

REGIONAL RECYCLING MANAGEMENT

FOR OUR FUTURE



Supported Project by EU Life+
LIFE12 ENV/IT/000671
OPTIMAL - OPTimized nutrients MAnagement
from Livestock production in Alto Adige



**BIOGAS
WIPPTAL**

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CHALLENGES IN ALPINE AGRICULTURE

- ✓ Slopes with an inclination of $>15\%$
- ✓ The ballanced distribution of fertilizer, oversaturation of fields and high ammonia emissions when applying manure / liquid manure
- ✓ Conflicts with tourism (odors)
- ✓ Increased sealing of agricultural lands

Nitrogen excretion (kg / year)		
Livestock in grasslands	N [nitrogen]	
Dairy cow (8,000 kg milk)	124	kg
Dairy cow (10,000 kg milk)	141	kg

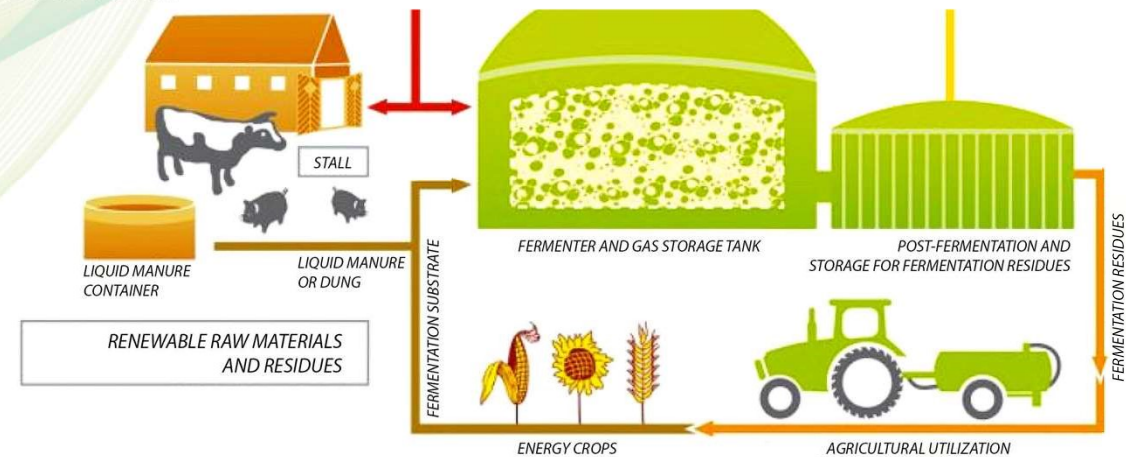
source: Bavarian state ministry for agriculture



Why make biogas?

- ✓ Fermentation residues yield a homogeneous, almost entirely odorless fertilizer which does not impair the soil's pH value.
- ✓ In confront to liquid manure, fertilizers obtained from fermented dung result in hardly any leaching-out of nitrates.
- ✓ The use of fermented residues has been proven to incur lower levels of CO₂ emissions than liquid manure and dung, and the resultant methane is not released into the atmosphere.
- ✓ Organic fertilizers derived from fermented residues are rich of nutrients and have a long-lasting and positive effect upon the soil flora.
- ✓ Long-term availability of nutrients.

It thus represents an active contribution to climate protection!



