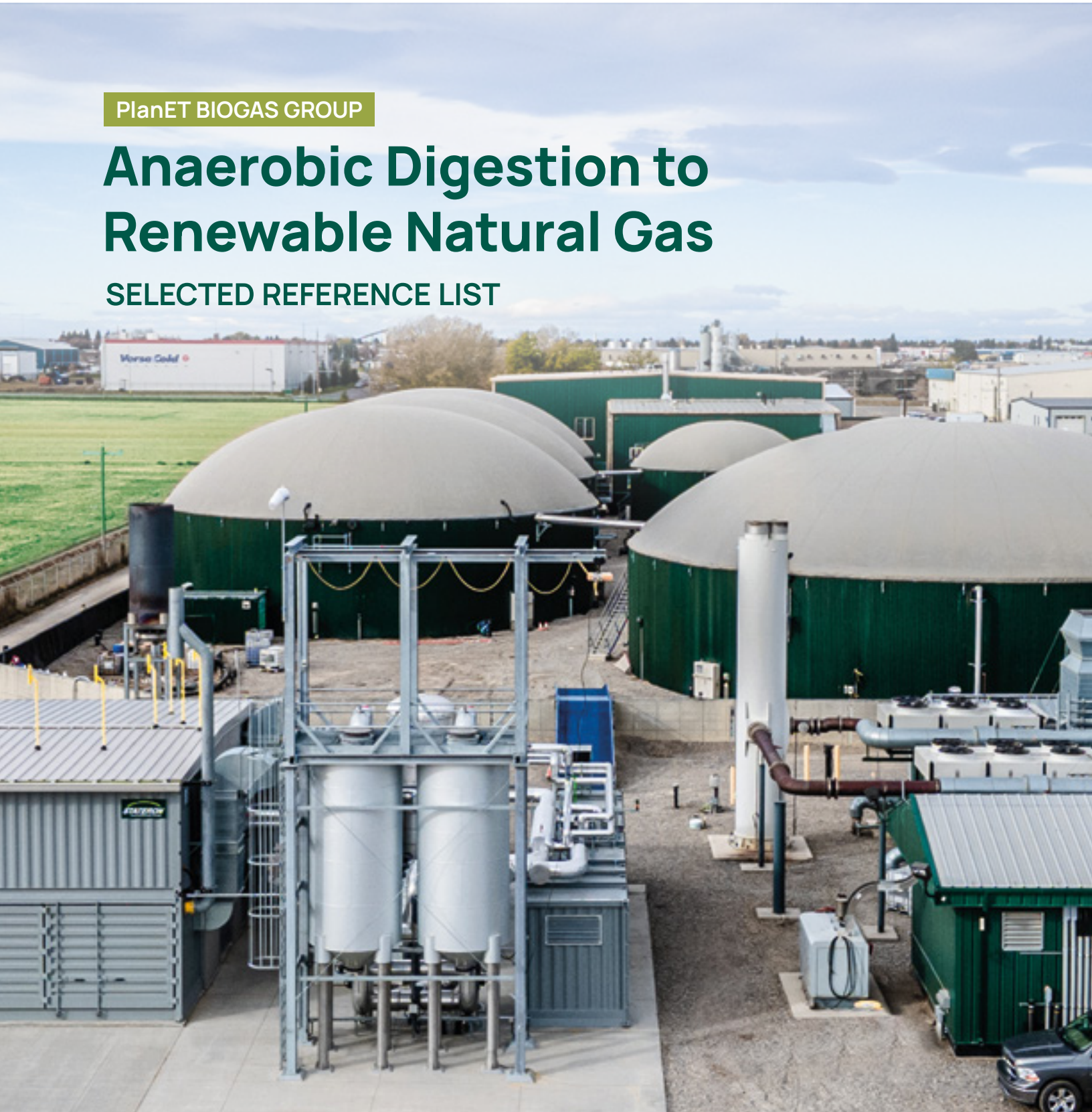


PlanET BIOGAS GROUP

# Anaerobic Digestion to Renewable Natural Gas

SELECTED REFERENCE LIST





## Neuss, 2010

**Inputs:** chicken dung, horse dung, pig slurry, maize silage

**Digestion:** digester (0.66 Mgal / 2493 m<sup>3</sup>), secondary digester (0.55 Mgal / 2078 m<sup>3</sup>), digestate storage (0.87 Mgal / 3303 m<sup>3</sup>)

