

**WASTE-TO-ENERGY:
THE ITALIAN SCHEME
FOR ADVANCED
BIOMETHANE
PRODUCTION**

**ABREN
WORKSHOP**

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GSE
PROMOTES SUSTAINABLE DEVELOPMENT IN ITALY
SUPPORTS RENEWABLE SOURCES AND ENERGY EFFICIENCY

BRASILIA
17.10.2019

CONTENT

- Gestore dei Servizi Energetici**
- Waste production**
- European and Italian targets**
- Biomethane for transport sector**
- Biofuel quota obligation and biomethane incentive scheme**
- Biomethane for local transport**

CONTENT

➤ **Gestore dei Servizi Energetici**

- ❑ **Waste production**

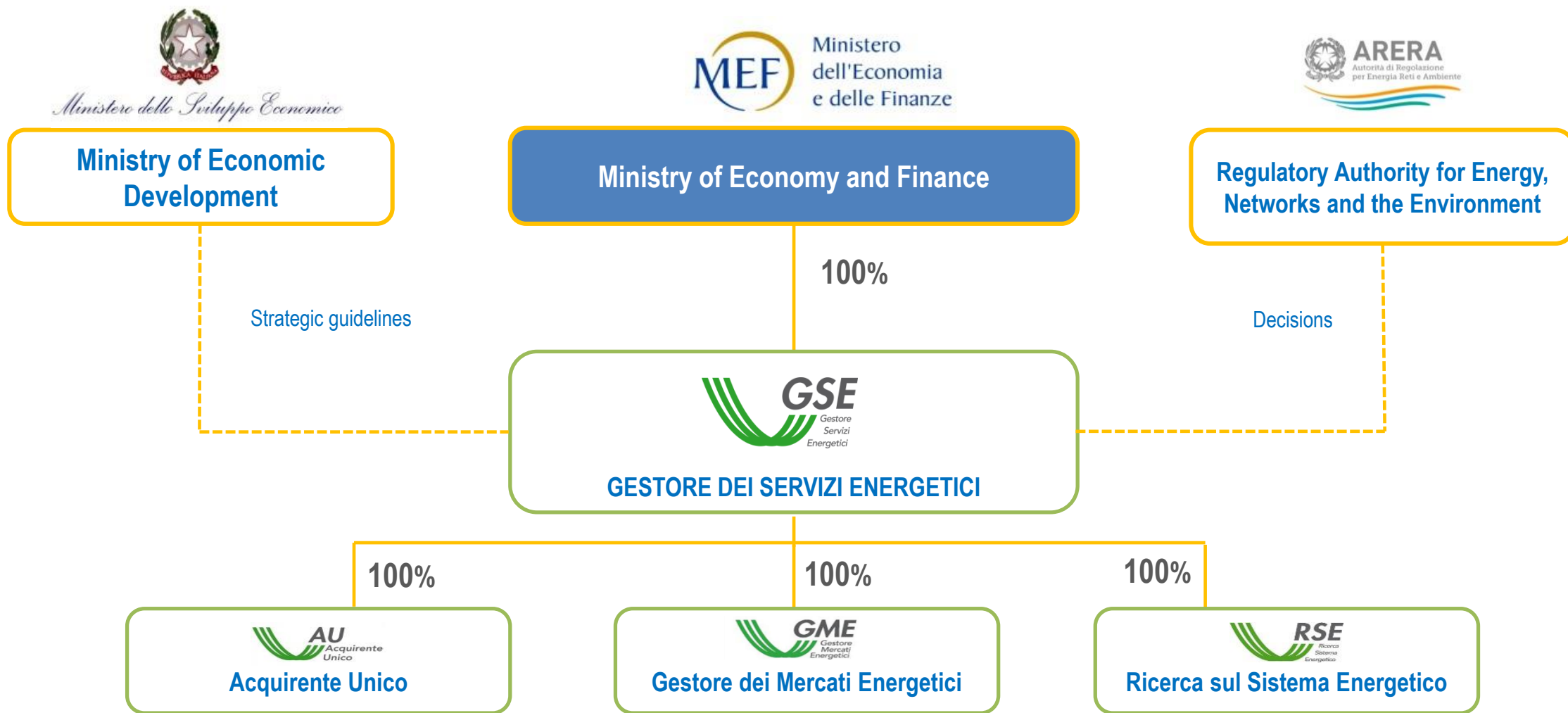
- ❑ **European and Italian targets**

- ❑ **Biomethane for transport sector**

- ❑ **Biofuel quota obligation and biomethane incentive scheme**

- ❑ **Biomethane for local transport**

Gestore dei Servizi Energetici



Gestore dei Servizi Energetici



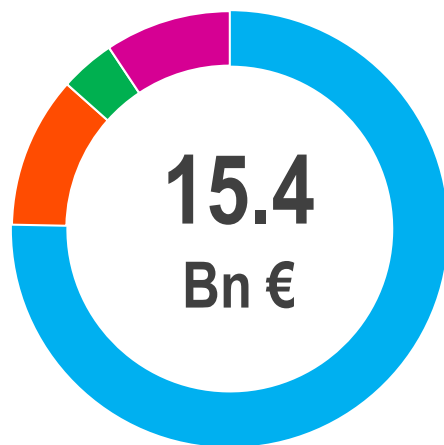
Acquirente Unico - AU S.p.A. is responsible for **buying electricity on the market** at the most favourable terms and to resell it to distributors or retailers of the standard offer market **for supplying small consumers of the protected market**. AU also manages the **Consumers' Help Desk** (supporting end customers and providing a mediation service for disputes with operators) and operates the **Integrated Information System** to manage information flows on electricity and gas customers, as well as the **Italian Central Storage Entity** (OCSIT) for managing security oil stocks.



Gestore dei Mercati Energetici – GME S.p.A. is responsible for the **economic management of the wholesale power market (IPEX)**, as well as the **gas and environmental markets**, under principles of neutrality, transparency, objectivity and competition. GME also operates a platform for registering OTC transactions (fixed-term energy trade agreements).



Ricerca sul Sistema Energetico - RSE S.p.A., specialized in analysis, study and research **in the energy sector**, with a particular focus on **national strategic projects of general public interest**, financed by the Italian System Research Fund, and projects financed both by EU and national institutions. RSE supports GSE in the **evaluation and certification of energy saving projects**.

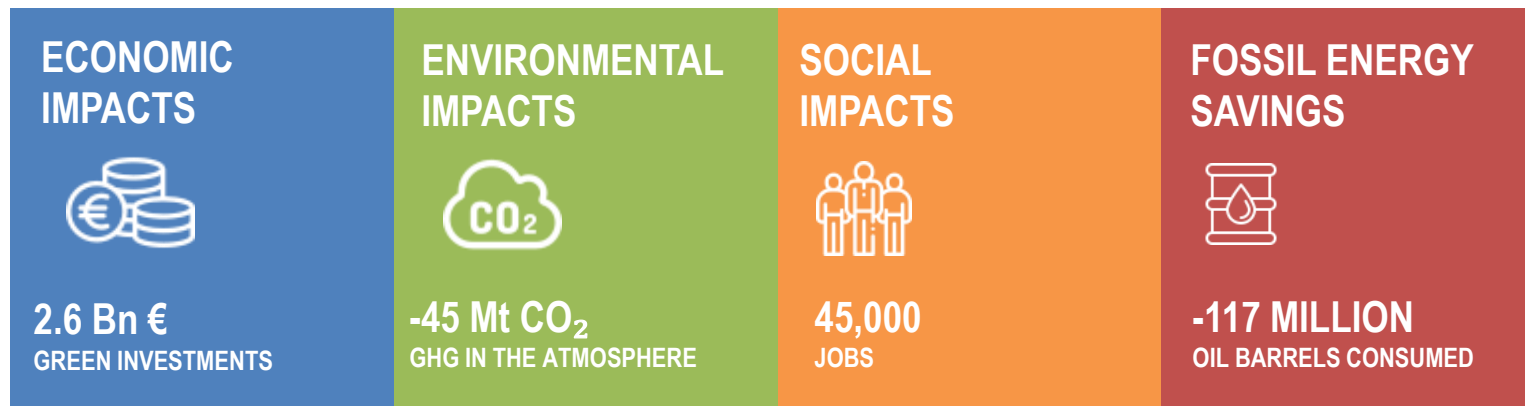


GSE FOR THE SUSTAINABILITY PROMOTION

In 2018 GSE activities allowed the allocation of 15.4 Bn € for the sustainability promotion

