

An aerial photograph of a multi-lane highway bridge crossing a river. The surrounding landscape is covered in trees with vibrant autumn foliage in shades of yellow and orange. On the left bank, there are several red-roofed buildings. A boat is visible on the river in the upper left, leaving a white wake. The sky is clear and blue.

Gasum

CLEANER ENERGY



Gasum

ENERGY COMPANY GASUM IN 2018

REVENUE
€1,177 million

.....

OPERATING PROFIT
€124 million

.....

BALANCE SHEET TOTAL
€1,527 million

.....

INVESTMENTS
€48 million

.....

EQUITY RATIO
43.7%



SALES OF NATURAL GAS
BUSINESS
24.7 TWh

.....

SALES OF BIOGAS BUSINESS
517.7 GWh

.....

SALES OF LNG BUSINESS
6.3 TWh

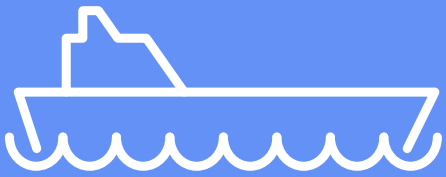
.....

PERSONELL
434

.....

THE OWNERSHIP
100% Finnish State

BUSINESS UNITS



**NATURAL GAS
AND LNG**



BIOGAS



**PORTFOLIO
MANAGEMENT
AND TRADING**



TRAFFIC

Gasum

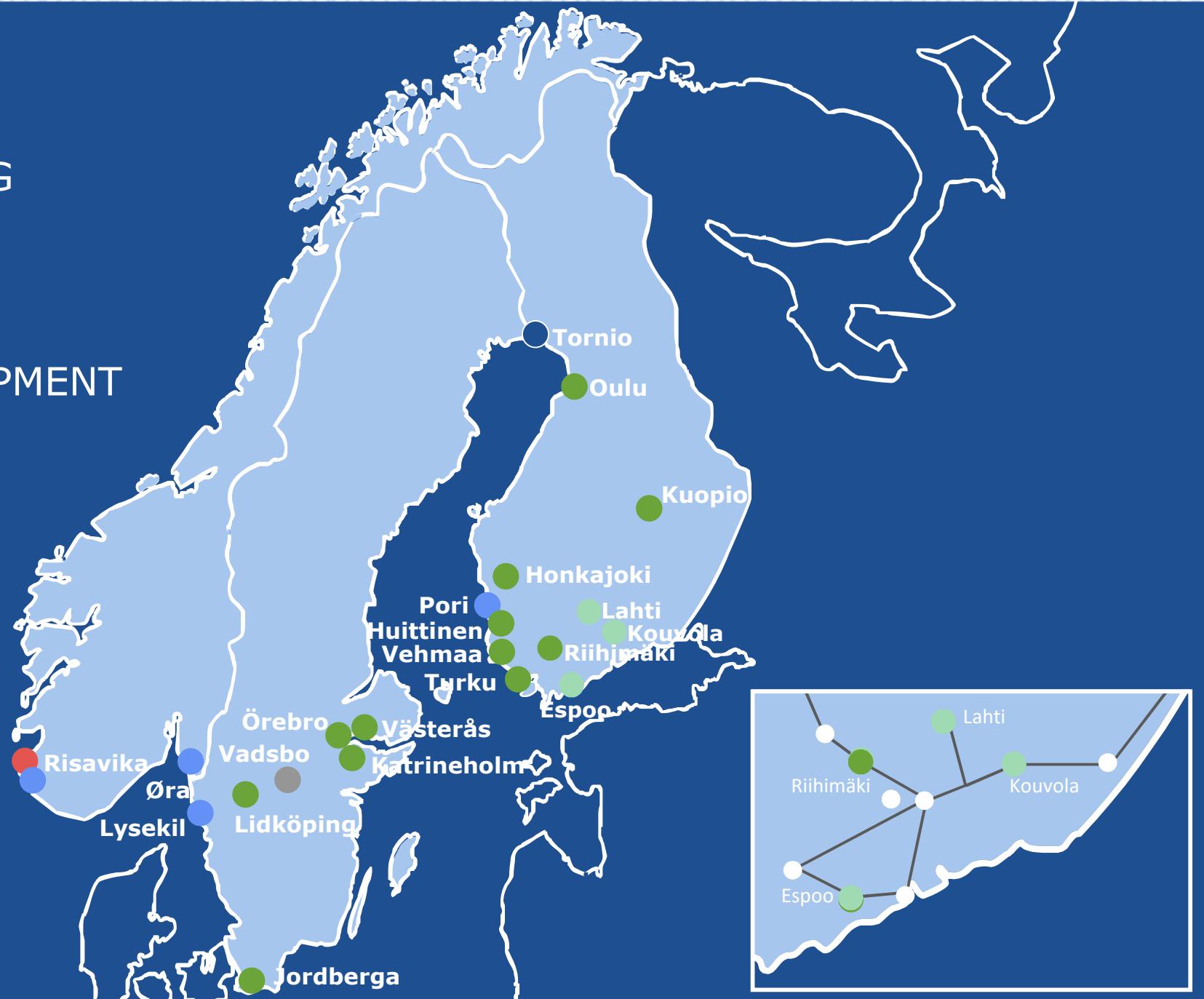
BIOGAS BUSINESS UNIT

The Biogas business unit is responsible for promoting the circular economy, increasing biogas production capacity and selling recycled nutrients and biogas.

Gasum is the leading supplier of biogas in the Nordic countries.

GASUM IS DEVELOPING THE NORDIC GAS ECOSYSTEM AND PROMOTING SUSTAINABLE DEVELOPMENT

- LNG production plant
- LNG terminal
- LNG terminal (joint project)
- Gasum, biogas
- Gasum, biowaste and biogas
- Biogas production plant (joint project)



BIOGAS PLANTS IN SWEDEN

- BIOGAS 290 GWH/A



Jordberga



Katrineholm



Örebro



Västerås



Lidköping

From 2014	From 2010	From 2009	From 2014	From 2011
110 GWh/a	26 GWh/a	55 GWh/a	28 GWh/a	65 GWh/a
Co digestion veg origin	Manure/ABP + co digestion veg origin	Co digestion veg origin	Manure/ABP + co digestion veg origin	Co digestion veg origin
80 000 ton biofertilizer	80 000 ton biofertilizer	65 000 ton biofertilizer	70 000 ton biofertilizer	80 000 ton biofertilizer

*In addition Gasum has a 50% shareholding in Vadsbo Biogas in Sweden.

