

Renewable Gas in France

Energy Community, 25-26th of April 2018

Who is GRDF ?

The longest natural gas network in Europe

200 000 km - A network that could circle the Earth almost five times!

1 million gas smart meters already rolled out

11 million to be installed by 2023

11 million customers in France

41 biomethane injection plants operated by GRDF network (out of 48 in France as of march 2018)



Past, Present and Future of Gas

Manufactured gas

Natural gas

Renewable gas

Local production and distribution

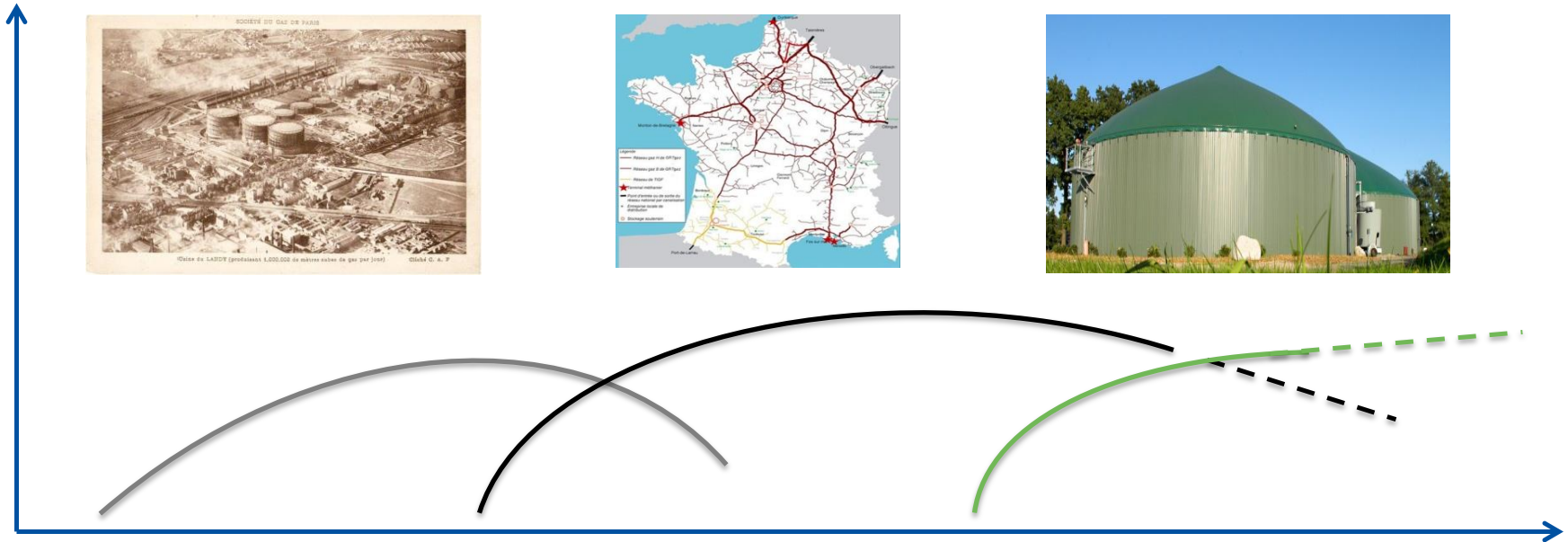
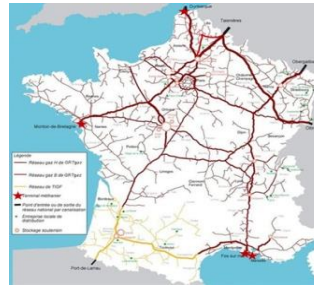
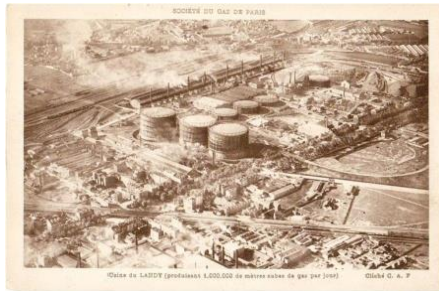
Centralised infrastructures

Decentralised infrastructures

Lighting Cooking

... Heating, Hot water...

... Heating, Mobility...



1818
1st city gas company
in France

1956
Natural gas
production in Lacq

1970
End of
city gas

2012
Biomethane
injection

2050...

