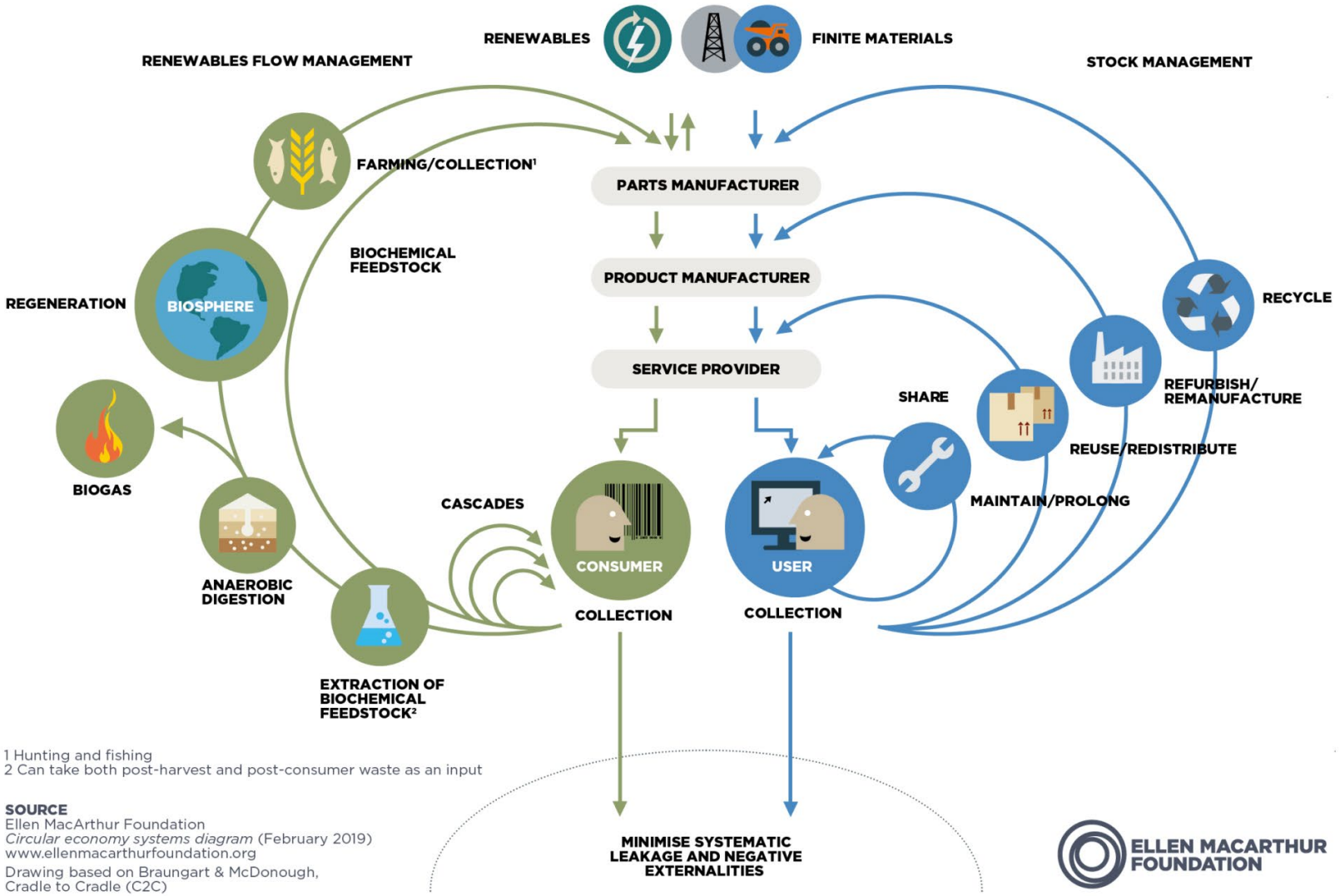
CityLoops Bio – waste

Edwin Keijsers

Circularity

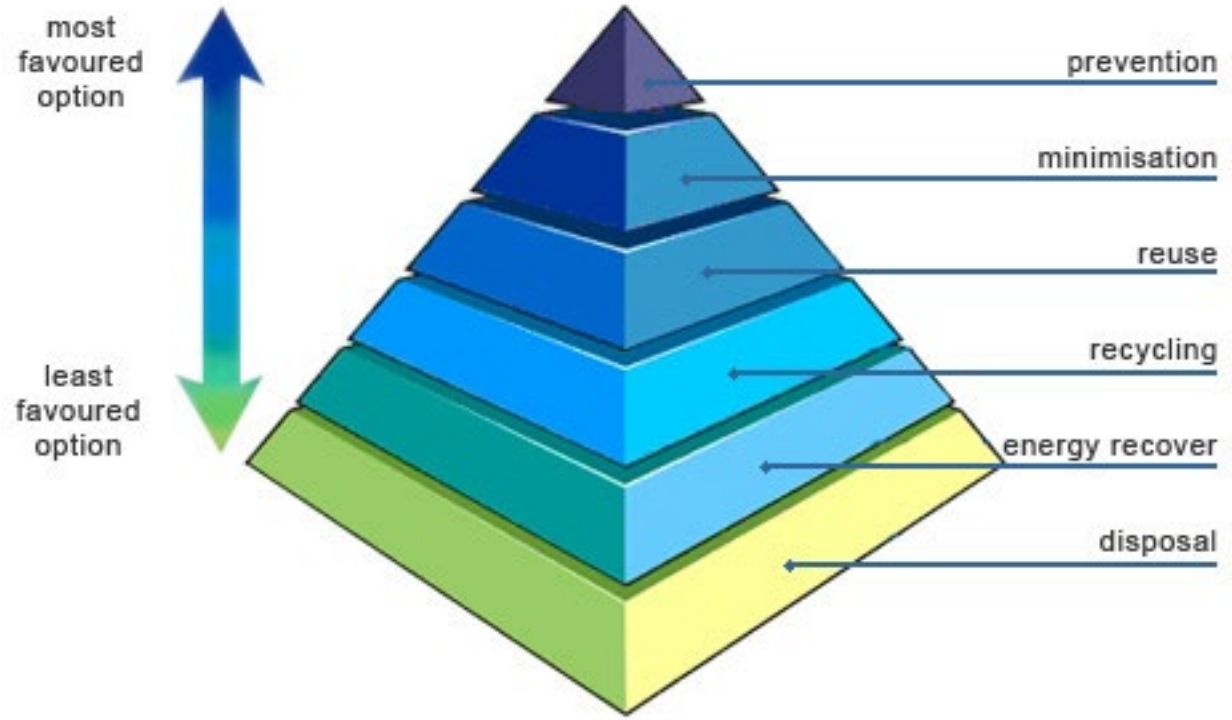


1 Hunting and fishing
2 Can take both post-harvest and post-consumer waste as an input

