



# **FROM SIAPA TO SIEPE: URBAN FARMING AS AN INNOVATIVE SUSTAINABLE TOOL FOR CITIES' RETROFITTING**

**THE CASE OF GALLIERA CITY IN BOLOGNA, ITALY**

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with Patricia González Mariscal, Laura Gabrielli, Michele Lapomarda



# URBAN FARMING AS A KEY FACTOR

Influencing cities' sustainable development

Urban farming as an innovative tool for generative and sustainable cities, the case of Galliera city in Bologna, Italy



# URBAN FARMING AS KEY FACTOR INFLUENCING CITIES' RESILIENCE AND SUSTAINABLE DEVELOPMENT

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EX-SIAPA INDUSTRIAL SITE

194 000 SQ.M.

A HURDLE AND AN ABANDONED WOUND

The area holds a huge potential for both retrofitting and adaptive reuse of buildings and spaces.

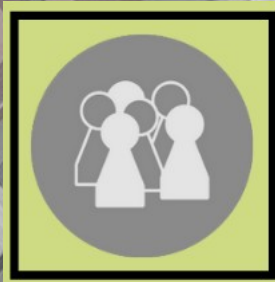


# **A GENERATIVE EDUCATIONAL & AGRICULTURE-BASED HUB**

**A RESILIENT AND SUSTAINABLE CITY ENGINE BASED ON  
URBAN FARMING TECHNOLOGIES AND SMART SOLUTIONS.**

**A MULTILAYERED FULLY INTEGRATED APPROACH THAT  
TACKLES ALL CHALLENGES AT THE SAME LOCATION**

## **REVITALIZATION**



# A SMART & SUSTAINABLE INTERACTIVE APPROACH



Mitigation of UHIE through green and cool roofs



Daylighting is maximized through light wells, and light shelves



Circular economy to be utilized



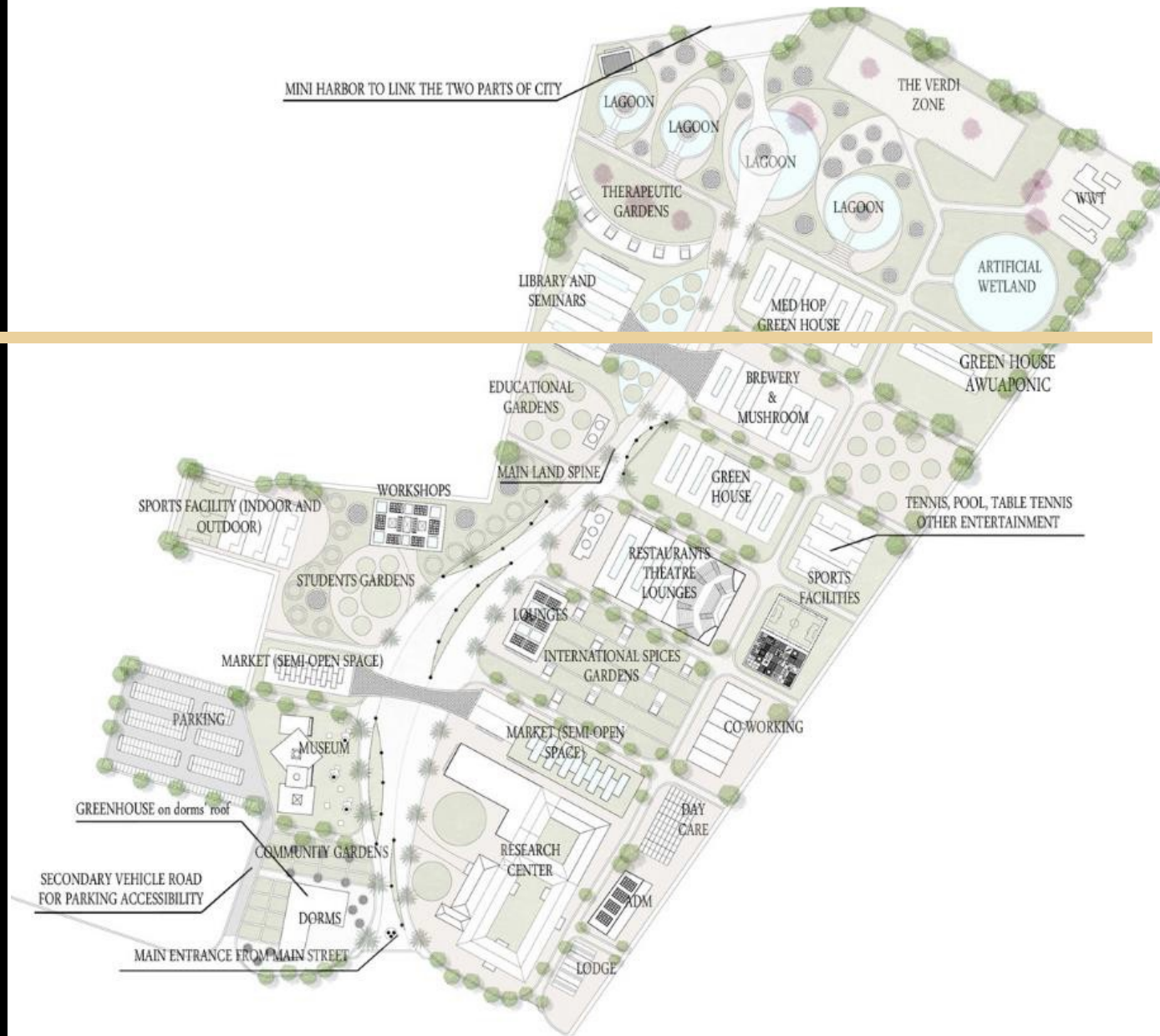
Facades were redesigned with smart and green treatments such as, algae facades, smart double glazed, and green walls



