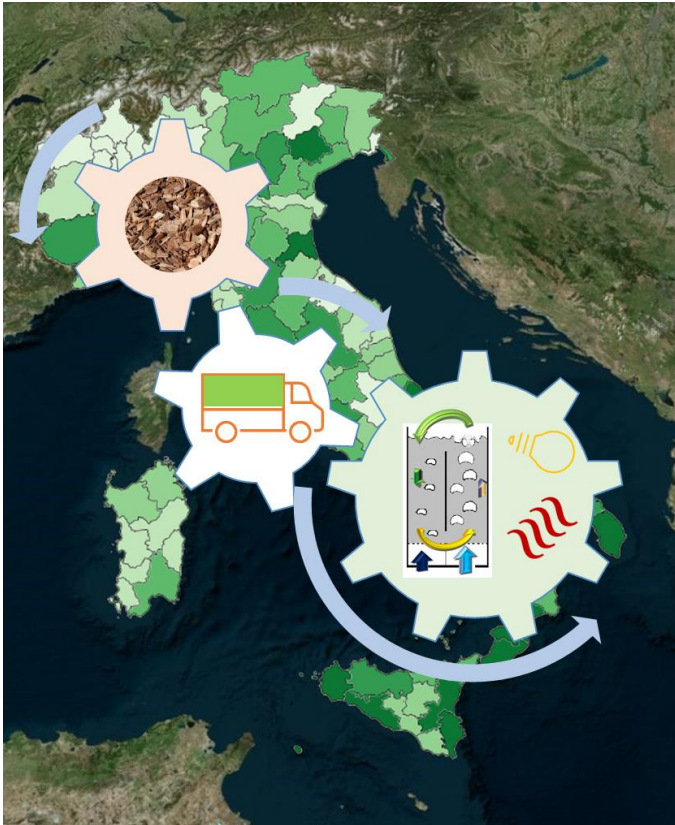




**IEA Bioenergy**  
Technology Collaboration Programme



## Country report - Italy

### Gasification of biomass and waste

Donatella Barisano

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

e-meeting, 29-30 June 2020

*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.*

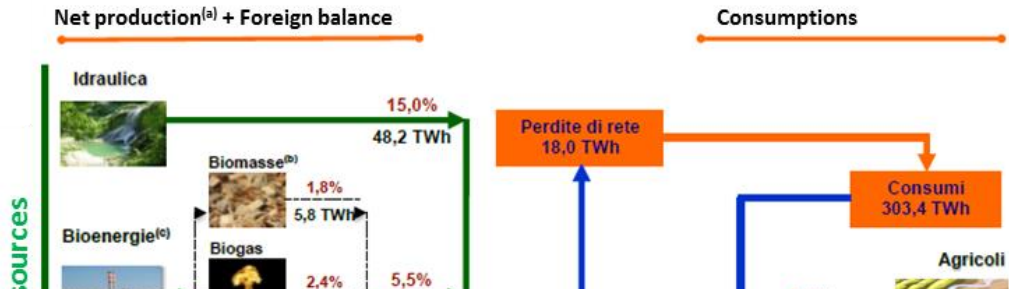
**Technology Collaboration Programme**

by **iea**

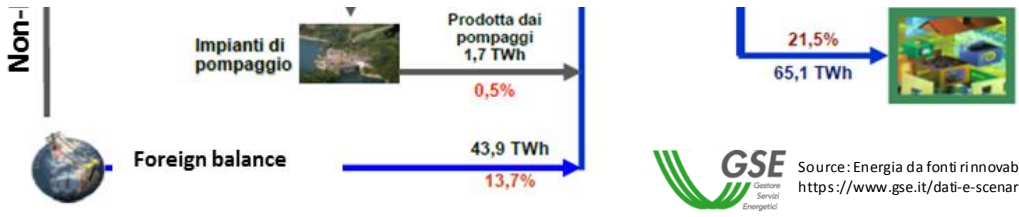
# Contents

- The NEB
- The PNIEC 2030
- EU R&D Projects
- Gasification status update - Italy

