Systemic large scale eco-innovation to advance circular economy and mineral recovery from organic waste in Europe

Results

Project Information

SYSTEMIC

Grant agreement ID: 730400

Project website

DOI
10.3030/730400

Project closed

EC signature date
2 May 2017

Start date
1 June 2017

End date
30 November 2021

Funded under
SOCIETAL CHALLENGES - Climate action, Environment, Resource Efficiency and Raw Materials

Total cost
€ 9 665 580,65

EU contribution
€ 7 859 828,75

Coordinated by
STICHTING WAGENINGEN RESEARCH
Netherlands

CORDIS provides links to public deliverables and publications of HORIZON projects.

Links to deliverables and publications from FP7 projects, as well as links to some specific result types such as dataset and software, are dynamically retrieved from OpenAIRE.

Deliverables

Websites, patent fillings, videos etc. (14)

Fact-sheets on outreach locations

Short description of the ten selected outreach locations for publication on the website

Dissemination materials (year 2)

During the course of the project, leaflets, videos and infographics will be produced with the objective of disseminating and communicating the project results and activities in different formats to reach a range of stakeholders. These documents and videos will be published on the project website and distributed through consortium networks and other existing networks at EU and Member State level.

Business Development package including manual and guiding materials

This Business Planning Package will support the decision making for implementation of the innovative business cases in Europe output of Task 35

First annual update of the factsheets with a summary on the performance of the demonstration plants (for website)

The monitoring results of the technical performance (mass and energy balances) and product quality (composition, nutrient value etc) will be collected in a database (internal, confidential). On a yearly basis, these results will be analysed and a summary of the results will be published on the website in the form of factsheets.

A quantitative Excel tool for CBA's and technology selection

This open-access tool is the output of Task 3.4., to provide insight in the feasibility of the key technology/cascade of technologies on the outreach plants.

Second annual update of the factsheets with a summary on the performance of the demonstration plants (for website)

The monitoring results of the technical performance (mass and energy balances) and product quality (composition, nutrient value etc) will be collected in a database (internal, confidential). On a yearly basis, these results will be analysed and a summary of the results will be published on the website in the form of factsheets.

Dissemination materials (year 1)

During the course of the project, leaflets, videos and infographics will be produced with the objective of disseminating and communicating the project results and activities in different formats to reach a range of stakeholders. These documents and videos will be published on the project website and distributed

through consortium networks and other existing networks at EU and Member State level.

Dissemination materials (year 3)

During the course of the project, leaflets, videos and infographics will be produced with the objective of disseminating and communicating the project results and activities in different formats to reach a range of stakeholders. These documents and videos will be published on the project website and distributed through consortium networks and other existing networks at EU and Member State level.

Dissemination materials (year 4)

During the course of the project leaflets videos and infographics will be produced with the objective of disseminating and communicating the project results and activities in different formats to reach a range of stakeholders These documents and videos will be published on the project website and distributed through consortium networks and other existing networks at EU and Member State level

Press release targeted at the agricultural, commercial and public sectors, policy makers and academics

A press release will be written following the kick-off meeting of the project to inform the agricultural, commercial and public sectors, policy makers and academics about the project objectives, planned activities and expected impacts. The document will be distributed throughout the network of the consortium members in order that they may target their local media and networks, as well as through existing networks (i.e. Biorefine Cluster, WSSTP, European Sustainable Phosphorus Platform, the IWA Resource Recovery Cluster and similar organisations at Member State and EU level.)

Technical scheme and specification of the demonstration installation

Design of 5 process flow schemes (1 for each of the demonstration plants), including due diligence requirements towards technical and operational performance. A technical report/fact sheet will be prepared for the public dissemination at the project website.

Fourth annual update of the factsheets with a summary on the performance of the demonstration plants (for website)

The monitoring results of the technical performance mass and energy balances and product quality composition nutrient value etc will be collected in a database internal confidential On a yearly basis these results will be analysed and a summary of the results will be published on the website in the form of a database or factsheets

Media coverage of the project through Brussels policy level press (EurActiv, Agrafacts, Politico, Parliament Magazine) and Member State and regional press.

The main project activities and results will be translated into press releases at key points throughout the duration of the project and at its completion These will be sent to both Brussels policy level media and through the consortium members to target regional and Member State level press

Third annual update of the factsheets with a summary on the performance of the demonstration plants (for website)

The monitoring results of the technical performance (mass and energy balances) and product quality (composition, nutrient value etc) will be collected in a database (internal, confidential). On a yearly basis, these results will be analysed and a summary of the results will be published on the website in the form of a database or factsheets.