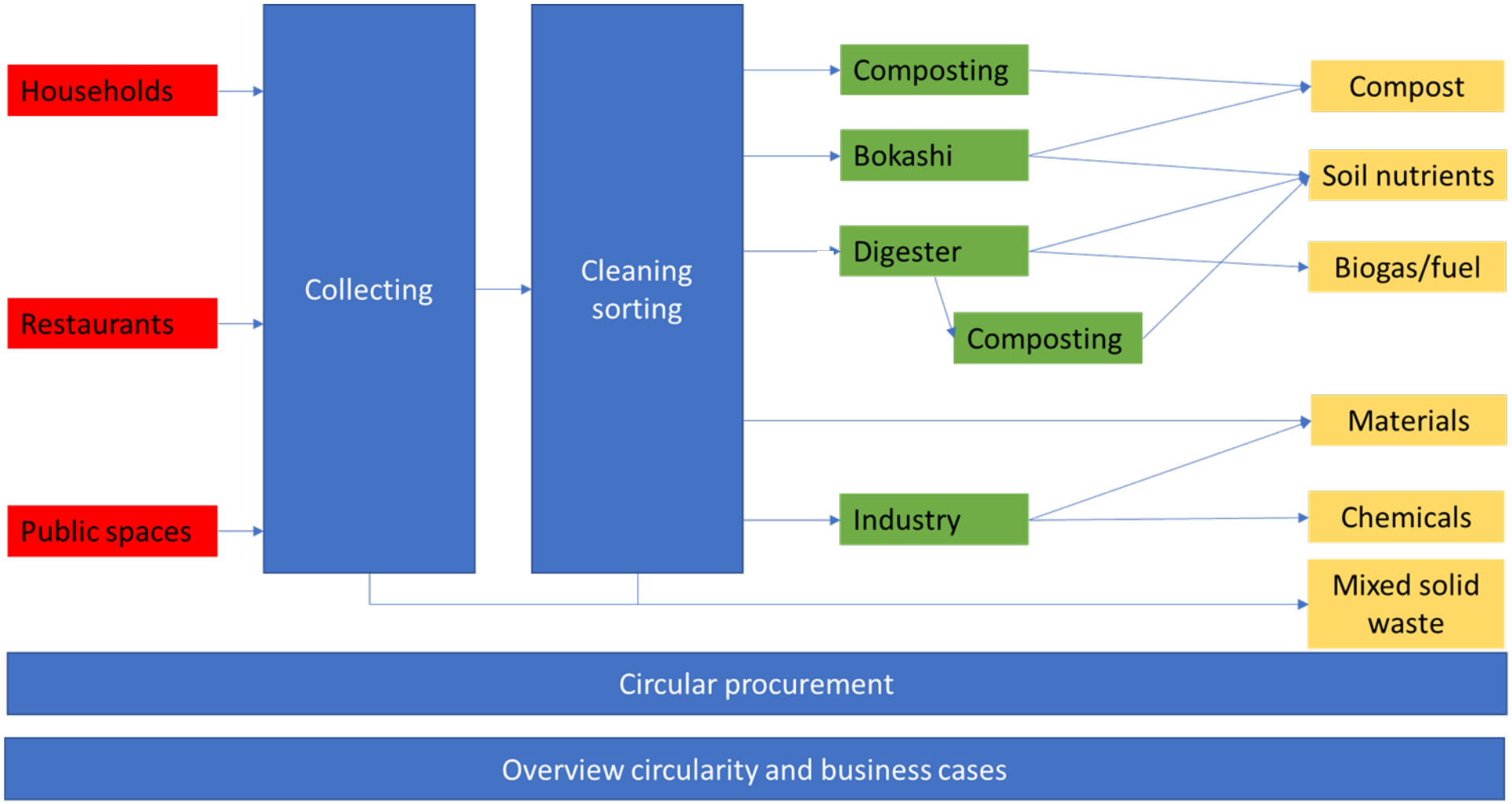
SOURCE
Ellen MacArthur Foundation
Circular economy systems diagram (February 2019)
www.ellenmacarthurfoundation.org
Drawing based on Braungart & McDonough, Cradle to Cradle (C2C)

