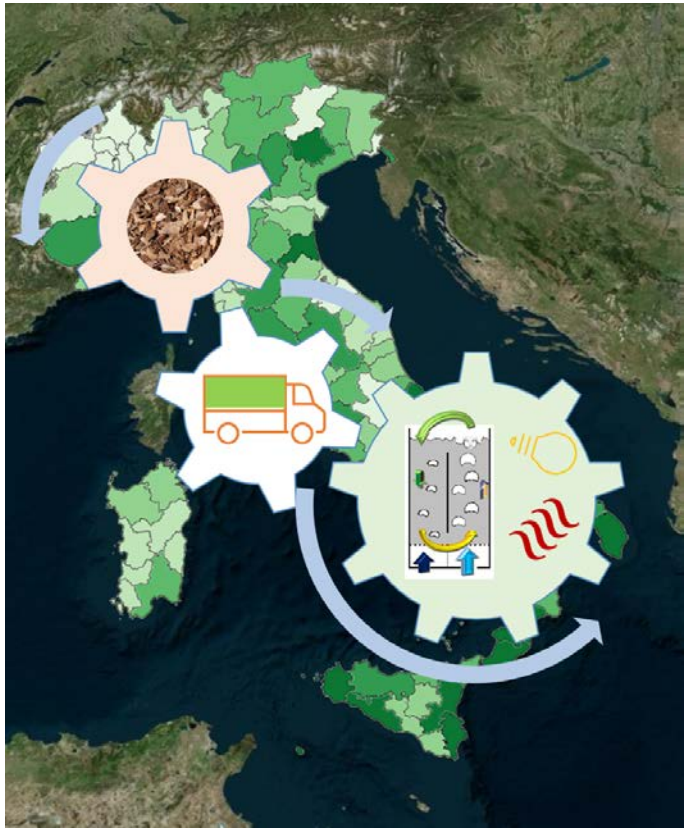
IEA Bioenergy
Technology Collaboration Programme