Introducing a smart Building Management System



Minimizing overall demolition of existing structures





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# FROM SIAPA TO

S  
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P  
E

SUSTAINABILITY  
INCLUSION  
ENERGY  
PRODUCTION  
ENVIRONMENT

SUSTAINABLE  
DEVELOPMENT  
GOALS



1	2	3	4	5	6
5%	4000	100	200	6.87	266.7
DEMOLITION	SQ.M.	TON	STUDENTS	KWH/ SQ.	TON
	P.V.	FRESH ZERO CARBON FOOTPRINT FRUITS AND VEGETABLES		ANNUAL SOLAR ENERGY PRODUCTION	CO2 REDUCTION IN CARBON EMISSIONS



# ENVIRONMENTAL INTERVENTIONS

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**Saving resources and lowering environmental impacts through the implementation of efficiency measures, renewable technologies, and by treating waste as a resource.**

**Technologies we focused on:**

- 
- **SUSTAINABLE URBAN DRAINAGE (SUDs)**
  - **PHYTOREMEDIATION**
  - **MICROBIAL FUEL CELLS (MFC)**
  - **ANAEROBIC DIGESTION OF AGRONOMICAL WASTE**
  - **GREEN ROOF INTEGRATED PHOTOVOLTAIC SYSTEMS**



# ENVIRONMENTAL INTERVENTIONS

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## Sustainable Urban Drainage (SUDs)

**Annual water requirement (100 residents):**

- **Washing machine = 365000 L/y**
- **Cleaning = 73000 L/y**
- **Irrigation = 600000 L/y**
- **Aquaponics and hydroponics = 10000 L/y**

**DESIGN VOLUME**

**2086**

**M<sup>3</sup> / Y**

**AV. DRY TIME**

**24 DAYS**

**STORAGE TANKS WITH**

**TANK VOLUME**

**60000 L**

**CAPACITY ARE SET UP.**



# ENVIRONMENTAL INTERVENTIONS

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## Phytoremediation

- **Organochlorides**
- **Three polluted aquifers**
- **P&Tsystem and facultative pond**
- **In-situ treatment with poplar trees**
- **Upgrade of the green area for biodiversity enhancement**





