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### **1. Energy system overview**

#### SUPPLY AND DEMAND (\*)

Energy production: 36.09 Mtoe - 68,4% RES
 TPES: 152.60 Mtoe - 18,2% RES



\*Source: GSE Statistical Report 2016

https://www.gse.it/documenti\_site/Documenti%20GSE/Rapporti%20statistici/Rapporto%20statistico%20GSE%20-%202016.pdf

# Italy has already achieved its target by 2020 with a RES penetration of 17,5% in total energy consumption in 2015 vs. a 17% target to be reached by 2020



<sup>1</sup>TPES: Total Primary Energy Supply

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# 2. Electricity generation and consumption

#### SUPPLY AND DEMAND (\*)

- Gross electricity national generation: 289.8 TWh (-4.6% since 2005)
- □ Share of RES (Gross RES production vs. Energy consumption)\*: 34,0%



"SOURCE: GSE Statistical Report 2010 https://www.gse.it/documenti\_site/Documenti%20GSE/Rapporti%20statistici/Rapporto%20statistico%20GSE%20-%202016.pdf

Italy has also achieved its 2020 target in terms of RES-E penetration with a 34,0% share of RES-E in 2016 vs. a 23,11% target to be reached by 2020



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\* Calculation according to Directive 2009/28/CE criteria

### 3. Biofuels for transport (1/2)

**Italy plans for 2% of advanced biofuel in 2022** - Italy was the first EU country to set its own advanced biofuels development framework through the decree of 10 October 2014. The decree stipulates that petrol and diesel should contain at least 1,2% of advanced biofuels in 2018 and 2019. In 2020 and 2021, this incorporation rate will rise to 1,6% and reach 2% in 2022.



Biofuels consumption (toe)								
2015	2016							
3.024	391							
1.141.849	1.008.631							
22.124	31.988							
1.166.997	1.041.010							
	<b>2015</b> 3.024 1.141.849 22.124 <b>1.166.997</b>							

99,8% certified as sustainable

**11% less biofuels** consumption in 2016



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### 3. Biofuels for transport (2/2)

<u>Use of advanced biofuels for transport</u> - The interministerial decree of 2 March 2018 promotes the use of biomethane and other advanced biofuels in the transport sector. The provision is in line with the provisions of the EU Directives on the promotion of energy from renewable sources.

The mandatory quota for advanced biofuels is divided into two rates:

#### • <u>75% advanced biomethane</u>

#### <u>25% other advanced biofuels other than biomethane</u>

Year	Biofuels obligation (%)	Biofuels obligation (Gcal)	Advanced biofuels	Advanced biomethane (75 %)	Other advanced biofuels (25 %)
2018	7,0 %	23.800.000	0,60 %	0,45 %	0,15 %
2019	8,0 %	27.200.000	0,70 %	0,60 %	0,20 %
2020	9,0 %	30.600.000	0,90 %	0,68 %	0,23 %
2021	9,0 %	30.600.000	1,50 %	1,13 %	0,38 %
2022	9,0 %	30.600.000	1,85 %	1,39 %	0,46 %



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### 4. Biofuels in Italy

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30.4% of sustainable biofuels released for consumption in Italy in **2016 is produced in Italy** - The first import country for biofuels is Spain (25.6%) followed by the Netherlands (9.5%) and from Austria (6.6%); the first non-European country is Indonesia (5.2%).

