MOVE THE WORLD FORWARD MITSUBISHI HEAVY INDUSTRIES GROUP

MHI CO_2 Capture Technology

Mitsubishi Heavy Industries Engineering, Ltd.

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Annual CO_2 capture amount to achieve carbon neutrality

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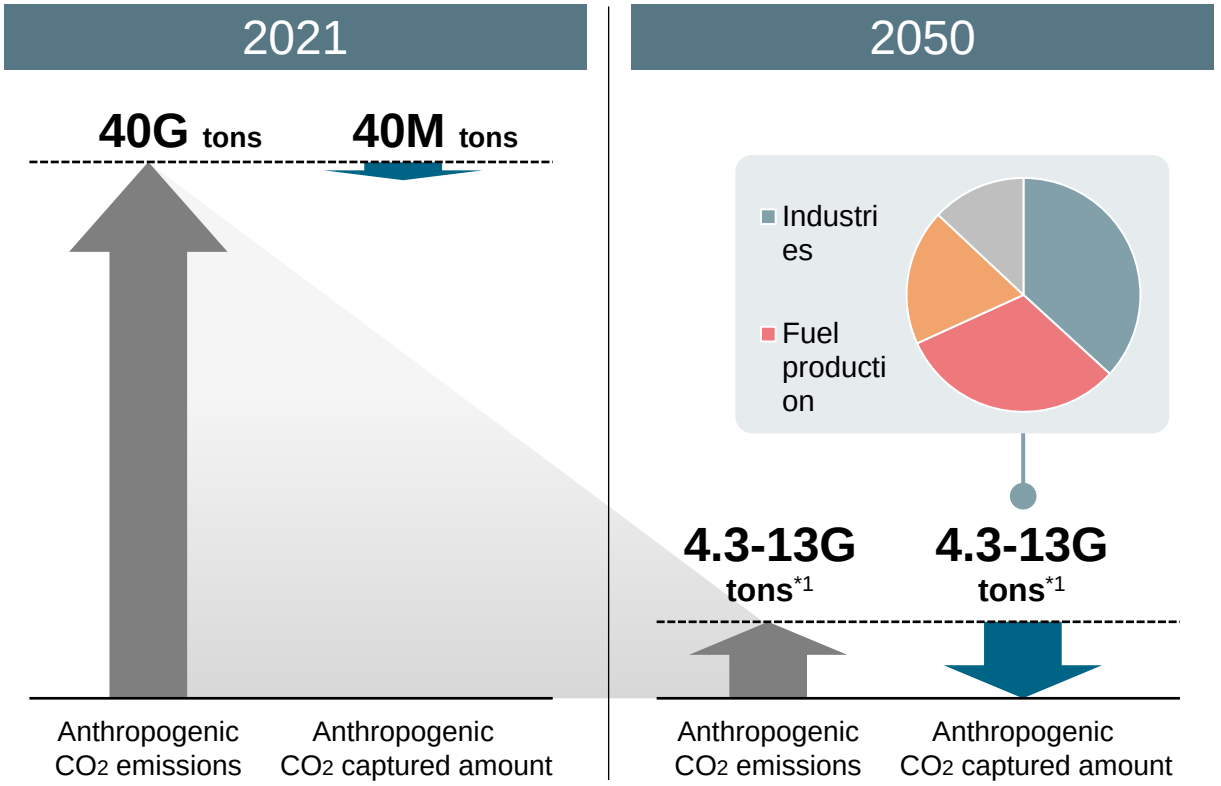
- In order to achieve carbon neutrality in 2050, anthropogenic CO_2 emissions must be reduced. However, even after such efforts, we expect around 4.3-13G tons of CO_2 emissions to remain.
- To capture this remaining CO_2, 100 to 300 times the current capacity is needed.
- In 2050, CO_2 capture will operate in a wide range of sectors, including industries, fuel production (including blue fuel production), power generation, and others (aviation, transportation, etc.).