# National Electricity Balance from 2016 to 2018



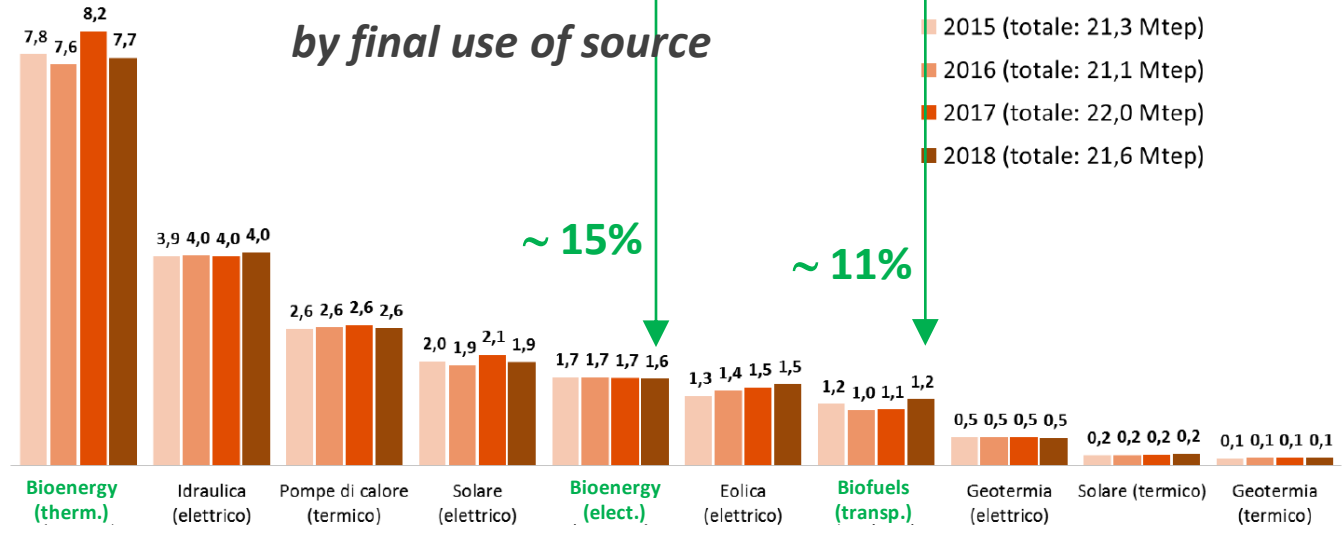
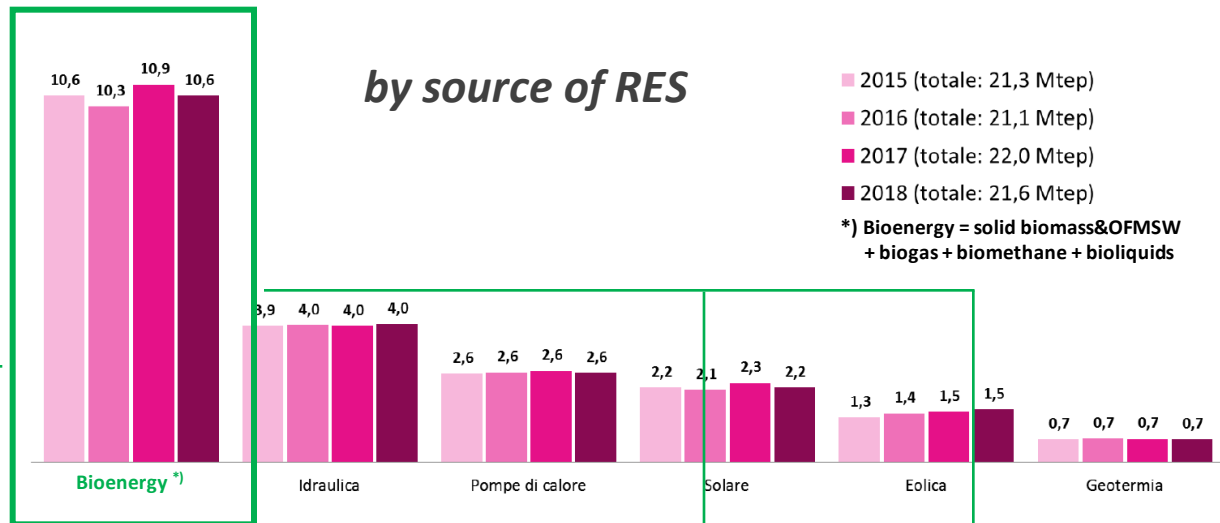
2016	2017	2018
Total grid requirement 314.3 TWh	Total grid requirement 320.5 TWh	Total grid requirement 320.5 TWh
Share of Total RES 105.1 TWh, 33.4%	Share of Total RES 101.0 TWh, 31.5%	Share of Total RES 111.4 TWh, 34.7%
Share of Bioenergy 17.9 TWh, 5.7%	Share of Bioenergy 17.9 TWh, 5.6%	Share of Bioenergy 17.6 TWh, 5.5%
Share of Biomass 5.8 TWh, 1.8% (4.7 TWh Bioliq.)	Share of Biomass 5.9 TWh, 1.8% (4.3 TWh Bioliq.)	Share of Biomass 5.8 TWh, 1.8% (4.2 TWh Bioliq.)



Source: Energia da fonti rinnovabili in Italia - Rapporto Statistico 2018, available at: <https://www.gse.it/dati-e-scenari/statistiche>; published in December 2019.

(A) Net production: gross production net of auxiliary services; (B) Includes the biodegradable part of MSW; (C) Net of the non-biodegradable fraction of MSW accounted in other fuels; (D) Coal + Lignite; (E) The energy used for pumping is conventionally subtracted from the non-renewable thermal production.

