

EU SUSTAINABLE ENERGY WEEK



Densification through new energy plus buildings for NZE construction sector

Giovanni Semprini, University of Bologna

LEAD THE CLEAN ENERGY TRANSITION
#EUSEW18



Introduction

Buildings – Energy factors

- 40% energy consumption
- 36% CO₂ emission in the EU
- Investments need to be scaled up in order to achieve the EU climate and energy 2030 goals



LEAD THE CLEAN ENERGY TRANSITION
#EUSEW18



Introduction

Buildings – NON Energy factors

- IEQ
- building safety
- Urban quality
- Social inclusion



LEAD THE CLEAN ENERGY TRANSITION
#EUSEW18

Towards NZEB building/district



Assistant Buildings' addition to Retrofit,
Adopt, Cure And Develop the Actual
Buildings up to zeRo energy, Activating a
market for deep renovation



**Proactive synergy of
inteGrated Efficient Technologies
on buildings' Envelopes**

GET system

LEAD THE CLEAN ENERGY TRANSITION
#EUSEW18





Objectives

ABRACADABRA aims at implementing
a new, attractive renovation strategy based on a multi-benefit approach
(substantial increase in the real estate value)

(NON-ENERGY RELATED FACTORS for nZEB!)

provided by AdoRES

(new **A**ssistant buildings' **a**dditi**o**n and **R**enewable **E**nergy **S**ources)

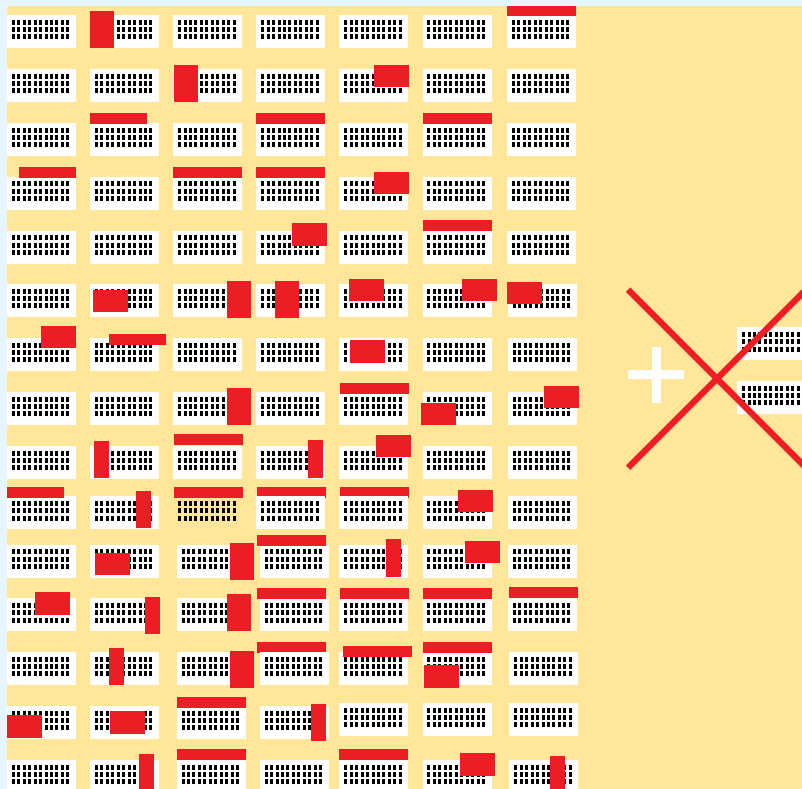
**to create an up-grading synergy between
OLD AND NEW ...**

LEAD THE CLEAN ENERGY TRANSITION
#EUSEW18





Urban densification



A densification strategy could help providing an **alternative solution** to the construction of **new buildings in natural areas**, contrasting the consequent **urban sprawl**



At legislative urban level ABRA = **punctual densification policy** fostering the investments in nZEB while preserving the natural areas around the cities....

