



# Recovering waste heat from light-duty vehicles

Since 2014, Carnot IFPEN Transports Energie has been partnering Enogia, an SME specialised in heat recovery, which has been marketing stationary ORC (Organic Rankine Cycle) engine systems for a number of years. This technology, which is based on waste energy recovered from the cooling water of internal combustion engines, has been adapted to road transport for an automotive application.

Carnot IFPEN Transports Energie Institute

## Scientific / technological breakthrough

The research harnesses synergies between digital experiments and simulations in order to recover waste thermal energy at an affordable cost. Aside from energy recovery, the technology also focuses on:

- the space taken up by the system,
- manufacturing processes to get to production costs for long runs,
- integration into the vehicle's cooling system,
- compatibility of current powertrains with an ORC product with electrical output of 48V.

The system developed thanks to the work performed by Carnot IFPEN Transports Energie helps reduce motorway consumption by 2% to 3% for utility vehicles and cut CO<sub>2</sub> emissions by between 2 and 4 g/km on the WLTC driving cycle, depending on the heat management solutions deployed for the vehicle.



## Competitive advantage for the economic stakeholders

Enogia designs and manufactures stationary ORC applications and is looking to break into new markets such as transport. An initial partnership with Carnot IFPEN Transports Energie has resulted in a range of machines adapted to light vehicles, giving Enogia a path into the road transport market. It also saw Enogia's workforce grow from 10 to 37 people in 2019.

Convinced of this technology's ability to harness low flows of medium-temperature heat for the non-road transport market, the company also wants to adapt this technology for ships and trains.

The partnership is continuing with a view to creating ever more efficient and affordable systems.

## Partnership

- **ENOGIA** is a Marseille-based SME that designs and manufactures heat-to-power conversion systems that harness a combination of the Organic Rankine Cycle (ORC) and unique patented micro-turbine technology.

### Contact

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