11.6 Bn €	Financial support for RES electricity
1.7 Bn €	Energy efficiency and RES H&C
0.6 Bn €	RES in the transport sector
1.4 Bn €	EU-ETS

VALUE GENERATED FOR ITALY



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- ❑ European and Italian targets

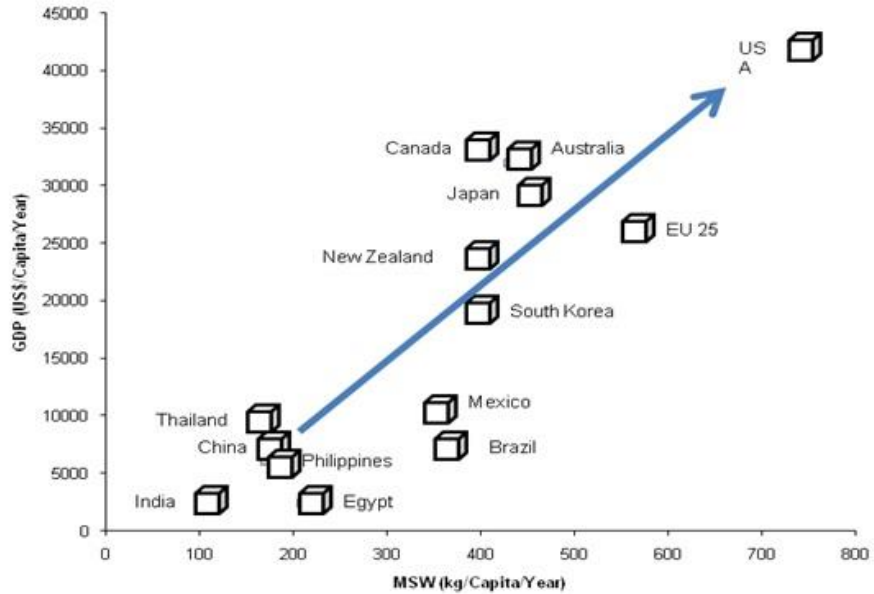
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WASTE PRODUCTION

Waste Production per capita vs GDP



Source: Imad A. Khatib, Municipal Solid Waste Management in Developing Countries: Future Challenges and Possible Opportunities, "Integrated Waste Management - Volume II", book edited by Sunil Kumar, August 2011, ISBN 978-953-307-447-4.

World waste production and 2025 estimate



Source: Sherien Elagroudy, Mostafa A. Warith & Mohamed El Zayat, Municipal Solid Waste Management and Green Economy, Global Young Academy, September 2016, ISBN: 978-3-939818-65-6.



WASTE PRODUCTION

WASTE-CYCLE MANAGEMENT

E.g. RETURNABLE BOTTLES



RAW MATERIAL RECOVERY



EXAMPLES

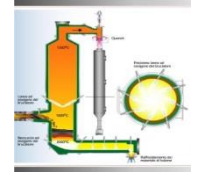
WASTE-TO-ENERGY PLANTS



ANAEROBIC DIGESTION



PYROLYSIS AND GASIFICATION



AEROBIC DIGESTION



LANDFILL DIVERSION



REDUCTION OF WASTE PRODUCTION



WASTE

RE-USE

RECYCLING

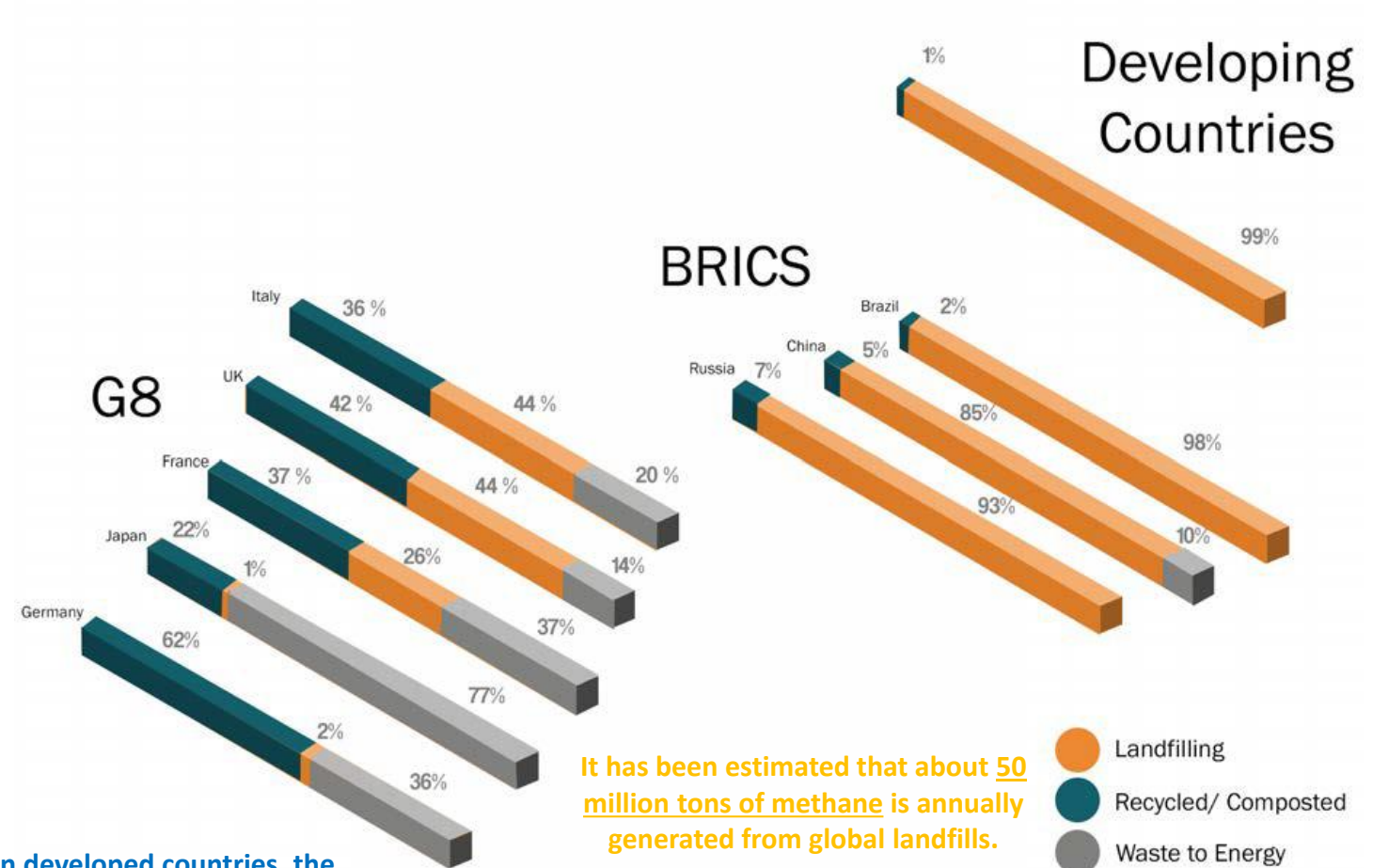
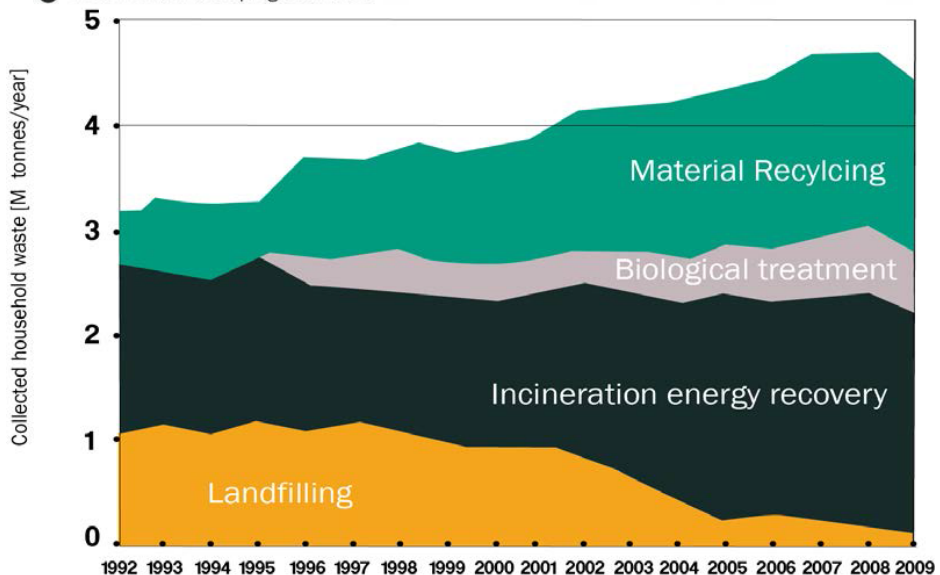
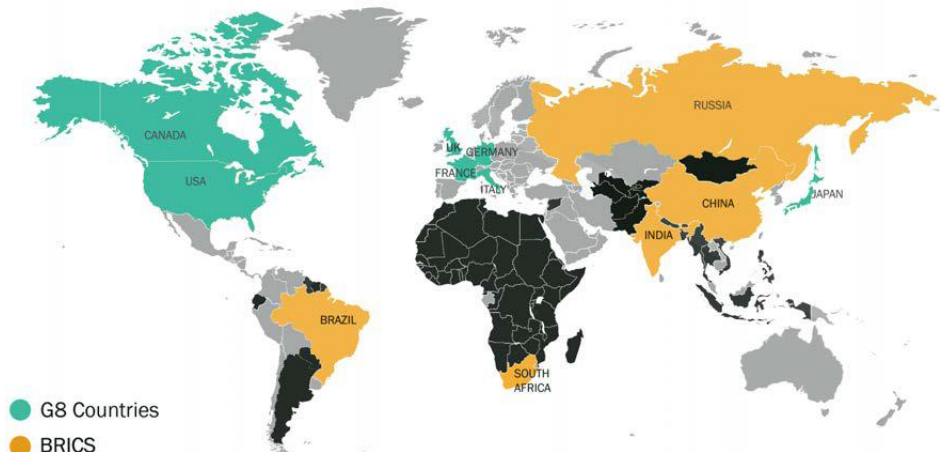
INDIRECT RECOVERY

