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Separate Collection and Biological Treatment of Food and Biowaste in a Circular Economy

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Waste Agency of Catalonia, Spain

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The Waste Agency of Catalonia



Generalitat de Catalunya
**Departament de Territori
i Sostenibilitat**



**Agència de
Residus de
Catalunya**



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ARC is a public enterprise within the Planning & Sustainability Department of the Government of Catalonia.

ARC has own competences on waste generated in Catalonia and also on all waste which are managed within Catalonia

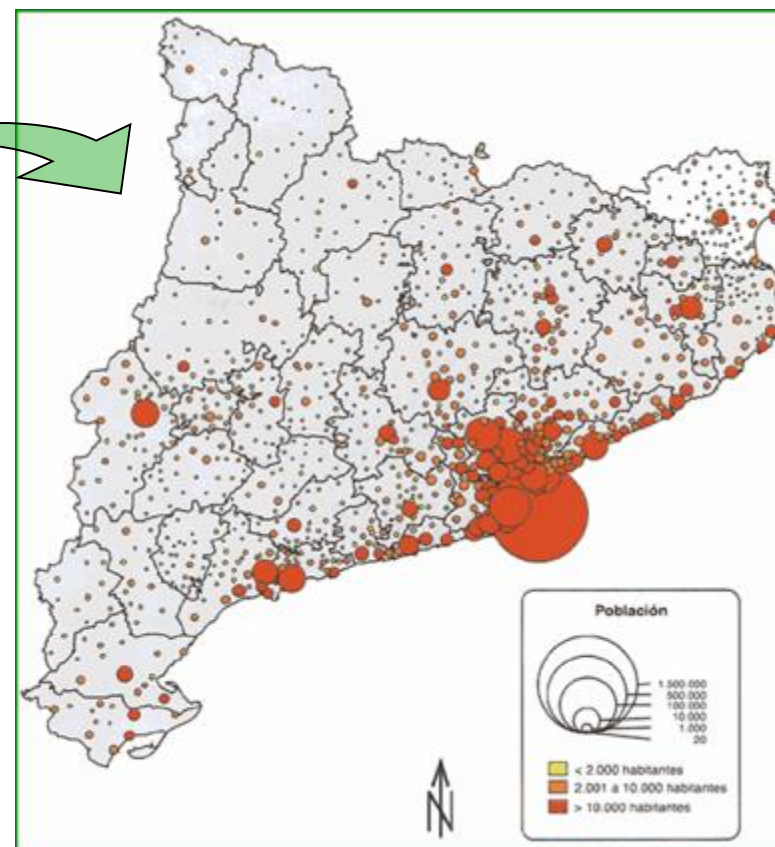
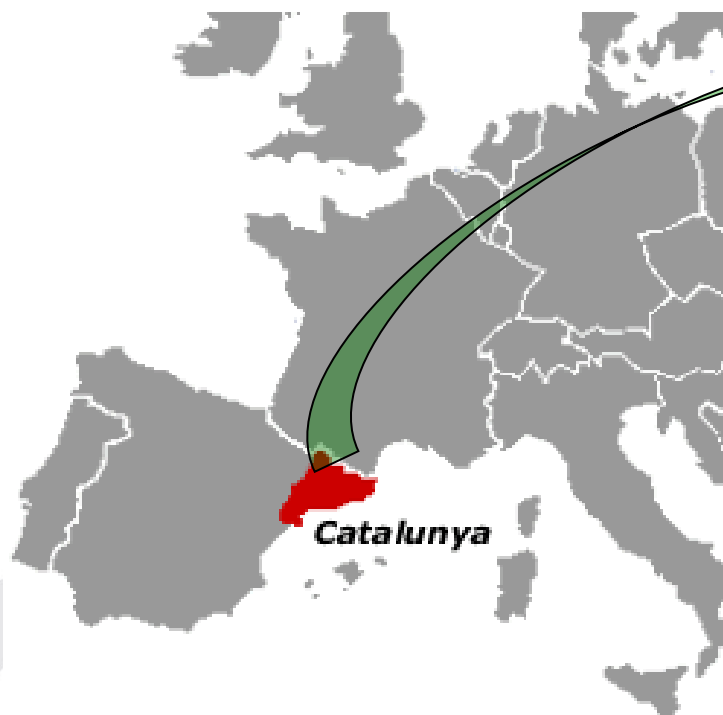


- Competences
 - Municipal waste
 - Industrial waste
 - Construction waste and debris
 - Manure & Livestock (jointly with Agriculture Department)
 - Sanitary waste and
 - Soil recovery

Geographical information



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MSW Management in Catalonia: Competent authorities



948 Municipalities

Authorities responsible for MSW collection

May **delegate** obligations to

- **Consortia**
- **Consells Comarcals (County Councils)**
- **Associations of municipalities**
- **Etc.**



