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*IMproved lifetiMe stacks fOR heavy duty Trucks through ultra-durabLe components*

## ABOUT IMMORTAL

### Expertise in fuel cell science and technology

The IMMORTAL project is developing exceptionally durable and high power density Membrane Electrode Assemblies (MEAs) well beyond the current state of the art up to Technology Readiness Level 4. This will be achieved by building on understanding of fuel cell degradation pathways specific to heavy-duty truck operation and developing lifetime prediction models from extensive real-life stack operation, accelerated stress test and load profile cycles on short stacks. IMMORTAL encompasses Original Equipment Manufacturers, Tier 1 suppliers and leading industrial and academic/research organisation partners with extensive experience in fuel cell science and technology.

### Exceptionally durable and high power density MEAs

Building on the best developments from the FCH JU, the project will not only develop significantly **more durable MEAs** (transferable to other fields), but will accelerate **competitiveness** of the European fuel cell truck sector by providing recommendations at system level to **improve durability**, and designs that contribute to increasing stack power density and to **reducing the Proton Exchange Membrane Fuel Cell system cost**.

## CONTACT

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## Performance & Durability in Full-Size Cell Short Stacks

Validate the MEA performance and durability in full size cell short stacks using extended load profile testing and achieve a predicted lifetime of 30,000 hours.

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## IMMORTAL OBJECTIVES

### Identify & Rank Degradation Mechanisms

Identify and rank critical degradation mechanisms using data from field and laboratory stack ageing tests, and accelerated ageing protocols.

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## Develop New Materials Concepts

Develop new materials concepts for world-leading components (electrocatalysts, membranes) by incorporating mitigation strategies to fuel cell operation-induced degradation into their design to ensure both their activity and their stability, and improve the interfaces between them to minimise resistances.

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### Novel Electrode & MEA Constructions

Realise the potential of the components in MEAs by introducing novel electrode and MEA constructions to deliver a step change in durability while exceeding  $1.2 \text{ W/cm}^2$  at  $0.675 \text{ V}$ .

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### Develop Load Profile Tests

Develop load profile tests for heavy-duty MEA performance and durability assessment, including input from real-life usage profiles.