Sustainable bi	olueis released lor	consumption in Ital	iy in 2016 by countr	γ οι ρισαμείτου

Country	Biodiesel (t)	BIO-EIBE (t)	Bioethanol (t)	lotale (t)
Italy	339.811	17.688	18	357.517
Spain	296.246	4.556	-	300.802
The Netherlands	111.870	-	-	111.870
Austria	76.995	-	314	77.309
UE-Others	312.562	13.673	270	326.506
No-UE	1.498	1.195	-	2.692
Total	1.138.982	37.112	602	1.176.696



1.000 https://www.gse.it/documenti\_site/Documenti%20GSE/Rapporti%20statistici/Rapporto%20statistico%20GSE%20-%202016.pdf 800 Biodiesel installed capacity is around 2,5 million of tonnes for 14 plants. Main producers are Marseglia Group (Ital Green Oil and Ital Bi Oil) and ENI with a production capacity of 560.000 t 600 400

**Bioethanol** production is mainly based on wine and fruit-derivatives distillation. Main producers are Caviro Distillerie s.r.l. and I.M.A. s.r.l. The first plant in the world for the industrial production of 2nd-generation bioethanol was started up in Crescentino, province of Vercelli, at the end of 2012. At full capacity, the plant will produce **40.000 tons per year**. The plant was carried out by BioChemtex, affiliate of the M&G Group and is based entirely on the PROESA<sup>™</sup> technology, also developed by Biochemtex.

Source: GSE Statistical Report 2016





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and 360.000 t respectively.



### **5. Bioenergies plants**

#### NUMBER AND POWER OF PLANTS IN 2015/2016

	2015		20	2016		2015-16				
	n°	MW	n°	MW	n°	MW				
<ul><li>Solid biomass</li><li>Urban wastes</li><li>Other biomass</li></ul>	<b>369</b> 69 300	<b>1.612,2</b> 953,3 658,9	<b>407</b> 68 339	<b>1.670,7</b> 937,9 732,8	<b>10,3</b> -1,4 13,0	<b>3,6</b> -1,6 11,2				
<ul> <li>Biogas</li> <li>Wastes</li> <li>Muds</li> <li>Animal dejections</li> <li>Agricultural activities</li> </ul>	<b>1.924</b> 380 78 493 973	<b>1.406,0</b> 399,0 44,4 217,0 745,6	<b>1.995</b> 389 77 539 990	<b>1.423,5</b> 401,3 44,2 229,7 748,3	<b>3,7</b> 2,4 -1,3 9,3 1,7	<b>1,3</b> 0,6 -0,4 5,9 0,4				
<ul><li><i>Bioliquids</i></li><li>Vegetable oils</li><li>Other bioliquids</li></ul>	<b>525</b> 436 89	<b>1.038,4</b> 892,4 146,0	<b>510</b> 417 93	<b>1.029,8</b> 877,4 152,4	<b>-2,9</b> -4,4 4,5	<b>-0,8</b> -1,7 4,4				
Bioenergies	2.647	4.056,5	2.735	4.124,1	3,3	1,7				
		Source: GSE Data 2018								

The plants fueled by bioenergies are 2.735 in 2016, +3.3% compared to 2015. The most numerous are biogas plants.

Of the 4,124 MW total, 40.5% is fed with solid biomass, 34.5% with biogas and the remaining 25% with bioliquids.



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## 6. Biomass supply and potential (1/2)

**ENEA** created the National Atlas of Biomass with the aim of assessing the local demand and supply of biomass, trends, prices, competitions and synergies among sectors and uses (www.atlantebiomasse.enea.it).

