



## D5.2– Turbocharger Development (open-loop efficiency) incl. simulations

Innovation Action

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<b>Written By</b>	Laurentius Jaeger (GARR)	2022-Mar-31
<b>Checked by</b>	Bram Hakstege WP leader (DAF)	2022-apr-16
<b>Reviewed by (if applicable)</b>	RWTH & PRIMA	2022-May-30
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## Publishable summary

Following-up on the promising results with E-Turbo in the Imperium project, DAF has invited Garrett to support WP5 of Longrun with E-Turbochargers. In the Imperium project, the potential of turbocompounding with E-turbo was shown in steady state operation. However, we had not reached a clear understanding of the difference in performance of single, open volute turbine and twin, divided volute turbine configurations.

A new E-Turbo is to be designed, with a line of sight towards product developments: 48V instead of 400V, made with affordable technology.

Objectives of Longrun WP5 is to demonstrate 50% engine brake thermal efficiency in best point. In reference to turbocharging, the targets are:

- Preserve more of the exhaust gas enthalpy for the benefit of higher turbine power.
- Reduce engine pumping work.
- Produce electric power with the E-Turbo.

A three steps approach is chosen:

- A first E-Turbo to verify new technologic solutions, developed in-house at Garrett, namely in details of the shaft and bearings as well as in-house developed inverter.
- A conventional turbo with two different turbine housings (OV and SD) to investigate pulse utilization, on gas stand, in simulation and on engine dyno.
- A second E-turbo to incorporate all the lessons learned in the course of the project activity.

The first of the three project steps is completed with good results for the electric performance of the E-Turbo. Work is ongoing, in parallel, on the second and third steps.

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### Project partners:

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20	TECHNA	FUNDACION TECHNIALIA RESEARCH & INNOVATION
21	TOTAL	TOTAL MARKETING SERVICES
22	UMIC	UMICORE AG & CO KG
23	UNR	UNIRESEARCH BH
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