BIOMETA 2018
Barcelona, 18 y 19 Junio

UNIVERSITAT DE BARCELONA

Viabilidad de la implementación de un sistema descentralizado para la valorización de los bioresiduos. Aspectos a considerar

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Fundació ENT

FUNDACIÓ ent

DECISIVE

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 689229.

DECISIVE project

GOAL: developing and demonstrating eco-innovative solutions to valorize municipal biowaste in decentralized plants in two demonstration sites

Comisión Europea

HORIZON 2020

A DECentralIzed management

Scheme for Innovative Valorization

of urban biowastE

DECISIVE

- Horizon 2020 Project (2016-2020)
- **Call:** Promoting eco-innovative waste management and prevention as part of sustainable urban development

- Start: September 2016
- Duration: 4 years
- 14 Partners

DECISIVE Partners

Concept and tools development

Technologies development

Land users

Communication/ impact politique

France
Irstea, SE, Refarmers

Spain
UAB, AERIS, ENT, ARC

Germany
TUHH, GEOMAR

Italy
ITS

Belgium
PSUtec, ACR+

Denmark
Univ. Aarhus

DECISIVE Concept

1.Technological innovations: mAD+ SSF

2.Decision Support Tool

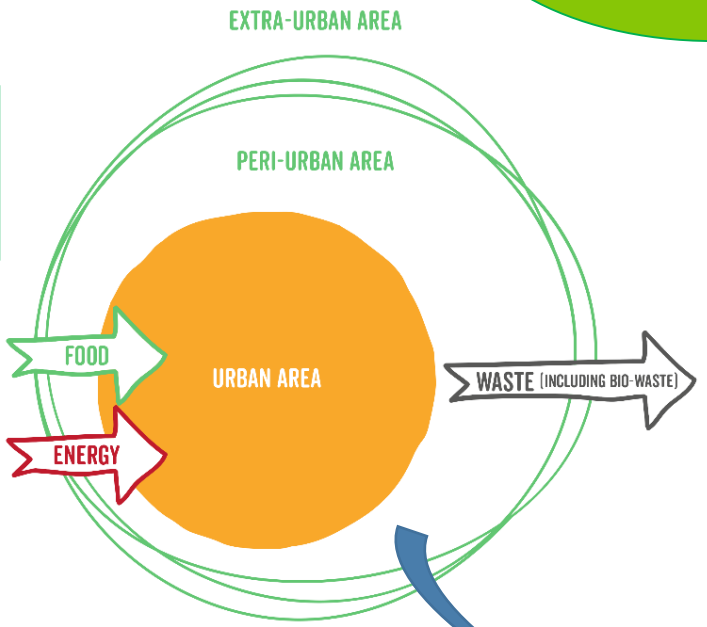
3.Communication & Dissemination

2 demonstration pilots in Lyon and Catalunya

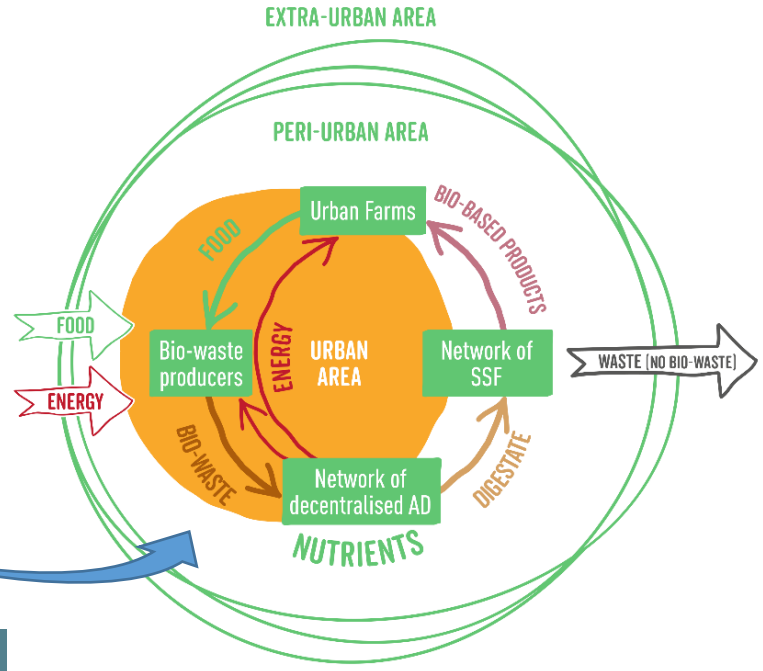
Concept of a resilient city using organic waste to develop urban farming and circular economy

Local sustainable energy supply
Waste biotreatment

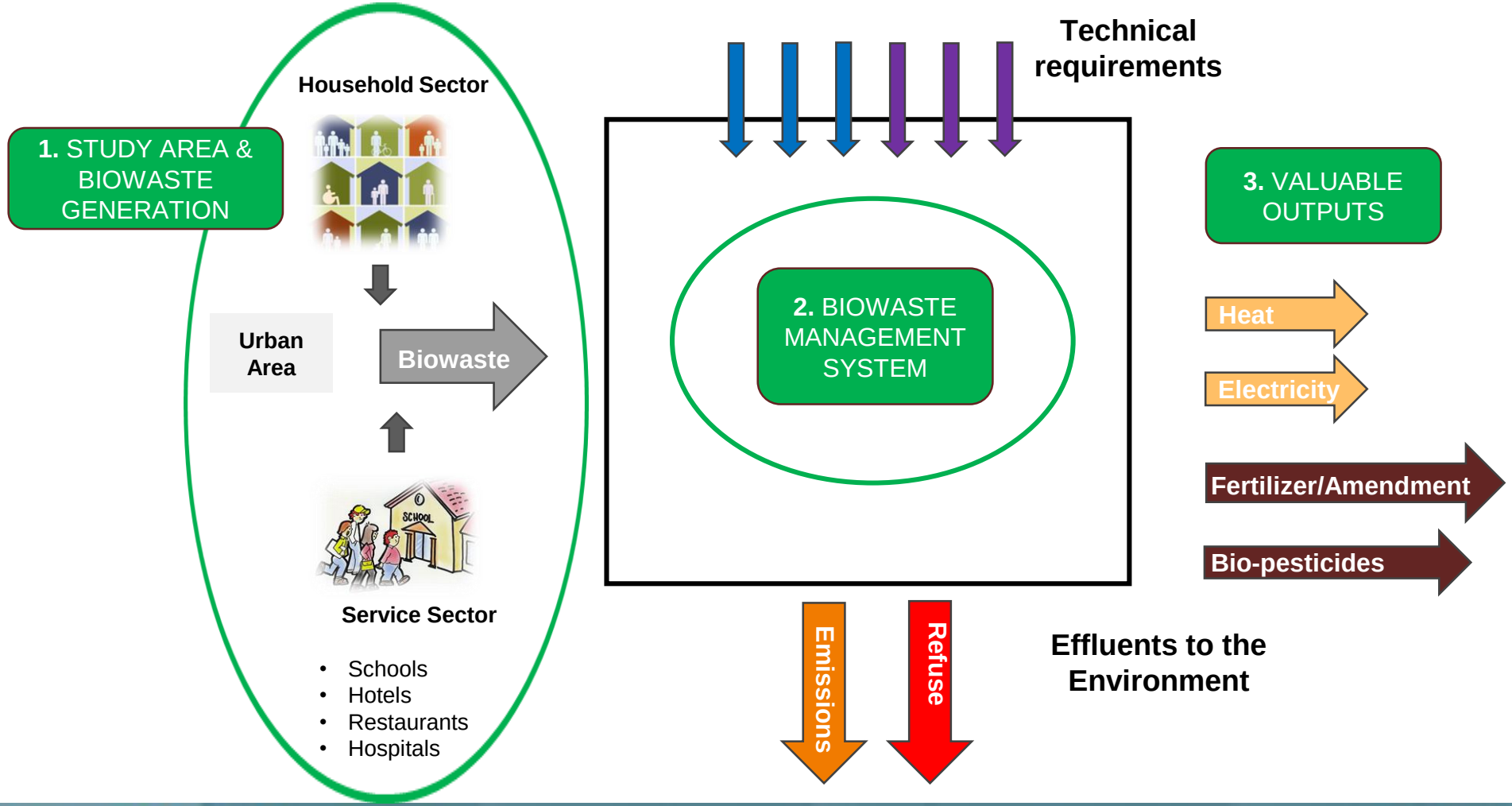
New business opportunities
Spatial planning
Sustainable design



