



**IEA Bioenergy**

Technology Collaboration Programme



# Country report - Italy

## Gasification of biomass and waste

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**Technology Collaboration Programme**

by **iea**

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# Projects on Gasification funded by National/Regional Programmes: Updates

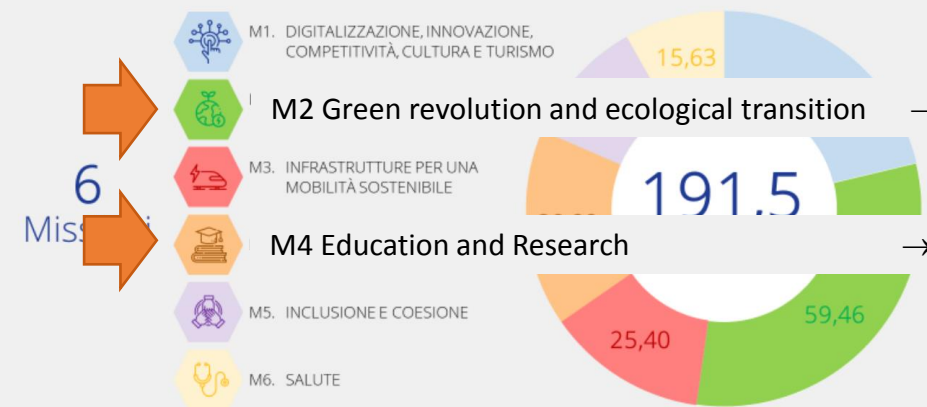
National/Italian Region	Name	Funding	Project aim/Activity on Gasification	Reactor design	Present Status	Note
National	NEST	MUR	SPOKE 3: Bioenergy & New Biofuels for Sustainable Future	Fluidized, Fixed, Rotary beds	In progress (November 2022, 36 M)	Large Consortium ( <b>Universities</b> , Public research organizations, Private Companies)
National	POR H2	MASE	Objective 1 - Green and clean hydrogen production (thermochemical, biochemical or biological type processes, reforming processes integrated with renewable sources, residual biomass gasification processes, etc.)	Fluidized and fixed beds	In progress (July 2022, 42 M)	<b>ENEA</b> , CNR, RSE & Universities
Abruzzo, Lazio, Puglia	AIRE	MIUR	Gasification for power and biomethane synthesis	Dual FB	June 2021 - November 2024	<b>UNIVAQ</b> , Walter Tosto, DIZIOINOXA, USGM, UNISALENTO, UNIROMA2 (Tor Vergata)
Basilicata & Campania	RECOVERY	MISE	Energy valorization of residual materials coming from the agro-food industry through syngas from gasification for self-production and self-consumption of <b>electricity</b> .	Downdraft	January 2022	<b>CMD S.p.A</b> , Giaguaro S.p.A, ENEA
Basilicata & Calabria	WW-GREEN FUEL	MISE	Development of gasification process (dry and SCWG) for the exploitation of large-scale biomass and production of liquefied <b>SNG</b> .	Pyro-gasifier	January 2022	<b>ENEA</b> , CNR, UNICAL, UNIBA, POLITO, SOTACARBO, CALABRA Maceri, et al.
Basilicata & Campania	EMERA	Regional	Efficient Micro Energy networks <b>powered</b> by only RES for the autonomy and independence of rural areas from the centralized system.	Downdraft	1 February 2022	<b>CMD S.p.A</b> , DIGIMAT, EES, ESA, ENEA, CNR
Campania & Basilicata	GREEN FARM	MISE	<b>Power</b> production from residual biomass via gasification, integrated with other RES, for self-reliance in cultivation and food processing systems.	Downdraft	In progress (2020-2023)	<b>UniNA</b> , CMD SpA, CNR, Graded SpA
Basilicata	PIBE	Regional	<b>Infrastructure</b> and R&D activities aimed at producing biofuels, innovative biolubricants, biomethane and <b>syngas</b> for frontier energy applications.	Different types	In progress (2024)	<b>ENEA</b> , CNR, UNIBAS
Basilicata & Sicily	EMAP	Regional	Demonstrative plant for <b>energy</b> and <b>material</b> recovery (activated carbon for super capacitor electrodes) from disposed tires.	Pyro-gasifier	In progress	<b>Baucina Tyre</b> , Energia Futura , ENEA