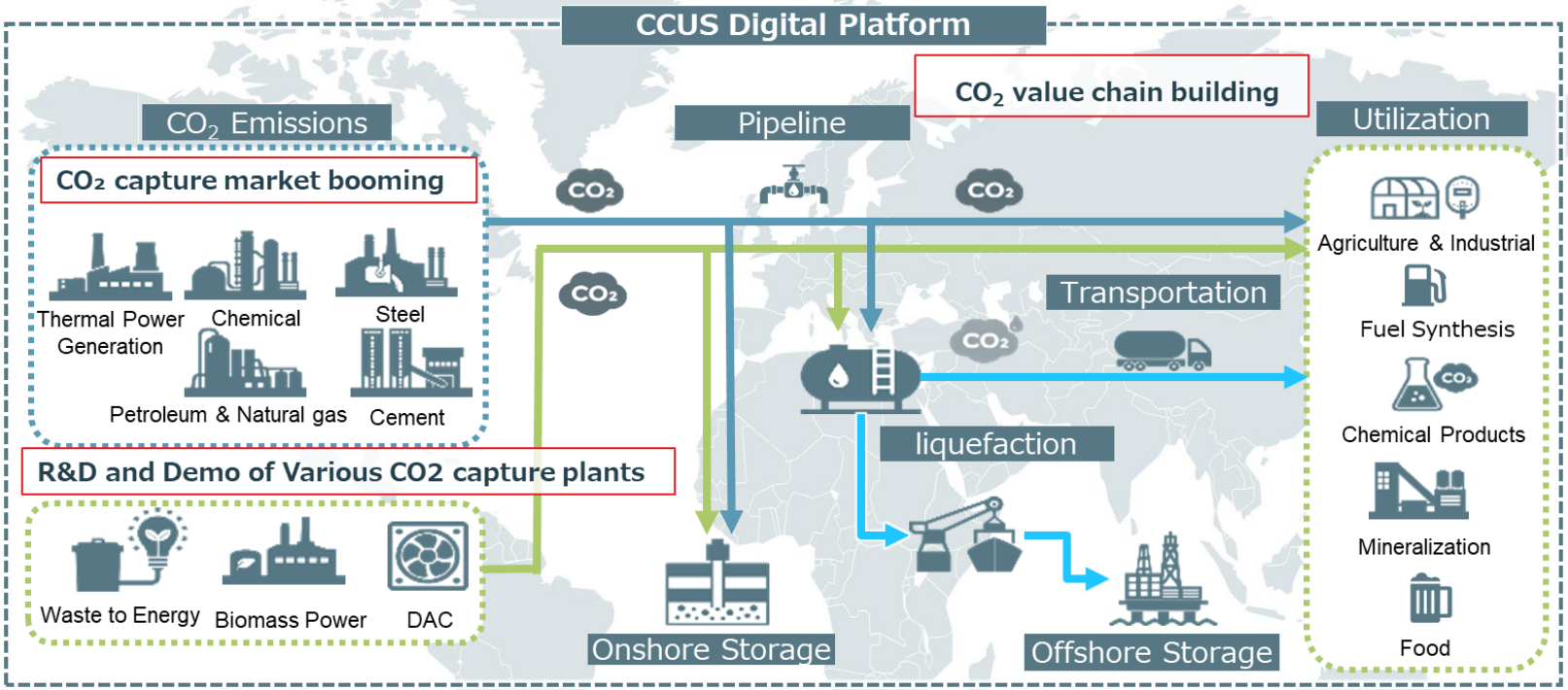
Deployment of CCUS is required in a wide range of sectors



*1 : Annual estimates based on our internal analysis of reports including McKinsey 1.5°C scenario, IEA Net Zero by 2050, IEA SDS, and IPCC materials.

CO_2 Ecosystem

- CO_2 value-chain : connecting end-to-end values / business of CCUS to accelerate carbon neutrality
- CO_2 capture process application : gaining momentum to expand to various CO_2 emissions
- CCUS digital platform : data transparency and business flexibility for tracing and trading of CO_2
- Investment : accelerating R&D of techs and products, also investing on innovative start-ups



MHI CO_2 Capture Technology Feature

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Advanced KM CDR Process™ - Overview and Features