# Share of individual RES to gross final consumption: from 2015 to 2018



# The PNIEC 2030

(Piano Nazionale Integrato per l'Energia e il Clima 2030/  
Integrated National Plan for Energy and Climate 2030)

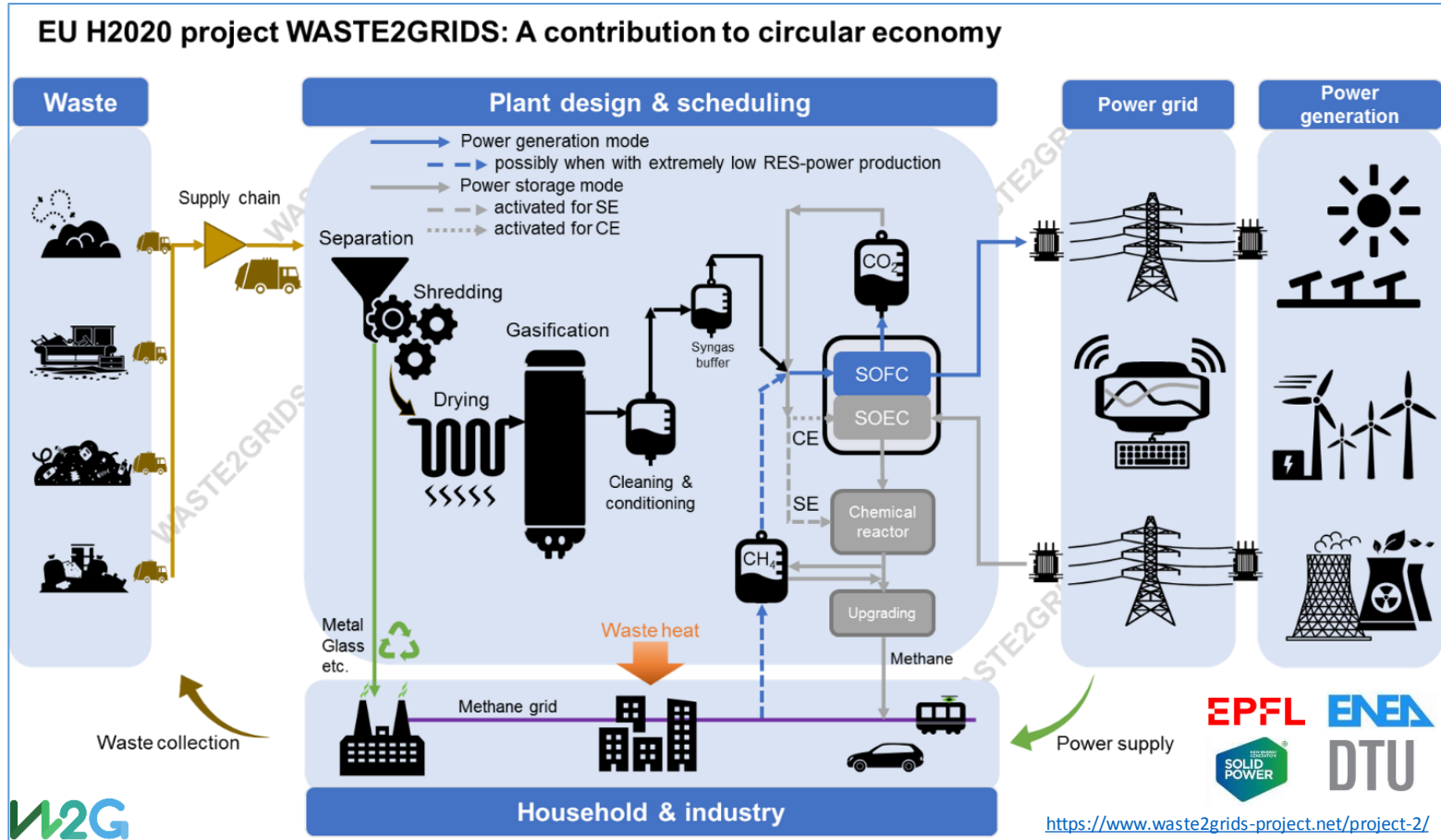


# EU projects on gasification involving Italy: Updates

Name	Funding	Aim	Reactor design	Present Status	Partners	link
GLAMOUR	H2020	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	University of Manchester, TU/e, TNO, CSIC, VITO, CiaoTech (IT), SIIRTEG NIG S.P.A (IT), Argent Energy, INERATEC, C&CS	Website to be published
BioSFerA	H2020	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	EKETA, VTT Oy, CARTIF, BBEU, CSIC, Q&R&T, RINA (IT), Sumitomo SHI FW, SeaNRG BV, NTUA, Environment Park S.p.A (IT)	Website to be published
BLAZE	H2020	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 2022-02-28, ongoing	USGM, UNIVAQ, ENEA, EPFL, Walter Tosto, SOLIDpower, HyGear, VERTECH GROUP, EUBIA	<a href="http://www.blazeproject.eu/">http://www.blazeproject.eu/</a>
WASTE2GRIDS	H2020	Identify the most promising industrial pathways of waste gasification and solid-oxide cell (SOC) integrated <b>power</b> -balancing plants (W2G plants in short).	All types of reactors	From 2019-01-01 to 2020-06-30, ongoing	EPFL, ENEA, DTU, SOLIDpower SA	<a href="https://www.waste2grids-project.net/">https://www.waste2grids-project.net/</a>
CLARA	H2020	Chemical Looping gasification for sustainable production of <b>biofuels</b> .	Dual fluidized bed reactors	From 2018-11-01 to 2022-10-31, ongoing	EST, REPOTEC, CHALMERS, UNIVAQ et al.; 13 partners	<a href="https://clara-h2020.eu/">https://clara-h2020.eu/</a>
LIG2LIQ	RFCs	Economically efficient production of <b>liquid fuels</b> , such as FT fuels or methanol, from lignite and SRF from municipal waste.	HT-Winkler reactor	From 2018-08-01 to 2022-01-31, ongoing	TUDA, UNIVAQ, ULSTER, CERTH, ICHPW, RWE, TKIS	<a href="https://www.lig2liq.eu/">https://www.lig2liq.eu/</a>