Country report - Italy

Gasification of biomass and waste

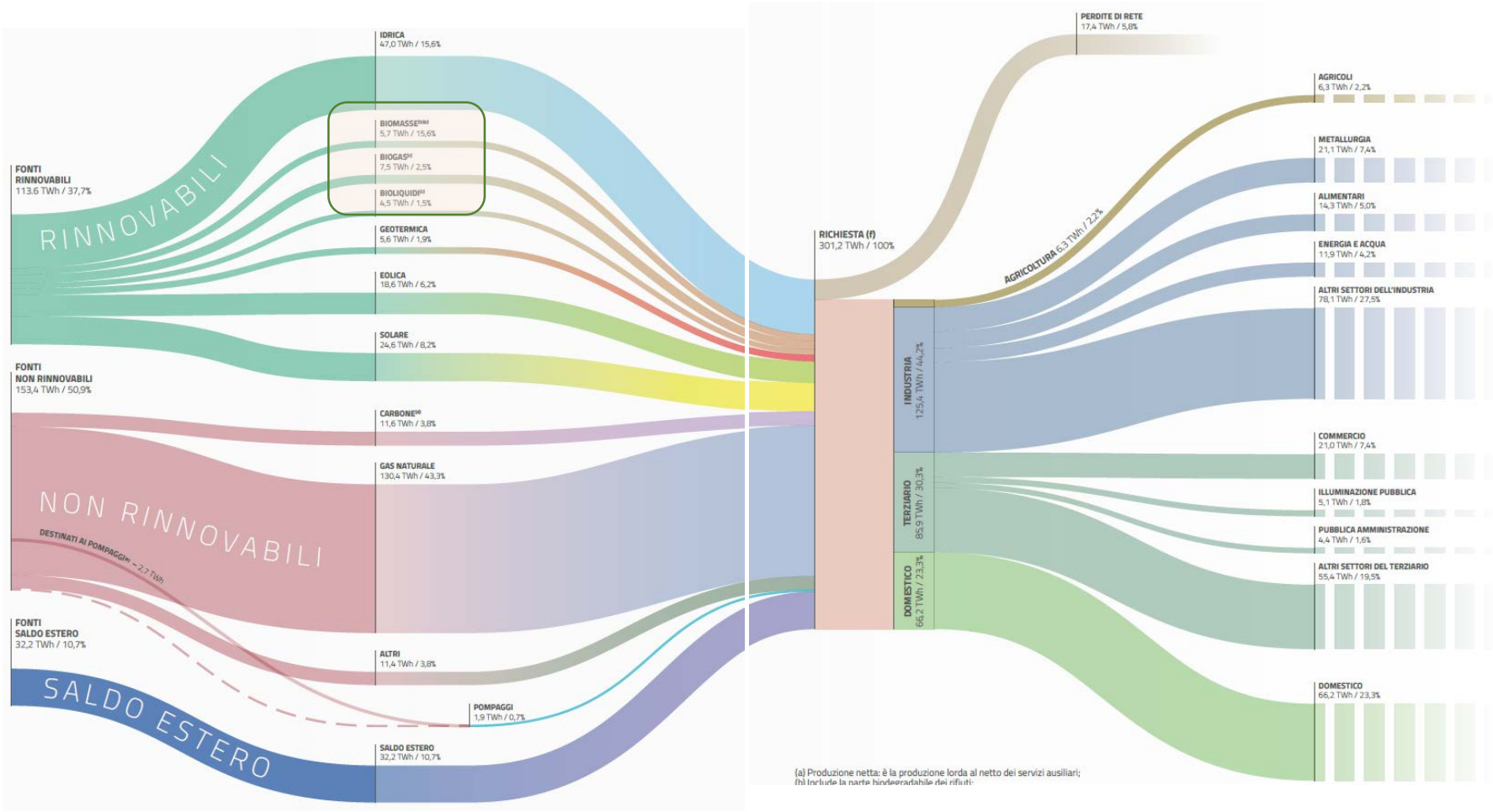
Donatella Barisano, ENEA

e-meeting, 20 May 2022

Contents

- The NEB (National Electricity Balance)
- The PNRR (Italian National Recovery and Resilience Plan)
- Gasification status update – Italy
- Italian CHP technology players

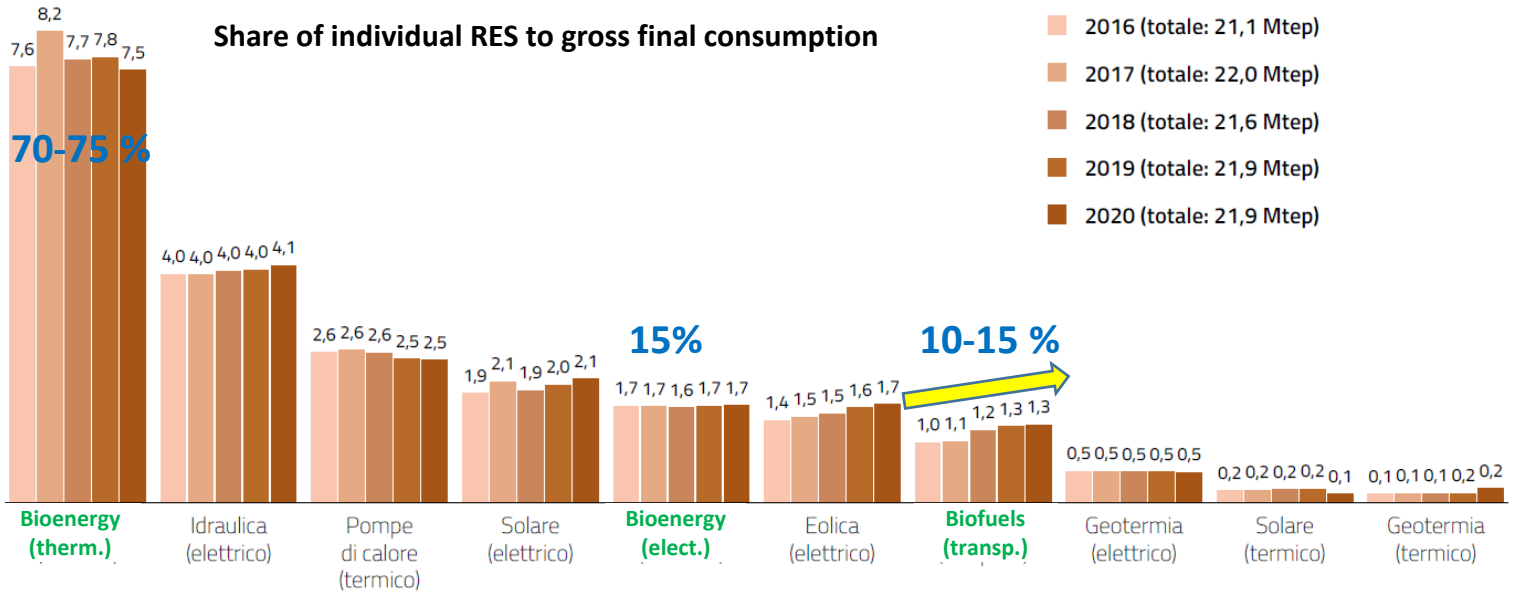
National Electricity Balance from 2016 to 2020



