

**TOP**  
**GEAR**

## **Gears with top in-service performance developed for hybrid and electric vehicles**

City, Date

Event

Speaker's name – Organisation



This project has received funding from the Research Fund  
for Coal and Steel under grant agreement No 101033989

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## Motivation

- EU aims to reduce the emission of CO<sub>2</sub> gases in transportation
- HEVs and especially EVs are the solution to reach those goals

## Challenge

- speed of electric motor of HEV/EV is much higher than in ICE
- rotating speed of the transmission gears as high as 15,000 rpm
  - problem of **augmentation of fatigue failures in gears** (e.g.scuffing)





## Research Fund for Coal and Steel



- Starting date:** Aug 2021
- Duration:** 42 months
- Funded under:** Research Fund for Coal and Steel RFCS-RPJ
- Project budget:** 1.17 M€
- Partners:** 5
- Countries:** Spain, Italy, Germany, Austria



...complementary partners along the entire value chain



**Sidenor**  
(steelmaker, Spain)



**Centro Ricerche Fiat**  
(end-user, Italy)



**ALD Vacuum Technologies**  
(surface hardening company, Germany)

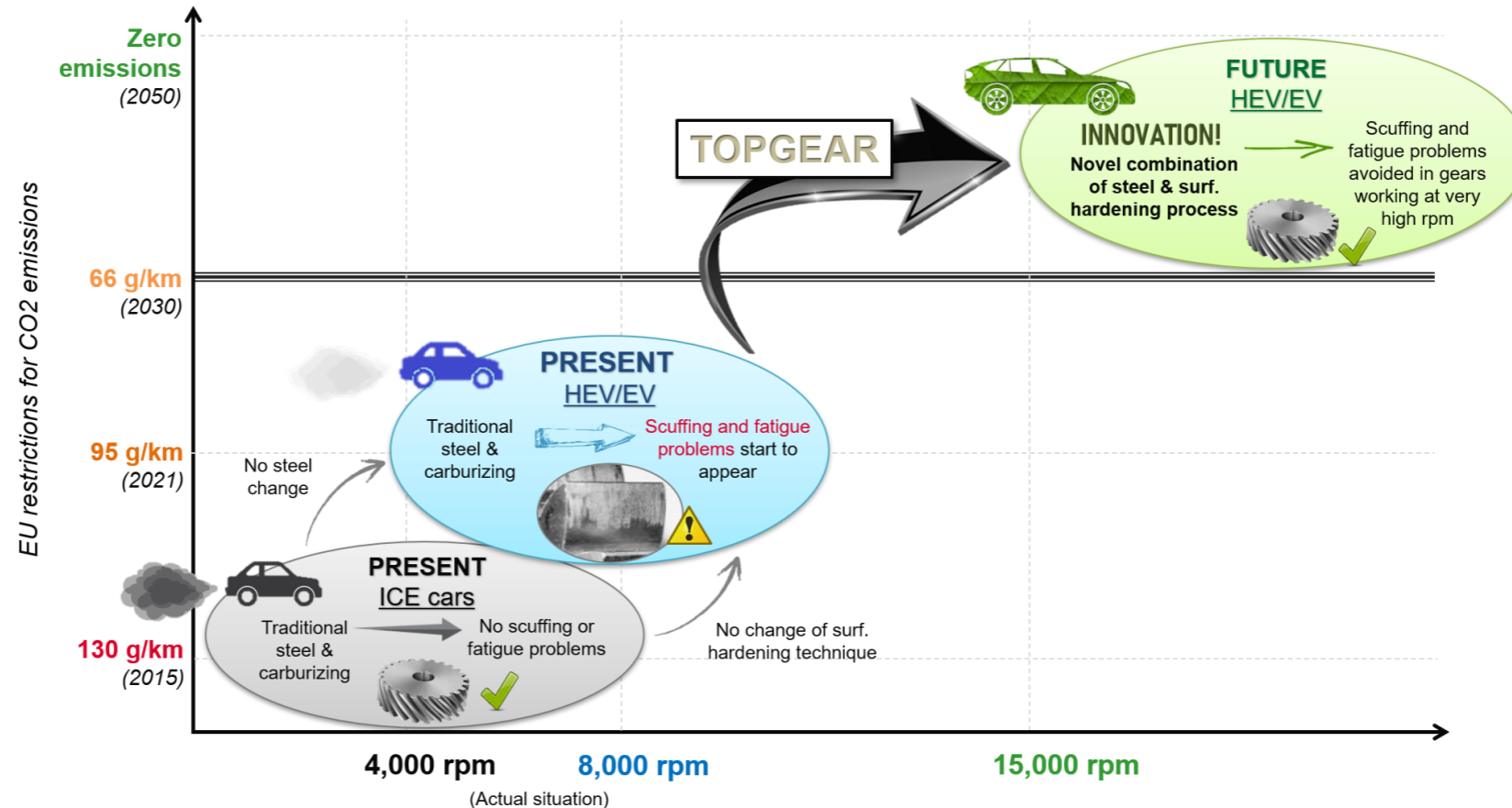


**Rheinisch-Westfälische  
Technische Hochschule Aachen**  
(University, Germany)



**i2m Unternehmensentwicklung**  
(technology development consultancy, Austria)

- developing a new manufacturing route for gears
- combining new steel solutions & surface hardening treatments
- pushing gear performance to overcome today's fatigue and scuffing problems



## Solutions

- low temperature surface hardening processes (nitriding and nitrocarburizing)
- new carburizing and quenching process with single-layer-treatment
  - **minimize teeth distortions and enable notable economic savings**

## Benefits

use of F-P microalloyed steels for nitriding/nitrocarburizing

- **avoid Q&T, an expensive and pollutant heat treatment**
- simplification of manufacturing process
- reduction of machining costs (better machinability of the F-P steel compared to martensite)



A banner with a dark grey background and a glowing orange gear in the center. The text 'About TOPGEAR' is written in bold black font over the gear.

# About TOPGEAR

**For more information visit our website:**

[www.topgear-project.eu](http://www.topgear-project.eu)



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