



PAVING THE WAY TOWARDS CLEAN ENERGY AND FUELS IN EUROPE

Talks with research, industry and EU Member States
on bioenergy, advanced biofuels and renewable fuels

WEDNESDAY 29TH MAY 2019 | 09:00 - 17:15
CONGRESS CENTER CCL LISBON

Organised in the framework of 27th EUBCE
European Biomass Conference and Exhibition



Project Acronym: BIN2GRID **Project Number:** 646560 **Call:** LCE-14-2014

Topic: Market uptake of existing and emerging sustainable bioenergy

Project title: Turning unexploited food waste into biomethane supplied through local filling stations network

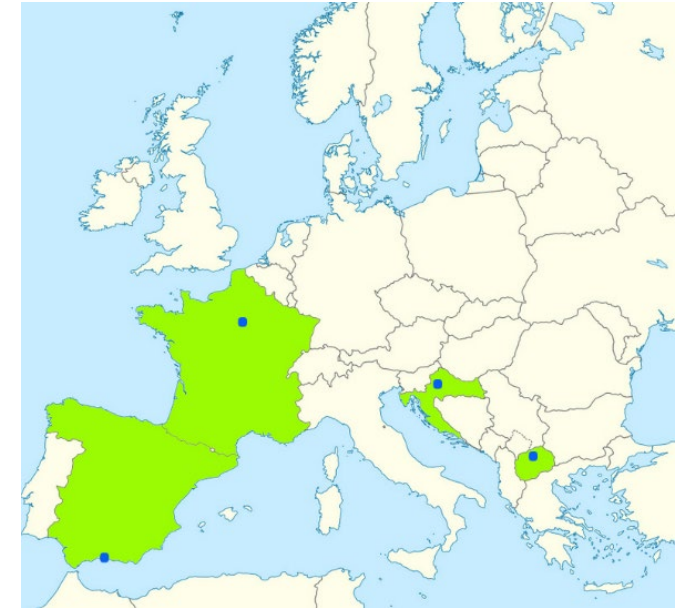
Main Category of the Project: Bioenergy

TRL: 9

Keywords: Biomethane, Waste Management, Sustainability

Technological approach of the Project: Project proposed a waste to energy supply chain through the promotion of segregated collection of food waste from waste producers (food waste, food and beverage industry, catering, residential) in order to produce biofuel (biomethane) and its usage through local filling stations

Expected Impact of the Project: The main expected impact of the Bin2Grid project is to increase the renewable energy production through sustainable management of food waste in 4 target cities



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 646560

Highlights (technological/non-technological):

- **City of Zagreb** improved its current waste management system: door-to-door collection of biowaste and utilization at the biogas plant
- **City of Malaga** has made the first step towards the implementation of sustainable waste management and upgraded its current waste treatment facility
- **City of Paris** has made obligatory the separation of food waste for all waste producers. Also, the project activities contributed to the large-scale introduction of CNG filling stations in Paris
- During the project lifetime **City of Skopje** for the first time started to consider sustainable waste management and waste as a resource

What is needed in future:

- Analysis of the current situation emphasised the need for improvement of current waste management systems and its navigation towards the energy utilization
- Pre-feasibility studies confirmed economic and ecological benefits