Green Gas Answers XXI Century EU Challenges

1

Reduce significantly the greenhouse gas emissions



2

Contribute to energy flexibility



3

Reduce energy dependency



4

Rebalance the trade balance



5

Creation of direct and indirect local jobs



Overview of biomethane production in Europe

503 biomethane plants in Europe in 2017

Austria
(14 plants, 140 GWh/year, 2016)¹

Belgium
(1 plant, 12 GWh/year, 2018)¹

Denmark
(17 plants, 898 GWh/year, 2015)¹

Germany
(196 plants, 9,400 GWh/year, 2016)¹

Finland
(10 plants, 98 GWh/year, 2015)¹

France
(44 plants, 406 GWh /year, 2017)²

Hungary
(2 plants, 55.5 GWh/year, 2016)¹

Italy
(1 plant, 300 GWh/year, 2018)³



Luxembourg
(3 plants, 62 GWh/year, 2016)²

Netherlands
(28 plants, 900 GWh/year, 2016)²

Norway
(12 plants, 392 GWh/year, 2017)¹

Spain
(1 plant, 70 GWh/year, 2016)¹

Sweden
(71 plants, 1,297 GWh/year, 2015)¹

Switzerland
(36 plants, 277 GWh/year, 2016)¹

United Kingdom
(93 plants, 3,663 GWh/year, 2016)¹

European regulation on renewable gas

Renewable Energy Directive (RED II)

❖ *Negotiations timeline*

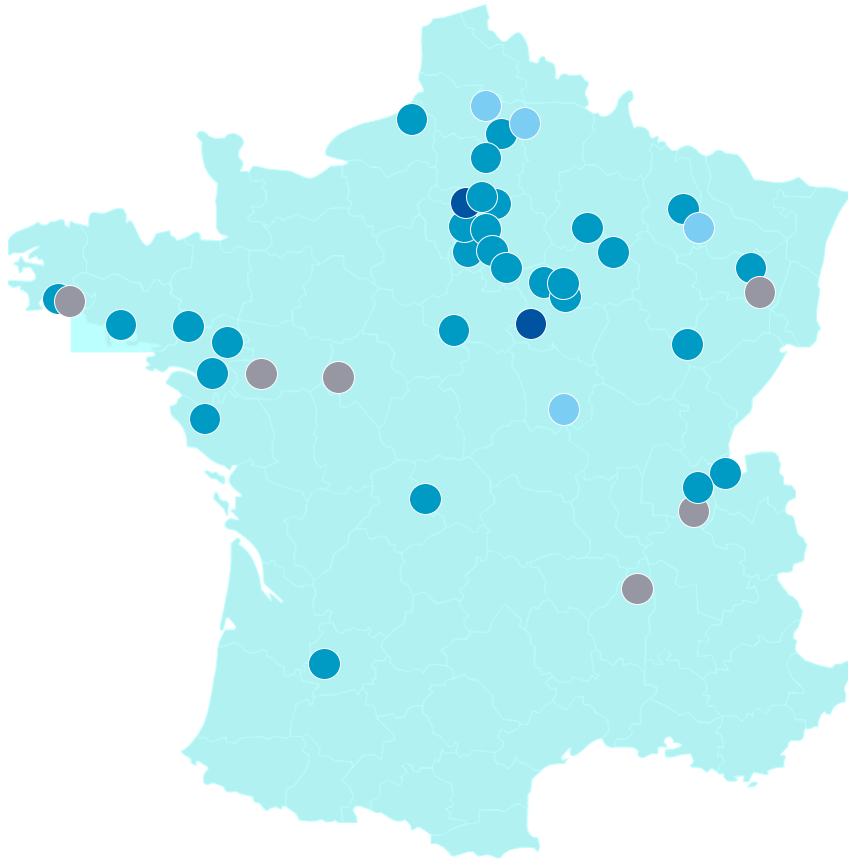
European Commission	November 30th 2016
European Parliament	January 17th 2018 (ITRE and ENVI Committee with competence)
European Council	November 13th 2017
Trilogues	February 27th 2018, March 27th 2018 and May 17th 2018

❖ *Key points*

- 1 European and national renewable energy targets for 2030
- 2 Recognition of renewable gas as renewable energy sources
- 3 Possibility to create guarantee of origin for renewable gas
- 4 Obligation for the production of renewable gas to fulfil greenhouse gas emissions targets to be qualified as renewable energy sources
(Except for small renewable gas production plants)