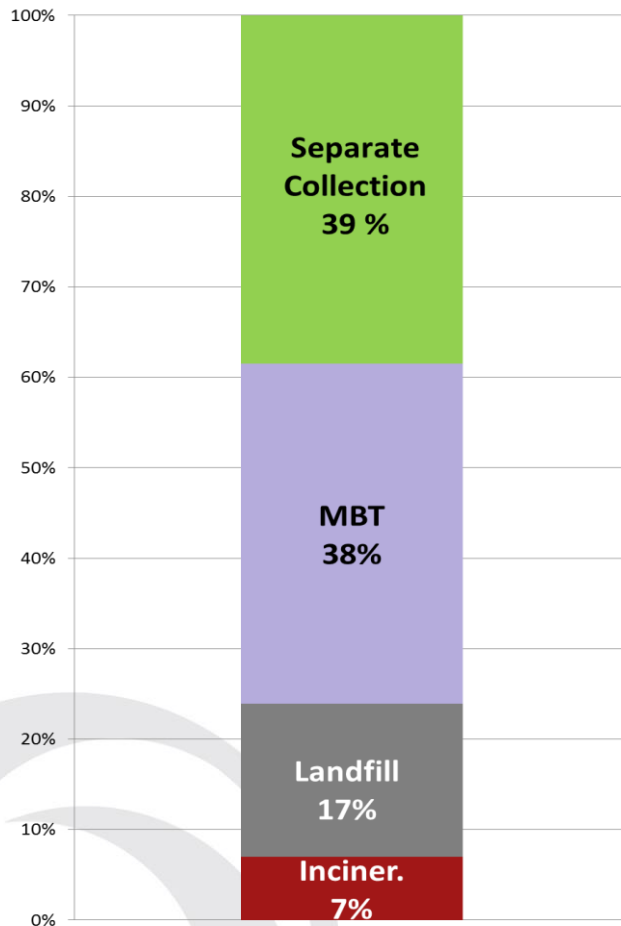
MSW Management in Catalonia: Generation, composition, management



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2016

Total MSW 3,73 mio tons



MSW Management

MSW Composition Analysis 2013



29,6%
OFMSW

7,7%
Garden & Park
Waste



MSW Management in Catalonia: Separate Collection 2016



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Total MSW amount 2016: 3.727.886 t 496 kg/inh./y

Separately collected

Residual waste

378.150 t 263.648 t 166.136 t 139.242 t 2.291.342 t

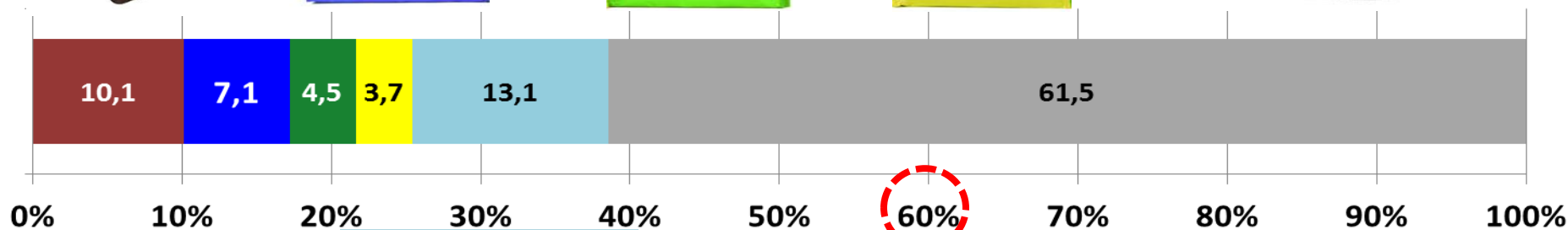
**50,3
kg/inh./y**

**35,0
kg/inh./y**

**22,1
kg/inh./y**

**18,5
kg/inh./y**

**304,6
kg/inh./y**



Other waste
separately collected

New target [PRECAT20]
in 2020

What is Biowaste?

EU Definition



Waste Framework Directive (2008/98/EC) defines biowaste as:
“biodegradable



- garden and park waste,



- food and kitchen waste from households, restaurants, caterers and retail premises



- comparable waste from food processing plants”.

What is Biowaste?

Catalan Definition



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The Organic Fraction of the Municipal Solid Waste: OFMSW



peel and rejected parts of fruit and vegetables



fish bones and waste, shellfish and mollusc shells



leftover bread



coffee grounds and tea waste



bones and fish bones



dirty kitchen paper, dirty paper napkins



dry flowers and leaves,

Garden and Park Waste



Objectives and Targets



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EU Circular Economy Package



PRECAT 20



General Program for Waste Prevention and Management and Resources in Catalonia 2020:

Strategic objectives:

- Consider **waste** a **resource**
- Waste **prevention**
- Increment **material recovery** with view to **circular economy**
- **Abandon** gradually **landfilling** and **incineration** of recoverable waste
- ...

Quantitative targets:

- **Reduction of 50% food waste** production, 2010 reference in retail, catering and households
- **Material recycling: 60%** in weight of **biowaste**

Qualitative targets:

- **Biowaste: impurities < 10 %** by weight
- **Packaging: impurities < 25 %** by weight

Biowaste prevention:

Food waste



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What is the impact of food wastage?



