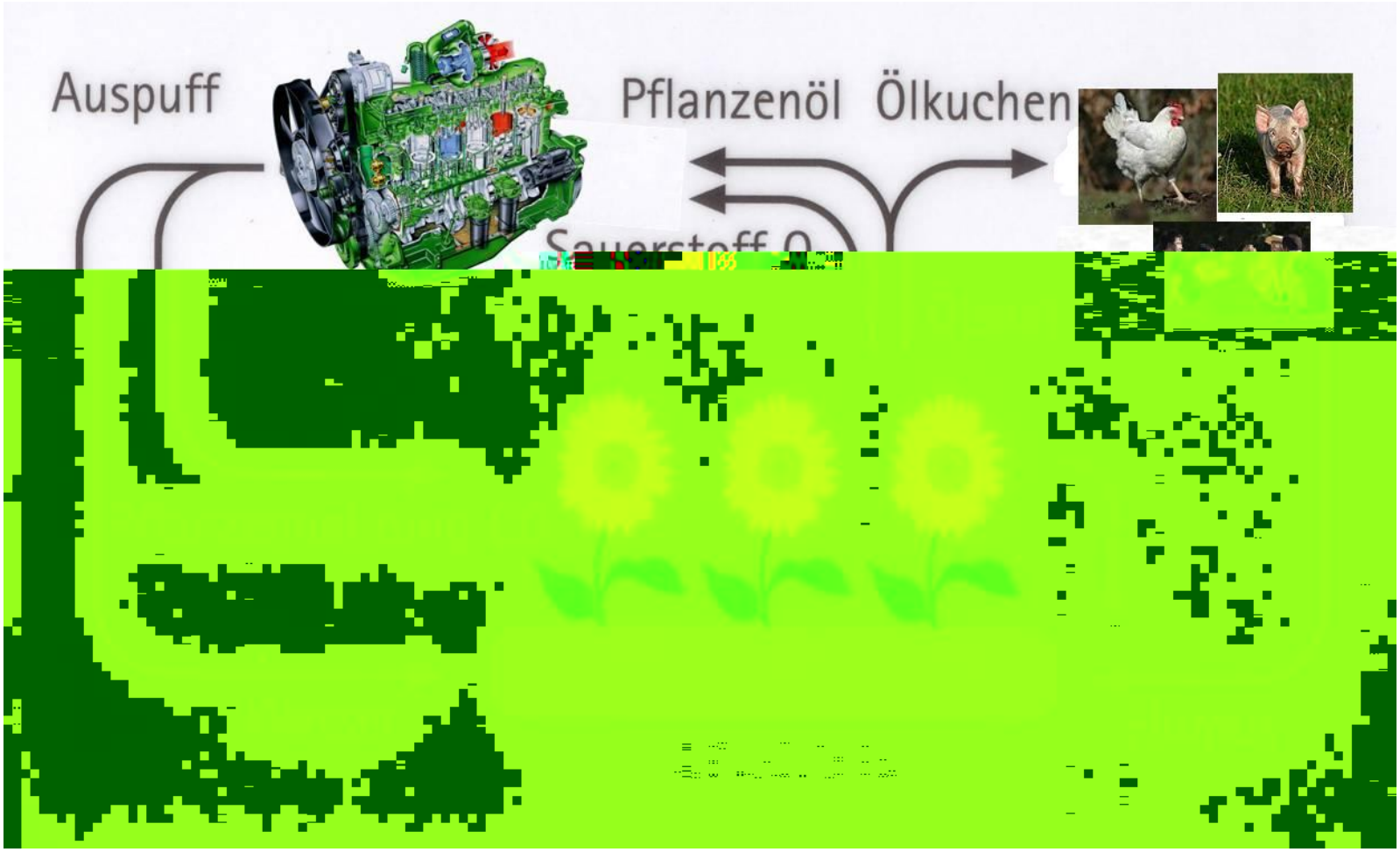
9. Fachtagung Kraftstoff Pflanzenöl

„Standortangepasste Mischfruchtanbausysteme mit Ölpflanzen“

Thomas Kaiser,
Institut für Energie und Umwelttechnik – München