Renewable Gas in France today

48 biomethane injection plants in March 2018



**AGRICULTURAL
AND AGROFOOD
INDUSTRY
EFFLUENTS**

34 sites

**URBAN
WASTE**

4 sites

**SLUDGE FROM
WASTE TREATMENT
PLANTS**

8 sites

**NON HAZARDOUS
WASTE
(ISDND)**

2 sites

*Hypothesis

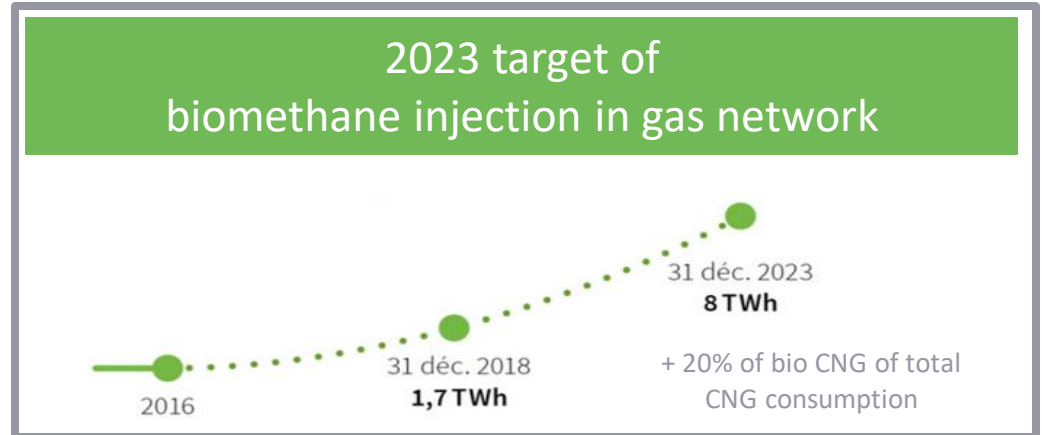
82 00 hours of operation in a full year. Consumption for GRDF's medium customer = 12 MWh/year; for a truck = 256 MWh/year