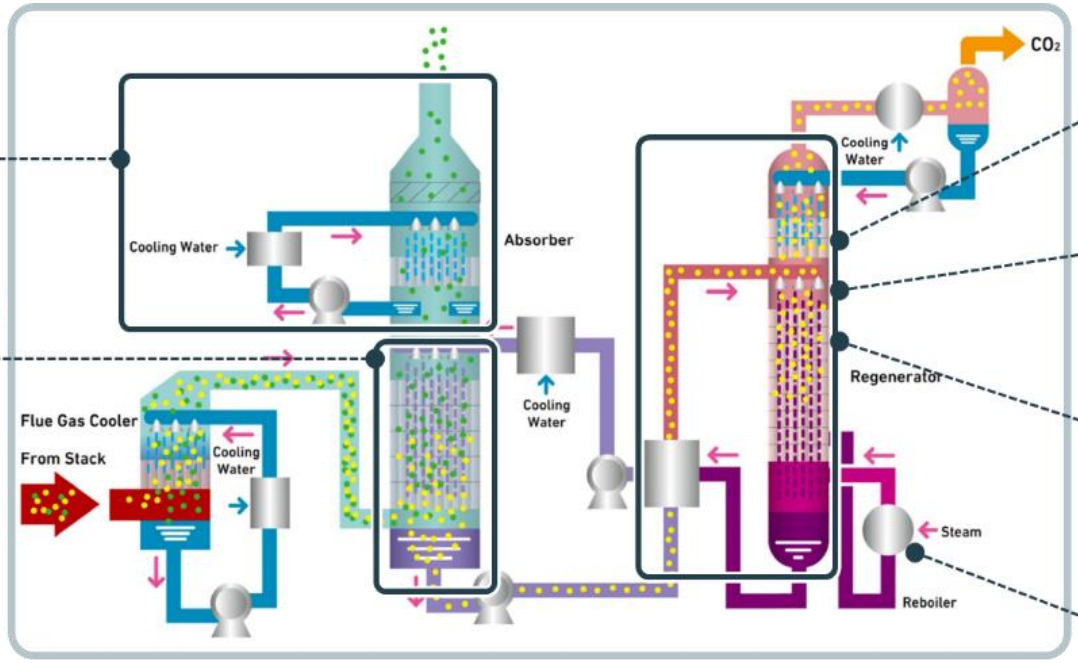
- KM CDR Process™ = ***K****ansai* ***M****itsubishi* ***C****arbon* ***D****ioxide* ***R****ecovery Process*
- Amine-based technology
- Capable of capturing >95% CO_2 from combustion gas
- Proprietary features developed over three decades

② Amine Emissions Reduction System

Amine washing system reduces VOC emissions and amine emission

① KS-1™/KS-21™ solvent (High-performing amine solvent)

KS-1™/KS-21™ solvent with high CO_2 capacity, low degradation, and low regeneration energy



③ Heat integration system

Heat Integration system to reduce steam consumption

④ Amine Purification System

Amine Purification System filtrates unwanted impurities

⑤ Automatic Load Adjustment control (ALAC)

ALAC adjusts operating parameters automatically to optimize plant performance

⑥ Proven Tower Design

Proven Tower Design and Reboiler for reliable CO_2 absorption performance for large-scale

MHI CO_2 Capture Development Progress

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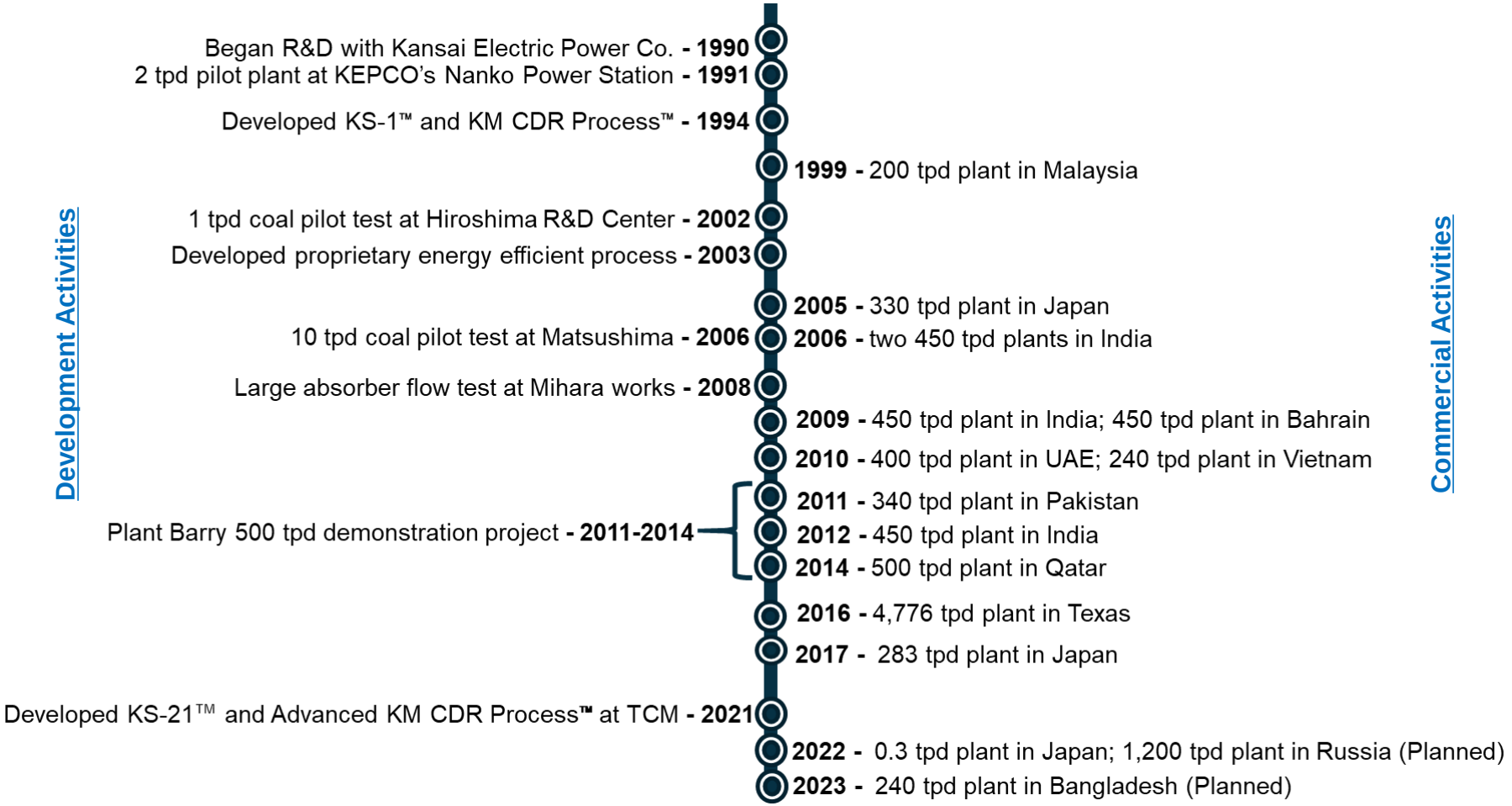

