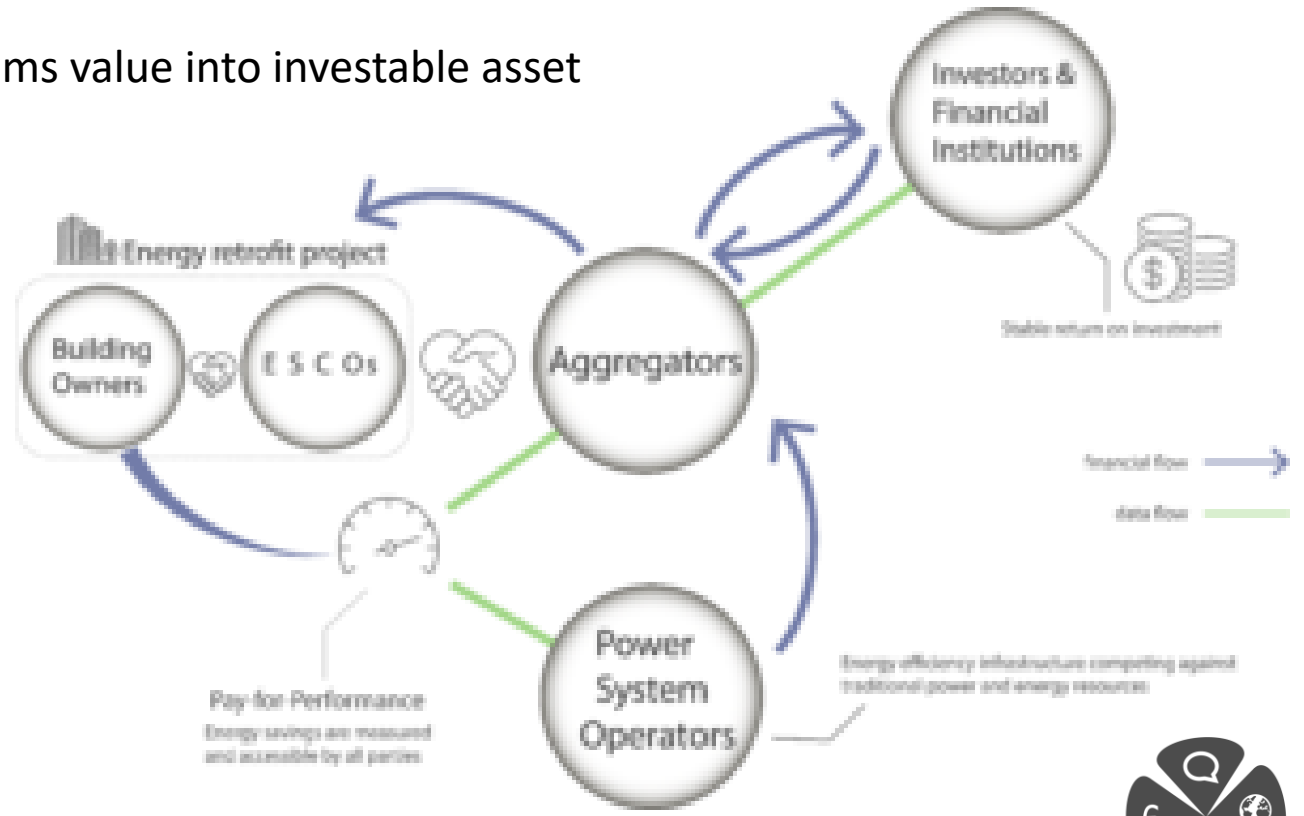
What is SENSEI?

Problem Rebates and incentives for Energy Efficiency Programs are paid up front
→ EE Programs need to rely on deemed energy savings

Solution Enable Energy Efficiency as a ressource
Attract private financing by turning an EE Programs value into investable asset

Pay-for-Performance (P4P) schemes as a business model
SENSEI will develop P4P schemes which are applicable in an EU context.