0,75 TWh/year of Injection Capacity

8 TWh/year of booked capacity (projects)

Renewable Gas in France today

French Objectives



In 2030, **10%** of gas consumption will have to be renewable

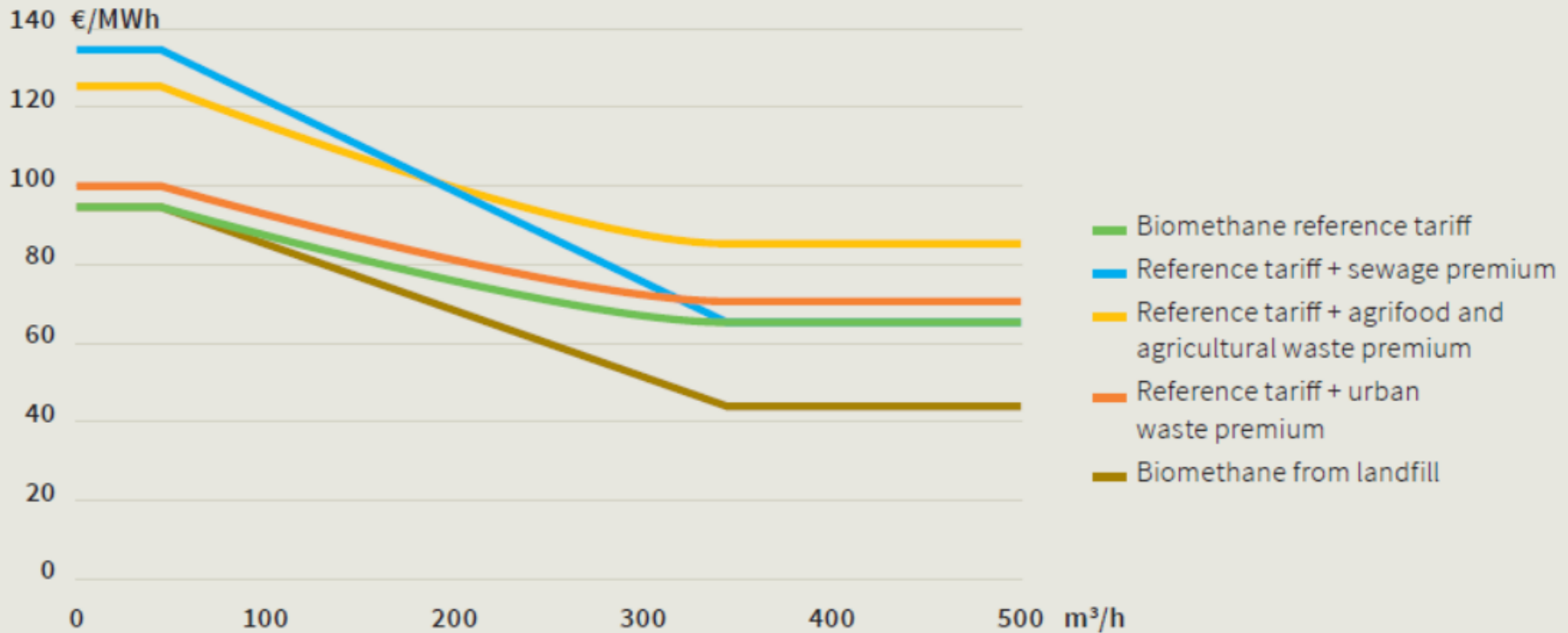


In 2030, need **30%** of renewable gas to reach 2050 decarbonization objectives

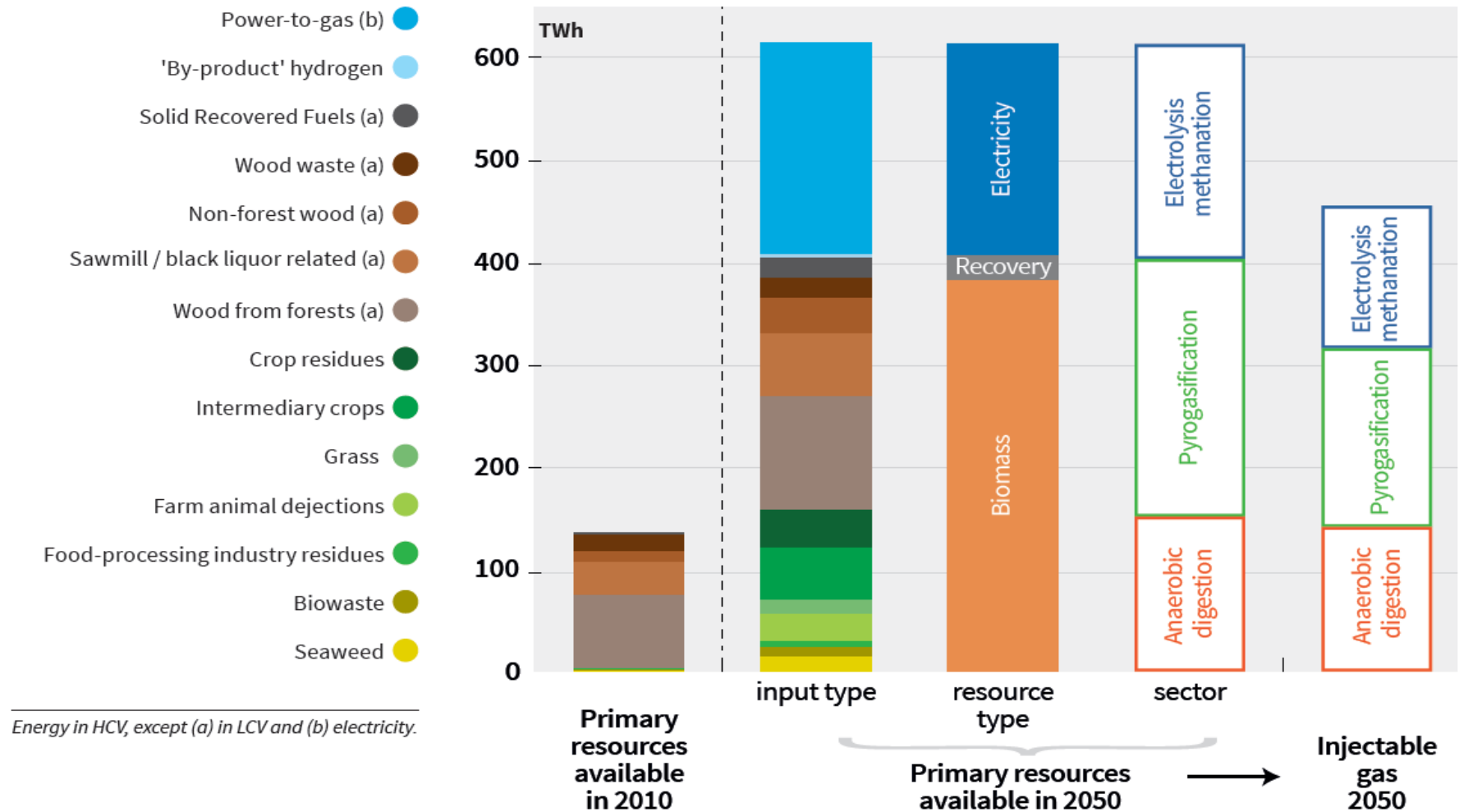
Renewable Gas in France today

French Support Mechanisms

Biomethane feed-in-tariff according to the type of waste and the installation's maximum production capacity of biomethane

