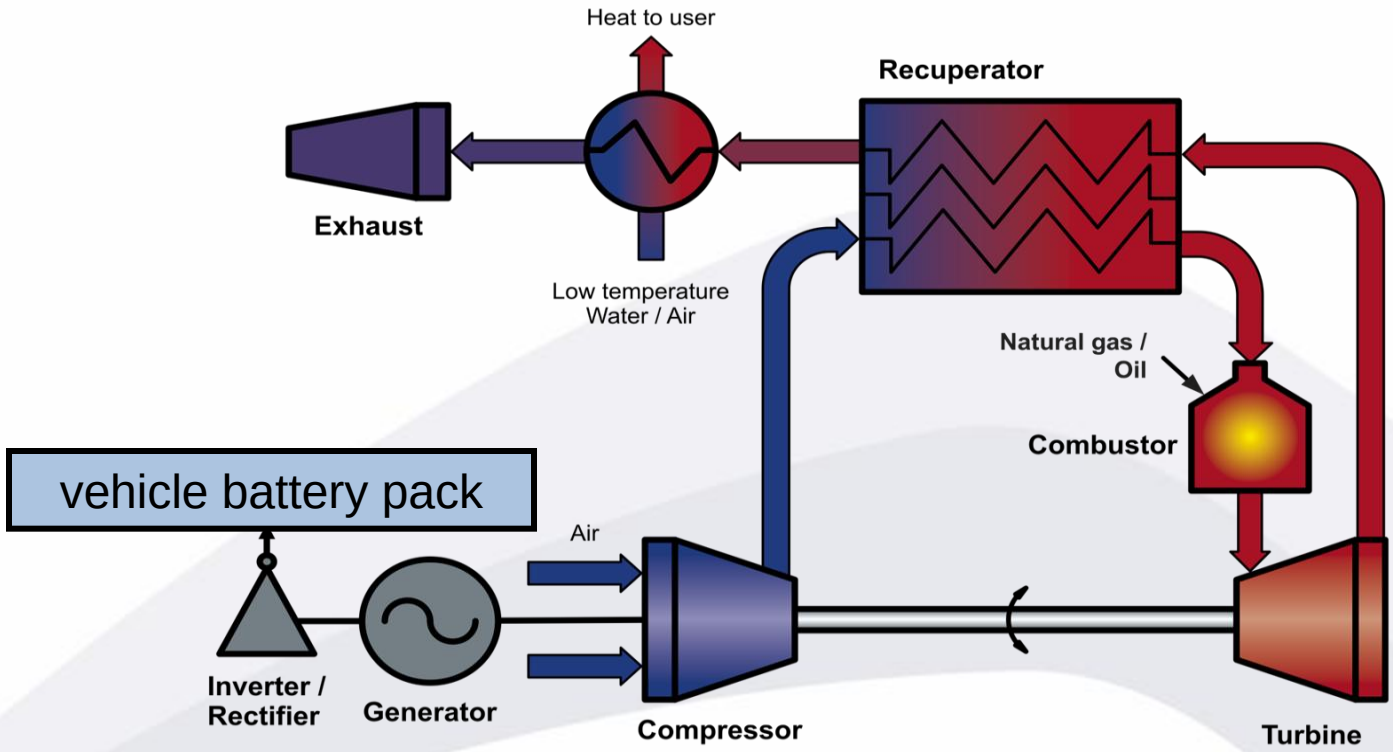
MTT CAP unit

Micro turbine solving the idling problem

MTT 3 kWe CAP unit

MTT's CAP system is based on the use of COTS automotive turbocharger components which result in:

- high performance and efficiency
- reliability and cost effectiveness



MTT 3 kWe CAP unit

- Most **economic solution** to the problem of idling main truck engines during rest period of driver
  - **Short pay back** for the fleet owner (less than 2 years)
  - Significant **reduction of fuel consumption** for large trucks (1.600-2.400 ltr./ year)
  - Additional **performance improvement** for trucks: pre heating catalyst, battery charging
  - **Increase comfort** level for truck driver
- Most **compact and light weight** system compared to competition
- Significant **reduction of carbon footprint, noise and PM**
- System specification that fits to the needs of global truck manufacturers in Europe and US
- COTS components (where possible) → **Fast to market and proven reliability**