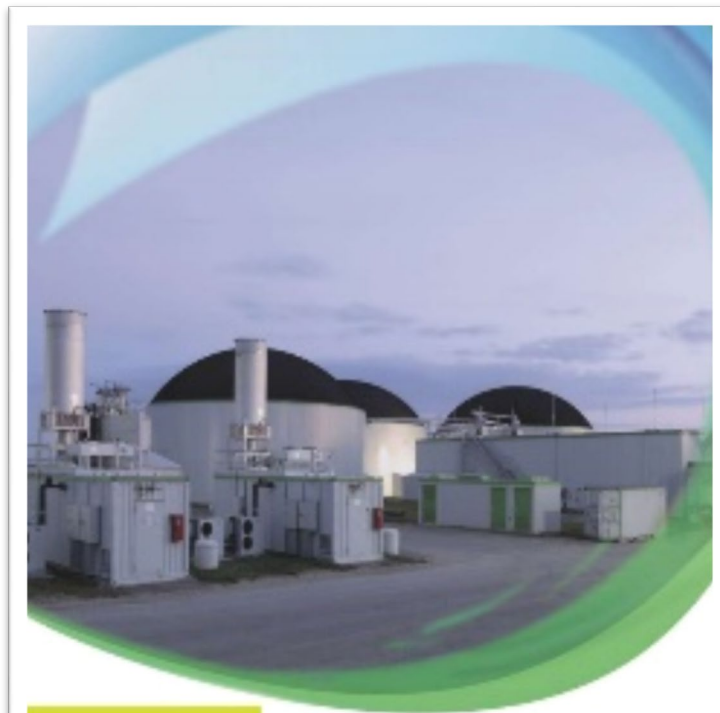


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Biogas ACTION

<http://biogasaction.eu>



Biogas Action Brochure on Best Regional-Integrated Biogas Plants

Biogas Action Project: Promotion of Sustainable Biogas Production in the EU



Discover the best-fitting tools available to develop your project

Make use of the extensive Biogas Action database, providing existing tools and guidelines for biogas promotion in Europe to boost the development of your operating biogas plant or to find answers for your planned biogas project.

Navigate using numerous filters such as language, substrate, output, type of support and plant size. Find additional information and explanations (policy, technical, market, training and education) suitable for your expected application. The tools available include EU projects, national and regional projects, success stories, policy/legislation documents, maps, software, videos and more.

RUN TOOL

Online tool <http://tool.biogasaction.eu>



Promotion of Sustainable Biogas Production in the EU

Guidelines and Opportunities



Project Acronym: **BiogasAction**

Project Number: **691755**

Call: **LCE-14-2015**

Topic: **Market uptake of existing and emerging sustainable bioenergy**

Project title: **Promotion of sustainable biogas production in EU**

Main Category of the Project: Biogas

Keywords: Biogas biomethane, implementation guidelines and strategy, intervention in 9 regions, supporting specific high quality biogas/bomethane projects, EU wide replication and dissemination

Technological approach of the Project: Biogas Action offered a consistent approach on how EU regions can become drivers in paving way for sustainable use of biogas, incl. finding the appropriate technology solutions to make optimal use of local resources.

Impact of the Project: Institutional-building, strengthened biogas sector framework, optimized biogas production and business models and financing of biogas projects as well as assistance to specific high-quality biogas project development (triggering new biogas plants with an investment volume of 86 MEUR)

Highlights (technological/non-technological): Compilation of reports and tools for regional biogas deployment processed into an interactive database of tools (Toolbox) <http://tool.biogasaction.eu> Brochure of Europe's 10 most interesting projects. Case studies and other materials of the project's intervention in nine target regions.

What is needed in future: There is need for continued and strong support to release the biogas potential at regional level, considering both common approaches and the particular challenges of each region



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 691755

QUALITY & SUSTAINABILITY LABEL



**Solid Biofuels
for domestic use**

Customer's trust



partners of the Biomassud Plus project



biomasud.eu

Certification's WEB

biomasudplus.eu

Project's WEB

Main Category of the Project: Solid Biofuels

TRL: 9

Keywords: fuel certification; quality assurance; Mediterranean biomass; olive stones; nut shells; prunings

Technological approach of the Project: Development of quality classes for “Mediterranean” solid biofuels using extensive sampling, analysis and combustion tests & update / revision of a relevant fuel certification scheme for small-scale consumers

Expected Impact of the Project:

- Decreased emissions of small-scale combustion systems using “Mediterranean” biofuels
- Increased confidence in domestic consumers
- Increasing share of renewable energy in domestic heating sector
- New opportunities for fuel producers (e.g. increased income, opening of markets, etc.)

Highlights (technological/non-technological):

- Update of the BIORAISE GIS on-line tool
- Detailed fuel analysis of around 350 samples of “Mediterranean” biofuels
- Combustion tests of selected fuels in market available systems → technical guidelines for operators and manufacturers
- Revised BIOMASUD® handbook, including new sustainability / traceability requirements & tools
- Pilot implementation or feasibility studies of BIOMASUD® label in 16 companies / 7 countries (EL, ES, HR, IT, PT, SI, TR)

What is needed in future:

- Adoption of clear regional / national policies favoring use of certified solid biofuels (e.g. market monitoring, tenders, etc.)
- Support for adoption of the BIOMASUD® label in SMEs (fuel producers)





Reliable Bio-Based Refinery Intermediates



Project Acronym: **BioMates** Project Number: **727463** Call: **H2020-LCE-2016-2017** Topic: **LCE-08 (RIA)**
Project title: **Reliable Bio-based Refinery Intermediates**

Main Category of the Project: Biofuels from pyrolysis or hydrothermal liquefaction and process integration with existing biodiesel or oil refineries

