



EnviTec Biogas

BIOGAS FROM AGRICULTURAL AND INDUSTRIAL WASTE

Eng. Marcello Barbato – Regional Business Development - SEA

Company profile

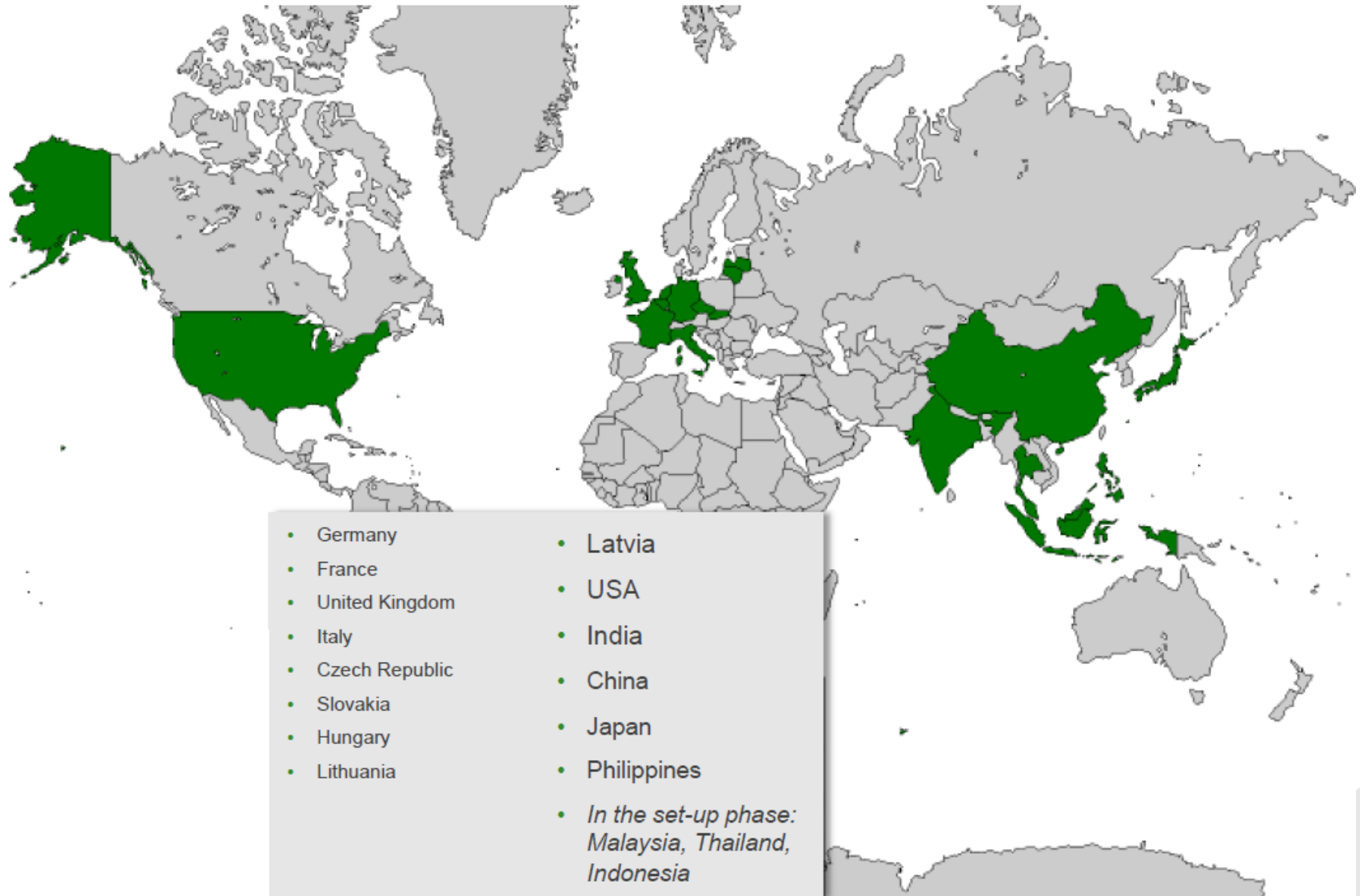
- EnviTec Biogas covers the entire value chain for the production of biogas
- Market leader in Europe
- Foundation of company in 2002 with 20 employees
- Since July 2007 listed on the Frankfurt Stock Exchange
- Headquarter and Administration in Lohne, Lower-Saxony
- Sales and Project Execution in Saerbeck, Northrhine-Westfalia
- 163.4 Mio. Euro Turnover in 2014
- Thereof abroad 43.1 Mio. Euro in 2014
- 350 employees worldwide