Source: Energia da fonti rinnovabili in Italia - Rapporto Statistico 2020, available at: https://www.gse.it/dati-e-scenari/statistiche; published in March 2022.

National Electricity Balance from 2016 to 2020

	TWh				
HEADING	**2016**	**2017**	**2018**	**2019**	**2020**
TOT grid requirement	314.3	320.5	321.4	319.6	301.2
Share of Total RES	105.1 (33.4%)	101.0 (31.5%)	111.4 (34.7%)	112.8 (35.3%)	113.6 (37.7%)
Share of Bioenergy	**17.9 (5.7%)**	**17.9 (5.6%)**	**17.6 (5,5%)**	**18.0 (5.6%)**	**17.7 (5.9%)**
Biomass	5.8	5.9	5.8	5.8	5.7
Biogas	7.4	7.7	7.6	7.7	7.5
Bioliq	4.7	4.3	4.2	4.5	4.5



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The Italian National Recovery and Resilience Plan (PNRR)

ORGANIZED IN 6 MISSIONS

2. Green revolution and ecological transition

MISSIONE 2: RIVOLUZIONE VERDE E TRANSIZIONE ECOLOGICA

COMPONENTI

- M2C1 - ECONOMIA CIRCOLARE E AGRICOLTURA SOSTENIBILE
- M2C2 - ENERGIA RINNOVABILE, IDROGENO, RETE E MOBILITÀ SOSTENIBILE
- M2C3 - EFFICIENZA ENERGETICA E RIQUALIFICAZIONE DEGLI EDIFICI
- M2C4 - TUTELA DEL TERRITORIO E DELLA RISORSA IDRICA

M2C1: ECONOMIA CIRCOLARE E AGRICOLTURA SOSTENIBILE

OBIETTIVI GENERALI:

M2C1 - CIRCULAR ECONOMY AND SUSTAINABLE AGRICULTURE

- Miglioramento della capacità di gestione efficiente e sostenibile dei rifiuti e avanzamento del paradigma dell'economia circolare
- Sviluppo di una filiera agroalimentare sostenibile, migliorando le prestazioni ambientali e la competitività delle aziende agricole
- Sviluppo di progetti integrati (circolarità, mobilità, rinnovabili) su isole e comunità

Deadline: March 2022

M2C2: ENERGIA RINNOVABILE, IDROGENO, RETE E MOBILITÀ SOSTENIBILE

OBIETTIVI GENERALI:

M2C2 - RENEWABLE ENERGY, HYDROGEN, GRID AND SUSTAINABLE MOBILITY

- Incremento della quota di energia prodotta da fonti di energia rinnovabile (FER) nel sistema, in linea con gli obiettivi europei e nazionali di decarbonizzazione
- Potenziamento e digitalizzazione delle infrastrutture di rete per accogliere l'aumento di produzione da

Call Type A
(Leaders: ROs & universities, Participants: Enterprises)

Call Type B
(Leaders: Enterprises, Participants: ROs & universities)

Deadline: May 2022

The Italian National Recovery and Resilience Plan (PNRR)

ORGANIZED IN 6 MISSIONS

4. Education and Research

MISSIONE 4: ISTRUZIONE E RICERCA

COMPONENTI E RISORSE

M4C1 - POTENZIAMENTO DELL'OFFERTA DEI SERVIZI DI ISTRUZIONE: DAGLI ASILI NIDO ALLE UNIVERSITÀ

M4C2 From research to enterprise

Deadline: May 2022

M4C2: DALLA RICERCA ALL'IMPRESA

OBIETTIVI GENERALI:

M4C2 From research to enterprise

innovative models for basic and applied research

- Rafforzare la ricerca e favorire la diffusione di modelli innovativi per la ricerca di base e applicata condotta in sinergia tra università e imprese

synergy between universities and companies

- Sostenere i processi per l'innovazione e il trasferimento tecnologico
- Potenziare le infrastrutture di ricerca, il capitale e le competenze di supporto all'innovazione

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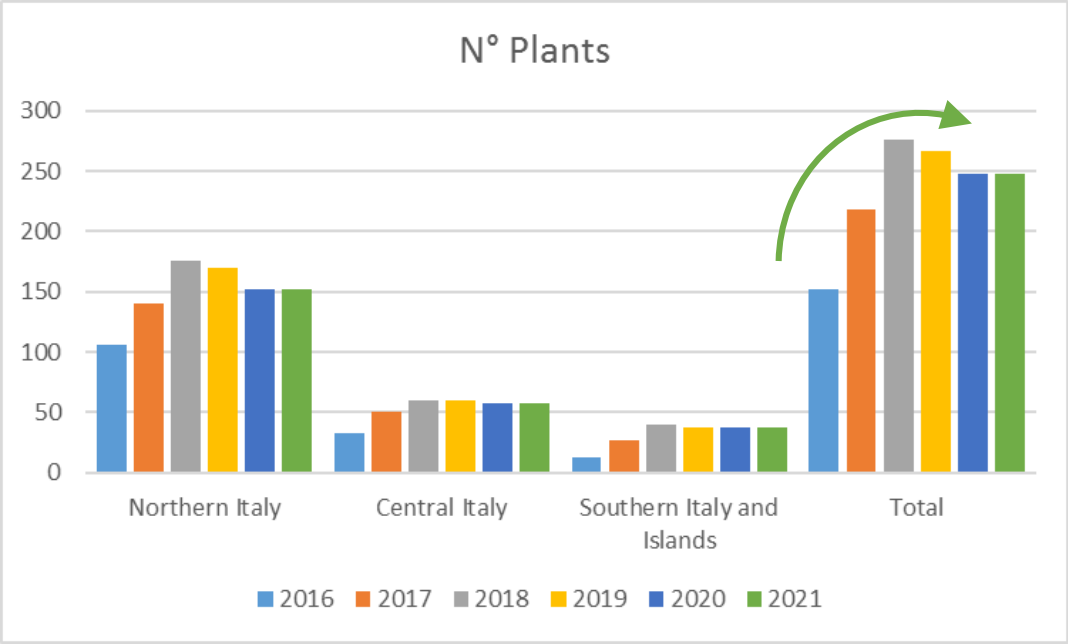
Status of Gasification in Italy

