

## IKERLAN TECH OFFER FOR HORIZON-JU-CLEAN H2 PROJECTS

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# 1. IKERLAN's capacities

Cooperative-based R&D centre: Mondragon Corporation

+400 people

## Basque Research & Technology Alliance

### Combustion and burner design:

- Working on combustion (gas –including H2 blends-, liquid, solid biomass) for about 40 years
- Working on 100% H2 combustion for about 10 years
- Combustion CFD simulations for burner and appliance design
- Combustion lab, including H2 combustion
- Several projects for H2 burner development:
  - Domestic appliances (boilers, range tops...), including CFD, prototyping, testing and pre-certification, for clients like ORKLI, COPRECI, BSH
  - Industrial appliances, only at CFD level or lab-scale prototypes: heat treatment, secondary aluminium melting, industrial boilers

### Other capacities (non-related to H2):

Energy & Power Electronics

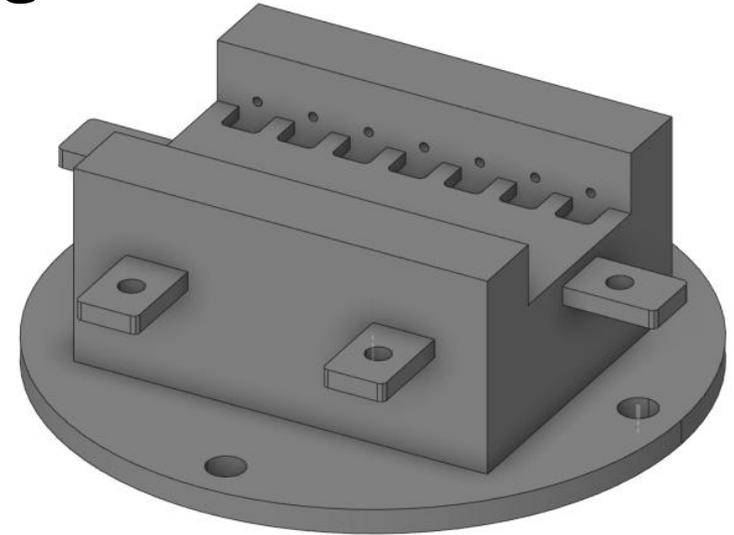
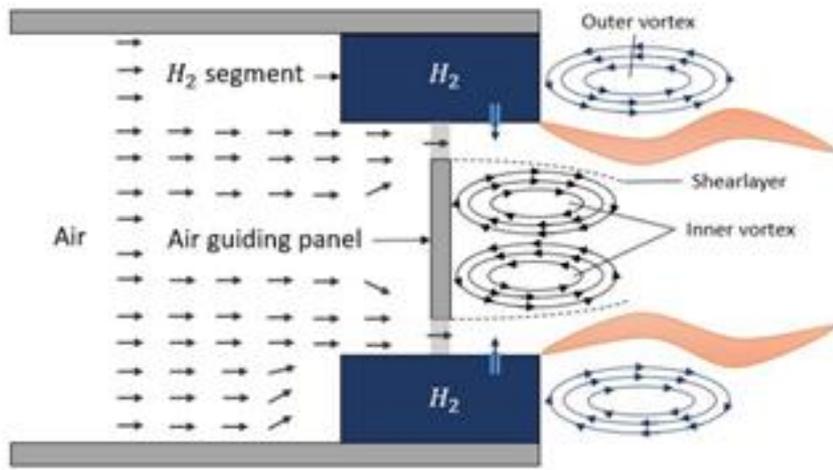
Embedded systems, Cybersecurity, IA

Mechatronics



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## Micromix Combustion Principle



### Core Technology

Cross-flow principle with miniaturised injectors where fuel is injected perpendicularly into the air stream through a homogenising plate.

- Thermal **NO<sub>x</sub> reduction**.
- Flame anchoring without flashback risks.
- Origin: turbine sector for **H<sub>2</sub> fuel**.

### Development & Applications

Laboratory design, construction and validation for **H<sub>2</sub>** for **H<sub>2</sub> and H<sub>2</sub> (85%) + NH<sub>3</sub> (15%) blends**. Adapted for industrial heating processes.

- Scaled to **3MW** capacity.
- **Redesigned for H<sub>2</sub> (40%) + NH<sub>3</sub> (60%)** combustion.