	AGRICULTURAL BIOMASS* (tons)								FOREST BIOMASS** (m <sup>3</sup> )		
REGION	Straw	Pruning	Seeds	Grape Marc	Pomace	Vegetable Oil	Citrus Pulp	Tomato Puppy	Shells	Rice Husk	Total
Abruzzo	244.181	218.580	2.480	31.393	21.067	2.287	10	478	59	0	274.310
Basilicata	432.298	48.848	6.298	1.534	7.141	269	13.583	1.146	284	0	294.261
Calabria	140.189	530.681	5.199	4.755	74.042	73	111.840	1.124	831	0	771.012
Campania	288.232	215.363	32.336	59.057	14.801	60	3.766	2.389	20.204	0	378.203
Emilia Romagna	1.435.675	252.665	14.775	176.436	910	29.873	0	18.141	8	8.368	383.797
Friuli V. Giulia	569.584	95.291	339	18.957	270	56.084	0	1	2	496	262.143
Lazio	323.186	170.161	2.083	15.869	40.656	3.719	300	847	17.439	0	499.256
Liguria	271.496	27.203	142	1.088	6.530	0	43	0	47	2.878	256.688
Lombardia	2.584.741	48.937	540	22.251	1.282	38.205	0	4.849	23	131.955	770.509
Marche	596.260	52.460	956	10.175	4.006	25.035	0	9	25	0	164.729
Molise	153.024	45.223	421	16.786	22.314	2.336	0	324	255	0	98.536
Piemonte	2.580.856	113.330	4.710	39.246	36	18.674	0	575	14.536	165.846	670.322
Puglia	1.537.854	599.984	6.788	137.927	159.599	1.405	29.634	17.168	13.781	597	124.321
Sardegna	209.801	97.497	2.772	6.948	445	22	10.899	257	2.927	426	482.622
Sicilia	710.541	488.133	10.113	103.267	55.269	0	137.095	610	37.896	5.008	258.508
Toscana	766.084	213.732	1.168	27.751	29.824	19.222	34	1.239	85	413	1.060.850
Trentino A. Adige	237.533	66.210	12	16.595	475	0	0	1	0	0	1.158.342
Umbria	284.779	58.646	127	6.874	7.684	11.615	0	131	57	0	270.515
Valle D'Aosta	6.676	2.174	0	253	0	0	0	0	0	0	109.319
Veneto	1.881.798	355.642	3.220	91.936	3.745	99.881	0	1.119	20	1.141	350.584
ITALY	15.254.789	3.700.760	94.479	789.096	450.097	308.761	307.205	50.408	108.479	317.127	8.638.827





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# 6. Biomass supply and potential (2/2)

The previous estimates of the agricultural and forest residues show that they are produced and available in large quantities. There are therefore good opportunities for their use in biorefinery applications but also some limitations related to the <u>security</u>, <u>continuity and sustainability of the biomass supply</u>.

In order to provide a reliable information on the currently available biomass for the biorefinery applications market, some additional considerations should be done:

- Sustainable removal rate of residual biomasses, on average, is around 40-50%(\*);
- The amount of biomasses destined to non energy sectors (i.e. mushroom, cattle, sheep, horses, pigs) is around 10% (\*);
- Part of these biomasses is actually used for domestic energy production (firewood) in the residential sector and official national data only partially quantify the real consumption levels.

However, also keeping into account all the various agricultural, environmental constraints and competitive uses, it can be approximatively estimated that 50% of the overall potential could be available for bioenergy and bioproducts production. Logistic concerns are of particular importance.

\*Source: i) JRC, Optimal energy use of agricultural crop residues preserving soil organic carbon stocks in Europe, 2014 and *ii*) JRC, Assessment of the availability of agricultural crop residues in the European Union: Potential and limitations for bioenergy use, 2010



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### 7. Biomass for non-energetic purposes

**Italy is characterized by low levels of domestic biomass production** - The national statistics show a decreasing *trend*: **from 144** (1999-2000) to 112 million tons in 2015.

Year/s	1999-2000	2001-2010	2010-2015	2015	%var 2013-15
Biomass of which:	144.764	126.782	112.038	111.611	3,5%
Cultivation of which:	73.370	66.547	57.823	58.276	3,8%
Cereals	20.843	20.789	18.711	17.792	-2,2%
Roots, tubers	2.412	2.009	1.637	1.575	3,1%
Sugar production	12.877	7.102	2.624	2.184	1,2%
Legumes	165	146	135	147	17,6%
Shell fruit	211	221	188	167	-11,2%
Oil production	4.451	4.313	3.952	4.944	27,1%
Vegetables	13.528	13.610	13.287	13.608	7,6%
Fruit not in shell	18.736	18.247	17.233	17.808	2,6%
Other crops	146	109	56	51	2,0%
Residues used by crops	18.589	16.651	15.874	15.710	2,4%
Forage and pasture	45.130	36.623	32.887	32.612	5,1%
Wood of which:	7.209	6.577	5.182	4.762	-6,8%
Firewood	2.705	2.245	1.635	1.629	0,2%
Work wood	4.504	4.333	3.547	3.133	-10,1%
Other biomass of which:	466	384	271	251	-1,2%
Fishes and other aquatic animals	335	265	189	188	8,7%
Wild animals and other biomass	131	119	82	63	-22,2%