Social and ethical impact

Nearly **one billion** people suffer from hunger worldwide



**ECONOMIC LOSS
IN WASTE:
€112 PER PERSON
(2010)**

Economic impact

Total economic loss: **841 M€ in Catalonia** (2010)



Environmental impact

Greenhouse gas emissions: 520.700 tonnes of CO₂ eq in 2010 in **Catalonia** (equivalent of emissions from 20.300 motor vehicles throughout their working life)

Food-waste prevention in Catalonia

The Diagnosis of Food Waste in Catalonia (2010)*

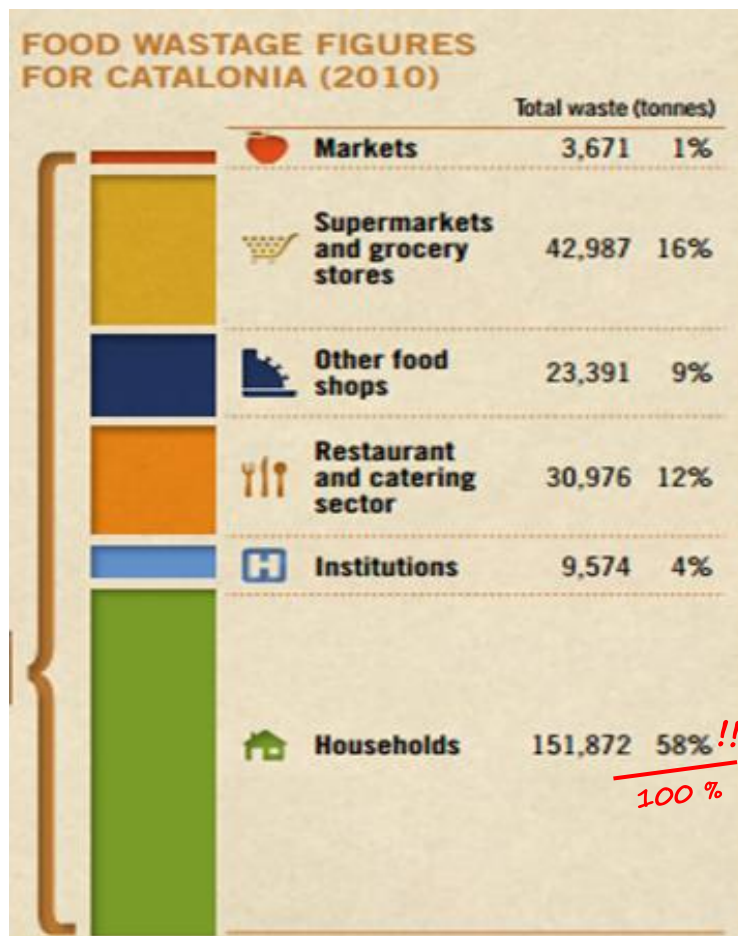


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262,471 TONNES OF
FOOD WASTE

34.9 KG PER PERSON
PER YEAR



proposed actions for

- Administration
- Production and manufacture
- Distribution
- Restaurants and catering
- Households

** Waste from wholesale distribution, the agrifood industry or the primary sector not considered in the study*

Published in 2012
Available at:

http://residus.gencat.cat/web/.content/home/lagencia/publicacions/centre_catala_del_reciclatge_ccr/guia_consum_responsible_en.pdf

Food-waste prevention in Catalonia

Action: Communication campaign



☐ TRAVELLING EXHIBITION



WE ARE
FOOD
WISE

☐ VIDEO CLIP



☐ TV PROGRAMME



SOM
GENT
DE PROFIT

☐ WEB somgentdeprofit.cat



☐ APP

☐ INSTAGRAM (15'' animations)

Food-waste prevention in Catalonia

Action: Education and capacity building

- ❑ Publication of education material for schools and retail and catering sector



- ❑ Conferences and seminars



Food-waste prevention in Catalonia

Action: Awareness raising

6th European Week for Waste Reduction (LIFE Project)

- 11.995 actions in 34 European regions
- 871 actions in Catalonia



Action: Support for local projects

750.000 € in economic subsidies and technical support (2015):

- Catalan Food Bank Foundations (since 2007)
- Local bodies and non-for profit organisations (since 2010)

Collaboration with other institutional initiatives



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Biowaste Prevention / Biowaste Recovery

Framework Directive 2008/98/EC



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Waste Prevention



Highest Priority

However...



Life-cycle-Thinking

Mediterranean conditions:

- **Poor soils**
- **Erosion**
- **Desertification**



sustainable option:

- **Separate collection**
 - **Biological treatment**
 - **Application to soil**
- of Bio-waste

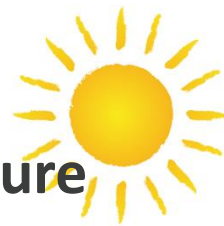
Biowaste collection in Catalonia: External factors



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- Topography
- Type of Settlement
- Housing and Urban Structure
- Climate



Biowaste collection in Catalonia: Separate collection systems



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Bring Systems: **Kerbside Containers**



Collection frequency: **daily** to avoid **odors**

Collection schedule: **at night** to avoid **traffic disturbance**

Biowaste collection in Catalonia: Separate collection systems

Fetch System: Door-to-Door Collection



Citizens deposit separated wastes at their door step



134 municipalities
≈325.000 inh.