Pflanzenöl- und Nährstoffkreislauf



Schwankungen der mittleren Temperatur auf der Nordhalbkugel

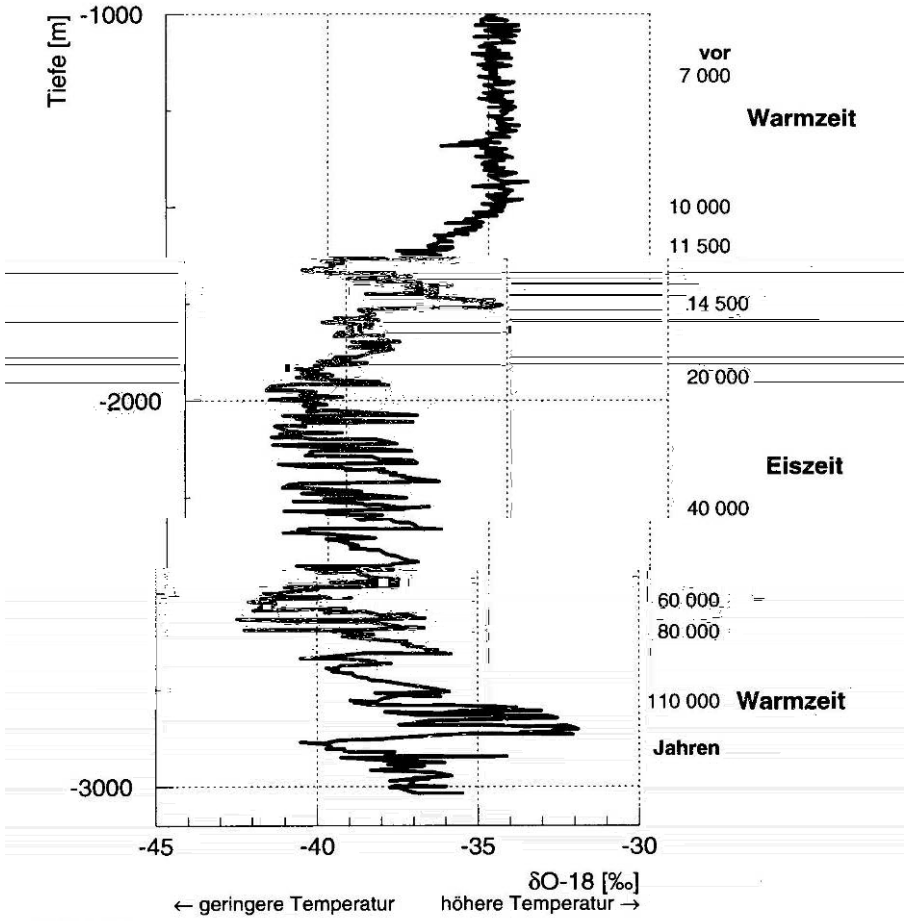
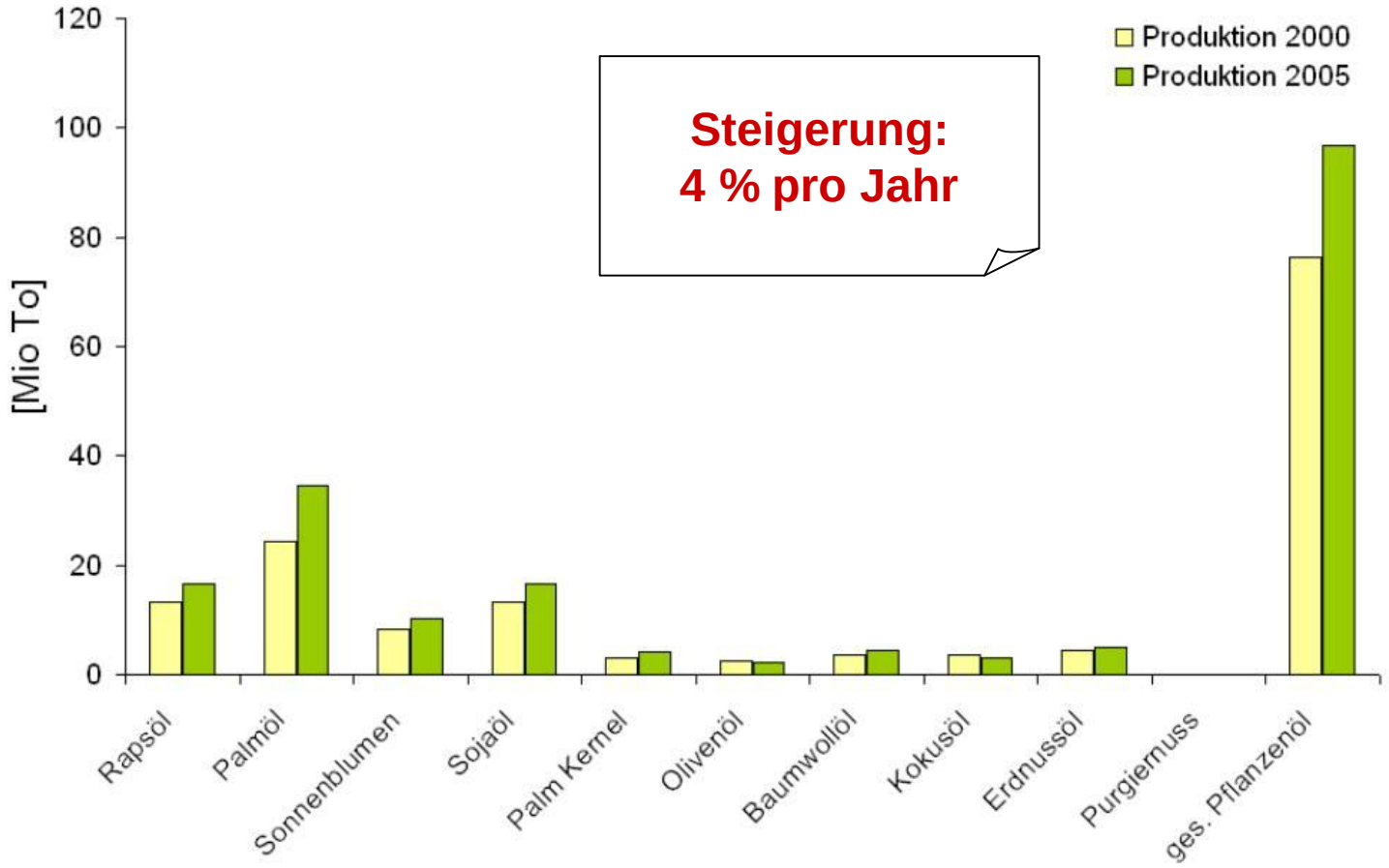