SENSEI Consortium consists of 13 parties and is funded by the EU Horizon2020 programme.



omnia é

sensei

The Energy Efficiency opportunity

- Energy efficiency decreases the total amount of primary energy used, which, in turn, reduces CO_2 emissions.
- Reduction of energy consumption favours the transition to clean energy, because it reduces the need for investments and finding sites for the deployment of RES technology.
- Energy efficiency can reduce EU energy import dependency, create growth and employment, reduce fuel poverty, and result in more comfortable and healthier buildings.

Despite its potential, the current building renovation rate in EU is very low.

In this challenging context, the SENSEI project proposes a **Pay-for-Performance (P4P)** business model in the EU.

omnia é

sensei

Pay-for-performance (P4P) business model

- Crucial aspects of Pay-for-performance (P4P)
  - Payments channelling & Performance assessment
    - Who pays? → **P4P rates concept**.
    - Who receives?
    - How much?
    - For what?
    - When?

Purposes of the study & approach

- Devising classes of EEMs according to the value of their energy savings for energy providers
- Estimating the P4P rates that energy providers would be willing to offer.

The proposed approach is not focused on quantifying the P4P rates, but on identifying which variables and parameters can affect these rates.

Energy Efficiency Measures (EEMs)

(a) measures that decrease energy consumption

(b) the deployment of solutions for on-site generation of RES-E and/or of renewables-based or renewables-compatible (like heat pumps) solutions for heating and cooling.

- Measures that reduce the use of electricity without affecting its temporal profile.
- Measures for improved control of electricity consumption.
- Measures that affect both the electricity used and the hours required to perform a task.
- Measures that increase electricity consumption due to fuel substitution.
- Measures that install technology for the generation of electricity onsite.

omnia é

sensei

Categorization of the Measures (1)

	Measure	Category
1	Photovoltaics	DISTRIBUTED GENERATION
2	Wind	
3	Solar collectors	
4	Cogeneration	
5	trigeneration	
6	Electric storage	STORAGE
7	Hydraulic storage	
8	CAES	
9	Hydrogen	
10	Thermal storage	
11	Refrigerator storage	
12	Heat pump	CONVERSION OF THE ENERGY
13	Electric vehicles	
14	Thermal coat	BUILDING INTERVENTION
15	Fixtures	
16	Solar screens	

omnia é

sensei

Categorization of the Measures (2)

	MEASURE	CATEGORY
17	District heating	HEATING VENTILATION AIR CONDITIONING AND DOMESTIC HOT WATER SYSTEMS
18	Heat recovery	
19	Heat pump replacement	
20	Low temperature distribution	
21	Replacement of indoor units	
22	LED	ELECTRICAL SYSTEMS
23	Efficient electric motors	
24	Capacitor bank	
25	Optimizers	
26	Heating	BUILDING AUTOMATION & CONTROL SYSTEMS
27	Domestic hot water	
28	Cooling	
29	Ventilation and Conditioning	
30	Lighting	
31	Solar screens	
32	TBM systems	