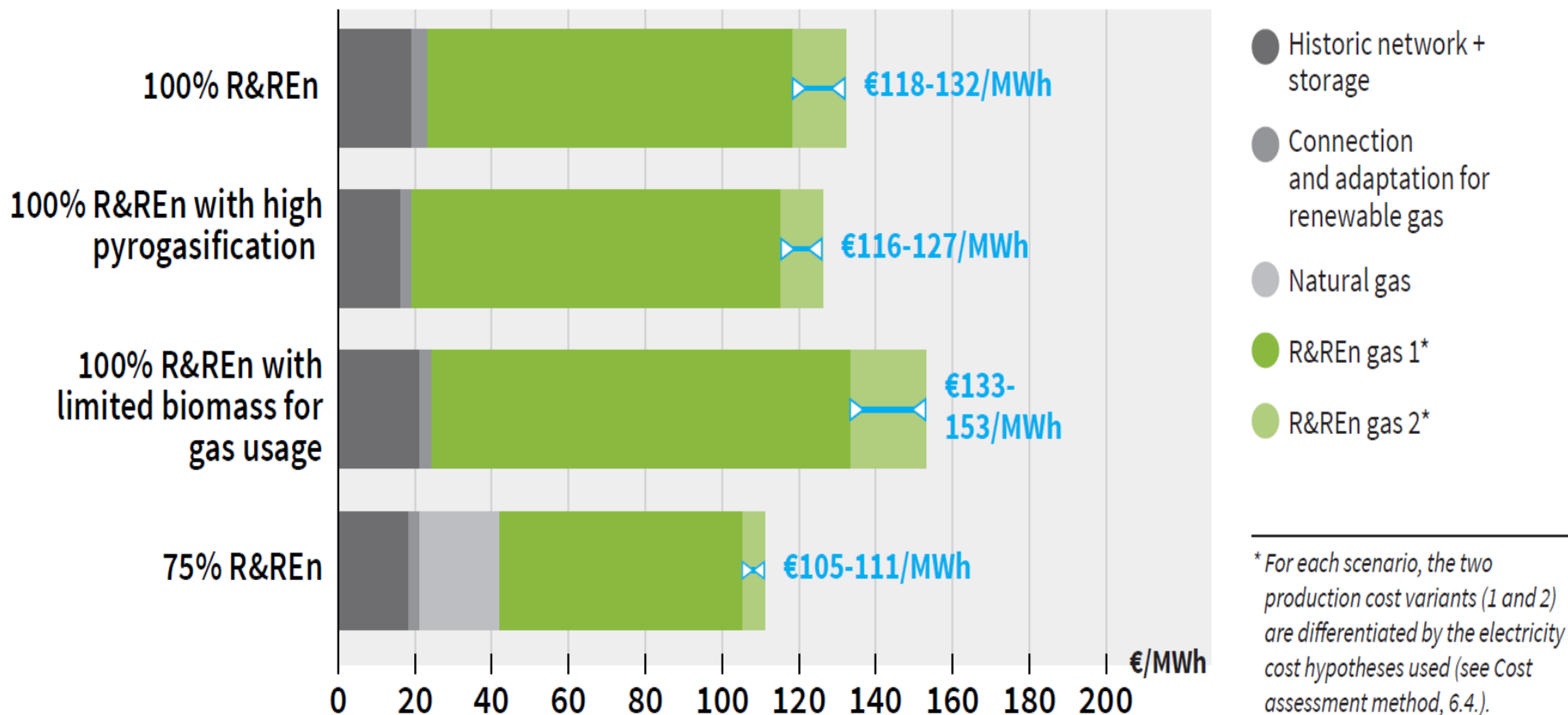


100% of Renewable Gas in 2050 in France is Technically Feasible



Total Production Cost of 100% Renewable Gas equals Total Production Cost of 100% Renewable Electricity

FIGURE 5: TOTAL COST PER MWh OF GAS CONSUMED



Last Advertising Campaign

Si votre enfant ne finit pas ses brocolis, on le fera pour lui.

Les efforts de la restauration collective visent à produire un gaz vert, local et renouvelable, le biométhane. Et ce gaz vert continue d'être dans les tuyaux !

CHOISIR LE GAZ
C'EST AUSSI
CHOISIR L'AVENIR

GRDF
GAZ RÉSEAU
DISTRIBUTION FRANCE

#LeGazC'estL'avenir
Plus d'informations sur www.gaz-energie.fr

« If your child does not finish his/her broccoli, we will do it for him/her »

Ceci est une patate chauffante.

L'échauffeur de votre pomme de terre produit un gaz vert, local et renouvelable, capable de chauffer votre logement.

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« This is a heating potato »

Maintenant, notre gaz est produit à partir de bouses de vaches. Ça ne l'empêche pas d'être plus propre.