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## Ammonia-Hydrogen Micromix Combustion Principle

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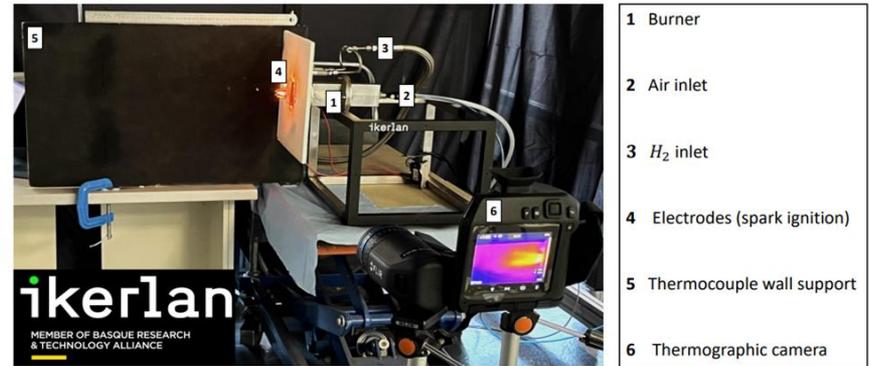
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(54) DEVICE FOR BURNING FUEL

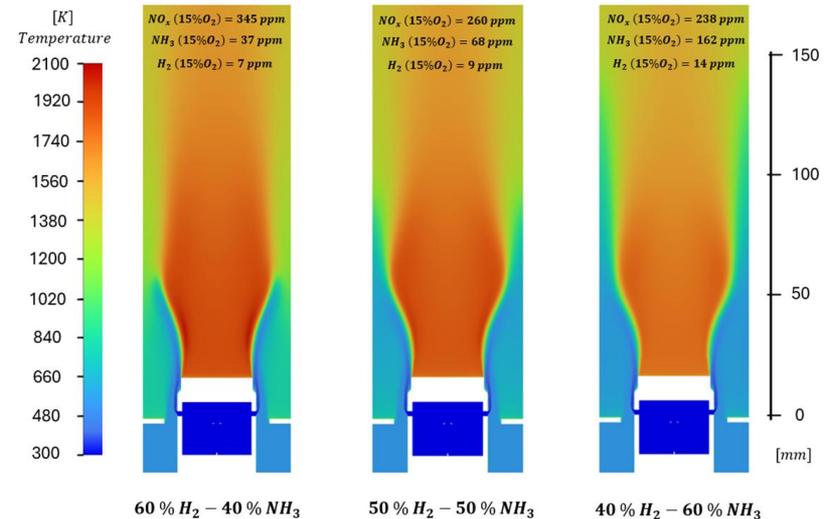
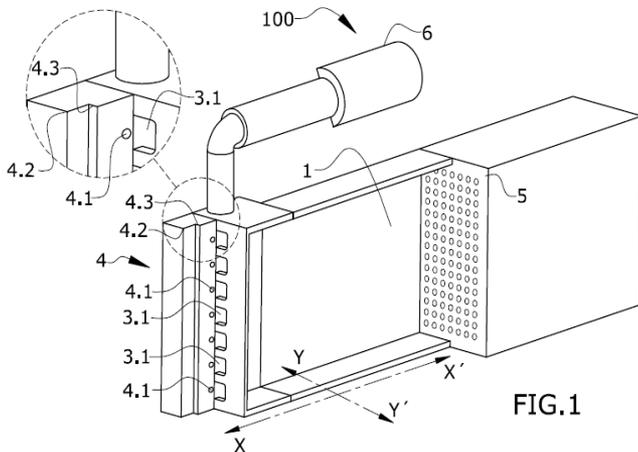
### Experimental set-up



- 1 Burner
- 2 Air inlet
- 3 H<sub>2</sub> inlet
- 4 Electrodes (spark ignition)
- 5 Thermocouple wall support
- 6 Thermographic camera

