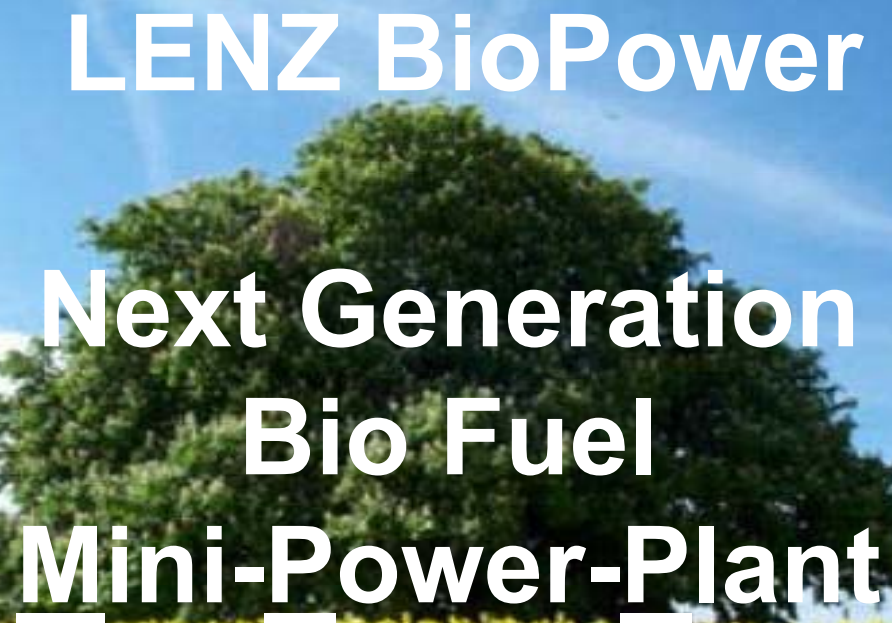


The logo for LENZ, consisting of the word "LENZ" in a bold, sans-serif font.The text "Bio-Power" in a sans-serif font, positioned on the left side of a green banner.The text "Next Generation" in a sans-serif font, positioned in the center of a green banner.The website address "www.lenz-bhkw.de" in a sans-serif font, positioned on the right side of a green banner.A large, bold, white text overlay on a background image of a yellow field and a tree. The text reads "LENZ BioPower", "Next Generation", "Bio Fuel", and "Mini-Power-Plant".