omnia é

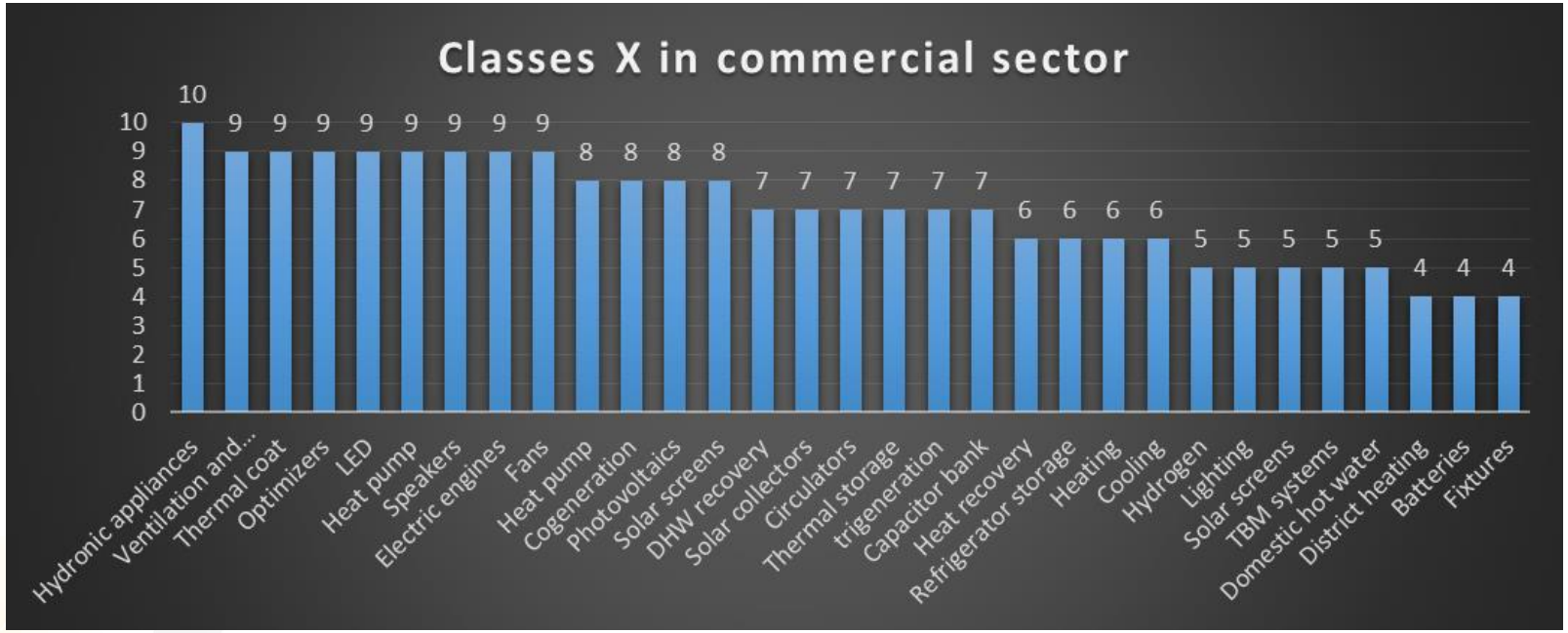
sensei

Classes of the EEMs

- **Table A: Qualitative analysis of the effects on the grid;**
- **Table B: Technical-qualitative analysis with details of the user-side benefits;**
- **Table C: quantitative table.**
- **Table X** (A & B & C)