Biogas Wipptal 2.0

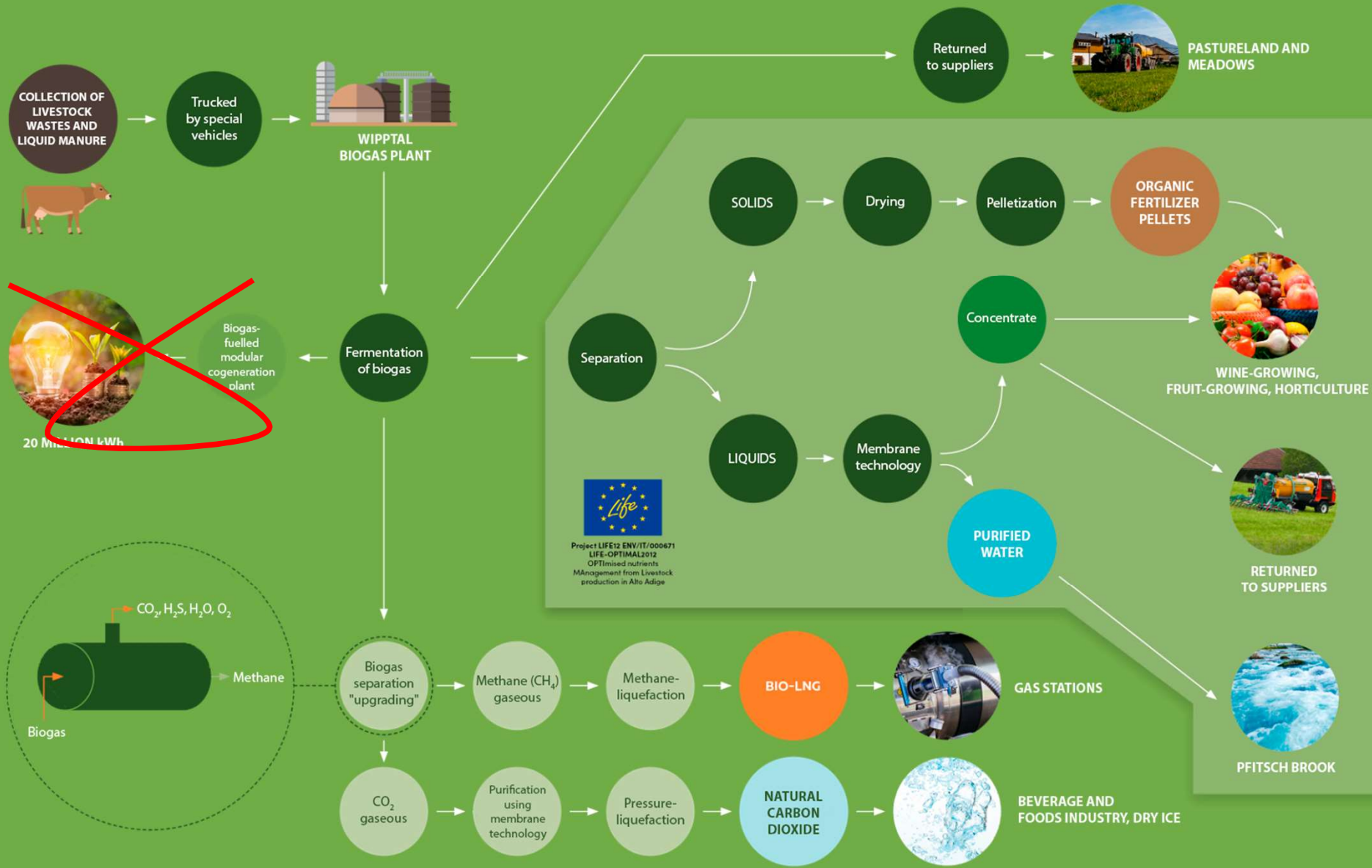
- ✓ **150,000 tons of solid animal waste and liquid manure** are collected from the farmsteads of the members using modern transportation vehicles.
- ✓ The organic wastes are fermented in the biogas facility. The digestate residues as **odorless growth stimulant or fertilizer** are returned to livestock breeding operations.
- ✓ **CO₂ – reduction** due to the lower use of dung and liquid manure, avoidance of **1.2 tons CO₂ e** (equivalents) per year per dairy cow*.
- ✓ The farmers are supplied with sensor-controlled equipment suitable for use on steep inclines which reduce **greenhouse gases by 95%** and **ammonia emissions by 60%****.



