



IEA Bioenergy

Technology Collaboration Programme



Country report - Italy

Gasification of biomass and waste

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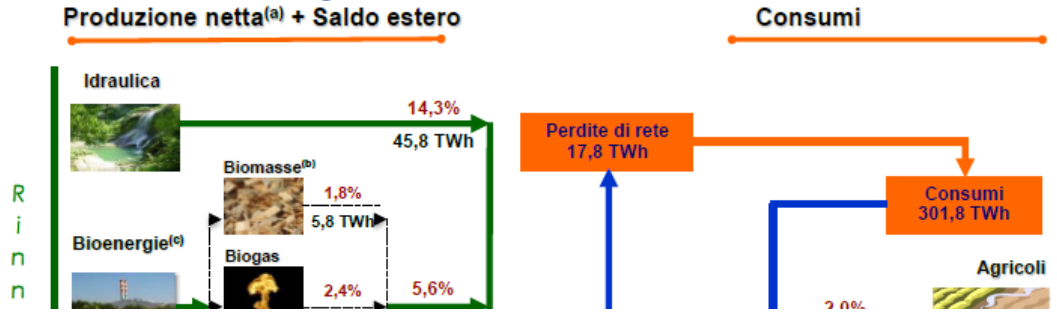
by **iea**



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National Electricity Balance from 2016 to 2019

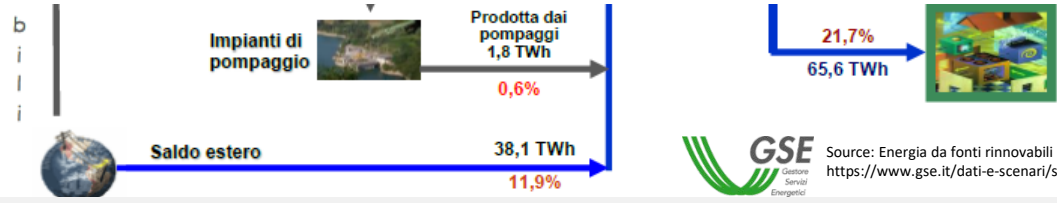


2016	2017	2018	2019
Total grid requirement 314.3 TWh	Total grid requirement 320.5 TWh	Total grid requirement 321.4 TWh	Total grid requirement 319.6 TWh

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 Total RES 112.8 TWh, 35.3%
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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 Bioenergy 18.0 TWh, 5.6%
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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.)	Share of Biomass 5.8 TWh, 1.8% (4.5 TWh Bioliq.)
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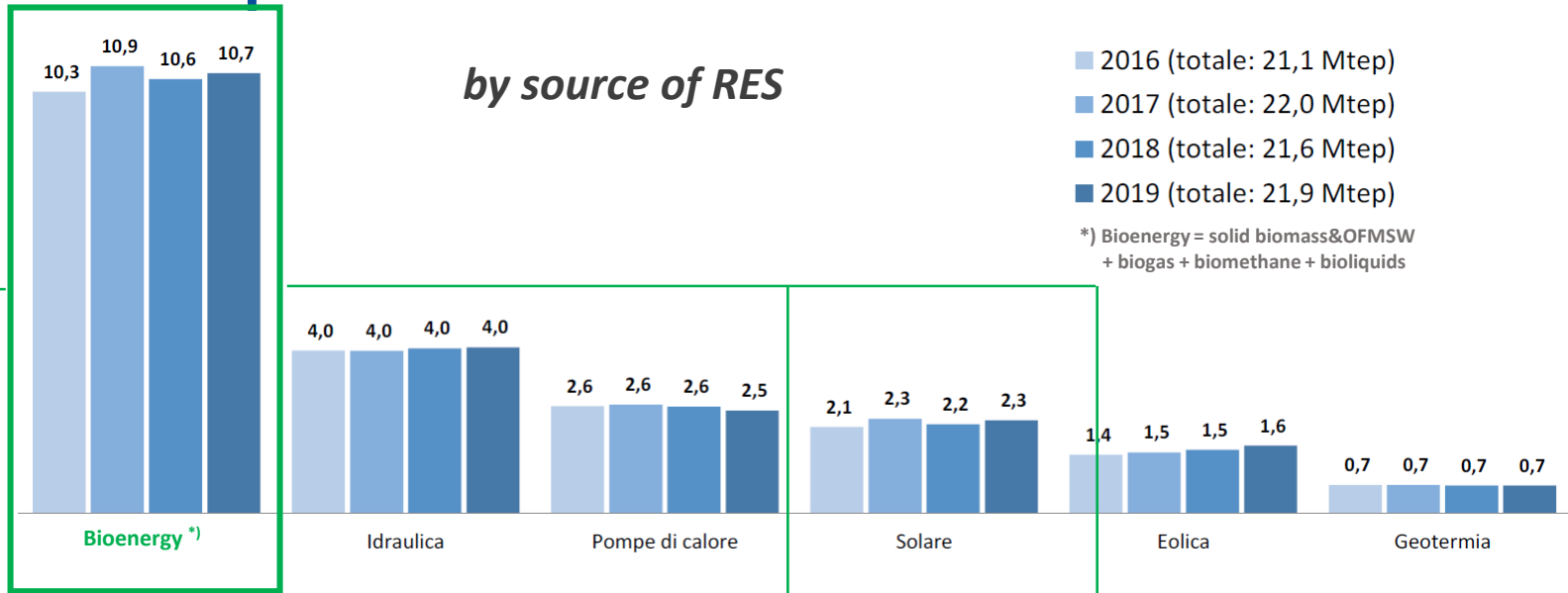