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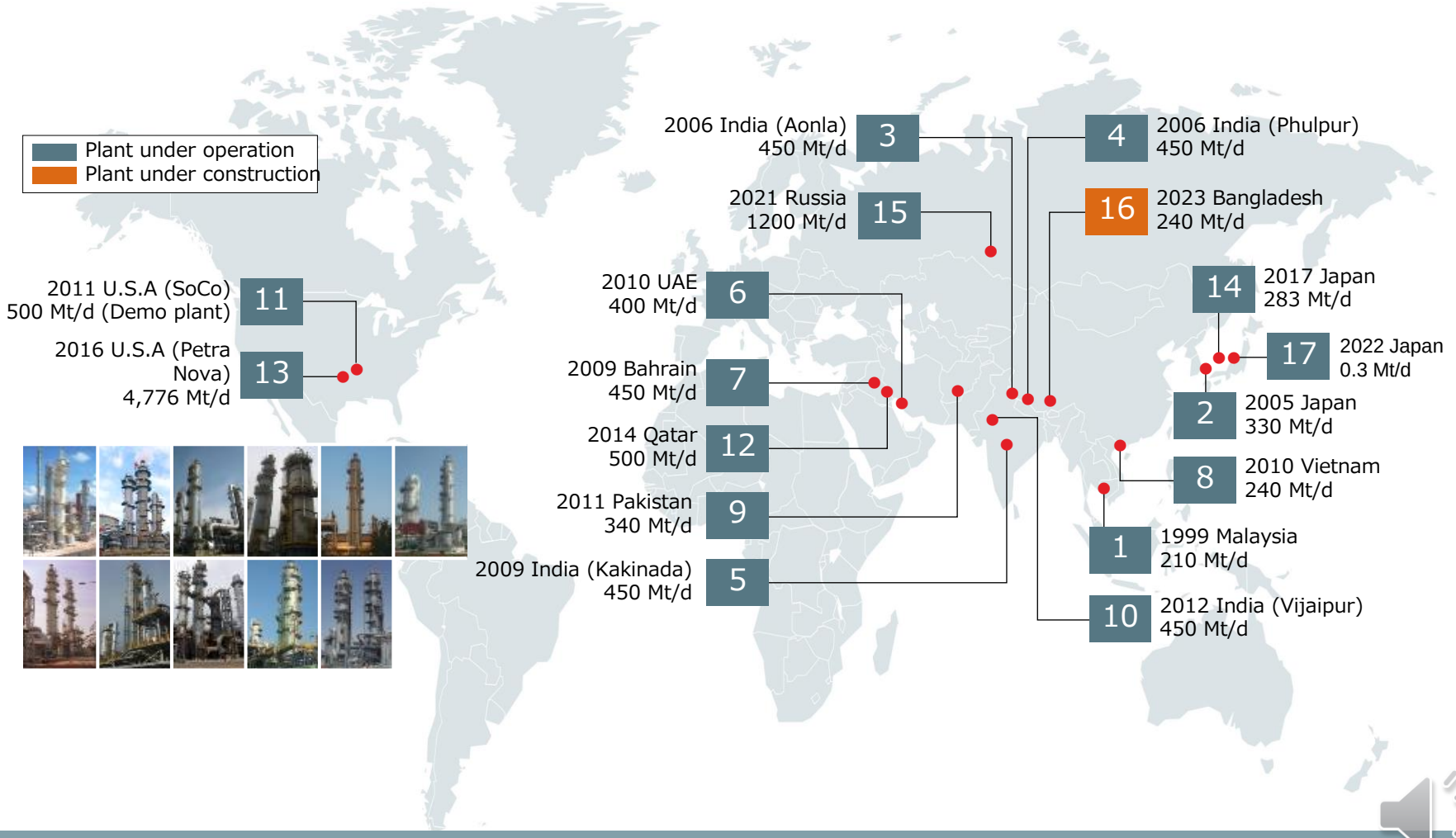
KM CDR Process™ - Worldwide Commercial Experience