# ENVIRONMENTAL INTERVENTIONS

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## Greenroofs integrated photovoltaic system

- **Extensive green rooftops for horizontal roofs**
- **Monocrystalline panels (eff. 20%)**
- **Mutual advantages:**
  - 1. Greenroof boosts the efficiency and durability of the panels;**
  - 2. Panels' shading attenuates plants evapo-transpiration and increase carbon sequestration.**
- **Energetic, thermal and acoustic buildings' behaviour enhancement**
- **Reduction of the UHI effect**
- **Provision of habitat for micro-flora and micro-fauna**





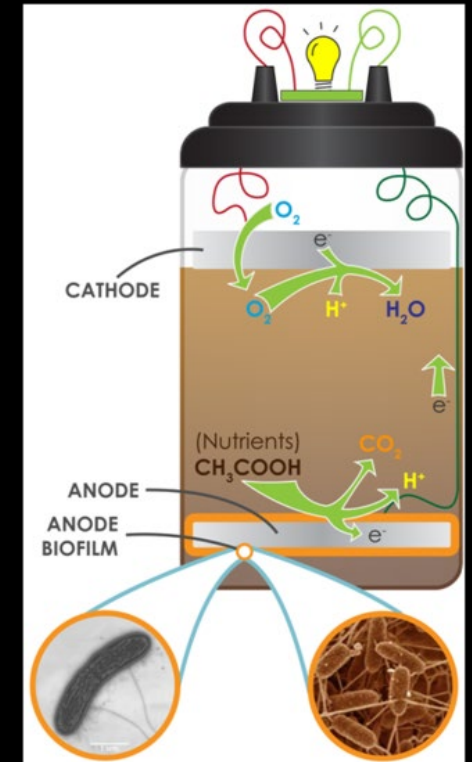
# ENVIRONMENTAL INTERVENTIONS

## Anaerobic digestion

<i>Waste source</i>	<i>30</i>	<i>with</i>	<i>137</i>	<i>Covering</i>	<i>100</i>
<i>Agronomic + organic</i>	<i>m<sup>3</sup>/ day of CH<sub>4</sub></i>		<i>KWh /day</i>		<b>PEOPLE</b>

## Microbial fuel cells

- **Substrate: Brewery wastewater**
- **Conversion of organic matter into electricity by bacteria**
- **High conversion rates for lack of inhibitory substances**
- **Combines electricity generation and wastewater treatment**





# Flyweel function: Urban Agriculture



## APPROACH INDOOR AREAS:

PRODUCE INTENSIVE TARGETED AND EFFICIENT



TRANSFORM THE VACANT WHAREHOUSES  
INTO HIGH-TECH GREENHOUSES



+CO2



## APPROACH OUTDOOR AREAS:

### Activities

1. Rent a vegetable garden
2. Honey bee keeping course
3. Oven for Pizza & Baking

✓ *Promote social  
inclusion*



### Community gardens:

- Allotment gardens
- International spice garden
- Hortotherapy



# EXPERIMENTAL AIM

## AQUAPONIC tech.



Common Rudd  
(*Scardinius Erythrophthalmus*)



Tench (*Tinca tinca*)