LENZ BioPower
Next Generation
Bio Fuel
Mini-Power-Plant

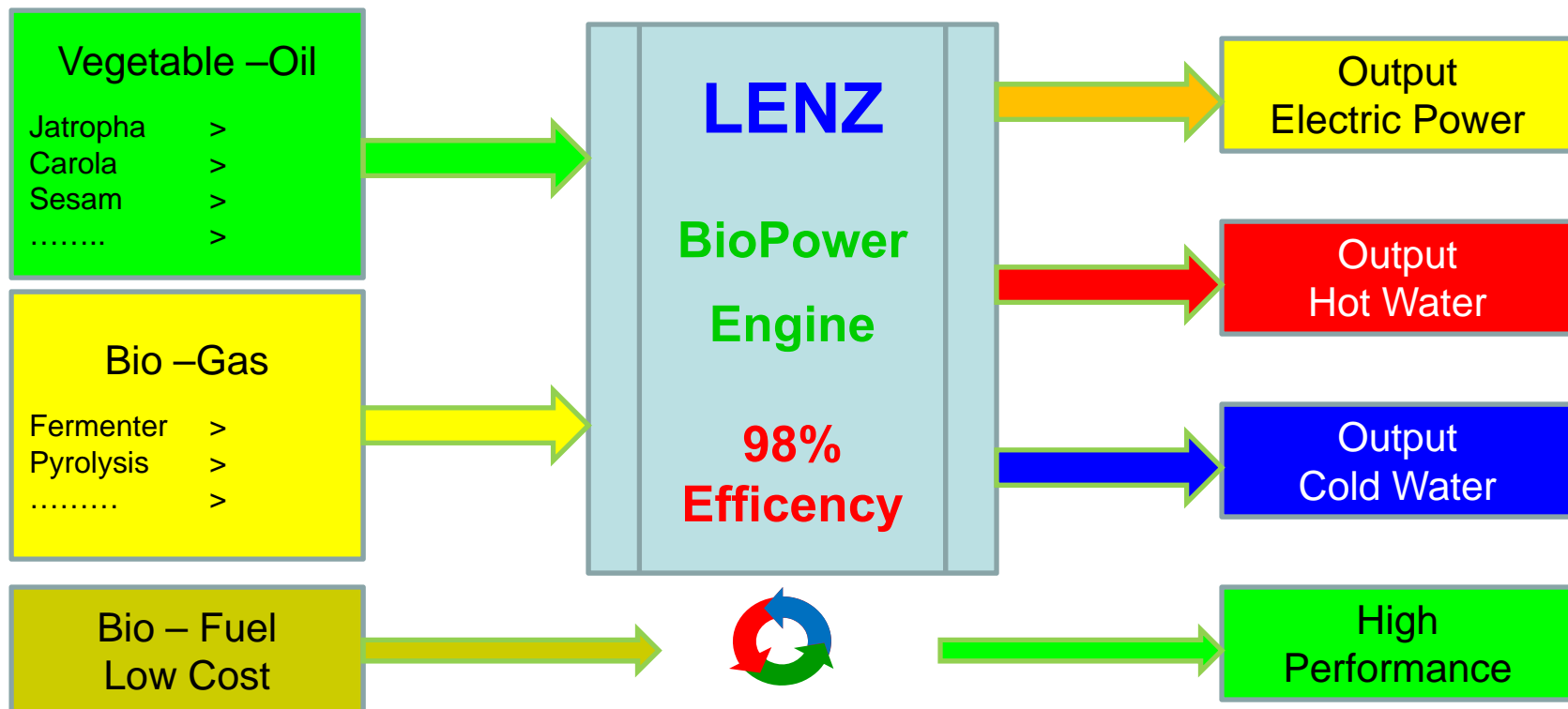
LENZ

Bio-Power

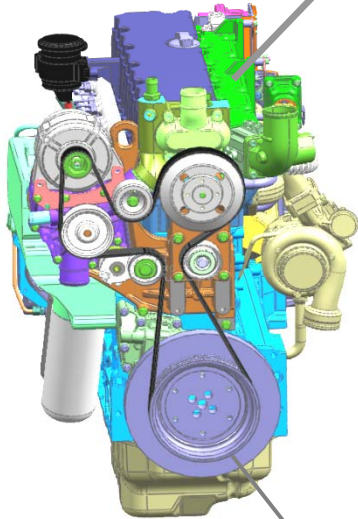
Next Generation

www.lenz-bhkw.de

Summary



- MPP's are a highly efficient Bio Engines



Supply of all plant and vegetable Oil

Consumption less than 200g/kWh 50% less than standard

No significant carcinogenic substances

Meets EU Greenhouse initiative CO₂ neutral

EU laws and regulations support and subsidize renewable resource power production

Long Life sytem because no contamination of engine lubricating oil



Competitive Comparison of Lenz MPP to present MPP Technology

- **electricity efficiency + 5% due to exhaust to power conversion**
- **heat efficiency + 15% (encapsulated engine allows the reuse of the radiant heat)**
- **Fuel savings 10 - 40% (depends on type of engine)**
- **Increased long-term usage (due to lenz motor management)**
- **remote motor calibration and management**
- **LENZ –VPM, patented for avoidance of contamination of lube oil (European Patents, US application in progress)**
- **reduction 98% of carcinogenic emissions and other pollution with LENZ PowerKat (compared to standard MPP emissions)**