TRL: 3-5

Keywords: Pyrolysis bio-oil; catalytic mild hydrotreating; electrochemical pumping; bio-based intermediates; sustainability; co-processing; hybrid fuel; fractionated condensation; in-line catalysis

Technological approach of the Project: Combine innovative 2nd generation biomass conversion technologies for the cost-effective production of bio-based intermediates (BioMates) that can be further upgraded in existing oil refineries as renewable and reliable co-feedstocks. Four technological pillars are included: a) Ablative fast pyrolysis, b) Single-stage mild hydroprocessing, c) Electrochemical H₂ pumping/compression, and, d) Co-processing of stabilized pyrolysis bio-oil for the production of hybrid fuels within underlying refinery

Expected Impact of the Project: a) Reduction of bio-oil processing cost for biofuels production, b) reduction of GHG emissions compared to conventional fossil fuels

Highlights (technological/non-technological): • single upgrading step of bio-oil • improvement of H₂ economy within hydroprocessing • utilization of available conversion capacity of refineries

What is needed in future: • Process validation in TRL5 • Final technical, economic, environmental and social sustainability assessment • End-use validation in industrially relevant environment



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The BIOSURF Project

Paving the way towards clean energy and fuels in Europe

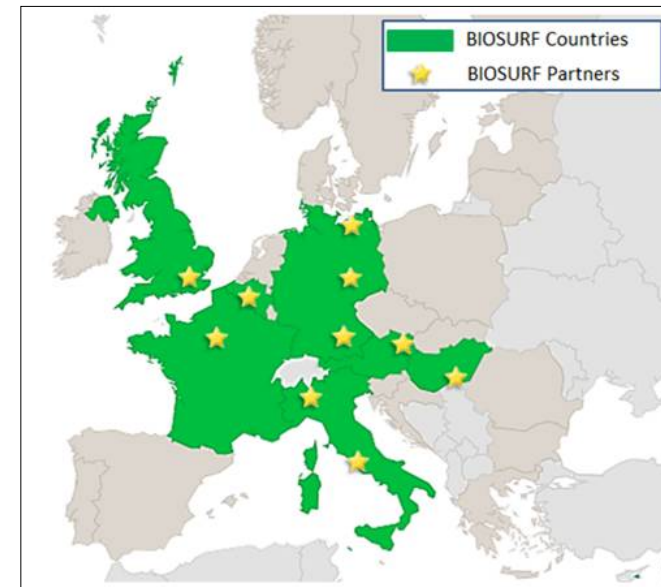
Lisbon, 29 May 2019

Attila Kovacs, EBA

Stefano Proietti, ISINNOVA

Project Summary

- **BIOSURF: BIOMethane as SUstainable and Renewable Fuel (HORIZON 2020);**
- **36** months (started January 2015);
- **11** partners in 7 countries: ISINNOVA, CIB (IT), EBA (BE), REA (UK), GBA, FNR, DBFZ (DE), HBA (HU), AKB, AGCS (AT), ATEE (FR);
- **1.873.000** € of EC funding (**100%**);
- **Main activities:**
 - National/domestic biomethane **registries**
 - **Cooperation** among the national biomethane registries
 - European **mass balancing system** for biomethane
 - Free market biomethane **trade**
 - **Sustainable** raw material supply
 - Methodology for entitlement to **CO₂ certificates**



Specific Challenge: Need to foster the development of the bioenergy sector and to ensure its sustainability. In order to achieve the EU targets set out in the RES and Fuel Quality Directives, and to address concerns regarding indirect and direct environmental impacts, sustainable bioenergy technologies (both existing and emerging) need to further penetrate the market.

Technological approach of the Project:

- Establishment of **national biomethane registries**
- **Cooperation** among the national biomethane registries: establishment of the European Renewable Gas Registry (**ERGaR**)
- European **mass-balancing system for biomethane**: recognize the European natural gas network as one single balance-circle

Expected Impact: Increasing the share of sustainable bioenergy in the final energy consumption. Substantial and measurable reductions in the transaction costs for project developers as well as for the permitting authorities, whilst still fully addressing the needs for environmental impact assessments, including considerations for indirect impacts and energy balance, and public engagement. Development of better policy, market support and financial frameworks, notably at national, regional and local level.

Contribution of the Project:

No direct impacts but the establishment of a common European biomethane market indirectly contributes to the growth of biomethane production. Austria, France and Italy were chosen for establishing bilateral and trilateral agreements among the national registries and thus, allowing the exchange of GoOs. Realisation of a “virtual” exchange of biomethane (through exchange of GoO), as “embryonic” **European common biomethane market**.