### FISH RESTOCKING PROGRAME

- Food production
- Decrease the impact of fish farming

**PROVIDE ECOSYSTEM SERVICE  
ALONG THE PO VALLEY**

# INNOVATION

## HOP Hydroponic Tech.

**98% today  
is imported**

**14 KG / M2  
EVERY YEAR**

**4 TIMES MORE  
PRODUCTIVE  
THAN IN TRADITIONAL  
CULTIVATION**

**Social Brewery**

Added Value=  
**100% made in Italy**

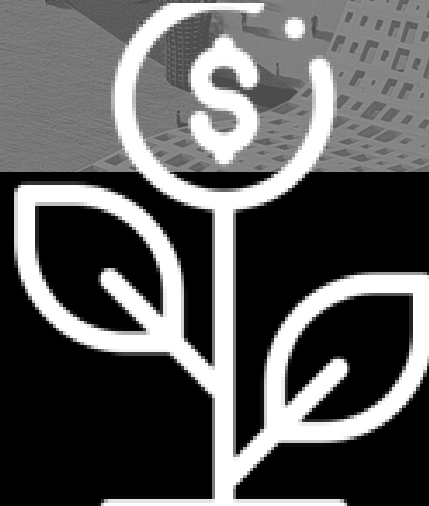


# Drivers of the investment



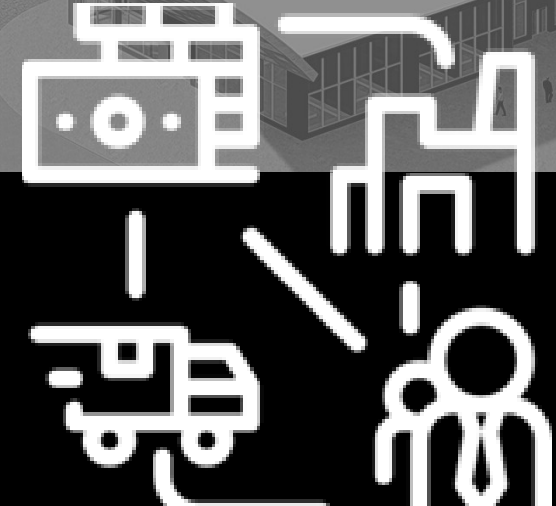
## EUROPEAN PUBLIC FUND

( PNRR, Leonardo, Life and FEASR founds)



## FINANCIAL AND OPERATIONAL EFFECTIVENESS

(use, re-use and integration)



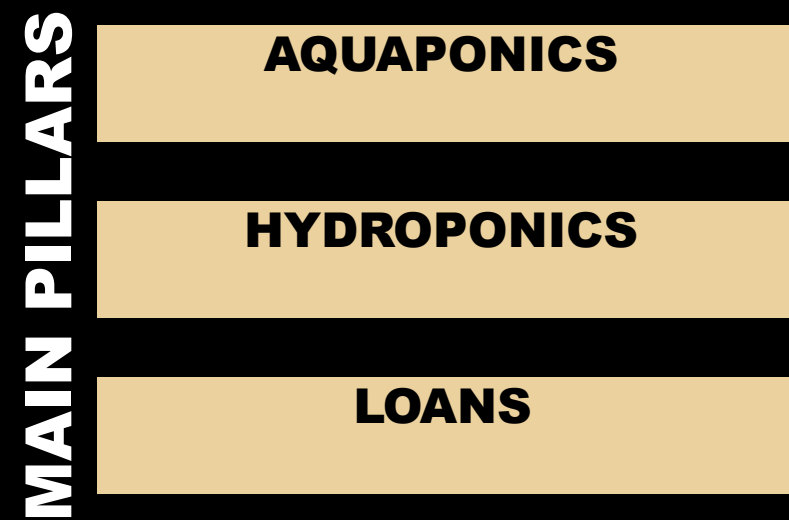
## INTEGRATION WITH THE ITALIAN SUPPLY CHAIN

( 20 km from airport, 0 km vegetables, Circular economy)