CAP unit: Business drivers

- **From the fleet owners perspective:**
  - Saving on operational costs of long distance transport (> € 3,000 / year)
  - Avoids expensive stranding and subsequent cargo loss
  - More comfort for driver
  - Lower maintenance cost of main engine
  - Compliance to international laws on prohibition of engine idling
- **From the perspective of truck manufacturers (OEM)***:*
  - Comply to new laws and regulations on emissions (i.e. EURO 6 / UF 2010)
  - New opportunities for business, improved competitiveness (more comfort)
  - Increased turnover / increased gross margin
  - No need to install a parking heater (cost reduction by ± € 650,-)
  - Additional operational advantages: battery charging, pre-heating catalyst
- **From governmental (national / EU) perspective***:*
  - CO2 reduction and energy savings
  - Environmental improvement (noise reduction, PM reduction)
  - New economic impulses

CAP is a hot topic for all stakeholders

CAP unit market potential

1. **OEM Market: New heavy trucks deliveries (figures 2007)*:**

– Europe	± 300.000 trucks
– North America	± 340.000 trucks
– Rest of the World	± 180.000 trucks
Total	± 820.000 trucks

This is both an OEM market as well as a market to be addressed through truck dealers.

2. **After market: existing stock of heavy / long distance trucks:**

– World:	> 6,0 million trucks
– Europe:	> 2,0 million trucks

This is an after market to be addressed through truck dealers.

3. **Current market penetration of APU's is < 1,0%**
4. ***Note that due to credit crises sales have decreased significantly (2008 and 2009).**

* Source: annual reports DAF Trucks / Paccar, Scania and Volvo (2007)

MTT CAP unit end user advantage

Benefits of the MTT 3 kWe CAP unit:

- Using off the shelf components available at low cost → excellent commercial start position
- Low weight (compared to competing systems i.e. piston engines, stirling engines)
- Rapid response
- Avoids expensive stranding due to low batteries

Financial calculation fleet owner (through OEM channel):

– Sales price of MTT CAP system to fleet owner :		€ 4,000
– Minus cost of parking heater		€ 950*
	netto investment:	€ 3,050
– Fuel cost due idling of main engine (800 * 3,5 ltr/hr) :		€ 2,800
– Fuel consumption CAP unit (800 * 1.12 liter/hr):		€ 896
	nett annual saving:	€ 1,904

→ **Pay back time for fleetowner: 19 months**

* Fleet owner price for parking heater (installed)

MTT CAP unit proposition

- **Design specification CAP unit:**
  - Average power input (nominal load): 12 kW
  - Electrical efficiency : 20 %
  - Nominal electrical power output: 2,4 kWe (peak load: 3 kWe)
- **Fuel consumption:**
  - Energy use/hr 12 kW → 43,2 MJ / hr
- **Diesel:**
  - Caloric value: 45.6 MJ/ kg → ± 38,650 MJ / ltr (density 0.844)
  - Fuel consumption → 1.12 ltr / hr
- **Target selling price to fleet owner:** ± € 4,000 (through OEM channel)

Overview of MTT and risk sharing partners

KNOWLEGE PARTNERS

INDUSTRIAL PARTNERS

Micro Turbine Technology bv:

- **Formed in 2003, located in Eindhoven, the Netherlands**
- **14 FTE (academic level), growing to 16 - 18 FTE in 2010**
  Including partners: ± 35 engineers on development programs
- **Strong partnerships *(participate at risk sharing bases)***
- **Independent assessment by KEMA (October 2009) shows that MTT's technical objectives are feasible**

Business proposal

- **Purchase of field trial units:**
  - Setting up a field trial
- **Exclusivity agreement**:
  - For specific geographical market
  - For specific fuel type
  - For agreed period / first series
- **Technology purchase / licensing**:
  - Use of MTT technology in other applications
  - Marketing of MTT CAP technology outside Europe
- **Development / engineering contract**

Contact details

Willy Ahout,
CEO

Mobile: +31 6 2245 3479
Email: willy@mtt-eu.com

Mateusz Kurkowski,
Business Development

+31 6 2456 6430
mateusz@mtt-eu.com

Micro Turbine Technology BV (MTT)
De Rondom 1
5612 AP Eindhoven
The Netherlands

Web: www.mtt-eu.com
Phone: +31 (0)88 688 0000