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Source: Intesa San Paolo Bioeconomy Report 2017



# 8. Bioeconomy in Italy

In Italy, Bioeconomy accounted for <u>a total turnover of EUR 251 billion</u> <u>in 2015, and around 1.6 million employees</u>.

	Production value (millions of euros)	Employees (thousand persons employed)	Share
Agriculture, forestry and fisheries	57.733	910,4	23,0%
Food industries, beverages and tobacco	129.460	450,3	51,5%
Textiles from natural fibers and leather	17.628	84,7	7,0%
Wood and products of wood	14.154	117,7	5,6%
Paper and paper products	22.025	73,7	8,8%
Biobased chemicals and chemical products	2.900	6,4	1,2%
Biobased pharmaceutical products	5.083	12,1	2,0%
Biodiesel	321	NA	0,1%
Bioenergy	1.971	1,8	0,8%
Total Bioeconomy	251.275	1.657	100,0%

Source: Intesa San Paolo Bioeconomy Report 2017



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# 9. Economic and employment impacts of **Bioenergy**

#### Economic and employment impacts of Bioenergy in Italy in 2016:

- The contribution to value added and employment in the Italian economy from bioenergy sector is calculated within the framework of a standard demand driven Input Output model. The analysis is carried out by Gestore dei Servizi Energetici S.p.A. (GSE).
- Jobs are expressed in Full Time Equivalent (FTE).
- Temporary jobs are linked to the construction, installation and manufacturing (CIM) phase; permanent jobs are linked to operation and maintenance (O&M) phase.
- Direct jobs are the FTEs directly involved in the bioenergy sector; indirect jobs are the FTEs belonging to bioenergy sector's suppliers.

Technology	Investments (mln €)	O&M (min €)	Value Added (min €)	Tempoary Jobs directs+indirects (FTE)	Permanent Jobs directs+indirects (FTE)
Biogas	105	498	449	1.076	6.443
Solid biomass	358	629	396	3.576	3.520
Bioliquids	-	594	121	-	1.987
Total	463	1.721	966	4.652	11.950

Source: GSE Data 2018



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# **10. Biorefinery targets, policies and legislation**

**Italy has its Bioeconomy Strategy** - Italian Bioeconomy Strategy was launched on 2017, April 20<sup>th</sup>. It aims at bridging the main Bioeconomy sectors, producing new knowledge, technologies, services, capacity building and creating longer, more sustainable and locally routed value chains. It also allows Italy to increase its competitiveness, role in promoting sustainable growth and job creation in Europe and in the Mediterranean basin and also to contribute to EU's environmental and industrial policies.



Source: Bioeconomy in Italy





## **11. Regional initiatives**

The Department for Development Policies and Economic Cohesion (DPS) of the Italian Ministry of Economic Development (MISE) launched, in agreement with the Italian Ministry of Education, University and Research (MIUR), the project "<u>Support to the definition and implementation</u> of regional policies for research and innovation (Smart Specialization Strategy)", managed by Invitalia (National Agency for Inward Investment and Enterprise Development).



A recent collaborative work for drawing up a **Position Paper on Bioeconomy** was developed by the *Conference of the Italian Regions*, monitoring the strategic position of the regions with respect to three pillars of the Bioeconomy:

- 1. Marine bioeconomy 2. Agrifood
- 3. Bio-based industry.

