



IEA Bioenergy

Technology Collaboration Programme



Country Report - Italy

Gasification of Biogenic and Waste Feedstocks for a Sustainable Future

Donatella Barisano, ENEA

Glasgow, UK, 11th May 2026

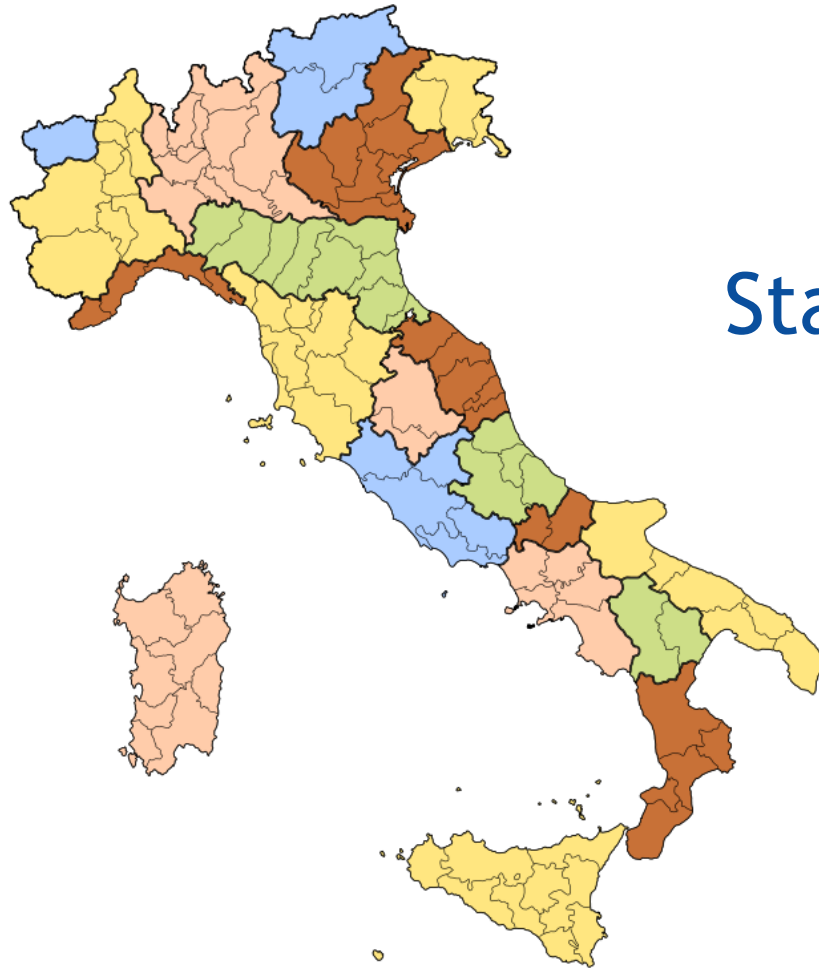
The IEA Bioenergy Technology Collaboration Programme (TCP) is organised under the auspices of the International Energy Agency (IEA) but is functionally and legally autonomous. Views, findings and publications of the IEA Bioenergy TCP do not necessarily represent the views or policies of the IEA Secretariat or its individual member countries.

Technology Collaboration Programme

by **iea**

Contents

- Gasification status update - Italy;
- Renewable Sources Decrees and other opportunities (e.g. FER II/RES II);
- Update on EU, National and Regional Projects;
- Framework Program “Electric System Research”,
- PORH2.