Source: Energia da fonti rinnovabili in Italia - Rapporto Statistico 2019, available at: <https://www.gse.it/dati-e-scenari/statistiche>; published in March 2021.

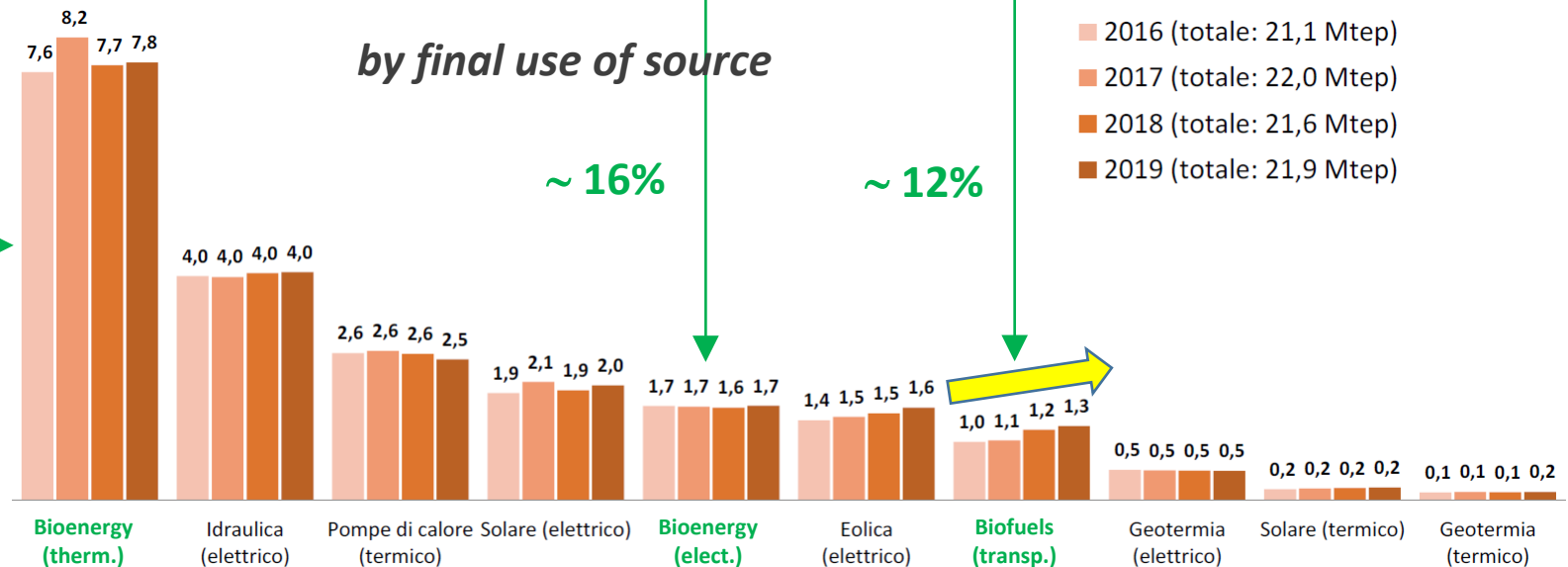
(A) Net production: gross production net of auxiliary services; (B) Includes the biodegradable part of MSW; (C) Net of the non-biodegradable fraction of MSW accounted in other fuels; (D) Coal + Lignite; (E) The energy used for pumping is conventionally subtracted from the non-renewable thermal production.