BIOGAS PLANTS IN FINLAND

– BIOGAS 240 GWH/A, WASTE MANAGEMENT CAPACITY 450,000 TN/A



Riihimäki

Huittinen

Honkajoki

Turku

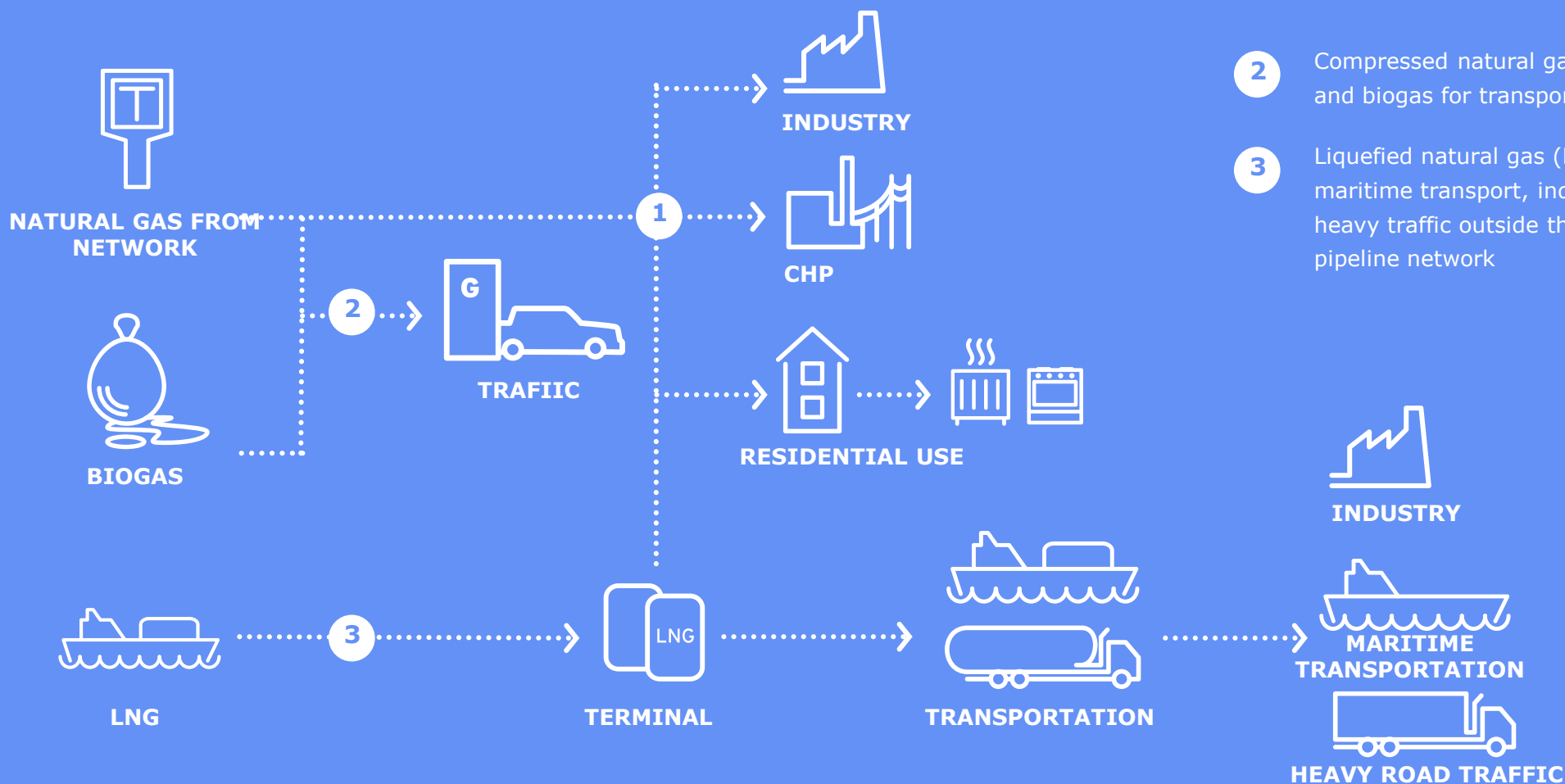
Kuopio

Oulu

Vehmaa

From 2016	From 2010	From 2014	From 2009	From 2014	From 2015	From 2005
47 GWh/a	30 GWh/a	34 GWh/a	30 GWh/a, after extension 60 GWh/a	30 GWh/a	35 GWh/a	32 GWh/a
75,000 tn/a	60,000 tn/a	60,000 tn/a	75,000 tn/a, expansion 110,000 tn/a	60,000 tn/a	60,000 tn/a	105,000 tn/a
Connected to the main gas grid	Local gas grid – industrial use Container filling station in project planning phase	CHP use	CHP use LBG production in project execution phase	CHP use	Local gas grid – industrial use Container filling station in project execution phase	CHP use