DISPOSAL

PRIORITY

WASTE PRODUCTION

WASTE CYCLE MANAGEMENT IN THE WORLD



In developed countries, the option of landfill is decreasing, in comparison to other options

It has been estimated that about **50 million tons of methane** is annually generated from global landfills.

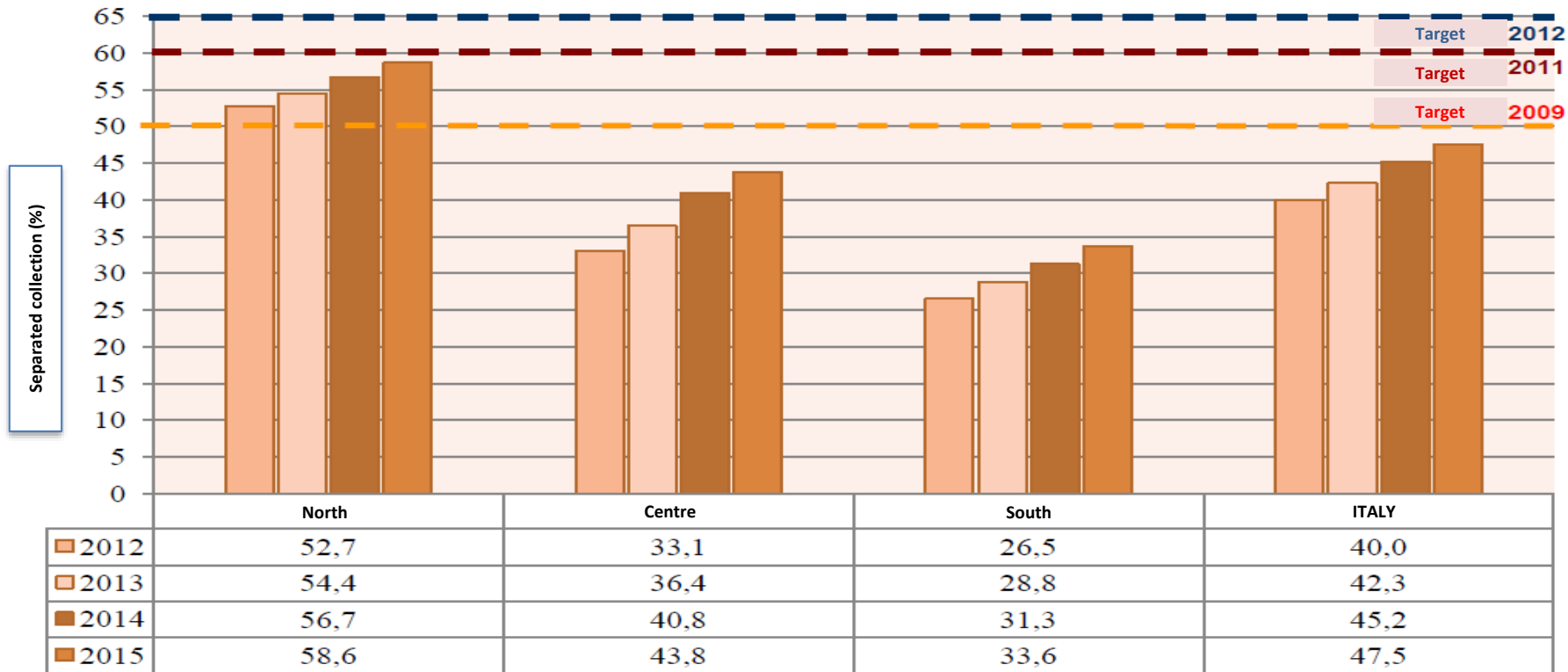
- Landfilling
- Recycled/ Composted
- Waste to Energy

Source: Sherien Elagroudy, Mostafa A. Warith & Mohamed El Zayat, Municipal Solid Waste Management and Green Economy, Global Young Academy, September 2016, ISBN: 978-3-939818-65-6.

WASTE PRODUCTION

WASTE PRODUCTION IN ITALY

- ❖ In 2015, **national production of municipal waste** was about **29,5 Mtons**, equivalent to **1,33 kg/person/day**.
- ❖ In 2015, **separated waste collection** reached **47,5%**, with an increase of **2,3%** in comparison to the previous year. The **organic fraction** represents over 43% of **the separated waste collection** (then paper and cardboard 22,5%, glass 12,5%, plastic 8,4%)



E. g. biomethane for transport from Bio-waste from Private Household subject to separate collection is incentivised in Italy

Source: Report on Urban Waste - 2016 edition, ISPRA.