Heat-To-Fuel	H2020	Biorefinery combining HTL and FT to convert wet and solid organic, industrial wastes into <b>2nd gen. biofuels</b> with highest efficiency	Dual circulating fluidized bed	From 2017-09-01 to 2021-08-31, ongoing	GUSSING Energy Technologies, RE-CORD, TUV, BIOENERGY 2020+, PoliTO, CRF et al.; 14 partners	<a href="http://www.heattofuel.eu/">http://www.heattofuel.eu/</a>
BECOOOL	H2020	Brazil-EU Cooperation for Development of <b>Advanced Lignocellulosic Biofuels</b> (twinned with the Brazilian BioVALUE project)	Indirect Circulating Fluidized Bed	From 2017-06-01 to 2021-05-31, ongoing	UniBO, BIOCHEMTEX SPA, CREA, RE-CORD, BTG, ECN et al.; 13 partners	<a href="https://www.becoolproject.eu/">https://www.becoolproject.eu/</a>
COMSYN	H2020	Developing a new <b>BTL production</b> concept that will reduce biofuel production cost up to 35 % compared to alternative routes.	Dual fluidized bed gasifier	From 2017-05-01 to 2021-04-30, ongoing	VTT Oy, AMEC FW ITALIANA SRL, GKN, DLR, UniCRE, ÅF-Consult, INERATEC.	<a href="https://www.comsynproject.eu/">https://www.comsynproject.eu/</a>
BRISK II	H2020	<b>Biofuels Research Infrastructure</b> for Sharing Knowledge II	Fluidized and Fixed Beds	From 2017-05-01 to 2022-04-30, ongoing	KTH, BIOENERGY 2020+ GMBH, ECN, KIT, ENEA et al.; 15 partners	<a href="https://www.brisk2.eu/">https://www.brisk2.eu/</a>
FLEDGED	H2020	FLExible <b>Dimethyl ether</b> (DME) production from biomass Gasification with sorption-enhanced processes	Dual circulating fluidized bed	From 2016-11-01 to 2020-10-31, ongoing	PoliMI, ECN, CSIC, LUT et al. 9 partners	<a href="http://www.fledged.eu/">http://www.fledged.eu/</a>