* Study by STRATECO, Graz

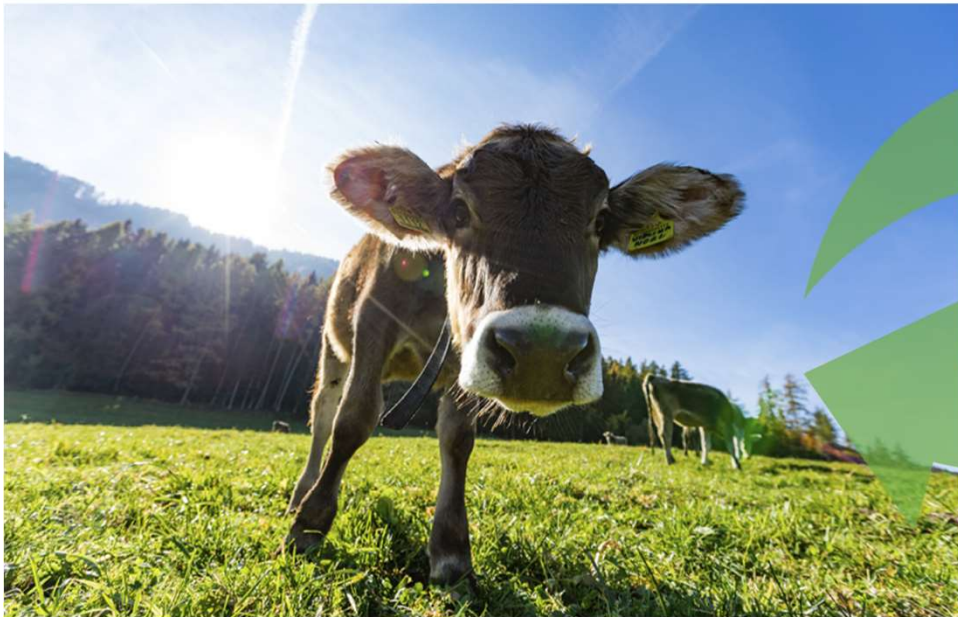
** Study by the University of Turin

FUNCTIONAL PRINCIPLE OF BIOGAS WIPPTAL 2.0



REGIONAL COMPENSATION OF NUTRIENT REQUIREMENTS

Promoting local recycling systems: “Apples fertilize apples.”



Northern part of South Tyrol (900 to 1,400 meters above sea-level)
Excess nutrients from animal husbandry



Southern part of South Tyrol (200 to 500 meters above sea-level)
Need for nutrients for the fruit and wine industry – currently met by importing synthetic fertilizers

Bio-BIWI and Wicon Concentrate

The natural fertilizers

Advantages of the BIWI and WICON organic fertilizers:

- ✓ Odorless
- ✓ No leaching of nitrates
- ✓ No impairment of the soil's pH

Characteristics of the Bio-BIWI and Wicon natural fertilizers:

- ✓ Certified for ecological agriculture
- ✓ Easy to use
- ✓ Improved soil condition and aeration
- ✓ Promotes root growth
- ✓ Promotes soil fertility