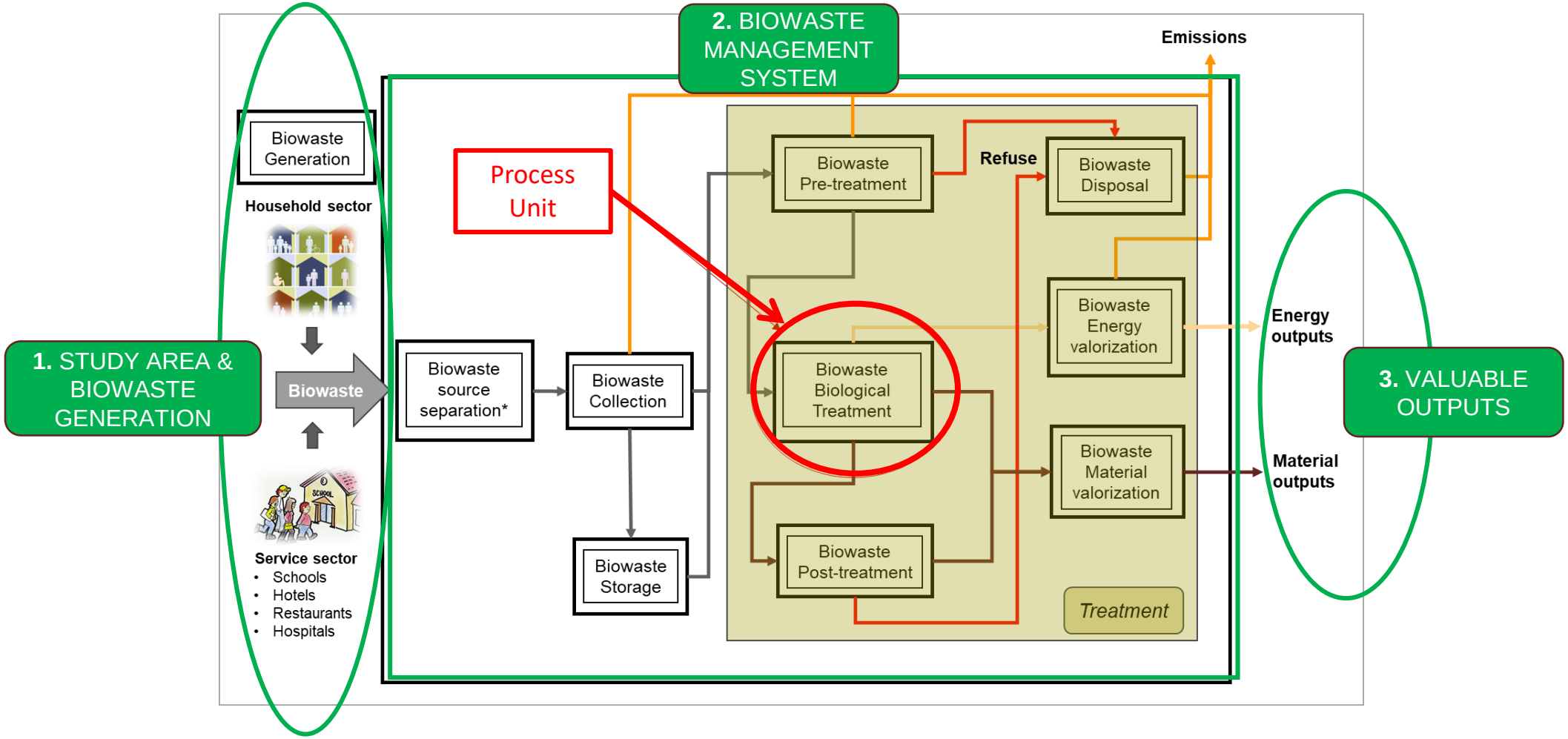
DECISIVE: change of urban metabolism



Biowaste management overview



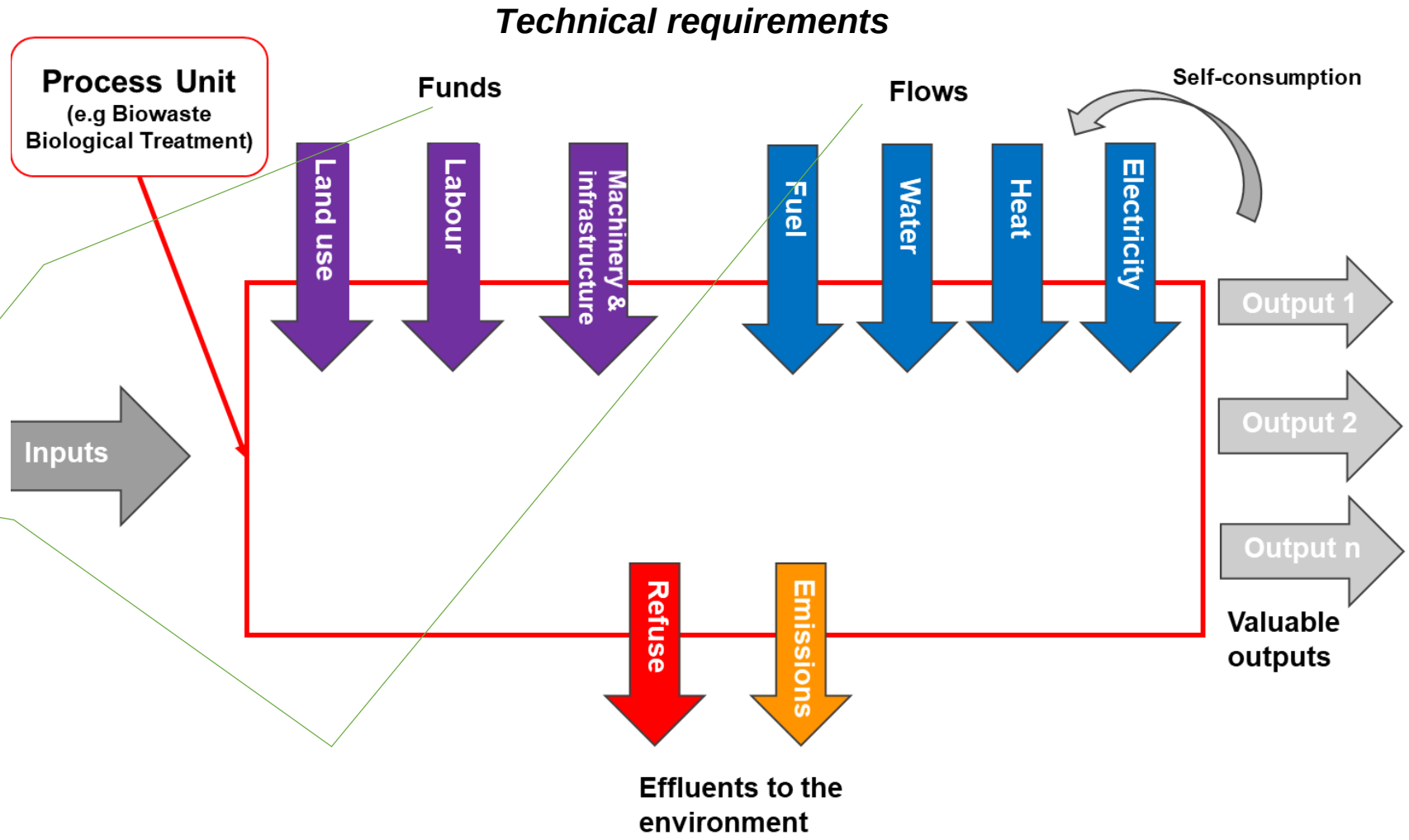
Processes of biowaste management systems



Main elements of each Process Unit

Funds: Entities that transform, consume or produce flows and remain constant in the analysis

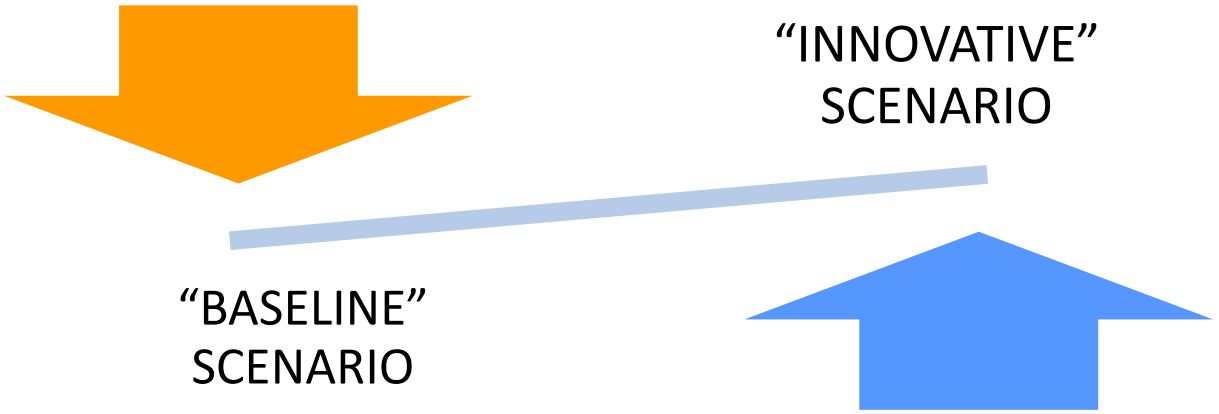
Flows: Elements that appear and disappear in the analysis because transformed, consumed or produced by funds



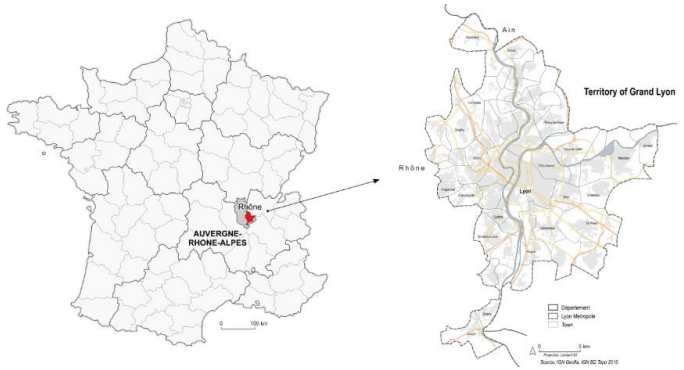
Technical parameters for the total system

		Unit
Biowaste	Biowaste input	t/year
Consumption	Water consumption	m^3/year
	Thermal energy consumption	MJ/year
	Electricity consumption	kWhe/year
	Fuel requirements	Liter/year
Cost	Maintenance cost	€/year
	Investment cost (anual amortization)	€/year
Land use	Space occupied, overall dimensions	m^2
Machineries	Engine Power Capacity nominal	kW
	Electrical	kWe
	Thermal	KWth
Labour	Operating personnel requirements	working hours/year
Valuable outputs	Biogas production	Nm^3/year
	Thermal energy production	kWhth/year
	Electricity production	MJ/year kWhe/year
	Digestate production	t/year
	Solid Fertilizer	t/year
	Liquid Fertilizer	Tonne/year