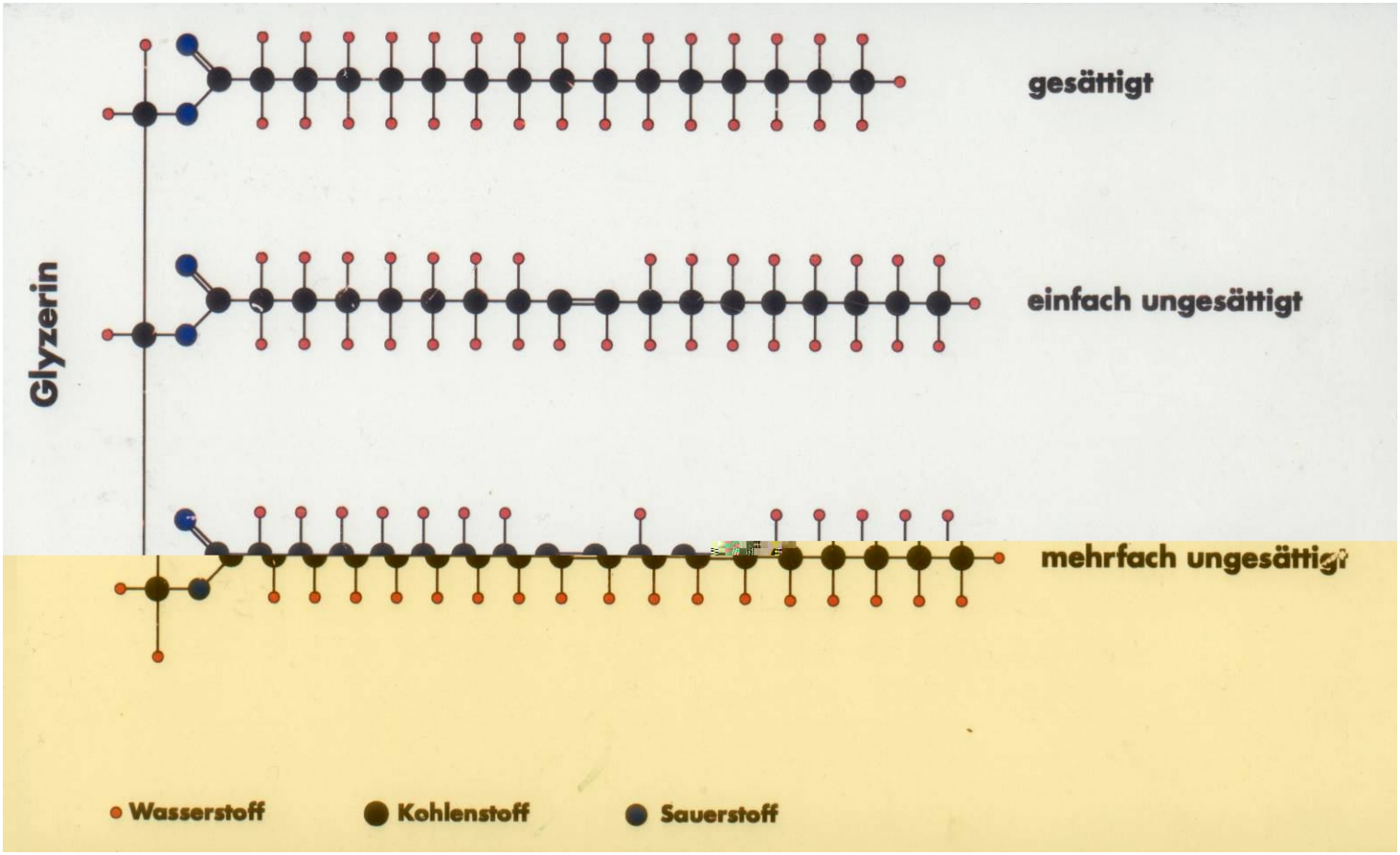
Bild 4.16
Schwankungen der mittleren Temperatur auf der Nordhalbkugel der Erde über die Eis- und Warmzeiten der letzten 160 000 Jahre (abzulesen aus entsprechenden Schwankungen des Verhältnisses der Sauerstoff-Isotope O-18 zu O-16 (δO-18) im Eis von Eisbohrkernen aus Grönland relativ zum Meerwasser ([PAT94]))