Natural fertilizers from Biogas Wipptal
BIWI-BIO
and WICON pellets

Official registration as per E.U. Directive
EU 889/2008 by ECOCERT



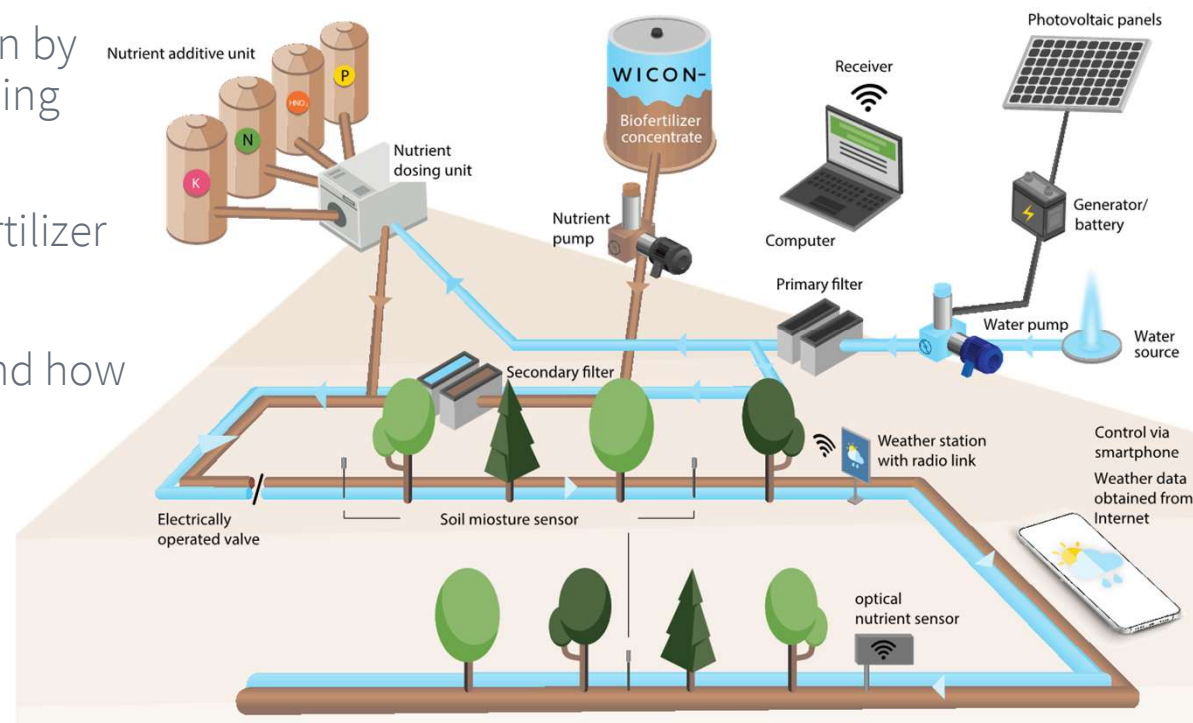
Precision Fertigation

Combatting soil fatigue in fruit and wine cultivation

NutriDrip digitally controlled drip-water irrigation with combined nutrient application

(Biogas Wipptal – in cooperation with the world market leader Netafim)

- ✓ WICON is used to provide basic needs.
- ✓ Significant reduction of fertilizer consumption by means of precision-controlled application using sensors and Artificial Intelligence.
- ✓ More nature through the return to organic fertilizer and the reduction of ammonia fertilizers.
- ✓ The farmer can decide for himself whether and how much mineral fertilizer he wants to use.
- ✓ Amortization according to Industry 4.0.



UNIQUE PROTECTION OF WATER

Water treatment for the environment

Dung and liquid manure contain a great deal of liquid (permeate) and a high concentration of environmentally hazardous ammoniacal nitrogen.

The innovative SLURLESS 100 system

- ✓ Extraction of the water (permeate) from fermented residues.
- ✓ Ammoniacal nitrogen is converted into ammonia sulfate and remains trapped in the concentrate.
- ✓ Purification and pH-neutralization of the water.
- ✓ 65% of the extracted permeate is returned to the stream in the form of clean water.