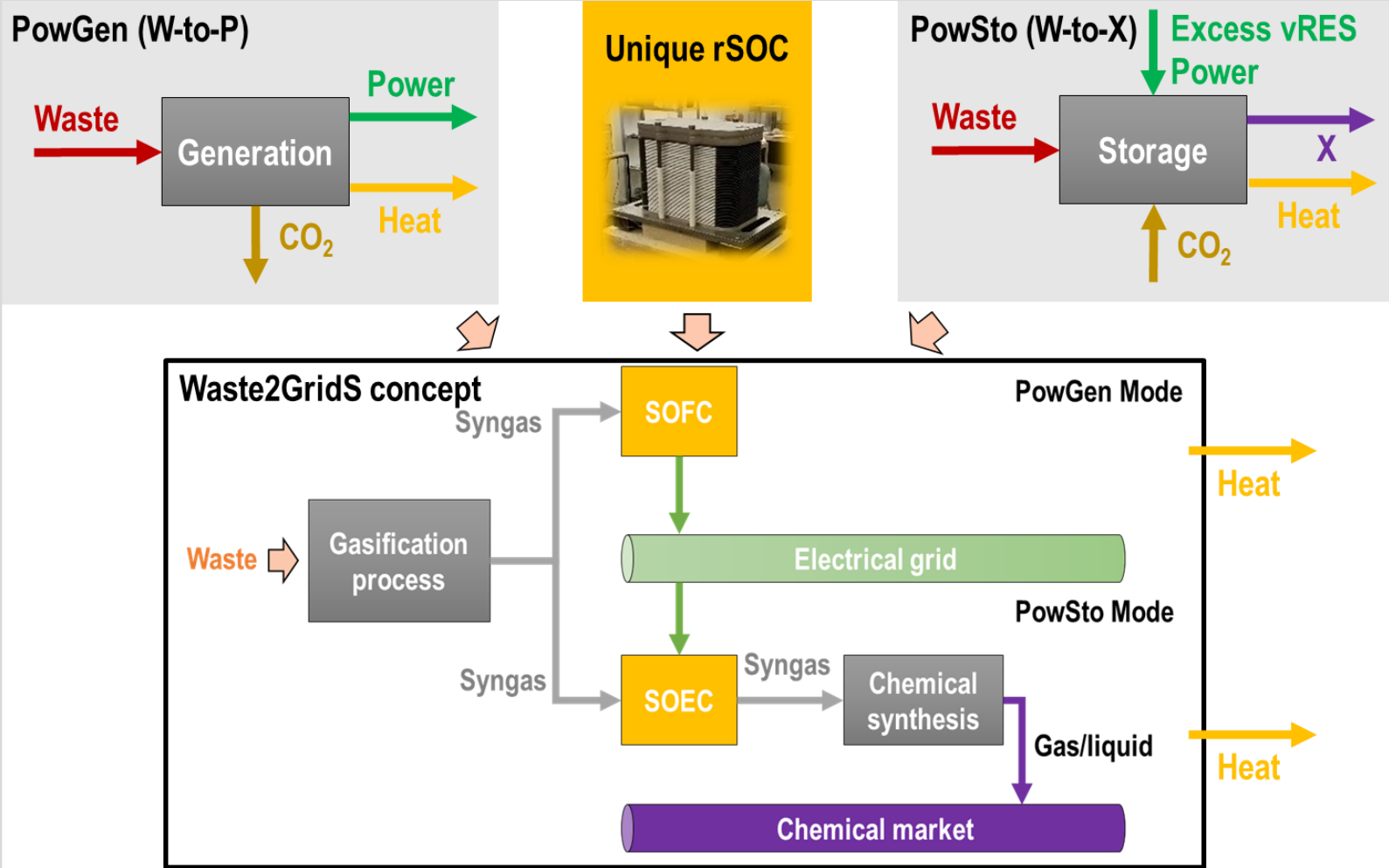
NB: This table is based on data available from the EU CORDIS database and project websites.

# Waste2GridS



# Waste2GridS Concept

A single, **dual-mode** plant for power storage and generation

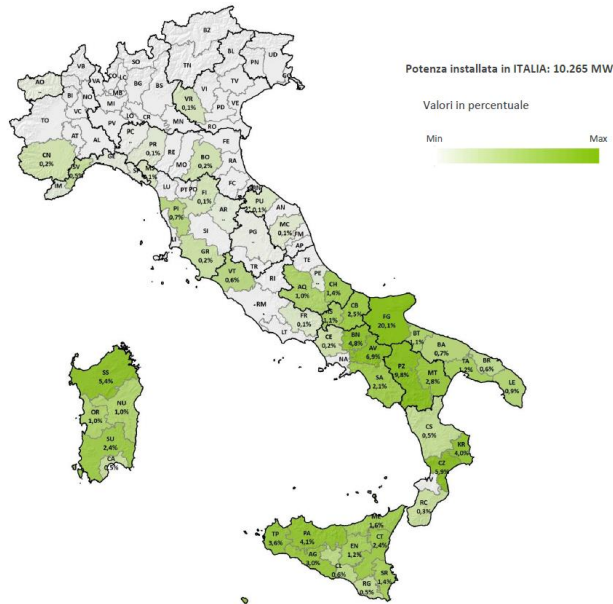




# Variable RES

## WIND

In 2018 the production of electricity from wind sources in Italy was 17.7 TWh.



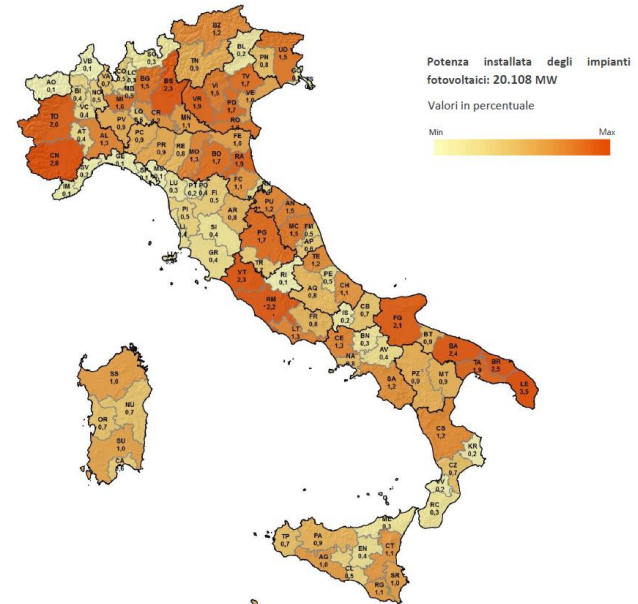
Produzione per Regione nel 2018 (GWh) **12.0 TWh**

Piemonte	29,1	Liguria	130,4	Molise	679,0
Valle d'Aosta	3,5	Emilia Romagna	26,9	Campania	2.494,0
Lombardia	0,0	Toscana	223,0	Puglia	<b>67.8%</b> 4.594,2
Prov. Aut. Trento	0,0	Umbria	2,8	Basilicata	2.140,2
Prov. Aut. Bolzano	0,0	Marche	26,6	Calabria	2.045,5
Veneto	23,1	Lazio	115,9	Sicilia	3.211,3
Friuli Venezia Giulia	0,0	Abruzzo	298,8	Sardegna	1.672,1

Fonte: Terna

## PHOTOVOLTAIC

In 2018, photovoltaic production in Italy accounted for 19.8% of the 114 TWh produced from renewable sources (i.e. 22.6 TWh).

