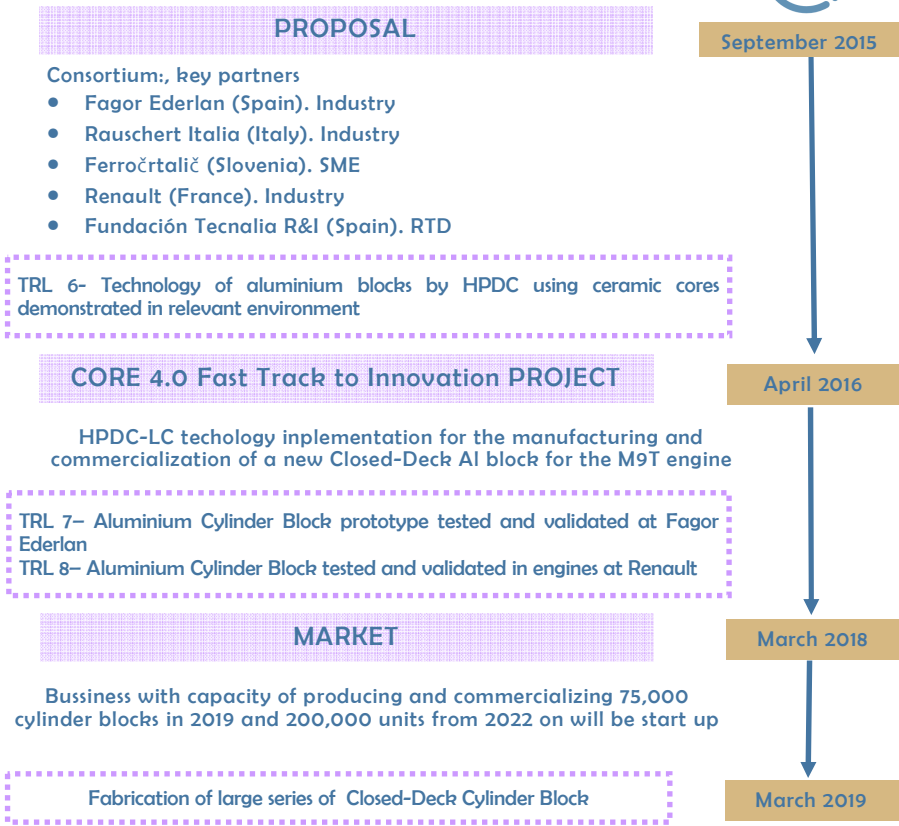


CORE 4.0 PROJECT ROAD MAP



Nº 701197

Engine block manufacturer

Andoni Sabando (Project Coordinator)
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fagoredelan **taldea**

Ceramic core manufacturer

Alberto Menoni
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Rauschert

De-coring equipment manufacturer

Marko Trajkovski
 marko.trajkovski@ferrocrtalic.com

Ferročrtalič
 INTERNATIONAL

Product validator

Mohammed Mokaddem
 mohammed.mokaddem@renault.com

RENAULT
 Passion for life

Technology provider

Mikel Merchán
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tecnalia Inspiring Business

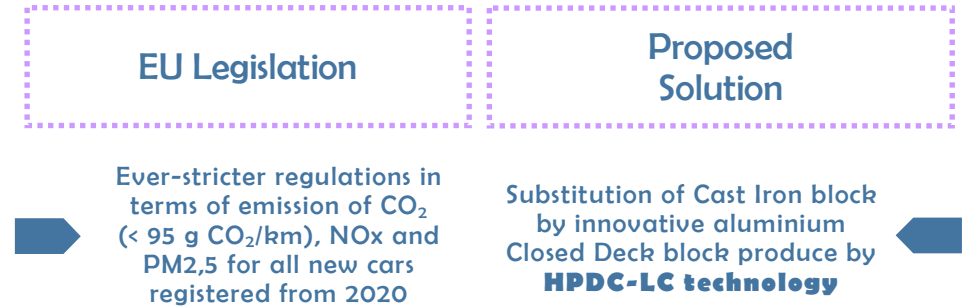
TECHNOLOGY FOR NEXT GENERATION ENGINES

CORE 4.0

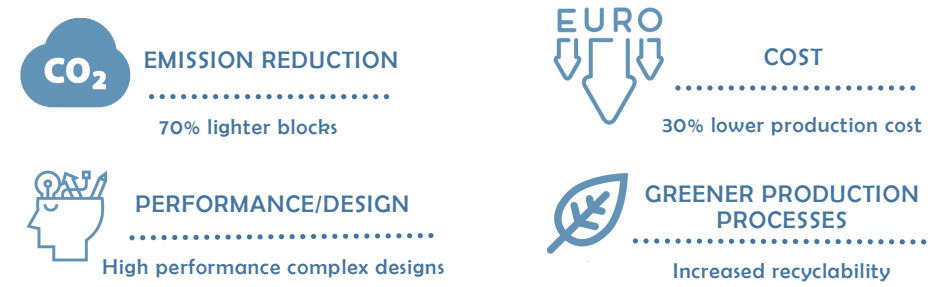


<http://core40-project.eu/>

New Innovative aluminium Closed-Deck block produced by High Pressure Die Casting (HPDC) Lost Core (LC) technology



Value proposition Benefits



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 701197

CORE 4.0 BUSINESS MODEL



VALUE PROPOSITION

Innovative aluminium Closed Deck Engine Blocks produced by HPDC-LC for the next generation of Euro7 engines



TECHNOLOGY

Barriers to be overcome

Advantages:

- High productivity
- Complex parts
- High surface quality
- Robust designs

Limitation	Approach
Brittleness of the cores used currently	Ceramic cores will be used instead
Penetration of the aluminium	Advanced coatings on the core surface
Cores cannot be easily removed	A robotic UHP water de-coring machine will be developed



KEY ACTIVITIES

- Ceramic cores able to withstand casting pressures of up to 800 bar and easy to be de-cored
- Closed-deck aluminium block for engines with combustion pressures over 170 bars
- UHP water de-coring equipment with high production rate
- 2,000 blocks manufactured with HPDC-LC technology and cleaned by UHP water de-coring process by a continuous process
- Complete Engine bench Test



KEY RESOURCES

- Highly experienced industrial and innovation partners
- Complex equipment and manufacturing plants
- Engine test bench for endurance test of new AI block
- Intellectual property of the new design

CORE 4.0 BUSINESS MODEL



MARKET SEGMENT

CORE 4.0 is creating value mainly for engine and car manufacturers but also for the automotive industry value chain.

- 1st for Renault's new generation of diesel engines with pressures over 170 bars
- Beyond the project, European engine manufacturers
- Future applications in the same sector (other automotive components) and even in other sectors and segments (range extended engines, energy...)



KEY PARTNERSHIP

CORE 4.0 consortium, is the main strength of the project, and has been built up with the key partners;

- Natural value chain
- Necessary and complementary skill
- Potential to increase each particular business outside the common one

Partner	Role in CORE 4.0	Impact (expected turnover by 2024)
FAGOR EDERLAN	Coordinator / Engine Block manufacturer	Exclusive new plant for manufacturing innovative blocks (26.4M€/yr)
RAUSCHERT	Ceramic cores manufacturer	New sector (foundry), supplier of Fagor (8M€/yr)
FERROCRTALIC	De-coring equipment manufacturer	New market segment (3M€/yr)
RENAULT	Engine block validator	Lighter blocks for the new M9T engine to fulfil the Euro 7 regulation (800-1,000M€/yr)
TECNALIA	Technology provider	New technology knowledge and becoming key strategic technology partner for automotive companies