



Biorefinery Pischelsdorf

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At a Glance – AGRANA products in daily life



I SUGAR.

- Sugar is sold
 - to consumers via the food **trade (20%) with “Wiener Zucker” and**
 - to manufacturers: e.g. soft drinks industry, confectionery industry, fermentation industry, other food and beverage industries (80%).



I STARCH.

- AGRANA produces starch and special starch products
- Starch is a complex carbohydrate which is insoluble in water. Starch is used in food processing e.g. as thickener and for technical purposes e.g. in the paper manufacturing process.
- Bioethanol is part of our starch business.



I FRUIT.

- Fruit juice concentrates customers are fruit juice and beverage bottlers and fillers.
- Fruit preparations are special customized products for
 - the dairy industry,
 - the baked products industry,
 - the ice-cream industry.

Production Sites

EUROPE



AMERICA



AFRICA



ASIA



OCEANIA



Segment	2012 13	2002 03
Sugar	10	15
Starch	5	5
Fruit	41	-
Total	56	20

As of May 2013

- Sugar
- ▲ Starch
- Fruit

Key figures by segment 2012|13

		Revenues €m	Employees
	<p>SUGAR</p> <p>AGRANA is leading sugar manufacturer in Central- and Eastern Europe</p>	1,121.5	2,315
	<p>STARCH</p> <p>AGRANA is major manufacturer of customer specific starch products in Europe and largest producer of bioethanol in Austria and Hungary</p>	804.3	950
	<p>FRUIT</p> <p>AGRANA is world market leader in fruit preparations and one of the leading producers of fruit juice concentrate in Europe</p>	1,140.1	5,184
	Total	3,065.9	8,449

Biorefinery Pischelsdorf

- **Bioethanol and DDGS production**

- Investment : approx. 125 € mln
- Raw materials processed: approx. 600,000 t of grain p.a.
- Production: up to 240,000 m³ of bioethanol and 175,000 t of protein feed
- CO₂-emission reduction: -70% vs. fossil fuel



