



Horizon 2020



Living Lab concept in the SYSTEMIC project

Living Labs towards circular economy developed for AD plants in Europe

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Introduction

SYSTEMIC is a 4-year H2020 demonstration project running from June 2017 until 2021 and is funded by the European Commission under call CIRC-01-2016 'Eco-innovative approaches for the circular economy: large-scale demonstration projects' of its H2020 framework (projectnr. 730400).

SYSTEMIC aims to give a boost to the implementation of circular economy solutions for manure, sewage sludge and food waste through nutrient recycling and recovery (NRR) technologies.

SYSTEMIC has partnered up with five **demonstration plants**: large scale anaerobic digestion plants located all over Europe, which have already invested in nutrient recovery technologies.

The project also selected eleven so-called '**outreach locations**' which are biogas plants interested in opportunities to improve their current practice in a sustainable way. Other interested biogas plants can still join the project as an '**associated plant**'.

The demo plants will facilitate the outreach plants in their process of business case development by sharing knowledge on nutrient recovery technologies and related financial and legislative issues. The project consortium will have a coordinating role and will evaluate the envisaged business cases in terms of technological feasibility, economic viability and sustainability.

The project will be

- demonstrating the technical, economic- and environmental performance of the recovery and reuse of nutrients (NRR) technologies from the demo plants running on manure, sewage sludge and/or bio-waste
- Developing an online tool to explore the possibilities of different nutrient recovery techniques and setting up a business case with NRR
- reinforcing the cooperation and experience exchange between practitioners, research entities and companies
- Translating this information into opportunities for circular economy business cases/opportunities at twelve outreach locations.
- -Fact sheets on end products and techniques & roadmap that gives an overview of barriers and bottlenecks of innovations and ways to overcome these
- Field trials and analyses on recovered products
- formulating policy recommendations and to derive a roadmap to support the roll out of Circular Economy Solutions for bio-waste over Europe

Concept of Living Labs: benefits & expectations of outreach locations and associated plants

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Introduction

In the process of innovation (in nutrient recovery from digestate) the scale up from lab scale and pilot scale tot full scale techniques is seen as a valley of death. There are a lot of factors stopping innovation in this stage:

- The impact of translating small volumes (lab scale) to large volumes (full scale) is not to be underestimated
- A market value has to be created for new products
- The economic feasibility of a full scale technique (CAPEX, OPEX, business plan,...)
- Regional and EU legislation: for example: anaerobic digestion is supported on a regional level while the recognition of recovered products is part of European Legislation

In the project SYSTEMIC we will try to overcome these barriers for innovation and find solutions by joining forces between scientists, business and practitioners and policymakers.

Demonstration plants

SYSTEMIC includes five large-scale **Demonstration Plants** which will advance their current treatment process through the implementation of novel nutrient recycling and recovery (NRR) technologies. Thereby, these plants will demonstrate the practical feasibility and commercial viability of NRR from organic waste streams. Throughout the project, the demonstration plants will be closely monitored hereby generating data on mass- and energy balances, technical performance, product quality, product prices and feed tariffs and premiums etc. These data will be used to evaluate the technical, economic and environmental performance of the AD plants and the implemented NRR technologies. During the project they will supply information for mass-& energy balances, business case, market, grants/subsidies, costs, etc (Read more about the [Demo Plants](#))

Outreach locations

Spread over Europe, eleven large-sized anaerobic digester plants have been selected as **outreach locations**. All outreach locations have a strong interest in opportunities for NRR and want to find out if this could be a sustainable and profitable way to prepare their business for the future. All outreach locations offer excellent opportunities for implementation of NRR technologies, enhancement of existing NRR technologies and/or optimization of their business case.

The set of outreach locations covers all relevant feedstocks; manure, mostly combined with digestion of various other agro-industrial and municipal organic waste streams, sewage sludge and slaughterhouse waste. Outreach location Atria (Finland), being part of the project consortium, is a forerunner among the outreach locations.

Associated plants

The eleven outreach locations were selected from a larger group of interested plants. The non-selected AD plants were offered the possibility to remain connected to SYSTEMIC as a '**Associated plant**' meaning that they can, on their own costs, join the workshops and meetings organised with the outreach locations and will be asked to bring in their experiences regarding nutrient recovery of biomass streams.([read more about the benefits and expectations of the Associated Plants](#))

Interested biogas plants can still [join as an Associated Plant](#).

"Business Development Package"

One of the outcomes of SYSTEMIC will be the "**Business Development Package**", which includes a **calculation tool, fact sheets and roadmap**.

Calculation tool

The calculation tool will be based on a database with information from literature, real-life data from the Demo Plants, Outreach Locations and Associated plants.

The web based tool will contain information on:

- Mass -& energy balances
- Nutrient recovery & separation efficiency
- Economic aspects:
CAPEX, OPEX, maintenance cost, wearing cost
- Energy requirement
- Chemicals
- Environmental impact

Fact sheets

For each demo plant a fact sheet was made and can be downloaded at the [SYSTEMIC website](#).

The contain basic information about the plant, the basic process steps, their drivers and benefits for and from nutrient recovery.