Pflanzenöl- / Erdölproduktion

Pflanzenölproduktion weltweit



Beispiel eines Triacylglycerols



Pflanzenöl für PKW

VW Touran 2,0 TDI PD, 100 kW, Vierventiltechnik

Pflanzenöl für Traktoren

THE 2ND VEGOIL PROJECT

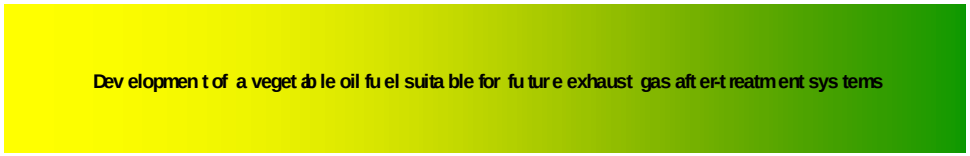
Ambitious targets for sustainable solutions

Our goals:

- To demonstrate the reliability throughout the entire project period of various John Deere tractors (off-road exhaust emissions standard Stage 3A) that run on vegetable oil fuel on a day-to-day basis. The demonstration is to take place at various sites in Europe
- To optimise and test engines and exhaust gas after-treatment components conforming to exhaust emissions standards Stage 3B and 4 for operation with vegetable oil fuels
- Alongside this, to develop and optimise a local production process for 2nd generation* vegetable oil fuels – with a view to future exhaust emissions standards and exhaust gas after-treatment technologies
- To achieve sustainable solutions beyond the current exhaust emissions standards

THE 2ND VEGOIL PROJECT

Projekt schedule:

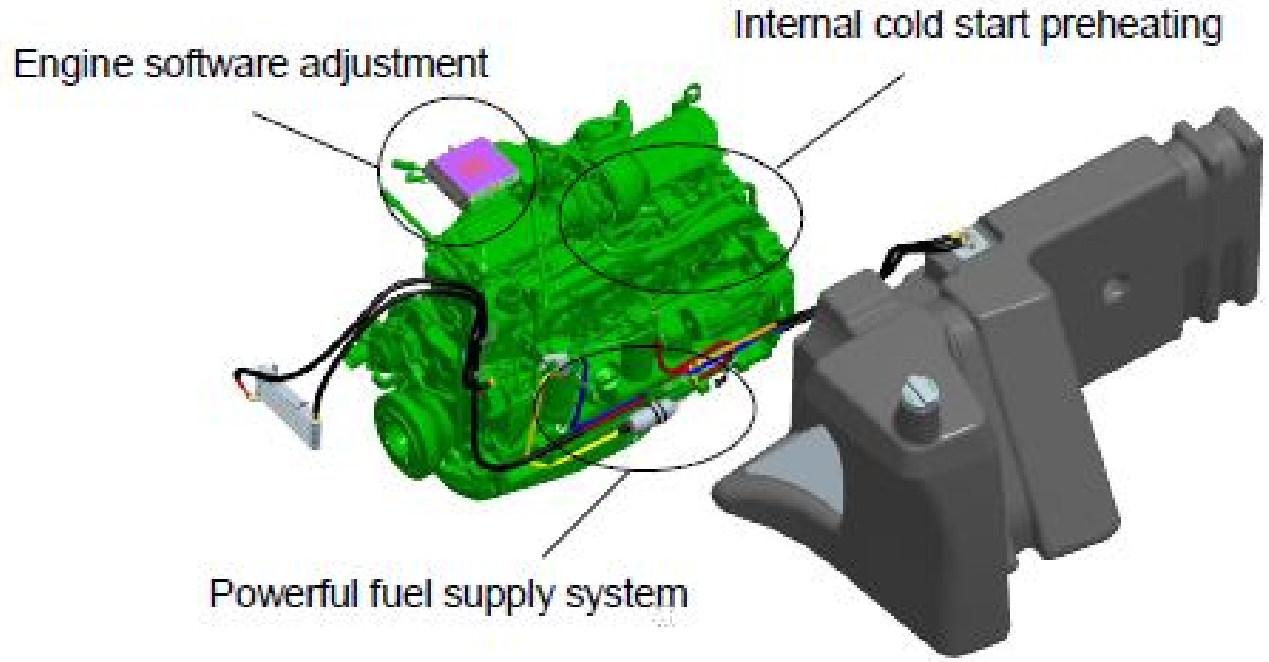


THE 2ND VEGOIL PROJECT

Projekt-Partners:

- John Deere, Mannheim (Germany)
- Vereinigte Werkstätten für Pflanzenöltechnologie (Germany)
- TU Munich, Lehrstuhl für Verbrennungskraftmaschinen (Germany)
- Lubrizol Ltd. (UK)
- Waldland Vermarktungsges. m.b.H. (Austria)
- Rhônalpénergie-Environnement (France)
- Fédération Régionale des CUMA Rhône-Alpes (France)
- Instytut Budownictwa, Mechanizacji i Elektryfikacji Rolnictwa (Poland)
- Nederlands Normalisatie-instituut NEN (Netherlands)
- *Supported by TFZ Straubing and TU Kaiserslautern*

THE 2ND VEGOIL PROJECT



THE 2ND VEGOIL PROJECT

THE JOHN DEERE RESEARCH PROJECT

Single tank solution with massive savings potential

How it works:

- Increased fuel supply system performance
- Software adjustment to improve cold start response and fulfil both current and future emissions standards
- Internal preheating for low temperature starts
- Preheating of the vegetable oil via circulation, no need for additional heat exchanger
- No additional filter or tank necessary

THE 2ND VEGOIL PROJECT

What it offers:

- Engine runs on vegetable oil, diesel or biodiesel
- External appearance not different from standard model, only little modifications required
- Same, familiar vehicle handling
- No additional fuel stops, no additional on-site diesel station, no manual switchover from vegetable oil to diesel operation
- Greatest potential savings

THE 2ND VEGOIL PROJECT

THE ADVANTAGES OF VEGETABLE OIL FUEL

Efficiency in every instance

THE 2ND VEGOIL PROJECT

GREENHOUSE GAS REDUCTION POTENTIAL

Decentralised, sustainable production and consumption

Closed carbon cycle
During combustion the same amount of CO2 is released as is assimilated during plant growth (and bound in the oil).

Fossil fuel savings
Renewable plant oil fuel saves fossil fuels and thus prevents the release of fossil CO2.

Little energy consumption
The production of plant oil fuels is simple and demands little energy (compared to other biofuels and fossil fuels).