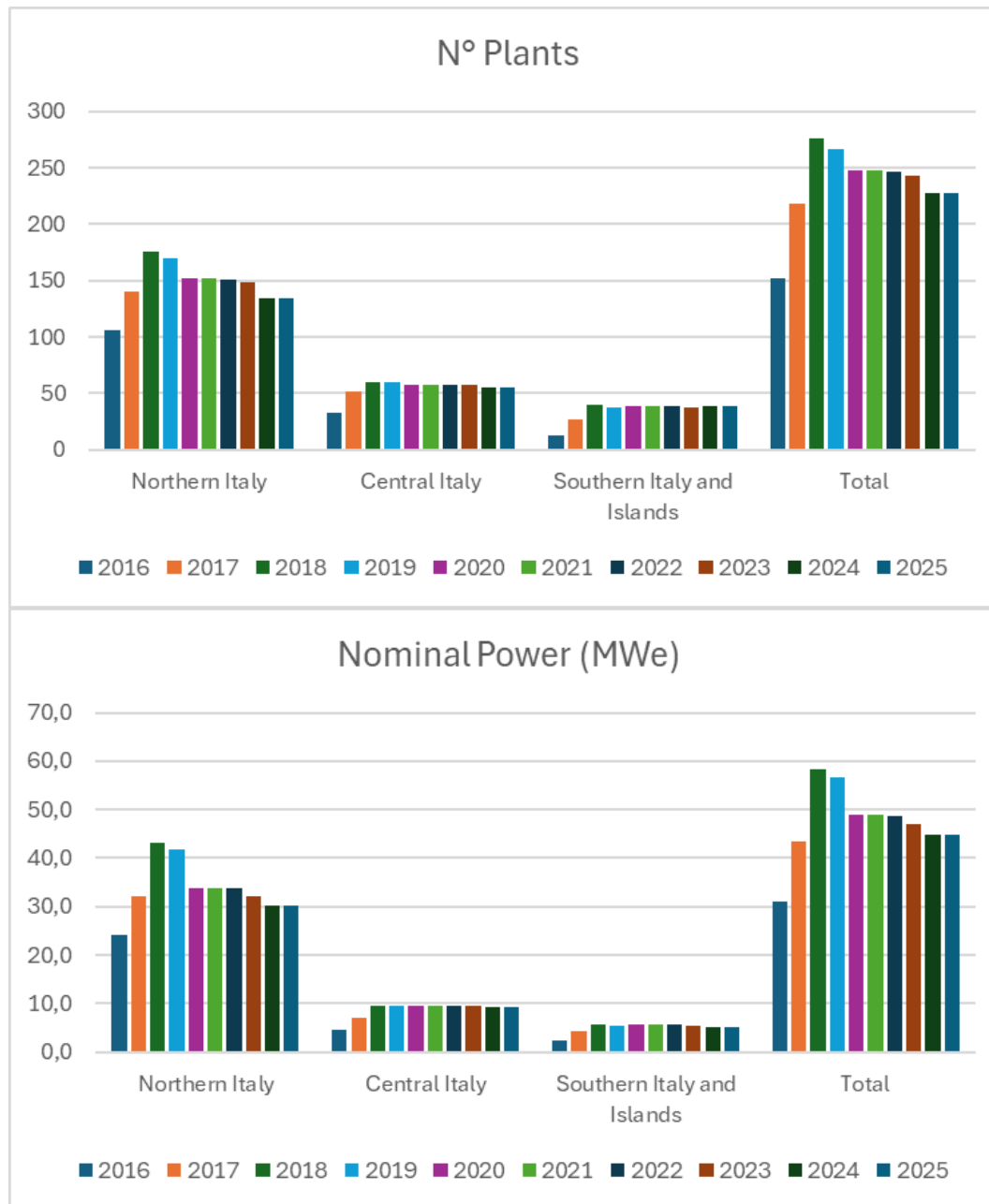
Status of Gasification in Italy

Trend in the biomass gasification plants: number of units and installed power

Geographic Area	Region	N. Imp.										kWe									
		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Northern Italy	Trentino Alto Adige	49	56	70	68	62	62	60	60	54	54	9782	10631	13249	12924	11338	11338	11120	11120	9443	9443
	Friuli	6	15	18	16	9	9	9	9	7	7	1975	4924	7866	7466	2890	2890	2890	2890	2608	2608
	Veneto	11	19	22	22	22	22	22	21	20	20	1723	2279	2875	2875	2875	2875	2875	2495	2750	2750
	Lombardia	9	15	17	17	17	17	17	16	13	13	2489	5058	6798	6798	6798	6798	6798	6478	5729	5729
	Piemonte	19	20	31	30	25	25	25	25	24	24	5408	5991	7759	7714	5995	5995	5995	5995	5709	5709
	Emilia Romagna	11	14	17	16	16	16	17	16	15	15	2597	3209	4434	3934	3934	3934	4059	3069	3919	3919
	Valle d'aosta	1	1	1	1	1	1	1	1	1	1	49	49	49	49	49	49	49	49	49	49
	Liguria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central Italy	Toscana	14	17	23	23	21	21	21	21	20	20	2259	2526	4489	4489	4370	4370	4370	4370	4325	4325
	Umbria	8	14	16	16	16	16	16	16	14	14	1445	2095	2344	2344	2344	2344	2344	2344	2250	2250
	Lazio	7	12	13	13	13	13	13	13	13	13	573	1716	1915	1915	1915	1915	1915	1915	1915	1915
	Marche	4	8	8	8	8	8	8	8	8	8	283	804	804	804	804	804	804	804	774	774
Southern Italy and islands	Abruzzo	1	4	4	3	3	3	3	3	3	3	45	249	249	194	194	194	194	194	194	194
	Basilicata	2	1	2	2	2	2	2	1	2	2	399	199	399	399	399	399	399	199	399	399
	Calabria	1	4	7	7	7	7	7	7	7	7	45	315	764	764	764	764	764	764	764	764
	Campania	3	7	11	9	9	9	9	9	9	9	342	1303	2002	1614	1614	1614	1614	1614	1614	1614
	Molise	0	1	1	1	1	1	1	1	1	1	0	22	20	20	20	20	20	20	20	20