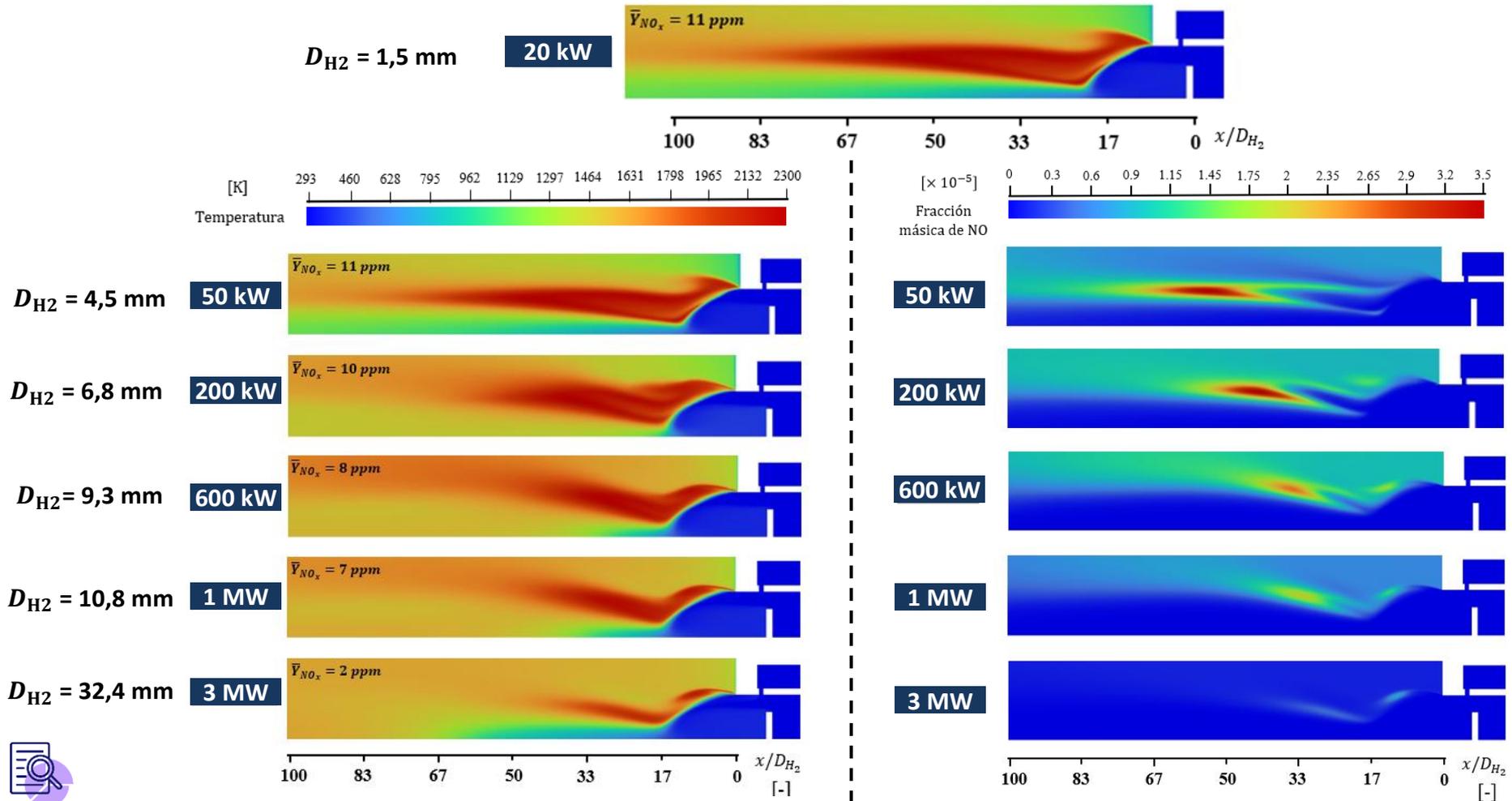
### CFD simulation

### Redesign



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## Scaling-up methodology



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## Customers:

**ikerlan**

MEMBER OF BASQUE RESEARCH  
& TECHNOLOGY ALLIANCE



# 2. Topics of interest in call 2026

Topic	Experience and Contribution
<p><i>HORIZON-JU-CLEANH2-2026-04-03: Fuel-flexible gas turbine combustion technology for clean and efficient ammonia firing</i></p>	<p><b>Experience:</b></p> <ul style="list-style-type: none"><li>• FP7NMP2-LA-2008-214395 H2SUSBUILD 2007-2014. <a href="http://www.h2susbuild.ntua.gr/">http://www.h2susbuild.ntua.gr/</a> and many others (EU and national/regional).</li></ul> <p><b>Contribution:</b></p> <ul style="list-style-type: none"><li>• The composition of NH<sub>3</sub>-based fuels varies with production route and cracking degree, influencing the proportions of NH<sub>3</sub>, H<sub>2</sub>, and N<sub>2</sub>. Strict specification control is complex and costly, so effective management of this variability supports project goals in a cost-efficient manner. Variations in fuel composition can negatively affect flame stability, ignition, thermo-acoustic response, component durability, and emissions such as NO<sub>x</sub>, N<sub>2</sub>O, and unburned NH<sub>3</sub>.</li><li>• IKERLAN can conduct <b>CFD-based combustion simulations</b> to characterize fuel behavior across different compositions and assess impacts on emissions and operability under gas turbine conditions. It can also develop methodologies to scale laboratory results to industrial applications, ensuring validated models are applicable to practical combustor designs.</li><li>• IKERLAN can also conduct <b>combustion experiments</b> to evaluate different fuel blends and develop strategies to reduce emissions and unburned species. These laboratory-scale campaigns, at kilowatt scale, generate high-quality datasets for model validation and support the development of fuel-flexible combustion systems.</li></ul>