- **Liquefaction of CO₂ for food industry**

- Investment: 15 € mln
- Capacity: 100,000 t to CO₂



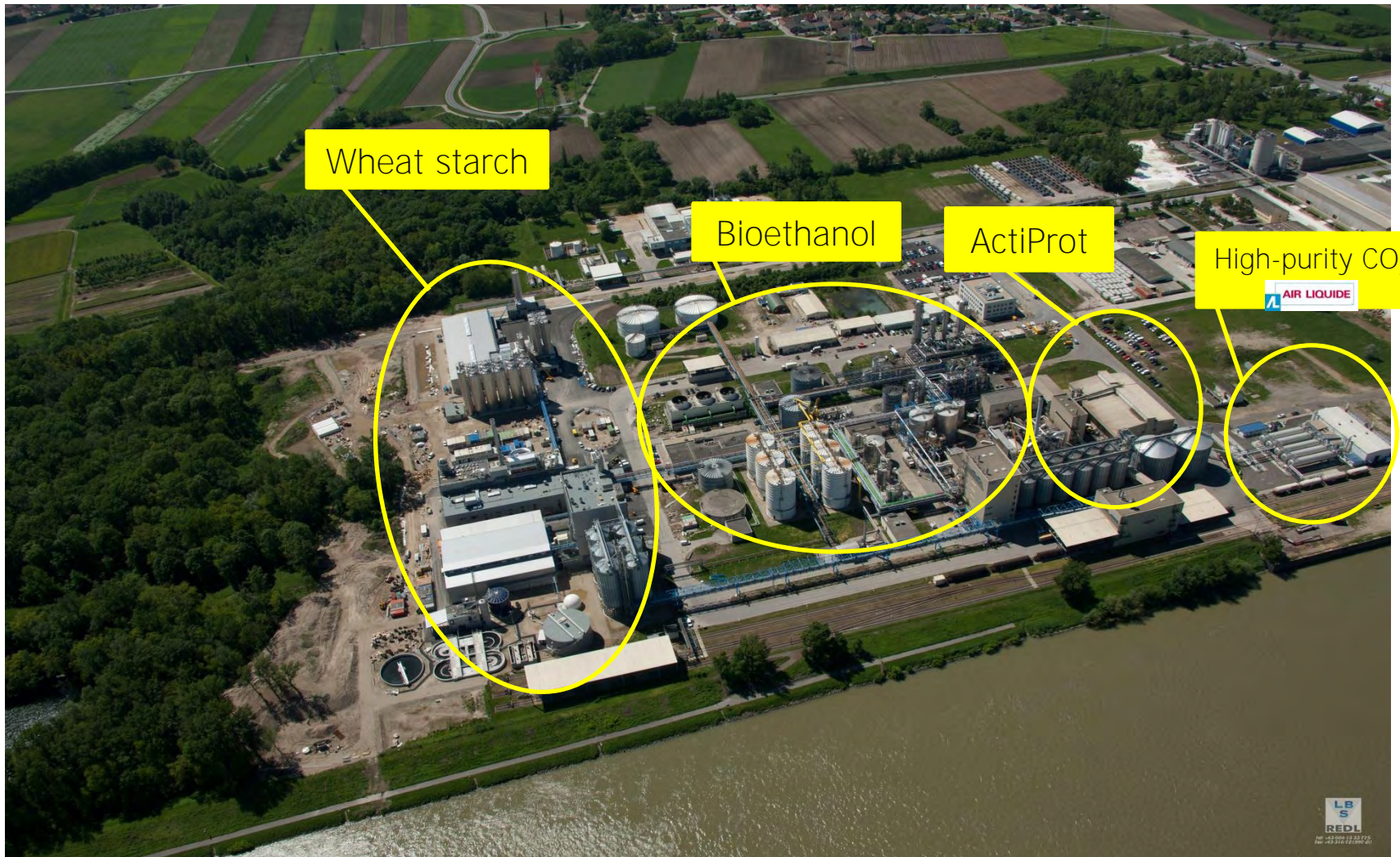
- **Wheat starch production**

- Investment: 65 € mln
- Raw materials processed: 250,000 t of wheat
- Production: 107,000 tonnes of wheat starch
 - 23,500 tonnes of wheat gluten
 - 55,000 tonnes of wheat bran
 - 70,000 tonnes of raw material substitutes (B+C starch) for bioethanol