	Puglia	3	3	3	3	4	4	4	4	4	4	425	325	325	325	524	524	524	524	524	524
	Sardegna	1	4	5	5	5	5	5	5	5	5	90	583	903	903	903	903	903	903	903	903
	Sicilia	2	3	7	7	7	7	7	7	7	7	1049	1248	1143	1143	1143	1143	1143	1143	843	843
Total		152	218	276	267	248	248	247	243	227	227	30978	43526	58387	56674	48873	48873	48780	46890	44732	44732

Data source: GSE (Gestore Servizi Energetici, Energy Service System Operator).
See also Atlaimpianti (https://atla.gse.it/atlaimpianti/project/Atlaimpianti_Internet.html)

Overview by geographical area



n the RES II degree frameworks

RES 2: action promoting innovative and sustainable plants

Procedura	Tipologia di impianto	Categoria	Potenza [kW]	Contingenti totali disponibili 2024-2028 (MW)
Procedure tipo A	Biogas	Nuovi impianti	P≤300	150
	Biomasse	Nuovi impianti	P≤1.000	
Procedure tipo B	Solare termodinamico piccola taglia	Nuovi impianti	P≤300	5
Procedure tipo B-I	Solare termodinamico media/grande taglia	Nuovi impianti	P>300	75
Procedure tipo C	Geotermico tradizionale con innovazioni	Nuovi impianti	Tutte le potenze	100

Tipologie di impianto	Categorie di intervento	Mesi *)
Biogas	Nuovi impianti	31
Biomasse	Nuovi impianti	31
Geotermico tradizionale con innovazioni	Nuovi impianti	51
Geotermico tradizionale con innovazioni	Rifacimenti	36
Geotermico a emissioni nulle	Nuovi impianti	60
Fotovoltaico <i>floating</i> su acque interne	Nuovi impianti	36
Eolico <i>off-shore</i>	Nuovi impianti	60

1st call: 11/12/2024 → 14/02/2025

Contingent to tender: **10 MW**

Primo Bando pubblico relativo alle procedure competitive per l’accesso agli incentivi per gli impianti del Gruppo A alimentati da **biogas e biomasse**, ai sensi dell’articolo 4 del D.M. 19 giugno 2024.