Les déchets agricoles produisent du gaz vert, plus respectueux de l'environnement, local et renouvelable, capable de chauffer.

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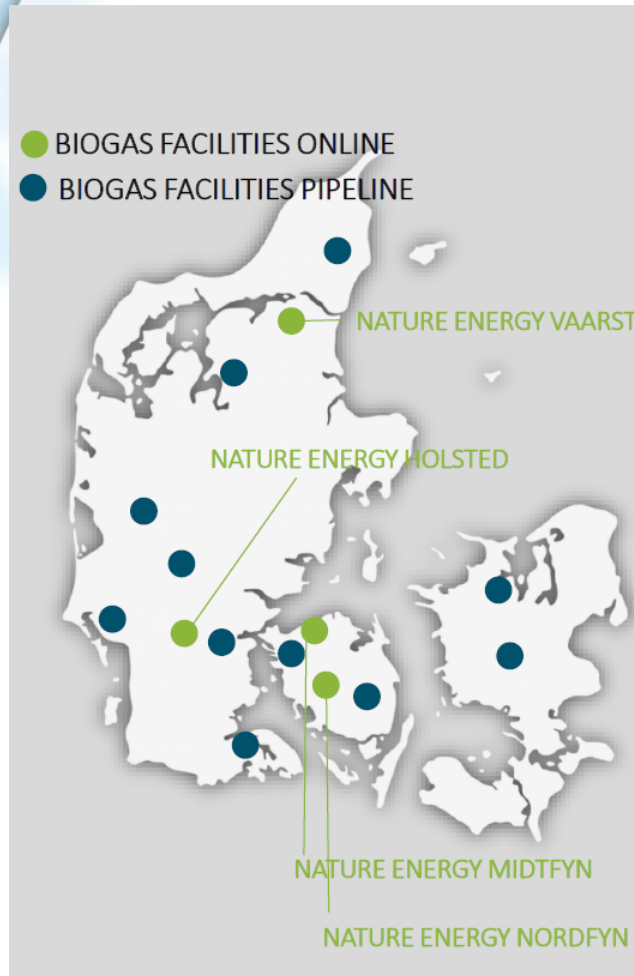
#LeGazC'estL'avenir
Plus d'informations sur www.gaz-energie.fr

« Our gas is now produced with cows dung, but this does not prevent it from being cleaner »

And other examples from across the EU

- Denmark
- Ireland
- Italy

Renewable gas - What is the potential at the national level? Denmark



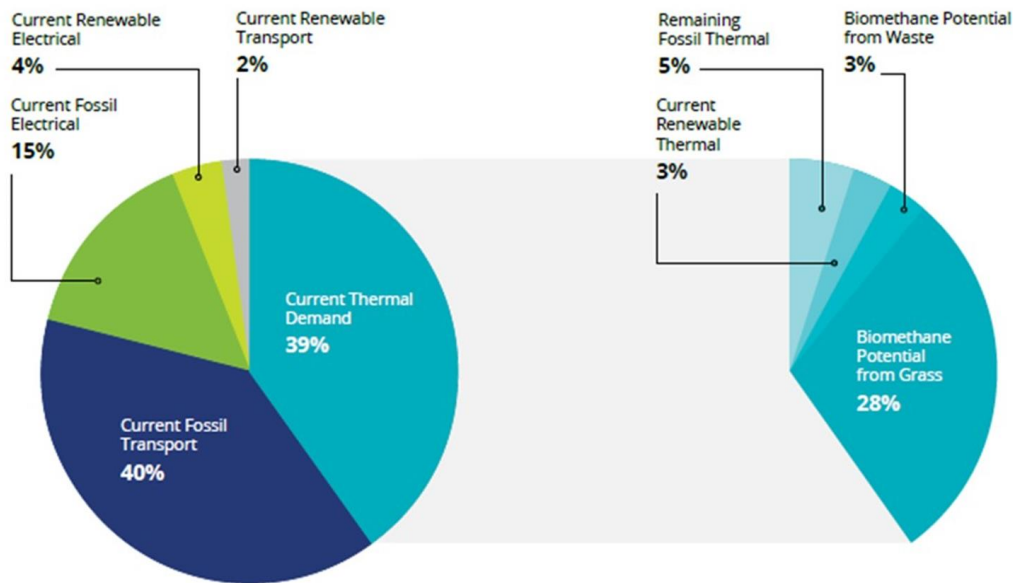
PROGRES OF BIOGAS EXPANSION

- 4 facilities online: 400 GWh bio methane/year
- + 3 facilities in pipeline: 1 TWh bio methane/year
- + 2 facilities/year next 5 years: 2,5 TWh biomethane/year