Sectors:
- Industrial
- Commercial
- Residential

Class (Value)	Class (Alphabetical)
10	A
9	B
8	C
7	D
6	E
5	F
4	G
3	H
2	I
1	J

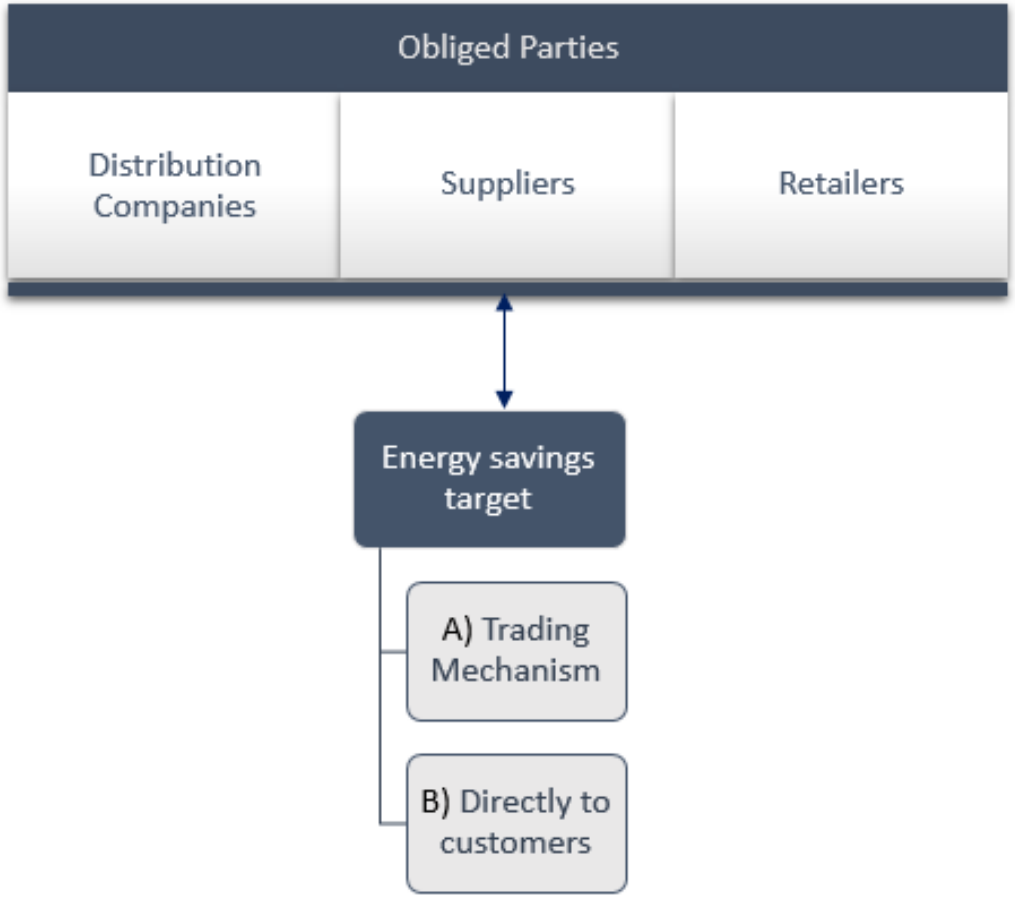


The P4P rate concept

A P4P rate can be seen as funds transferred per energy saved.

A P4P rate could be interpreted as a numerical value (€/kWh) that energy providers are willing to pay for each kWh saved or moved to another time of the day. These rates could vary according to the variations the electricity demand curve

P4P rates for complying with EEOs



P4P rates for complying with EEOs

CATEGORY	INTERVENTION	ID	Table C Class
DISTRIBUTED GENERATION	photovoltaics	1a	C
		1b	C
		1c	C
	Wind	2b	B
	Solar collectors	3a	D
		3c	C
	Cogeneration	4a	F
		4b	B
		4c	B
	trigeneration	5b	C
		5c	C
STORAGE SYSTEMS	Batteries	6a	I
		6b	I
		6c	I
	Hydroelectric	7b	B
	CAES	8b	B
	Hydrogen	9b	E
		9c	E
	Thermal storage	10a	C
		10b	B
		10c	B
	Refrigerator storage	11b	C
		11c	C
CONVERSION OF THE	Heat pump	12a	B
		12b	B
		12c	B