2nd call: 14/05/2025 → 05/09/2025

Contingent to tender: **9 MW**

Secondo Bando pubblico relativo alle procedure competitive per l’accesso agli incentivi per gli impianti del Gruppo A alimentati da **biogas** ai sensi dell’articolo 4 del D.M. 19 giugno 2024.

3rd call: 08/06/2026 → 07/08/2026

Contingent to tender: **5 MW**

3rd public call for competitive procedures to access incentives for Group A facilities powered by **biogas and biomass**, in accordance with Art. 4 of the Ministerial Decree of June 19, 2024.

	avviso pubblico procedura A_bando 2_FER 2		
BANDI	FER2 avviso pubblico_procedura A_bando 1_FER 2	11/12/2024	
BANDI	FER2 Avviso pubblico procedura Gruppo A - bando 3 - FER 2	23/04/2026	

RES 2: action promoting innovative and sustainable plants

1st call: 11/12/2024 → 14/02/2025
Contingent to tender: **10 MW**
Primo Bando pubblico relativo alle procedure competitive per l’accesso agli incentivi per gli impianti del Gruppo A alimentati da **biogas e biomasse**, ai sensi dell’articolo 4 del D.M. 19 giugno 2024.

2nd call: 14/05/2025 → 05/09/2025
Contingent to tender: **9 MW**
Secondo Bando pubblico relativo alle procedure competitive per l’accesso agli incentivi per gli impianti del Gruppo A alimentati da **biogas** ai sensi dell’articolo 4 del D.M. 19 giugno 2024.

3rd call: 08/06/2026 → 07/08/2026
Contingent to tender: **5 MW**
3rd public call for competitive procedures to access incentives for Group A facilities powered by **biogas and biomass**, in accordance with Art. 4 of the Ministerial Decree of June 19, 2024.

	2024	2025	2026	2027	2028
€/MWh	246	246	238	231	223
Plant size for access to all-inclusive tariff.	≤ 300 kW	≤ 300 kW	≤ 200 kW	≤ 200 kW	≤ 200 kW

For plants with a capacity of up to 300 kW, an incentive of €246/MWh is provided for the 2024/2025 period. Starting in 2026, however, a 3% annual reduction will be applied (see table). The biomass types eligible for these incentives are listed in Table 2 attached to the Decree. Specifically, at least 80% of the byproducts specified in “Part A” of the Table must be used (e.g., byproducts from agricultural activities, byproducts from food and agro-industrial activities, byproducts from industrial activities).

<https://www.gse.it/servizi-per-te/fonti-rinnovabili/fer2/documenti>; <https://www.reset-energy.com/il-decreto-fer2-tutto-cio-che-ce-da-sapere/>