As of 2014-12-31

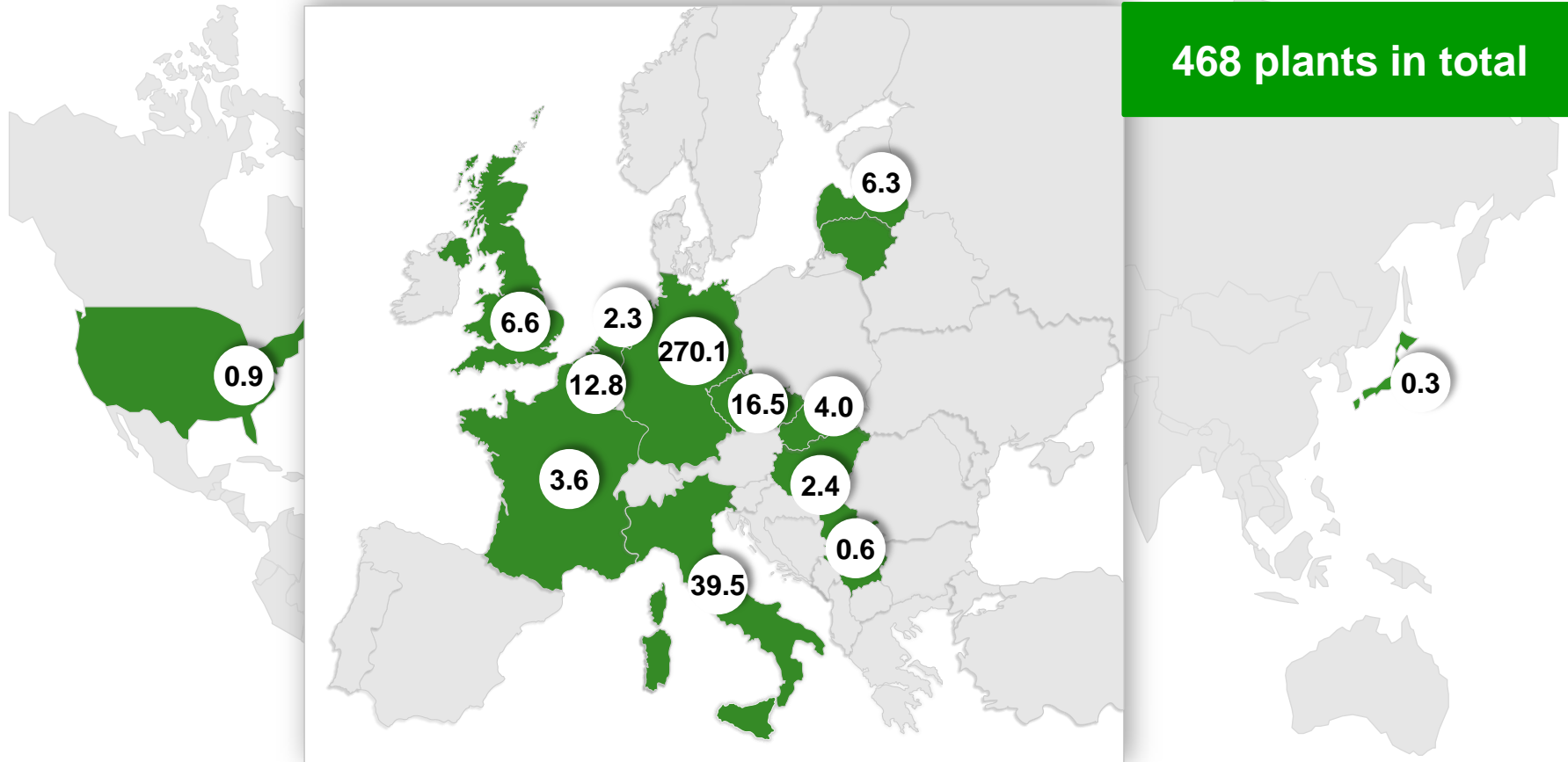


EnviTec Biogas AG – Company Profile

Daughter companies & strategic cooperations in 14 countries



Plants in operation (as of 2015-03-31)



- Installed capacity: 366 MW_{el}
Germany: 270.1 MW_{el}
International: 95.9 MW_{el}
Thereof Own Investment 57.2 MW_{el}

- Type of plant
Agricultural plants: 333.3 MW_{el}
Waste to energy plants: 32.7 MW_{el}