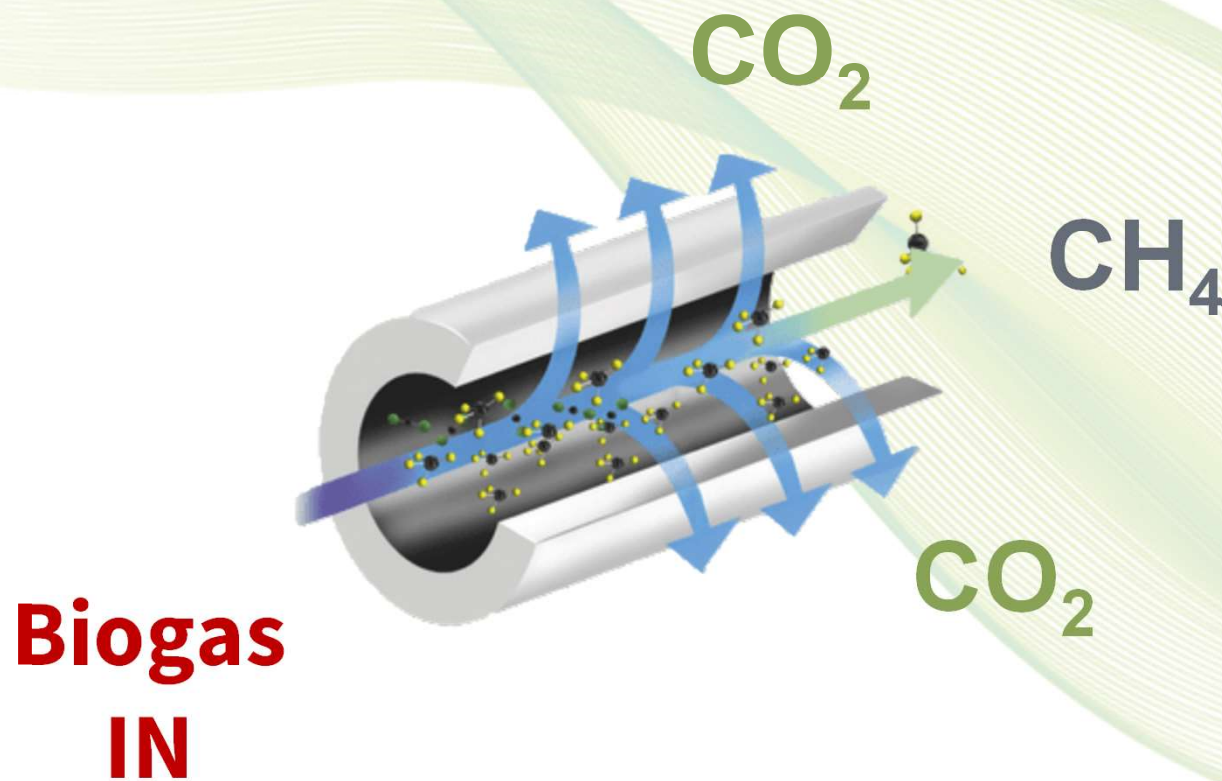


SLURLESS 100
OB Impianti



BIOGAS WIPPTAL 2.0 - upgrading

Processing of the biogas to make LNG and extraction of the CO_2



Gas yields		
Material	Biogas/ton	
Dung	95	m^3
Liquid manure	20	m^3
Straw	280	m^3

Regionally produced CO₂ for SOUTH TYROL

Upcycling to produce carbon dioxide for the foods industry

Current situation:

- ✓ The beverages industry in South Tyrol (Italy) and the Austrian regions of Vorarlberg and Tyrol need about **27,000 tons of CO₂ per year***; this is imported chiefly from Hungary.
- ✓ Shipment of liquified CO₂ from Hungary = 5 semitrailers which are driven 1,500 km per day.

Biogas Wipptal captures and reuses 7,000 tons of CO₂ per year – which would otherwise escape into the atmosphere.



* source: Tyrol Ice

Bio LNG

The CO₂ neutral fuel “with cow power into the future”

What is Bio LNG?

Bio LNG is liquified methane (at a temperature of -165 °C) obtained from biological sources.

- ✓ 25% to 30% higher energy density than diesel.
- ✓ Increased action radius of vehicles of more than 1,600 km per fill-up.
- ✓ LNG engines are up to 50% quieter than diesel motors.
- ✓ In contrast to fossil fuels, Bio LNG is CO₂ neutral.



The background of the slide features several overlapping, wavy, translucent green bands that create a sense of movement and depth. These bands are set against a plain white background.

A view into the future?

**Biogas Wipptal
is getting ready!**

Dry Ice

-80 °C: The power of Mother Nature

Dry ice = CO₂ in solid form

- ✓ Blocks and pellets of dry ice are shaped using specially developed high-pressure presses and have a cooling capacity of up to 400 % that of ordinary water ice.
- ✓ Dry ice does not melt or become wet. Rather, after a time, it sublimates (transforms directly from a solid into a gas).
- ✓ In South Tyrol, dry ice is used chiefly in foods logistics and is also employed by wine producers in the cold maceration process.



Hydrogen and Methane

From methanization to steam reforming

Up until the market readiness of hydrogen for mobility

- ✓ Hydrogen is difficult to store. But it can be converted into synthetic Bio LNG for use in trucking by means of biological methanization using bacteria / microbes.
- ✓ High energy-efficiency through heat recovery and recycling using electrolysis.

After achieving hydrogen for mobility

- ✓ It will be possible to use existent infrastructure for the production of LNG from hydrogen.
- ✓ Affordable and efficient production of hydrogen by means of the steam reforming of methane.
- ✓ As is already practice in our LNG production, the resultant CO₂ is purified and liquified.