Update on EU Projects on gasification involving Italy

Name	Funding	Aim	Reactor design	Present Status	Partners	link
NIAGARA	Horizon EU	Combination of thermochemical processes (hydrothermal liquefaction, aqueous phase reforming, gasification and CO ₂ capture) converts this mix into a hydrogen-rich advanced biofuel, which powers a SOFC generating electricity.	Different tech.	1 May 2024 - 30 April 2028	CEA (FR), POLITO (IT), UAL (ES), GAZOTECH (FR), RISE (SE), LOMARTOV (ES), LULEA (SE), SOLYDERA (IT), ...	https://www.niagara-project.eu/
RISEnergy	HORIZON EU	Research Infrastructure Services for Renewable Energy	Different tech.	1 March 2024 - 31 August 2028	KIT (DE), CEA (FR), CSIC (ES), ENEA (IT), CNR (IT), ...	https://www.eera-energystorage.eu/risenergy-proposal.html
Fuels-C	Horizon EU	Develop and validate energy-efficient technologies at TRL 5, including bioelectrochemical CH ₄ and NH ₃ production, gasification , microbial electrosynthesis, and electroreduction	Different tech.	1 June 2024 - 30 November 2027	LEITAT (ES), VITO (BE), CEA (FR), BLUENERGY (IT), FINCOENERGIES (NL), ...	https://fuels-c.com/
SUPREMAS	Horizon EU	Modular units designed at the purpose for syngas production and energy generation both via traditional CHP and also SOFC compacted modules.	Downdraft gasifier	1 May 2024 - 30 April 2028	RINA CONSULTING (IT), MDU (SE), RESET S.P.A. (IT), CIRCE (ES), ARTELYS (FR), STEINBEIS (DE), ...	https://www.supremas.eu/
BeBOP	Horizon EU	Power Biomass to X (PBtX) system integrating gasification and SO electrolysis cell unit (SOEC) to produce Methanol	Fluidized Bed Gasifier	1 October 2024 - 30 September 2028	EU CORE (IT), POLIMI (IT), LUT Univ. (FI), VTT OY (FI), ECODESIGN (AU), ICODOS (DE), INERIS (FR), WOOD ITALIANA (IT), ...	https://www.bebop-project.eu/
PYRAH2	Horizon EU	Sustainable and cost-effective hydrogen and carbon-based products (autothermal gasification and syngas conditioning, syngas biomethanation, CO ₂ separation, and plasma-assisted methane pyrolysis)	Different tech.	1 January 2026 - 31 December 2029	LANGA DE DUERO (ES), NECTA BIOENERGY (ES), TERRAWATT (FR), POLIMI (IT), DTU (DK), GOODYEAR (LU), HYCHEM (PT), ...	Linkedin
ICARUS	HORIZON EU	Development of technology steps limiting the wider production of Sustainable Aviation Fuel (SAF) , i.e. HTL biocrude, isobutanol from lignocellulosic biomass and Fischer-Tropsch from biomass gasification.	Different tech.	1 October 2023 to 30 September 2026	CRES (EL), 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 bioenergy for industry - Novel fuel flexible highly efficient and close-to-zero emission combined biomass gasification and combustion technology.	Updraft gasifier	1 September 2023 to 31 August 2026	BIOS BIOENERG. (AT), 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 (rdME) and synthetic natural gas (SNG) from feedstocks of biological and non-biological origin.	Indirect gasification	1 July 2023 to 31 October 2026	TNO (NL), ENGIE (FR), POLIMI (IT), LUT (FI), et al. Overall: 10 Partners	Website to be published (GA ID: 101118241)
METHAREN	HORIZON EU	Sustainable and circular biomethane production system enabling the management of the intermittent renewable energy sources.	Fluidized bed gasification and AD	1 November 2022 to 31 October 2027	T.EN NETHERLANDS BV (NL), Fraunhofer IKTS (DE), ERGAR (BE), TECHNIP ENERGIES (IT) et al. Overall: 18 Partners	https://metharen.eu/
BIOMETHAVERSE	HORIZON EU	Demonstrating and Connecting Production Innovations in the BIOMETHANE universe (+ renewable H₂ or renewable electricity to increase the overall biomethane yield)	Three-stage gasification and AD	1 October 2022 to 31 March 2027	ISINNOVA (IT), AERIS (ES), CERT (EL), CORTUS (SE), ENEA (IT) et al. Overall: 21 Partners	https://www.biomethaverse.eu/
PLASTICE	HORIZON EU	New technologies to integrate PLASTIC waste in the Circular Economy (Combined gasification and chemical post-treatment; HTL; and MW assisted pyrolysis) to assess the valorisation processes which will be further validated in industrial environments). Umbria, Italy	Different tech.	1 June 2022 - 31 May 2026 -> 30 November 2026	CIRCE (ES), 5 IT (RINA CONSULTING, CNR, PRT POLYURETHAN RECYCLING TECHNOLOGY SRL, et al.). Overall: 25 Partners	https://plastice.eu/
Micro-Bio-CHP	HORIZON EU	Development of a novel highly efficient energy supply system for energy autonomous multi-family buildings based on biomass gasification coupled to SOFC and a PV system	Updraft gasifier	1 October 2022 to 30 September 2025 -> 31 October 2026	WINDHAGER (AU), BIOS BIOENERGIESYSTEME GMBH (AU), FRAUNHOFER (DE), HYSYTECH SRL (IT), CATATOR AB (SE), WUPPERTAL INST. (DE)	https://microbiochp.eu/
REFFECT AFRICA	HZ2020	Renewable energies for Africa: effective valorization of agri-food wastes	Different tech.	1 Nov 2021 to 31 Oct 2026	UJA (ES), several African Countries, TREE S.r.l. (IT), UniPI (IT), TIFEEO SRL (IT) et al; 29 partners	https://www.reffect-africa.eu/