THE 2ND VEGOIL PROJECT

Optimum utilisation of cultivated land:
Simultaneous production of feed and fuel

High energy content:
1 litre of rapeseed oil = 96% of the energy of 1 litre of diesel (biodiesel: 91%)

Pre-crop value:
Rapeseed aids humification and offers up to 10% increase in crop yield with wheat following

Feed value:
Rapeseed cake and rapeseed extraction groats are high-grade protein feed and can replace expensive soya imports

Simple manufacture:
Following pressing and cleaning, no other processing steps are necessary*

Regional added value:
Fuel self-sufficiency in small, local systems

THE 2ND VEGOIL PROJECT

Combined food and energy supply

The production of plant oil is coupled with the production of highly valuable animal nutrition. The rapeseed cake contains high amounts of proteins and can compensate for soybean groats. This saves energy and thus CO2 emissions for long distance transportation of soybean groats.

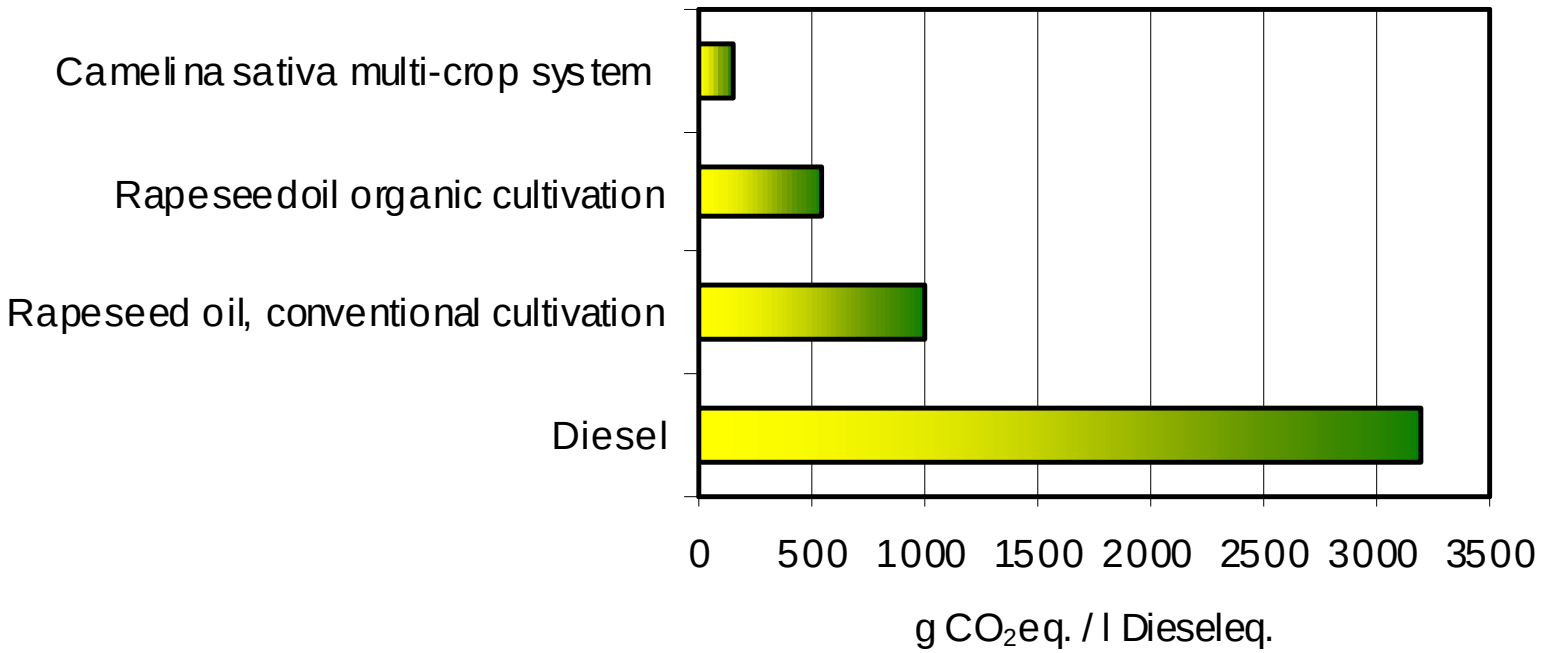
Humus accumulation

The straw is left on the field as a harvest residue. This leads to an accumulation of humus and thus carbon in the soil.