ELLEN MACARTHUR FOUNDATION

Circularity



Bio-waste Circular City



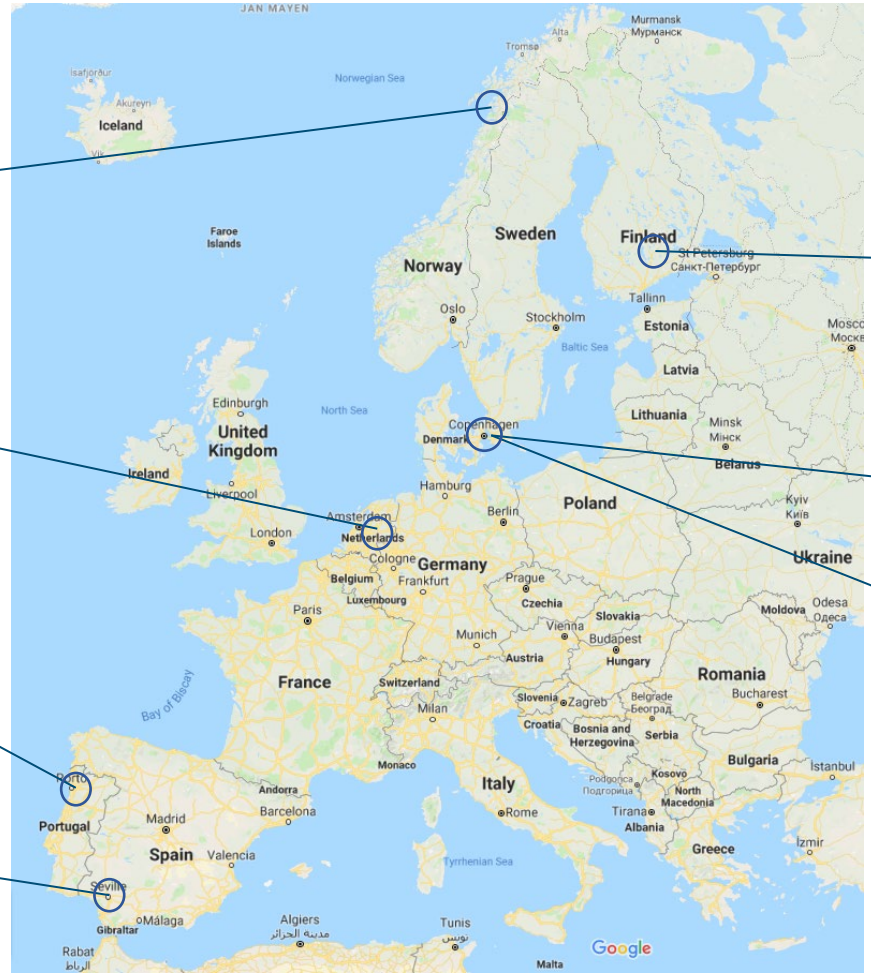
The cities

BODØ

APELDOORN

PORTO

SEVILLE



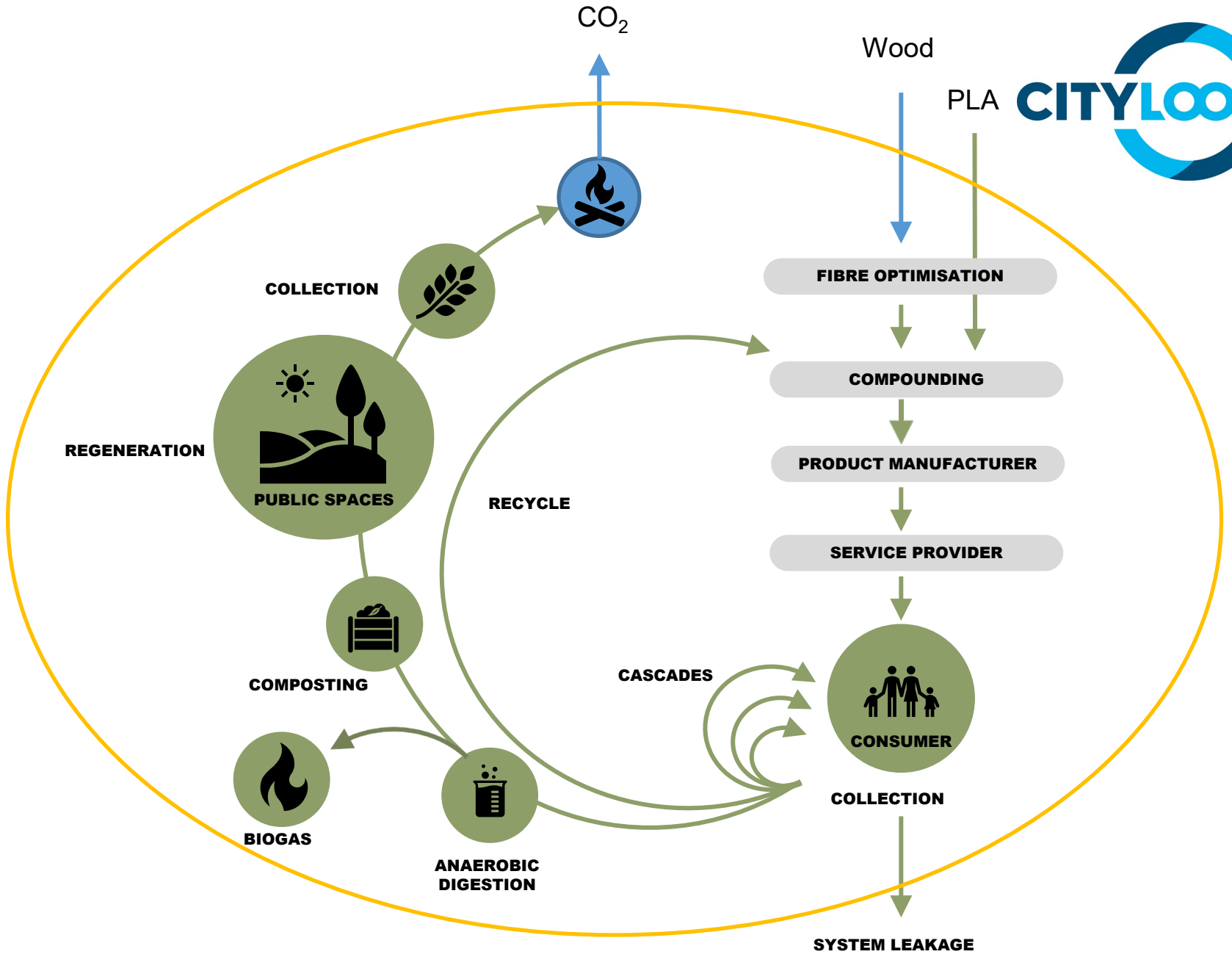