LEAD THE CLEAN ENERGY TRANSITION
#EUSEW18



SUSTAINABLE
ENERGY WEEK
04-08 JUNE 2018

An initiative of the  European Commission



Market actors

Policy makers

KEY FINANCIAL DECISION MAKERS



Economic Investment



AdoRes

RES

Coatings

Plants renewal

Environmental/Social
Benefits

Profit of Investment

Break Even

Economic Profit
+
Added value



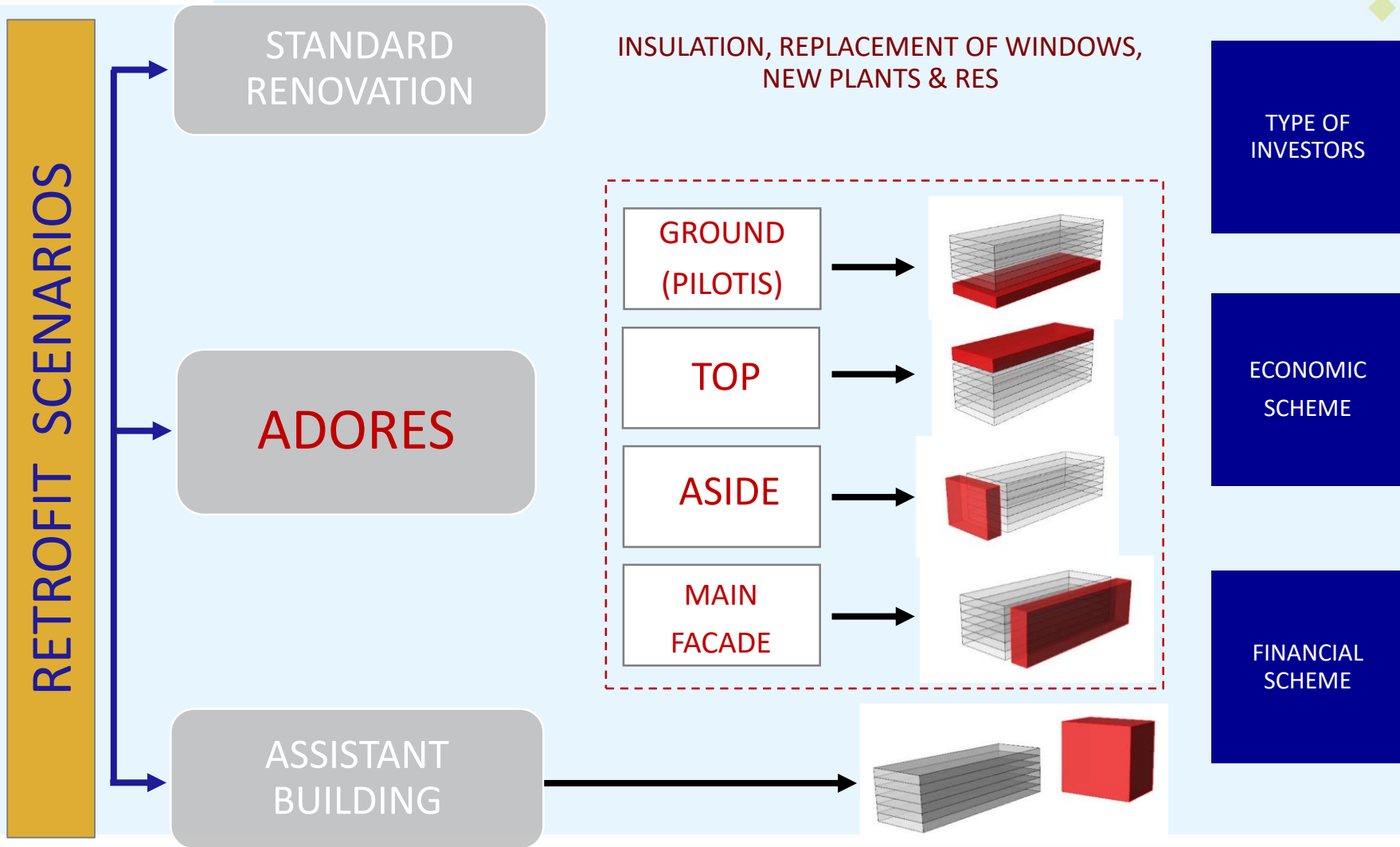
Energy Efficiency
+
Savings

LEAD THE CLEAN ENERGY TRANSITION
#EUSEW18



SUSTAINABLE
ENERGY WEEK
04-08 JUNE 2018

An initiative of the  European Commission





Why AdoRES can be a viable solution for the nZEB feasibility?

