



Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından finanse edilmektedir
This project is co-funded by the European Union and the Republic of Türkiye



International Brokerage Event on Clean Hydrogen Partnership 2024 Call

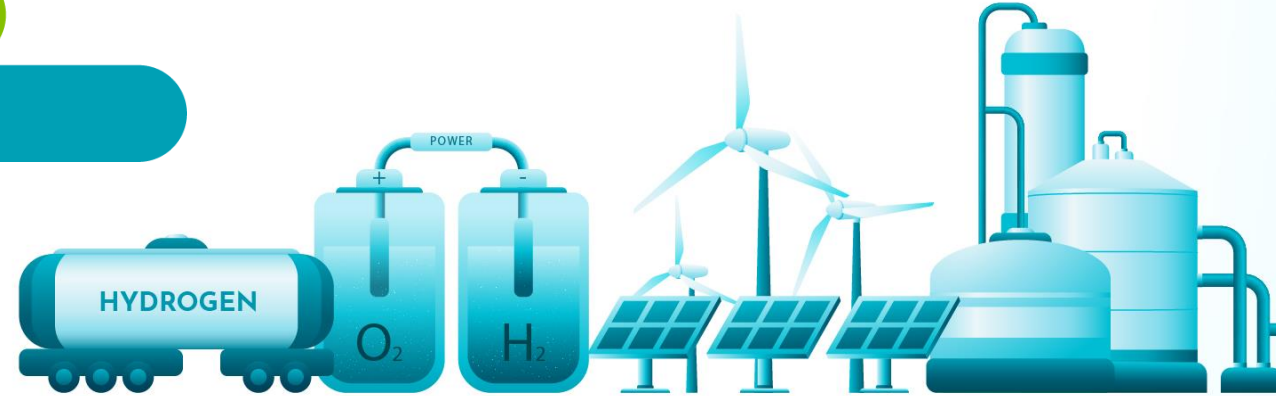


Online

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Organization: TÜBİTAK-MAM

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Description of the Organization

Research Activities at TÜBİTAK MAM:
Hydrogen and FuelCell Technologies Research Group
Research Interest Areas



Natural Gas, Metanol, Diesel Reforming

NaBH_4 Based Hydrogen Generation

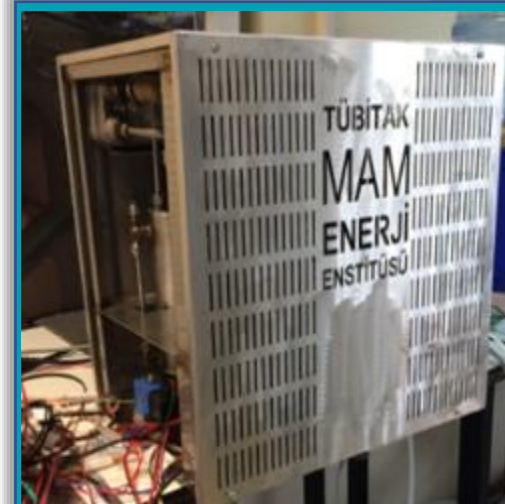
Hydrogen Poduction with PEM Electrolysis

Catalytic Burners

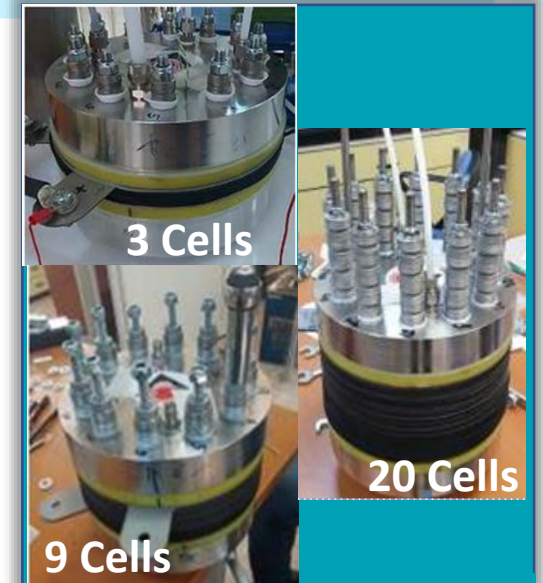
Hydrogen Production from Biomass and Waste

Hydrogen Purification Systems (PSA&DEOX)