Documents, reports (15)

Report on application of the Business Development Package to ten outreach locations

This will contain information on the effective implementation of the Business Package tool at all outreach locations output of Task 36

Final document on product characteristics, lab results and field trials

Report on the quality assessment of the recovered products from scientific agronomical and environmental view Data will be cross referenced with mineral nutrients and biowaste characteristics The report will act as a reference towards the regional endusers criteria and will act as a catalyst for further improvements to the nutrient recovery technologies and market development

Report on regulations governing AD and NRR in EU member states (input WP3,4)

Since regulation is heavily impacting the economic feasibility of anaerobic digestion (AD) and nutrient recycling and recovery (NRR) the current regulation in project relevant member states will be evaluated and reported. Project relevant member states will be determined by the WP leaders.

Final project document defining a roadmap on systemic innovation at EU level, based on the conclusions from all work packages and discussions at workshops and meetings

Delivered at the end of the project the synthesis document will serve as a roadmap to systemic innovation highlighting opportunities and enabling industry business and governments in decision making The synthesis document will highlight the contribution of SYSTEMIC in addressing critical elements of the SPIRE roadmap eg reduction and reuse of waste streams resource and energy efficiency targets and will also include an assessment on the potential for

implementation of additional business cases in other EU locations following the experience and example with knowledge transfer to outreach locations

Final report on LCA analysis and sustainability indicators of products

Apart from the commercial viability of ADNRR implementation SYSTEMIC aims at promoting more sustainable business models Hence a robust LCA is developed for each case and indicators are developed that enable a quick analysis to determine if a ADNRR model is sustainable or not

Report on business case evaluation of 5 demonstration plants

The five demonstration plants operate according to individual business models and policies within determined regulatory and economic frameworks. The report will evaluate the factors that make the difference between a viable and non-viable AD+NRR business in the states where the demonstration plants are located.

Market research in Europe

Note, describing the needs for recovered nutrients and NRR technologies in different regions in Europe

Final report with scenario's and schemes of proven NRR techniques

In this task all knowledge regarding nutrient recovery efficiency for different type of digestate will be collected, consulting scientific publications and reports and gathering experiences and existing knowledge of the consortium partners gained in other EU-projects and meetings. A list will be generated with all available full-scale proven and cost-effective nutrient recovery technologies and process approaches, which focus on the nutrient recovery efficiency rate. Based on the outcome of the demonstrations plants from WP1 and WP2 the information will be updated.

Final report on mass and energy balances, product composition and quality and overall technical performance of the demonstration plants

Comprehensive living report on the light house demo hardware performance The report will be built up in close collaboration with all actors involved in the individual demonstration plant and will provide valuable insights in operational performance and potential obstacles interventions and adjustments necessary to achieve stable viable processes technical advances

Full-report: Synthesis of the performance of the demonstration plants (end of project)

Report compiling the technical performance operational performance and product evaluation scientific agronomic ecologic of the nutrient recovery technologies in the 5 demonstration plants

Submit a policy sound message on the produced products including information on regulatory obstacles and barriers on national and EU-leve

Submit a policy sound message on the produced products including information on regulatory obstacles and barriers on national and EUlevel

Final report on the development and application of economic Key Performance Indicators (KPI's) (Full report)

The factors that make the difference worked out and reported with D2.2 are the basis for the development of KPIs. The report explains the basis and value of each KPI selected and informs on how the KPI should be applied.

Policy brief on boosting mineral recovery in the EU and transition into a circular economy

A policy brief will be produced during the final months of the project which will bring together the information generated from the workshops held during the second and third years of the project and the outcomes and recommendations from the work packages It will include clear policy recommendations

Report on business model development and application to five demonstration plants

The full and final report exhibits the opportunities and threats of certain business models based on the evaluation of the demonstration plants with regard to determined regulatory and commercial frameworks It serves as a guideline for stakeholder for the preliminary quick evaluation of projects

Full report on environmental impact assessment of recovered products

Environmental performance of the 5 demo plants is carefully evaluated and reported in a midterm report in order to guarantee that the consortium is promoting environmentally sound technologies

Demonstrators, pilots, prototypes (4)

Construction-, monitoring-, or demonstration-activities at demonstration plants (year 4)

Construction monitoring or demonstrationactivities at demonstration plants

Construction-, monitoring-, or demonstration-activities at demonstration plants (year 1)

Construction-, monitoring-, or demonstration-activities at demonstration plants

Construction-, monitoring-, or demonstration-activities at demonstration plants (year 2)

Construction-, monitoring-, or demonstration-activities at demonstration plants

Construction-, monitoring-, or demonstration-activities at demonstration plants (year 3)

Construction-, monitoring-, or demonstration-activities at demonstration plants

Publications

Other (1)

Nitrogen fertilising products based on manure and organic residues: supporting literature of the SYSTEMIC factsheets

