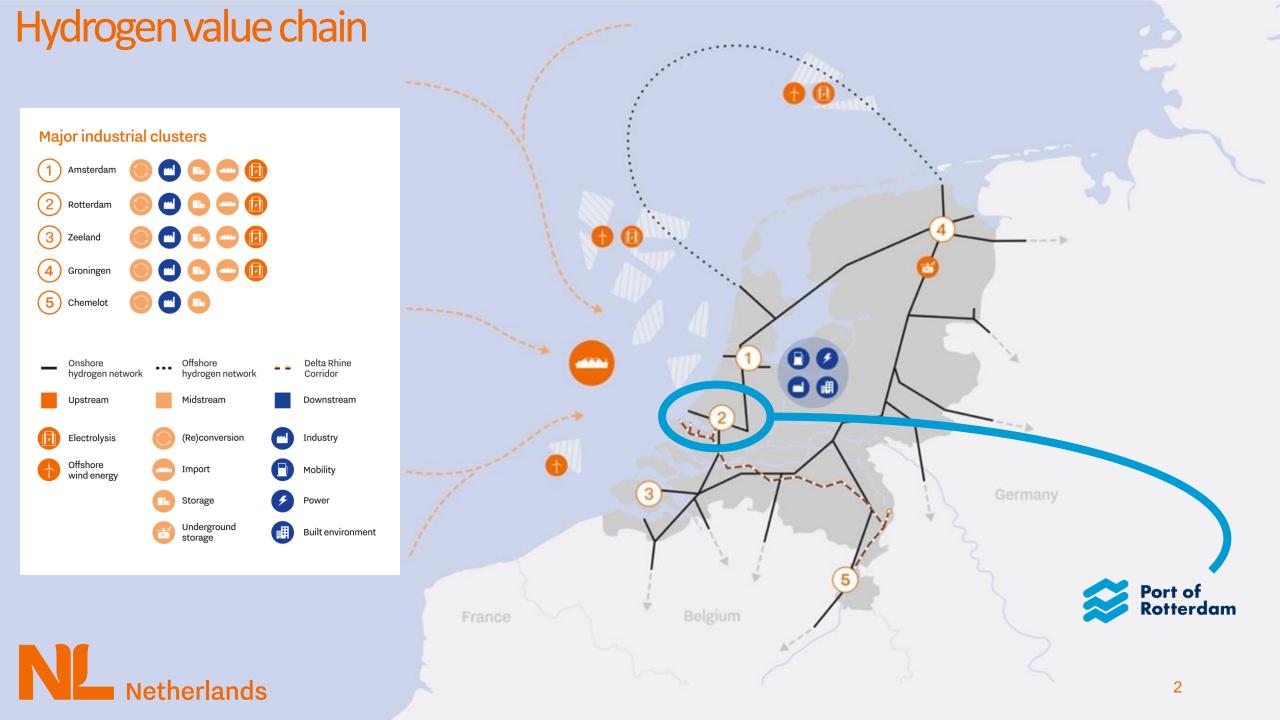


Netherlands

Ammonia and the Netherlands

AEA August 2023 - Netherlands Consul-General Hugo Klijn



Production and imports in Rotterdam





NH3 projects





NH3 Cracker

REPowerEU Plan:

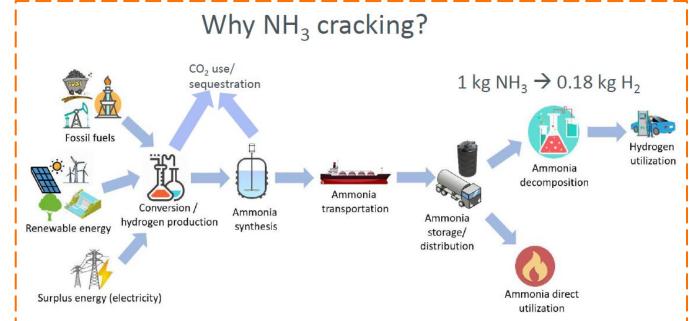
European Commission proposed to produce 10 million tons and import 10 million tons renewable H2 by 2030

Port of Rotterdam - Study:

1 million ton/year H2 from NH3 Cracker $\rightarrow \pm 7$ million ton/year NH3 (with no external fuel usage)

Objectives:

- Understanding NH3 cracking technology landscape
- Maximum achievable single train capacity
- Technical Readiness Level (TRL) of technologies
- Feedstock, energy, utility consumption
- Environmental footprint
- Plot footprint
- Investment & operating cost of plant, Cost of H2 production
- Safety aspects associated with NH3 storage and transport
- Limitations to plant scale up
- Ammonia cracking technology advancements
- Benefits of a centralised cracking plant compared to several decentralised facilities





Planning Projects Rotterdam

	2023	2024	2025	2026	2027	2030
Production FID			First 200 MW electrolyser operational		First H-vision plant operational	2,5 GW electrolysers operational (0.25 Mton H ₂) 0,35 Mton Iow carbon H2 production
Import	Expansion existing ammonia terminal operational	First low carbon ammonia imports		First new import terminal for green ammonia operational LOHC imports at industry scale	First LH ₂ terminal operational	4 Mton H ₂ imports
Infrastructure	Order LLI		'Hydrogen network' pipeline in the port operational		'Delta Corridor' pipelines to Chemelot, North Rhine-Westfalia operational	
Use FID	First tank station for trucks operational		First green hydrogen replaces grey in refineries Road transport: 1000 H ₂ powered trucks (500 in Rotterdam)	'Condor' hydrogen powered inland barges operational		
	Netherlan	ds				

World Hydrogen Summit – May 2023

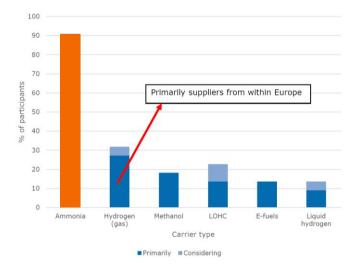
Suppliers' countries of origin



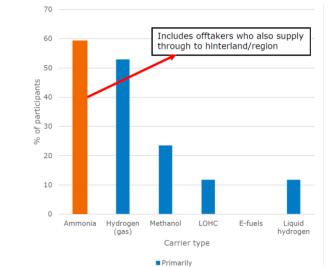
Netherlands

World Hydrogen Summit – May 2023

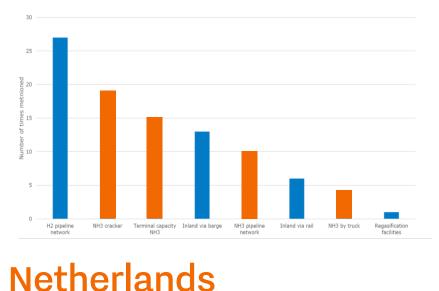
Type of carrier expected to supply



Type of carrier expected to offtake



Infrastructure needed



Expectations from public entities