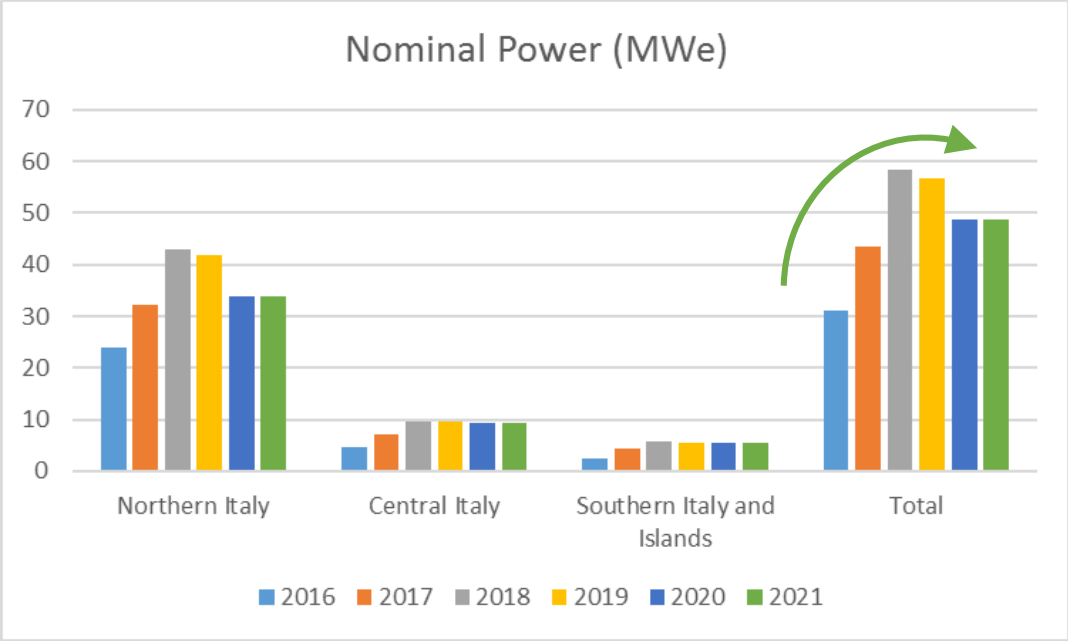
Trend in the biomass gasification plants: number of units and installed power

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

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





Thank you

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ENEA
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www.ieabioenergy.com

Link to «Defossilization»

https://unfccc.int/sites/default/files/resource/1.5DLR-TT-SYS-REfuels.pdf
https://advancedbiofuelsusa.info/tag/defossilization/
https://link.springer.com/article/10.1007/s38313-021-0658-7
https://www.cimac.com/events/cimac-web-seminars/cimac-web-seminars-defossilization-of-shipping.html

https://www.sciencedirect.com/science/article/pii/S2452223621001425
Defossilization of pharmaceutical manufacturing
Lea Wollensack, Kristi Budzinski, Jan Backmann
February 2022
…
The current generation of chemists must turn over a new page in history and face the task of **decoupling organic chemistry from petroleum, a finite fossil stock**, and — on top — of helping to improve humanity's climate gas balance on the road to climate neutrality [4]. This is what we call **defossilization**. The term **decarbonization does not make sense** if one talks about the future of industrial organic chemistry, such as organic chemistry (and biotechnology) cannot be decarbonized as all molecules by their nature contain carbon atoms.
…

https://www.mdpi.com/2071-1050/13/7/4026/pdf
A New Perspective for Climate Change Mitigation—Introducing Carbon-Negative Hydrogen Production from Biomass with Carbon Capture and Storage (HyBECCS)
Johannes Full, Steffen Merseburg, , Robert Miehe and Alexander Sauer.
March 2021
…
The greatest lever for advancing climate adaptation and mitigation is the **defossilization** of energy systems. A key opportunity to replace fossil fuels across sectors is the use of renewable
hydrogen.
…