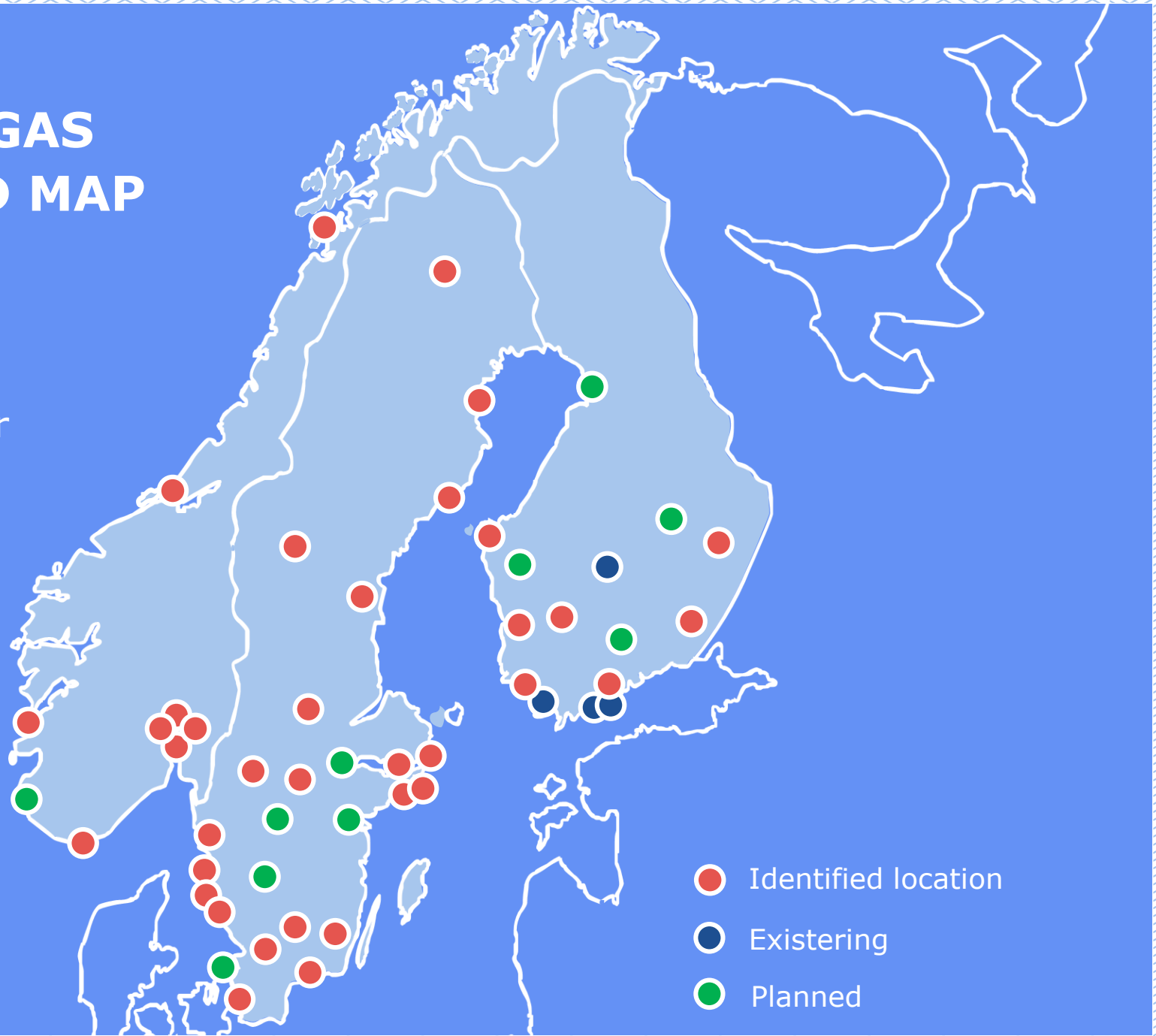
DIVERSE NATURAL ENERGY GASES



- 1 Natural gas for industrial and municipal electricity and heat production, as well as home needs.
- 2 Compressed natural gas (CNG) and biogas for transport use
- 3 Liquefied natural gas (LNG) for maritime transport, industry and heavy traffic outside the gas pipeline network