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EUROPEAN AND ITALIAN TARGETS

NATIONAL ENERGY AND CLIMATE PLAN: MAIN TARGETS *

	2020 targets			2030 targets	
	EU	ITALY		EU	ITALY (NECP targets)
Renewables					
RES share in total gross final consumption	20%	17%		32%	30%
RES share in transport gross final consumption	10%	10%		14% → 21,6%	
RES share in gross final consumption for heating and cooling				+ 1,3% year	+ 1,3% year
Energy efficiency					
Reduction compared to scenario PRIMES 2007	- 20%	- 24%		- 32,5%	- 43%
Reduction of final consumptions through active policies	- 1,5% year (no transp.)	- 1,5% year (no transp.)		- 0,8% year (with transport)	- 0,8% year (with transport)
GHG emissions					
Reduction GHG vs 2005 for ETS plants	- 21%			- 43%	
Reduction GHG vs 2005 for non ETS sectors	- 10%	- 13%		- 30%	- 33%
Total reduction of GHG compared to 1990	- 20%			- 40%	

To reach the target of **30% of RES in total gross final consumption**, the **transport sector is expected to surpass the 14% target, reaching 21.6%**

*According to the EU Parliament and Council Regulation 2016/0375 on European Governance of Energy Union.

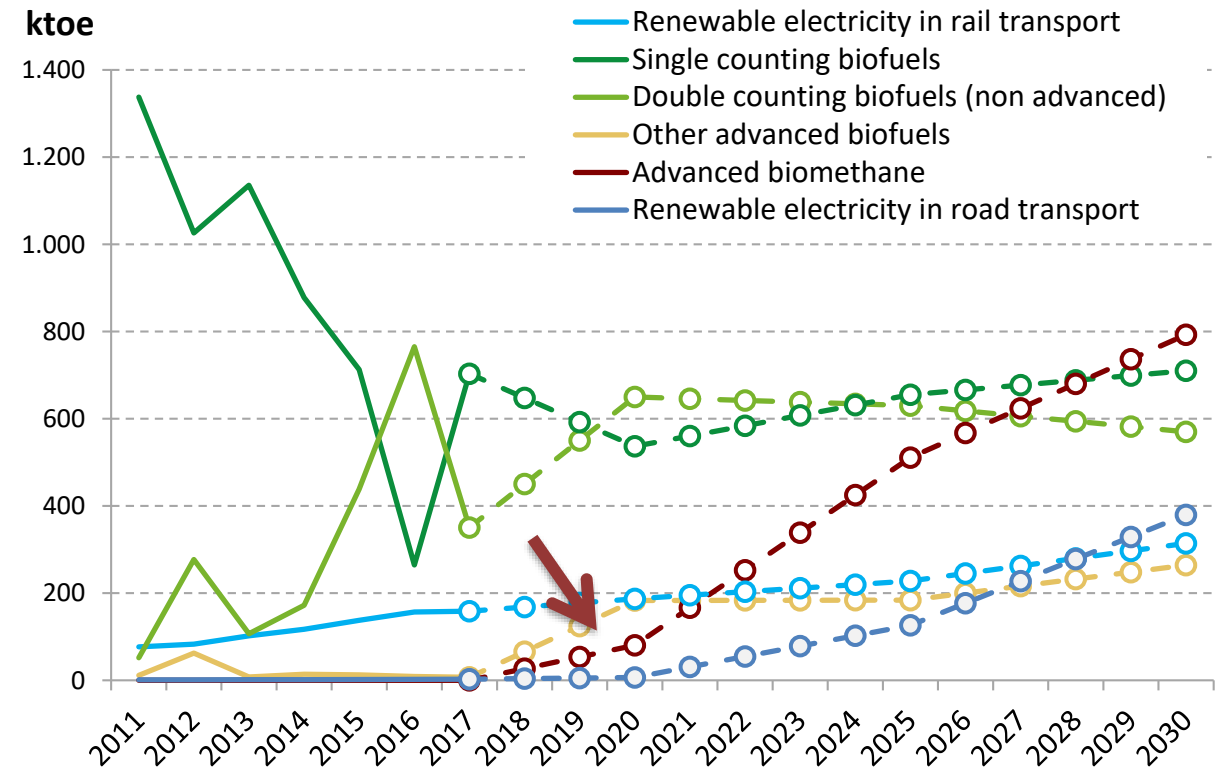
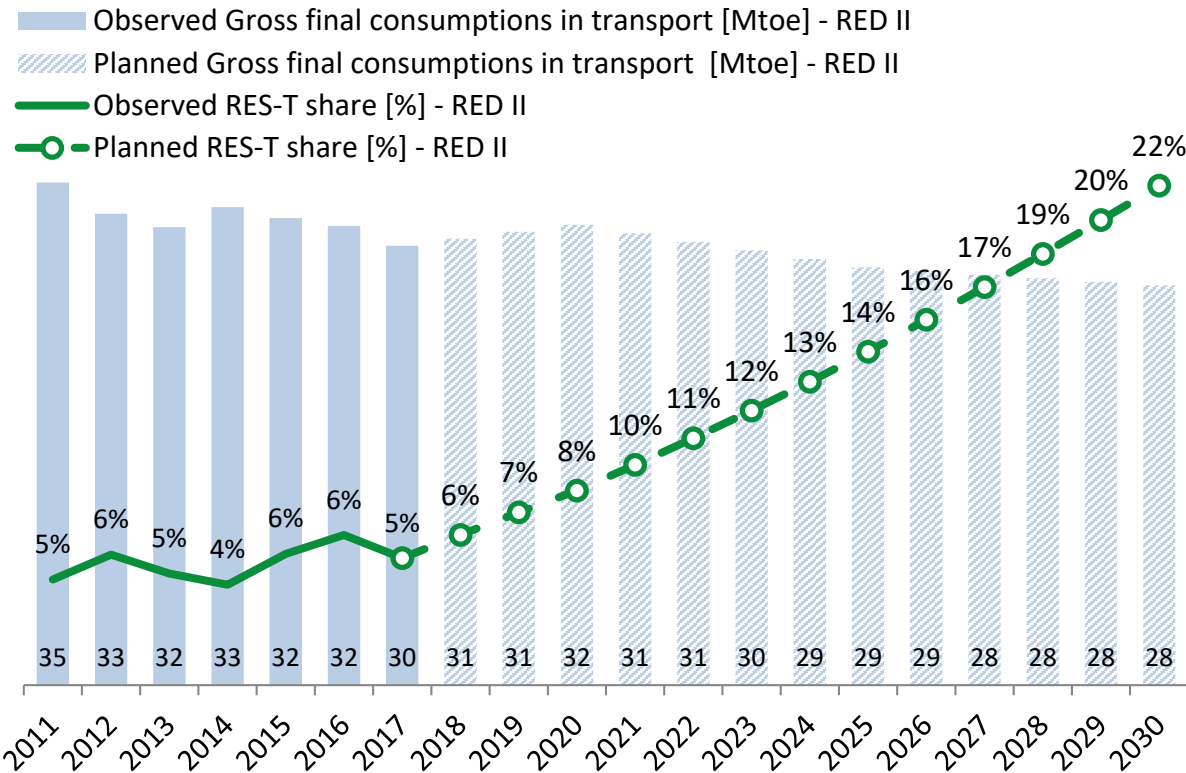
EUROPEAN AND ITALIAN TARGETS

RES IN TRANSPORT: STATUS AND TARGET

- In 2017 the renewable share was 6,5%* with an important role of **double counting biodiesel**. Over 70% of the share is due to **biofuels** - of which **50%** from **double counting biofuels** - and almost **30%** from **RES electricity used in transport**. In 2018, an **increase of biofuels**, especially **double counting** (+18%), was registered.
- RES share target** fixed by NECP is higher than RED II (21,6% vs 14%), **advanced biofuels** will reach around 8% (twice the RED II target) thank to the contribution of **biomethane** (planned to cover 75% of advanced biofuels);
- Strong growth of **RES electricity** consumed by **road vehicles**: up to 380 ktoe, **6 mln of electric vehicles**.