Biowaste collection in Catalonia: Separate collection systems



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Biowaste treatment in Catalonia:



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THE ORGANIC MATTER CYCLE

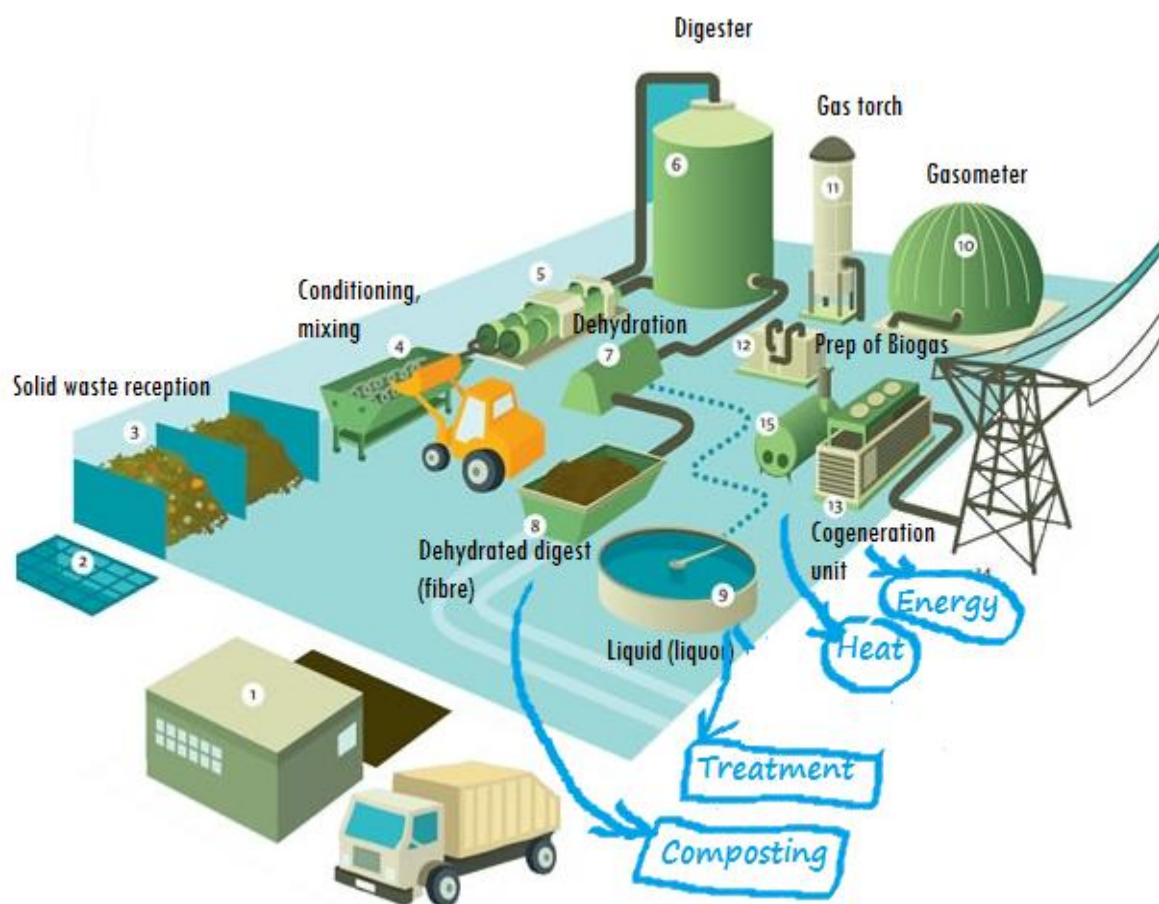


Centralised biowaste treatment: Anaerobic Digestion+Composting



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4 Facilities



PROs

- Requires less area
- Allows better management of emissions / odors
- Allows recovery of energy (biogas)
- Fuel for vehicles