- 2021: 10 % of Denmark's total consumption of Natural gas
– or 1,5 x the consumption on Funen|

Source: NGF Nature Energy

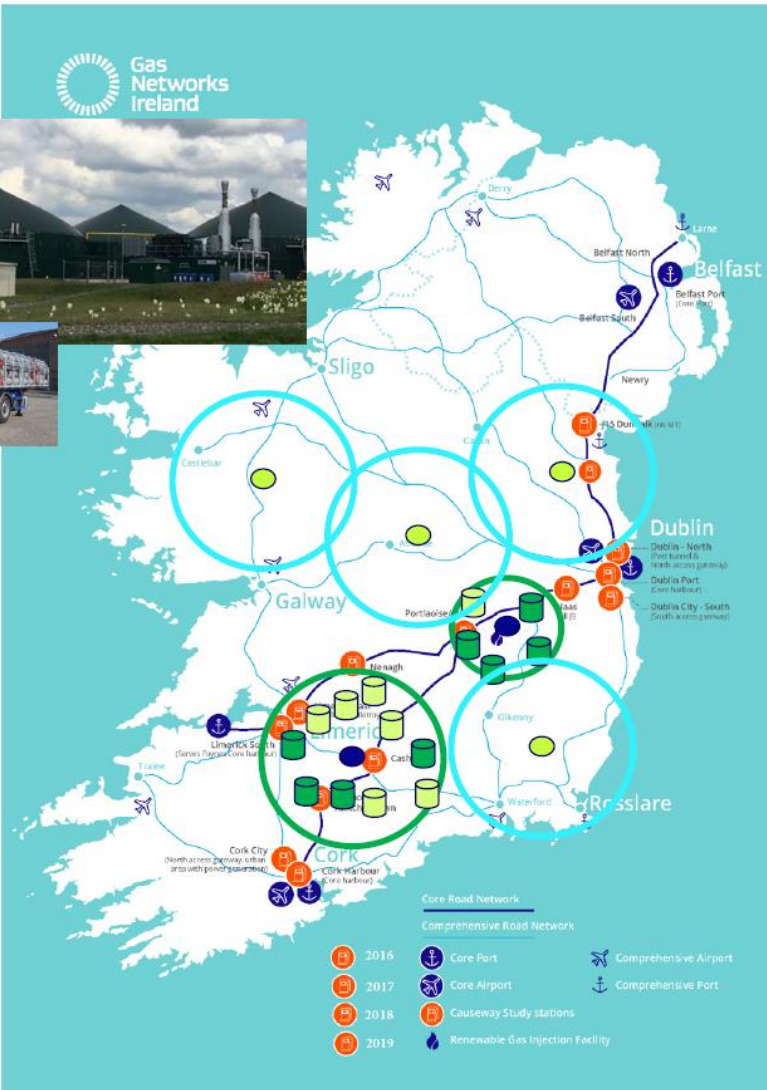
Renewable gas - What is the potential at the national level? Ireland



- Ireland's final energy consumption ~ 130 TWh/annum.
- Ireland's natural gas demand 2016 ~ 50 TWh.
- Ireland has significant bioresources which could produce ~ 40 TWh/annum of biomethane from wastes, residues and excess grass.
- Potential additional resource of 10 TWh from emerging renewable gas technologies such as gasification and power to gas.