Comparing *baseline* and *innovative* scenario

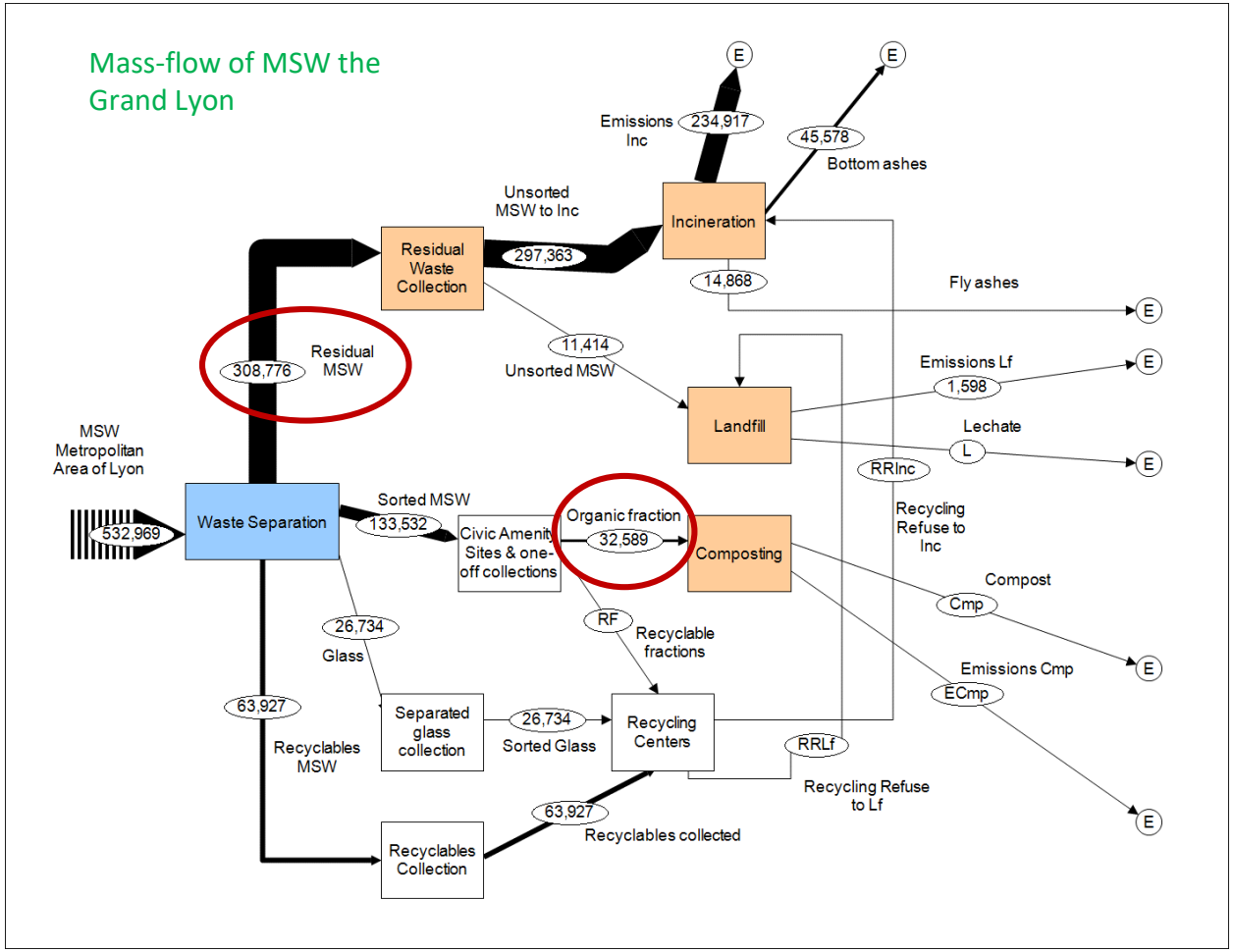


“Baseline” scenario in Lyon site

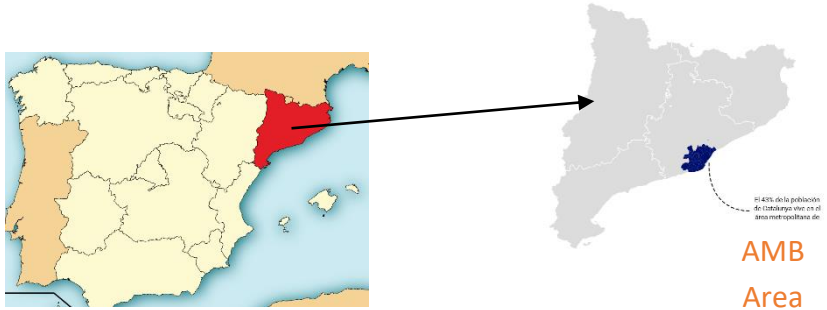


- *Socio-demographic specifications of the area to study*
- *Biowaste sources (type and localization)*
- *Waste generation (amount and composition)*
- *Analysis of the current waste management system*

Most of the biowaste generated in the area of study of Lyon is currently being disposed together with the residual waste and thus its value as bioresource is not at all exploited.