EnviTec Biogas AG – Company Profile

Integrated Business Model

EnviTec Biogas AG

Construction

- Planning
- Permission
- Realization
- Commissioning
- Repowering

Service

- Biological Service
- Technical Service
- 24-Hour-Hotline
- Insurance

Own Operating

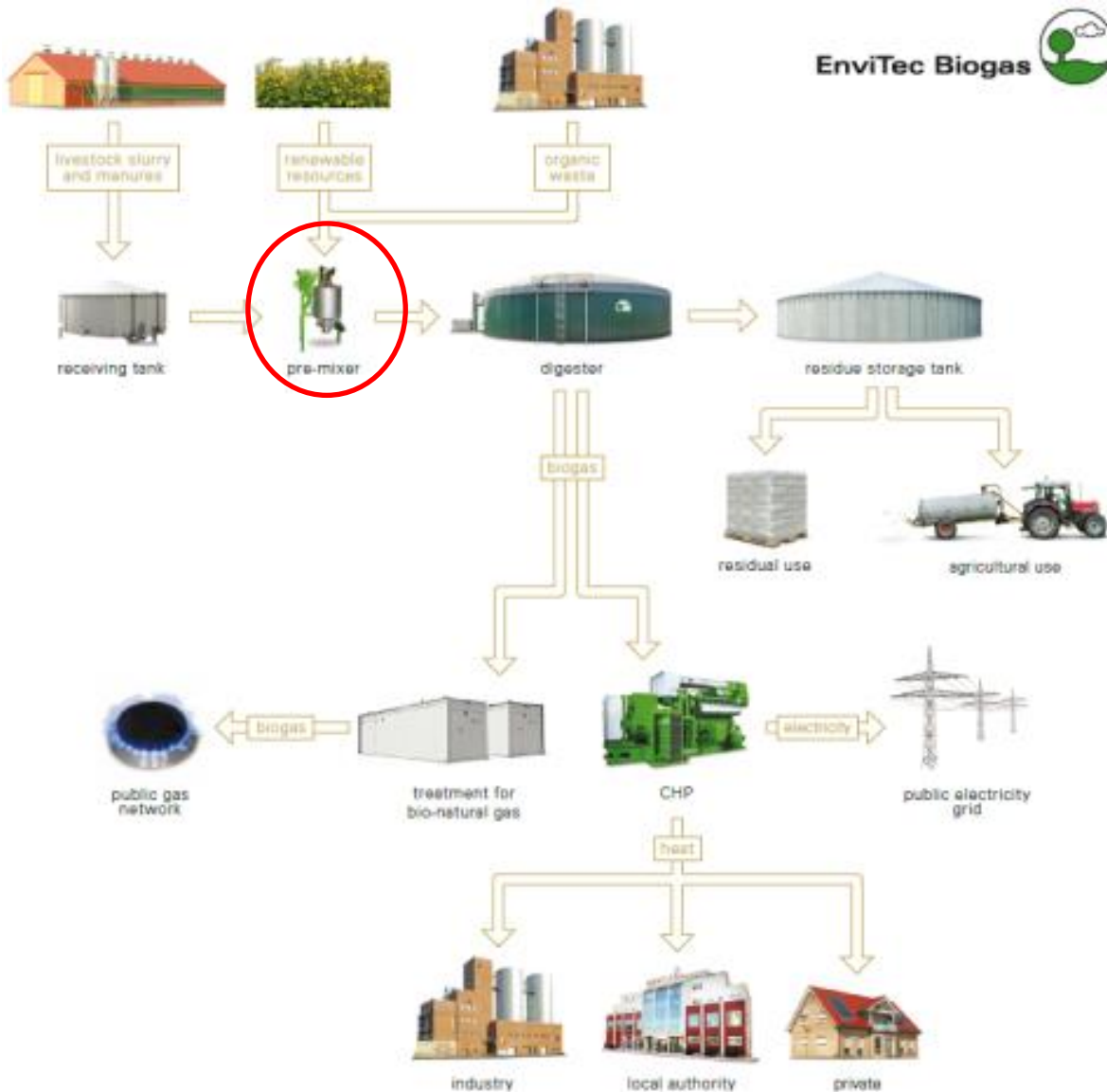
- Operation and Own Investments
- Plant Management
- Purchase of Raw Material
- Logistic

EnviTec Energy

- Direct Marketing of Electricity
- Purchase and Sale of Biomethane
- Green Heat from Biomethane CHP

Biogas – an allrounder

- Process of energy generation



Preparation and pre-treatment of feedstock

- Feedstock blending
- Crushing
- Separation of contaminants before inserting into the fermenter