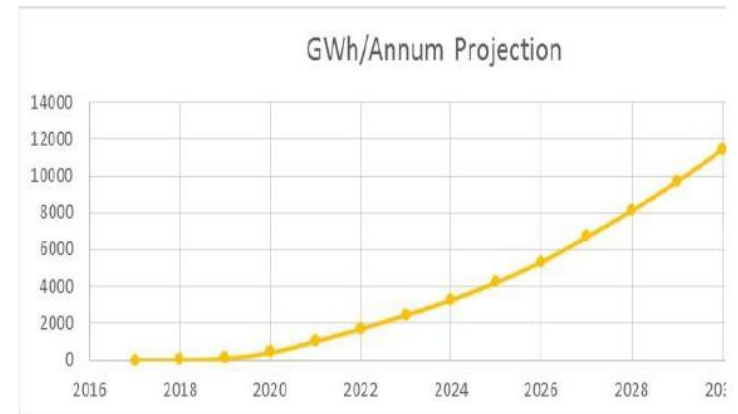
Source: GNI, 2017

Renewable gas - What is the potential at the national level? Ireland



20% Target by 2030

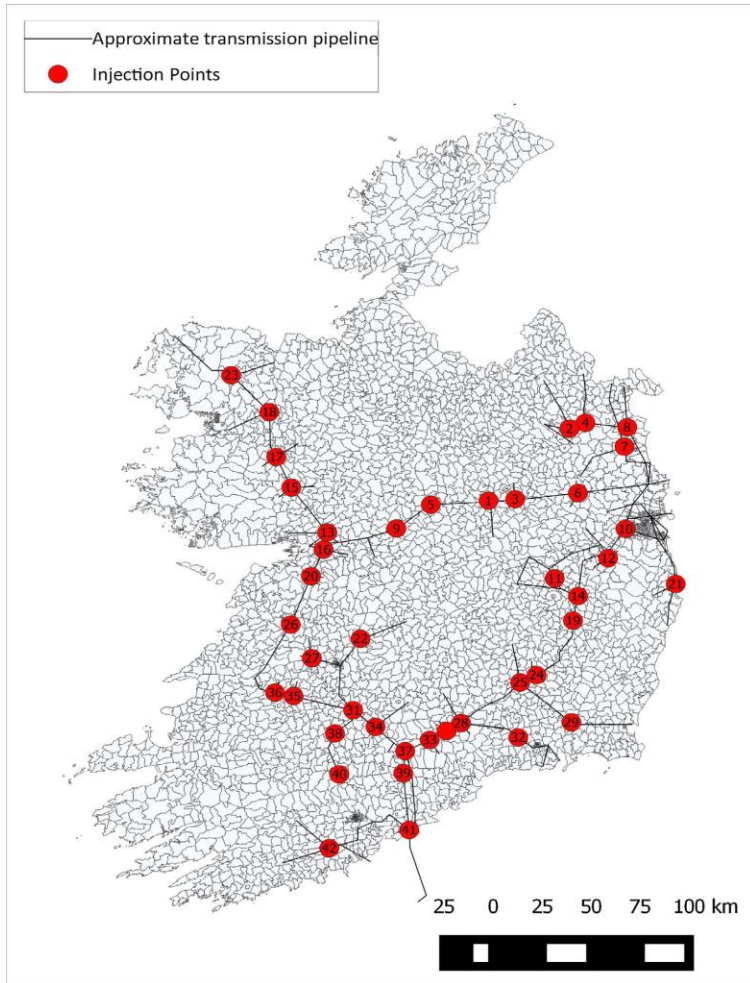
- Phased deployment – initial injection hubs
- Rapid growth in Renewable Gas production
 - Gas Entry Hub enables development and growth by catchment area.



Source: GNI, 2017



Ireland - Key Stakeholders



Gas Customers

Agri-Food & Beverage

Public Transport

Government

DCCAIE

DAFM

RGFI

Biogas Developers

Technology providers

Gas Shippers

Transporters

Research

UCC

MaREI

NUIG

DCU

Renewable gas - What is the potential at the national level? Italy

	2015	2020	2025	2030	2040	2050
BIOMETHANE FROM OMW	500,000,000	650,000,000	750,000,000	900,000,000	1,200,000,000	1,500,000,000
AGRICULTURAL BIOMETHANE	2,000,000,000	3,550,000,000	5,500,000,000	8,000,000,000	13,000,000,000	18,500,000,000
RENEWABLE GAS FROM NO BIOGENIC SOURCES AND BIOMETHANE FROM GASIFICATION			50,000,000	1,100,000,000	5,800,000,000	15,000,000,000
TOTAL Nm³ CH₄ bio	2,500,000,000	4,200,000,000	6,300,000,000	10,000,000,000	20,000,000,000	35,000,000,000
TWh th	25	42	63	100	200	350
	2015	2020	2025	2030	2040	2050
BEST PRODUCTION COSTS PROJECTION FOB ANTE GRID INJECTION						
AGRICULTURAL BIOGAS (MWh th)	€ 60	€ 50	€ 45	€ 40	€ 35	€ 30
AGRICULTURAL BIOMETHANE ANTE INJECTION (€/MWh th)	€ 75	€ 62	€ 56	€ 50	€ 43	€ 37
RENEWABLE GAS (€/MWh th)			€ 100	€ 70	€ 60	€ 50

Source: CIB, Feb 2017

Source: CIB, Feb 2017

Renewable gas - What is the potential in the EU?

Eurogas PRIMES scenario in 2016 for 2050:

220 bcm synthetic gas + 45 bcm biomethane
+ 35 bcm hydrogen + (120 bcm natural gas)

ENTSOG in 2017 for 2040:

49 bcm of biomethane + 4 bcm power-to-gas
in the best scenario

Ecofys in 2018 for 2050:

98 bcm of methane + 24 bcm of renewable hydrogen by 2050 + 20 bcm from UA + BY



Thank you for your attention !

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