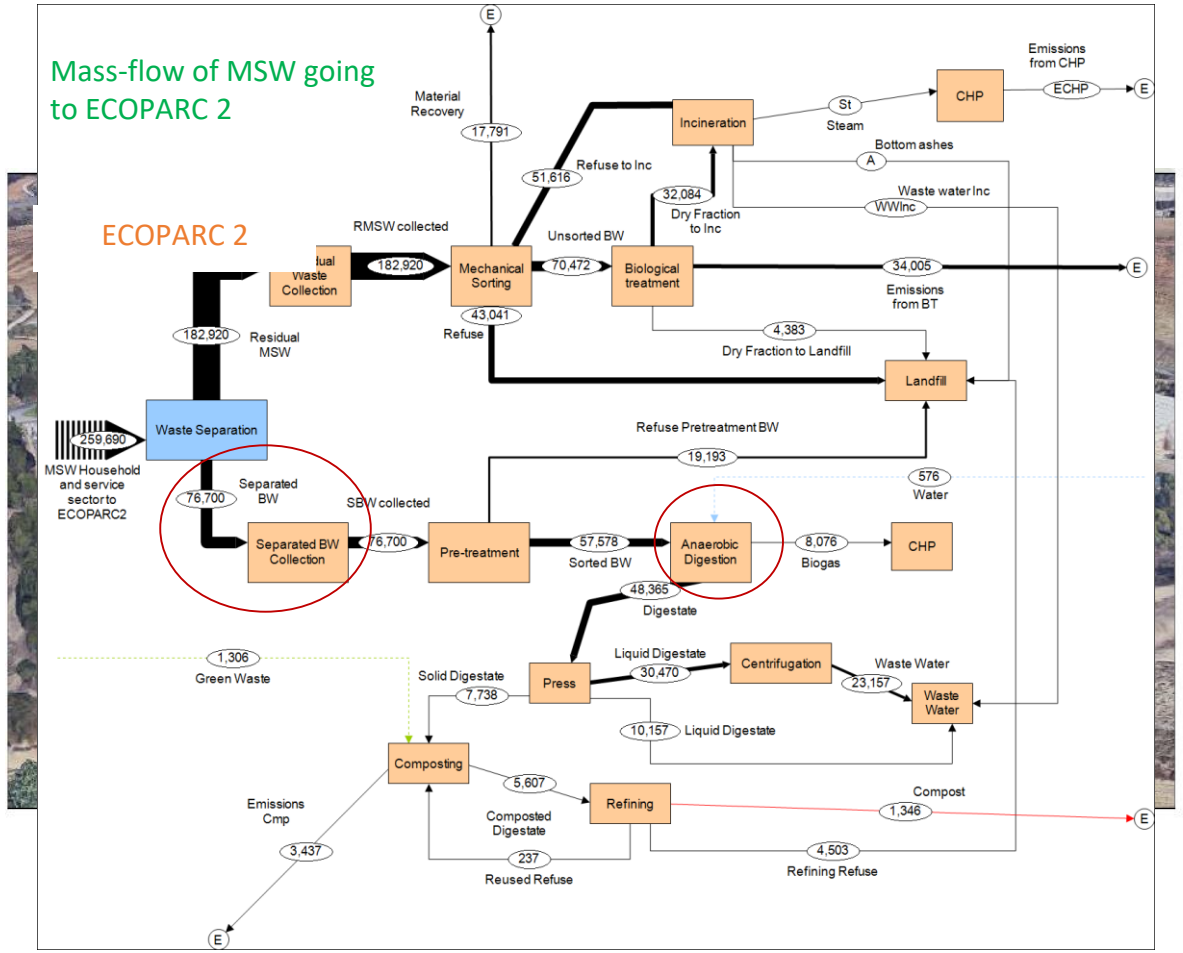


“Baseline” scenario in Catalunya site

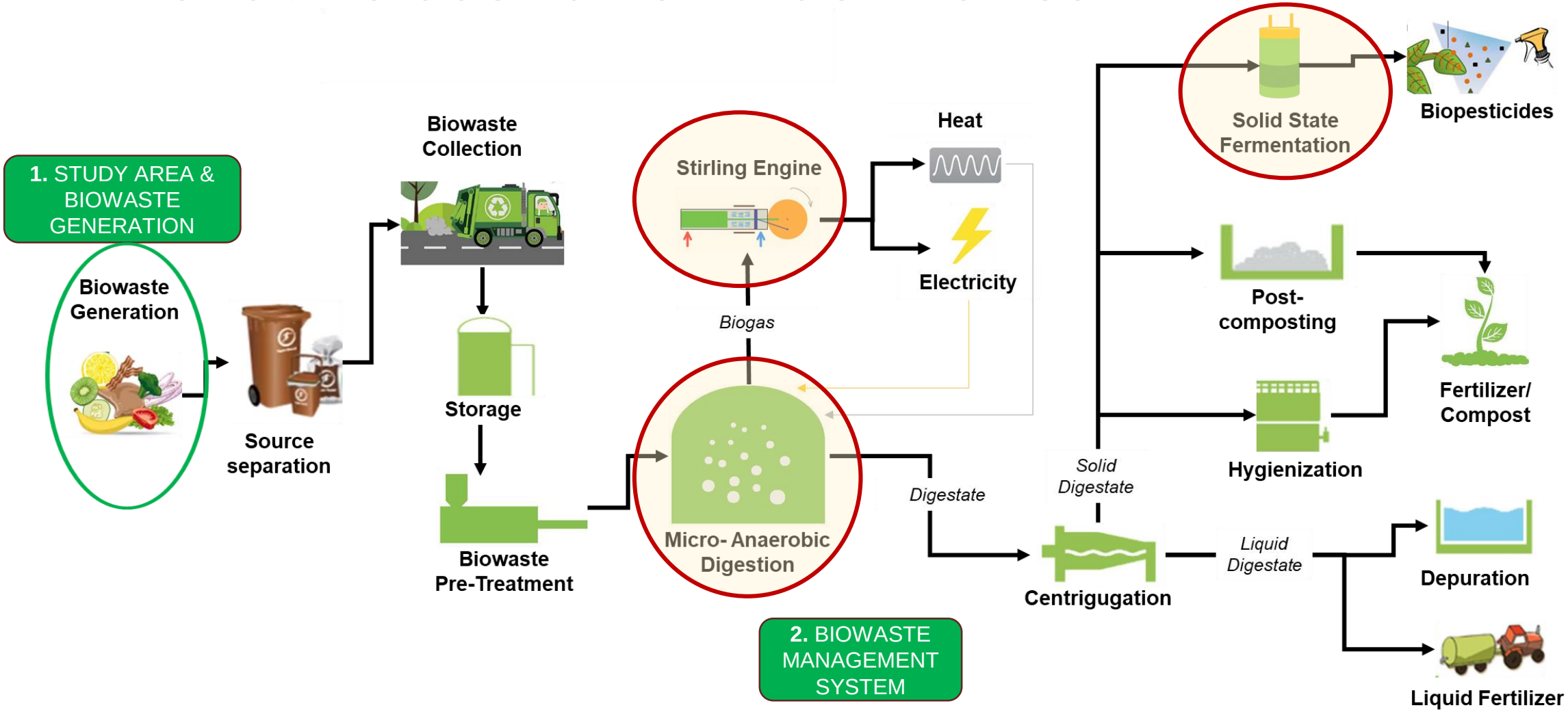


- *Socio-demographic specifications of the area to study*
- *Biowaste sources (type and localization)*
- *Waste generation (amount and composition)*
- *Analysis of the current waste management system*