EFB Pre-Treatment

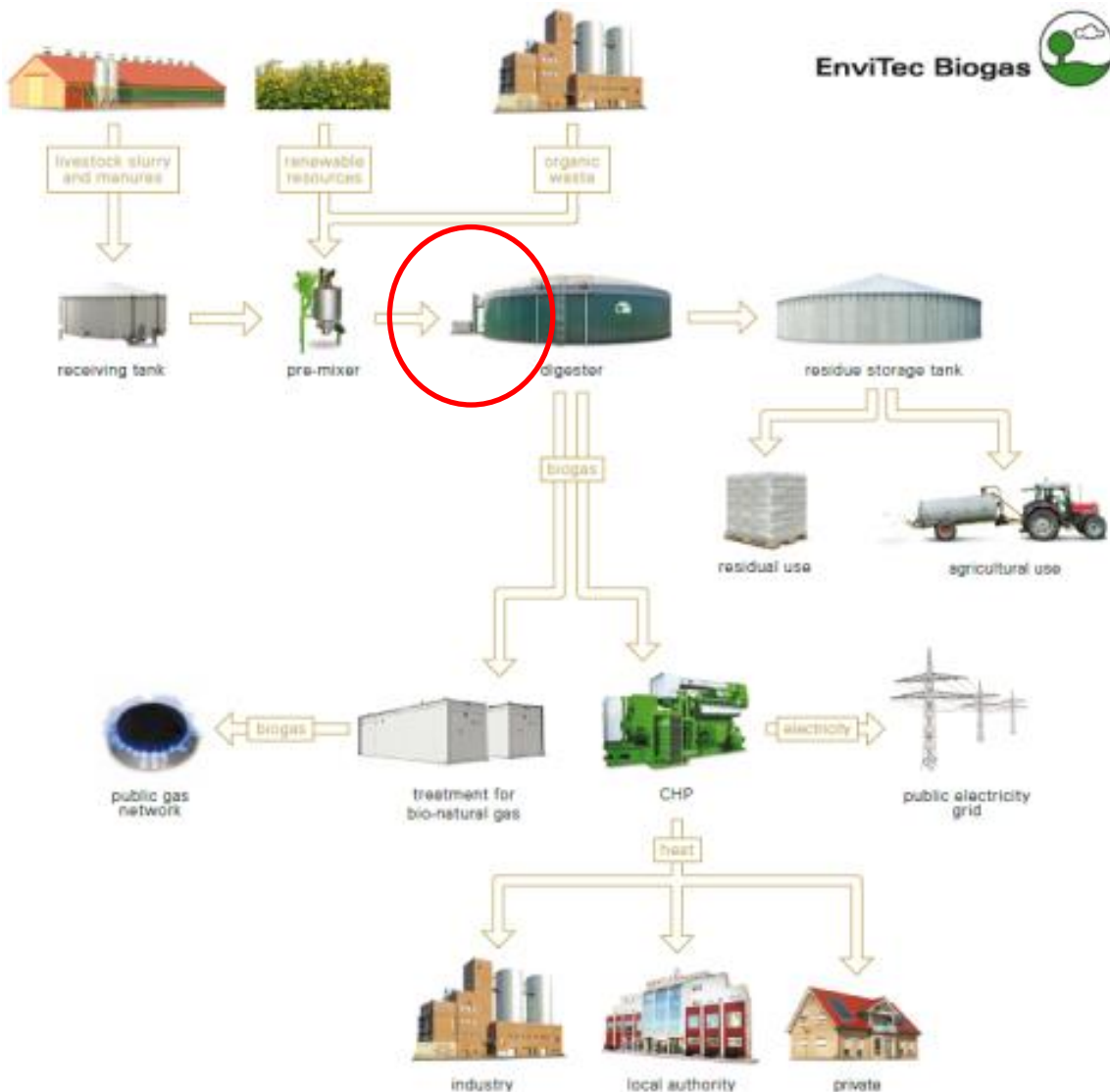
Dissolver

- Multi-feed capable
- More gas out of less substrate
- More gas in less time due to shorter retention time in the fermenter
- Less agitator power needed due to better consistence
- Separation of stones and external bodies (bottom hopper)
- EnviTec Biogas Protected Know-How



Biogas – an allrounder

- Process of energy generation



Preparation and pre-treatment of feedstock

- Recirculation from digester

Biogas – an allrounder

- Process of energy generation

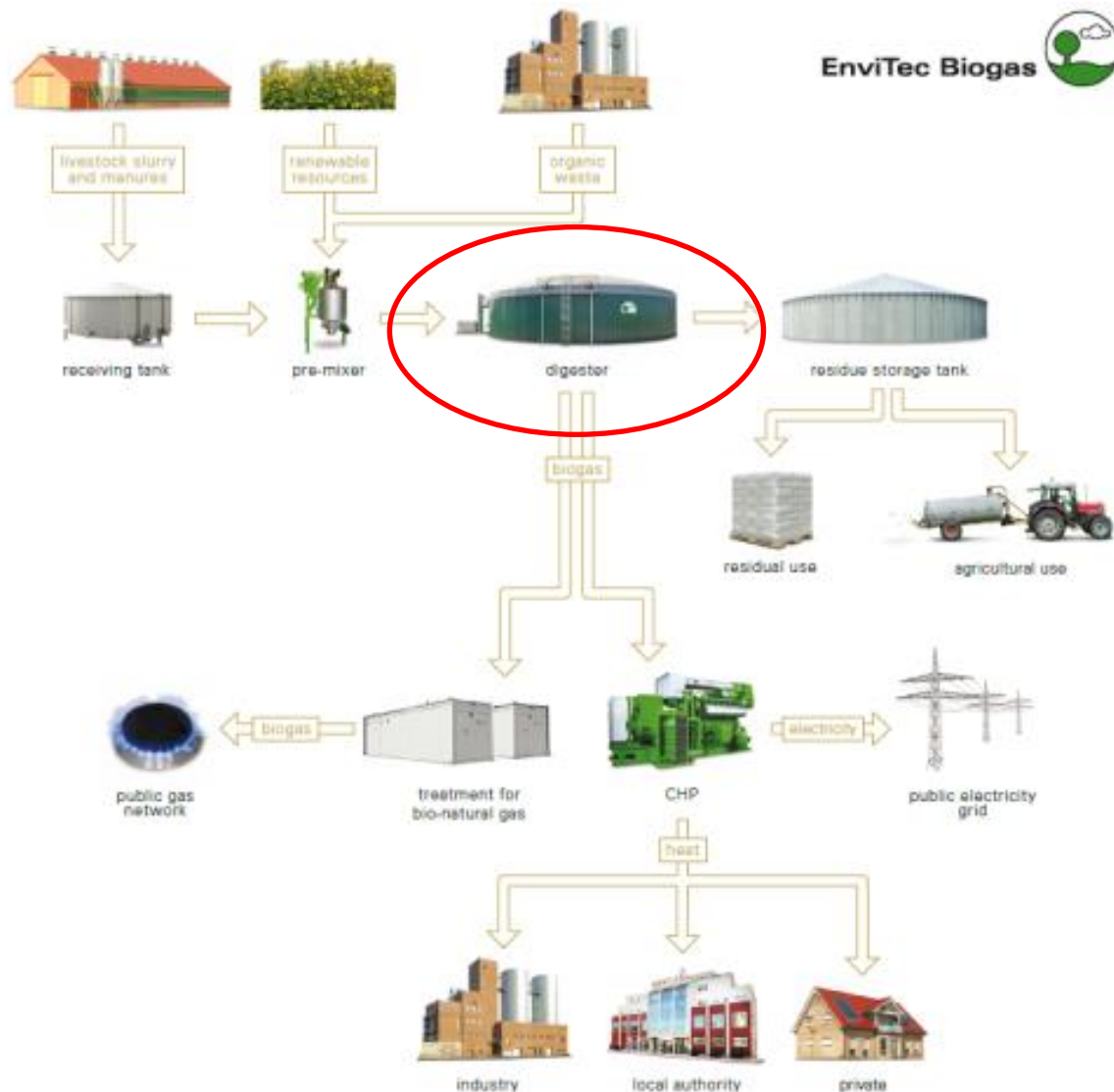
Preparation and pre-treatment
of feedstock

