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**DANISH
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NATIONAL INSTITUTE OF CHEMISTRY



UNIVERSITY OF
LIVERPOOL



LOMARTOV
[Applied Innovation Engineering]

Project Information

G.A. 101083905

Topic: HORIZON-CL5-2021-D3-03-02
Next generation of renewable energy
technologies

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UKRI Funding: £492 K

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Mobility

Coordinated by: TEKNOLOGISK INSTITUT

HOW TO ENGAGE

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UK Research
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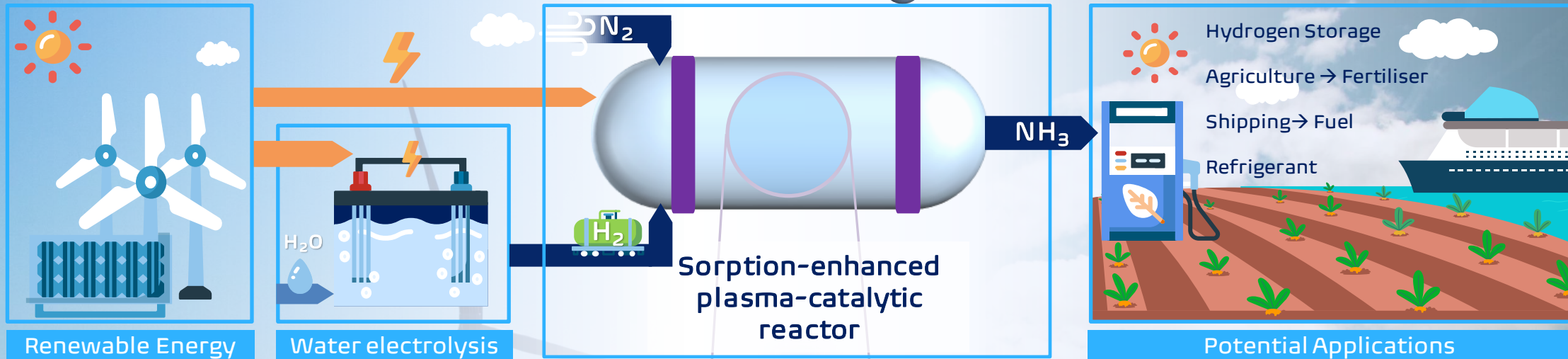


Decentralised Ammonia
production from
Renewable Energy
utilising novel
sorption-enhanced
plasma-catalytic
Power-to-X technology

From Renewable Energy Sources.....

DARE2X

..... to green H₂ storage and NH₃ production



DARE2X OUTPUTS

- Technology Validation at TRL4
- Optimised under a triple pillar **sustainability** framework (environmental, economic & social)
 - NH₃ production at **near ambient conditions**
- **Energy Efficiency Level** compared to current Haber-Bosch process
- **Energy Consumption <10 kWh/kg NH₃**

MAIN INNOVATIONS

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- ⚡ Plasma Tech. → Minimum energy consumption.
 - 🔷 Novel Catalysts with low CRMs content.
 - 🟢 New Sorption Materials with boosted stability.
 - 💻 Materials design supported by computational modelling.
 - 💻 Digital-twin driven plasma reactor design.
 - 🔧 Integration of all the developments in a single stage operation scalable reactor able to produce and separate NH₃ simultaneously.

DARE2X IMPACT

-
- **CO₂ Emissions Reduction** From NH₃ production (~82 MT/year in EU).
 - By replacing fossil based maritime fuels (~150 MT/year) & other transport sectors (~1.1 BT/year).

Energy Savings

- From NH₃ production: ~23TWh/year for traditional uses.

Substitution of Critical Raw Materials (CRMs)

- Alignment with Commission Action Plan on CRMs.
- ~€22.3B saved vs. Ru-based facilities until 2050.