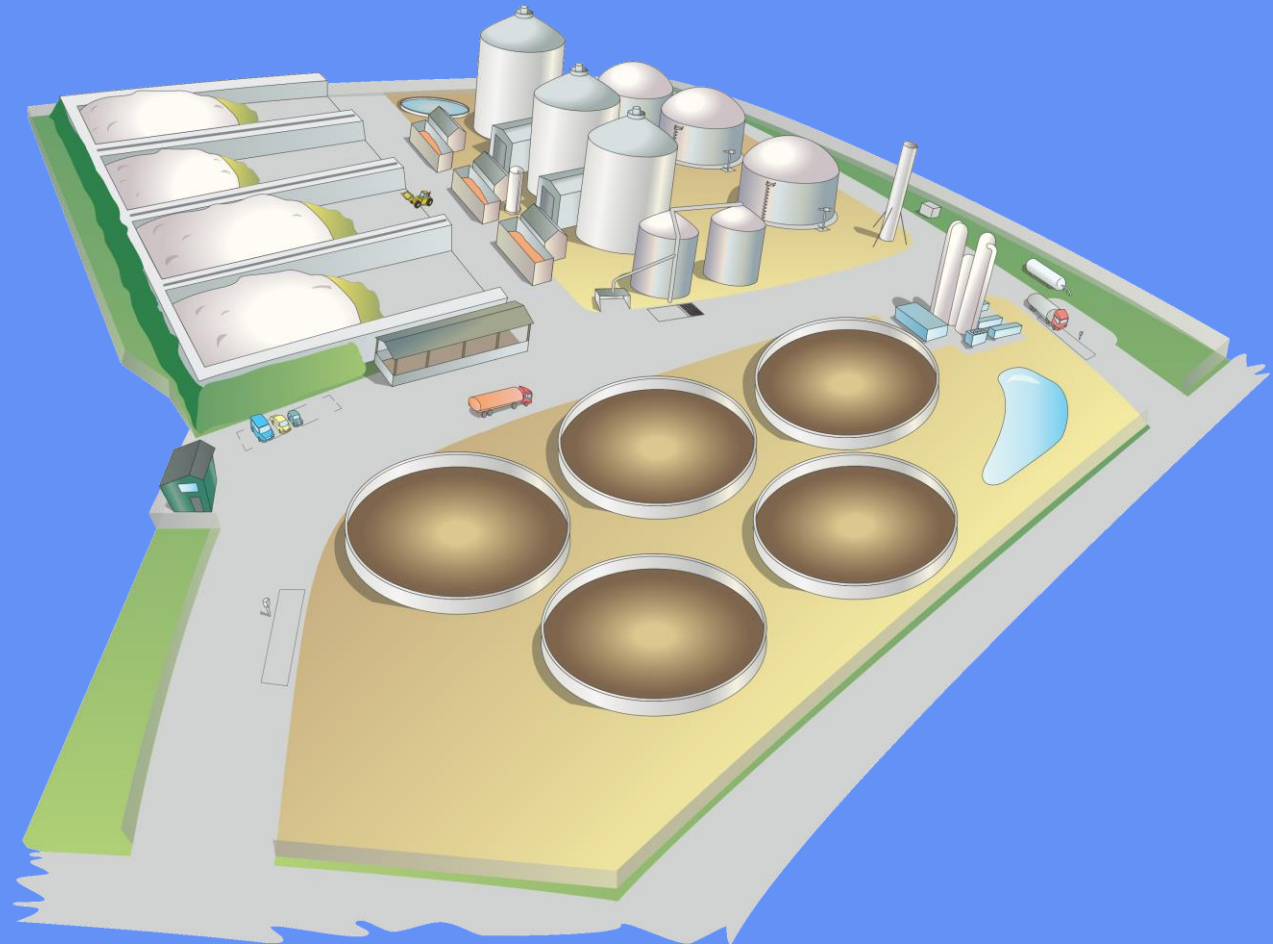
GASUM'S HEAVY-DUTY GAS FILLING STATION ROAD MAP

- The map show Gasum's ambition to quickly make LBG/LNG accessible as an attractive fuel for heavy duty vehicles
- During an start-up phase, in the first part of 2020-ies, 50 filling stations will e established, of which at least 25 in Sweden



Welcome to Gasum Jordberga

Gasum



JORDBERGA, SWEDEN

- Biogas production capacity 110 GWh/a
- Biogas upgraded to vehicle fuel, injection to natural gas grid.
- Co-digestion of industrial residues of vegetable origin, residues from agriculture, crops etc.
- Organic fertilizers ~80,000 tn/a
- In operation since 2014