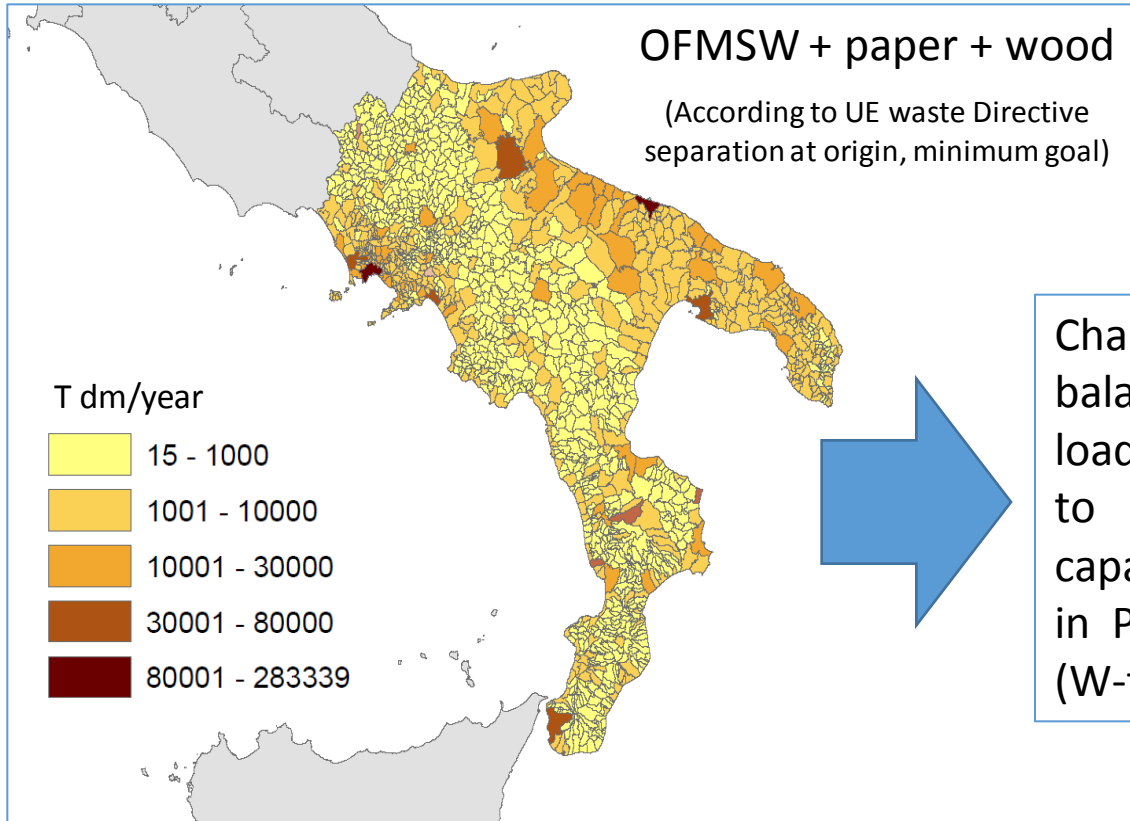


Produzione per Regione nel 2018 (GWh) **5.6 TWh**

Piemonte	1.695,2	Liguria	105,7	Molise	214,0
Valle d'Aosta	24,8	Emilia Romagna	2.187,7	Campania	877,5
Lombardia	2.251,8	Toscana	876,7	Puglia	<b>24.8%</b> 3.438,2
Prov. Aut. Trento	190,5	Umbria	526,7	Basilicata	445,3
Prov. Aut. Bolzano	263,2	Marche	1.237,7	Calabria	616,6
Veneto	1.990,2	Lazio	1.619,2	Sicilia	1.788,2
Friuli Venezia Giulia	561,6	Abruzzo	857,4	Sardegna	906,7

Source: Energia da fonti rinnovabili in Italia - settori termico, elettrico e trasporti. Rapporto statistico 2018, available at: <https://www.gse.it/dati-e-scenari/statistiche>

## The bio-waste potential of Agri – Residues – Italy – total 2030



Characterization of specific power grid balancing needs, matching residual loads with the availability of waste flows to explore the maximum potential capacities of the W2G technology both in PowStorage (W-t-X) and in PowGen (W-t-P).