The study paves the way to interregional cooperation in the bioeconomy, especially between neighboring territories, also favoring the necessary dialogue with national programs and strategies.



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## **12. Biorefinery related funding programs**

**Industry 4.0** provides opportunities for enterprises of the Bioeconomy domain for enhancing research, innovation and competitiveness.

**Key points: i)** a public investment of about 20 billion euros, **ii)** a super and hyper amortization of 140% and 250%, **iii)** a 50% tax credit on R&D investments incentives on investments in start-ups and **iv)** innovative small businesses

**National Technological Clusters** as defined by the Ministry for Education, University and Research in the National Research Plan (NRP) 2015-2020 play a significant role. Clusters directly linked to Bioeconomy **(Agrifood, Green Chemistry, Smart Factory, Blue Growth and Energy)** are priority areas of intervention in the framework of the NRP.

**Key points:** create permanent dialogue platforms between public research network and enterprises



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## **13. Running commercial bio-based industries**

**Italy accounts for a number of commercial bio-based industries currently in operation** - A narrow list of these realities is shown in the following table.

Name	Locatio	n, Country	ntry Owner Products portfolio		rtfolio Weblink
Polycart	Assisi (F	PG), Umbria	Polycart	Bio-bags, ad product	hesive s www.polycart.eu
Agrium Italia	Livorno (LI), Tosacana		Agrium Italia S	S.p.A. Biofertiliz	ers http://www.triu. /tag/agrium- italia/
Agroils	Firenze (	FI), Toscana	Agroils Technol S.p.A.	ogies Biofuels a biochemie	and www.agroils.com
Parodi	Camparone (GE), Liguria		A&A Fratelli Pa S.p.A.	vegetable arodi esters, nat cosmetics nutraceut	oils, tural www.fratelliparo and di.it icas
MICA	Ragusa	(RG), Sicilia	MICA s.r.l	HempBioPl (HBP®	astic www.kanesis.eu )
<b>:: y</b> P0	OLYCART	Agrium Italia	Agroils	م ۸.۵. <i>Fratelli Larodi ب</i> ر www.fratelliparodi.it	KANÈSIS
IEA Bioen Task42 Biorefinin Future BioEcond	ergy	www.ta	ask42.ieabioen	<u>ergy.com</u>	EREERS Instant Agency for New Technologies, Energy and Soutianable Economic Development

### **14. Industrial biorefinery plants** (1/2)



#### **5 INDUSTRIAL PLANTS**

Italy has important projects for the reconversion of industrial sites into biorefineries. Some of these projects have been recognized as flagship initiatives in Europe by the BBI JU.

Products

Origo-Bi®

Capacity 100 ktons/year

• •







www.task42.ieabioenergy.com

#### Products . •

Biolubricants and bioplastics from local crops

Mater-Biopolymer (Patrica, FR) INDUSTRIAL

- Capacity
- 120 ktons/year - compounding

Novamont (Terni, TN) INDUSTRIAL

• 60 ktons/year - polyesters

#### BioChemtex (Crescentino, VC) DEMO

- Products .
- Bioethanol
- Capacity .
- 40 ktons/year .

In October 2017, the Company has applied for unemployment benefits for all its 227 employees. Currently, it is owned and operated by ENI-VERSALIS.

#### ENI (Gela, CL) INDUSTRIAL

- Products .
- Biofuels from vegetable oils •
- . Capacity •
  - 720 ktons/year max capacity
- 600 ktons/year HVO production

The start of production is scheduled for 1st September 2019.



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### **14. Industrial biorefinery plants** (2/2)



#### **5 FLAGSHIP PROJECTS**

Italy has important projects for the reconversion of industrial sites into biorefineries. Some of these projects have been recognized as flagship initiatives in Europe by the BBI JU.