Share of individual RES to gross final consumption: from 2016 to 2019

by source of RES



by final use of source



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 E RISORSE (MILIARDI DI EURO):



- 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

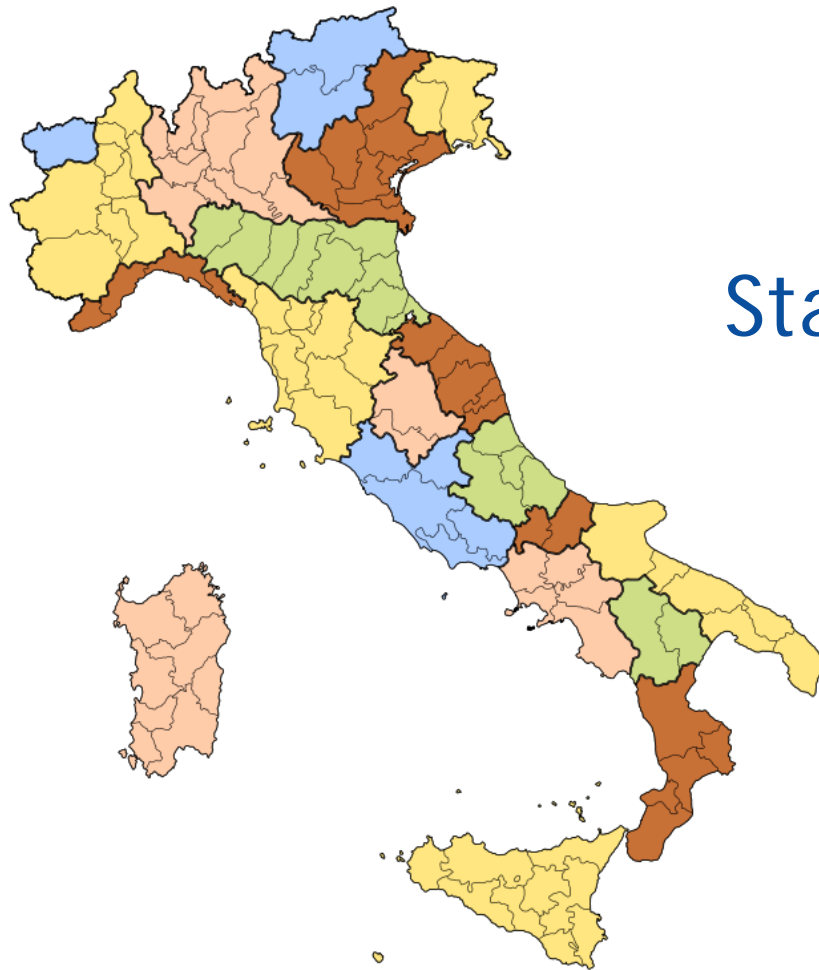
M2C2: ENERGIA RINNOVABILE, IDROGENO, RETE E MOBILITÀ SOSTENIBILE

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 FER e aumentarne la resilienza a fenomeni climatici estremi
- Promozione della produzione, distribuzione e degli usi finali dell'idrogeno, in linea con le strategie comunitarie e nazionali
- Sviluppo di un trasporto locale più sostenibile, non solo ai fini della decarbonizzazione ma anche come leva di miglioramento complessivo della qualità della vita (riduzione inquinamento dell'aria e acustico, diminuzione congestioni e integrazione di nuovi servizi)
- Sviluppo di una leadership internazionale industriale e di ricerca e sviluppo nelle principali filiere della transizione