Feedstock diversity

There are hundreds of oil plants in all regions of the world. Within the project not only the combustion of rapeseed oil, but also Camelina sativa, Jatropha and sunflower oil will be examined. Especially Camelina sativa can be cultivated in multi-cropping systems e.g. together with oats. This system further facilitates the reduction of GHG emissions (see graphic).

THE 2ND VEGOIL PROJECT

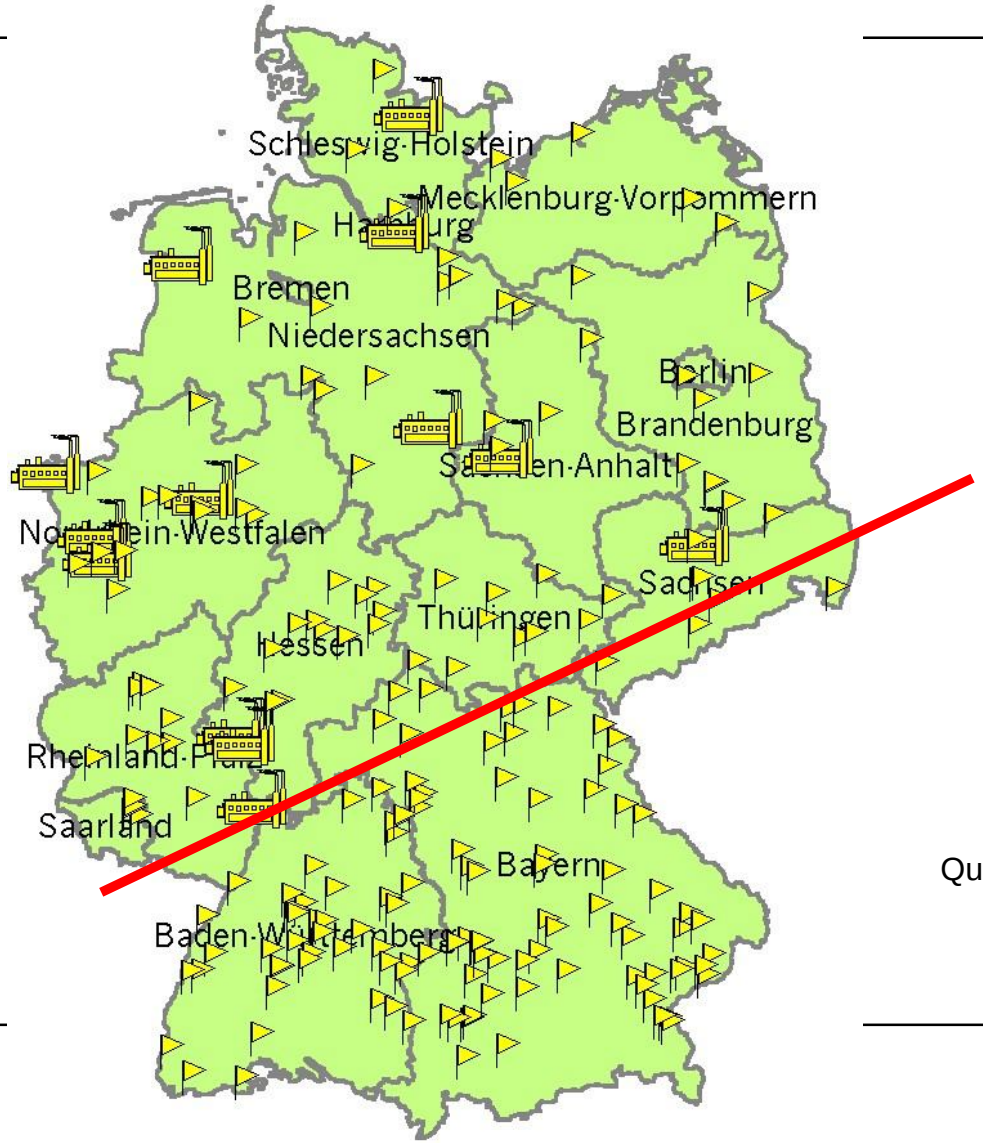


Dezentrale Ölmühlen seit 1984

Ölmühle Kramerbräuhof in Pfaffenhofen

Ölmühle Wöhrl in Galgenhofen / FFB

Ölmühlen in Deutschland



Quelle: TFZ Straubing


24 5'99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Ökologischer Mischfruchtanbau