Catalyst Development and Production



Sodium Borohydride Based H_2
Production System



9 Cells
PEM Electrolyzer



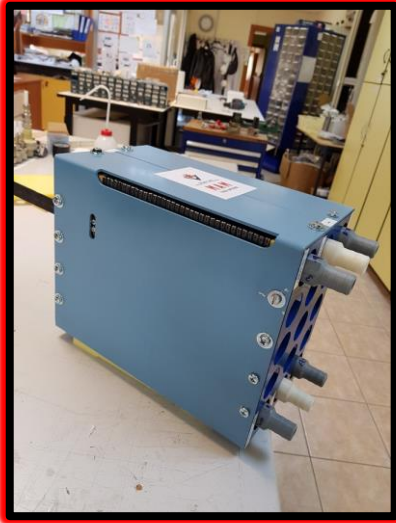
Reformer System

Description of the Organization

Research Activities At TÜBİTAK MAM-
Hydrogen and FuelCell Technologies Research Group:
Completed Projects



1 kW DBHFC



2 kWe PEMFC



5 kWe PEM mCHP



Portable Fuel Cell



10 kW PEM-Electrolyzer



Fuel Cell Vehicle



Fuel Cell Range Extender



Fuel Cell UAV



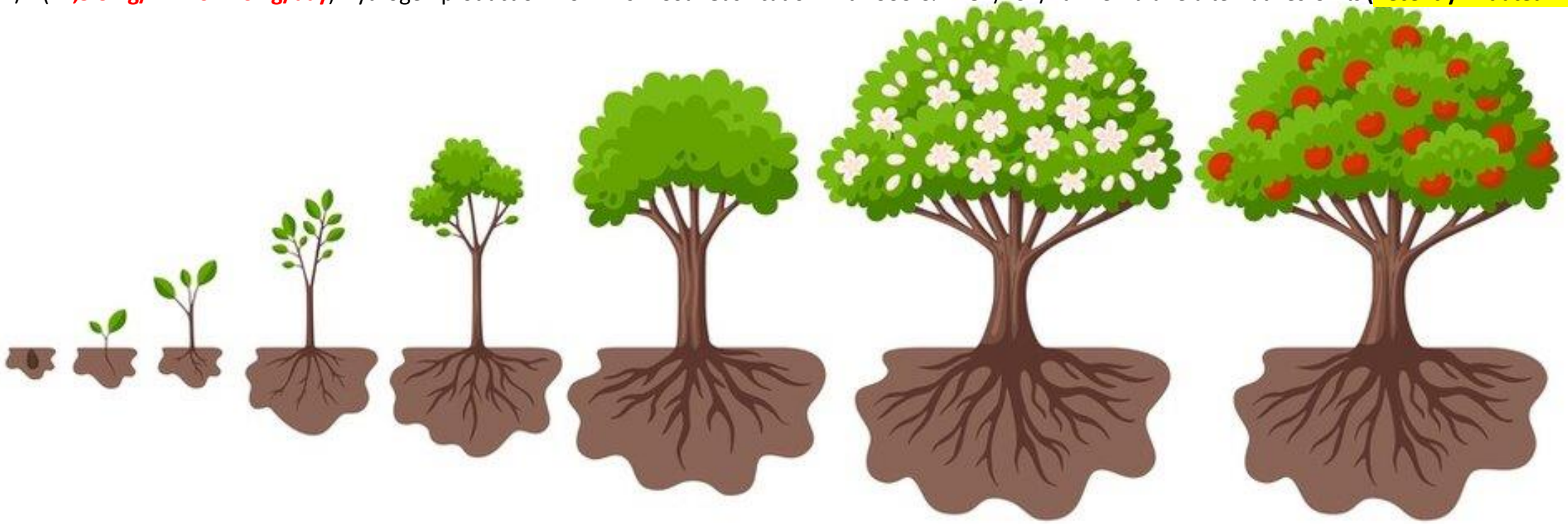
Fuel Cell Vehicle

Our experiences about Gas Purification

Design, manufacturing and commissioning works carried out / will be planned to carry out



- 1) Syngas cleaning experience of $1\text{MW}_{\text{thermal}}$ equivalent (SOMA-TRIEN gasification pilot plant) (**Completed**)
- 2) Design of 44 MW FGD system and 125 kW FGD pilot plant study (MILKAS, 2016-2019) (**Completed**)
- 3) 10 kW PEM Hydrogen electrolyser Design, manufacturing and performance works (**Completed**)
- 4) 30 kW ($\approx 0,55 \text{ kg/h} = 13 \text{ kg/day}$) PEM Hydrogen electrolyser with DEOX Unit (**Ongoing project**)
- 5) 50 kW ($\approx 0,92 \text{ kg/h} = 22 \text{ kg/day}$) PEM Hydrogen electrolyser with DEOX Unit (**Ongoing project**)
- 6) 250 kW ($\approx 4,6 \text{ kg/h} = 110 \text{ kg/day}$) PEM Hydrogen electrolyser with DEOX Unit (**Scheduled to launch soon 2024-06**).
- 7) 50-100 Nm^3/h ($\approx 4,5-9 \text{ kg/h} = 110-220 \text{ kg/day}$) Hydrogen production from Afsin Coal Gasification with CCU & DEOX/PSA/Pd Membrane alternatives Units (**Recently initiated 15.12.2023**)