MUR: Ministry of University and Research; MASE: Ministry of the Environment and Energy Security; MISE: Ministry of Economic Development

# The National context: PNRR and Agenda 2030



## National Recovery and Resilience Plan (NRRP)



→ PORH2

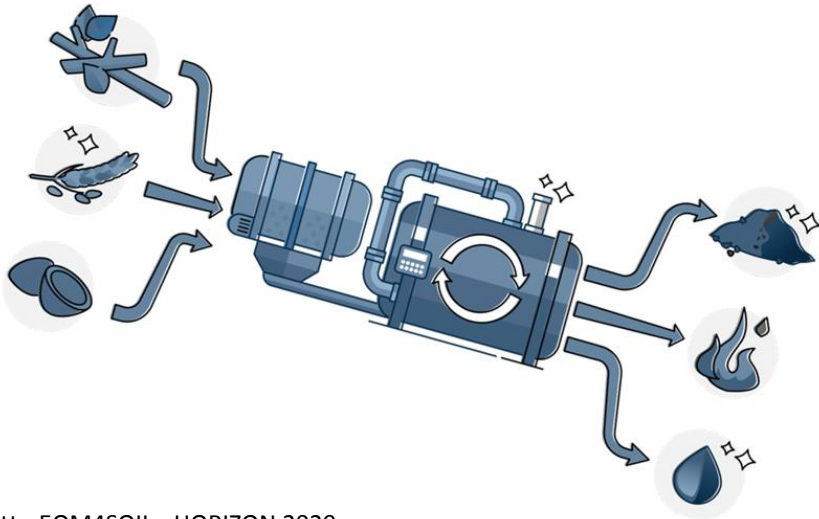
→ NEST

## AGENDA 2030



# State of the biochar supply chain in Italy: production, legislative framework and opportunities

Production and commercialization of biochar from pyrolysis and gasification.



Progetto EOM4SOIL - HORIZON 2020

“Stato della filiera del biochar in Italia: produzione, quadro normativo e opportunità”

Webinar: Tuesday 09 May 2023 - 09:00; video at: [https://youtube.com/KESOaNpsW\\_4](https://youtube.com/KESOaNpsW_4)

Modera: Alessandro Pozzi, *ICHAR*

- 09:00 **Il Progetto EOM4SOIL**  
Maria Valentina Lasorella, *CREA Politiche e Bioeconomia (CREA PB)*
- 09:10 **Quadro normativo italiano ed europeo**  
Massimo Valagussa, *Laboratorio MAC*
- 09:25 **Produzione di biochar in Italia e barriere allo sviluppo della filiera**  
Irene Criscuoli, *CREA Politiche e Bioeconomia (CREA PB)*
- 09:40 **Incentivi FER e sinergie a livello Europeo con il BioRURAL toolkit**  
Diego Rossi, *AIEL*
- 09:55 **Impatto dei processi produttivi sulle caratteristiche del biochar**  
David Chiaramonti, *Re-cord*
- 10:10 **BlockCO2: prima piattaforma italiana per i crediti di carbonio**  
Silvia Scozzafava, *Aichi Obiettivo 20 Srl*
- 10:25 **Mentimeter**
- 10:35 **Discussione aperta**

EOM4SOIL Project: Propose best management practices of external organic matter (EOM) pre-processing and application on soil to contribute to climate change mitigation and improve soil health.