Highlights (technological/non-technological): the establishment of the **European Renewable Gas Registry aisbl (ERGaR)** is the direct result of the project. In the meantime ERGaR already got 25 members from 13 European countries and keeps growing. In December 2018 ERGaR has applied to the European Commission for the recognition of its „**ERGaR RED MB**” voluntary scheme under the RED. Subsequent to the project, ERGaR continues the work aimed at establishing the European trade-centre for biomethane Guarantees of Origin (certificates).

Thank you for attention!

Contacts:

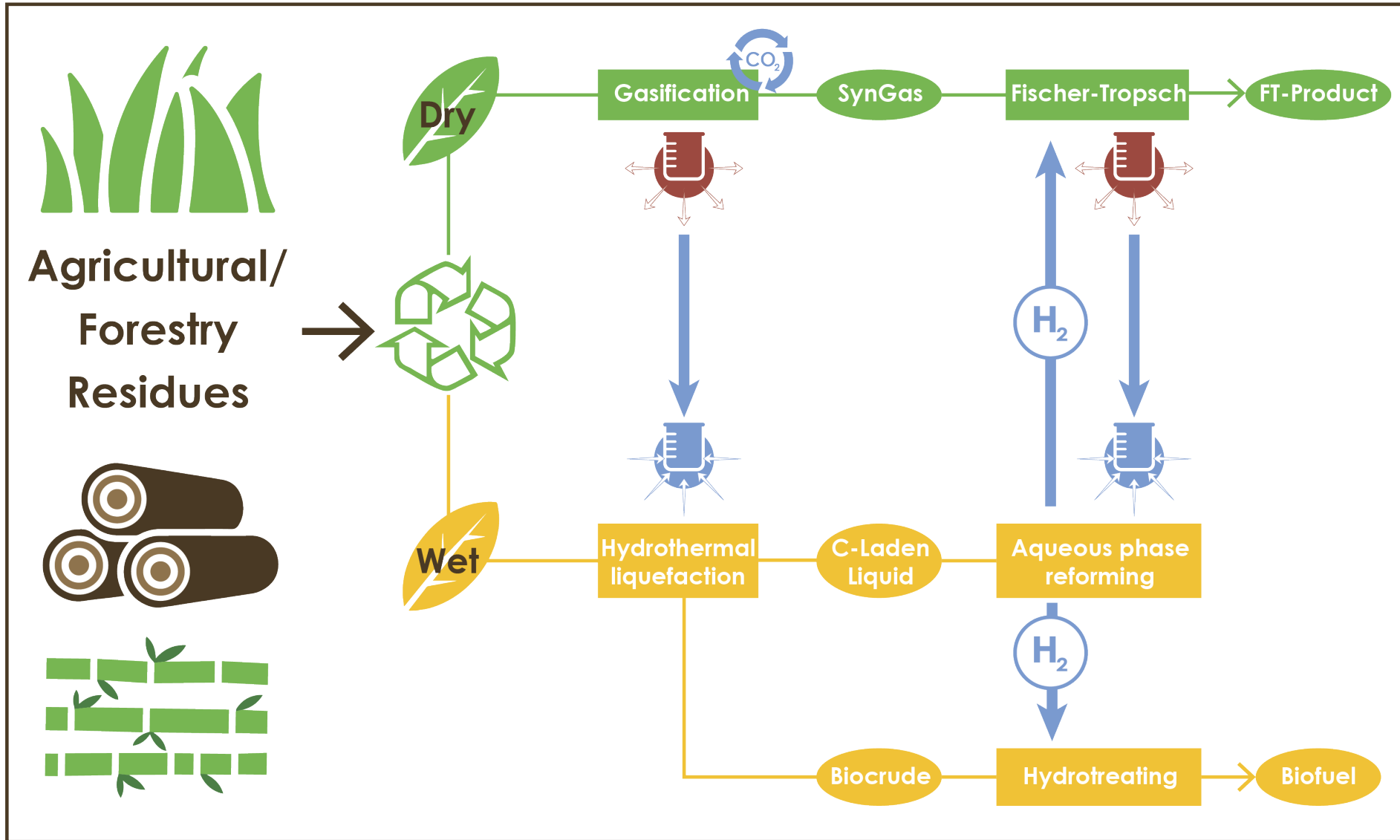
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Main Category of the Project: Biofuel, Bioenergy, renewable Fuel, Bioeconomy, sector coupling

TRL: 3-5

Keywords: HTL (hydrothermal liquefaction), APR (aqueous phase reforming), Fischer Tropsch, DFB (dual fluidized bed) gasification, hydrogen, thermochemical conversion, millistructured reactor

Technological approach of the Project: Based on fundamental R&D results of gasification (agglomeration behavior improvements, CO₂ gasification) and required basic R&S results of APR and HTL of biogenic residues a solution for sites for the bioeconomy is developed, which can convert wet and dry waste streams into highly valuable products

Expected Impact of the Project: Merging all European research activities in the mentioned areas.