- end products, techniques, grants and subsidies
- Regional market for recovered end products
- Success stories
- Barriers and bottlenecks
- Drivers for NRR

Such fact sheets will also be made for each outreach location and for interested associated plants and published on the [website](#).

For each outreach location, a business case with nutrient recovery will be explored and a fact sheet on these "new" business cases will also be included in the BDP.

Confidentiality

The fact sheets will be revised by each outreach locations/associated plant and they will have to approve their factsheet before it is published on the website.

All other information will be used to build up the database for the Business Development Package and will not be published or visible.

- Mass- and energy balances will be published in factsheets and reports but **only after written permission of the plant owner**
- Economic data **will remain confidential**

Living Labs

One of the outcomes the project aims for are partnerships, cooperation, good advice and experience exchange between practitioners, business and scientists.

To facilitate this, the project aims to set up Living Labs.

A living lab would be a regional collaboration between biogas plants, farmers and industry to form a sustainable (environment, economic, social) circular chain (recovery, recycling and re-use).

Good examples of a Living Labs are "An Achterhoek without artificial fertilizer"(NL) in which Demo Plant Groot Zvert is involved and the Associated plant "NDM Naturwertstoffe GmbH" (DE).

More specific, in the SYSTEMIC project we see a Living Lab a real life innovation environment where Demo Plants and scientists can learn from each other. The Living lab can also include other stakeholders like local farmers and industries.

We believe that the key to creating a Living Lab is to make the concept of nutrient recovery from digestate transferable to an "Outreach Location" .

This is an intensive learning experience which requires the adaptation of the concept depending on different variables like social environment, economic feasibility, regional legislation, choice of technologies, market characterisation, etc to fit the outreach location.

The one of the ultimate goals of the SYSTEMIC project is that all AD plants in Europe can learn from these Living Lab learnings at the Outreach Locations by making use of the Business Development Package that will become publicly available at the end of the project.

Living Lab meetings

SYSTEMIC will try to stimulate the development of more of these Living Labs by **bringing together practitioners, industry and researchers**, to exchange ideas on innovation and research and collaborate to find joint ventures and concrete solutions for implementation of NRR.

In the framework of this, **3 meetings** will be organized during the project where to each outreach locations, associated plant and demo plant is invited.

Each meeting will be an interactive networking moment with updates about the project including a visit demo plant or an outreach location. At the final meeting the web based tool for nutrient recovery will be exhibited in première before it goes public and different stakeholders will be brought together.

1st Living Lab meeting 22-23 February 2018

Visit to Outreach Location Waternet and ICL Fertilizers in Amsterdam (NL).

2nd Living Lab meeting November 2019/ January 2020

Visit to Demo Plant Groot Zevert (NL) and/or AM-Power(BE)
(date and location still needs to be confirmed)

3rd Living Lab meeting March/April 2021

Visit to Outreach Location Atria (FI)

(date and location still needs to be confirmed)

Final workshop of the Living Labs where experiences will be shared, business cases shown, future plans discussed and the web tool presented. This meeting will attempt to bring together all different stakeholders.

Living Lab visits

During the project, all AD plants in the SYSTEMIC network (demo plants, OL and AP) are encourage to visit each other to facilitate exchange of experiences and knowledge with NRR. These visits can be done on own initiative or with help from the SYSTEMIC consortium.

19/12/2017

Outreach Location Atria(FI) visits Demo Plant AM-Power(BE)

21/03/2018

Associated Plant Agman Inc. visits Outreach Location Biogas Bree (BE) –

5/07/2018

Outreach Locations Biogas Bree (BE) and Waterleau New Energy (BE) visit Demo Plant AM-Power

05/07/2018

Outreach Location Biogas Bree (BE) visits Outreach Location Waterleau New Energy (BE) –

28/09/2018

Outreach Locations Bojana (CR), Biogas Bree (BE) and SCRL Kessler (BE) visit Outreach location Biogastur (ES)

Possible visits in the future organized by the SYSTEMIC consortium

Demo Plant AM-Power (BE)

Demo Plant Groot Zevert (NL)

Demo Plant Benas (DE)

Outreach Location SCRL Kessler (BE)

Associated Plant Arbio (BE)

...

Benefits for Outreach Locations and Associated plants

All outreach locations and associated plants:

1. will – as mentioned before- be invited to the Living Lab meetings where an intensive interactive exchange of knowledge & experiences is facilitated.
2. Will be invited to all Living Lab visits organised by the SYSTEMIC consortium
3. Their logo & fact sheet will appear on the Systemic website
4. Will receive exclusive newsletters & reports on:
 - the progress of the outreach locations and associated towards nutrient recovery
 - Intermediate project results
 - Development web tool
 - Progress on demo plants development to large scale NRR
 - Analyses on end products + pot & field trials
 - Progress in business plan development Atria and Biogastur and Greengas AD
 -

The 11 outreach locations:

- Will assess/develop together with the consortium a business case with NRR
- Will be the first test cases for the calculation tool for NRR
- Get analysis results of a limited amount of their digestate and/or recovered products
- Get reimbursement for their travel and hotel costs for attending the Living Lab meetings