Exploring the circular bioeconomy potential in cities

BIO CIRCULAR CITIES

Local management of agri-industrial organic waste chain

Metropolitan City of Naples

Angelo Venezia, Metropolitan City of Naples
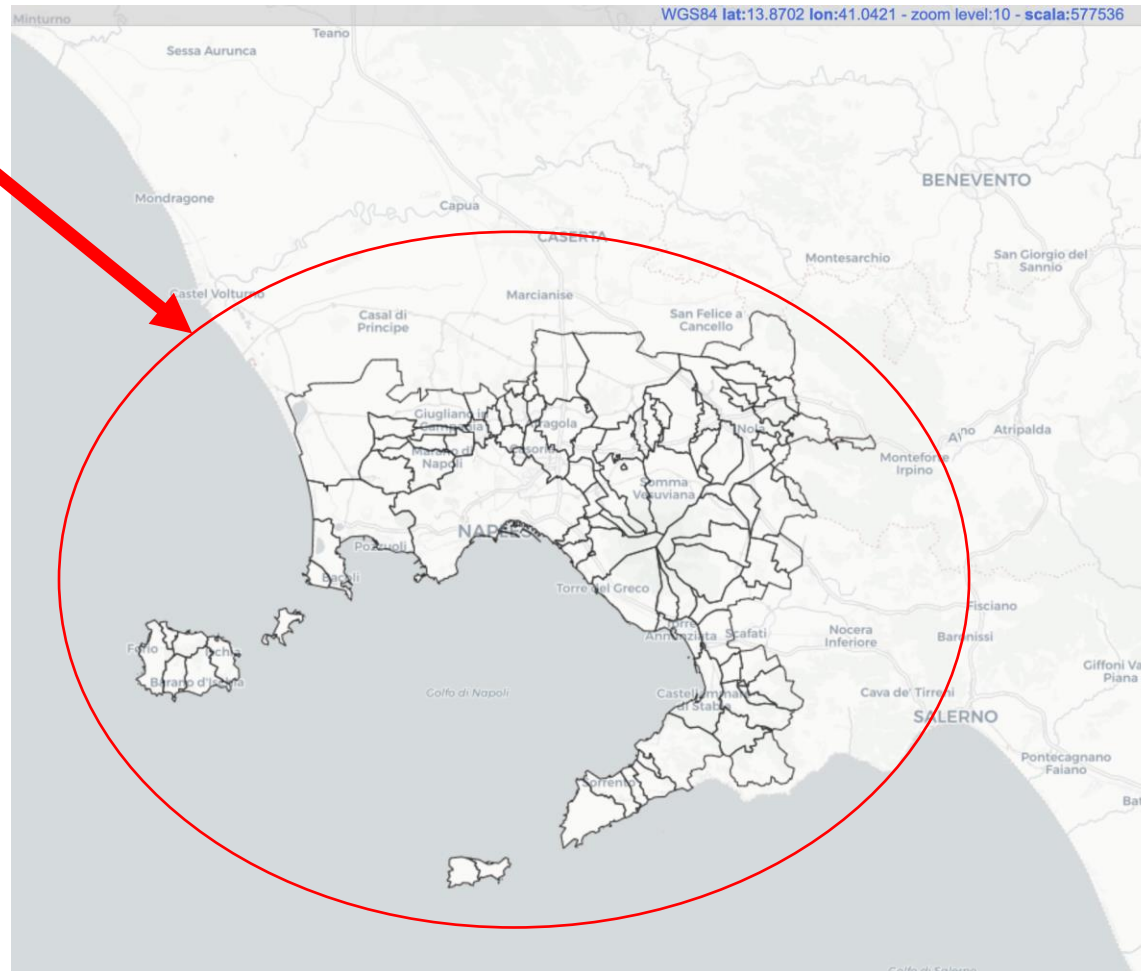
Naples, 13.09.2023 – Third BCC Webinar