Ökologischer Mischfruchtanbau

Ökologischer Mischfruchtanbau

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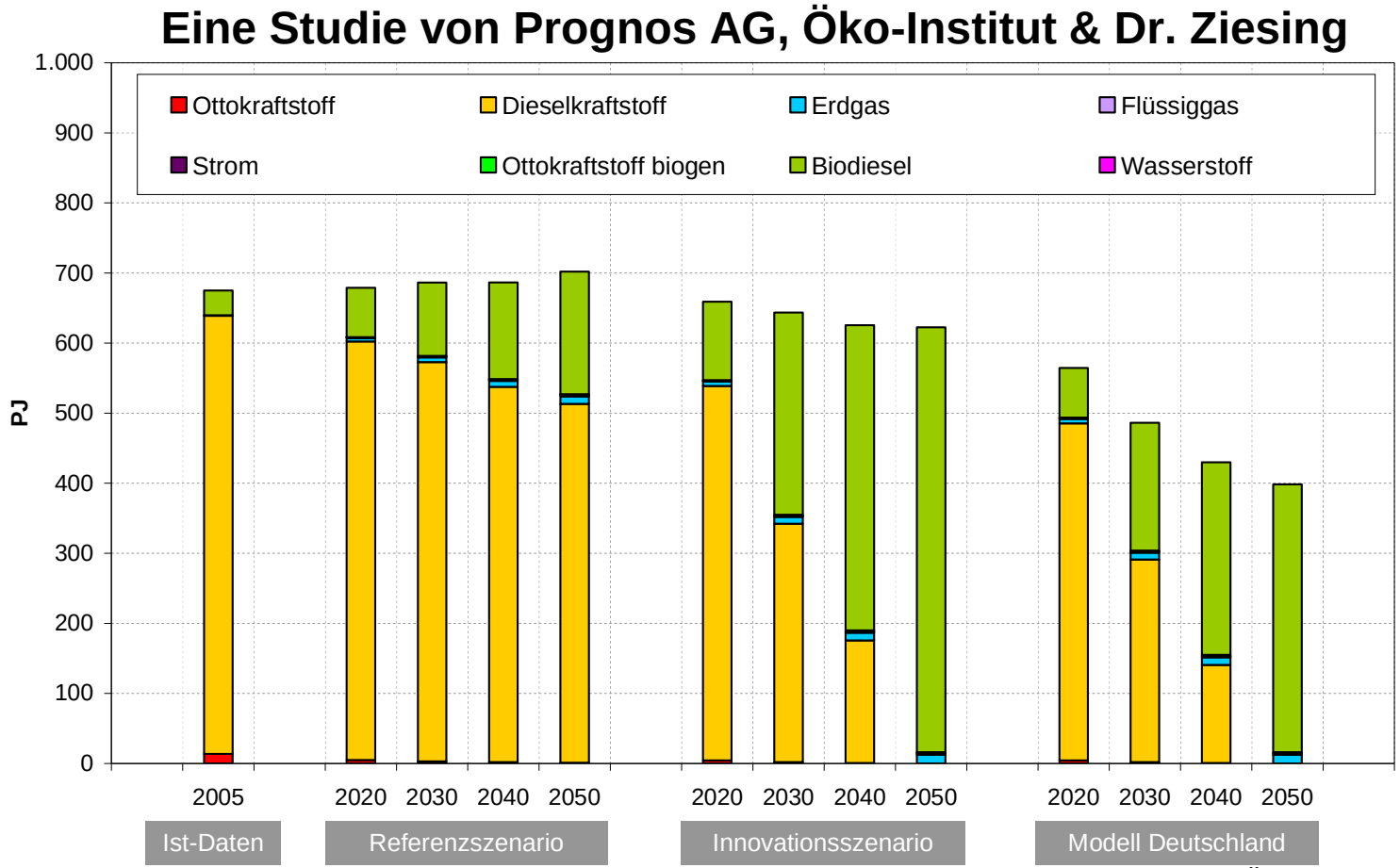
Versuchshof

„Modell Deutschland – Klimaschutz bis 2050
Vom Ziel her denken“



Quelle: Prognos AG/Öko-Institut für WWF 2009

Vielen Dank für Ihre Aufmerksamkeit

IEU – Institut für Energie- und Umwelttechnik

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