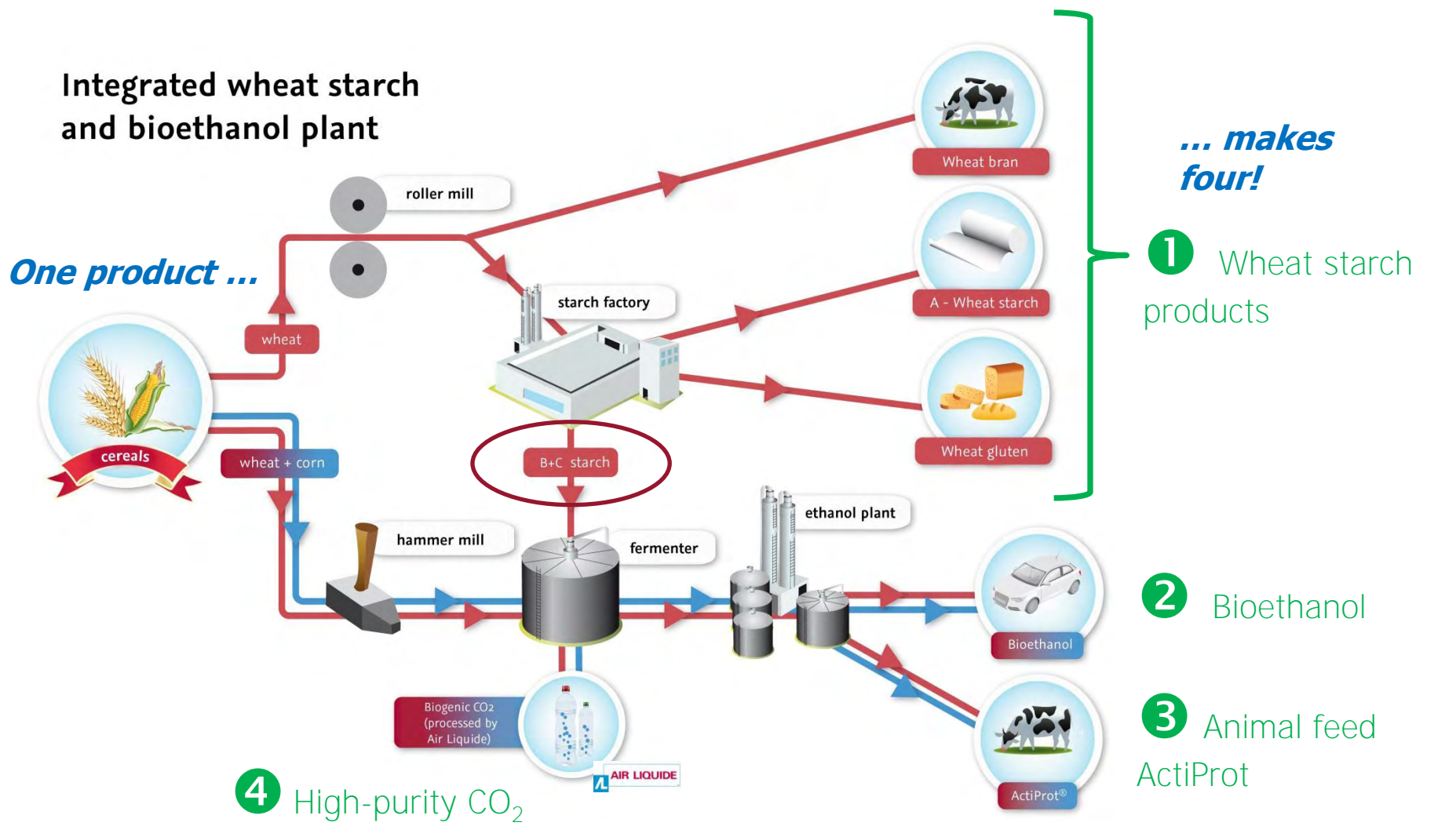


=> AGRANA makes optimal use of its available resources -> by-products of the wheat starch factory are directly used for bioethanol production, a 100% use of the processed raw materials is achieved

Biorefinery Pischelsdorf



The Concept of the Biorefinery Pischelsdorf



1st Wheat Starch Plant

Portfolio Supplement Starch

Processing ca. 250,000 t grain to ...

107,000 t Wheat Starch



- Derived by physical separation from wheat

Use and product properties:

- Esp.: paper industry (esp. production of corrugated card board and other cartons)
- Partly in cosmetics and textiles



- Increases sturdiness of paper
- Makes skin products more creamy
- Smoothing of fabric surfaces (Finish care in laundries)

23,500 t Wheat Gluten



- Natural plant protein
- Derived from wheat flower through extraction

Use and product properties:

- Baked goods
- Animal and fish feed



- Volume increase by baked goods
- **Improvement of elasticity („glueiness“)**
- Extension of storage life
- Source of proteins + provides structure for animal and fish feed

55,000 t Wheat Bran



- By-product of wheat flour production

Use and product properties:

- Animal feed, esp. for ruminants (cows)



- Provides structure
- Source of raw fabric
- Component that has dietary effects in pig feed (monogastrides)