SCOPE of HORIZON-JTI-CLEANH2-2024-02-03

*Demonstration of Hydrogen Purification and Separation Systems
for Renewable Hydrogen-containing Streams in Industrial Applications*

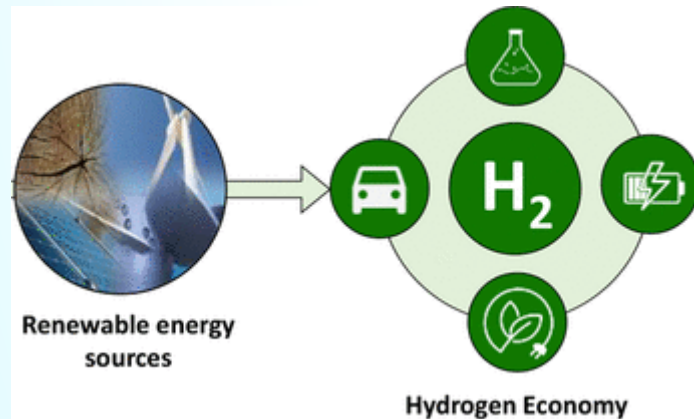


- Include a review of the existing industrial streams
- Mixtures With < 20% Hydrogen Or “Almost Pure” Hydrogen (> 98%).
- Should Demonstrate Applicability On 2 Types Of Streams;
- **De-blending From N. Gas Lines is Excluded**



Literature Review

- Demonstrate in a representative industrial application (**TRL7**)
- Operations **3000 hours**,
- Concepts should target **> 100 kg/day** pure hydrogen output.
- Coupling different technologies
- Offer and demonstrate an adaptable technology to meet the needed purity.



- Analyse the impact of production scaling-up for purification systems.
- Consider hydrogen safety issues associated to this process.
- Conduct a techno-economic analysis and an optional life-cycle assessment
- Develop accelerated protocols to assess the lifetime of the components/systems.