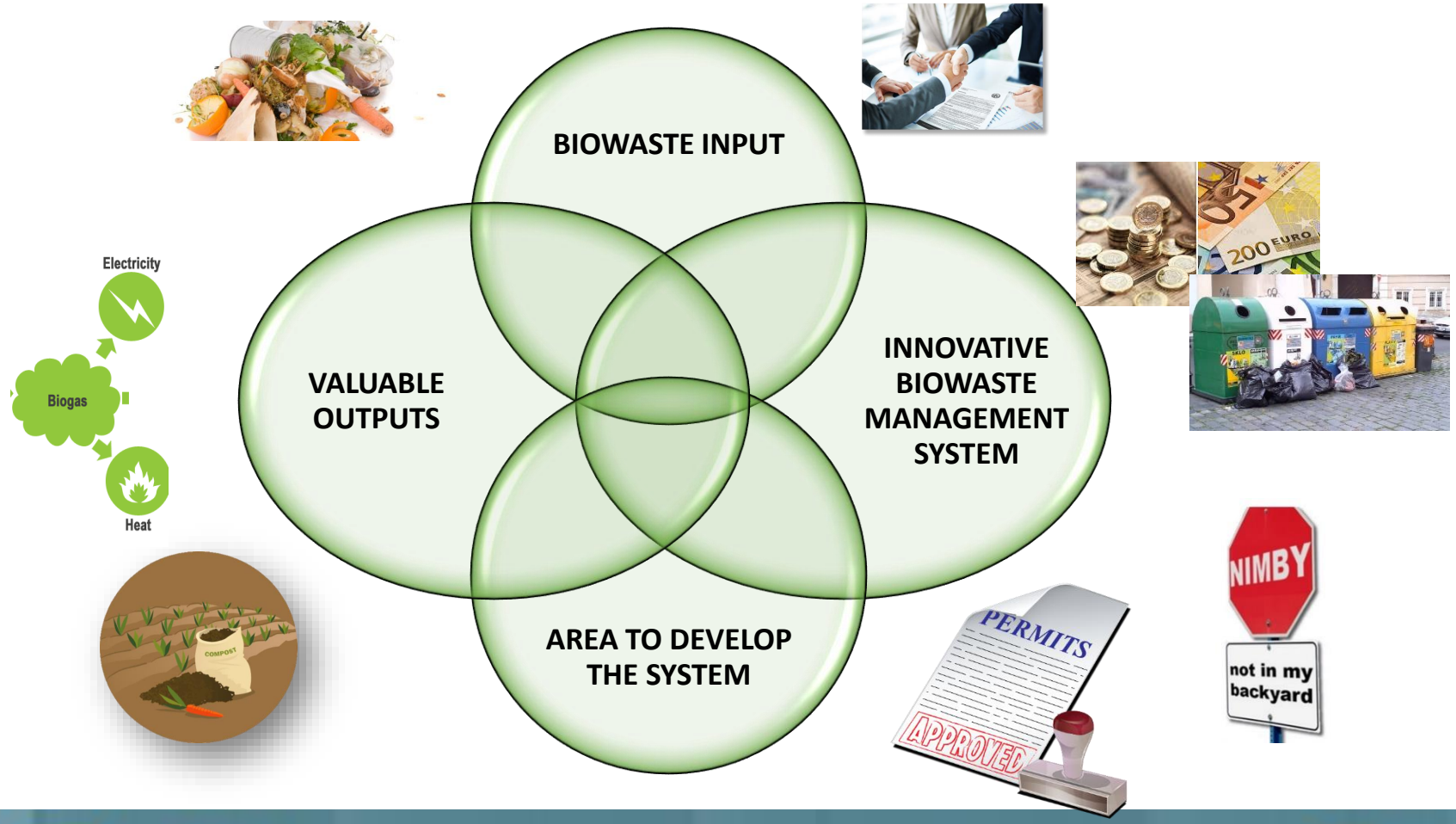
Part of the **biowaste** generated in the area of study of Catalunya is already being source-separated and the bioresources recovered, but there is also room for improvements.



Innovative scenario in both sites



Which factors need to be considered to implement those decentralized systems?



Biowaste input

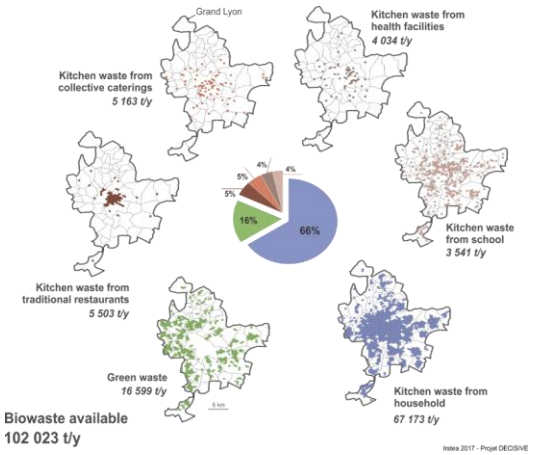
BIOWASTE INPUT

Analysis of amount, availability, sources of biowaste input for the system

Households

Commercial

- Schools
- Hotels
- Restaurants
- Hospitals

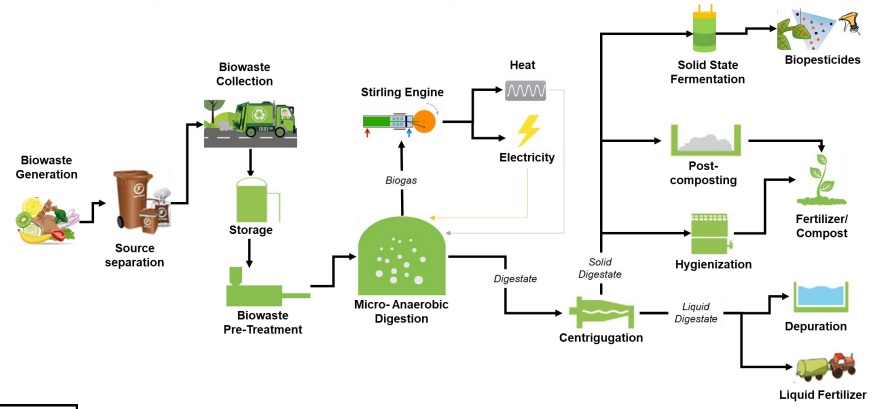


FACTORS to consider
• Type of generation sources (households, schools, restaurants, markets, hospitals,…)
• Localization of sources
• Available amount of biowaste
• Type of biowaste (food waste, garden waste)
• Quality of selected biowaste (amount of macro impurities)
• Agreements of biowaste supply (buiding network)

Innovative biowaste management system

INNOVATIVE BIOWASTE MANAGEMENT SYSTEM

Analysis of technical requirements of the entire system and economic constraints to implement the system



FACTORS to consider

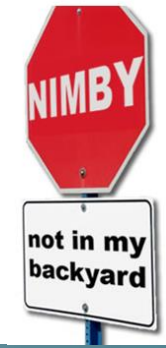
- Selection of the specific treatment units according to the site (pre-treatment, type of AD (wet/dry; termo/meso), hygienization, biogas purification,
- Budget constraints
- Technical requirements of the system (Fuel, thermal energy, electricity, water consumption)
- Adaptation of the existing biowaste collection system

Area to develop the pilot

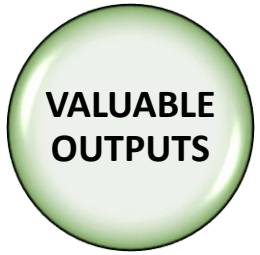
AREA TO DEVELOP THE PILOT

Analysis of social, environmental-legislative, logistic and technical aspects related to the specific area where to develop the pilot

FACTORS to consider	PARAMETERS
• Pros & contras of different types of area	Proximity to : 1. Biowaste generators 2. Existing biowaste treatment plants 3. Peri-urban farms
• Technical information for the implementation of the pilot	Available surface, logistic of routes and morphology of territory, accessibility, existing energy provisions, supply of consumables, etc.
• Legislation Constraints	Local permits' limitations, time needed for obtaining permits
• Social constraints	Population acceptance, NYMBI effect, proximity to urban areas