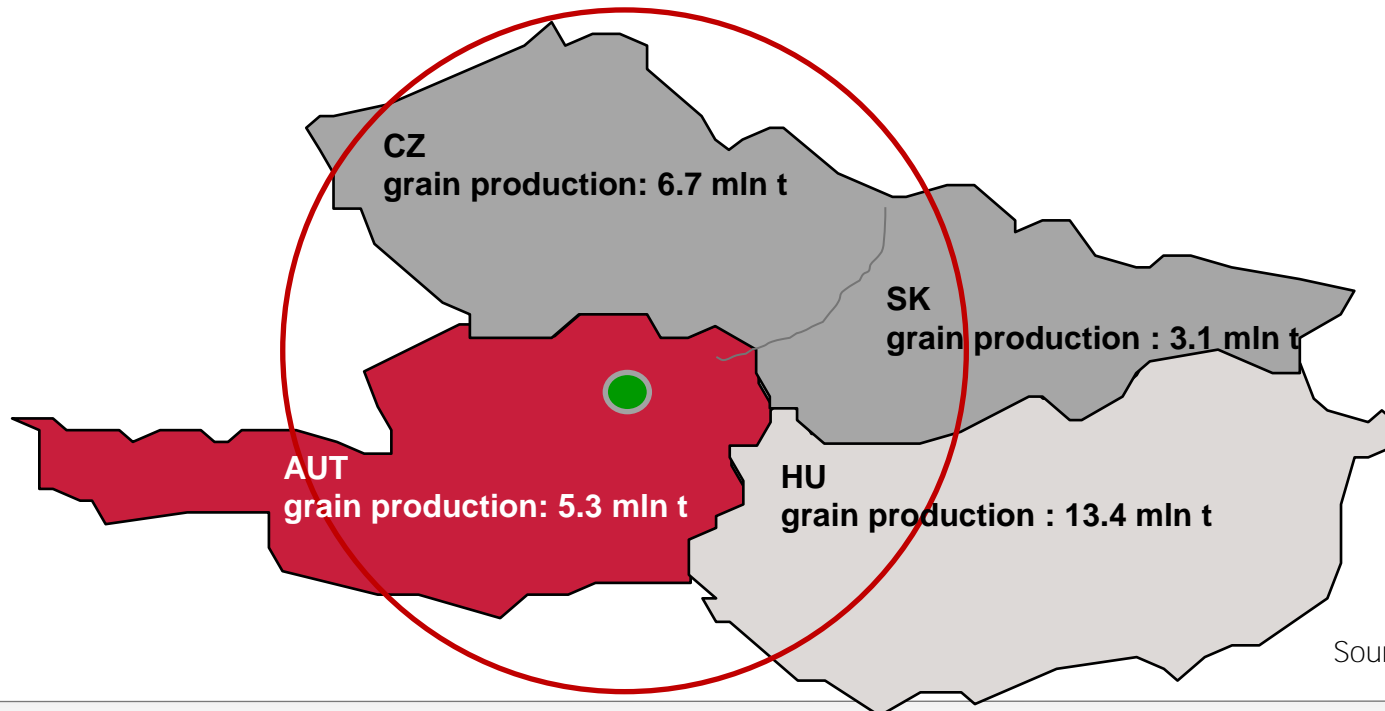
Pischelsdorf Uses Regional Grain Surpluses

Grain production AUT, CZ, SK and HU

- 28.5 mln t grains production (> 10% of EU total production)

Surplus btw. 5 and 9 mln. t

- From that 0.6 mln t are processed in Pischelsdorf
- Creates value and adds jobs in Austria
- AGRANA is ISCC certified -> no rainforest is harvested for E10 in Austria



Source: AMA, 2012

The Raw Material for Ethanol Production

Pischelsdorf relies on sustainable raw materials

25
YEARS



The natural upgrade since 1988

Sustainability criteria of the ISCC Standard:

(International Sustainability & Carbon Certification)

Raw material requirements for biofuel production:

- Raw materials must not originate from areas with a high degree of biodiversity (e.g. moors and rainforests)
- Limited use of fertilisers and pesticides
- End-to-end traceability of the origin of the raw materials used must be ensured

In order to be classified as biofuels, the following savings in relation to fossil fuels must be achieved throughout their lifecycle:

- **by end of 2016, min. 35% cut in greenhouse gas emissions**
- **from January 2017, min. 50% cut in greenhouse gas emissions**



Certification in Austria:

- by AMA (raw materials) &
- Environment Agency Austria (Production)