Main characteristics of the pilot territory

- 92 Municipalities
- 3 ATO: Naples 1, Naples 2, Naples 3
- Number of inhabitants: 3,082,905
- Total MSW: ~1,497,089 tons
- Total not separated collection: ~782,183 ton
- Total separate collection: ~696,906 ton
- Separate collection: 47.12%
- Total bio-waste: 302,909 tons
- Source and year of data: ARPAC, 2019

MSW composition in CMNA
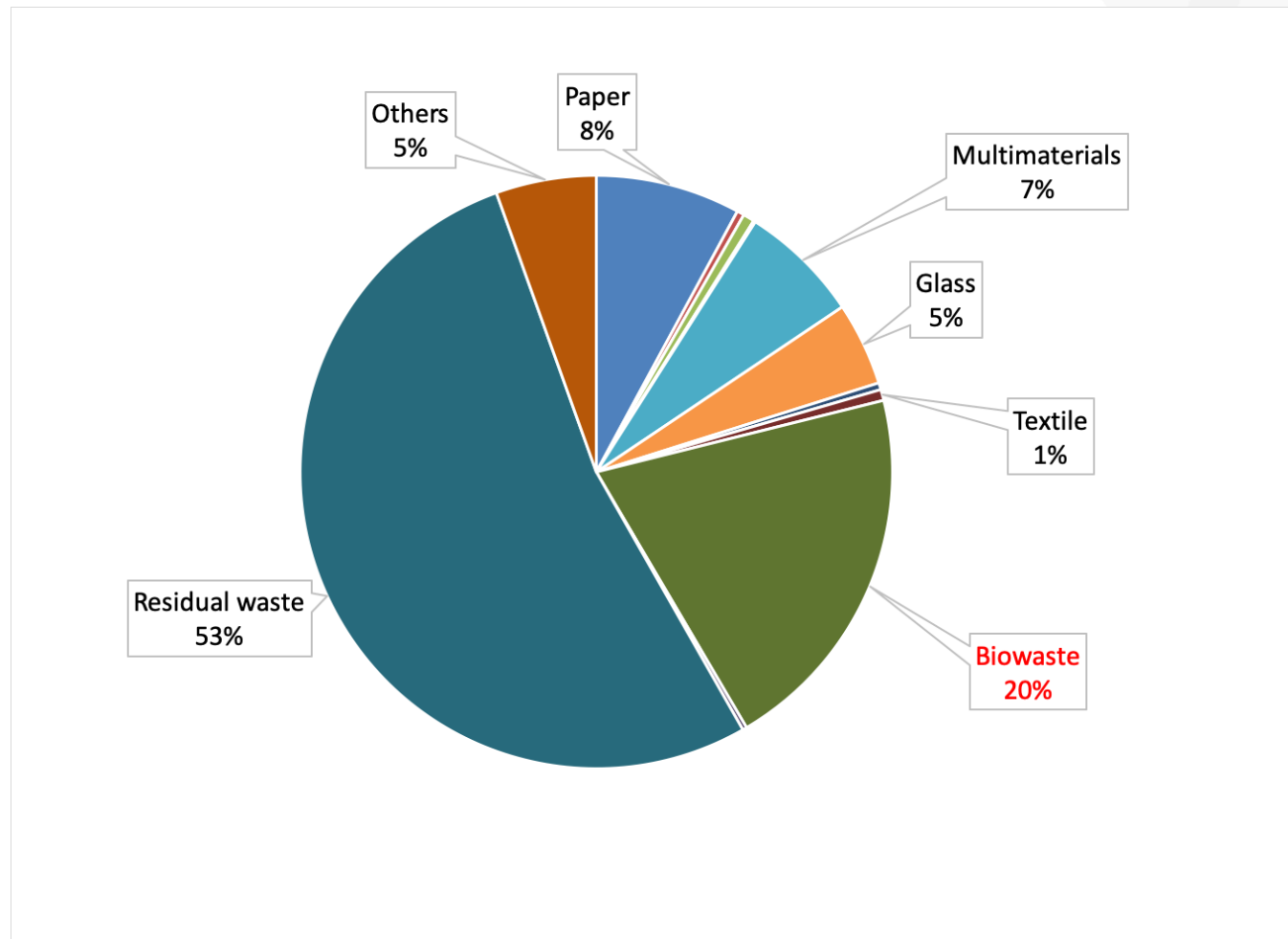
- Total MSW: ~1,497,089 tons
- Total source separated bio-waste: 302,909 tons (20% of collected MSW)
- Source and year of data: ARPAC, 2019