MHI's experienced global KM CDR Process™ team stands ready to meet customer requirements for commercial CO_2 capture plants on various coal exhaust from conceptual design through detailed engineering and project delivery.



Commercial Plants of KM CDR Process™

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Year of Delivery	Country	Flue Gas Source	CO_2 Capacity (TPD)	Application
1999	Malaysia	NG Fired Furnace	210	**Urea Production**
2005	Japan	NG and Heavy Oil Boiler	330	**General Use**
2006	India	NG Fired Furnace	450	**Urea Production**
2006	India	NG Fired Furnace	450	**Urea Production**
2009	India	NG Fired Furnace	450	**Urea Production**
2009	Bahrain	NG Fired Furnace	450	**Urea Production**
2010	UAE	NG Fired Furnace	400	**Urea Production**
2010	Vietnam	NG Fired Furnace	240	**Urea Production**
2011	Pakistan	NG Fired Furnace	340	**Urea Production**
2012	India	NG Fired Furnace	450	**Urea Production**
2014	Qatar	NG Fired Furnace	500	**Methanol Production**
2016	USA	Coal-Fired Boiler	4,776	**Enhanced Oil Recovery**
2017	Japan	Gas Fired Furnace	283	**General Use**
2021	Russia	NG Fired Furnace	1,200	**Urea & melamine Production**
2023	Bangladesh	NG Fired Furnace	240	**Urea Production**

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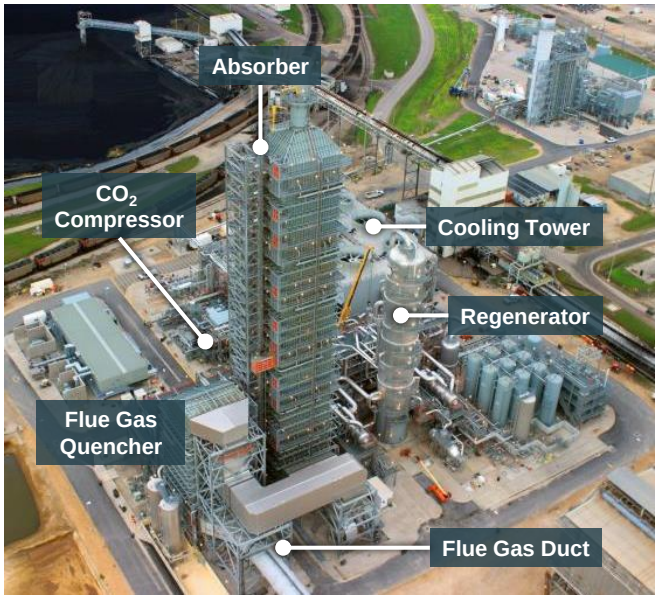
The world's largest CO2 capture plant on coal-fired flue gas delivered in December 2016.

