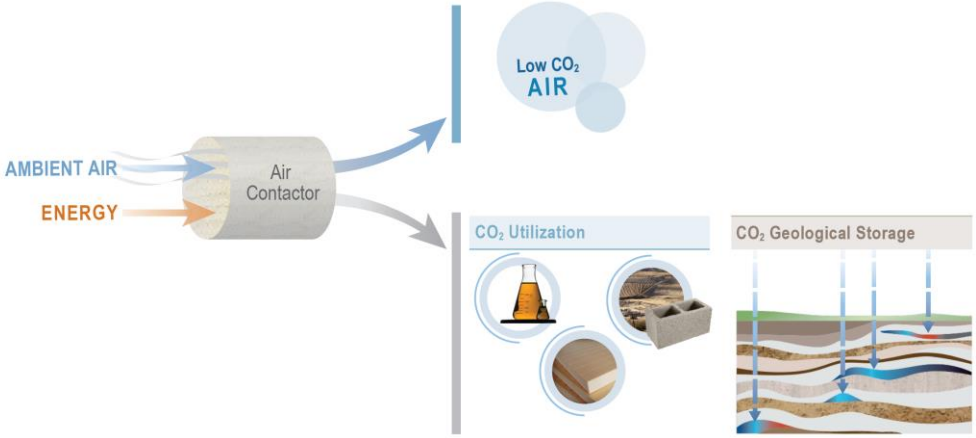
Direct Air Capture by Kawasaki CO_2 Capture technology

Ryohei Numaguchi, Ph.D.
Kawasaki Heavy Industries, Ltd.

Kawasaki
Powering your potential

Direct Air Capture (DAC)

- Novel CO_2 capture concept: Capture from atmosphere, achieving negative emission.
- Can conduct everywhere, different from post-combustion capture.
- Demonstration is on-going by several start-up companies.



ICEF Roadmap 2018 “Direct Air Capture of Carbon Dioxide”

Large DAC demonstration plant by Climeworks, at Iceland

Kawasaki's Development Background

Kawasaki Heavy Industries (KHI) has been developed solid-type CO_2 removal technology since 1980s for air conditioning of closed space. Then, we are conducting CO_2 emission reduction by both of post-combustion capture and direct air capture.