Valuable outputs



Analysis of proposed alternatives for the valorisation of the outputs (biogas and digestate) in relation to the specificity of the sites

	FACTORS to consider	PARAMETERS
BIOGAS	• Use of produced thermal energy	Heat or Cooling demands (swimming pools, schools, hospitals, companies)
	• Use of produced electricity	Surplus of produced electricity? Availability of Subsidies?
DIGESTATE	• Digestate management	Quality of digestate/fertilizer
		Availability of and proximity to lands where to spread digestate/fertilizers
		Cost for alternative treatment of digestate

Energy Efficiency Stirling Engine:

Electrical efficiency: 15%

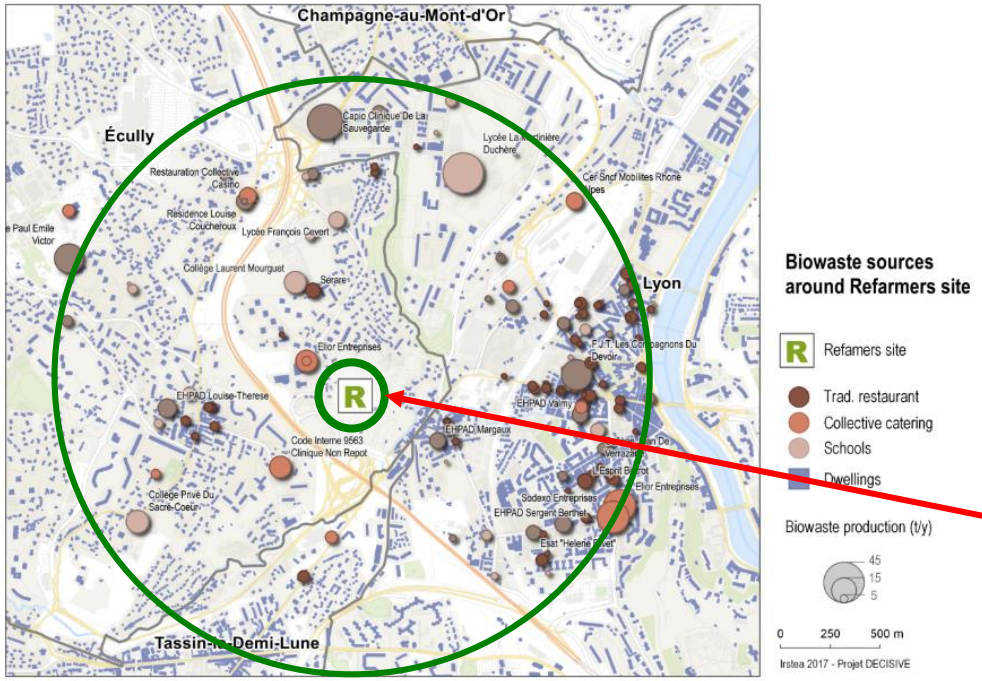
Energy loss in fumes: 20%

Thermal energy efficiency: 65%

Biowaste sources and pilot localization in Lyon

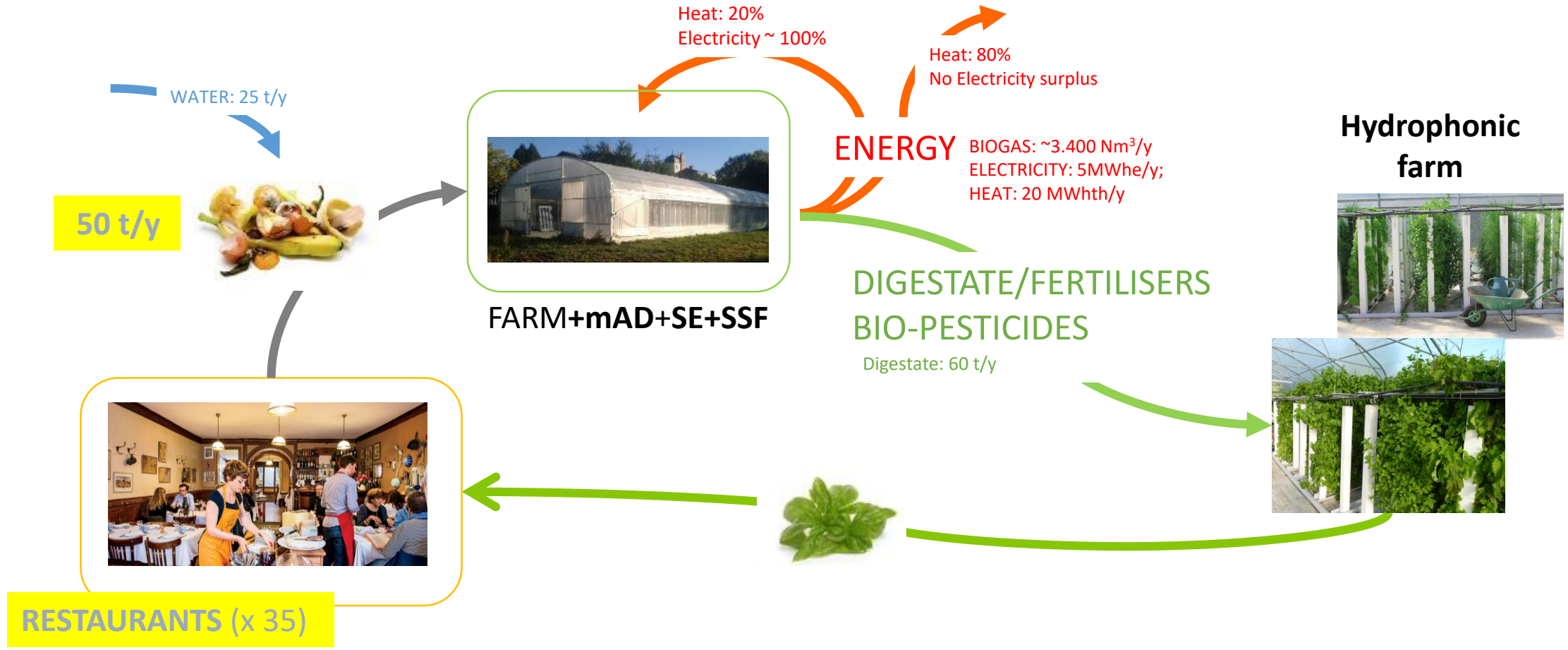
Refarmers farm

(treatment annual capacity: 50 t of biowaste)