Supported by DOE (U.S. Department of Energy) grant program (CCPI* Round 3) and Japanese government finance (JBIC / NEXI)

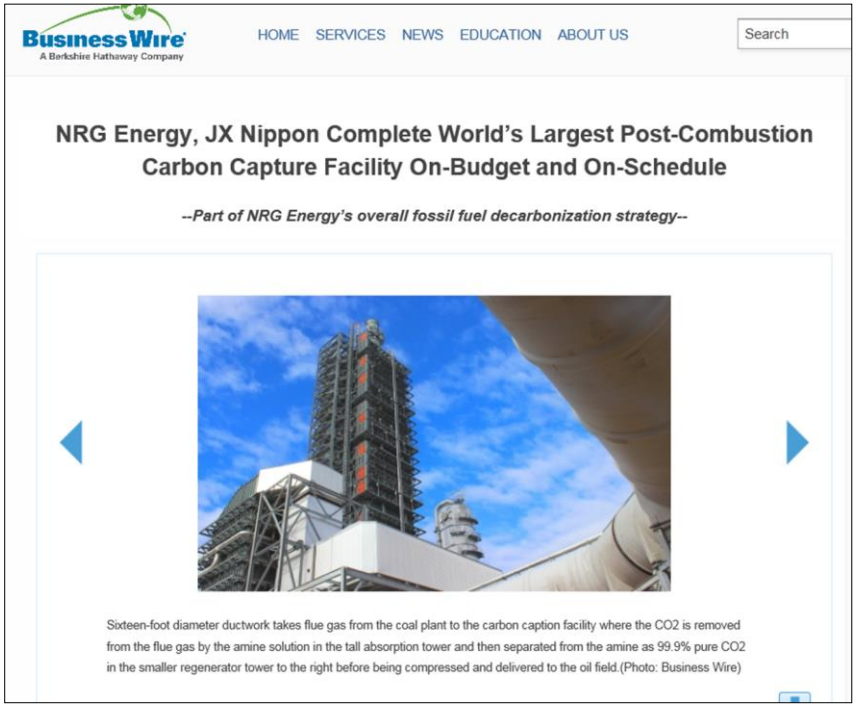
*Clean Coal Power Initiative

Plant location	NRG WA Parish Power Plant (Thompsons, TX)
Project owner	Petra Nova – partnership between NRG Energy and JX Nippon Oil & Gas
Plant scale	240 MW_{eq}
CO_2 capacity	4,776 TPD (1.4 Mmtonne/year)
CO_2 conc.	11.5 mol%-wet
CO_2 removal	90%



*U.S. Department of Energy "W.A. Parish Post-Combustion CO_2 Capture and Sequestration Project Final Environmental Impact Statement Volume I" (Feb, 2013), DOE/EIS-0473