# Update on EU Projects on gasification involving Italy

Name	Funding	Aim	Reactor design	Present Status	Partners	link
ICARUS	HORIZON EU	Development of technology steps limiting the wider production of <b>Sustainable Aviation Fuel (SAF)</b> , i.e. <b>HTL</b> biocrude, <b>isobutanol</b> from lignocellulosic biomass and <b>Fischer-Tropsh</b> from biomass gasification.	Different tech.	From 1 October 2023 to 30 September 2026	<b>CRES (EL)</b> , LNEG (PT), TNO (NL), UNIBO (IT), SINTEF (NO) et al. Overall: 13 participants + 6 partners	Website to be published (GA ID: 101122303)
CBE4I	HORIZON EU	Clean <b>bioenergy</b> for industry - Novel fuel flexible highly efficient and close-to-zero emission combined biomass <b>gasification</b> and combustion technology.	Updraft gasifier	From 1 September 2023 to 31 August 2026	<b>BIOS BIOENERG. (AT)</b> , Polytechnik Luft (AT), DAIKIN (IT), CIEMAT (ES), Wuppertal Inst. (DE) et al. Overall: 9 partners	Website to be published (GA ID: 101118241)
BUTTERFLY	HORIZON EU	Flexible production of renewable DiMethyl Ether ( <b>rDME</b> ) and synthetic natural gas ( <b>SNG</b> ) from feedstocks of biological and non-biological origin.	Indirect gasification	From 1 July 2023 to 31 October 2026	<b>TNO (NL)</b> , ENGIE (FR), POLIMI (IT), LUT (FI), et al. Overall: 10 Partners	Website to be published (GA ID: 101118241)
METHAREN	HORIZON EU	Sustainable and circular <b>biomethane</b> production system enabling the management of the intermittent renewable energy sources.	Fluidized bed gasification and AD	From 1 November 2022 to 31 October 2027	<b>T.EN NETHERLANDS BV (NL)</b> , Fraunhofer IKTS (DE), ERGAR (BE), TECHNIP ENERGIES (IT) et al. Overall: 18 Partners	<a href="https://metharen.eu/">https://metharen.eu/</a>
BIOMETHAVERSE	HORIZON EU	Demonstrating and Connecting Production Innovations in the <b>BIOMETHAnE</b> universe (+ <b>renewable H2</b> or <b>renewable electricity</b> to increase the overall biomethane yield)	Three-stage gasification and AD	From 1 October 2022 to 31 March 2027	<b>ISINNOVA (IT)</b> , AERIS (ES), CERT (EL), CORTUS (SE), ENEA (IT) et al. Overall: 21 Partners	<a href="https://www.biomethaverse.eu/">https://www.biomethaverse.eu/</a>
PLASTICE	HORIZON EU	New technologies to integrate <b>PLASTIC waste</b> in the <b>Circular Economy</b>	Gasification and chemical post-treatment	Form 1 June 2022 to 31 May 2026	<b>CIRCE (ES)</b> , <b>5 IT</b> (RINA CONSULTING, CNR, PRT POLYURETHAN RECYCLING TECHNOLOGY SRL, et al.). Overall: 25 Partners	<a href="https://plastice.eu/">https://plastice.eu/</a>
Micro-Bio-CHP	HORIZON EU	Development of a novel highly efficient energy supply system for energy autonomous multi-family buildings based on <b>biomass gasification</b> coupled to <b>SOFC</b> and a <b>PV</b> system	Updraft gasifier	From 1 October 2022 to 30 September 2025	<b>WINDHAGER (AU)</b> , BIOS BIOENERGIESYSTEME GMBH (AU), FRAUNHOFER (DE), <b>HYSYTECH SRL (IT)</b> , CATATOR AB (SE), WUPPERTAL INST. (DE)	<a href="https://microbiochp.eu/">https://microbiochp.eu/</a>
REFLECT AFRICA	HZ2020	Renewable energies for Africa: effective valorization of agri-food wastes	Different tech.	From 1 Nov 2021 to 31 Oct 2026	<b>UJA (ES)</b> , several African Countries, TREE S.r.l. (IT), UniPI (IT), TIFEO SRL (IT) et al; 29 partners	<a href="https://www.reflect-africa.eu/">https://www.reflect-africa.eu/</a>