CONs

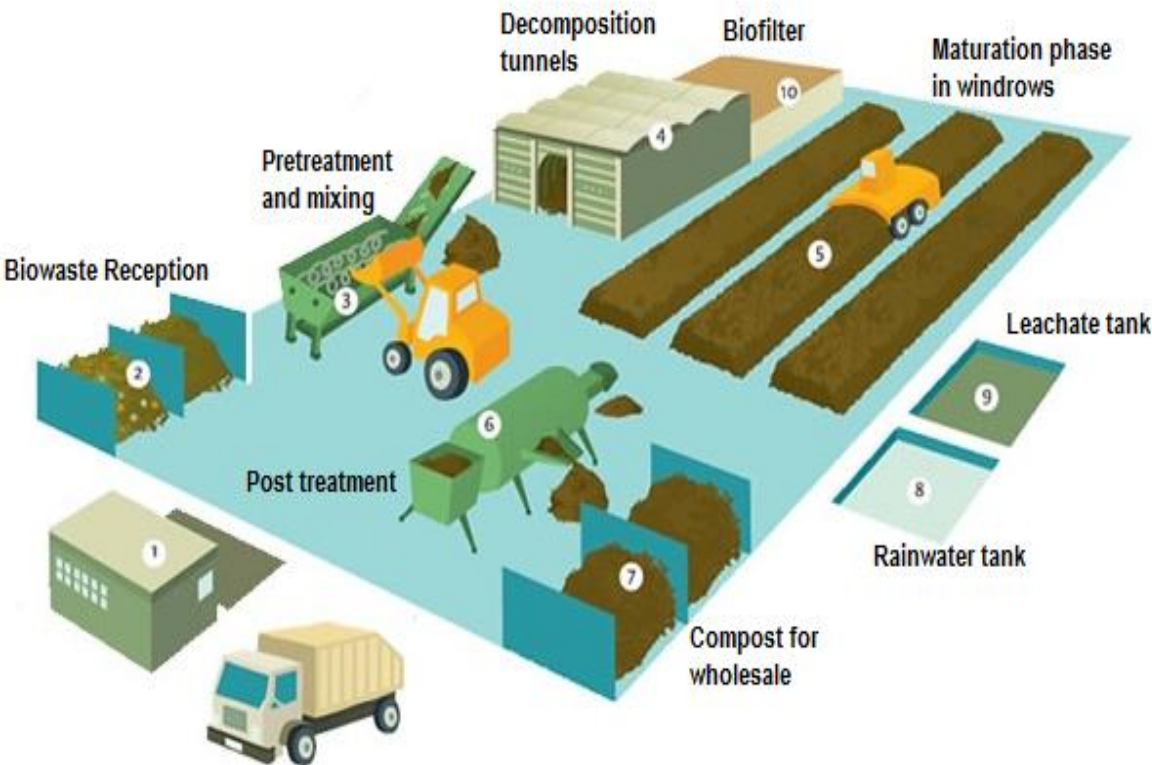
- High costs (investment /management)
- More sophisticated and sensitive technology
- Requires high input quantities
- Requires homogeneous input
- More feasible on the industrial scale

Centralised biowaste treatment Composting



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20 Facilities



PROs

- Simple, robust technology
- Flexibility (capacity/modules)
- Biological process less complicated
- Process allows and requires input of woody materials (green waste)
- Lower costs (investment/management) than AD

CONs

- Slower process

Decentralised biowaste treatment: Composting



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Diversity of Settlements and topography

➡ Diversified approach to biological treatment

Home and Community Composting

- 2016 : 439 Municipalities - 6.453 t of Biowaste treated
- Investment and operational cost very low
- Proximity - less waste transport
- High identification of the citizens



Decentralised biowaste treatment: Composting



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Diversity of Settlements and topography

➡ **Diversified approach to biological treatment**

Small decentralised facilities, of simple and robust technology for high quality bio-waste

- Adequate for smaller waste amounts (<2.000 t)
- Lower investment and operational costs
- Relatively high surface demand
- High quality bio-waste required



New approaches to decentralised biowaste management:

revólta



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Distribution
and nearby
consumption



Generation
and separation
in origin



Pre-treatment
in origin

Fertilization and
ecological production

& Tarpuna

Una cooperativa
d'iniciatives sostenibles



Composting

New approaches to decentralised biowaste management:



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revólta



New approaches to decentralised biowaste management:



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School

revólta



<https://www.youtube.com/playlist?list=PLWQMeO43vsucX8Kpv2fBVppvyzoortnfz>



New approaches to decentralised biowaste management:



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DECISIVE: decentralised bio-waste management

Gisela Sommer – ARC



This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 695225.