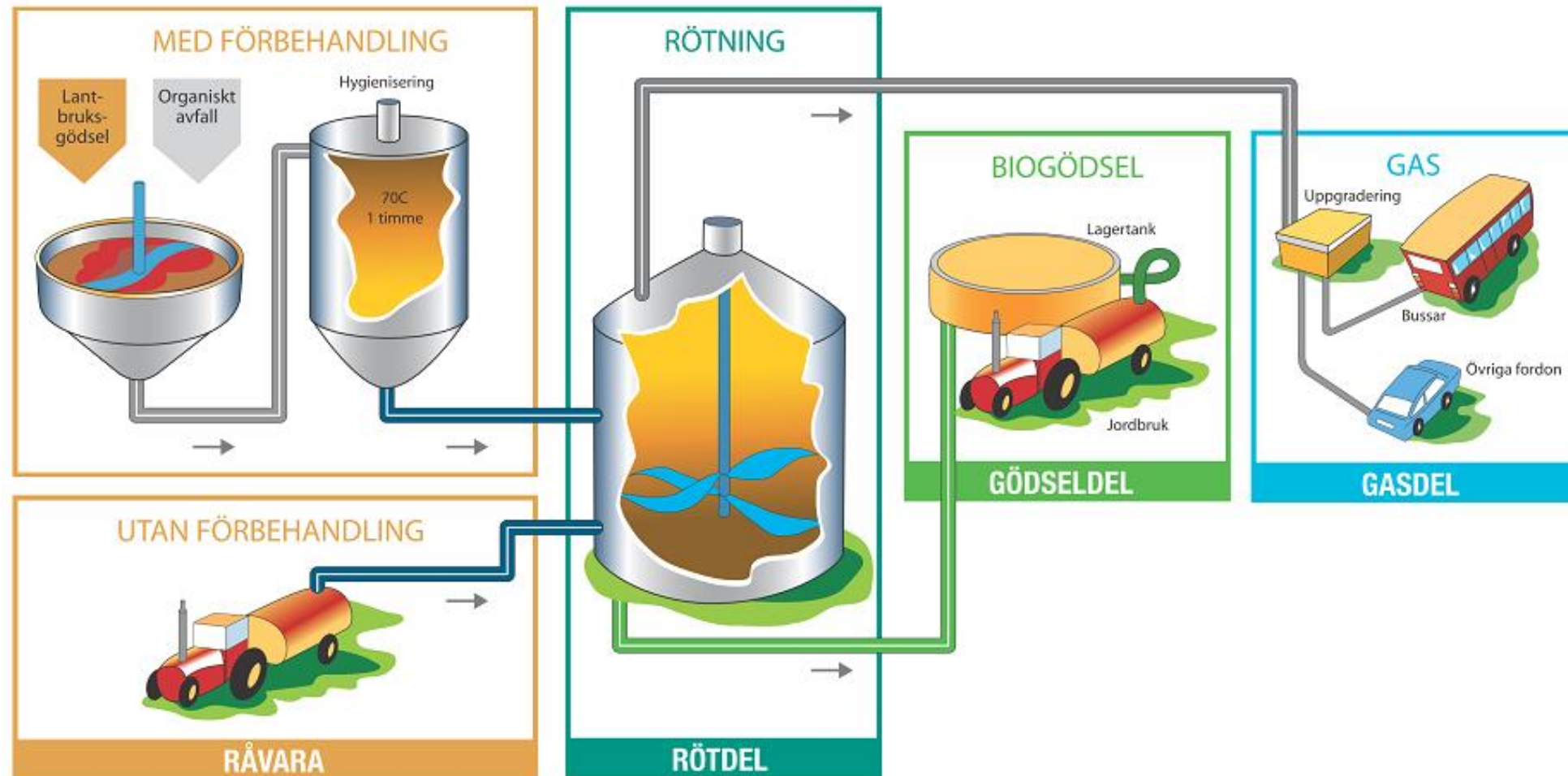




SUBSTRATES FOR BIOGAS PRODUCTION

- Crops, whole seed and corn
- Grain
- Flour
- Residues from milling/grain handling facilities ("Avrens")
- peanuts
- Carrots
- Sugar beet residues
- Etc...