MIKKELI

ROSKILDE

HØJE-TAASTRUP

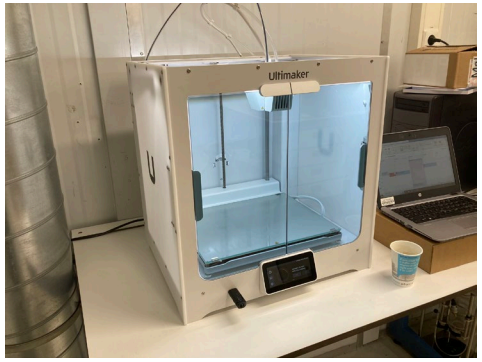
Before

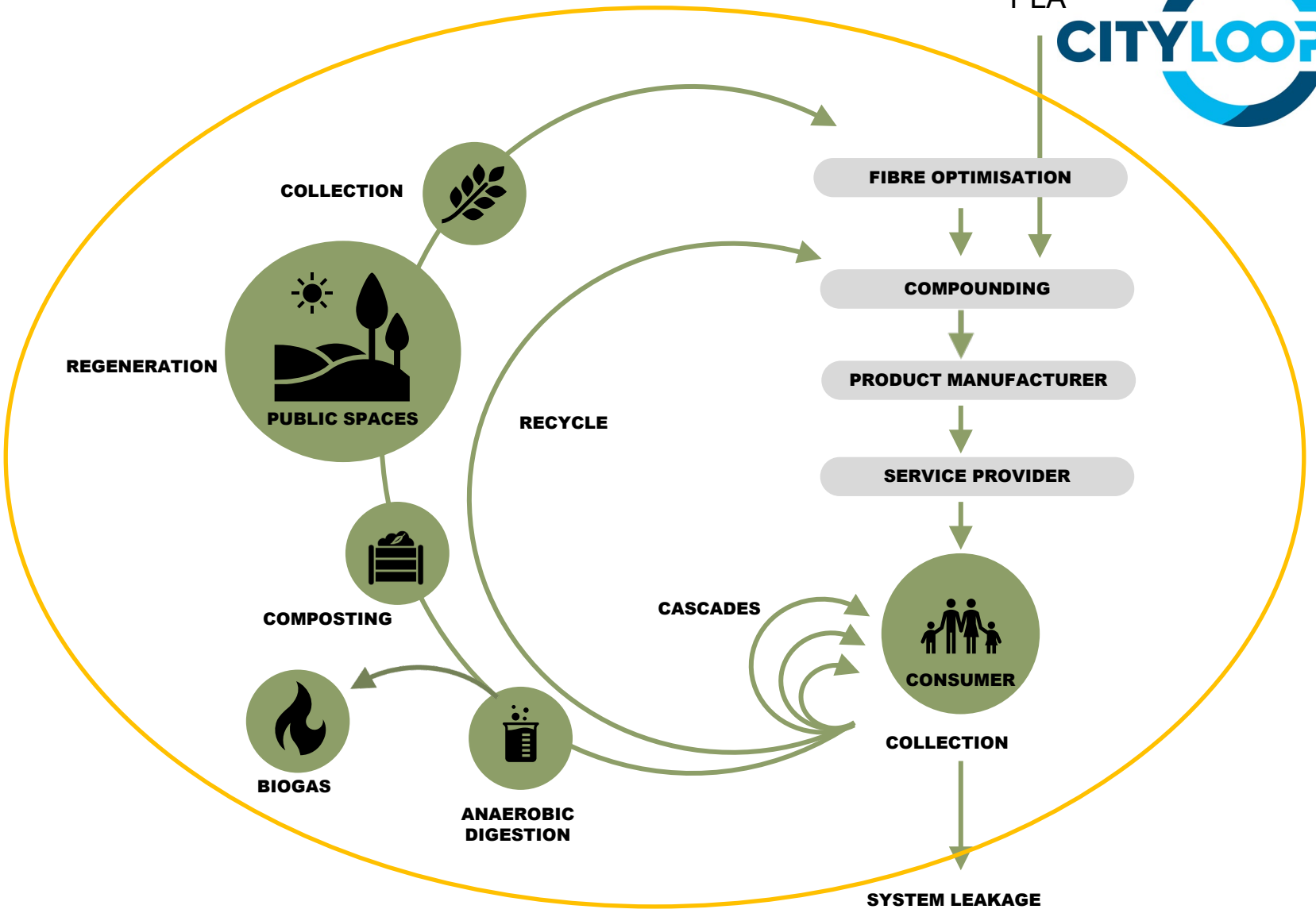
Import of components to produce materials