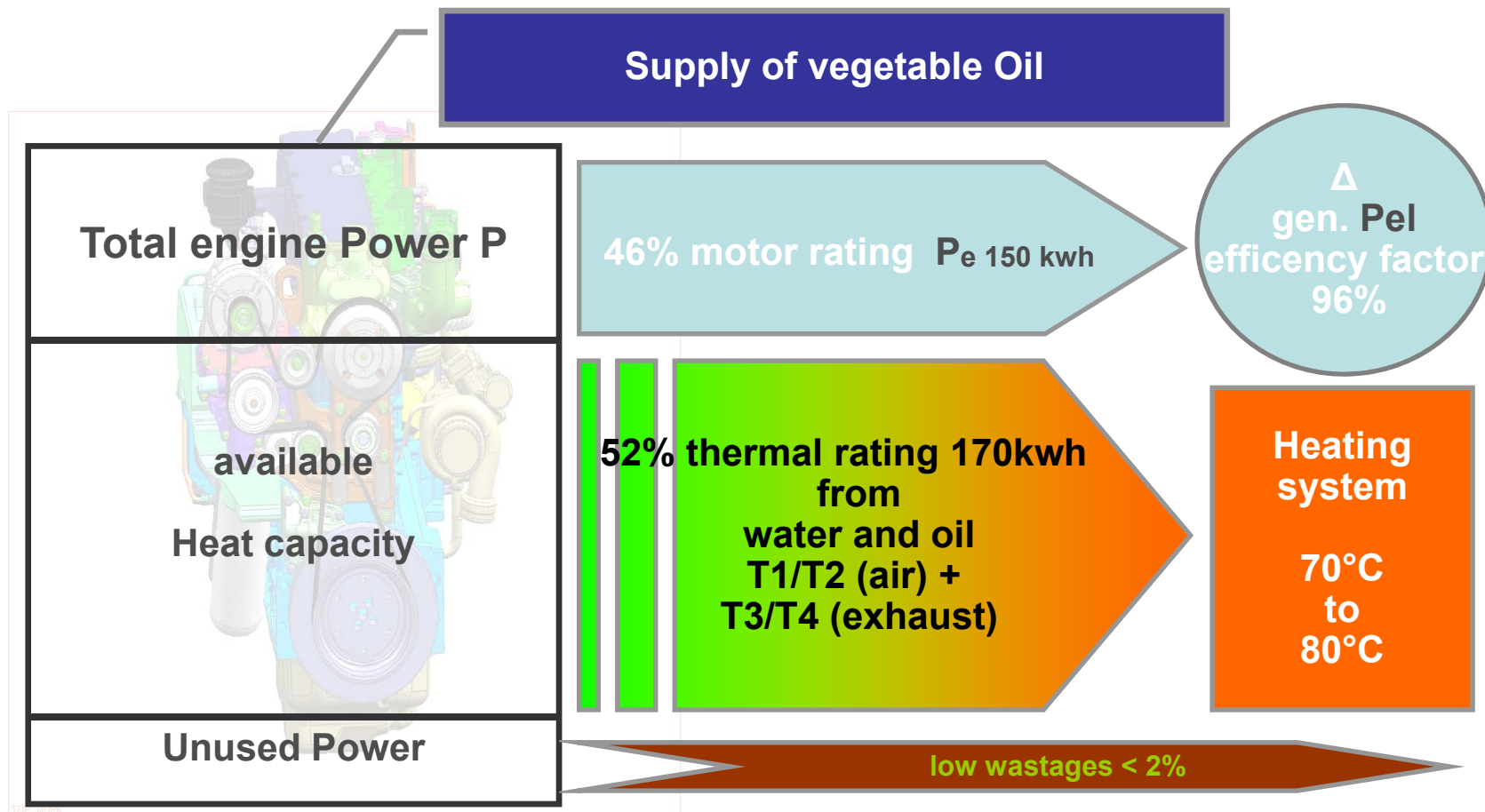
LENZ

Bio-Power

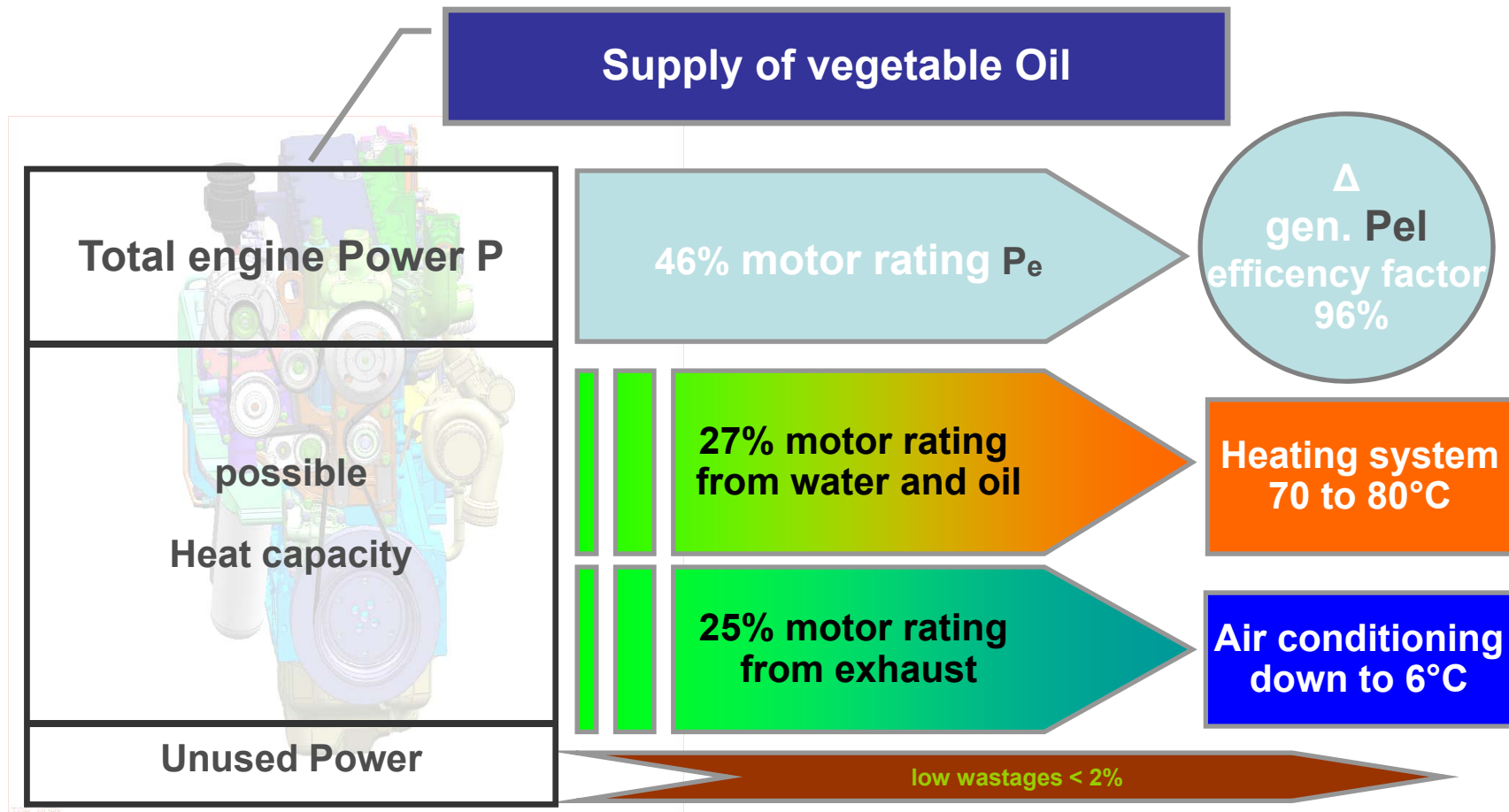
Next Generation

www.lenz-bhkw.de

Extremely low power wastage 150KW Engine (98% efficiency)