PROCESS FLOW OF BIOGAS PRODUCTION



DIGESTION PROCESS

- Continuous feeding
- Finely ground raw material
- Constant mixing
- pH ~7
- Mesophilic temperature, 38-40°C
- Total retention time 70-90 days



UPPGRADING OF BIOGAS

- Water scrubber
- Washes away primarily CO₂
- Methane content raised from 55% to 97%

RTO

Incineration in ceramic bed at 1000°C

- Removes methane and hydrogen sulfide from the air by incineration
- < 0,5% methane slip
- < 5 ppm hydrogen sulfide

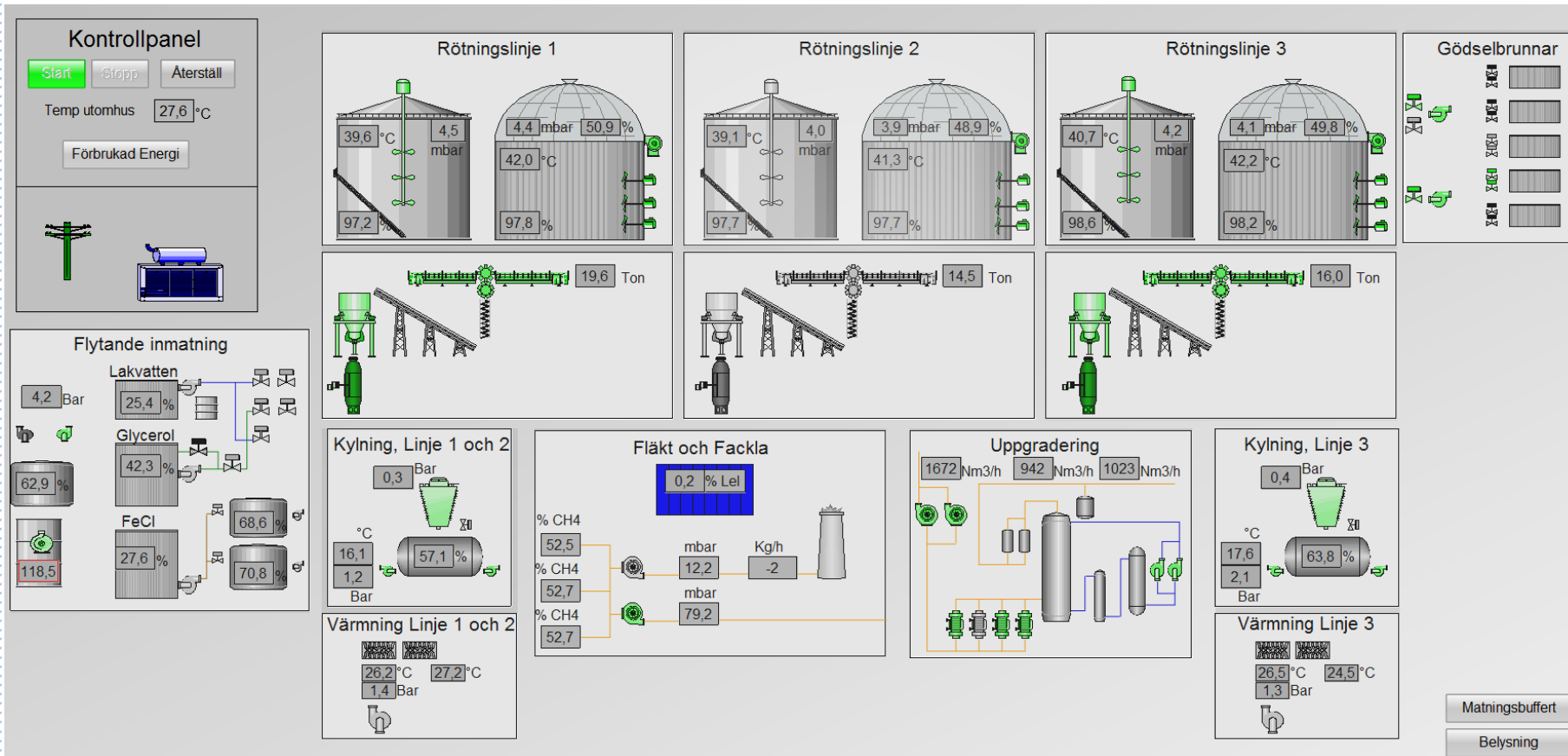




BIOFERTILIZER

- ~80 000 tons of high quality bio fertilizer
- Whole volume approved for organic (KRAV) farming
- SPCR 120 certified
- Local farmers
- Closes the loop for nutrient, and replace large amounts of mineral fertilizer

PROCESS MONITORING



- Physical monitoring
- Control system monitoring
- Sampling and analyzes

WE ♥ GAS