Highlights (technological/non-technological): Already during the first 18 months the scientific output is more than scheduled and the interest from the industry higher as expected.

What is needed in future: Fundamental research on CO₂-gasification, integration into greendustrial clusters, experimental development of HtF and APR, catalysis, etc.



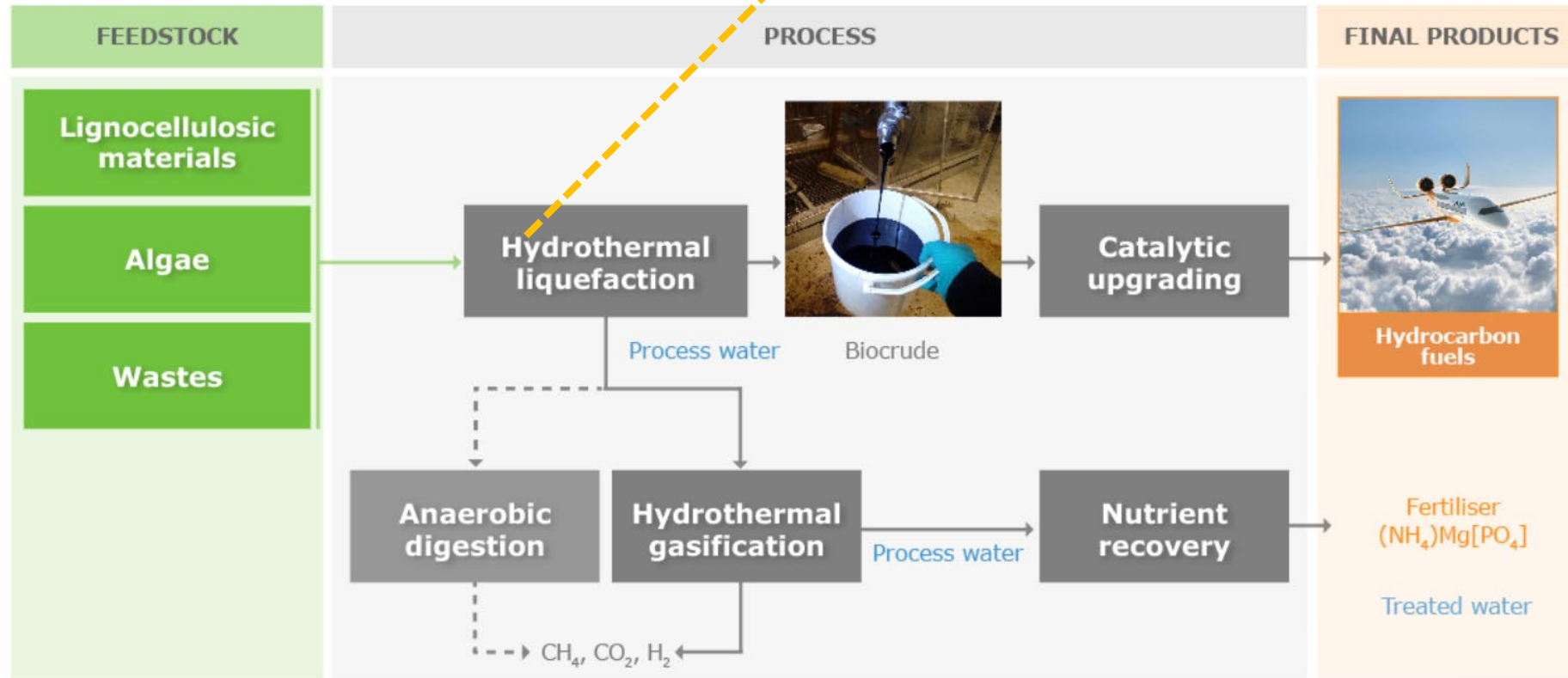
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Sustainable liquid fuels from various types of biomass feedstock