DECISIVE

A DECENTRALISED MANAGEMENT SCHEME FOR
INNOVATIVE VALORISATION OF URBAN BIOWASTE

Project DECISIVE

Horizon 2020



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Contact

www.decisive2020.eu

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🐦 #DECISIVE2020



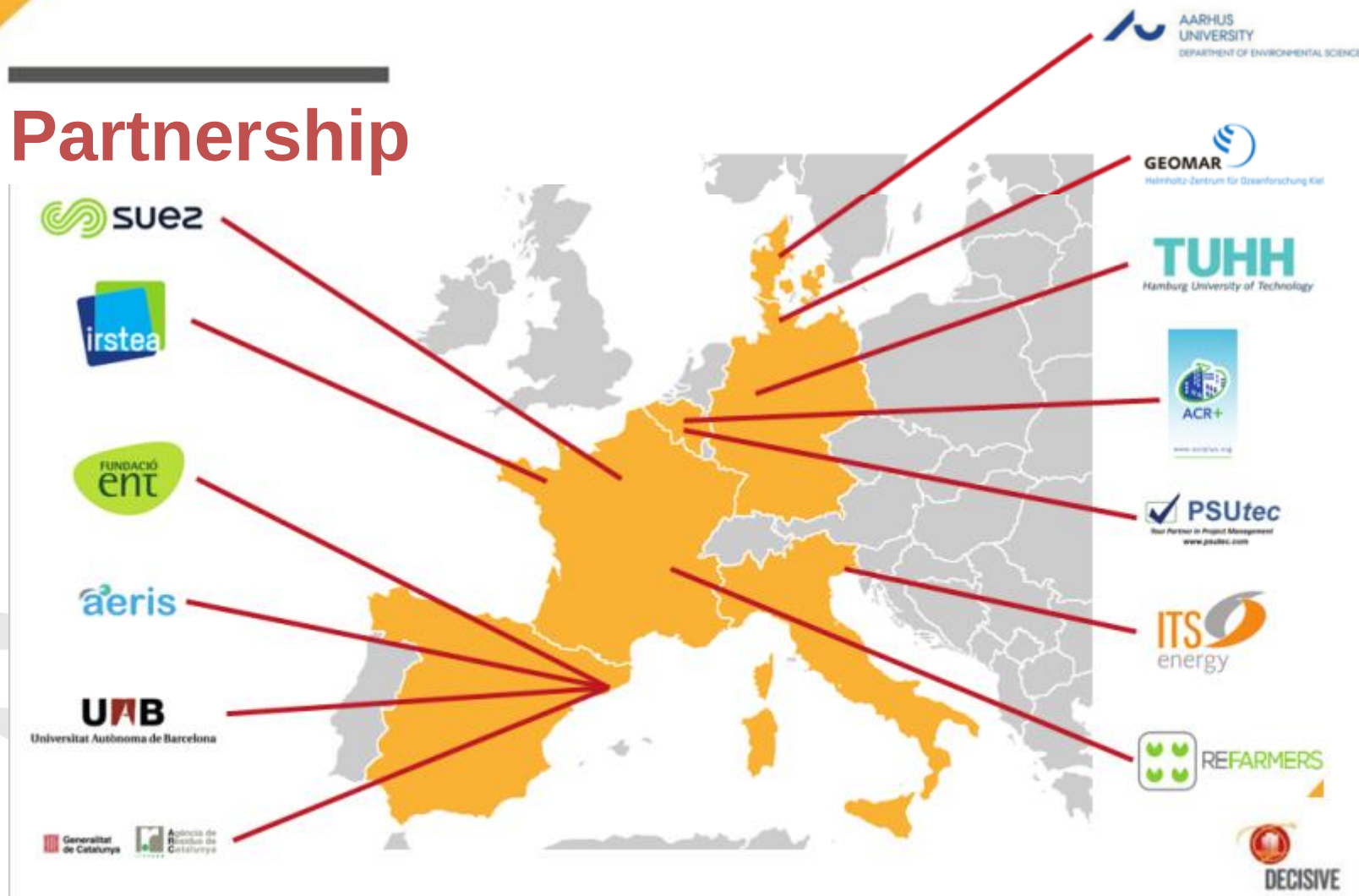
DECISIVE

Project DECISIVE

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Partnership





Current situation

Increasing demand of food and energy
in urban centres

Increasing production of (bio-)waste

Much bio-waste sent to disposal

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Horizon 2020

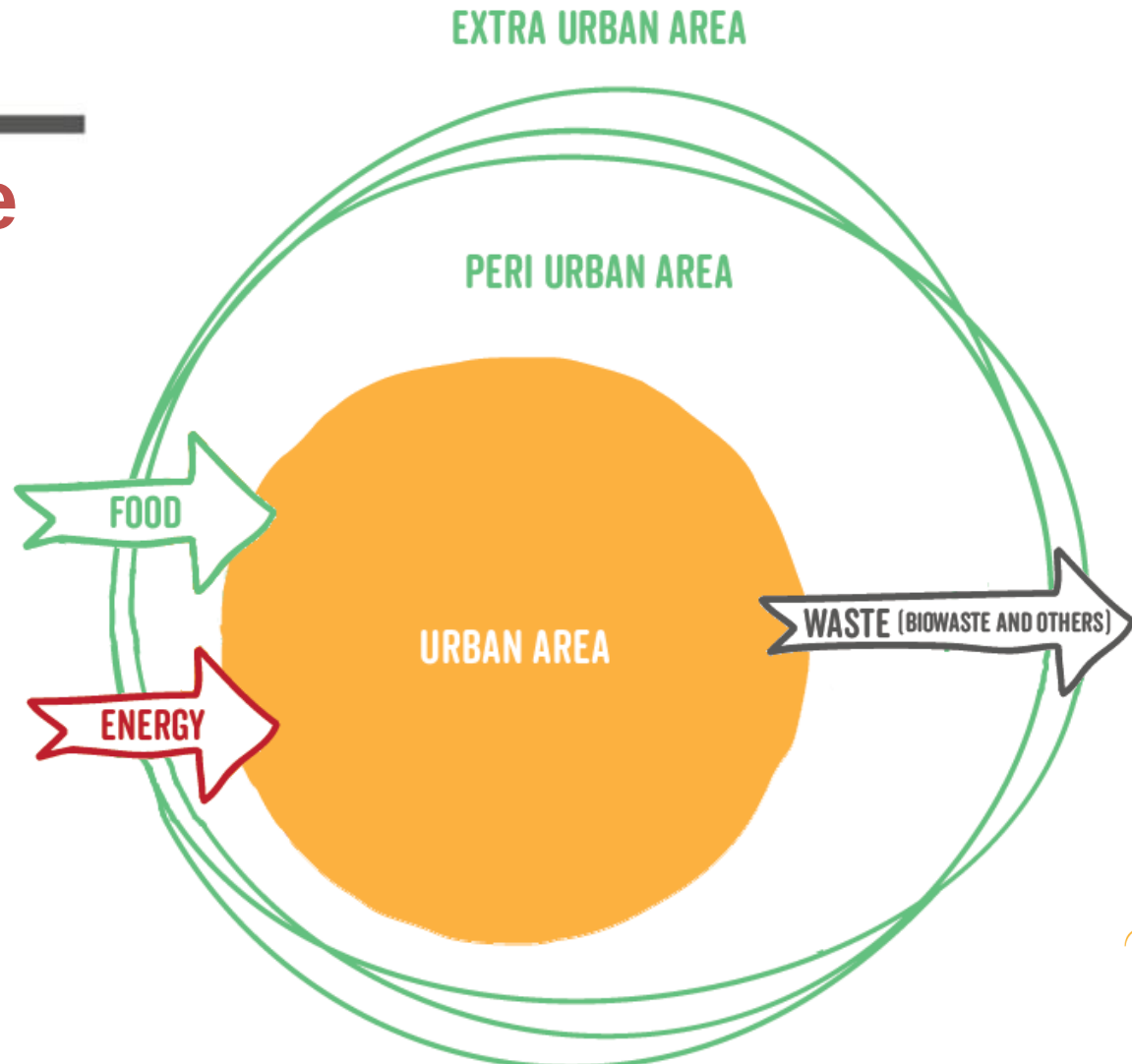


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Objective

Paradigm
shift

from
End-of-pipe
thinking...