Status of Gasification in Italy

Italian R&D organizations in the field of gasification

Organization		Specific Groups/ Consortium	Main Topics	Web page
Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile	ENEA	Trisaia, Casaccia	Biomass gasification, Pilot plants, gas cleaning & conditioning, energy vectors synt., CFC, process modelling, LCA, Coal, CCS	https://www.enea.it/it/centro-ricerche-casaccia http://www.trisaia.enea.it/en
Centro Interuniversitario per le Ricerche sulle Biomasse a Scopi Energetici	CIRBE	UnivAQ, UniTE, USGM	Biomass and waste Gasification, CFD, catalysis steam gasification, process simulation, tech.-econom. assessment	https://diie.univaq.it/ , https://www.unite.it/ , https://www.unimarconi.it/
Consiglio Nazionale delle Ricerche	CNR	IRC, ITAE, IM	Gasification Tech. develop., feedstock charact. and densification, system anal and optimization, SI and CI engine	http://www.irc.cnr.it/ , http://www.itae.cnr.it/it/ , https://www.im.cnr.it/
Liberà Università di Bolzano	unibz	Bioenergy & Biofuels LAB	gasification and pyrolysis reactors, On-site monitoring and diagnostics, CHP, Biofuels (FT, methanation), Chemical-physical characterization, biochar charact. & application	https://bnb.groups.unibz.it/
Renewable Energy Consortium for Research and Demonstration	RECORD	UniFI, CREAR, Villa Montepaldi, Spike Renewables S.r.l., ETA-Florence, GAL Start S.r.l, PoliTO	gasification, pyrolysis, HTC, HTL, Small-scale CHP, adv. biofuel, Biochar prod.&use, Tech.-econom. analysis and LCA, catalit. Conver.	https://www.re-cord.org/
Università degli studi di Modena e Reggio Emilia	UNIMORE	Bio-Energy Efficiency Laboratory	Biomass charact., gasification, pyrolysis, torrefaction, kinetic simulat., design and testing, biochar character.	http://www.beelab.unimore.it/site/en/home.html
Università degli Studi della Campania "Luigi Vanvitelli"	VANVITELLI UNIVERSITY	DISTABIF	Biomass, Waste (MSW, plastics), BFB, material and energy recovery, Tech., econom., social, and environ. evaluation	https://www.distabif.unicampna.it/
Società Tecnologie Avanzate Low Carbon S.p.A.	SOTACARBO	(ENEA & Sardinia Region)	Coal and Biomass, Fixed Bed and BFB gasif., gas clean&condit., CHP, CCUS	https://www.sotacarbo.it/en/

Italian R&D organizations in the field of gasification



R&D group connected
PoliTo, PoliMI, PoliBa, UniBO,
UniPI, UniPG/CRB, UniCal ...