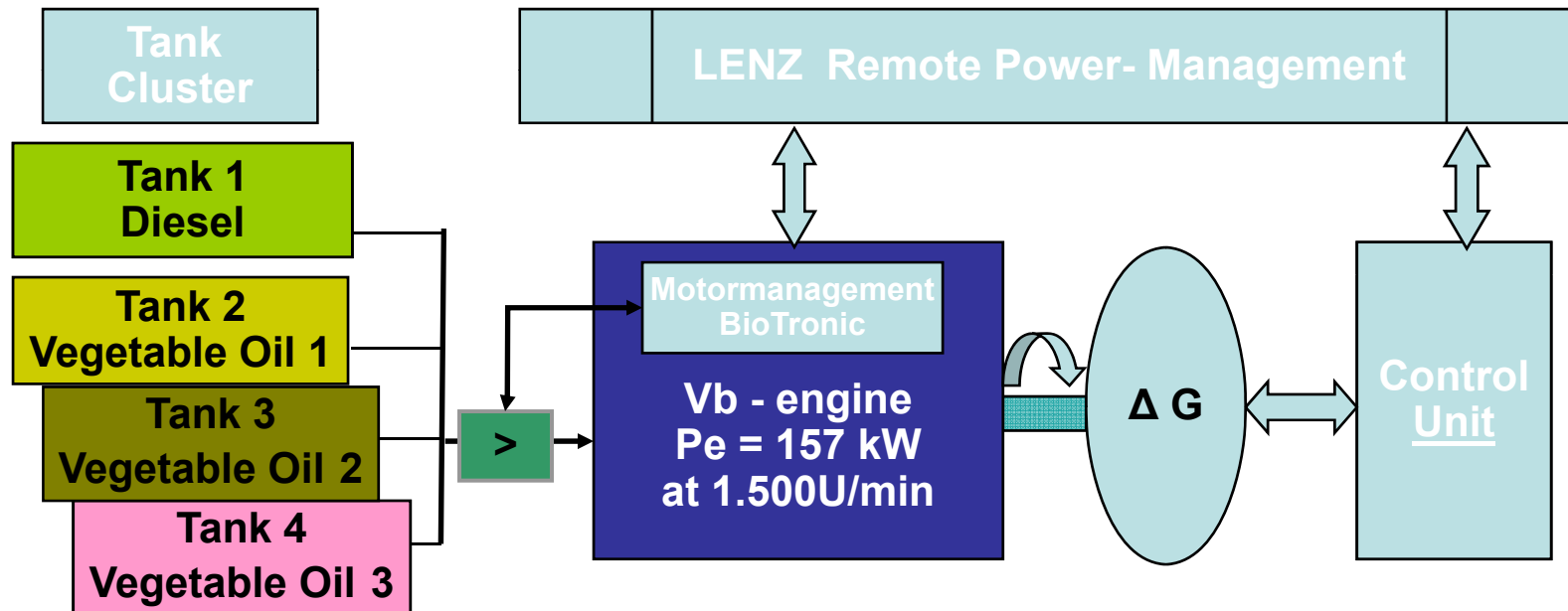


MPP produce usable Power, Heat and Cooling output



MPP Systems can utilize mixed fuel inputs & Gurantee 150kW constant output

MPP BioPower technics



Benefits:

- mixed use of fuel (several vegetable oils as well as diesel)
- electricty output optimized (150kW) / minimizing of all cost

The logo for LENZ, consisting of the word "LENZ" in a bold, sans-serif font.

Bio-Power

Next Generation

www.lenz-bhkw.de

BioTronic Motor Management extends engine performance and lifetime

Benefits Lenz BioTronic

- **Optimized system check with Lenz LambdaMeter®**
 - Constant system security
 - Realtime error detection, emergency deactivation
- **Optimized engine construction**
 - Optimized valve timing and fuel injection
 - Optimized gas mix
- **Optimized fuel burning with BioTronic**
 - **Lenz Aktiv PowerRam® and Aktiv PowerFlow®System**
 - reduction of consumption
 - Results in reduction of sooty particles more than 99%
 - Results in reduction of carcinogenic substances up to 98%

The logo for LENZ, featuring the word "LENZ" in a bold, white, sans-serif font against a green background.

Bio-Power

Next Generation

www.lenz-bhkw.de

Application Scenarios

Large Family homes and villas,
Multi-family houses
New residential areas with small
district heating system
Schools and Kindergartens
Recreational facilities:
swimming pools, amusement
parks
Sports facilities
Hospitals
Hotels, campgrounds
Agriculture with and without
Plant cultivation
Absorption refrigeration (CHP K)

Several Industries:
galvanizations
breweries
laundries
automotive
commercial farms,
large gas stations
churches / community centers
department stores,
shopping center's / malls
office building

LENZ

Bio-Power

Next Generation

www.lenz-bhkw.de

Bio fuel class I–II

Fuels: MPP with vegetable oils

- Optimized injection for soy, canola (Raps), sunflower oil
- Significant reduction of carcinogenic substances
- Control of fuel temperatur

Benefit of local production of class I-II fuel



Bio fuel class III-IV

Fuels: MPP with Palm and Pugir

(*Jatropha curcas*)

- Optimized injection for palm and pugir oil
- **Significant reduction of carcinogenic substances**
- Control of fuel temperatur at tank (heating with pugir not requiered)

Low price benefit of Class III-IV fuel



List of Fuel (abstract) Energy Coefficient

Fuel	density (15°C) [kg/l] / [l/kg]	calorific value [MJ/kg]
Diesel	0,842 / 1,187	42,7
Canola Oil	0,921 / 1,085	37,6
Soy Oil	0,931 / 1,074	37,1
Linseed Oil	0,931 / 1,074	37,1
Olive Oil	0,921 / 1,085	37,8
Sun flower Oil	0,932 / 1,072	37,1
Pugir Oil	0,912 / 1,096	37,2
Coco Oil	0,872 / 1,146	35,3
Palm Oil	0,921 / 1,085	37,1

Definitions for Calculation

❖ Technical definitions

- Total engine power P
- Real engine power $P_e = P$ minus Cooler, etc.
- Generator Input Performance $P_{nG} = P_e * 0.96$
- Definition for engine performance ISO 1585 / ECE R85
 - 1013 hPa / 293°K (20°C) or ECE 990 hPa / 25°C
 - DIN 51605 definition of Raps oil
- Consumption $b_e = [g/kWh]$
- Mechanical rating $\eta_m = P * x$
- Termal Rating $\eta_{th} = p_{th} * x$
- Total rating $\eta_e = P + p_{th}$