Project DECISIVE

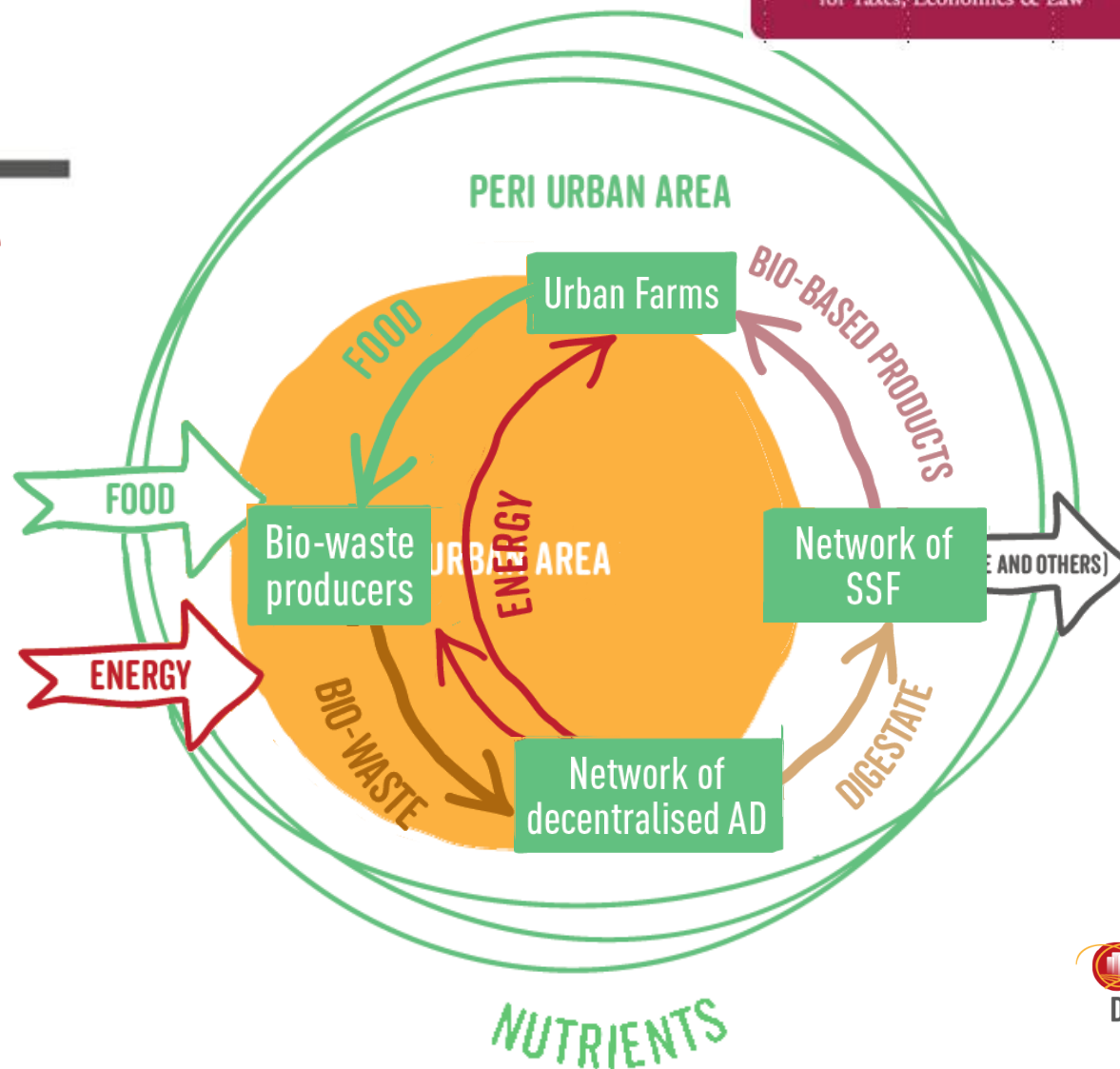
Horizon 2020



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Objective

...to a
**circular
thinking**



DECISIVE

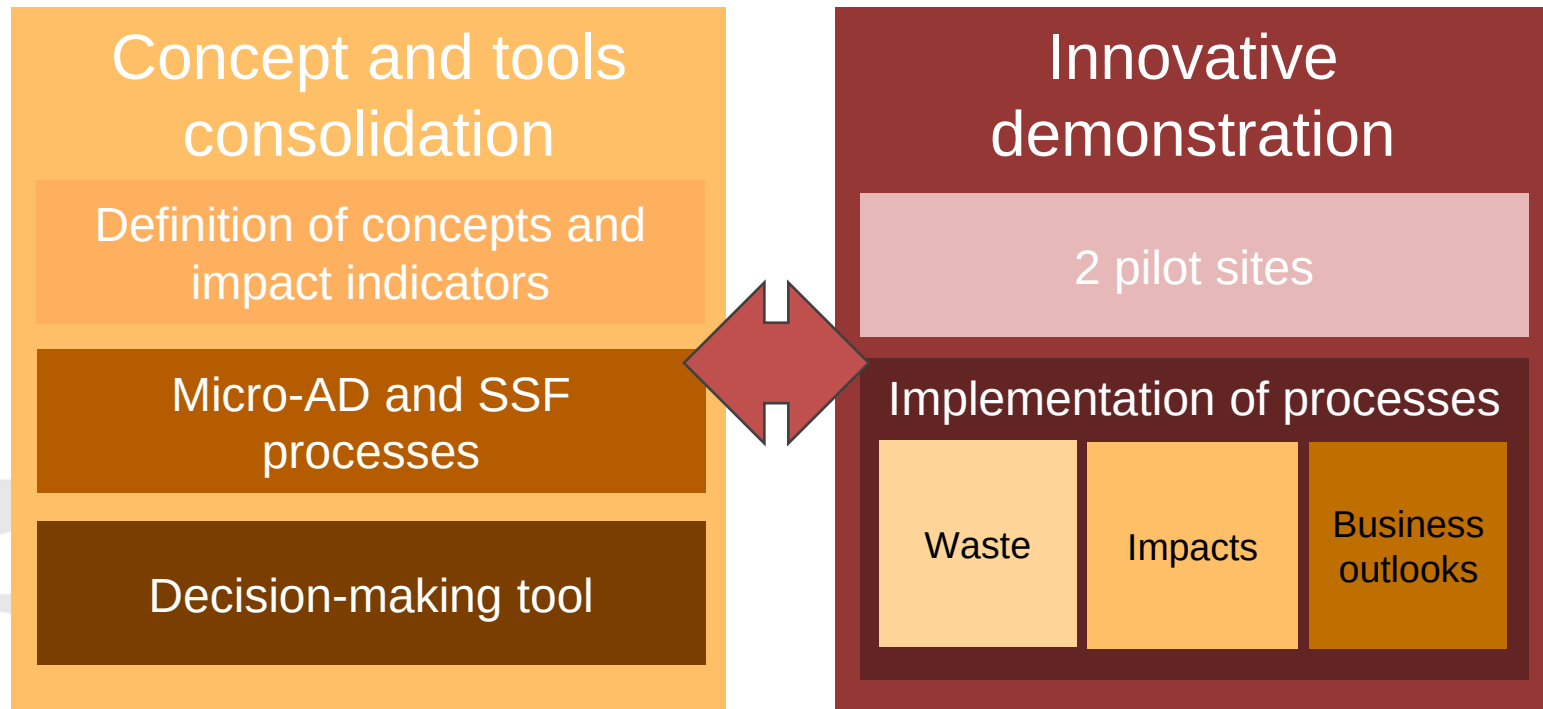
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Approach



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Outcomes



Micro-anaerobic digestion units



Solid state fermentation process



Decision-making tool



Training and communication material

More information

Separate Collection of MSW in Catalonia

http://residus.gencat.cat/en/ambits_dactuacio/recollida_selectiva/index.html

MSW Statistics in Catalonia

<http://estadistiques.arc.cat/ARC/>



Door-to-Door Collection

ASSOCIATION OF CATALAN MUNICIPALITIES FOR DOOR-TO-DOOR COLLECTION

<http://www.portaaporta.cat/en/index.php>

Biological treatment and separate collection of Biowaste

http://www.regions4recycling.eu/upload/public/Good-Practices/GP_ARC_Biowaste-collection.pdf

Waste disposal tax

http://www.regions4recycling.eu/upload/public/Good-Practices/GP_ARC_Disposal-tax.pdf



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THANKS FOR YOUR ATTENTION!

and

special thanks to the colleagues of the
Circular Economy Area
of ARC

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L'orgànica
al **marró**



torna a la terra el que és seu!