- Recirculation from digester



Biogas – an allrounder

- Process of energy generation

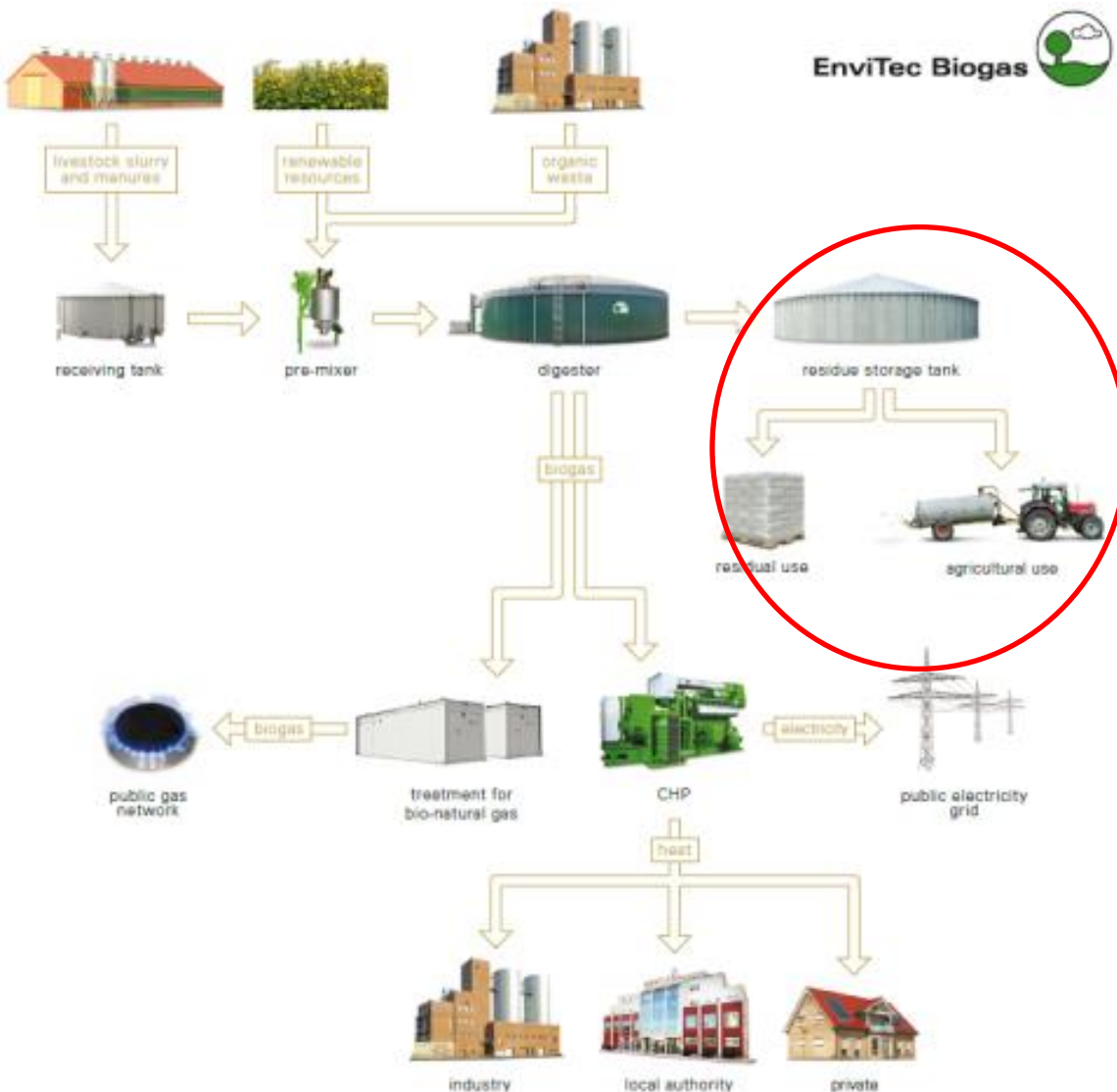


Biogas production through fermentation (system tank)