* The calculation method is different from the RED II method: X 2 D.C., X 2.5 (1.5) RES electricity for rail transport, X 5 (4) RES electricity for road transport.

RES TRAJECTORIES IN TRANSPORT UNTIL 2030



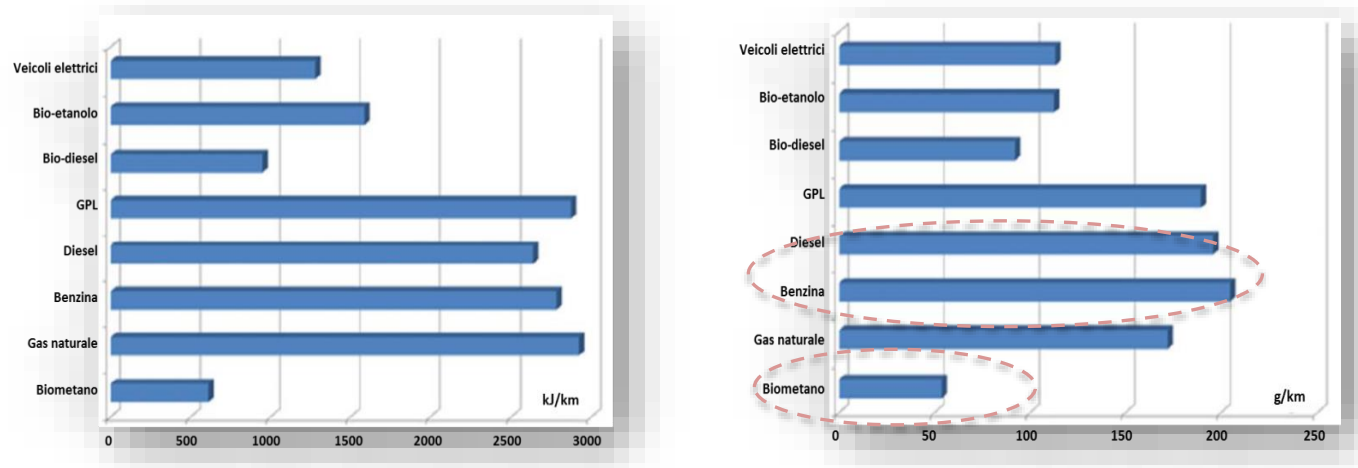
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BIOMETHANE FOR TRANSPORT

- Biomethane has **lower CO2 emissions** (well-to-wheel) in comparison to gasoline and diesel. **Particle emissions are low**, while **NO_x emissions are acceptable**, if **exhaust fumes are treated**.

“Well-to-Wheel» Analysis”



SOURCE: F. ZUCCARI, A. SANTIANGELI, A. DELL'ERA, A. D'ORAZIO, C. FIORI, F. ORECCHINI, USE OF BIO-METHANE FOR AUTO MOTIVE APPLICATION: PRIMARY ENERGY BALANCE AND WELL TO WHEEL ANALYSIS, ENERGY PROCEDIA 81 (2015) 255 – 271.



Italy is the European country with the largest number of vehicles fed by CNG: almost **1 million of vehicles**, representing about **2,4 %** of the total vehicle fleet nationwide (excluding commercial and 2-wheel vehicles and buses).



Refuelling stations in Italy: about **1.400 CNG** and **20 LNG** filling stations - **53%** of which located in **Northern Italy** – against a total of **21.000 filling stations**.

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BIOFUEL QUOTA OBLIGATION AND BIOMETHANE INCENTIVE SCHEME

BIOMETHANE INCENTIVISING MECHANISM

M. D. 18th March 2018



Biomethane (art. 5)

- CICs are issued to biomethane producers
- Extra CICs issued when using particular raw materials

E.g. FROM BIO-WASTE FROM PRIVATE HOUSEHOLDS SUBJECT TO SEPARATE COLLECTION

Advanced biomethane (art. 6)

- CICs are issued and paid to biomethane producers
- 375€ per CIC
- GSE can withdraw biomethane and sell it on the gas market
- Extra CICs issued for new filling stations (CNG/LNG stations / liquefaction plants)

Advanced biofuels (art. 7)

- CICs are issued and paid to biofuel producers
- 375€ per CIC
- No withdrawal of advanced biofuels

Plant Transformations (art. 8)

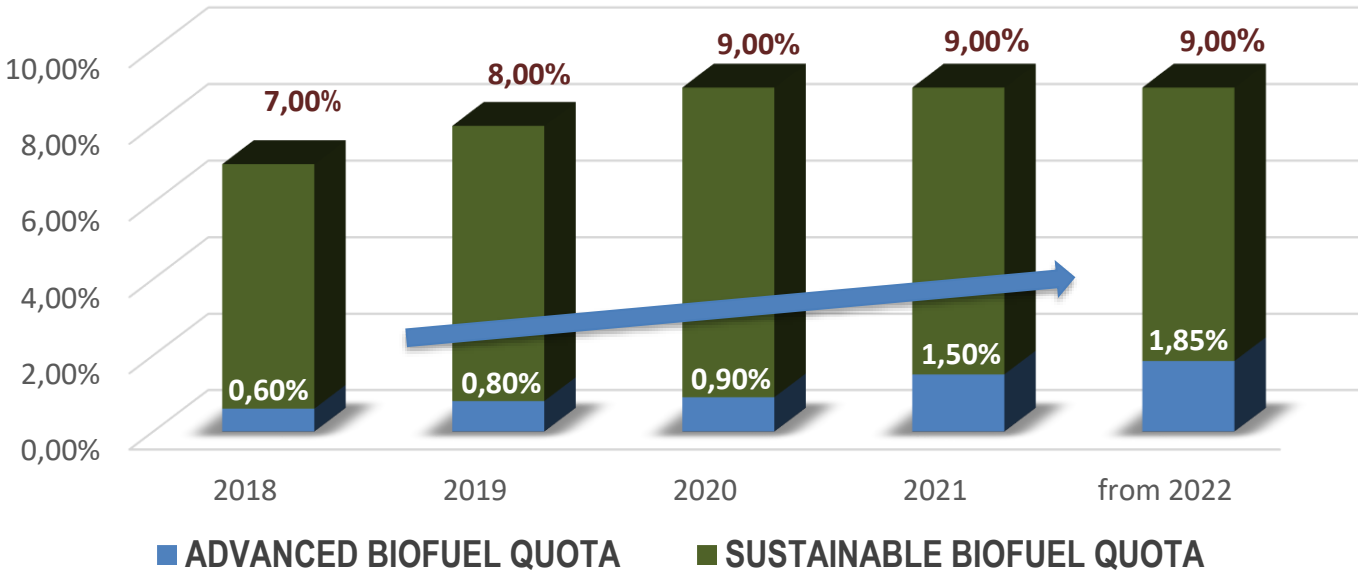
- Electricity producers from biogas can transform plants and access biomethane incentives
- Electric incentives are reduced
- Reduction of biomethane incentives if plant transformation is implemented after the end of the electricity incentive

BIOFUEL QUOTA OBLIGATION AND BIOMETHANE INCENTIVE SCHEME

CREATING THE CONDITIONS FOR USING BIOMETHANE

QUOTA OBLIGATION MECHANISM

In compliance with the ministerial decree of October 10th 2014, **Italian Obligated Entities (O.E.) must release/blend a quota of sustainable biofuels with fossil fuels.** (O.E. are the operators which have to pay the excise duties on PETROL (EN228) and DIESEL (EN590) fed into the transport consumption circuit).