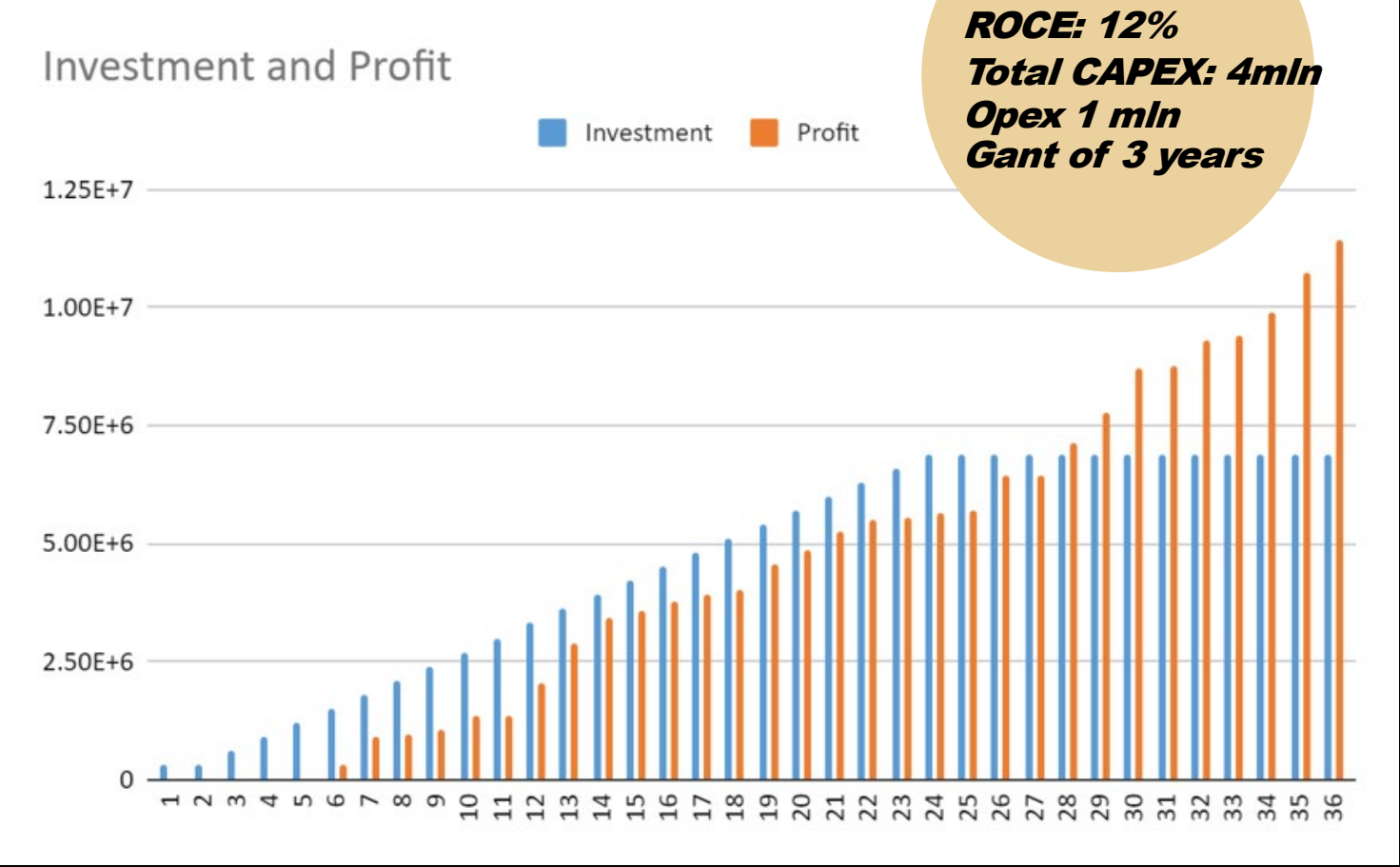


# ENTREPRENEURIAL ACTIVITIES WITH A SPIRAL OF INCLUSION

A PROFITABILITY THAT  
ENHANCES THE SOCIAL  
ACTIVITIES FOR A 0 IMPACT  
AND KM 0 WORD.



Financially supporting start up hub,  
biodiversity integration, other social  
activities; hence closing the circular loops





# Thank you

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