**e-EUBCE 2020** *Bioeconomy's role in the post-pandemic economic recovery*

28th European Biomass Conference & Exhibition VIRTUAL | 6 - 9 July

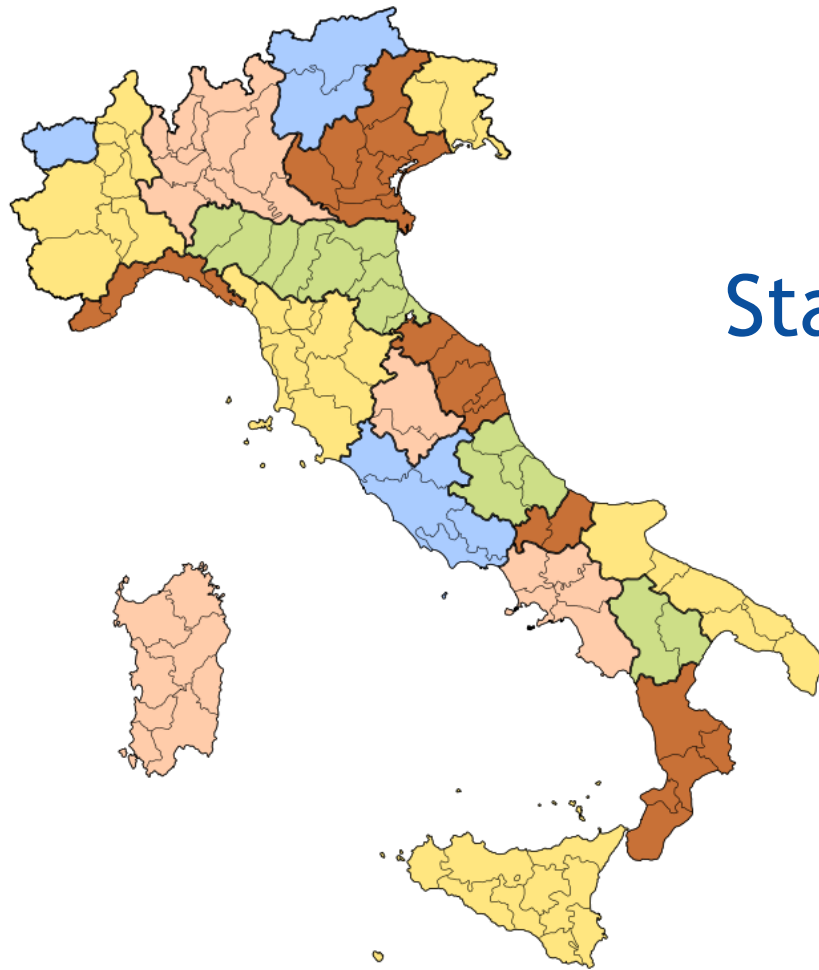
# The BIOCOGEN2030 European stakeholder forum

A spin-off of the projects BLAZE and Smart CHP



A screenshot of a web browser window. The address bar shows the URL: cordis.europa.eu/article/id/418050-biocogen-2030-forum-launched-to-promote-small-and-medium-scale-chp-from-biomass. The page content includes a news article titled "BIOCOGEN 2030 forum launched to promote small and medium-scale CHP from biomass". The article text states: "A stakeholder community dedicated to biomass-based combined heat and power (CHP) systems has been launched by partners of two European research projects." Below the text are icons for a recycling symbol, a gear, and a wind turbine, along with the text "NEW PRODUCTS AND TECHNOLOGIES". To the right of the article is a "Contributor" section for "Greenovatel Europe" from Belgium, with contact information for James Ling. Below that is a "Related projects" section featuring a "HORIZON 2020" logo. At the bottom of the article is a large graphic for "BIO COGEN 2030" with a "WEBINAR SMALL AND MEDIUM SCALE CHP FROM BIOMASS" scheduled for "9 JUNE 11:00-12:30 CEST". The browser's taskbar at the bottom shows various application icons and the system clock indicating 10:28 on 21/06/2020.