**RNG Upgrader Technology:** amine scrubbing

**Biogas upgrading:** 187 scfm / 300 Nm<sup>3</sup>/h

## Abbotsford, 2011

**Inputs:** chicken dung, grass, whey, fat waste, slaughter waste

**Digestion:** digester (0.72 Mgal / 2714 m<sup>3</sup>), secondary digester (0.72 Mgal / 2714 m<sup>3</sup>), 2 digestate storage (0.72 Mgal / 2714 m<sup>3</sup> each)

**RNG Upgrader Technology:** water wash

**Biogas upgrading:** 498 scfm / 800 Nm<sup>3</sup>/h

## Müden/Aller, 2011

**Inputs:** maize, whole-plant-silage, slurry, manure

**Digestion:** 2 digesters (1.30 Mgal / 4926 m<sup>3</sup> each), 2 secondary digesters (1.04 Mgal / 3927 m<sup>3</sup> each), 3 digestate storages

**RNG Upgrader Technology:** amine scrubbing

**Biogas upgrading:** 436 scfm / 700 Nm<sup>3</sup>/h

**CHP electrical output:** 3.4 MW<sub>e</sub>

## Liffré, 2015

**Inputs:** cattle slurry and manure, maize, apple pomace and diverse coferments

**Digestion:** digester (0.78 Mgal / 2945 m<sup>3</sup>), digestate storage (0.78 Mgal / 2945 m<sup>3</sup>)

**Extension 2019:** digester (0.60 Mgal / 2281 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 87 scfm / 140 Nm<sup>3</sup>/h expanded to 187 scfm / 300 Nm<sup>3</sup>/h in 2019

AD = Anaerobic Digestion, RNG = Renewable Natural Gas

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## Walchum, 2015

**Inputs:** dry chicken dung, maize

**Digestion:** digester (1.04 Mgal / 3927 m<sup>3</sup>),  
digestate storage (1.60 Mgal / 6038 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 143 scfm / 230 Nm<sup>3</sup>/h

**CHP electrical output:** 100 kW<sub>e</sub>

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## Sand Hutton, 2016

**Inputs:** cattle slurry and manure, chicken manure,  
grass, maize, potatoes, beets

**Digestion:** digester (1.49 Mgal / 5655 m<sup>3</sup>),  
secondary digester (1.49 Mgal / 5655 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 374 scfm / 600 Nm<sup>3</sup>/h

**CHP electrical output:** 250 kW<sub>e</sub>

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## Thierville-sur-Meuse, 2018

**Inputs:** pig slurry, cattle and chicken manure, maize,  
straw, recirculate

**Digestion:** digester (0.66 Mgal / 2493 m<sup>3</sup>),  
secondary digester (0.66 Mgal / 2493 m<sup>3</sup>),  
digestate storage (1.70 Mgal / 6434 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 93 scfm / 150 Nm<sup>3</sup>/h

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## Golzow, 2015

**Inputs:** duck manure, maize, recirculate

**Digestion:** 2 digesters (1.49 Mgal / 5655 m<sup>3</sup> each),  
2 digestate storages (2.03 Mgal / 7697 m<sup>3</sup> each)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 436 scfm / 700 Nm<sup>3</sup>/h

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## Girancourt, 2018

**Inputs:** cattle slurry, cattle manure, maize silage,  
grass silage

**Digestion:** digester (1.04 Mgal / 3927 m<sup>3</sup>),  
secondary digester (1.04 Mgal / 3927 m<sup>3</sup>),  
digestate storage (0.96 Mgal / 3619 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 156 scfm / 250 Nm<sup>3</sup>/h