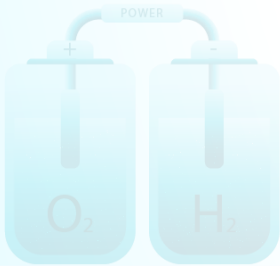
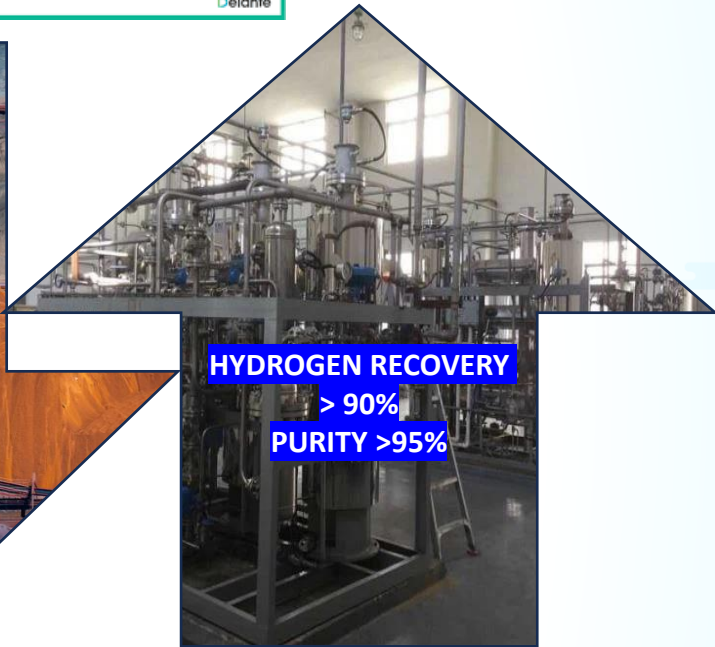
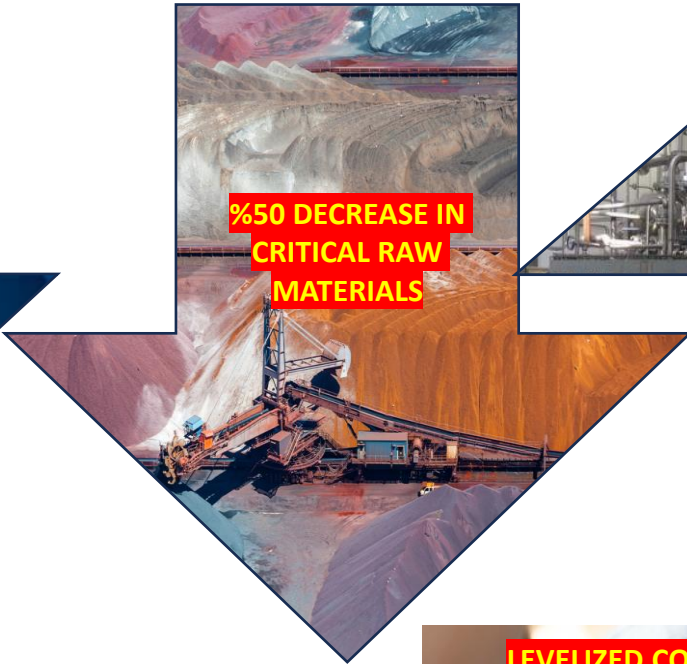
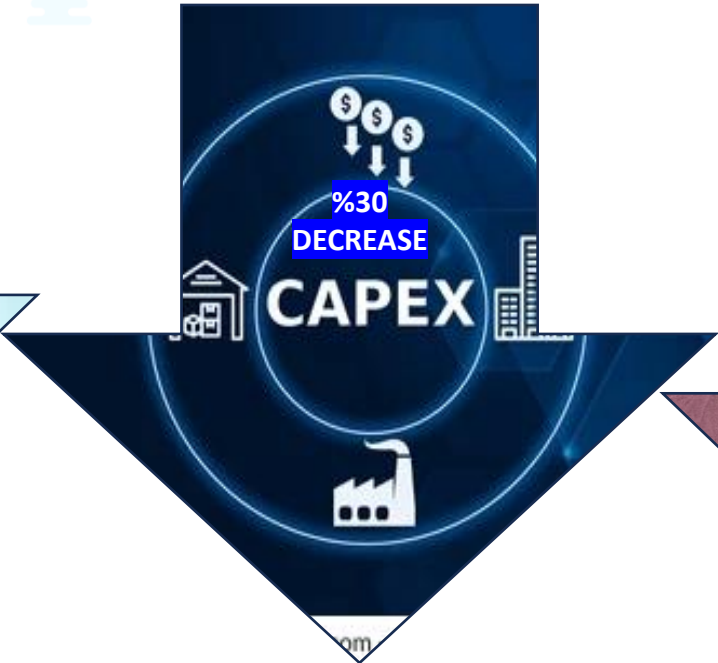
KPI's of HORIZON-JTI-CLEANH2-2024-02-03

Demonstration of Hydrogen Purification and Separation Systems
for Renewable Hydrogen-containing Streams in Industrial Applications



KPI
(Key Performance Indicators)

Delante



Description of the proposed project

Demonstration of Adaptable Hydrogen Purifier System (DAHPS)