After

Using biomass inside the city





Key highlights in Porto

Demo action 1: Bio-waste selective collection and local treatment model

- 120 street containers with electronic access, covering 15 000 families. 3 new jobs and more than 516 tonnes of food waste collected.
- Two community composting spaces. 15 composting bins, 177 households participating. 9,16 tonnes bio-waste locally treated and 2,75 tonnes of compost produced and distributed.

Key highlights in Porto

Demo action 2: Bio-waste circularity in the tourism and social sectors (2 hotels and 1 solidarity institution)

- 237,5 kg of food produced. 1400 kg / year of food waste avoided.
- 36,5 tonnes of food waste collected.
- 770 kg / year of bio-waste locally treated.

Key highlights in Porto

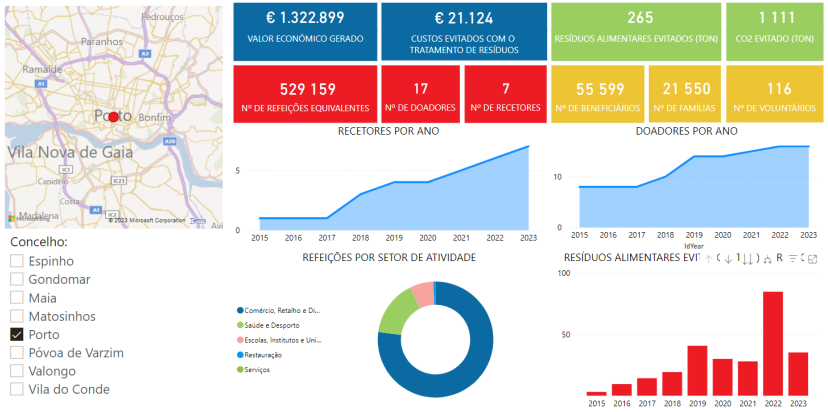
Demo action 3: Launch of Green Space Certification System

- 900 m2 of certified space
- 350 l compost applied. Drainage ditches made.
  New plant species introduced to increase biodiversity.

Key highlights in Porto

Demo action 4: Circular Entrepreneurship Initiatives - FoodLoop

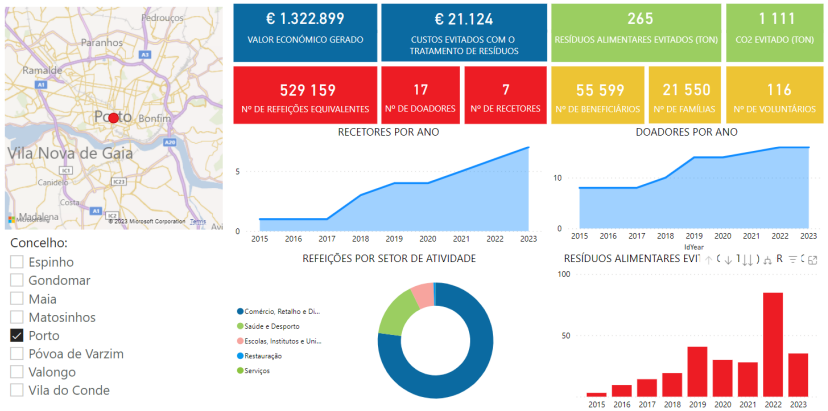
- 23 application, 15 ideas through BootCamp, 5 winners through mentorship.
- 1 winner had access to extra-prize: incubation at UPTEC – pilot project.