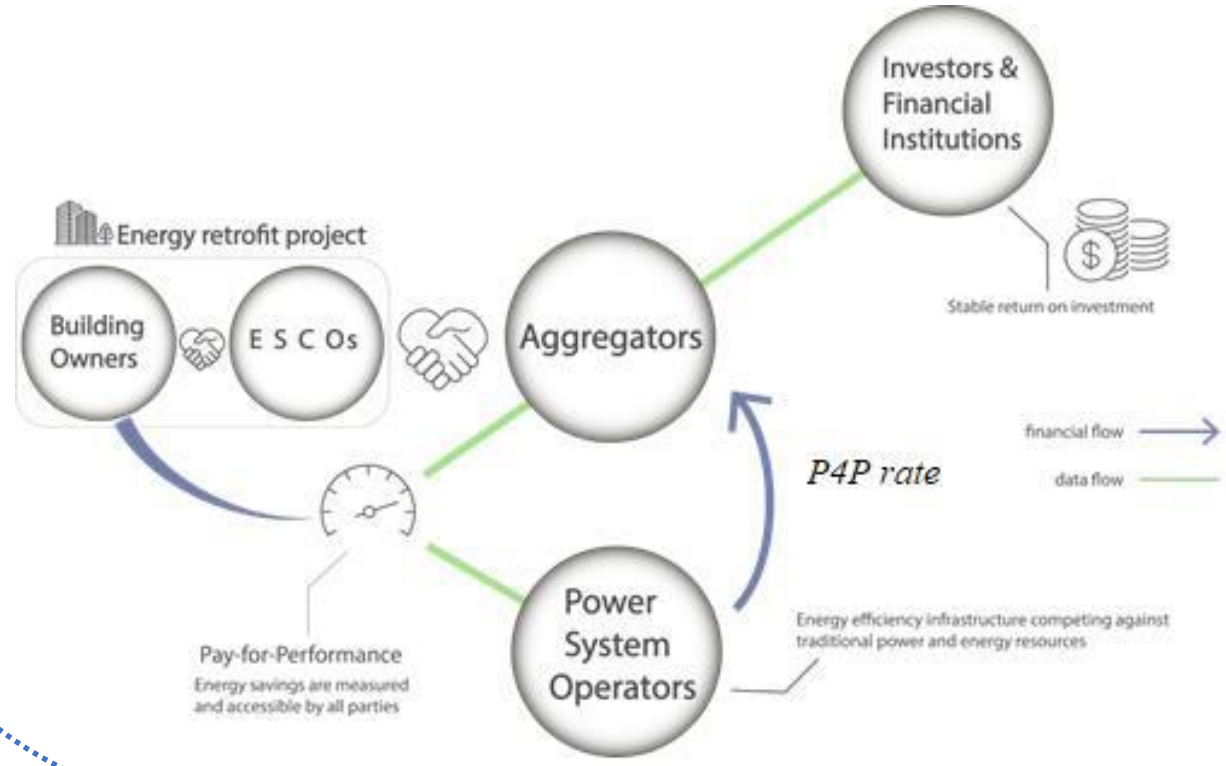
Classes of EEMs	P4P rates
A - B	High
C - D	Medium
E - F	Low
G - H	Very Low
I - J	N.A.

omnia é

sensei

The TSO perspective

CATEGORY	INTERVENTION	ID	Class X
STORAGE SYSTEMS	Batteries	6a	H
		6b	G
		6c	G
	Hydroelectric	7b	C
	CAES	8b	C
	Hydrogen	9b	F
		9c	F
	Thermal storage	10a	E
		10b	D
		10c	D
	Refrigerator storage	11b	E
		11c	E
CONVERSION OF THE ENERGY CARRIER	Heat pump	12a	B
		12b	B
		12c	B
	Electric vehicles	13b	F
BUILDING ENVELOPE	Thermal coat	14a	C
		14b	B
		14c	B
	Fixtures	15a	G
		15b	H
		15c	G
	Solar screens	16a	D
		16b	D
		16c	C



omnia é

sensei

Stakeholder Community – Why Join?

Influence

- Influence the development by participating in surveys, webinars, workshops
- Identify potential pilots for P4P

Knowledge

- Acces to interactive e-learning system, translating into early mover advantage
- Receive biannual newsletter, community news and publications

Visibility

- Have your company logo flagged alongside SENSEI activities all over Europe (optional)
- Showcase your expertise, experience and discuss SENSEI's latest progress during our events