- Wet fermentation, mesophilic process
- Fully blended system

Biogas – an allrounder

- Process of energy generation

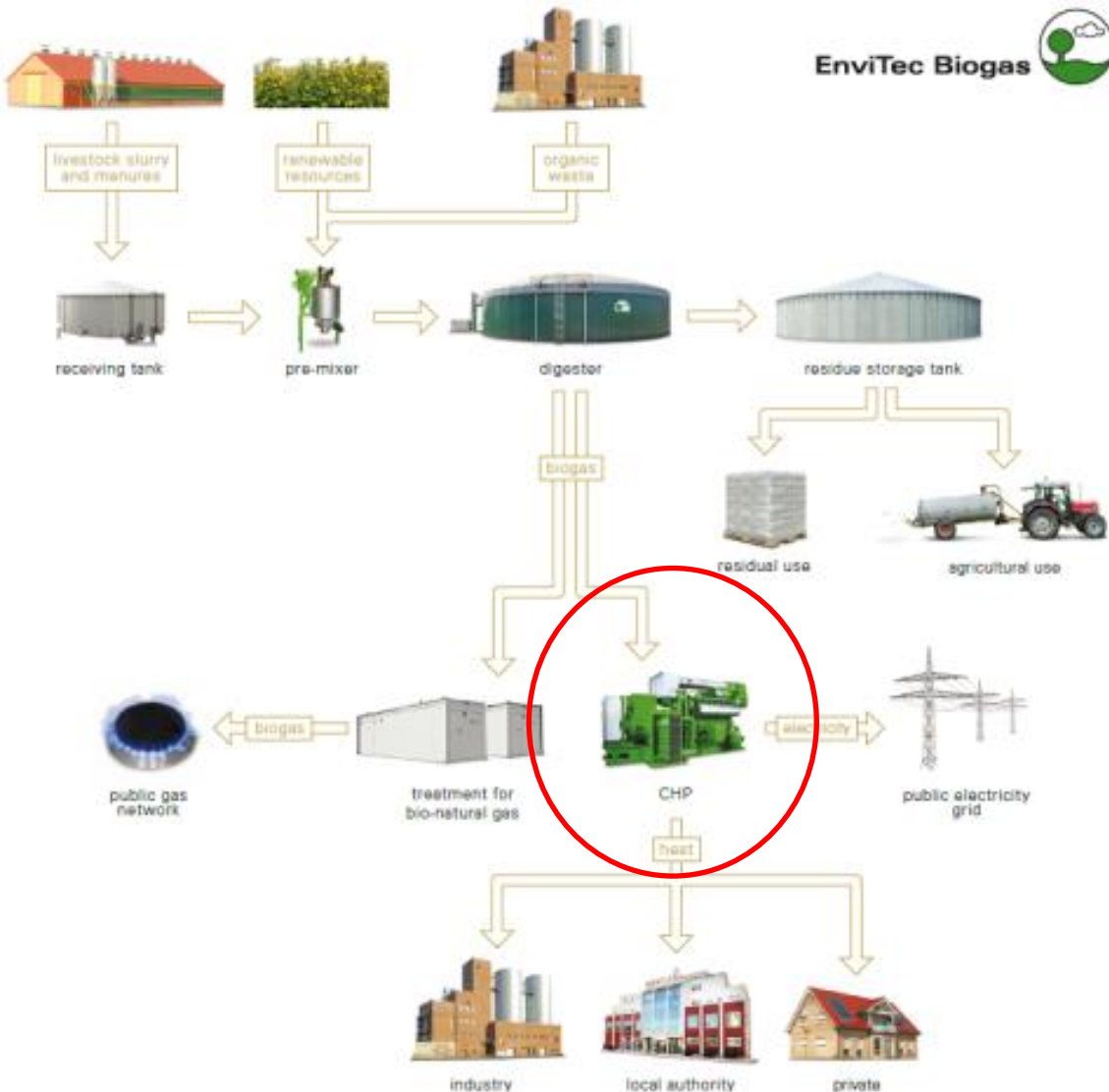


Fermented residue storage

- Usage of fermented slurry as fertilizer

Biogas – an allrounder

- Process of energy generation

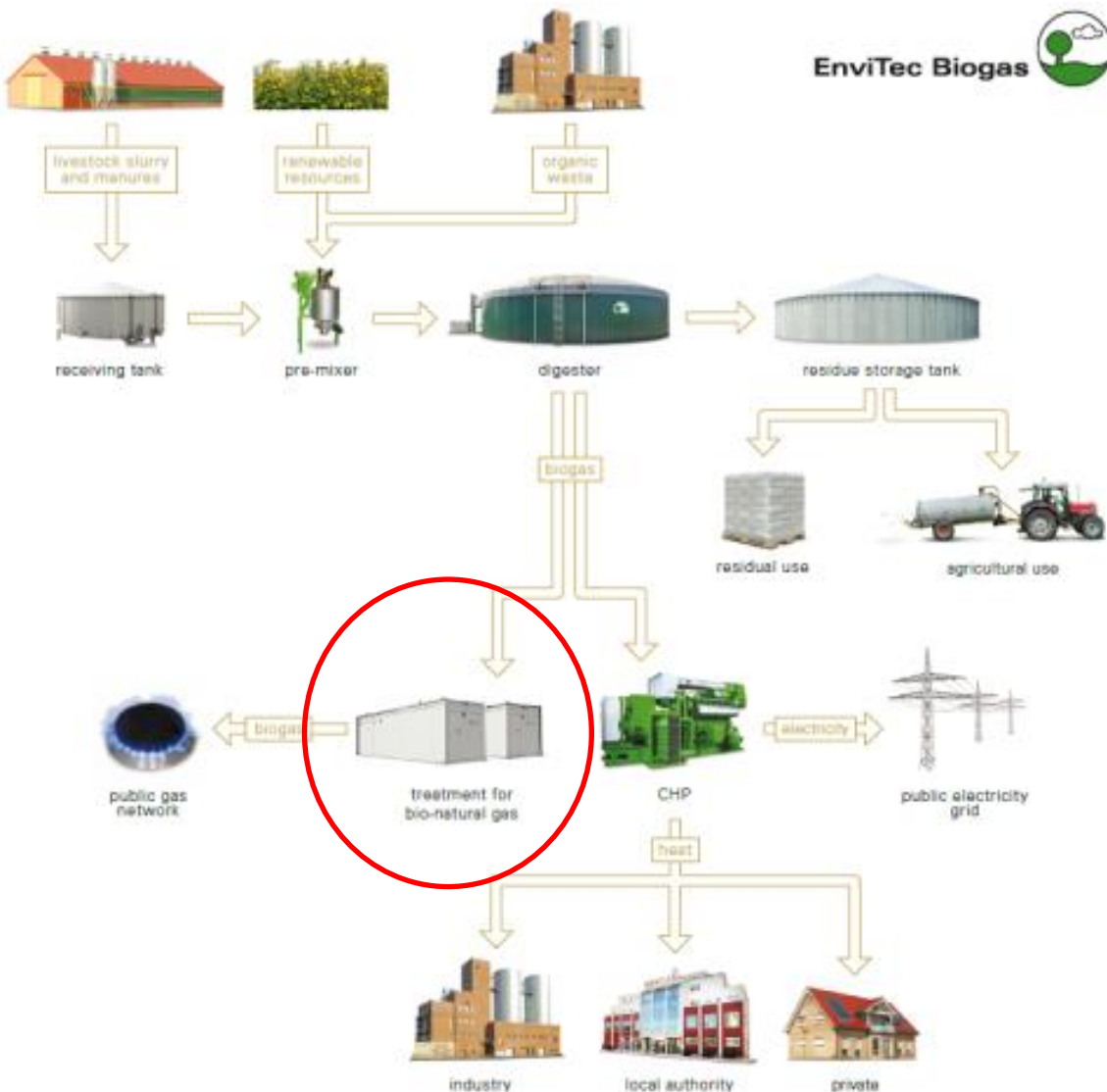


Biogas utilization

- Electricity and heat generation

Biogas – an allrounder

- Process of energy generation



Biogas utilization

- Gas upgrading

Biogas – an allrounder

- Process of energy generation



Biogas utilization

- Gas upgrading

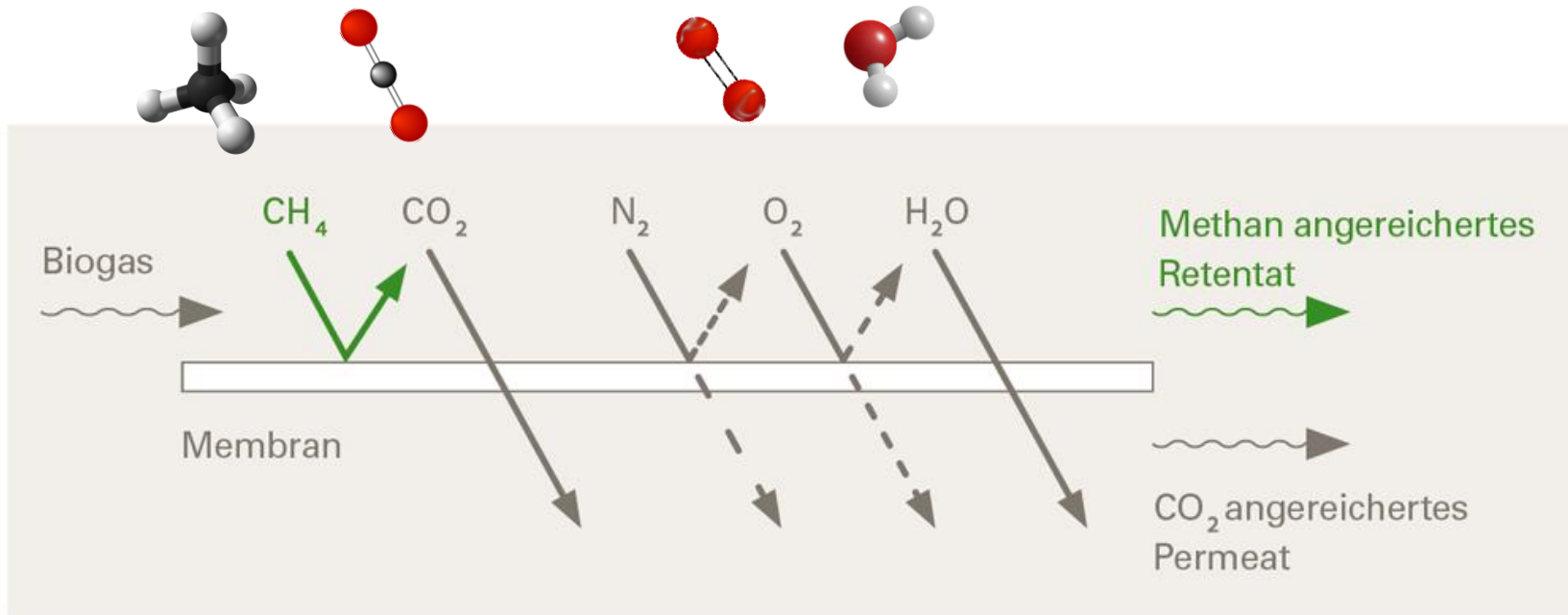


EnviThan – BIOGAS UPGRADE TO BIOMETHANE

Functionality of a Membrane

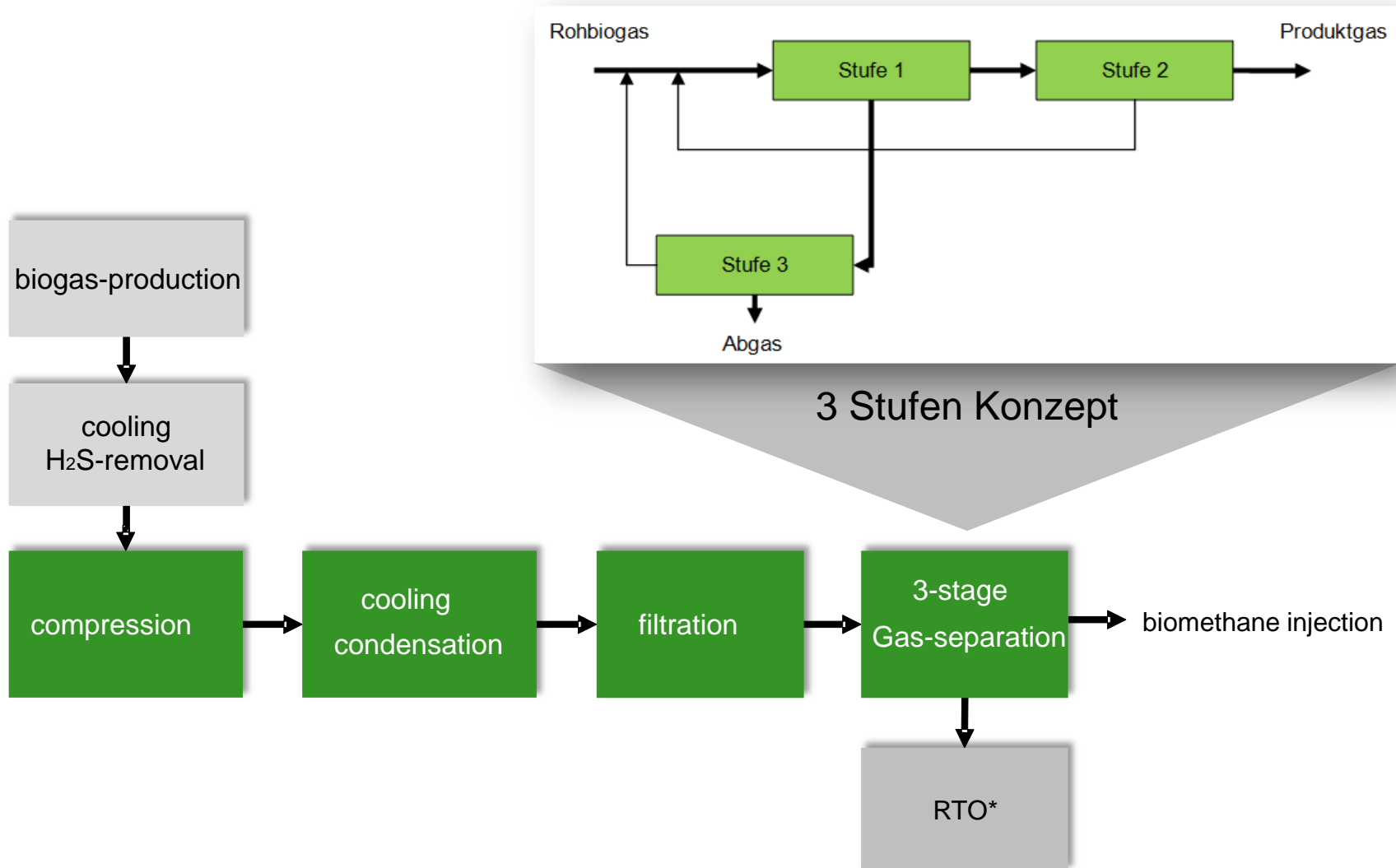
The gases have different penetration rates

Control variable: partial pressure ratio



EnviThan – BIOGAS UPGRADE TO BIOMETHANE

Schematic structure



* Regenerative thermal oxidizer

References

Gas Upgrading

Location: Güstrow (Germany)

Capacity: 5 x 2,4 MWel