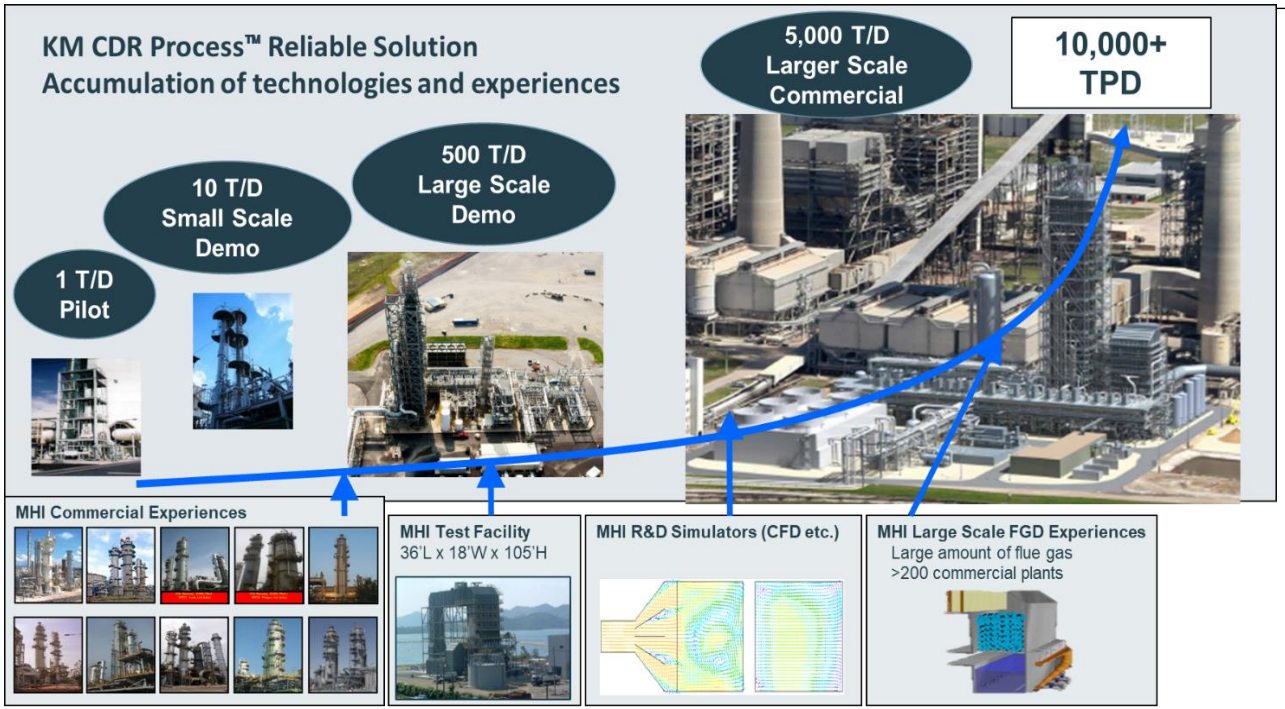
Petra Nova Project

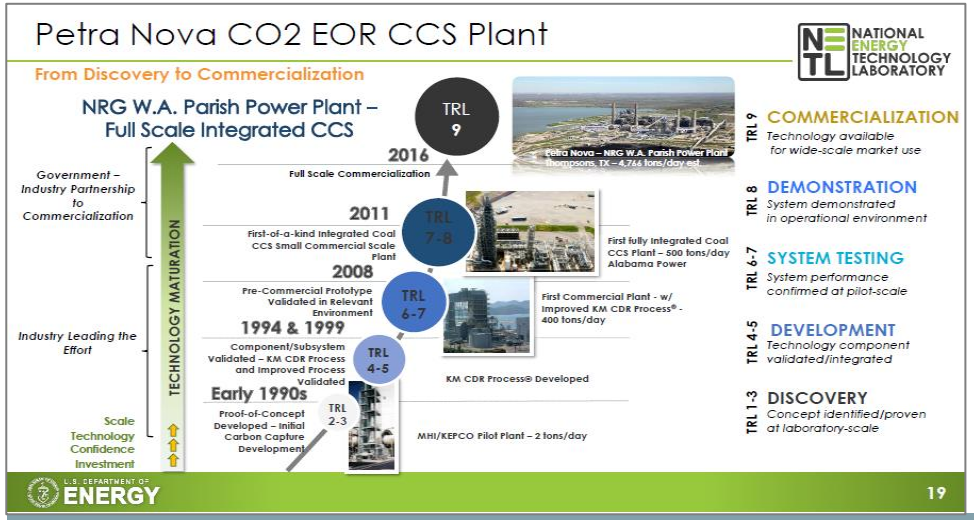


Petra Nova Project
"On-Budget and On-Schedule"

Power Magazine "**Plant of the Year**"
August 2017

Scale up progress





Ref. Brian J. Anderson, Ph.D., Director of NETL, Presentation to the 2019 CCUS, and Oil & Gas Technologies Integrated Review Meeting, August 26, 2019 - Pittsburgh, PA

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Pioneering deal to deliver world largest carbon capture project

Drax and MHI have agreed a long-term contract for use of MHI's carbon capture technology at Drax BECCS Project. (Press Release on 10th June 2021)

Site Location	North Yorkshire, UK
Project Owner	Drax Power Limited
CO_2 Source	Biomass Boiler Flue Gas
CO_2 Capacity	At least 8 million tons per year
Capture Process	Advanced KM CDR Process™ KS-21™ Solvent

- **World's largest** carbon capture project **More than x5** of Petra Nova
- **World's first** negative emission project
- **UK's first** carbon capture project at scale

Successfully Completes Testing of New “KS-21™” Solvent for CO2 Capture

Mitsubishi Heavy Industries Engineering (MHIENG), part of Mitsubishi Heavy Industries (MHI) Group, has entered into an agreement with Technology Centre Mongstad (TCM) to test its proprietary solvent for capturing CO2 at the amine plant located in Mongstad, Norway. The test campaign complete in Oct 2021.

- KS-21™ solvent, jointly developed with KEPCO, achieves up to **99.8%** flue-gas carbon capture rate
- TCM offers world’s largest and most flexible facilities and expertise
- MHI aims to expand its carbon capture business in the UK and Europe

CO_2 capture from various emission sources

- We are further expanding the number of applications for CO_2 capture based on our core technology.
- Smaller capture devices will be modularized and digitized to meet the challenges and needs of customers.

