



Bio Goriva d.o.o.

*Case of biodiesel
production in Slovenia*

A Pinus – Petrol Joint Venture



- headquartered in Rače / Maribor, Slovenia
- long-standing tradition in chemical production & distribution
- trading subsidiaries in Slovenia and abroad
- 210 employees in Pinus group; 155 employees in Rače / Maribor

PETROL

- headquartered in Ljubljana, Slovenia
- the leading energy / fuel distribution company in Slovenia
- extensive distribution network of proprietary service stations in Slovenia and abroad

Strategic Location of Production Facility

Macro-location:

- Near fuel tank warehouse of Petrol d.d. (1,5 km)
- Near highway Maribor-Ljubljana (2,5 km)
- Near railway Maribor-Ljubljana (1 km)
- Near major road connections to Austria, Croatia and Hungary

Micro-location:

- Land suitable for industrial development
- Existing electricity and water hydrant infrastructure
- Incineration plant for hazardous waste on site
- Available xperienced and skilled employees
- Existing well-equipped and flexible analytical laboratory
- Experienced procurement, sales and logistics staff



Why Biodiesel?

Biodiesel Advantages:

- up to 50% lower emissions of CO and up to 65% lower emission of unburned hydrocarbons
- no emissions of SO₂ – almost without sulfur content (below 10 mg/kg)
- lower levels of smoke (up to 45 % lower)
- non-toxic; no content of dangerous aromatic compounds (benzene, toluene etc.)
- lower emissions of CO₂
- biological decomposition – no danger to environment
- better lubrication as diesel fuels
- usable in existing diesel motors
- standardized fuel (EN 14214)
- no excise payable (tax)



2004/05 - How it All Began



Initial Biodiesel Production in PINUS TKI d.d. (2004, spring 2005)

2005/06/07 – Further Development

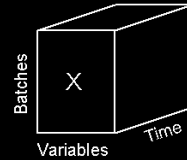


Upgraded Biodiesel Production in PINUS TKI d.d. (2005, 2006, 2007)

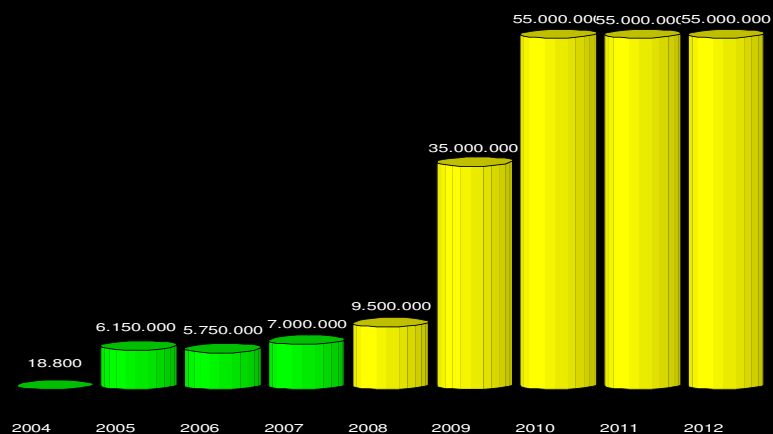
Existing Production Process

Biodiesel Batch Production Process

- Suitable when product variations are required for different markets
- Suitable for smaller biodiesel production plants up to cca. 30.000 t/y
- Good possibility to optimize process parameters of every batch
- Good flexibility to tune process to multifeedstock variations
- Possibility for quick process upgrade to optimized technical solutions
- Good overview and tracking of process parameters for each separate batch
- Optimizing mass balances, reaction temperatures, reaction times
- Optimizing usage of different catalysts, technological processes to decrease content of free fatty acids and water in vegetable oils
- Optimizing decreasing content of phosphorous in vegetable oils (degumming)
- Optimizing raw materials recycling, different separation processes and filtration processes
- Optimizing additives for biodiesel



Realized and Planned Production

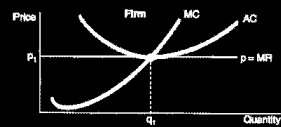


Realized biodiesel production in Pinus TKI d.d. in 2004 - 2007 and planned production in Bio Goriva d..o.o. for 2008 -2012 (in liters)

Future Production Process

Continuous Biodiesel Production Process Characteristics:

- Suitable where quality and quantity are important
- Multifeed stock possibilities
- Suitable for production plants with higher capacity
- Low parameter fluctuation in production process
- Good utilization of production equipment in real time
- Low maintenance costs
- High-volume separation systems which increase throughput
- Less labour required
- No production stops