GOLD	HZ2020	Bridging the gap between phytoremediation solutions on growing energy crops on contaminated lands and clean <b>biofuel</b> production	Different tech.	From 1 May 2021 to 30 April 2025	<b>CERTH (GR)</b> , RE-CORD (IT), ETA (IT), UniBO (IT) et al.; 19 partners	<a href="https://www.gold-h2020.eu/">https://www.gold-h2020.eu/</a>
CERESIS	HZ2020	ContaminatEd land Remediation through Energy crops for Soil improvement to <b>liquid biofuel</b> Strategies	SCWG	From 1 Nov 2020 to 30 April 2024	<b>NTUA (GR)</b> , CERTH (GR), Strath (UK), Uni Tuscia (IT), CNR (IT), et al.; 12 partners	<a href="https://ceresis.eu/">https://ceresis.eu/</a>
FlexSNG	HZ2020	Flexible Production of <b>Synthetic Natural Gas</b> and Biochar via Gasification of Biomass and Waste Feedstocks	Fluidized bed	From 1 June 2021 to 31 May 2024	<b>VTT OY (FI)</b> , CERT (GR), EIFER (DE), WOOD (IT), ETA (IT) et al.; 12 partners	<a href="https://www.flexsng.eu/">https://www.flexsng.eu/</a>
WASTE2H2	HZ2020 - CSA	Producing <b>hydrogen</b> from waste biomass (via gasification)	Different tech.	From 1 Jan 2021 to 31 Dec 2023	<b>IPPortalegre (PT)</b> , KTH (SE), ENEA (IT), KIT (DE)	<a href="https://waste2h2.eu/">https://waste2h2.eu/</a>
GICO	HZ2020	Development of small to medium scale residual biomass gasification plants integrated with CO2 capture and conversion (outputs: <b>CHP</b> and <b>Biofuels</b> )	Dual Fluidized Bed gasifier	From 1 Dec 2020 to 30 Nov 2024	<b>USGM (IT)</b> , ENEA (IT), TECNALIA (ES), ICI (IT), TU/e (NL), CSIC (ES), MTEC (FR), CALIDA (DE), FZI (DE), IRIS (IT).	<a href="https://www.gicoproject.eu/">https://www.gicoproject.eu/</a>
GLAMOUR	HZ2020	Full conversion of the crude glycerol into <b>biofuels</b> (synthetic paraffine kerosene (FT-SPK) to be used as jetfuel and into marine diesel oil (MDO))	auto-thermal reforming/gasification/chemical looping	From 1 May 2020 to 30 April 2024	<b>University of Manchester (UK)</b> , TU/e (NL), TNO (NL), CSIC (ES), VITO (BE), CiaoTech (IT), SIIRTEG NIGI S.P.A (IT), Argent Energy (UK), INERATEC (DE), C&CS (DE)	<a href="https://www.glamour-project.eu/">https://www.glamour-project.eu/</a>
BioSFerA	HZ2020	Gasification of biogenic residues and wastes to produce <b>biofuels</b> for aviation and maritime transport via syngas fermentation (hydrotreatment of triacylglycerides)	Dual Fluidized Bed gasifier	From 1 April 2020 to 31 March 2024	<b>EKETA (EL)</b> , VTT Oy (FI), CARTIF (ES), BBEU (BE), CSIC (ES), Q8 R&T (NL), RINA (IT), Sumitomo SHI FW (FI), SeaNRG BV (NL), NTUA (EL), Environment Park S.p.A (IT)	<a href="https://biosfera-project.eu/">https://biosfera-project.eu/</a>
BLAZE	HZ2020	Developing an advanced zero-emission <b>CHP</b> technology in the capacity range from small (25-100 kWe) to medium (0.1-5 MWe) by using low-cost and short-chain biomass feedstocks.	Bubbling fluidized bed	From 2019-03-01 to 2023-05-31	<b>USGM (IT)</b> , UNIVAQ (IT), ENEA (IT), EPFL (CH), Walter Tosto (IT), SOLIDpower (CH), HyGear (NL), VERTECH GROUP (FR), EUBIA (BE)	<a href="http://www.blazeproject.eu/">http://www.blazeproject.eu/</a>