The advanced biofuels quota is split into **two sub-quotas**:

- **advanced biomethane (75%)**
- **other advanced biofuels (25%)**

BIOMETHANE FOR TRANSPORT

BIOMETHANE INCENTIVES IN SYNERGY WITH DAFI DIRECTIVE

- BUILDING THE INFRASTRUCTURE FOR ALTERNATIVE FUELS

- RENOVATING PUBLIC TRANSPORT FLEETS

Production



Transport



Liquefaction



Distribution



Use



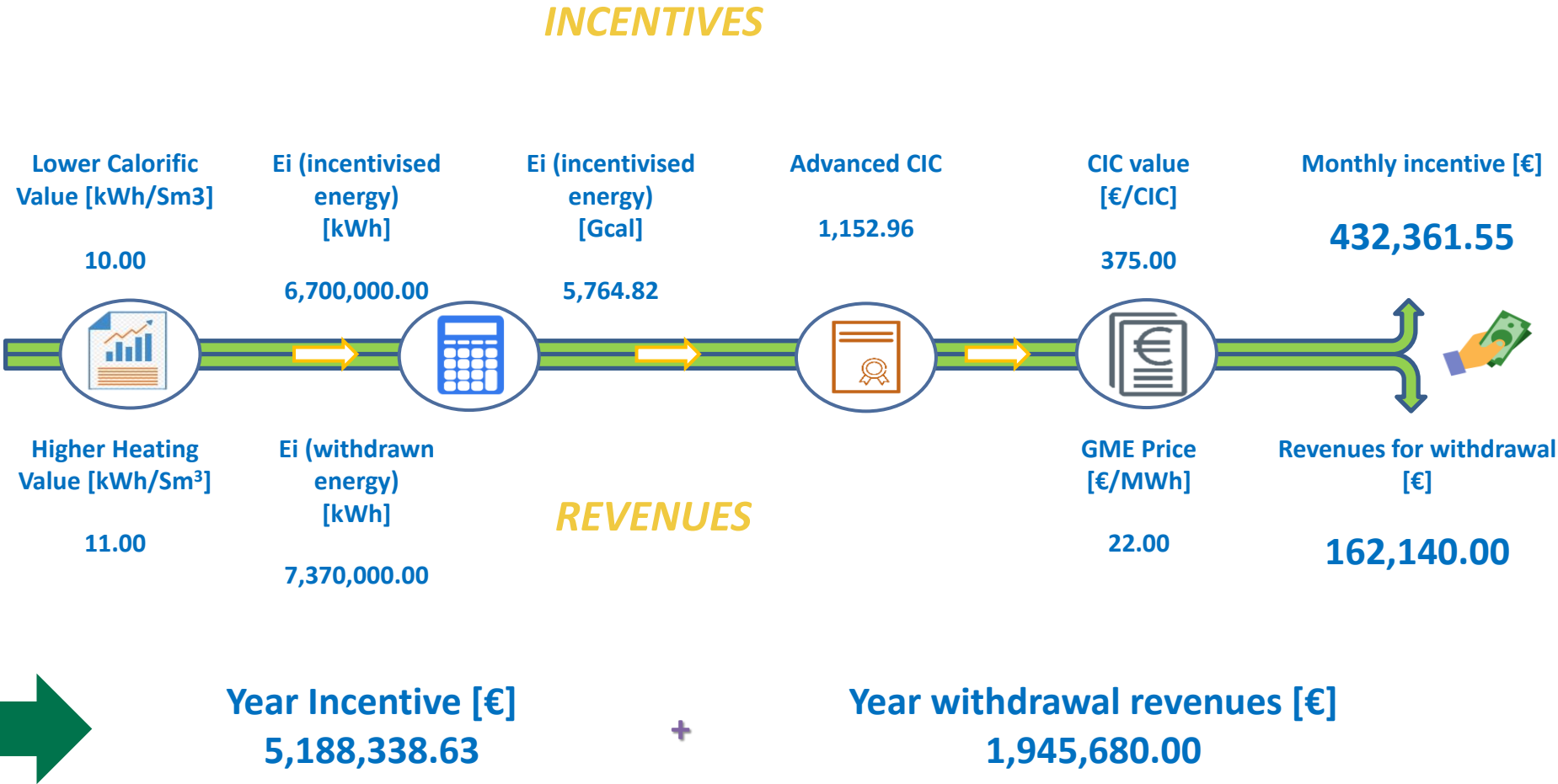
Infrastructures for refuelling vehicles with alternative fuels must be strengthened (LPG, Methane, Electricity for transport) –
Deployment of Alternative Fuels Infrastructures (DAFI, Directive 2014/94/EU)