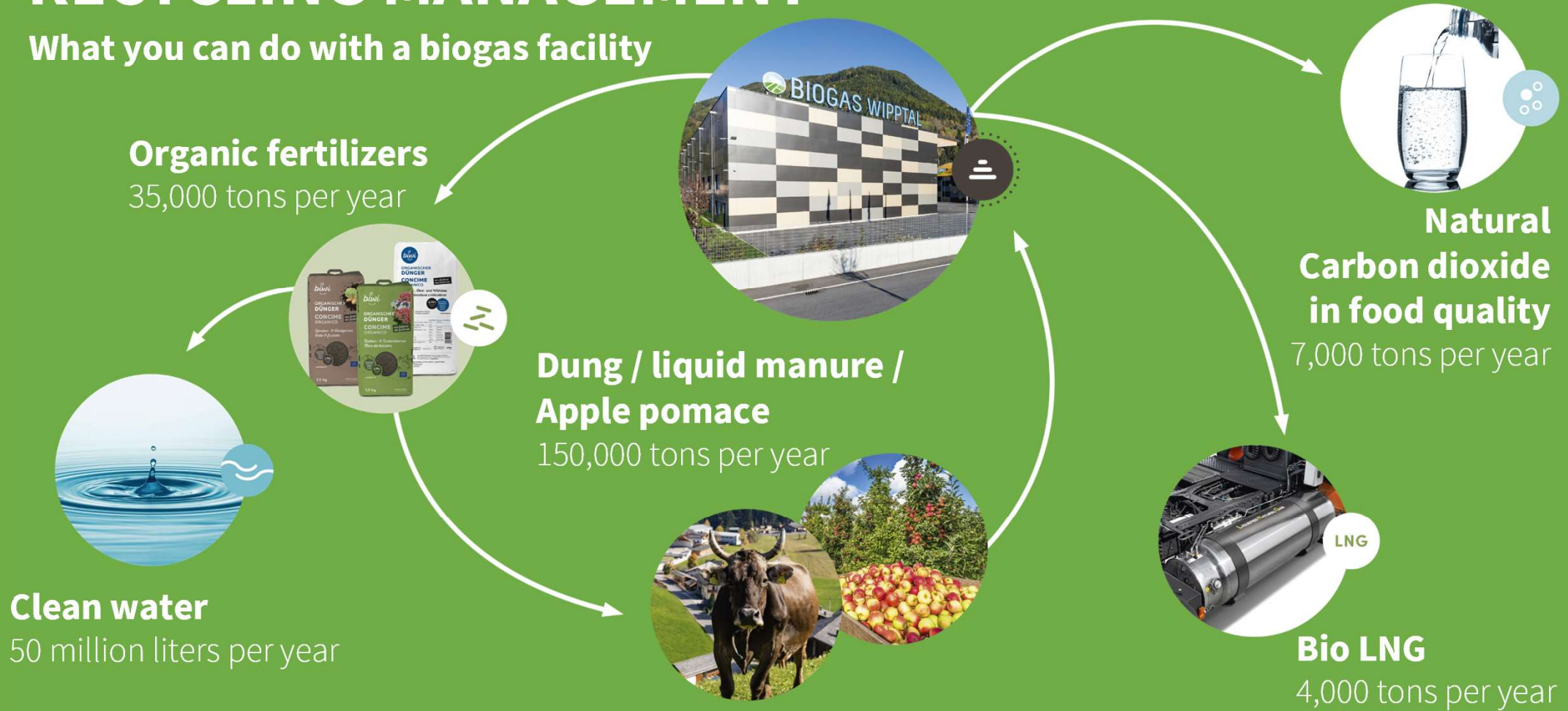


Methanization



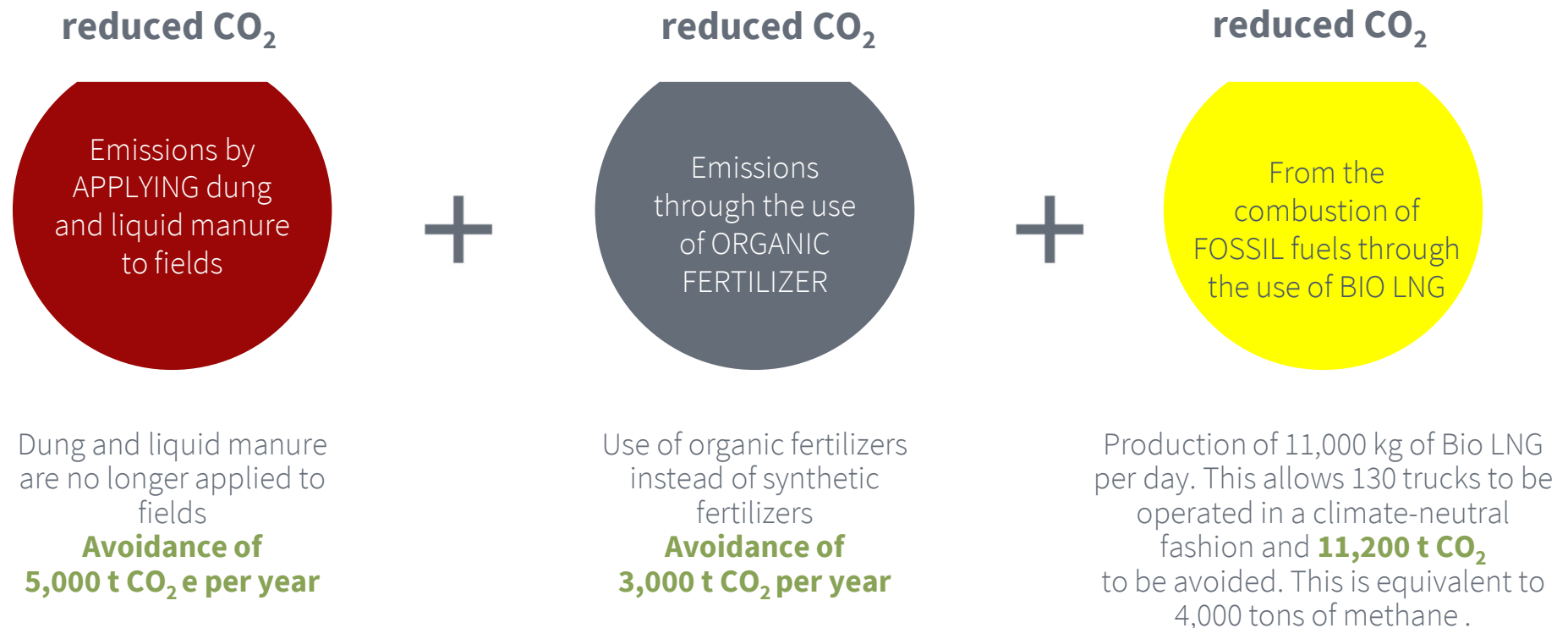
OVERVIEW OF REGIONAL RECYCLING MANAGEMENT

What you can do with a biogas facility



South Tyrol's Most Innovative Decarbonization Project

The facts

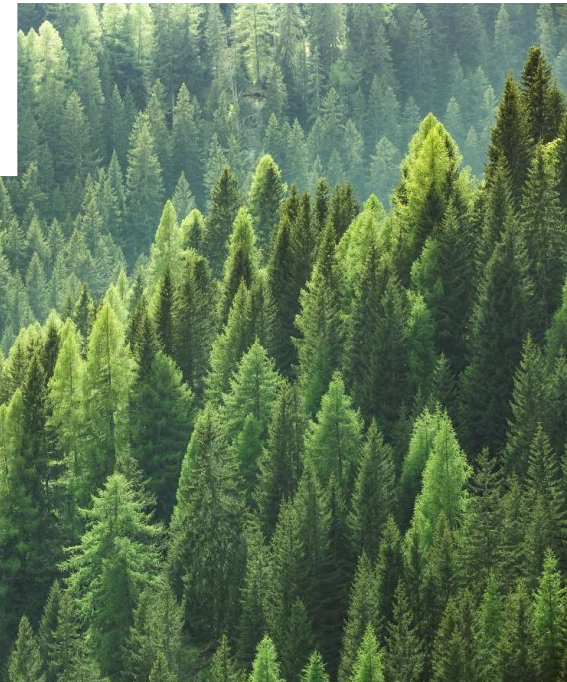


19,200 tons of CO₂ emissions are avoided per year!

South Tyrol's Most Innovative Decarbonization Project

Pure environmental protection

- ✓ **BIOGAS WIPPTAL** enables **19,200 tons of CO₂** emissions per year to be avoided!
- ✓ This corresponds to **6,350 ha of forest (= 3,500,000 trees)** which would have to be planted in order to absorb this amount of pollutant.