(c) Aarhus University



www.hyflexfuel.eu

hyflexfuel-arttic@eurtd.com

Twitter: @HyFlexFuel

Project Acronym: **HyFlexFuel** Project Number: **764734** Call: H2020-LCE-2016-2017

Topic: LCE-08-2016-2017: Development of next generation biofuel technologies

Project title: **Hydrothermal Liquefaction: Enhanced performance and feedstock flexibility for efficient biofuel production**

Main Category of the Project: Biofuels; **TRL:** 5

Keywords: Hydrothermal liquefaction; catalytic upgrading; hydrothermal gasification; feedstock flexibility; anaerobic digestion; nutrient recovery; liquid fuels

Technological approach of the Project: HyFlexFuel develops a process chain to produce sustainable liquid fuels based on hydrothermal liquefaction (HTL) of various biomass feedstock. Biocrude is upgraded and refined into fuel products. The HTL aqueous phase is valorized through catalytic hydrothermal gasification and anaerobic digestion. Inorganic nutrients are recovered as struvite, a valuable fertilizer.

Expected Impact of the Project: The newly developed technology pathway will improve economic, environmental and social benefits of biofuels; tap underutilized feedstock potentials through high feedstock-flexibility; show favorable energy and GHG balances and reduced cost through high efficiency

Highlights: HyFlexFuel is not limited to HTL as core technology, but includes all key processes along the value chain: HTL, catalytic upgrading and the valorization of residual process streams through catalytic hydrothermal gasification (cHTG), anaerobic digestion and nutrient recovery. Numerous pilot-scale HTL campaigns have been conducted in HyFlexFuel. Biocrude samples have been catalytically upgraded and a first cHTG campaign for energetic valorization of HTL process water has been conducted.

What is needed in future: R&D devoted to **all** process steps relevant for HTL-based production chains (particularly upgrading and refining of biocrude into marketable products and treatment/valorization of residual process streams) and to **integrated** process chains.



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Aim of ISAAC project: to overcome non technological barriers to the diffusion of biogas/biomethane in the Italian market

Social	Economic	Legislative
<ul style="list-style-type: none">• Lack of information among citizens, farmers, breeders• NIMBY syndrome• Lack of interaction between different stakeholders• Reluctance of farmers to cooperate in energy plants management	<ul style="list-style-type: none">• Lack of specific and efficient scheme of financing• Low profitability of small biogas plants and uncertainty about future incentive schemes	<ul style="list-style-type: none">• Lack of a clear national legislation for gas grid injection and for digestate use• Fragmentation and multiplicity of regulatory framework on authorization and installation procedures

Tools/channels, target groups: ISAAC's approach & results

Social: citizens	Economic: farmers	Legislative: technicians and legislators
<ul style="list-style-type: none">• Participatory Processes in 2 regions (pilots linked to planned biogas plants);• Information campaign in 7 regions;• Meeting with experts for school, public administrators• Visit to biogas plants• Use of small AD prototype for schools; Buck Bradley Comic Adventure• Website and Facebook	<ul style="list-style-type: none">• Use of a calculation tool for residual biomass availability assessment and potential definition;• Use of innovative funding schemes;• Socio-economic study on plants• Analysis of existing plants' criticalities• Visit to biogas plants• Social economic surveys	<ul style="list-style-type: none">• Law proposal on Participatory Processes;• Law proposals on biomethane injections;• Technical roundtables on by-products/co-products/waste;• Improvement of the Italian regulation on biomethane;• Training courses for municipal and regional technicians

Project Acronym: **ISAAC** Project Number: **681875** Call: H2020-LCE-2015-3 Topic: LCE-14-2015

Project title: **Increasing Social Awareness and ACceptance of biogas and biomethane**

Category: biogas, biomethane **TRL:NA** **Keywords:** non-technological barriers, biogas, NIMBY, awareness raising, participatory process

Challenge: to foster the development of the bioenergy sector and to ensure its sustainability, removing non-technical barriers to widespread production and use of biogas/biomethane

Technological approach of the Project:

- Encouraging European farmers to cooperate
- Ensuring sustained public acceptance with Participatory Processes
- Exchanging information with calculation tool, visit to biogas plants, event with experts, hands-on AD prototype for schools, use of a game

Impact/contribution of the Project:

1. Reducing NIMBY and increasing cooperation, as non-technical barrier to new AD plant installation
2. Producing clear and concrete proposals for laws improvement and regulatory framework organization
3. Using socio economic methodologies; survey; crowdfunding

Highlights:

- 2 participatory process in 2 Italian regions (more than 300 citizens involved)
- Telephonic surveys in 2 Italian regions (3 series for each area for around 800 citizens each)
- Tutorials in schools (around 850 students) in 7 different Italian regions
- Development of a game for mobiles (downloaded more than 5000 from google play and 800 from apple store)
- Involvement of around 150 farmers

What is needed in future:

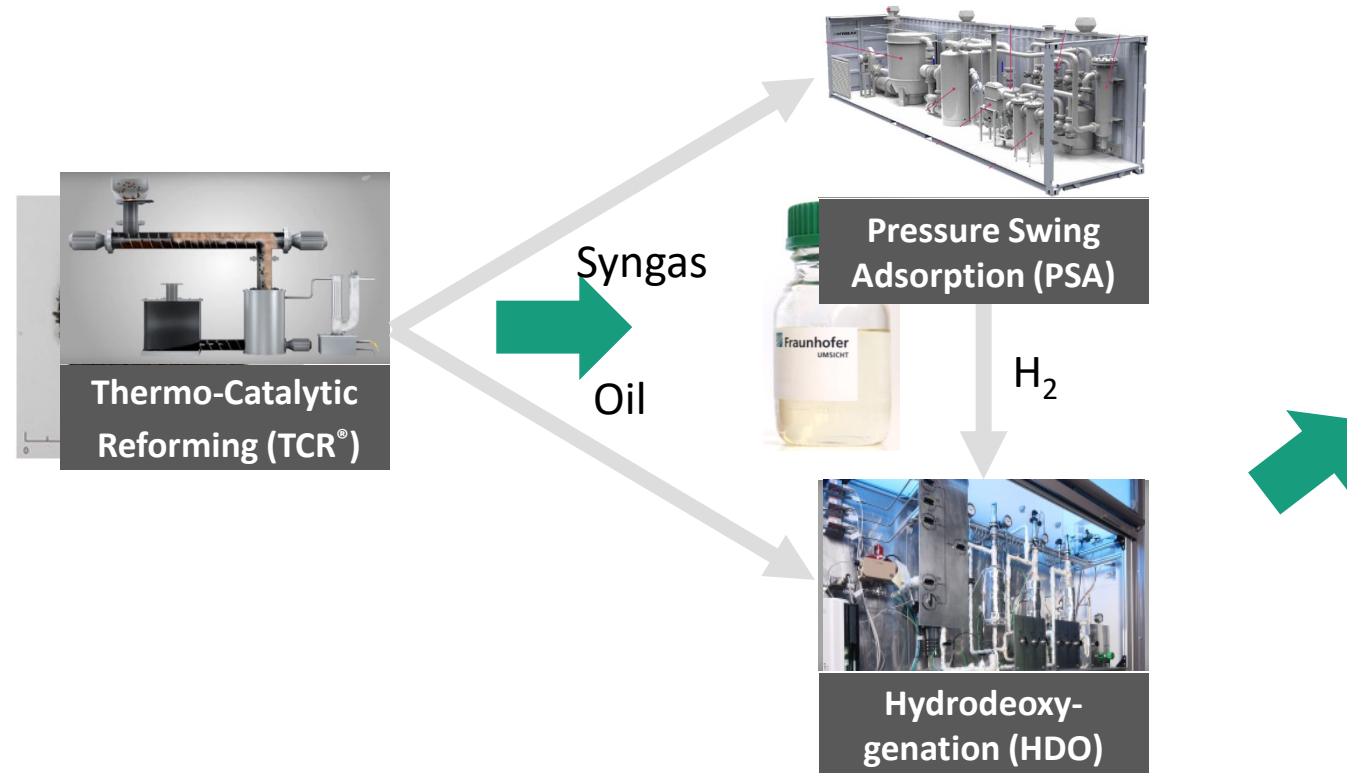
- Extent of the approach to other technologies and Countries;
- European regulatory framework on participatory processes.



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TO-SYN-FUEL

Core components



Key Performance Indicators:

2100 t of biomass consumption within the project
min. 300 kg per hr (biomass dry basis) plant demonstration scale
210.000 l of fuels

Project title: **The Demonstration of Waste Biomass to Synthetic Fuels and Green Hydrogen**

Main Category of the Project: Intermediate Bioenergy Carriers value chain

TRL: TRL 7 (at the end of the project)

Keywords: Green Fuels, Biogenic residues, Thermo-chemical conversion, TCR, HDO, PSA

Technological approach of the Project:

Conversion of biogenic residues on the example of sewage sludge into green fuels (Diesel and gasoline) on standard conditions (EN590 & EN228).