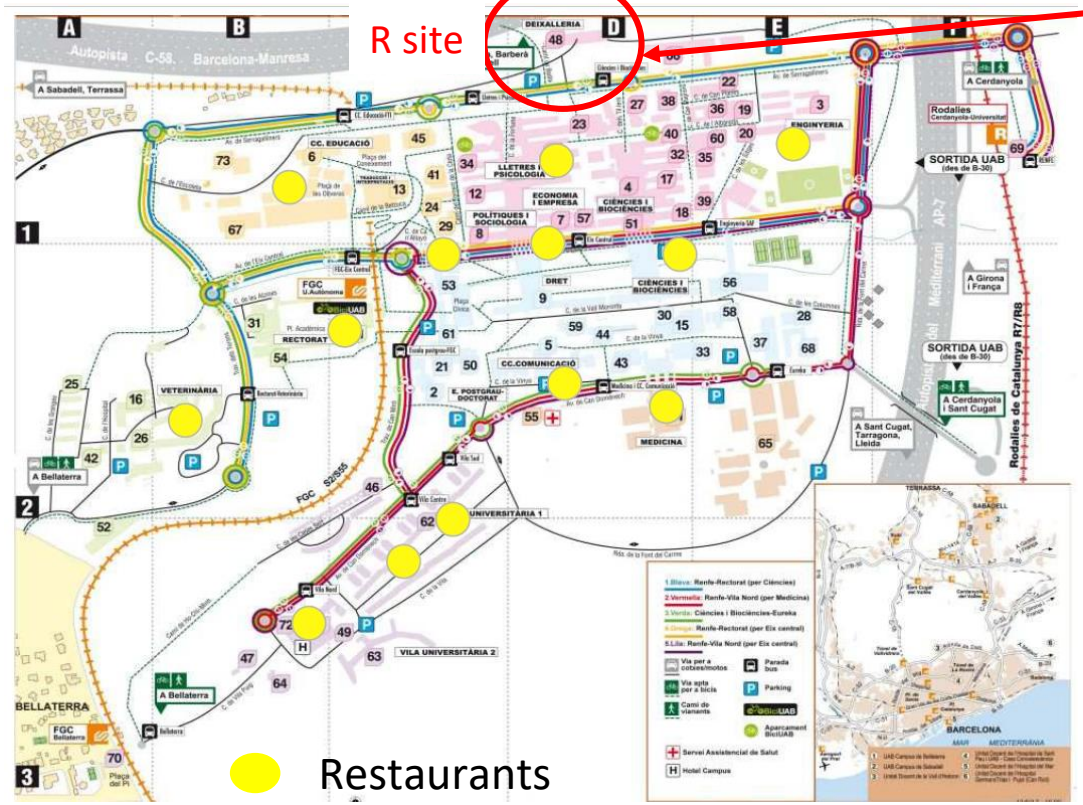
Lyon Pilot

Innovative system in Lyon

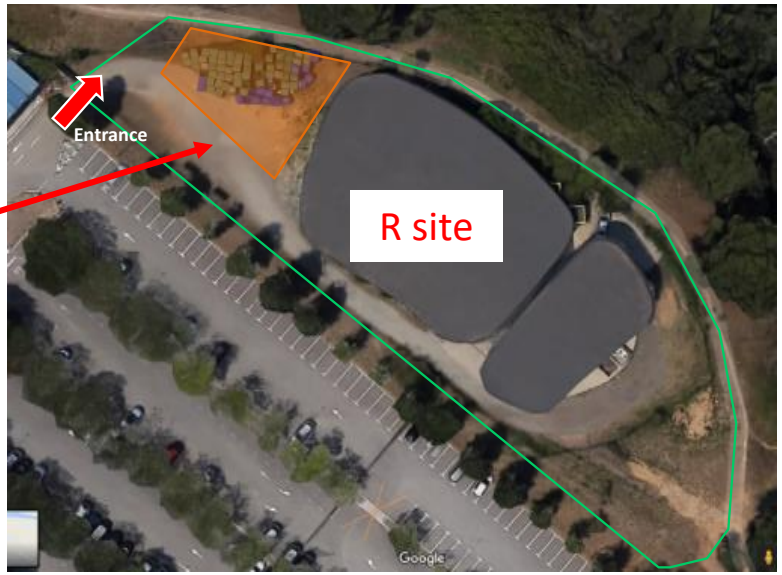


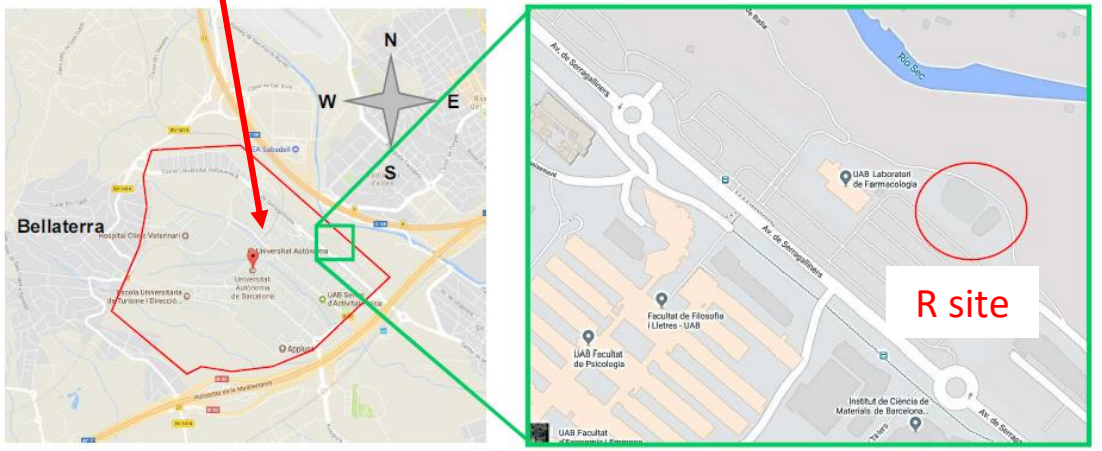
Biowaste sources and pilot localization in Catalunya

UAB University Campus
(treatment annual capacity: 200 t)



Catalunya Pilot





Innovative system in Catalunya

WATER: 100 t/y

200 t/year

mAD + SE+ SSF

Heat: 20%
Electricity ~ 50%

Heat: 80%
Electricity: 50% surplus

Maintenance building

ENERGY

BIOGAS: ~13.500 Nm^3/y

20 MWhe/y; 84 MWhth/y

Veterinarian Faculty composting

DIGESTATE/FERTILISERS
BIO-PESTICIDES

Digestate: 240 t/y

RESTAURANTS (x 11)

UAB Campus green areas

Current situation in the pilots

Catalunya Pilot

- Public tender to be launched to get the technology
- Moving sensibilization actions
- Getting permits
- Start: October 2018

Lyon Pilot

- Buying technology (a specific technology provider was contacted)
- Getting permits
- Building network with restaurants
- Start: December 2018

Thanks for your attention!

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