Technology Solution

Desmet Ballestra Oleo S.p.a. Continuous Biodiesel Production Technology

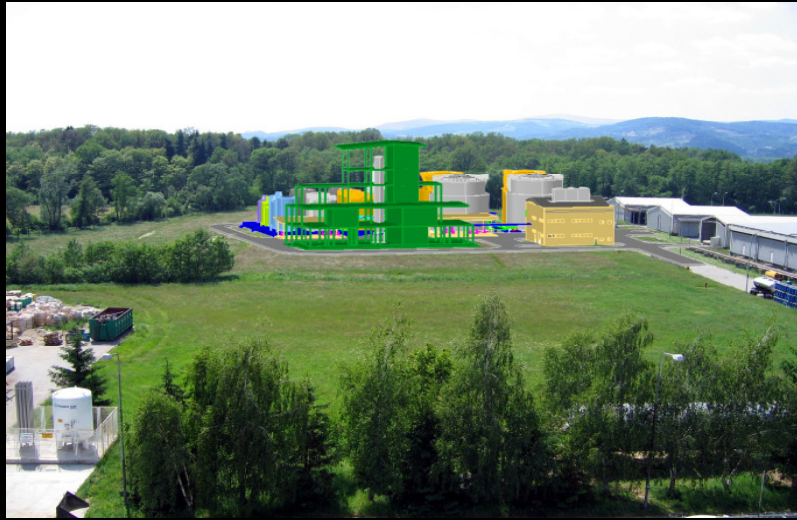
- over 50 plants in Europe, USA, Asia etc.
- capacity ranges from 50.000 up to 500.000 T/Y
- multiple feedstock technology
- www.desmetballestra.com

oleochemicals
& biodiesel

desmet ballestra



New Plant Positioning in Rače



3D View of Biodiesel Production Plant in Rače

Chemical Production Procedure

Chemical Procedure for Biodiesel Production

Raw materials: * rapeseed, soybean, palm oil and other vegetable oils
 * methanol
 * catalyst, acids, lye, additives, water

Products: * FAME (fatty acid methyl ester - biodiesel)
 according to EU standard EN 14214
 * refined glycerin, lecithin (gums)
 * waste waters, soaps, waste methanol

Chemical reaction – catalytic trans-esterification



Feedstock

Rapeseed or canola

- Rape seed oil is preferred vegetable oil for biodiesel production (EU)
- EU is the larger producer of rape oil
- The world largest producers of rape seed beside EU-27 : Ukraine, China, Canada (Canola).
- in 2007/08 expected world production of rapeseed is close to 48 MnT of rapeseed.



Feedstock

Soy beans

- world largest producer (33%) and consumer of soy bean oil are USA
- other world largest producers are Brazil, Argentina, China and India.
- in 2007/2008 expected production of soybeans will be 222 MnT and in next season over 240 Mn T.

Palm oil

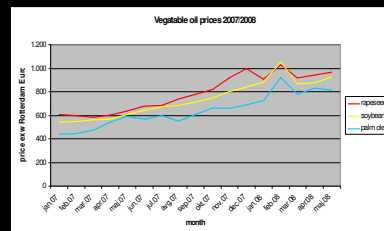
- world largest producers are Indonesia and Malaysia, this year production is estimated to reach 42 MnT.
- Palm oil (in EU) is used mainly in summer time for blending with soya oil (up to 10%). Due to high cloud point it is not suitable for usage during low temperatures.

Feedstock Prices

Vegetable oil prices

- world demand for oilseeds and oils push the prices over the acceptable limit for biodiesel production
- Lots of EU biodiesel plants stopped working due to high prices of raw materials.
- solution for biodiesel production is to organize the production of feedstock

price change	Jan 07vs Jan 08	Jan 07 vs May 08
Rape seed oil	up for 48%	up for 58%
Soy beans oil	up for 63%	up for 71%
Palm oil	up for 64%	up for 84%



Oil Seed Rape Production

Our advantages in organizing the production of oil seeds

- part of Pinus group of companies
- long term experience in plant protection business
- excellent relationships and partnerships with agricultural producers (farmers,...)
- highly trained field advisers (agronomists) for best field yields
- wholly owned companies in Croatia, Bosnia and Serbia; partnerships in other oil seed rape producing countries
- established relationships with partners for seed processing (siloses, oil pressing plants,...)



Arable Land in Slovenia



Arable land	208.300	ha
Corn / Maize	65.000	ha
Wheat	60.000	ha
Legume (dried pulses) and Root Crops	8.500	ha
Industrial Plants	16.900	ha
Oil Seed Rape	5.800	ha
Food from arable land	25.100	ha
Vineyards	22.500	ha
Orchards	4.000	ha
Vegetables	4.000	ha
Hops	1.700	ha
Olive groves	600	ha

Slovenia Overview

- In 2007 Pinus managed approx. 85% of whole rape seed production
- In 2008 rape seed production areas are expected to be reduced for 15% or to be at around 4.500 ha.
- Maximum possible area for rape seed production in Slovenia are valued to around 15.000 ha.



Arable Land in Croatia



Arable land 997.200 ha

Industrial plants:

Oil Seed Rape 20.000 ha

Soya 35.000 ha

Sunflower 40.000 ha

Arable Land in Serbia



Arable land 2.950.000 ha

Industrial plants:

Soya 250.000 ha

Sunflower 200.000 ha

Oil Seed Rape 15.000 ha

Arable Land in Bosnia and Herzegovina



Arable land 651.200 ha

Industrial plants:

Oil Seed Rape 2.000 ha

Soya 5.800 ha



**Thank you.
Go and buy biodiesel.**