High transformations in EE retrofitting operations
Against **higher initial costs** **can balance** the
economic investment
Up to set to zero **the costs** of standard energy
retrofitting

LEAD THE CLEAN ENERGY TRANSITION
#EUSEW18








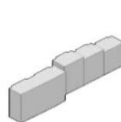
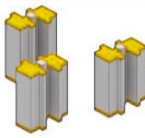
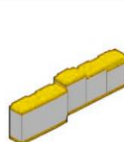
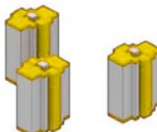
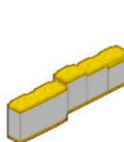
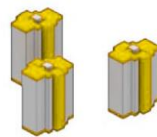
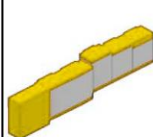
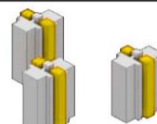
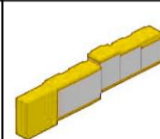
CASE STUDY

LEAD THE CLEAN ENERGY TRANSITION
#EUSEW18



**SUSTAINABLE
ENERGY WEEK**
04-08 JUNE 2018

An initiative
of the  European
Commission

ASSUMPTIONS	CASE STUDY 1: VIA TORINO/VIA ORTOLANI, BOLOGNA			Epi	PAY-BACK TIME
<div>Cost of construction: 1.000 euro/mq</div> <div>Cost of Renovation: 650 euro/mq</div> <div>Real estate value: 2.700 euro/mq</div>	CURRENT STATUS	<div></div> <div>Area= 16.150 mq Area=8.450 mq</div>		<div>Epi tower= 259 kWh/mq</div> <div>Epi line building= 315 kWh/mq</div>	-
	INTERVENTION	1 RENOVATION	<div></div> <div>NO ADDITION</div>	<div>Epi tower= 25 kWh/mq</div> <div>Epi line building= 32 kWh/mq</div>	27 years
		2 SATURATION	<div></div> <div>ADDED 4.740 mq</div>	<div>Epi tower= 25 kWh/mq</div> <div>Epi line building= 32 kWh/mq</div>	16 years
		3 ADHESION	<div></div> <div>ADDED 10.340 mq</div>	<div>Epi tower= 25 kWh/mq</div> <div>Epi line building= 32 kWh/mq</div>	2 years
		4 ASSISTANT BUILDING	<div></div> <div>ADDED 14.740 mq</div>	<div>Epi tower= 25 kWh/mq</div> <div>Epi line building= 32 kWh/mq</div>	0 years
		5 PROPOSED PROJECT	<div></div> <div>ADDED 12.140 mq</div>	<div>Epi tower= 25 kWh/mq</div> <div>Epi line building= 32 kWh/mq</div>	0 years

LEAD THE CLEAN ENERGY TRANSITION
#EUSEW18

Objectives



Energy requirements – by adding to the existing (or substituting it with) new pre-fab (plug and play) **highly energy performing envelopes combined with HVAC (Heating, Ventilation, Air Conditioning) systems**

Safety – using external structures to:
-**increase the overall structural capacity of the building**, supporting the new envelopes and the additional spaces for...

Social sustainability – by providing **tailored and customized solutions** for users, owners and house managers, increasing safeness and minimize disturbance of inhabitants, resulting in the increase of the desirability of retrofit options and the real estate value of the buildings

General approach:

- External GET system (2) connected to existing building (5) providing structural strengthening and thermal/acoustic insulation, shading devices, etc
- additional new units (3)
- New high efficiency HVAC plants Plug/Play-ready: centralised (4) and/or autonomous (6)
- Integrated RES production systems
- New distribution pipes/ductworks /electric wires (1)
- Integration of BACS and TBM





Impact and future chances

- New processes and new products to accelerate the competitiveness and attractiveness of energy efficient measures
- Add-on strategy to reduce costs of renovation
- NZEB & PEB by implementation of RES systems, new efficient plant systems, BACS systems
- People attractiveness
- Digital implementation by BIM process (design/construction) and TBM system (management)



JOIN #EUSEW18



EUSEW.EU



EUENERGYWEEK



@EUENERGYWEEK

LEAD THE CLEAN ENERGY TRANSITION
#EUSEW18



**SUSTAINABLE
ENERGY WEEK**
04-08 JUNE 2018

An initiative
of the  European
Commission