As a leading company in CO_2 capture, we offer a wide range of CO_2 capture technologies.

Coal/gas power generation	World's largest CO_2 capture plant (as of 2022)	Petra Nova 
Biomass	Annual CO_2 capture of over 8 million tons (planned)	Drax 
LNG liquefaction	Contributing to low-carbon production of LNG production	NextDecade 
Cement	FS in fields with high technical difficulty	Lehigh Cement 
Steel	Verification in hard-to-abate fields	Domestic Steel Co. 
Shipping	World's first verification of onboard CO_2 capture during an actual voyage	"K" Line 
Waste incineration facility Gas engines Small boilers/furnaces	CO_2 capture by small-scale facility through modularization	

Standardized & Modularized CO2 capture plant line-up

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- Standardized and Modularized, Medium and Small-scale CO_2 capture plants are developed and demonstrated for various “hard-to-abate” industry sectors. (All product line-up will be ready by FY23.)
- CO_2 capture as a Service in addition to automatic operation and remote monitoring services will be started from FY24.

CO_2 Emissions

Present

Large-Scale (”Tailor-made”)

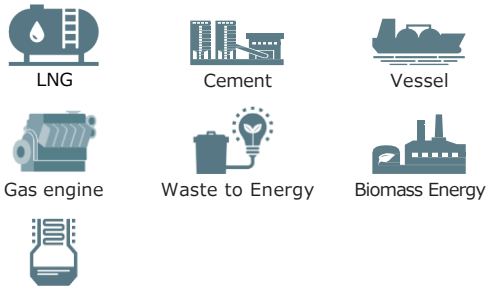
Power Generation & Chemical

Gas-fired Power | Coal-fired Power | Chemical Plant

Future

Medium and Small-Scale (Standardized & Modularized)

Various Industrial Sectors



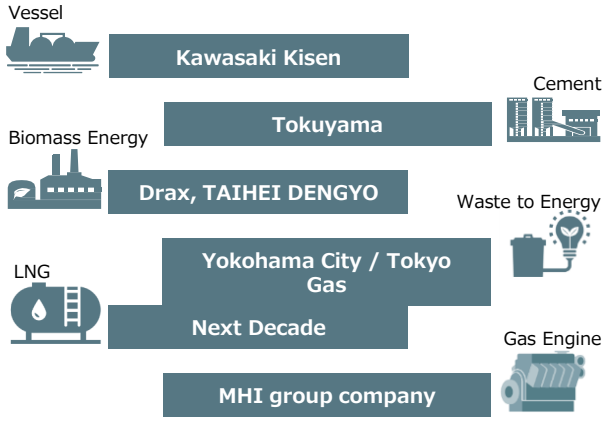
LNG | Cement | Vessel | Gas engine | Waste to Energy | Biomass Energy | Boiler & Furnace

Our Approach

Standardized & Modularized CO_2 capture plant line-up

	Std. Capacity	Required Area (reference only)
A	0.3 tons/d	7 m × 2 m
B	3 tons/d	12 m × 4 m
C	30 tons/d	15 m × 15 m
D	100 tons/d	25 m × 20 m
E	200 tons/d	35 m × 25 m

Demonstration Partners (examples)

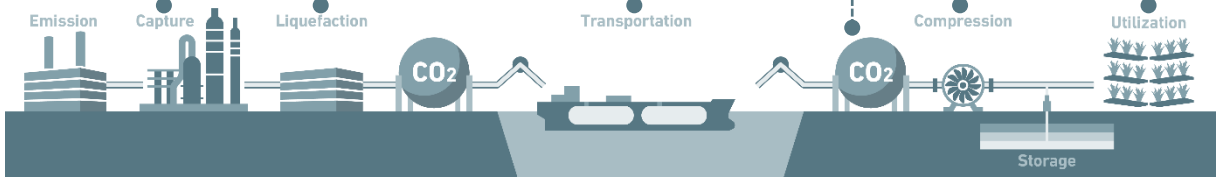


Components of the CCUS Value Chain

- MHI Group has a portfolio of technologies essential for CCUS, including CO_2 capture, transportation, and compression.
- We aim to further expand our business in the fields of large CO_2 carriers and CO_2 compression, which will become necessary as the volume of CO_2 increases.

We are contributing to the establishment of a robust value chain by offering broad CCUS-related technologies

Example: Fertilizer plant



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