Waste diagram – main flows

MSW GENERATION
1,479,089 t

Paper/cardb.
117,000 t

Plastic
5,844 t

Glass
67,125 t

Biowaste
302,909 t

Storage
25,887 t

Anaerobic Digestion

Composting
82,778 t

Residual Waste
780,311 t

MBT

Recycling

Recycling

Recycling

Compost

Landfill

Incineration

Special Landfil

Heat and eletricity

Recovered materials

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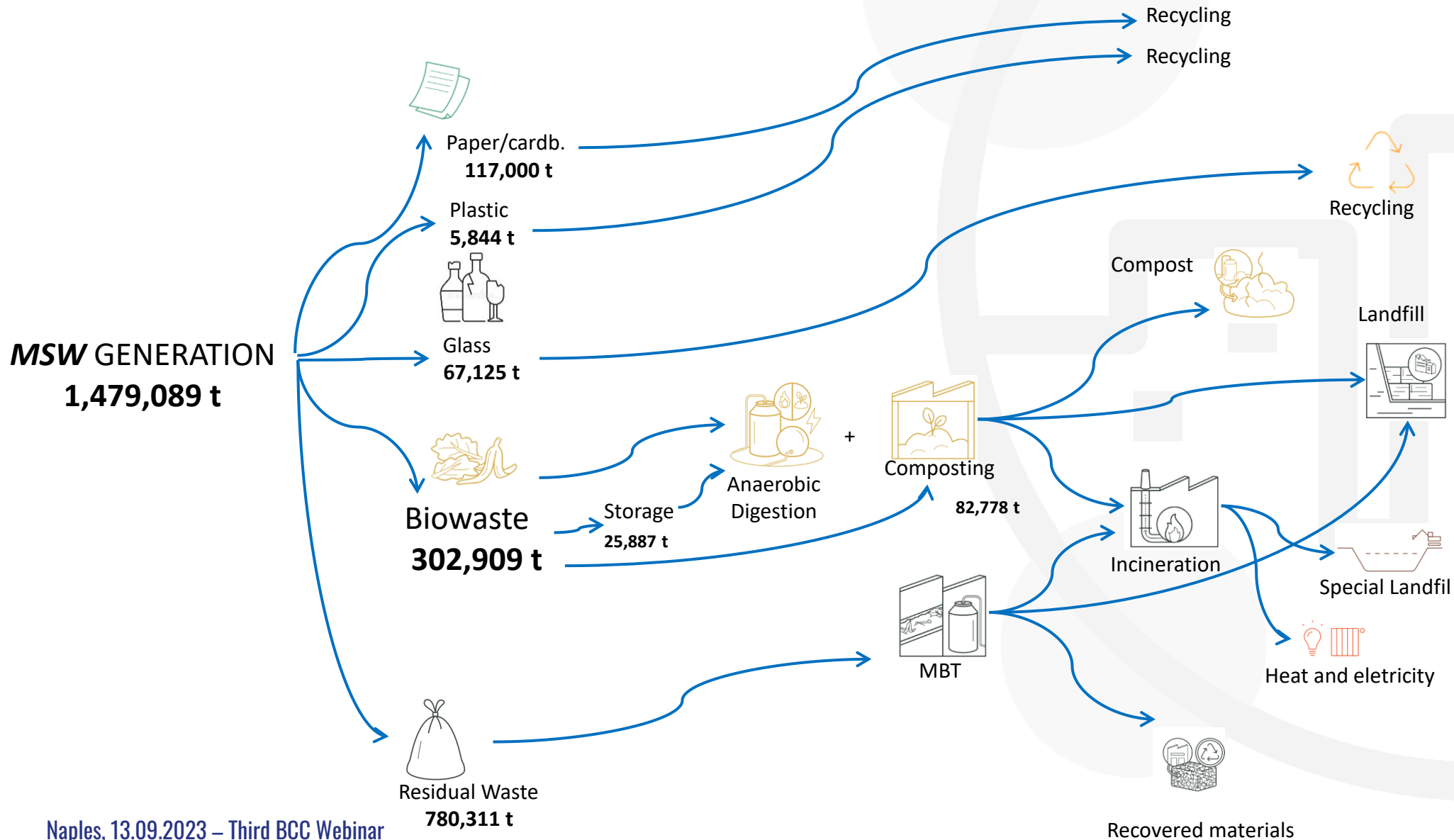
Selected biowaste chain: coffee silverskin (CS) from coffee roasting