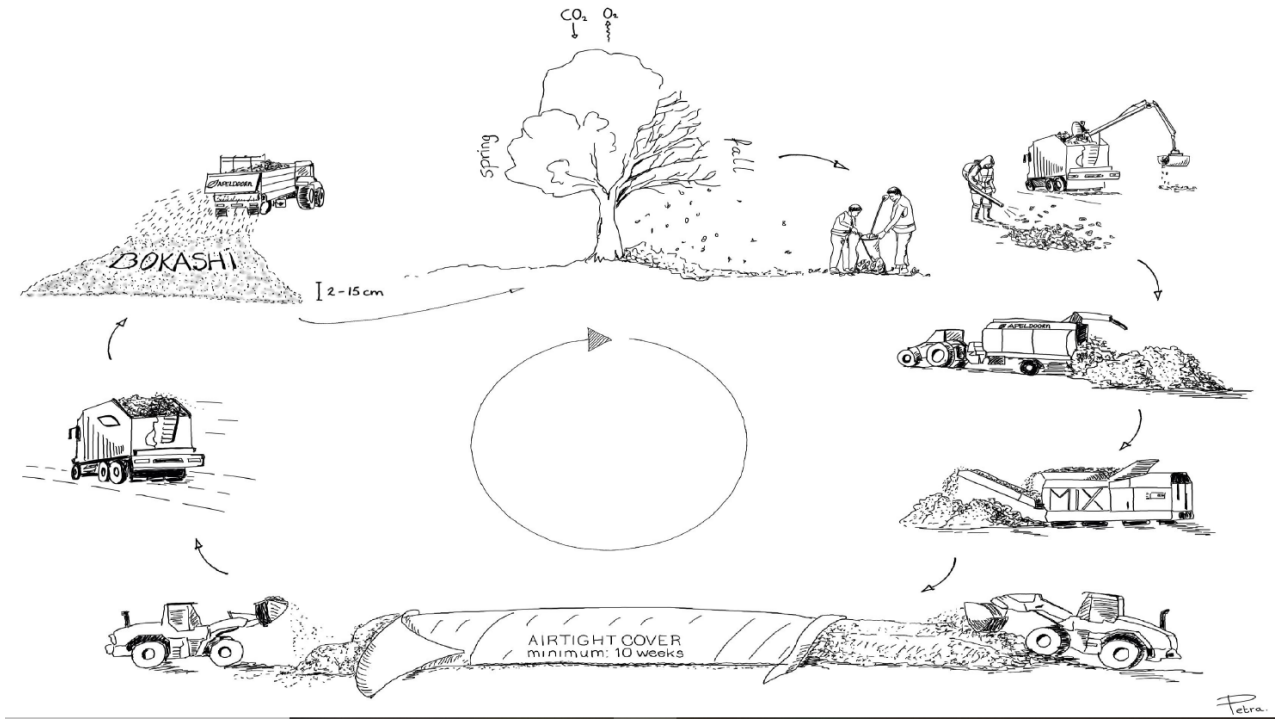
Key highlights in Porto

Demo action 5: Reducing food waste by a donation network

- From May 2021 to December 2022, there were 14 donors and 6 receivers, 207 957 equivalent meals were distributed by 12 083 families.
- 104 tonnes of food waste were avoided, resulting in the prevention of 437 tonnes CO2 eq emissions.