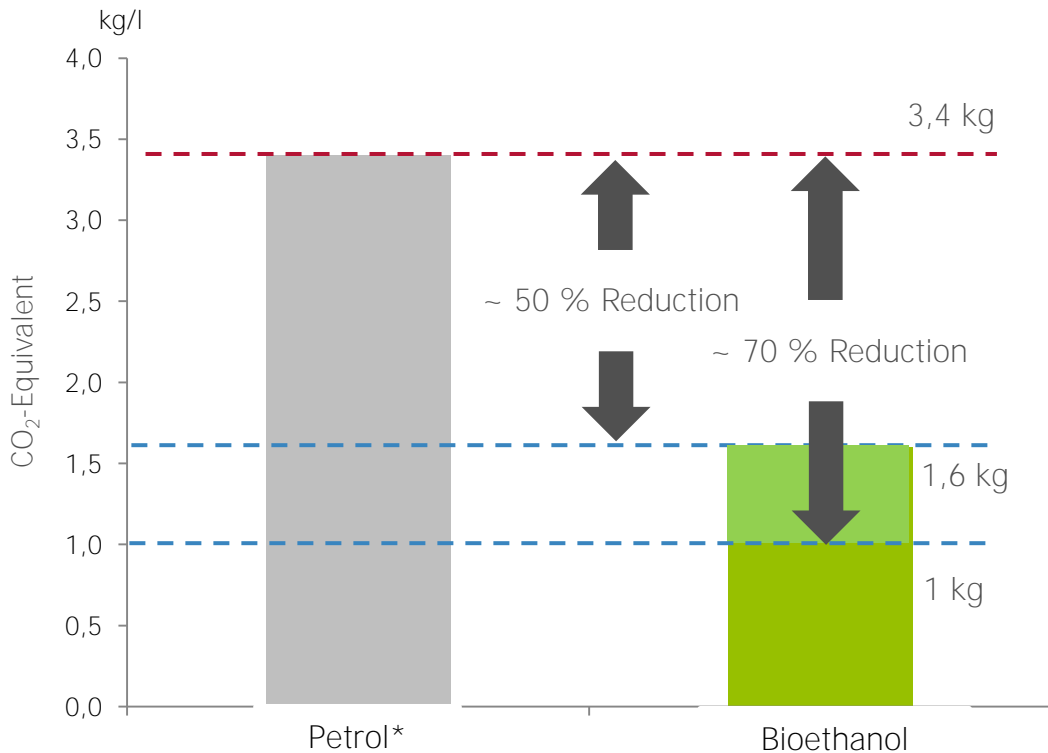
➔ No rainforest is cleared for bioethanol from Austria!

Bioethanol

Greenhouse gas emissions cut by 70% compared to petrol



Greenhouse gas emissions in CO₂ equivalents → Life cycle analysis performed by Joanneum Research