NB: This table is based on data available from the EU CORDIS, LIFE databases and project websites. CORDIS: <https://cordis.europa.eu/search>

Projects on Gasification funded by National/Regional Programmes: Updates

National/Italian Regions	Name	Funding	Project aim/Activity on Gasification	Reactor design	Present Status	Note
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	July 2022- sept 2026	ENEA , CNR, RSE & Universities (https://www.pnrr-ricerca2.it/)
National	NEST	MUR	SPOKE 3: Bioenergy & New Biofuels for Sustainable Future	Fluidized, Fixed, Rotary beds	November 2022- April 2026	Large Consortium (Universities , Public research organizations, Private Companies; https://fondazionenest.it/spoke/bioenergy-new-biofuels-for-sustainable-future/)
National	RDS 2025-2027	MASE	Electrical System Research	Different tech.	January 2025- December 2027	ENEA, CNR, RSE S.p.A. (https://www.ricercasistemaelettrico.enea.it/)
National	ERMES	MASE	E-fuels from Residues gasification and green H2 for bio-MEthane Synthesis	Fluidized bed Gasifier	January 2025 - June 2026	UNIVAQ , Tor Vergata, Uni Teramo
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 electricity.	Downdraft&Rotary kiln reactors	January 2022 – February 2027	CMD S.p.A , Giaguaro S.p.A, ENEA
EU, MUR, MASE, ANR (FR), SWEA (SE), TA CR (CZ)	Geniusfuels	CETP	Gasification and Electrolysis Novel Integration Used for Sustainable FUELS - a Clean Energy Transition Partnership Project	Updraft Gasifier	2023-2026	UniBO "Toso Montanari" , CNRS- ICPEES, Uni Ostrava, Hulteberg Chemistry & Engineering AB, Iridenergy Srl, SolydEra SpA, ENI SpA – Italy (https://site.unibo.it/geniusfuelsproject/it)
Emilia-Romagna	H2-Synergy	FESR 2023-2024	To convert renewable electricity, biomass waste, and plastics into hydrogen, syngas, and biochar in an integrated and sustainable manner.	Updraft Gasifier	March 2024-2026	CIRI (UniBO) , CIDEA, CNR, CIFLA, UniParma, Iridenergy Sr, ABK Group (https://site.unibo.it/h2-synergy/it)
Lazio	H2Bio	FESR 2021-2027	Hydrogen from Biomass	Downdraft reactor	End: June 2026	BIOSYN SRL , UniCassino, Pa.L.Mer., UniPI, (https://www.biosyn.it/bioidrogeno-h2bio/)
National	FENICS	MIMIT	Sludge, Energy and Industrial Waste for Circular Economy and Sustainability	Fixed bed gasifier	September 2022 – August 2026	Grastim J.V. S.r.l. , UniNA "Parthenope", GIOTTO Water S.r.l. , CNR-STEMS
National	GAPFORCE	MISE	Gas production for circular economy	Fixed bed gasifier	July 2023 – January 2027	Airmec - S.r.l. , SI.VA. Impianti S.r.l., UniNA Federico II, CNR
Campania	POTTERS	MIMIT	Portable thermal treatment for effective and regenerative sludge management	Different tech.	January 2025 – December 2027	Graded , UniNA "Parthenope", CNR-Stems, Facility & Energy Management Epm Srl.