Combination of Thermo-Catalytic Reforming (TCR) with Pressure Swing absorption (PSA) and Hydrotreatment

Expected Impact of the Project:

Large scale demonstration of integrated technology

→ Showcase for future sustainable investment and economic growth across Europe

Development of a business case, LCA and dissemination of results

Highlights (technological/non-technological):

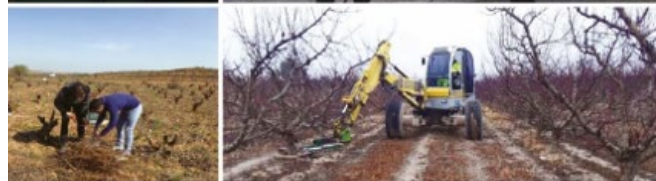
KPI: 2100 t of biomass consumption within the project

→ production of 210.000 l of fuels

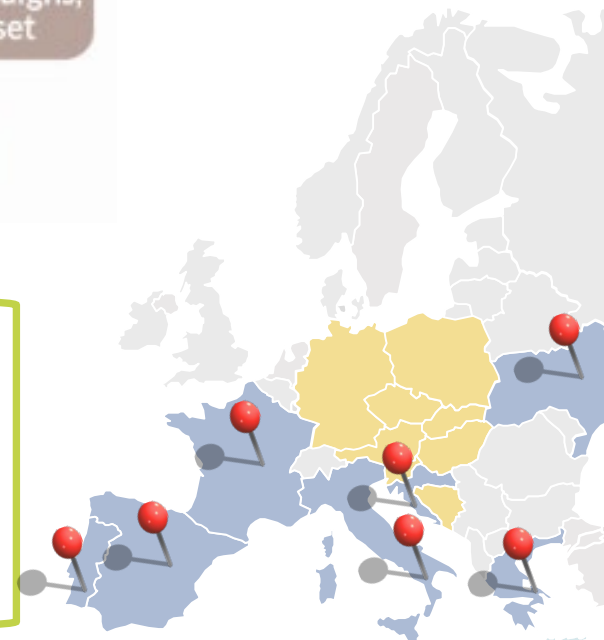
What is needed in future: Roll-out of technology in distributed application. Use of bio crude oil as drop-in for refineries. Utilization of further biogenic residues and biomass



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Consortium:



Project Acronym: **uP_running** Project Number: **691763** Call: **H2020-LCE-2015-3**

Topic: **LCE-14-2015 - Market uptake of existing and emerging sustainable bioenergy**



Project title: **Take-off for sustainable supply of woody biomass from agrarian pruning and plantation removal**

Main Category of the Project: Bioenergy

TRL: 7-9

Keywords: prunings; permanent crops; orchards; agrobiomass; value chains; capacity building; observatory

Technological approach of the Project: 1) support to entrepreneurs for implementing new chains; 2) capacity building for consultants; 3) observatory map of APPR biomass; 4) sector analysis and policy recommendations.

Expected Impact of the Project: 1) mobilization of huge (> 20 Mt/year dry matter) European biomass potential of agrarian prunings and plantation removal; 2) closer links between agrarian and energy sectors; 3) new value chains and positive impact on regional level (e.g. job creation); 4) emission reduction from fossil fuel substitution and avoidance of open-field burning of residues

Highlights (technological/non-technological): 1) 20 demonstration for the start-up value chains / 4 new chains; 2) more than 170 consultants trained and prepared to give consultancies to entrepreneurs; 3) more than 30 workshops with local / regional stakeholders => change of mindset of the agrarian & biomass sectors; approach of value chain actors to trigger new initiatives 4) recommendations in the policy framework and more than 20 lobbying actions at national and European scales; 5) public Observatory map-tool with large number of related experiences (e.g. field measurements of biomass potential, mechanized harvesting tests, operating value chains & flagships) with more than 430 points

What is needed in future: 1) adoption of relevant policy & regulatory instruments (e.g. incentives for avoidance of open burning through new CAP eco-schemes, relevant emission limits for agrobiomass boilers); 2) promotion of new value chain concepts (e.g. cooperative ownership of harvesters, synergies with green waste management, ESCOs); 3) technical improvements in pruning harvesting systems & specialized biomass boilers for agro-biomass

=> *follow-up actions for a wider range of agrobiomass and targeting the heating market are included in **AgroBioHeat (Nr. 818369)***



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