Source: Joanneum Research, 2008

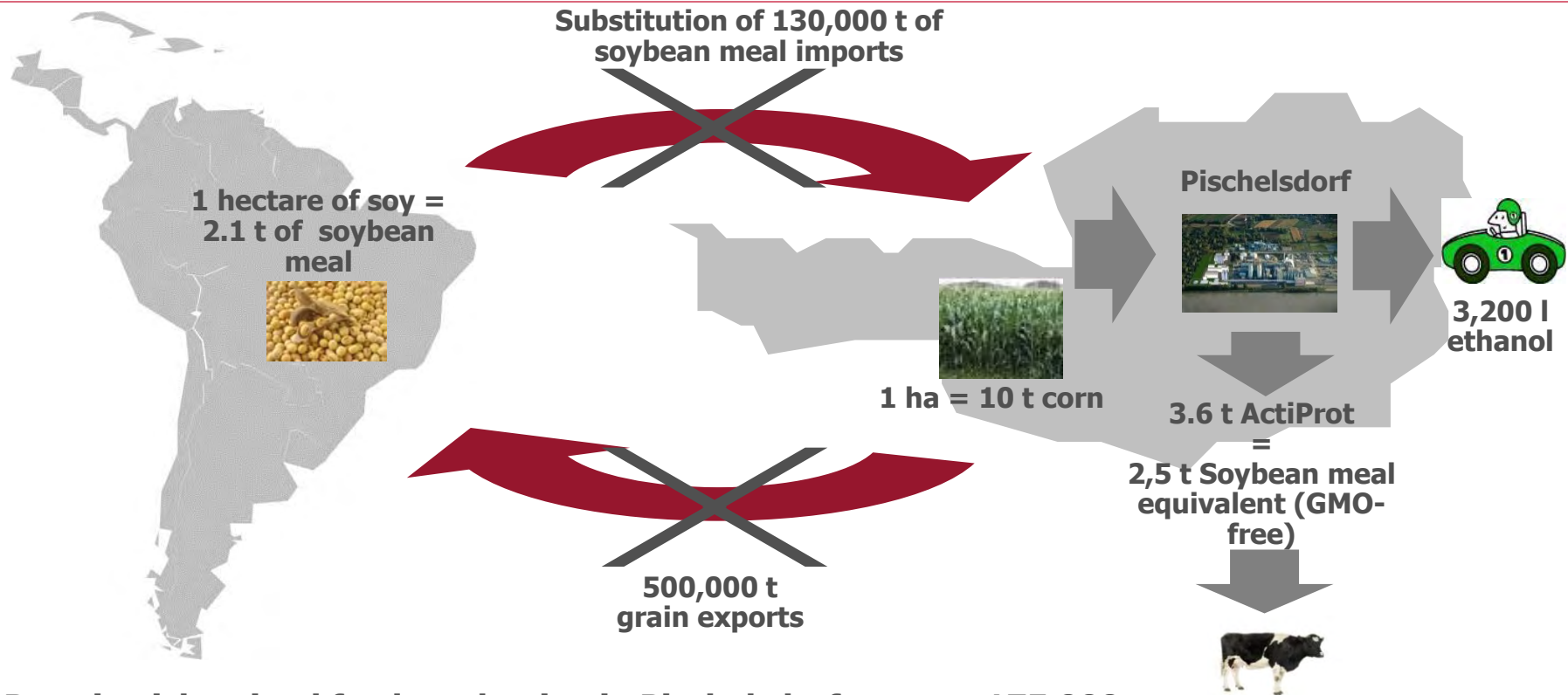
* Petrol equivalent litre

Greenhouse gas emissions

- Total savings due to facility: approx. 380,000 t p.a.
- 50 % of which exported by Austria → loss of 190,000 t of greenhouse gas emission savings for which emission certificates need to be purchased internationally!
- In consideration of „indirect CO₂-savings“: ~ 70 % reduction compared to petrol

Bioethanol

helps to avoid soy imports



Protein-rich animal feed production in Pischelsdorf: approx 175,000 t p.a.

- Carbohydrate fraction of the raw material is converted into bioethanol, while the protein fraction is concentrated and processed to make animal feed
- Reduction of the protein-rich animal feed shortage in the EU: avoidance of 130,000 t of GMO-free soybean imports from Abroad → land freed up for food production
- ActiProt key to GMO-free milk and meat production

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Bioethanol and its By-Products

- **Bioethanol**

- Currently, around 600,000 t of cereals processed annually
- Bioethanol production capacity of approx. 240,000 m³ p.a. (equivalent to 10% of Austria's petrol requirements (=E 10))
- Saving of 70 % in terms of greenhouse gas emissions compared to petrol (life cycle analysis performed by Joanneum Research)
- Sales of bioethanol:
 - » 50 %: domestic
 - » 50 %: export → loss of 190,000 t of greenhouse gas emission savings for Austria!

- **GMO-free protein-rich animal feed** (ActiProt): approx. 175,000 t p.a.

- Capable of substituting around 1/3 of Austria's soya-protein animal feed imports from South America

- **Biogenic carbonic acid (processed by Air Liquide to make high-purity carbonic acid)**

- Liquefaction of biogenic CO₂ previously bound in plants and released during the fermentation of alcohol → used in particular for carbonised beverages. This substitutes fossil-based CO₂

- **Wheat starch, bran and gluten**

1st Wheat Starch Plant

1st Stage of 2nd Generation Bioethanol

- Plant is set in front of the bioethanol production process
- High quality wheat for starch, gluten and bran / residue for bioethanol production