MASE: Ministry of the Environment and Energy Security; MUR: Ministry of University and Research; MISE: Ministry of Economic Development; MIMIT: Ministry of Business and Made in Italy; FESR: European Regional Development Fund

Italian Players in the CHP sector via gasification

SMEs, Start-up & Market

Name	Technology	Commercial	Size	Base	Markets
CMD SPA	Down-Draft Fixed Bed	ECO20X MICRO CHP SYSTEM	20 kWel/40 kWth	San Nicola la Strada (Caserta, Campania)	ITALY
ESPE SRL	Down-Draft Fixed Bed	CHIP50 COGENERATOR SYSTEM	49 kWel/110 kWth	Grantorto (Padua, Veneto)	ITALY, UK JAPAN
RESET SRL	Down-Draft Fixed Bed	SYNGASMART 50 CHP SYSTEM	50 kWel/75 kWth	Cittaducale (Rieti, Lazio)	ITALY
BIOSYN SRL	Down-Draft Fixed Bed	BIOSYN B-200 CHP, BIOSYN B-200 CH	200 kWel/260 kWth	Termoli (Campobasso, Molise)	ITALY
Iridenergy Srl	Up-Draft Fixed Bed		8 - 10 kWel/100 - 120 kWth	Parma (Emilia-Romania)	ITALY
IRIS Srl	Down-Draft Fixed Bed	5kg/h, 50kg/h, 250kg/h.		Orbassano (Torino, Piemonte)	ITALY
PFG-HYBRID Srl	Down-Draft Fixed Bed		750 kWel	Grisignano di Zocco (Vicenza, Veneto)	ITALY
HYSYTECH Srl	Fluidized bed	--	--	Orbassano (Torino, Piemonte)	ITALY



NextChem/MyR echemical	Proprietary NX Circular gasific. tech.				ITALY
Walte Tosto	DFB gasifier		100 kWth	Chieti (Abruzzo)	ITALY



Company working in the field of electronic engine control systems for alternative fuels and renewable energies.

MTM's SYN cogenerators series: 45-200 kWe with a single engine powered entirely with syngas.

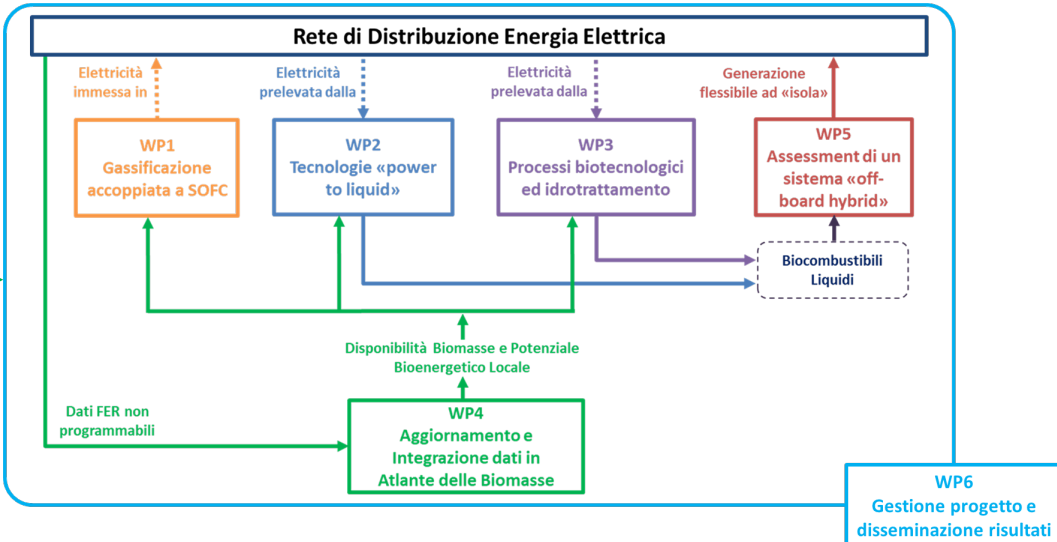
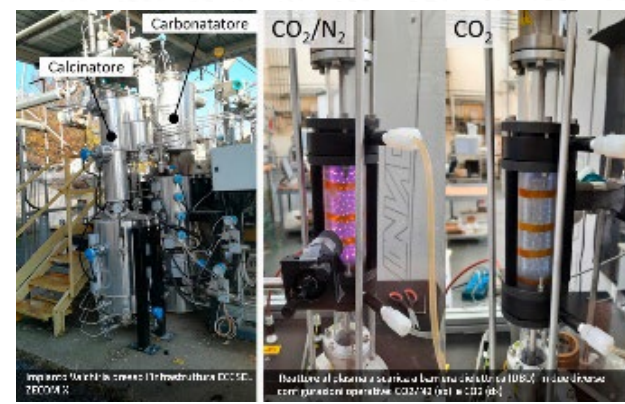
Note: The lists presented on this slide are based on information gathered from websites. The tables are updated frequently.