WP1. Review Of The Existing Industrial Streams

WP2. Design and Manufacturing of Purification System

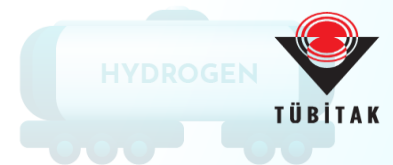
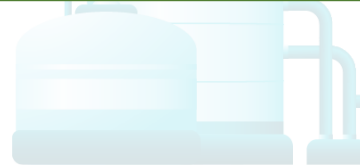
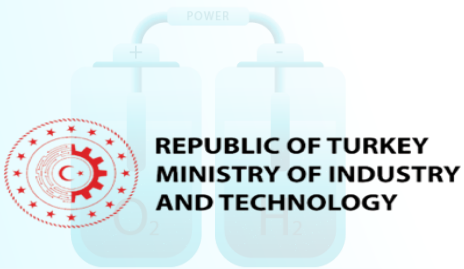
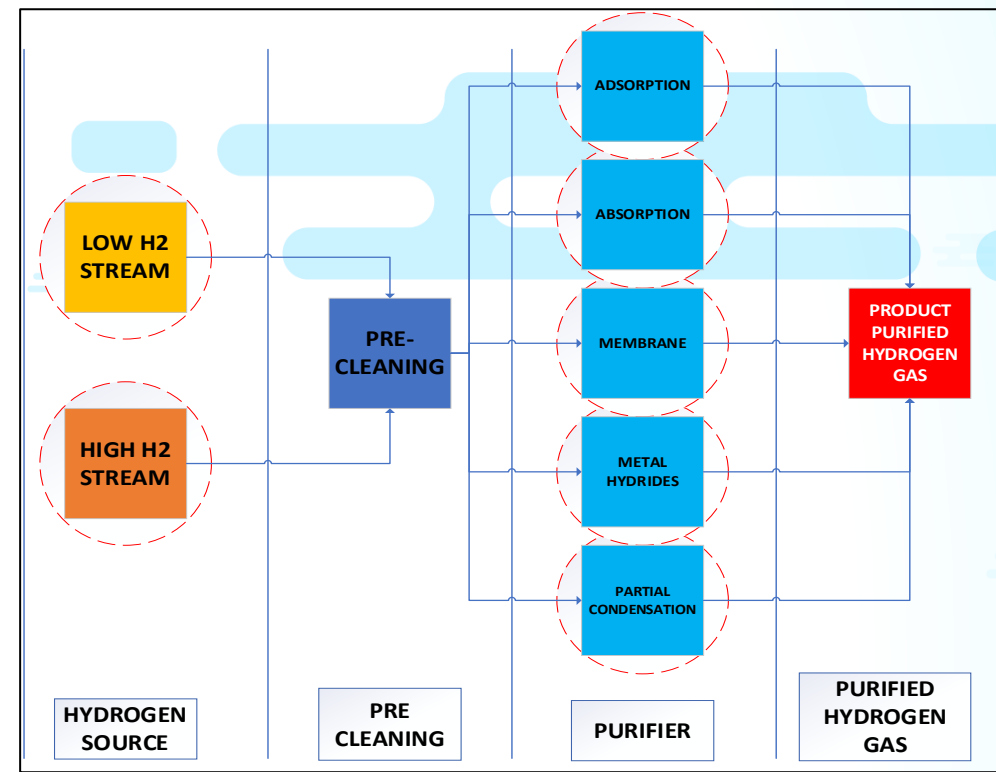
WP3. Field Tests and Optimization

WP4. Demonstration of Purification System

WP5. Techno-Economical Analysis/Feasibility & LCA Studies

WP6. Safety Issues

WP7. Dissemination Studies

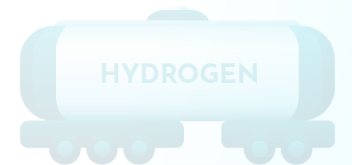
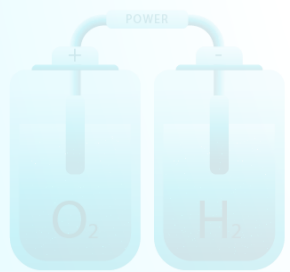


Consortium - Profile of Known Partners (if any)

Demonstration of Hydrogen Purification and Separation Systems for Renewable Hydrogen-containing Streams in Industrial Applications



No	Partner Name	Type	Country	Role in the Project
01	TUBİTAK	Research	TÜRKİYE	Gas purification system design and operation
02	Industry	TÜRKİYE	Demonstrator
03	Industry	TÜRKİYE	Manufacturing operations
04	Industry	TÜRKİYE	Demonstrator
05	University	TÜRKİYE	Review of the Existing Industrial Streams

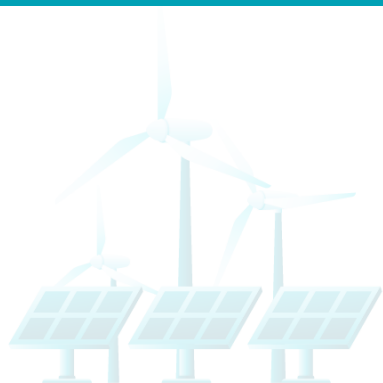
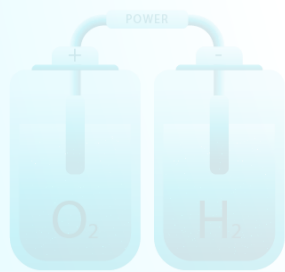


Consortium – Required Partners

Demonstration of Hydrogen Purification and Separation Systems for Renewable Hydrogen-containing Streams in Industrial Applications



No	Expertise	Type	Country	Role in the project
01	Gas purification system design and operation	Industry/ Reserch	Any	Design and verification of gas purification system
02	Market and feasebility analysis	Any	Any	Carry out techno-economic analysis and life-cycle assessment
03	Safety issues	Any	Any	Safety procedures will be followed according to the related regulations (e.g. NFPA2)
04	Adaptible control systems	Any	Any	Design and regulate the purity level by using control system
05	Demonstration and field operations	Any	Any	Plant owner and demonstrater





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