#### Mater-Biotech (Bottrighe, RO) FLAGSHIP

Products •

- 1.4 BDO •
- Capacity
- 30 ktons/year



#### Reverdia (Cassano Spinola, AL) FLAGSHIP . Products

- Succinic acid
- Capacity
- 10 ktons/year

#### Matrica (Porto Torres, SS) FLAGSHIP Products •

- Biolubricants •
- Bioadditives
- Azelaic acid .
- Pelargonic acid
- Capacity •
- 350 ktons/year

#### ENI (Porto Marghera, VE) FLAGSHIP

- Products .
- HVO (in the fractions of green-diesel, green-• naphtha and green-gpl)
- Capacity •
- 560 ktons/year at 2021 (currently about 360 • ktons/year) with a production of about 470 ktons/year of total HVO (currently about 300 ktons/year).

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# latest news

# Novamont starts second unit for bio-polyesters

Completed the reconversion of the plant in 2016 by the Mossi&Ghisolfi group, **Novamont** will officially inaugurate on **October 19** in **Patrica** (FR) the **Mater-Biopolymer** plant for the production of **Origo-Bi**<sup>®</sup> the line of biodegradable polyesters from vegetable oils and sugars – with a production capacity of 100,000 tons per year.

A further, concrete initiative in the wake of the Novamont strategy for **a bioeconomy at the service of the territories**, the engine of development and employment growth, to solve even the biggest environmental problems. The inauguration follows, in fact, a few days the announcement of the availability of the line of biodegradable ingredients able to eliminate the problem of micro-plastic pollution in the waters.

The Patrica plant will also produce a chemical product with high added value, tetrahydrofuran (THF), strategic for the chemical and pharmaceutical industry, for the first time in the world recovered from wastewater and also from renewable sources. THF is used as a chemical solvent and in pharmaceuticals for the synthesis of antibiotics (rifamycin), progesterone and other hormonal drugs.







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#### 15. R&D, pilot and demo biorefinery plants



**2 demo+13 pilot plants, 14 R&D centres** Italy has important R&D centres scattered throughout the country and numerous installations on a demo and pilot scale.





Pretreatment unit

Gasification plant

#### ENEA Trisaia Research Centre (Rotondella, MT)

- R&D for biorefinery and green chemistry
- Pilot Plants for the production of second generation sugars from lignocellulosic biomass, for fermentation. Availability of a technological platform including many types of gasyfiers



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### **16. Italian start-up projects**

**Italy accounts for 6 new Italian start-ups of the industrial biotech** and bioeconomy sector - A narrow list of these realities is shown in the following table.

Name	Main activity
MOGU	develops innovative green building products made from a new material coming from agro-waste and fungi
BIOERG	focuses on the microbial production method to obtain dextran powder
ALGA-CIRCLE	supports the development of the Trebouxia microalgae on a special wool fabric and extracts its high-value components
NAM	develops silicon based airgel highly resistant to extreme temperatures obtained from rice husks
BIOFP	develops an innovative bioprocess for the conversion of value-free substrates into biofuels and biopolymers
BABP	aims to exploit biogas to produce biodegradable fuels and plastics
EGGPLANT	transforms waste-water into high-performance bioplastic solutions
ORANGEFIBER	wastes from citrus processing to textiles



#### MOGU (Inarzo VA) Products

Innovative products and solutions . for the fields of bio-architecture and design



#### Orange fiber (Caltagirone, CT) Products

- Cellulose extraction for textiles Capacity
- In Italy, every year, more than 700 ktons of industrial waste from citrus processing are produced, a resource that can be exploited.



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### **17. Cutting-edge companies in Italy**

#### **Bioplastics for toys**

Bio-on and ITALERI confirmed their alliance for the toys of the future with new Minerv Supertoys, a eco-sustainable, child- and environmentally friendly, natural and 100% biodegradable biopolymer based line of toys. The product now goes to the market and the toys supply chain following completion of the test phase.