Registration form at: <https://forms.gle/GPynoHgCfpRE24As7>



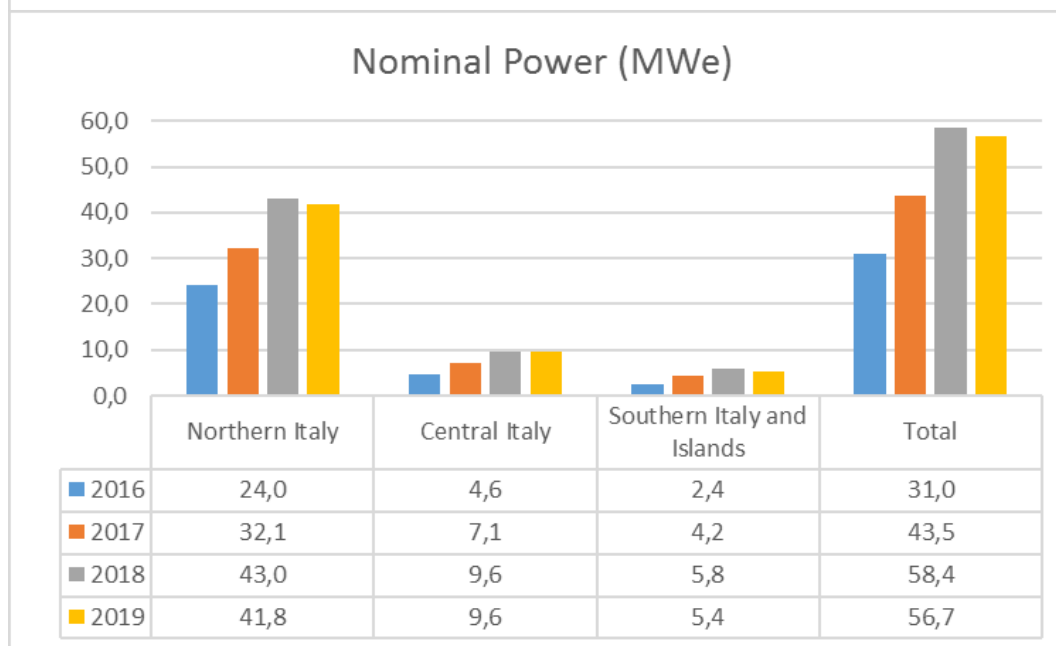
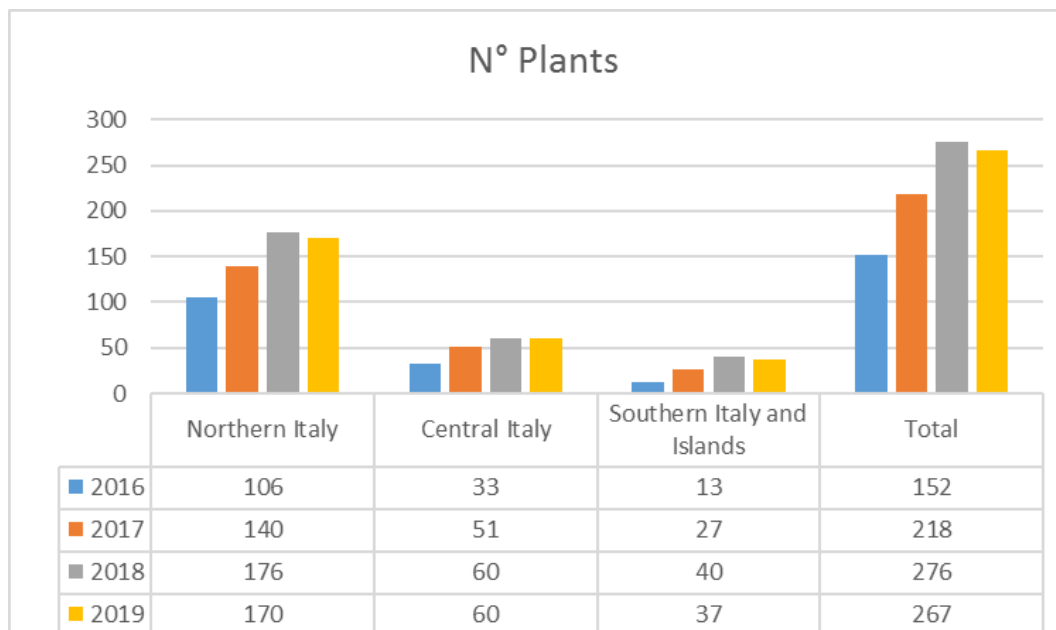
## Status of Gasification in Italy

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

Geographical Area	Region	N. Imp.				kWe			
		2016	2017	2018	2019	2016	2017	2018	2019
Northern Italy	Trentino Alto Adige	49	56	70	68	9782	10631	13249	12924
	Friuli	6	15	18	16	1975	4924	7866	7466
	Veneto	11	19	22	22	1723	2279	2875	2875
	Lombardia	9	15	17	17	2489	5058	6798	6798
	Piemonte	19	20	31	30	5408	5991	7759	7714
	Emilia Romagna	11	14	17	16	2597	3209	4434	3934
	Valle d'aosta	1	1	1	1	49	49	49	49
	Liguria	0	0	0	0	0	0	0	0
Central Italy	Toscana	14	17	23	23	2259	2526	4489	4489
	Umbria	8	14	16	16	1445	2095	2344	2344
	Lazio	7	12	13	13	573	1716	1915	1915
	Marche	4	8	8	8	283	804	804	804
Southern Italy and islands	Abruzzo	1	4	4	3	45	249	249	194
	Basilicata	2	1	2	2	399	199	399	399
	Calabria	1	4	7	7	45	315	764	764
	Campania	3	7	11	9	342	1303	2002	1614
	Molise	0	1	1	1	0	22	20	20
	Puglia	3	3	3	3	425	325	325	325
	Sardegna	1	4	5	5	90	583	903	903
	Sicilia	2	3	7	7	1049	1248	1143	1143
<b>Total</b>		<b>152</b>	<b>218</b>	<b>276</b>	<b>267</b>	<b>30978</b>	<b>43526</b>	<b>58387</b>	<b>56674</b>

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

# Overview by geographical area



# Thank you

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