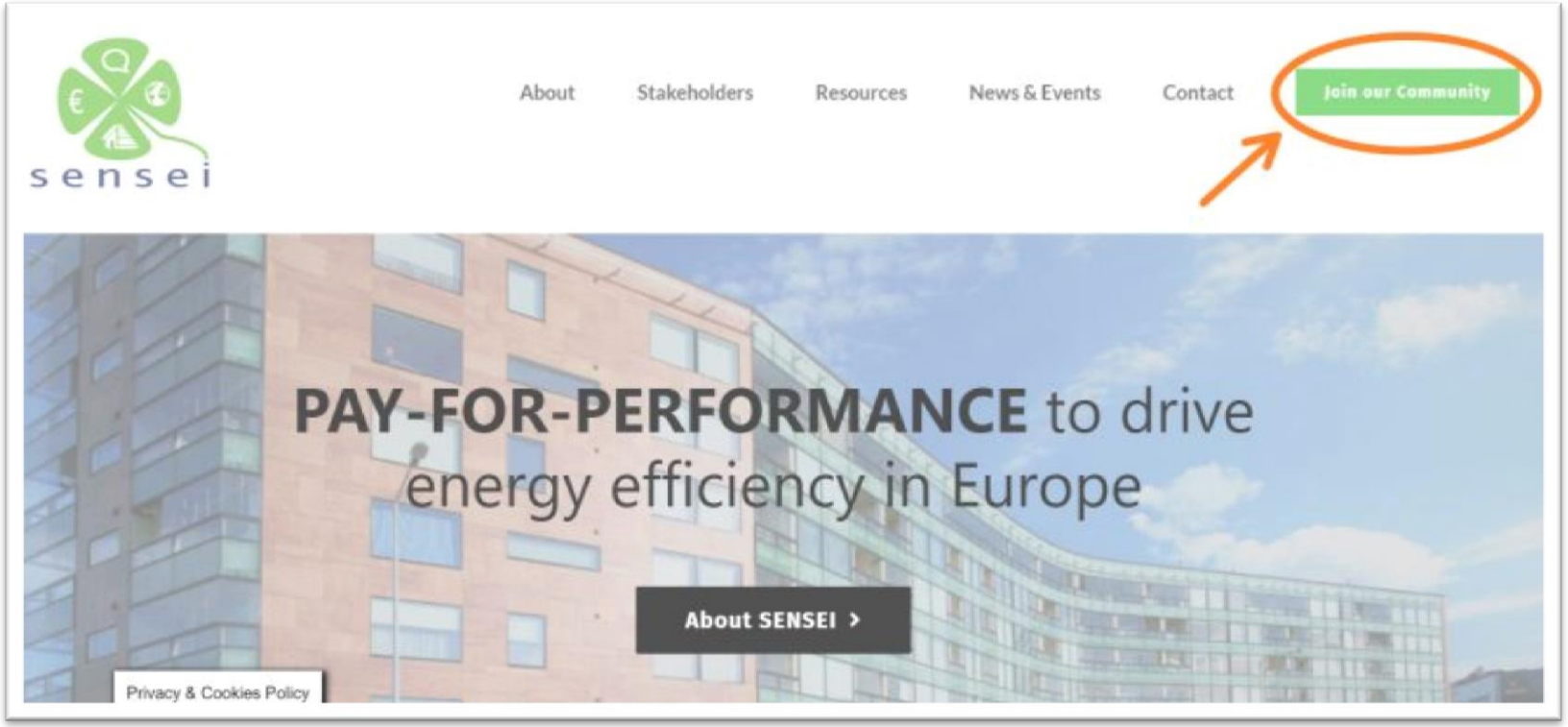
Activities

- Provide feedback and challenge our findings according to your availability and interest
- Attend our workshops, webinars and other activities with your peers

sensei

Stakeholder community – How to Join

To join the SENSEI Stakeholder community, go to out website at www.senseih2020.eu and click the button in the top right corner



sensei

Thank you

Arturo Lapietra

alapietra@omniaenergia.it

Omniaè - Cosenza (Italy)

Sign up to receive our Newsletter at www.senseih2020.eu

Sign up to join our Stakeholder Community: https://senseih2020.eu/stakeholders/

SENSEI project has received funding from the **European Union's Horizon 2020 Research** and **Innovation programme** under Grant Agreement No **847066**