#### **Bioplastics for beauty**

Bio-on launched a brand-new line of cosmetic ingredients for sun protection made from biodegradable bioplastic. The Minerv Bio cosmetics brand gains a new line of ecofriendly SPF (Sun Protection Factor) Booster products called minervPHB RIVIERA which are made with micro powders made with Bio-on's bioplastic, obtained from renewable plant sources and 100% biodegradable.







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# **18.** Major Italian R&D projects on biomass, bioenergies and biorefineries (1/2)

Italy boasts <u>a number of research projects on biorefineries</u> of national and international importance.

Acronym	Project name	Funding source	Coordinator	Duration	Weblink
ISAAC	Increasing Social Awareness and ACceptance of biogas and biomethane	H2020	AzzeroCO <sub>2</sub> (ITALY)	2016-2018	www.isaac-project.it
EMBRACED	Establishing a multi-purpose biorefinery for the recycling of the organic content of Absorbent Hygiene Products Waste in circular economy	H2020	Fater S.p.A. (ITALY)	2017-2022	www.embraced.eu
FIRST2RUN	Flagship demonstration of an integrated biorefinery for dry crops sustainable exploitation towards biobased materials production	H2020	Novamont S.p.A. (ITALY)	2015-2019	www.first2run.eu
BIOSKOH	BIOSKOH's Innovation Stepping Stones for a novel European Second Generation BioEconomy	H2020	BioChemtex S.p.A. (ITALY)	2016-2012	www.bioskoh.eu
GRACE	GRowing Advanced industrial Crops on marginal lands for biorEfineries	H2020	(GERMANY) Italian partecipation	2017-2022	www.bbi- europe.eu/projects/ grace
ZELCOR	Zero Waste Ligno-Cellulosic Biorefineries by Integrated Lignin Valorisation	H2020	(FRANCE) Italian partecipation	2016-2020	www.zelcor.eu
PEFrence	From bio-based feedstocks via di-acids to multiple advanced bio-based materials with a preference for polyethylene furanoate	H2020	(NETEHRLAND) Italian partecipation	2017-2022	www.bbi- europe.eu/projects/ peference
BRISK II	Biofuels Research Infrastructure for Sharing Knowledge II	H2020	(SWEDEN) Italian partecipation	2017-2022	www.brisk2.eu



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## **18.** Major Italian R&D projects on biomass, bioenergies and biorefineries (2/2)

Italy boasts a number of research projects on biorefineries of national and international importance.

Acronym	Project name	Funding source	Coordinator	Duration	Weblink
LIDIA	Second Generation Technologies for The Production of Dicarboxyilic Green Acids as Renewable Building Blocks for Chemical and Polymers Synthesis	Ministry of Education, University and Research	Politecnico di Milano	2014-2017	www.researchitaly.it /cluster-tecnologici- nazionali/chimica- verde/lidia/
ALBE	Alternative Lignocellulosic Biomasses for Elastomer	Ministry of Education, University and Research	ENI-Versalis	2014-2017	www.researchitaly.it /cluster-tecnologici- nazionali/chimica- verde/albe/
BIT3G	Third generation biorefineries	Ministry of Education, University and Research	Novamont S.p.A.	2014-2017	www.researchitaly.it /cluster-tecnologici- nazionali/chimica- verde/bit3g/
REBIOCHEM	Biochemical from biomass	Ministry of Education, University and Research	Novamont S.p.A.	2014-2017	www.researchitaly.it /cluster-tecnologici- nazionali/chimica- verde/rebiochem/



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### 19. Major Stakeholders (1/2)