BIOFUEL QUOTA OBLIGATION AND BIOMETHANE INCENTIVE SCHEME

EXAMPLE OF QUANTIFICATION OF INCENTIVES AND REVENUES

CAPACITY
[Sm³/h]
1,000.00

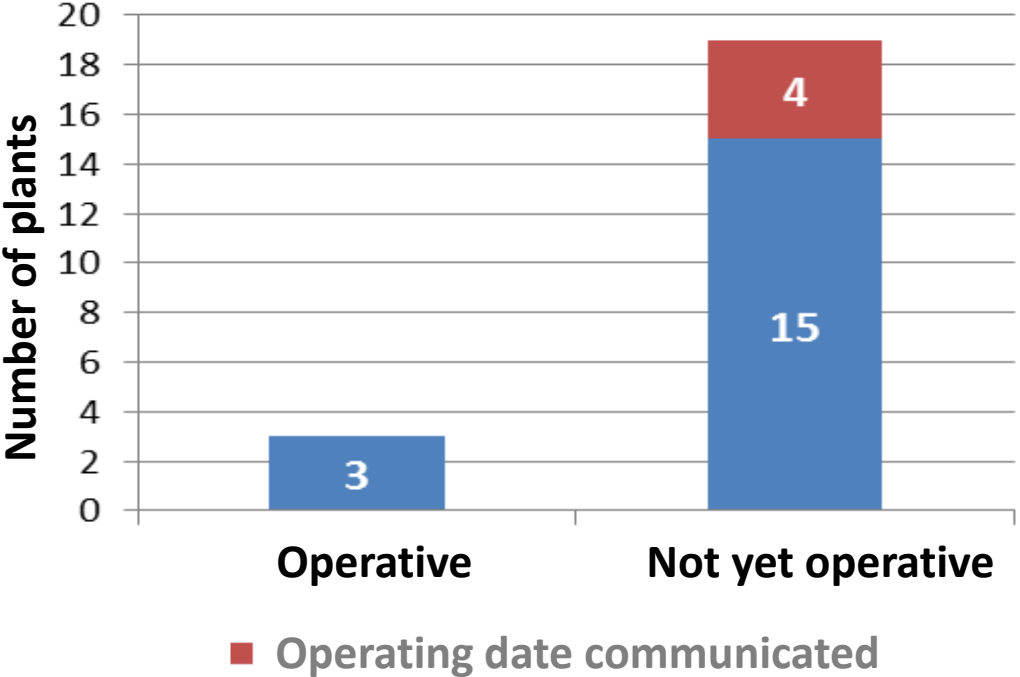
Monthly production
[Sm³]
670,000.00



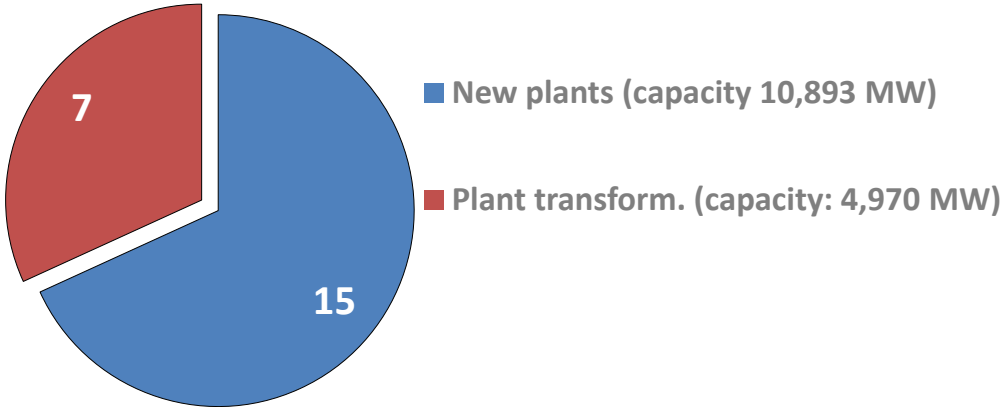
BIOFUEL QUOTA OBLIGATION AND BIOMETHANE INCENTIVE SCHEME

CURRENT SITUATION

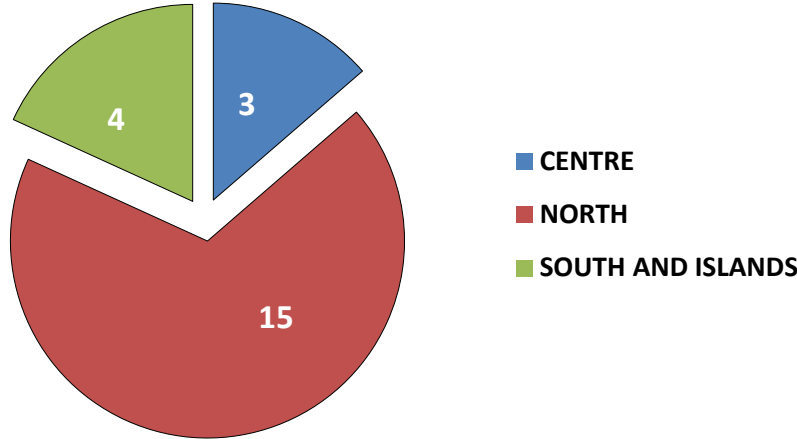
Assessment requests



Type of Project



Plant location

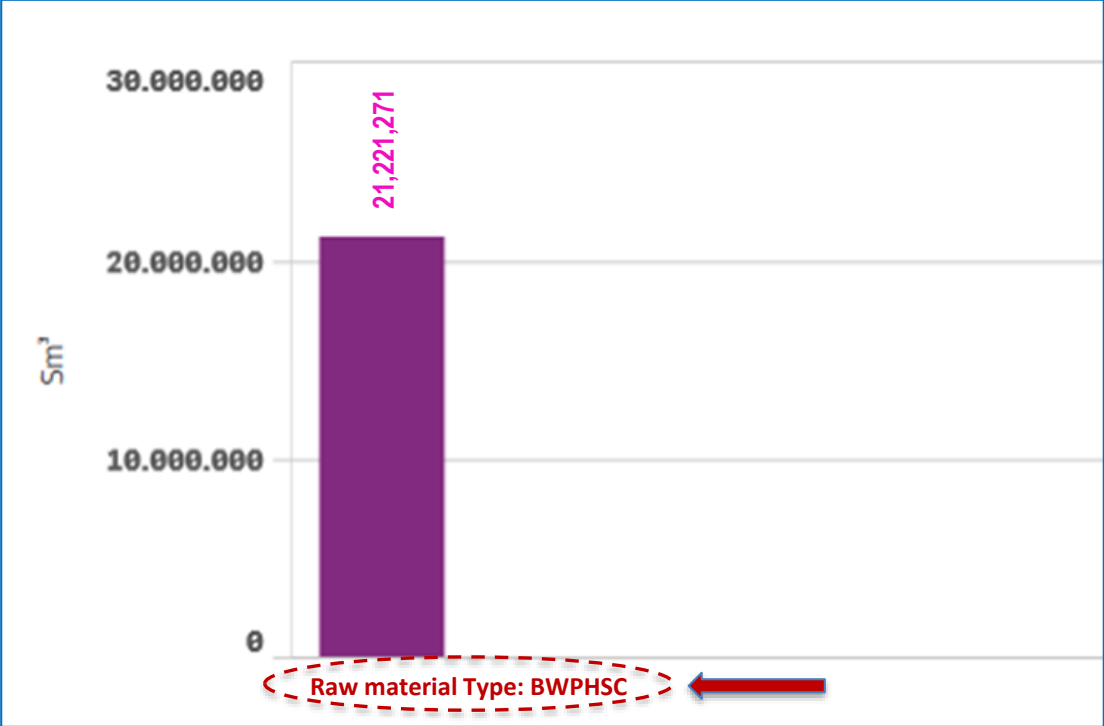


From the [data available on SRG website](#) concerning the connections to the gas grid (August 2019) and from the assessment requests submitted to GSE, around **50 plants should be in the building stage or have just finished to be built.**

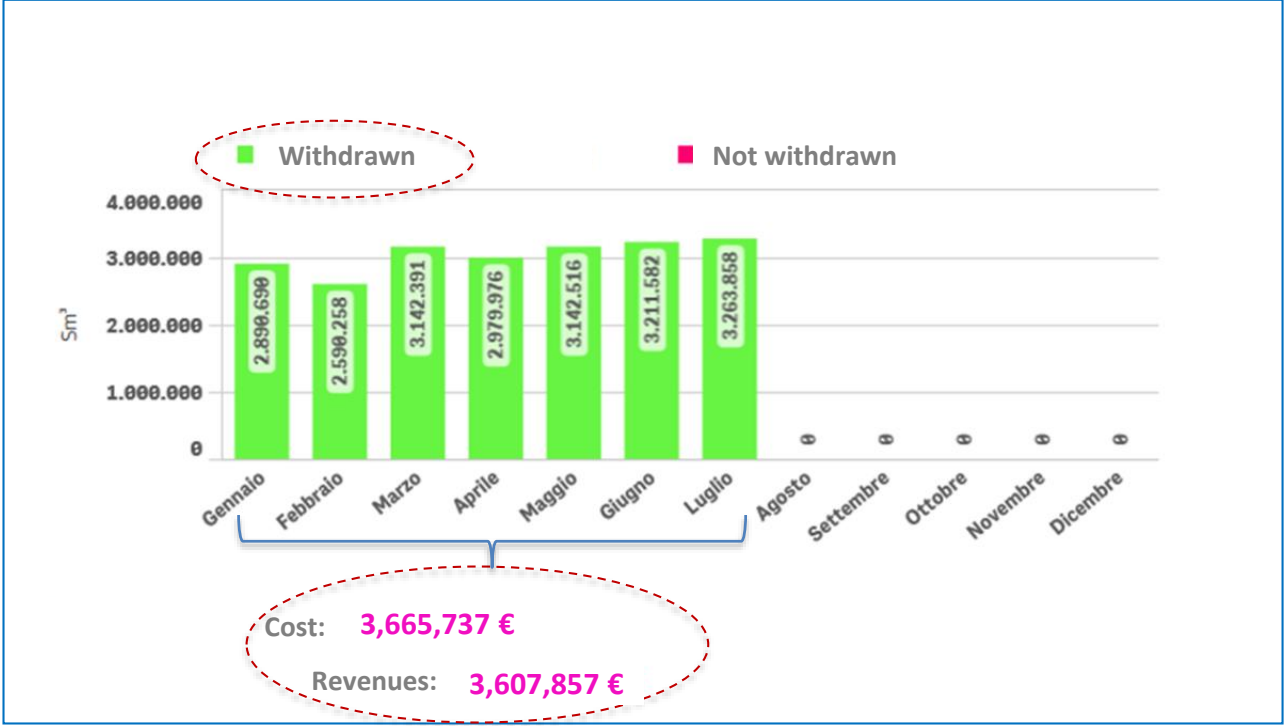
BIOFUEL QUOTA OBLIGATION AND BIOMETHANE INCENTIVE SCHEME

ACTUAL BIOMETHANE PRODUCTION DATA - JANUARY/JULY 2019

Currently only one plant (4,500 Sm³/h) is being incentivised: about 12.5 million euros in the period January-July 2019.
 By the end of this year, a second plant (1,000 Sm³/h) will be granted incentives (starting from the beginning of 2019)