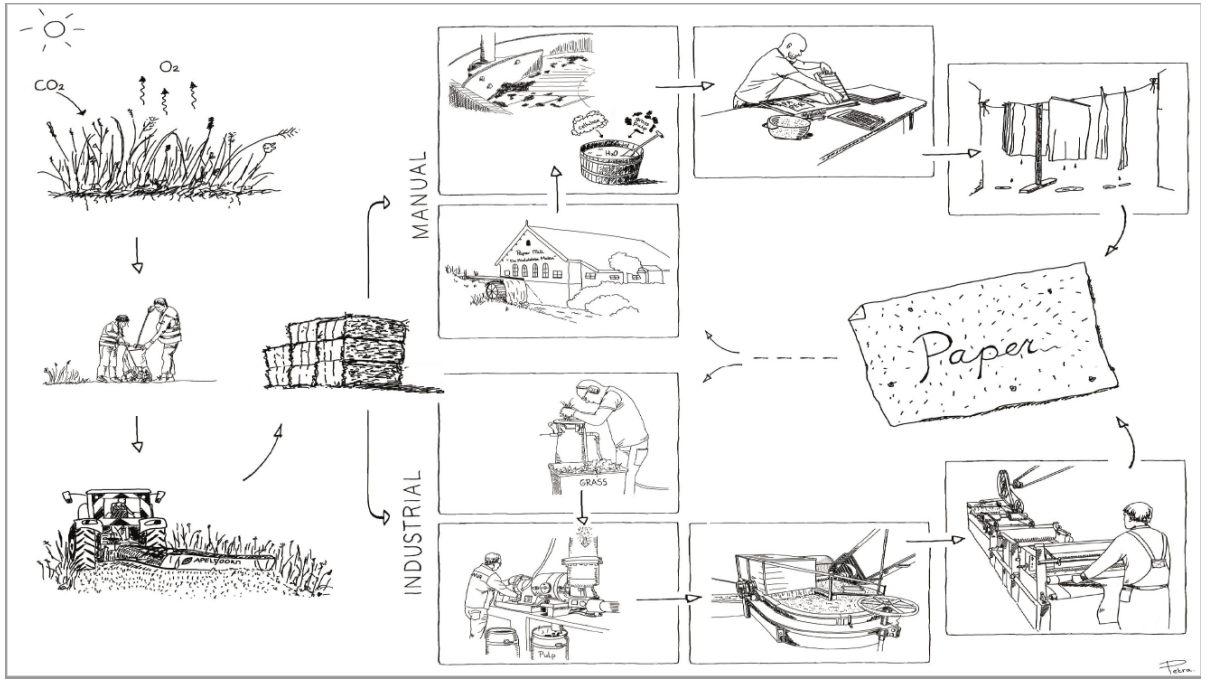


Key highlights in Apeldoorn



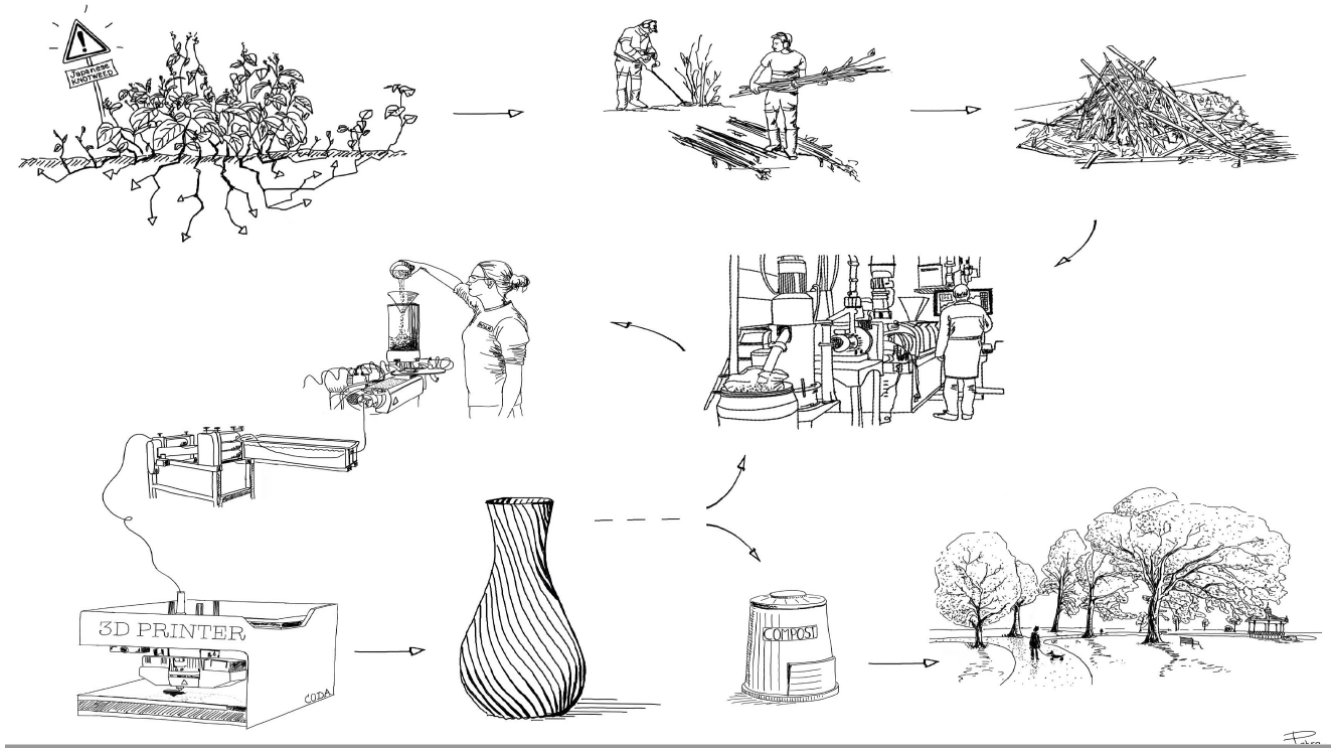
Production of bokashi from leaves on city scale

Key highlights in Apeldoorn



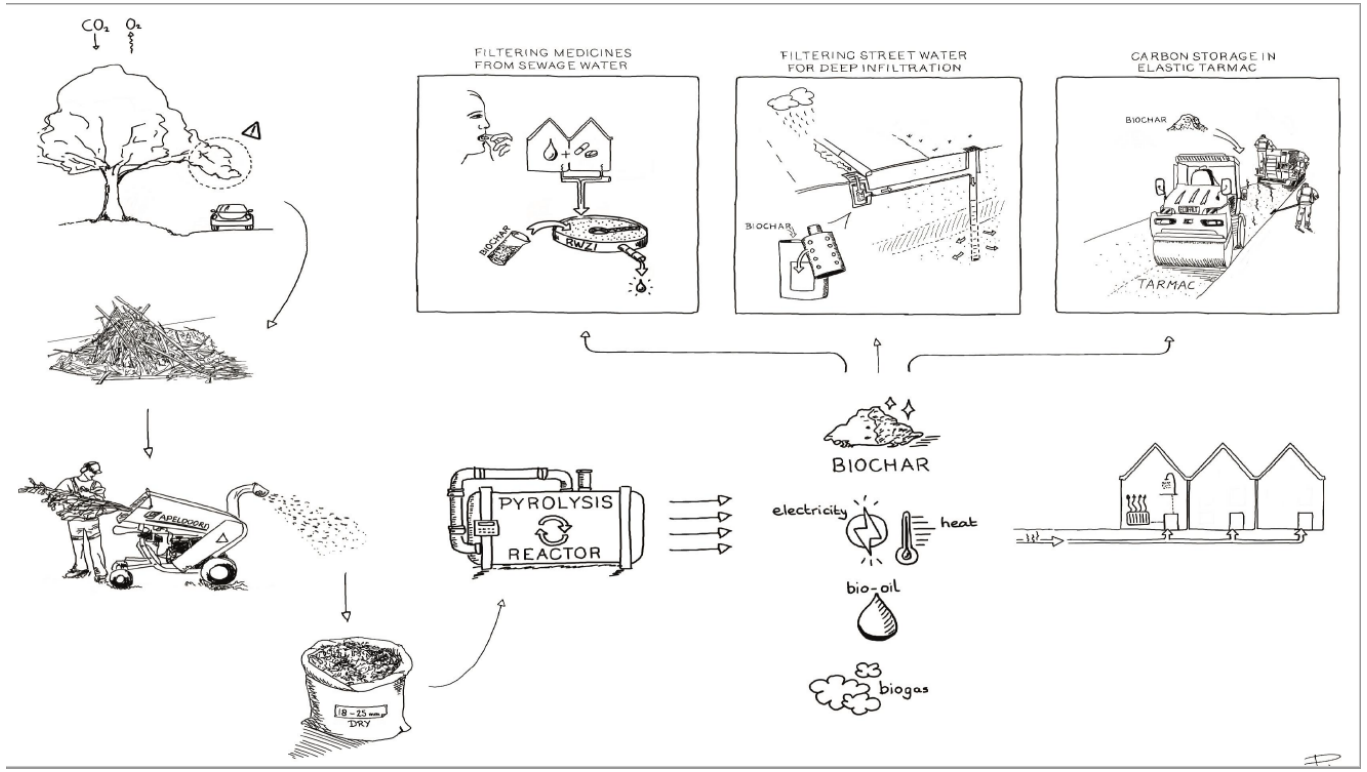
Production of paper from grass on pilot scale