www.ieabioenergy.com



OBIETTIVO 1 DECARBONIZZAZIONE	
1.1	Progetto Integrato Fotovoltaico innovativo, efficiente e sostenibile
1.2	Progetto Integrato Tecnologie di accumulo elettrochimico e termico
1.3	Progetto Integrato Tecnologie e usi finali dell'idrogeno
1.4	Materiali e dispositivi di frontiera per applicazioni energetiche
1.5	Edifici ad alta efficienza per la transizione energetica
1.6	Energy efficiency of industrial products and processes
1.7	Tecnologie per la penetrazione efficiente del vettore elettrico negli usi finali
1.8	Energia dal mare
1.9	Solare Termodinamico
1.10	Bioenergy
1.11	Risorsa idrica e sistema energetico

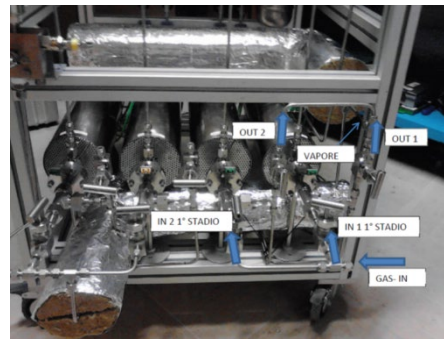
WP3 - Development of CCS technologies to improve the efficiency of the HtA industry and achieve the net-zero goal (Including SEG processes)



1.0 Bioenergie - Main facilities involved in the activities



10 kWth ICBFC



WGS & separation



UpDraft (150 kWth)



ICFBF (1000 kWth)

➤ New upgrading and realizations are in progress

The «POR H2» Framework Programme

(Program for research activities on hydrogen)

The screenshot shows a web browser displaying the PNR-RicercaH2 website. The page is titled "Hydrogen production" under the "Objective 1" section. It lists upcoming events for September 2026, including the 15th-17th CAPRI - EFCH2 event and the 23rd-24th NAPLES - PORH2 closing event. A list of research topics is provided, including Low and High Temperature Electrolysis, Thermochemical Conversion of Biomass, Biological Processes, and Solar-Assisted Processes. The page also features logos for ENEA, the European Union, and RSE.

Home > PI-Objectives and purposes

Hydrogen production

Objective 1

September 2026

15th-17th, 2026. CAPRI - EFCH2 event
(<https://www.europeanfuelcells.com/>)

23rd-24th, NAPLES - PORH2 closing event

WP1.1 Research and development of advanced electrolyzers (low and high temperature), or other innovative technologies, for the production of green and low-emission hydrogen

- LOW AND HIGH TEMPERATURE ELECTROLYSIS;
- **THERMOCHEMICAL CONVERSION OF BIOMASS;**
- BIOLOGICAL PROCESSES;
- SOLAR-ASSISTED PROCESSES.

Finanziato dall'Unione europea
NextGenerationEU

ENEA RSE

Thank you

Donatella Barisano

ENEA

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

Email: donatella.barisano@enea.it



IEA Bioenergy

Technology Collaboration Programme

www.ieabioenergy.com

Technology Collaboration Programme

by **iea**