Coffee Silverskin (CS) makes up about 90% of the biowaste generated during roasting

Skin

Pulp

Mucilage

Parchment

Silverskin
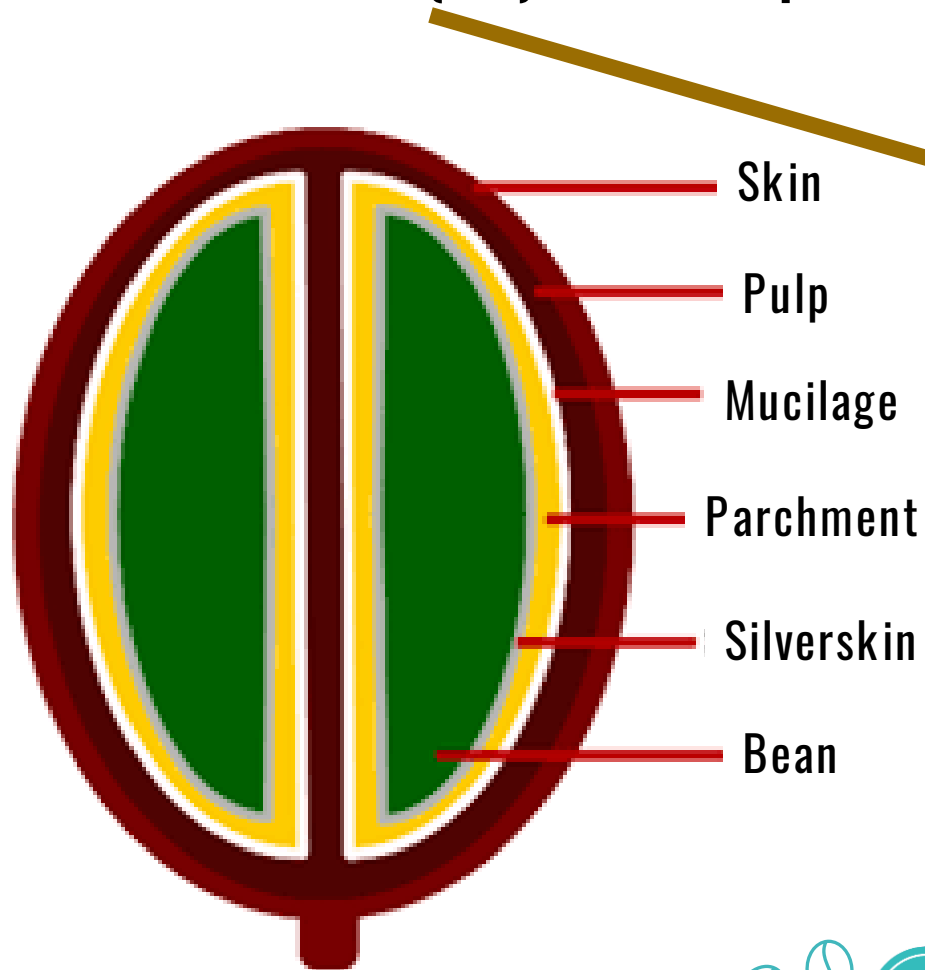
Bean

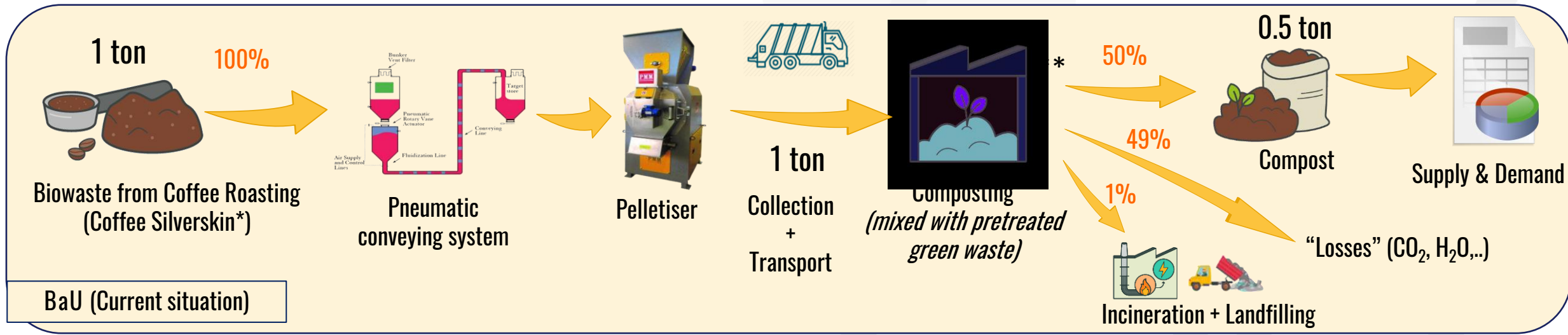# The selected chain in MCN

BaU (Current situation)

1 ton — Biowaste from Coffee Roasting (Coffee Silverskin*) — 100% → Pneumatic conveying system → Pelletiser → 1 ton Collection + Transport → Composting *(mixed with pretreated green waste)* *

- 50% → 0.5 ton Compost → Supply & Demand
- 49% → "Losses" (CO_2, H_2O,..)
- 1% → Incineration + Landfilling

**According to the Ecoinvent LCA database

ALTERNATIVE SCENARIO

1 ton — Biowaste from Coffee Roasting (Coffee Silverskin*) — 100% → Pneumatic conveying system → Pelletiser → 1 ton Collection + Transport → **Bakery** Sterilisation, sieving, washing, drying, homogenisation

- 95% → 0.95 ton Functional ingredient for baked goods → Supply & Demand
- 5% → Incineration + Landfilling

Current/ not changing situation   Alternative scenario changes   * About 90% of total biowaste from coffee roasting (besides discarded beans)

Conclusions

➤ The Alternative scenario turns out to be the most sustainable, thanks to the benefits deriving from the avoided production of flour.

➤ The most impacting processes are electricity consumption and transport.

➤ The Alternative scenario results to be more economically convenient than the BaU, in terms of savings in both biowaste disposal costs and environmental remediation costs.

These results suggest:

➤ increasing the use of renewable energy and/or of low energy consumption machinery;

➤ having local treatment facilities (less transport);