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## Aiguefonde, 2018

**Inputs:** cattle slurry and manure, paunch contents,  
green rye, maize straw, grass

**Digestion:** digester (0.78 Mgal / 2945 m<sup>3</sup>),  
secondary digester (0.40 Mgal / 1527 m<sup>3</sup>) lagoon

**RNG Upgrader Technology:** Pressure Swing  
Adsorption (PSA)

**Biogas upgrading:** 100 scfm / 160 Nm<sup>3</sup>/h

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## 🇫🇷 Iffendic, 2019

**Inputs:** cattle slurry, cattle manure, chicken manure, maize silage, catch crop (green rye)

**Digestion:** digester (0.66 Mgal / 2493 m<sup>3</sup>), secondary digester (0.66 Mgal / 2493 m<sup>3</sup>), digestate storage (1.12 Mgal / 4241 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 118 scfm / 190 Nm<sup>3</sup>/h

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## 🇫🇷 Saint-Laurent-Chabreuges, 2019

**Inputs:** cattle slurry and manure, catch crops (maize, sorghum, green rye) maize straw

**Digestion:** digester (1.04 Mgal / 3927 m<sup>3</sup>), digestate storage (0.66 Mgal / 2493 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 84 scfm / 135 Nm<sup>3</sup>/h

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## 🇫🇷 Villers-les-Ormes, 2019

**Inputs:** grass silage, cereal waste

**Digestion:** 2 digesters (0.88 Mgal / 3324 m<sup>3</sup> each), digestate storage (1.21 Mgal / 4580 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 187 scfm / 300 Nm<sup>3</sup>/h

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## 🇫🇷 Cerisy belle Etoile, 2019

**Inputs:** cow slurry and manure, maize silage, catch crops (green rye)

**Digestion:** digester (0.60 Mgal / 2281 m<sup>3</sup>), secondary digester (0.60 Mgal / 2281 m<sup>3</sup>), existing digestate storage

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 112 scfm / 180 Nm<sup>3</sup>/h

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## 🇫🇷 Argentan, 2019

**Inputs:** sugar beets, green rye, maize silage

**Digestion:** 2 digesters (1.12 Mgal / 4247 m<sup>3</sup> each), digestate storage (1.70 Mgal / 6434 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 274 scfm / 440 Nm<sup>3</sup>/h

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## 🇫🇷 Laulne, 2019

**Inputs:** cow slurry and manure, maize silage

**Digestion:** digester (0.88 Mgal / 3324 m<sup>3</sup>), digestate storage (0.88 Mgal / 3324 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 65 scfm / 105 Nm<sup>3</sup>/h

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## Isigny sur Mer, 2020

**Inputs:** cow slurry and manure,

**Digestion:** 2 digesters (0.80 Mgal / 3041 m<sup>3</sup> each),  
digestate storage (0.80 Mgal / 3041 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 312 scfm / 500 Nm<sup>3</sup>/h

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## Dommartin la Franc, 2020

**Inputs:** chicken dung

**Digestion:** digester (0.66 Mgal / 2493 m<sup>3</sup>),  
secondary digester (0.55 Mgal / 2078 m<sup>3</sup>),  
digestate storage (0.87 Mgal / 3303 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 137 scfm / 220 Nm<sup>3</sup>/h

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## Cintré, 2020

**Inputs:** cow slurry and manure, maize silage, catch  
crops (green rye), pig manure, fruit marc

**Digestion:** digester (0.40 Mgal / 1527 m<sup>3</sup>),  
digestate storage (0.40 Mgal / 1527 m<sup>3</sup>) existing

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 131 scfm / 210 Nm<sup>3</sup>/h

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## Grand Marsh, 2020

**Inputs:** cow manure

**Digestion:** 4 digesters (1.49 Mgal / 5655 m<sup>3</sup> each)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 623 scfm / 1000 Nm<sup>3</sup>/h