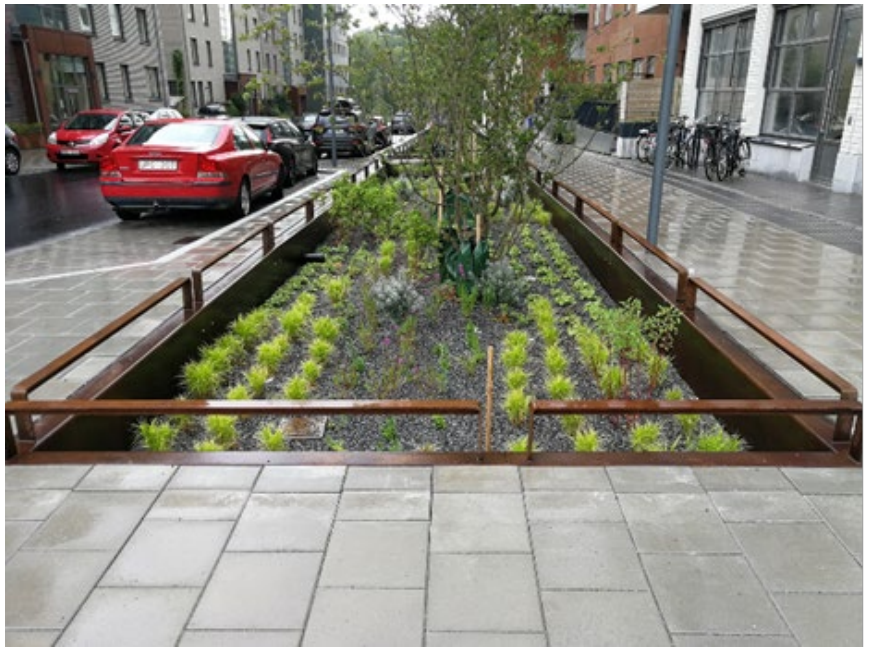
Key highlights in Apeldoorn



Production of 3D filament of Japanese Knotweed on pilot scale

Key highlights in Apeldoorn





Evaluation of the production of Biochar on City scale

Key highlights in Seville

Demo action 1: Implementation of a biowaste collection route in a neighborhood of Seville.

- Installation of 100 separate waste collection containers with electronic lock
- Communication campaign associated to the installation of the route
- Communication campaign focus on avoid food waste (large generators)
- Collection route optimization tool

Key highlights in Seville

Demo action 2: Test the methane production from the biowaste collected in co-digestion with sludge in a WWTP.

- Collected bio-waste was physically and chemically characterized to establish purity and biogas production potential
- Bio-waste mixed with sludge was tested in a pilot digester of EMASESA
- Economic and environmental evaluation of the demonstration

Key highlights in Mikkeli

Demo action 1: BW collection and sorting: pilot project

- Paper waste bags were distributed to residents, and information campaigns promoting the separate collection of bio-waste were conducted at the demonstration site as well as in the whole city area.
- The campaigning in the Peitsari demonstration area was successful: the proportion of bio-waste in household mixed waste decreased from 35% to 27% during the demonstration. The amount of separately collected bio-waste increased 47% per inhabitant compared to the baseline leading to increased nutrient recovery from the urban environment.

Photos: Xamk and Miksei

Key highlights in Mikkeli

Demo action 2: BW treatment: pilot and laboratory scale experiments

- Wood based biochar showed promising effects as and additive material on improving the quality of biogas process. Biochar addition in the biogas process prevented the effects of harmful or inhibiting materials and improved the quality of biogas. Additionally, valuable information on the process of electrochemical struvite precipitation from biowaste-based digestate was collected in the laboratory tests. Results can be used in optimizing the full-scale plant process with local stakeholders.
- Tested methods still need further development and commercialization of new methods can take several years.
- New procurement guidelines concerning biowaste streams and case reports are taken to use in Mikkeli´s procurement practices

Photos: Xamk and Miksei

THANK YOU VERY MUCH!

Website: www.cityloops.eu

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