Author(s): Phillip Ehlert, Ivona Sigjurnak, Erik Meers, Marieke Verbeke, Fabrizio Adani, Massimo Zilio, Fulvia Tambone, Oscar Schoumans
Published in: 2019
Publisher: Wageningen University and Research
DOI: 10.18174/506912

Peer reviewed articles (8)

Solid fraction of separated digestate as soil improver: implications for soil fertility and carbon sequestration

Author(s): Caleb Elijah Egene; Ivona Sigurnjak; I.C. Regelink; Oscar Schoumans; Fabrizio Adani; Evi Michels; Steven Sleutel; Filip Tack; Erik Meers
Published in: JOURNAL OF SOILS AND SEDIMENTS, Issue 2, 2021, ISSN 1439-0108
Publisher: Springer Verlag
DOI: 10.1007/s11368-020-02792-z

Production and performance of bio-based mineral fertilizers from agricultural waste using ammonia (stripping-)scrubbing technology.

Author(s): Ivona Sigurnjak; Claudio Brienza; Emilie Snauwaert; A De Dobbelaere; J De Mey; Céline Vaneeckhaute; Evi Michels; Oscar Schoumans; Fabrizio Adani; Erik Meers
Published in: WASTE MANAGEMENT, Issue 2, 2019, ISSN 0956-053x
Publisher: Pergamon Press Ltd.
DOI: 10.1016/j.wasman.2019.03.043

Thermophilic anaerobic digestion as suitable bioprocess producing organic and chemical renewable fertilizers: A full-scale approach.

Author(s): Ambrogio Pigoli; Massimo Zilio; Fulvia Tambone; Stefania Mazzini; Micol Schepis; Erik Meers; Oscar Schoumans; Andrea Giordano; Fabrizio Adani
Published in: Waste Management, Issue 2, 2022, ISSN 0956-053X
Publisher: Pergamon Press Ltd.
DOI: 10.1016/j.wasman.2021.02.028

Techno-economic assessment at full scale of a biogas refinery plant receiving nitrogen rich feedstock and producing renewable energy and biobased fertilisers

Author(s): C. Brienza, I. Sigurnjak, T. Meier, E. Michels, F. Adani. O. Schoumans. C. Vaneeckhaute. E. Meers
Published in: Journal of Cleaner Production, 2021, ISSN 0959-6526
Publisher: Elsevier BV
DOI: 10.1016/j.jclepro.2021.127408

Speciation of P in Solid Organic Fertilisers from Digestateand Biowaste

Author(s): Regelink, I.C. Egene, C., Tack, F.M.G., Meers, E.
Published in: agronomy, 2021, ISSN 2073-4395
Publisher: MDPI
DOI: 10.3390/agronomy11112233

Measuring ammonia and odours emissions during full field digestate use in agriculture.

Author(s): Massimo Zilio; Ambrogio Pigoli; Bruno Rizzi; Gabriele Geromel; Erik Meers; Oscar Schoumans; Andrea Giordano; Fabrizio Adani
Published in: Science of the Total Environment, Issue 3, 2021, ISSN 0048-9697
Publisher: Elsevier BV
DOI: 10.1016/j.scitotenv.2021.146882

Using highly stabilized digestate and digestate-derived ammonium sulphateto replace synthetic fertilizers: The effects on soil, environment, andcrop production

Author(s): Zilio, M. Pigolo, A., Rizzi. B., Herrera, A., Tambone, F., Geromel, G., Meers, E., Schoumans, O., Giordano, A., Adani, F.
Published in: Science of the Total Environment, 2022, ISSN 0048-9697
Publisher: Elsevier BV
DOI: 10.1016/j.scitotenv.2022.152919

Environmental Performance in the Production and Use of Recovered Fertilizers from Organic Wastes Treated by Anaerobic Digestion vs Synthetic Mineral Fertilizers

Author(s): Herrera, Axel; D'Imporzano, Giuliana; Zilio, Massimo; Pigoli, Ambrogio; Rizzi, Bruno; Meers, Erik; Schouman, Oscar; Schepis, Micol; Barone, Federica; Giordano, Andrea; Adani, Fabrizio
Published in: ACS Sustainable Chemical Engineering, Issue 3, 2022, ISSN 2168-0485
Publisher: American Chemical Society
DOI: 10.1021/acssuschemeng.1c07028

Non-peer reviewed articles (1)

SYSTEMIC - Systemic large scale eco-innovation to advance circular economy and mineral recovery from organic waste in Europe - H2020 project
Author(s): Oscar Schoumans
Published in: Impact, Issue 2018/8, 2018, Page(s) 84-86, ISSN 2398-7073
Publisher: Science Impact Ltd
DOI: 10.21820/23987073.2018.8.84