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# Final Conference

Portalegre, Portugal, 9-10th November 2023

## Conference topics

Hydrogen production



Hydrogen conversion technologies



Sustainable hydrogen for industry



- Electrochemical and thermochemical processes for H<sub>2</sub> production from waste

Cross-cutting activities to support H<sub>2</sub> widespread.



Special session dedicated to



Website: <http://waste2h2.eu/final-conference/>

# BLAZE Project: Parallel event at EUBCE 2023

**BLAZE** The Pilot Plant at Walter Tosto

Hopper

Electric heater

Feeding system

Dual bubbling fluidized bed gasifier

Secondary reactor

**EUBCE**  
31st European Biomass Conference & Exhibition  
IN PERSON, ONLINE 2023 | BOLOGNA, ITALY

walter tosto

Menu

**BLAZE** - Biomass Low cost Advanced Zero Emission small-to-medium scale integrated gasifier fuel cell combined heat and power plant

**Project Status:** ONGOING

**Fund line:** HORIZON 2020

**Project Objectives:** BLAZE aims to develop first of its kind low-cost biomass CHPs in small to medium size, advanced and zero emissions.

**Role of Walter Tosto SpA:** design and modeling of the entire system, integration of the units, installation of the system and execution of tests on site, market analysis and evaluation of the project results to analyze the social and environmental impacts, use of the project results, dissemination and communication of the project results.

**Action:** RIA - Research and Innovation

**Company resources involved:** 9

**Duration:** 51 months

**Start Date:** March 1, 2019

**Data fine:** June 30, 2023

**UE Program:** LC-SC3-2018-RES two stages | Developing solutions to reduce the cost and increase performance of renewable technologies

**Grant Agreement:** N. 815284

[OFFICIAL WEB SITE](#)



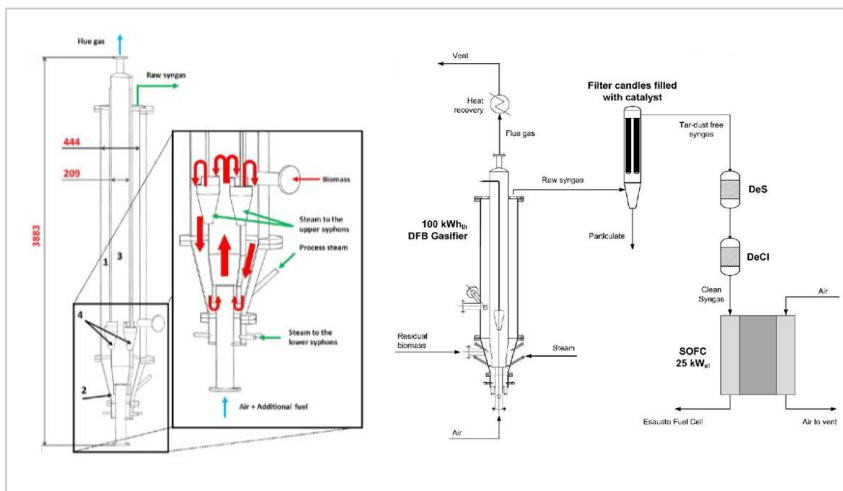
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ASSOCIATE