Governmental Organizations (GOs)	Non-Governmental Organizations (NGOs)		
Presidency of the Council of Ministers	ΙΤΑΒΙΑ		
Ministry of Economic Development	Consorzio Italbiotec		
Ministry of Education, University and Research	Chimica Verde Bionet		
Ministry of Agricultural, Food and Forestry Policies	RE-CORD		
Ministry of the Environment and Protection of Land and Sea	Consorzio Italiano Biogas e Gassificazione		
Committee of the Italian Region	ITP plants for the future		
Agency for Territorial Cohesion	Assobioplastiche		
Italian Technology Clusters:Green chemistry, Agrifood, Bluegrowth	Federchimica		
Research Institutions (RI)	Universities (U)		
ENER (The line Nethered Anna and fan New to shard size. En surry and			
Sustainable Economic Development)	University of Aquila (UNIVAQ)		
ENEA (Italian National Agency for New technologies, Energy and Sustainable Economic Development) CNR (National Research Council)	University of Aquila (UNIVAQ) University of Bari (UNIBA)		
CNR (National Research Council) CREA (Council for Agricultural Research and Analysis of Agrarian Economics)	University of Aquila (UNIVAQ) University of Bari (UNIBA) University of Bologna (UNIBO)		
CREA (Council for Agricultural Research Council) CREA (Council for Agricultural Research and Analysis of Agrarian Economics) Centro Ricerche Produzioni Animali	University of Aquila (UNIVAQ) University of Bari (UNIBA) University of Bologna (UNIBO) University of Messina (UNIME)		
ENEA (Italian National Agency for New technologies, Energy and Sustainable Economic Development)         CNR (National Research Council)         CREA (Council for Agricultural Research and Analysis of Agrarian Economics)         Centro Ricerche Produzioni Animali         CRIBE (Centro di Ricerca Interuniversitario sulle Biomasse da Energia)	University of Aquila (UNIVAQ) University of Bari (UNIBA) University of Bologna (UNIBO) University of Messina (UNIME) University of Milano Bicocca (UNIMIB)		
ENEA (Italian National Agency for New technologies, Energy and Sustainable Economic Development)         CNR (National Research Council)         CREA (Council for Agricultural Research and Analysis of Agrarian Economics)         Centro Ricerche Produzioni Animali         CRIBE (Centro di Ricerca Interuniversitario sulle Biomasse da Energia)         ECNP (Centro Europeo per i Polimeri Nanostrutturati)	University of Aquila (UNIVAQ) University of Bari (UNIBA) University of Bologna (UNIBO) University of Messina (UNIME) University of Milano Bicocca (UNIMIB) University of Padova (UNIPD)		
ENEA (Italian National Agency for New technologies, Energy and Sustainable Economic Development) CNR (National Research Council) CREA (Council for Agricultural Research and Analysis of Agrarian Economics) Centro Ricerche Produzioni Animali CRIBE (Centro di Ricerca Interuniversitario sulle Biomasse da Energia) ECNP (Centro Europeo per i Polimeri Nanostrutturati)	University of Aquila (UNIVAQ) University of Bari (UNIBA) University of Bologna (UNIBO) University of Messina (UNIME) University of Milano Bicocca (UNIMIB) University of Padova (UNIPD) University of Torino (UNITO)		



### 19. Major Stakeholders (2/2)

Industries (I)	Other (0)
Fater S.p.A.	Lombardy Green Chemistry Association (LGCA)
ASTER Cons.p.A.	Agroinnova
Biosphere s.r.l.	Environment Park S.p.A.
Biotec Sys s.r.l.	Parco Scientifico e Tecnologico della Sicilia s.c.p.a
Faci S.p.A.	Umbria SPRING – Cluster Umbro Chimica Verde
Spiga Nord S.p.A.	
Ticass s.c.r.l.	
BASF Italia S.p.A.	
GFBiochemicals Italy s.r.l.	
Versalis S.p.A.	
Biochemtex S.p.A.	
Matrica S.p.A.	
Beaulieu Fibres International Terni s.r.l.	
Mater-Biotech S.p.A.	



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#### **Contact Details**

Isabella De Bari

Division of Bioenergy and Green Chemistry ENEA Trisaia Research Centre SS 106 Jonica, Rotondella (MT)

☎ +39 0835 974 618
 ☑ isabella.debari@enea.it

IEA Bioenergy Website www.ieabioenergy.com

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