In operation since: December 2009

Input material: Liquid manure,
renewable raw material

Features:

- World's largest biogas processing biogas park
- Production of 10,000 m³/h gas
- Supply 50,000 inhabitants with gas



HISTORY CASE

Gas Upgrading



Location: Köckte (Germany)

Capacity: 1,7 MWe

In operation since: September 2013

Input material: Pig and cow slurry, corn

Features:

- Production of 350 Nm³ biomethane
- 192 kWel CHP

References

Waste to energy plants

Location: Kishiwada (Osaka, Japan)

Capacity: 249 kWel

In operation since: March 2015

Input material: Waste from food

Features / Special characteristics

- Complete container solution
- Power to the public grid
- Heat utilization by the adjacent factory



HISTORY CASE

Agricultural Biogas Plants

Location: Stanley, New York (USA)

Capacity: 541 kWel

In operation since: August 2013

Input material: Manure from 1,500 Holstein dairy cows, feed refusal, yogurt processing wastes and food waste

Features:

- Biogas Project of the Year 2014.
- Since beginning of 2014, the average degree of capacity utilization exceeds 91%.



**Biogas project
of the year**



HISTORY CASE

Agricultural Biogas Plants



Location: Udine (Italy)

Capacity: 330kWel

In operation since: August 2011

Input material: Broilers manure, cow slurry, corn waste

Features:

The heating produced by the plant is used to warm up the chicken farm. Reduction of ammonia content in the residue.

HISTORY CASE

Agricultural Biogas Plants



Location: Cremona (Italy)

Capacity: 250kWel

In operation since: 10-2010

Input material: Pig slurry

Features: The heating produced by the plant is used to warm up the pig farm.

HISTORY CASE

Waste to Energy Plants



Location: Ribeauvillé (France)

Capacity: 1,4 MWeI

In operation since: January 2012

Input material: Waste from supermarkets, pig slurry

Features:

- Hygienization
- Biogas boiler
- Heat transport to swimming pool of casino
- Heating of residential building

Thank you



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