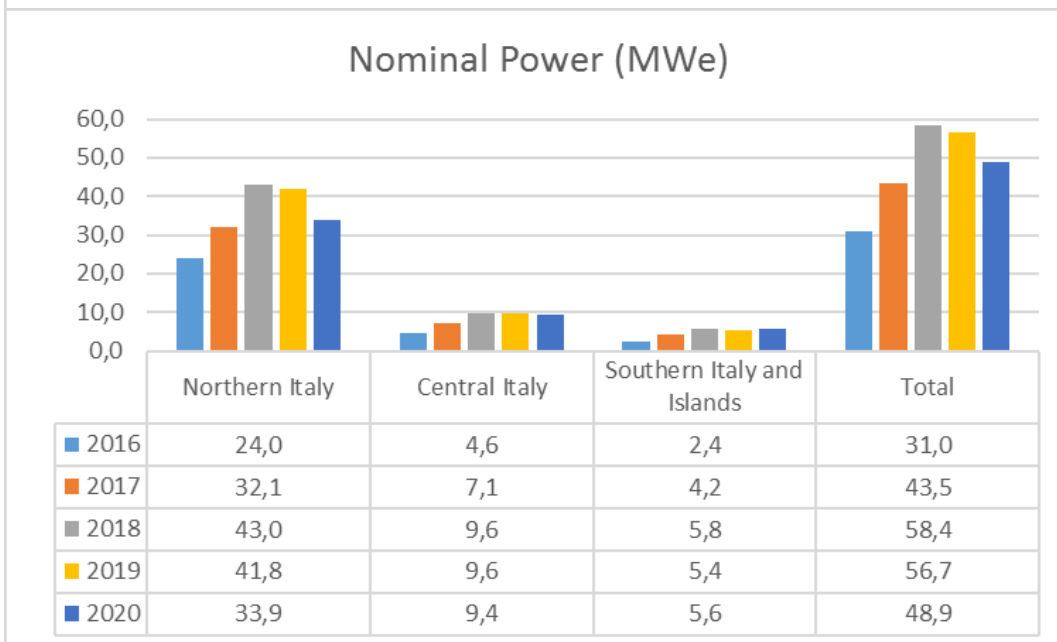
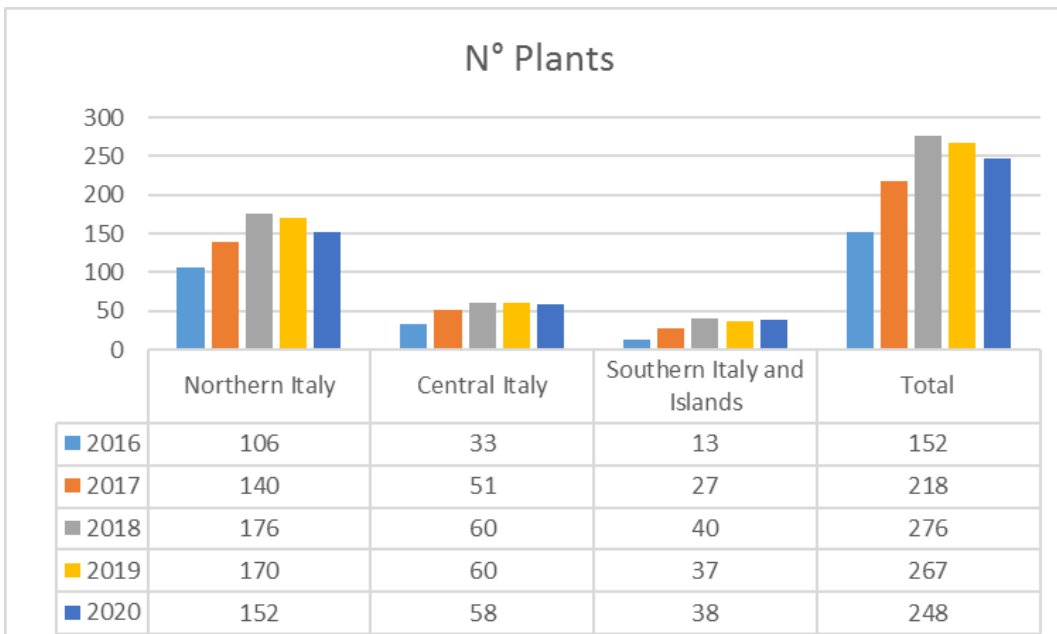
Trend in the biomass gasification plants: number of units and installed power