Biomethane produced by incentivised plants (Sm³)*



Incentivised biomethane withdrawn by GSE*

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BIOMETHANE FOR LOCAL TRANSPORT

MUNICIPALITIES PRODUCING BIOMETHANE FOR LOCAL TRANSPORT

- ❑ IDENTIFYING MUNICIPALITIES THAT CAN PRODUCE ENOUGH BIOMETHANE FROM **BWPHSC** IN ORDER TO FEED LOCAL TRANSPORT FLEETS OR TRUCKS FOR WASTE COLLECTION (VIRTUOUS CICLE OF WASTE CYCLE MANAGEMENT)



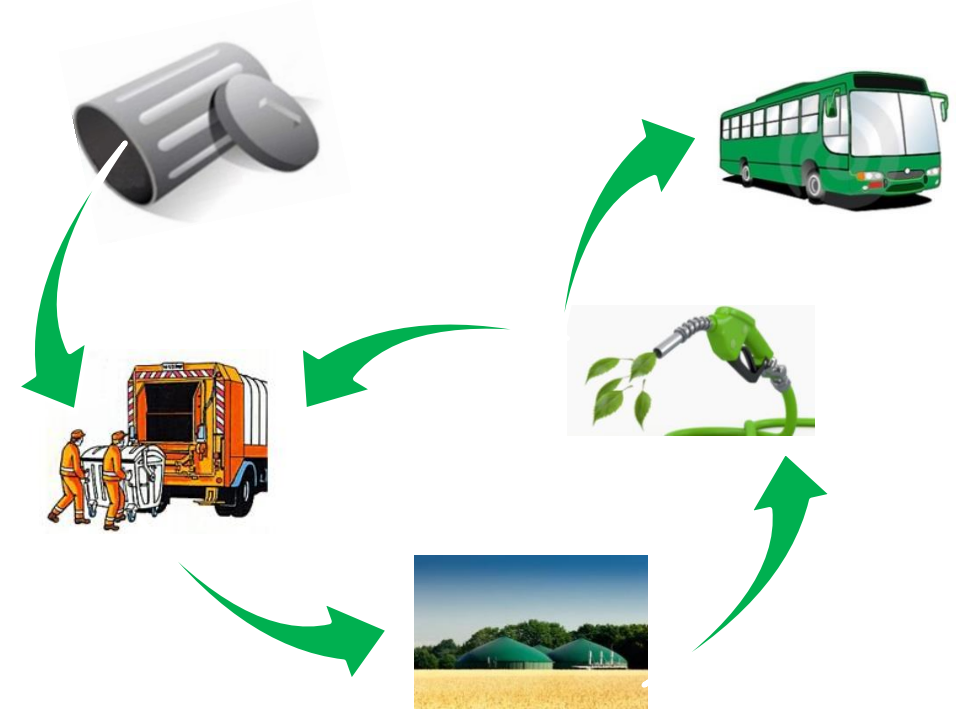
- ❑ **CREATING NEW INFRASTRUCTURES (DAFI DIRECTIVE)** IN SINERGY WITH THE OPPORTUNITY OF USING INCENTIVES FOR BIOMETHANE IN THE TRANSPORT SECTOR



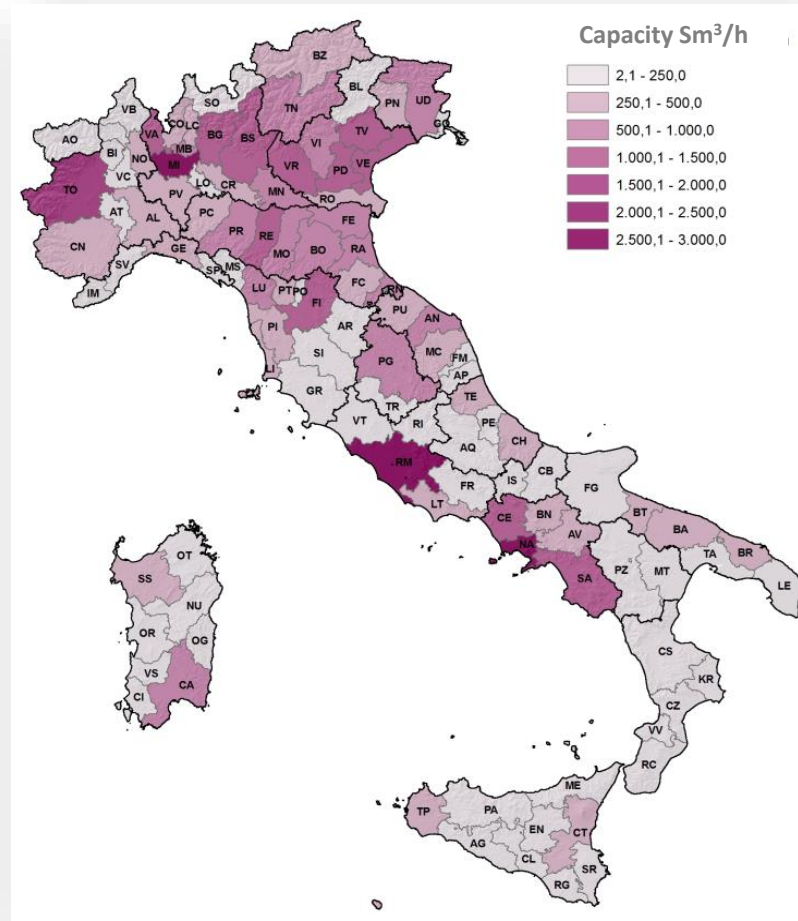
- ❑ **REDUCING EMISSIONS, WASTE MANAGEMENT COSTS** (WASTE TRANSFER/EXPORT COSTS), **IMPLEMENTING ENERGY RECOVERY OF WASTE, CREATING NEW JOBS**



- ❑ **BOOSTING BIOGAS PLANT INDUSTRY AND AUTOMOTIVE SECTOR**



BIOMETHANE FOR LOCAL TRANSPORT



PRODUCING CAPACITY OF PLANTS FED BY OFMSWSC:

- BY USING COMPLETELY THE BWPWSC COLLECTED IN ITALY, IT WOULD BE POSSIBLE TO PRODUCE, ON A NATIONAL LEVEL, ABOUT **400 MLN Sm³/year** OF BIOMETHANE, CORRESPONDING TO ABOUT **40% OF THE NG USED IN TRANSPORT CURRENTLY**.
- BY ASSUMING A STANDARD PLANT SIZE OF **500 Sm³/h** ALMOST **30% OF THE ITALIAN PROVINCES, WOULD BE CAPABLE OF FEEDING AT LEAST ONE BIOMETHANE PLANT**.

Source: ISPRA DATA 2014 BY PROVINCE (Hypothesis: production of 70 Sm³ per ton of BWPWSC, 8.000 annual working hours).

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**THANK YOU
FOR YOUR
ATTENTION**