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## Pickett, 2020

**Inputs:** cow manure

**Digestion:** 4 digesters (1.49 Mgal / 5655 m<sup>3</sup> each)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 623 scfm / 1000 Nm<sup>3</sup>/h

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## Casco, 2021

**Inputs:** cow manure

**Digestion:** 4 digesters (1.49 Mgal / 5655 m<sup>3</sup> each)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 623 scfm / 1000 Nm<sup>3</sup>/h

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## Le Louroux, 2020

**Inputs:** pit slurry, catch crops (green rye), cattle manure

**Digestion:** 2 digesters (0.55 Mgal / 2078 m<sup>3</sup> each),  
digestate storage

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 131 scfm / 210 Nm<sup>3</sup>/h

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## Bourbonne-les-bains, 2020

**Inputs:** cattle manure

**Digestion:** digester (0.66 Mgal / 2493 m<sup>3</sup>),  
secondary digester (0.55 Mgal / 2078 m<sup>3</sup>),  
digestate storage (0.87 Mgal / 3303 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 118 scfm / 190 Nm<sup>3</sup>/h

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## Saint Sulpice, 2020

**Inputs:** duck slurry, cattle slurry, catch crops (green rye)

**Digestion:** digester (0.88 Mgal / 3324 m<sup>3</sup>), digestate storage

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 93 scfm / 150 Nm<sup>3</sup>/h

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## Levignen, 2020

**Inputs:** sugar beets, catch crops (green rye), barley

**Digestion:** digester (0.72 Mgal / 2714 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 93 scfm / 150 Nm<sup>3</sup>/h

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## Liffré, 2020

**Inputs:** cow slurry, catch crops (green rye), sorghum

**Digestion:** digester (0.73 Mgal / 2771 m<sup>3</sup>), digestate storage (0.80 Mgal / 3041 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 75 scfm / 120 Nm<sup>3</sup>/h

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## Coëx, 2020

**Inputs:** maize silage, sorghum, recirculate

**Digestion:** digester (0.55 Mgal / 2078 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 218 scfm / 350 Nm<sup>3</sup>/h

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## Raray, 2020

**Inputs:** sugar beets, catch crops (green rye), recirculate

**Digestion:** 2 digesters (0.96 Mgal / 3619 m<sup>3</sup> each)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 131 scfm / 210 Nm<sup>3</sup>/h

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## Le Louroux, 2020

**Inputs:** pig slurry, cattle manure, catch crops (green rye)

**Digestion:** digesters (0.88 Mgal / 3324 m<sup>3</sup>), digestate storage (1.70 Mgal / 6434 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 93 scfm / 150 Nm<sup>3</sup>/h

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## Iffendic, 2020

**Inputs:** cow slurry and manure, maize silage

**Digestion:** digester (0.78 Mgal / 2945 m<sup>3</sup>),  
digestate storage (0.78 Mgal / 2945 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 72 scfm / 115 Nm<sup>3</sup>/h

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## Plourin les Morlaix, 2020

**Inputs:** cattle slurry, grass silage, maize silage

**Digestion:** digester (0.66 Mgal / 2493 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 87 scfm / 140 Nm<sup>3</sup>/h

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## Acreúna, 2021

**Inputs:** sugarcane filter cake, vinasse

**Digestion:** VALENTIN steel tank (0.25 Mgal / 942 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 17 scfm / 27 Nm<sup>3</sup>/h

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## Aiguefonde, 2021

**Inputs:** liquid fatty materials, cow slurry, maize silage

**Digestion:** digester (0.78 Mgal / 2945 m<sup>3</sup>),  
digestate storage (1.12 Mgal / 4241 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 75 scfm / 120 Nm<sup>3</sup>/h

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## Espechede, 2021

**Inputs:** cow slurry, grass silage, cow manure

**Digestion:** digesters (0.50 Mgal / 1885 m<sup>3</sup>),  
secondary digester (0.50 Mgal / 1885 m<sup>3</sup>),  
digestate storage (1.12 Mgal / 4241 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 87 scfm / 140 Nm<sup>3</sup>/h