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

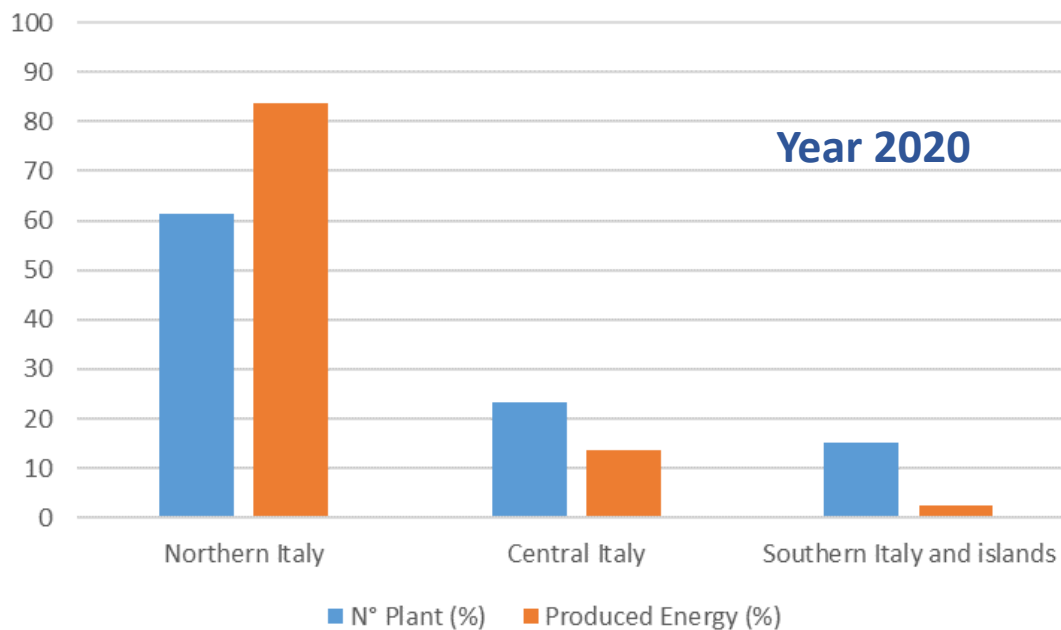
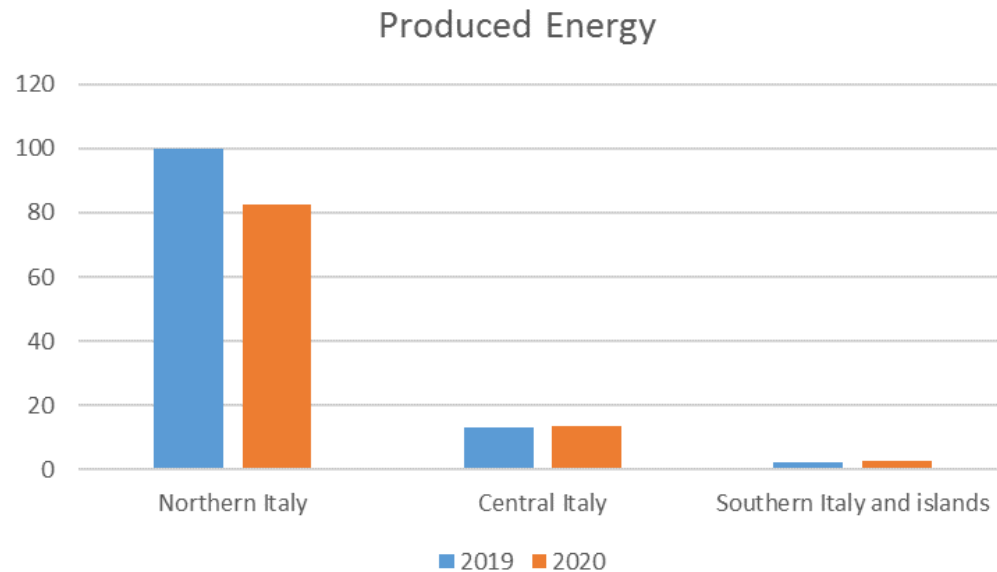
Data source: GSE (Gestore Servizi Energetici, Energy Service System Operator).

See also Atlaimpianti (https://atla.gse.it/atlaimpianti/project/Atlaimpianti_Internet.html)

Overview by geographical area



Share of produced energy by geographical area



Thank you

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ENEA

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

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www.ieabioenergy.com

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