➤ there are more economically convenient solutions than the public system for disposing of biowaste from the agro-industrial sector.
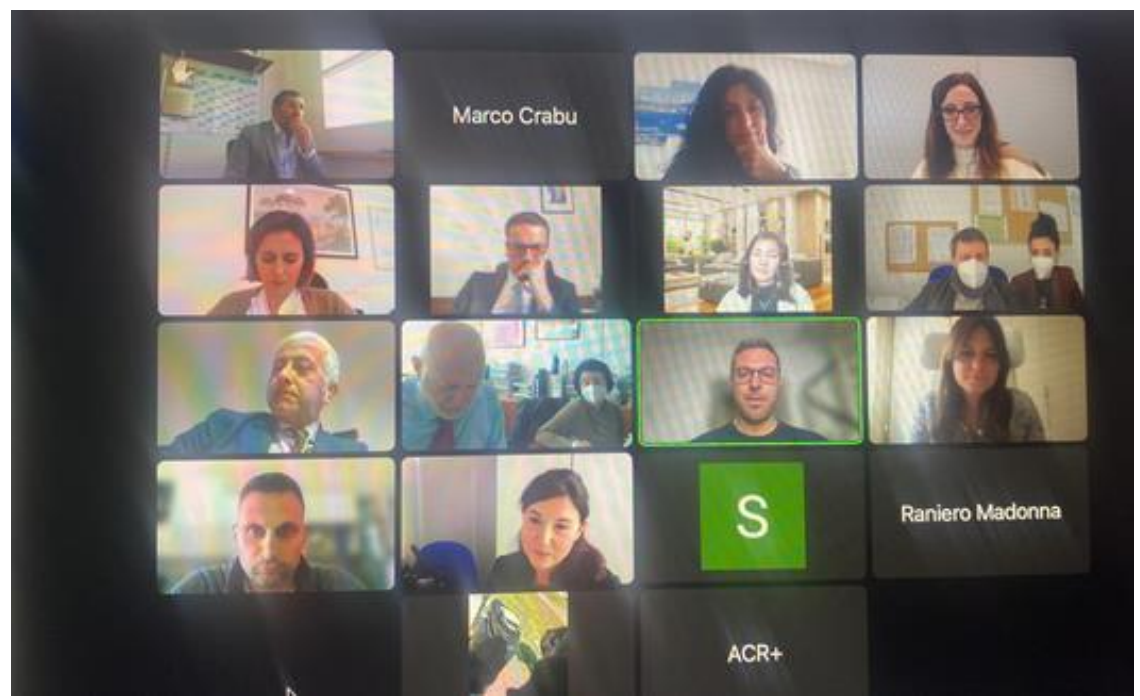
Stakeholder involvement

Stakeholders involved in 3 LLs and one Final Stakeholder event in Naples on June 2023

- Industrial and research dimensions -- active in the field of agro-industrial biowaste and especially in the coffee supply chai

- Interaction with them for collecting data for the two scenarios under analysis (BAU and alternative scenario) and for the general info in the Metropolitan Area of Naples, identification of good practices, BCC web-tool, policy recommendations, etc.

- Local administrations

- Environmental organizations and Energy agencies

- SMEs associations

- Educational authorities and representatives

Stakeholder involvement

First LL of Metropolitan City of Naples

Stakeholder involvement

Second and Third LLs of Metropolitan City of Naples

Stakeholder involvement

Second and Third LLs of Metropolitan City of Naples

Stakeholder involvement

Final Stakeholder event in Naples

Status of the implementation

- Key stakeholders identifies and involved

- What should be done next: policy improvement based on BCC policy recommendations and project outcomes; further analysis obtained during the project peer reviews by the external experts.

- Meetings with stakeholders to adopt strategy on implementation of the project outcomes

Main conclusions and lessons learnt

- Stakeholders are willingness to take into consideration the environmental aspects for selecting biowaste recovery or valorisation technology.

- Criticalities have been identified depending on the type and role of the decision-maker (public administration, technician, entrepreneur)

- The stakeholders are always concerned about the bureaucracy to be implemented in order to acquire the necessary environmental authorisations

- LCA and LCC are considered very useful for improving the environmental and economic performance of the organic waste chain analysed

- LCA results should be transparent, effective and clear. It is important to focus on the environmental aspects not only locally but also globally

- More incentives are needed and it is important to have more streamlined authorization procedures

Main conclusions and lessons learnt

- Web tools is useful because it would make it possible to identify the best system for the best treatment related to a specific waste

- It is possible to obtain various types of information (technical, environmental, economic)

- Limitations of the tools are that it needs the collection of prior information and it is available only in one language

- It should be simplified to be user friendly and improved the graphical representation

- To extend the use of the webtool to other case studies would be important strengthen technical characterisations of technologies and having more choices of it, an analysis of the policy context (economic incentives), and a combination with collaboration development tool (mapping of stakeholders).

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Thank you

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