Latest News



**GASIFICATION 2024**

20th - 21st March 2024 // Ghent, Belgium

Fuelling the Future of Gasification - Pioneering Sustainable Energy Solutions



# PARSIFAL gasification Plant by IRIDENERGY S.rl.



 **PATENTED**

 **iridenergy**

**PIROGASSIFICATORE INNOVATIVO**

**Produciamo**

- Electrical Power: **8 - 10 KW**
- Heat Power: **100 - 120 KW**
- Biochar yields: **15 %**

Link: <https://iridenergy.com/>



Euregio Award 2023

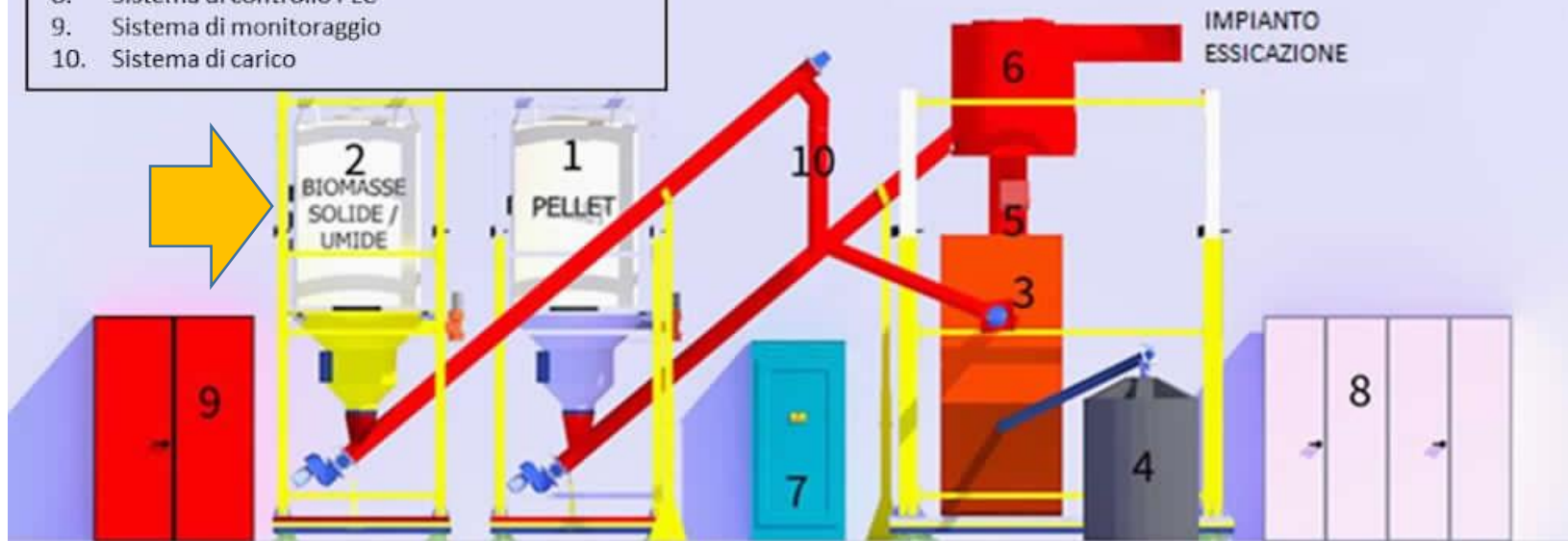
# PARSIFAL gasification Plant by IRIDENERGY S.rl.

IRIDENERGY



## LEGENDA

1. Sistema di carico biomassa secca
2. Sistema di carico scarti (solidi/umidi)
3. Reattore pirogassificazione
4. Sistema di scarico biochar
5. Innesco camera di combustione syngas
6. Camera di combustione
7. Impianto elettrico
8. Sistema di controllo PLC
9. Sistema di monitoraggio
10. Sistema di carico



Ref. <http://smacsforest.it/biochar-e-impianti/>

# Thank you

Donatella Barisano

ENEA

Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile

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