19,200 tons less CO₂
corresponds to 3,500,000
trees*

*Wipptal forest, with approx. 550 trees per hectare requiring roughly 5.5 kg CO₂ per year. Source: Sterzing Forestry Inspectorate

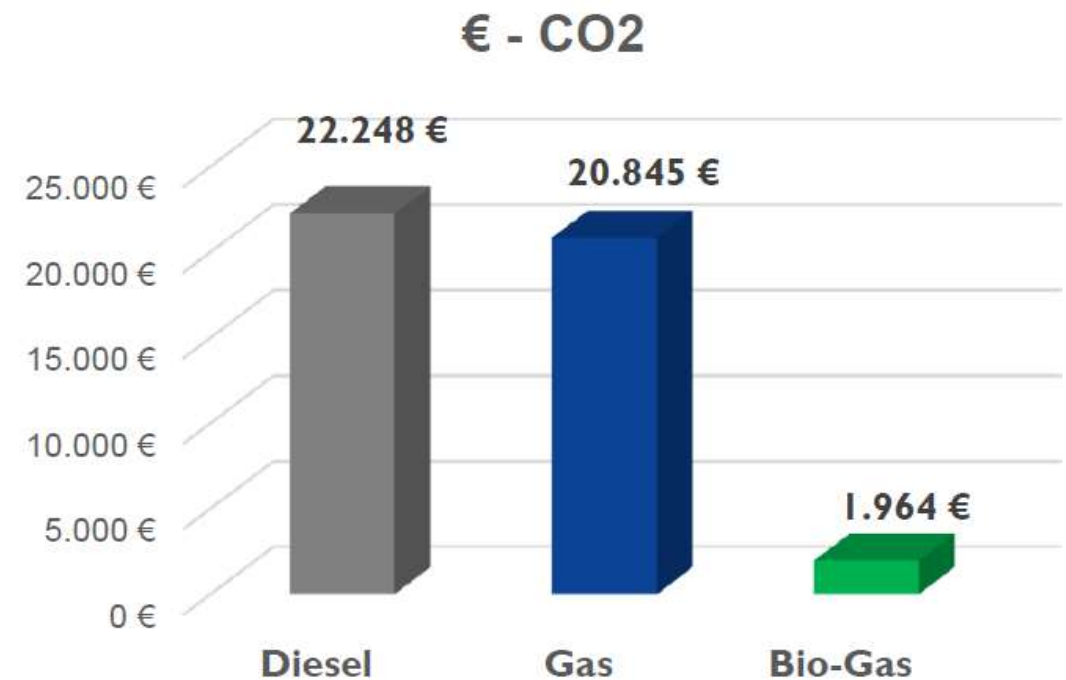
South Tyrol's Most Innovative Decarbonization Project

Social costs

Social costs resulting from pollution emissions in the transportation sector according to Directive 2009/33 - EU

- ✓ Social costs of 0.04 EUR/kg CO₂
- ✓ Contribution of Biogas Wipptal to **reducing the social costs** amounting to **527,000 EUR** per year

**Social costs per truck driving 600,000 km
(disaggregated by fuel)**



source: Iveco

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DEGLI STUDI
DI TORINO



Supported Project by EU Life+
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OPTIMAL
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from Livestock production in Alto Adige

Holzer Alois | Holzer Karl | Messner Martin | Mayr Josef | Frick Johann | Kofler Erwin | Markart Matthias
Planatscher Johann | Plattner Josef | Helfer August | Rainer Alexander | Frick Johannes | Paulhanserhof K.G.
Nagelehof OHG | Aukenthaler Raimund | Linter Peter | Plank Herbert | Braunhofer Barbara | Leitner Sebastian
Grossteiner Herbert | Pircher Bernhard | Stafler Andreas | Silva KG | Frick Peter | Mair Klaus | Siller Michael
Sorg Paula | Überegger Walter | Gander Kurt | Gruber Reinhard | Griesser Edmund | Holzer Isolde

WE ARE BIOGAS WIPPTAL

Leider Christian | Rainer Florian | Rainer Monika Maria | Siller Josef | Sossai Roberto | Toetsch Johanna Toetsch
Markus | Von Unterrichter Klemens | Aigner Josefine | Gschnitzer Florian | Holzer Stefan | Mayr Günther Ralser
Walter | Rainer Josef | Rainer Alois | Wurzer Johann | Faistnauer Peter | Kofler Josef | Lanthaler Christian
Mühlsteiger Walter | Mair Alexander | Mayr Patrick | Plattner Jan | Reichsigl Alfred | Rainer Alois | Wild Johann
Zössmayr Karl | Tyrol Ice Srl. | 2LNG Srl. | Gasser Paul Srl. | Bio L Brenner Srl. | Titan Srl. | Helfer August &
Leitner Christian Assicurazioni SNC | Pescosta Philipp | PR Projects Srl. | Schmid Carsten | Schweizer Luis
Unterleitner Siegfried