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## Saint d'Aubin, 2021

**Inputs:** cow slurry and manure, catch crops (green rye)

**Digestion:** digester (0.78 Mgal / 2945 m<sup>3</sup>),  
digestate storage (0.78 Mgal / 2945 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 84 scfm / 135 Nm<sup>3</sup>/h



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## 🇫🇷 La Ferté, 2021

**Inputs:** endive roots and leaves, maize silage, sugar beets

**Digestion:** 2 digesters (0.60 Mgal / 2281 m<sup>3</sup> each), digestate storage

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 103 scfm / 165 Nm<sup>3</sup>/h

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## 🇫🇷 Came, 2021

**Inputs:** pit slurry, catch crops (green rye), cattle manure

**Digestion:** 2 digesters (0.55 Mgal / 2078 m<sup>3</sup> each), digestate storage

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 106 scfm / 170 Nm<sup>3</sup>/h

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## 🇫🇷 Marollais les Braults, 2021

**Inputs:** grass silage, catch crops (green rye), cow slurry

**Digestion:** digester (1.04 Mgal / 3927 m<sup>3</sup>), digestate storage (1.49 Mgal / 5655 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 143 scfm / 230 Nm<sup>3</sup>/h

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## 🇫🇷 Grand Camp, 2021

**Inputs:** catch crops (green rye), green waste, maize silage

**Digestion:** digester (1.04 Mgal / 3927 m<sup>3</sup>), digestate storage (1.04 Mgal / 3927 m<sup>3</sup>),

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 131 scfm / 210 Nm<sup>3</sup>/h

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## Bailleul, 2021

**Inputs:** catch crop (green rye), cow manure, recirculate

**Digestion:** 2 digesters (0.73 Mgal / 2771 m<sup>3</sup> each),  
digestate storage

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 146 scfm / 235 Nm<sup>3</sup>/h

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## Faviere, 2021

**Inputs:** cattle manure, recirculate, maize silage

**Digestion:** digester (0.66 Mgal / 2493 m<sup>3</sup>),  
digestate storage (0.66 Mgal / 2493 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 78 scfm / 125 Nm<sup>3</sup>/h

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## Pontorson, 2021

**Inputs:** catch crop (green rye), green waste, cow slurry

**Digestion:** digester (0.60 Mgal / 2281 m<sup>3</sup>),  
secondary digester (0.60 Mgal / 2281 m<sup>3</sup>)

**RNG Upgrader Technology:** membrane separation

**Biogas upgrading:** 190 scfm / 305 Nm<sup>3</sup>/h

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## Eaton, 2021

**Inputs:** cow manure

**Digestion:** 2 digesters (1.80 Mgal / 6809 m<sup>3</sup> each)  
steel tanks

**RNG Upgrader Technology:** membrane separation

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 **Ault, 2021**

**Inputs:** cow manure

**Digestion:** digester (1.80 Mgal / 6809 m<sup>3</sup>) steel tank

**RNG Upgrader Technology:** membrane separation

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 **Pierce, 2021**

**Inputs:** cow manure

**Digestion:** 2 digester (1.80 Mgal / 6809 m<sup>3</sup> each) steel tanks

**RNG Upgrader Technology:** membrane separation

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 **Lethbridge, 2013 & 2021**

**Inputs:** cow, hog & poultry manure, specified risk material (SRM), slaughterhouse wastes, deadstock, food waste, fats, oils and greases (FOG), whey, potato residuals

**Digestion:** 3 digesters (1.04 Mgal / 3927 m<sup>3</sup> each), digestate storage (1.49 Mgal / 5655 m<sup>3</sup>)

**RNG Upgrader Technology:** Pressure swing adsorption (PSA)

**Biogas upgrading:** 1190 scfm / 1920 Nm<sup>3</sup>/h

**CHP electrical output:** 2.85 MW<sub>e</sub>

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