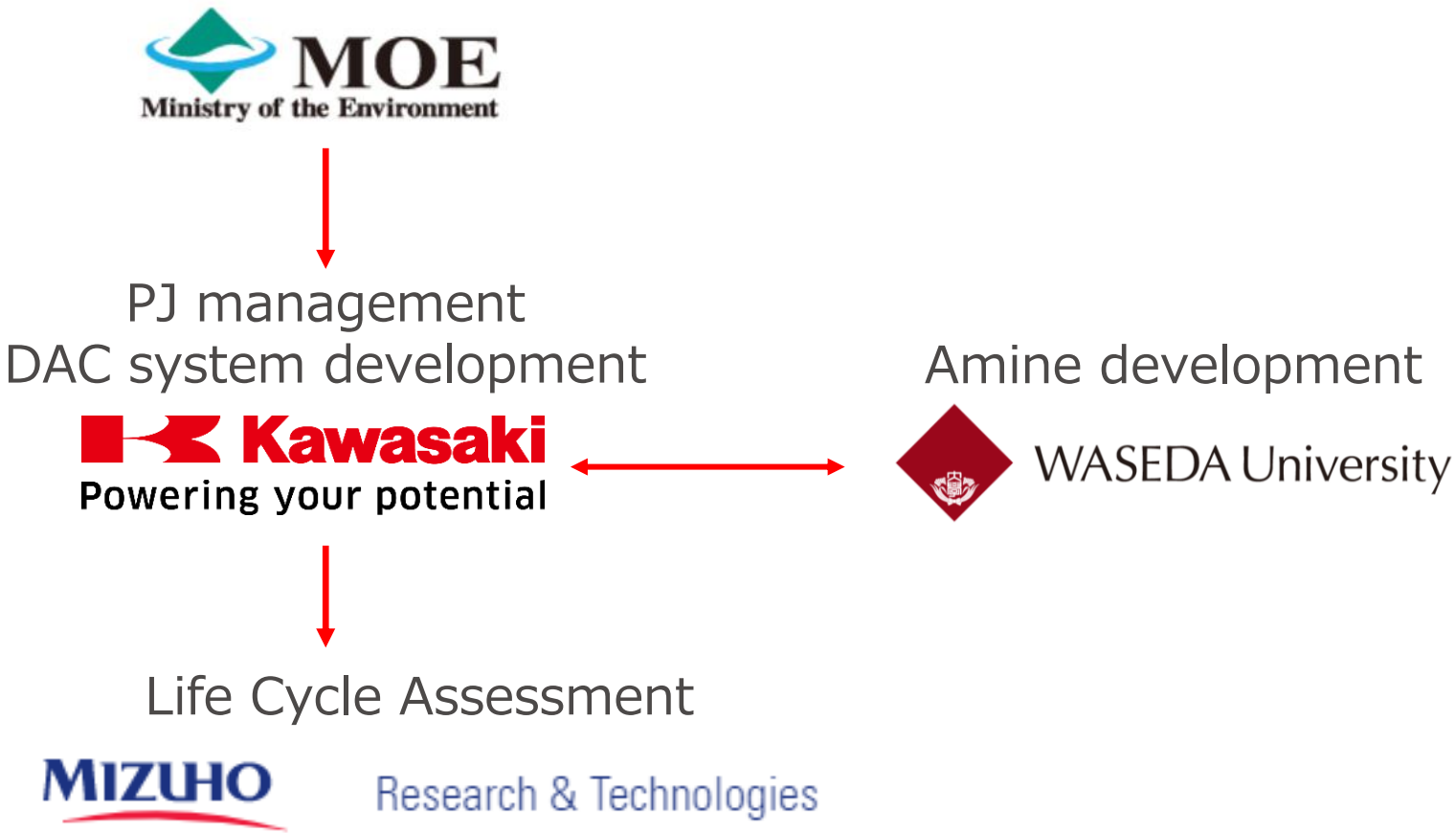
Amine-containing solid sorbent

Air conditioning of closed space

Post-combustion capture & Direct air capture

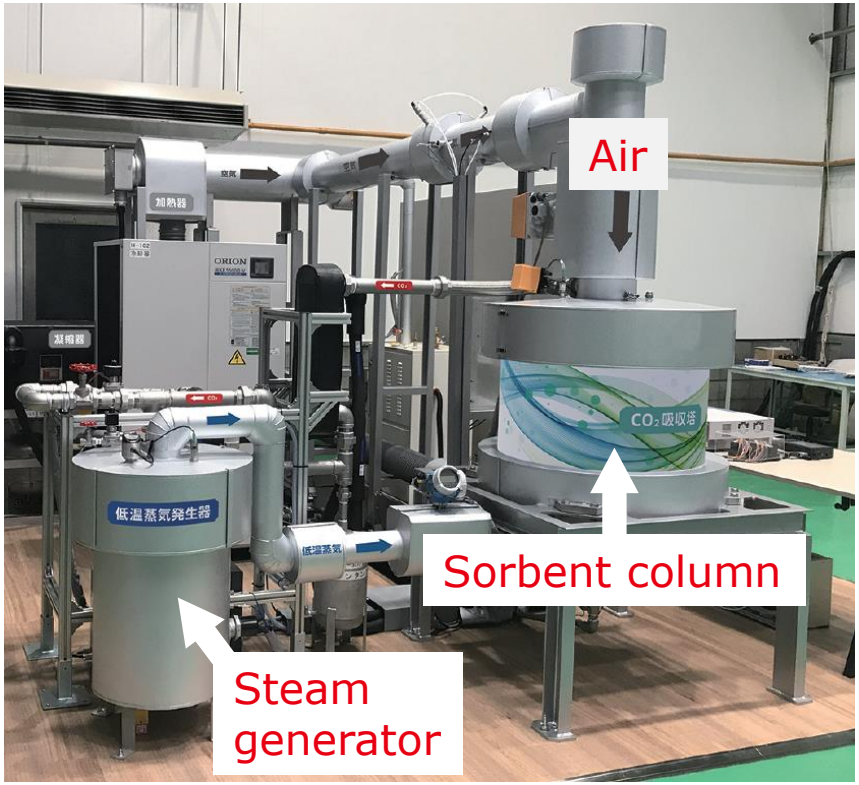
Technical demonstration of DAC (2019-2022)

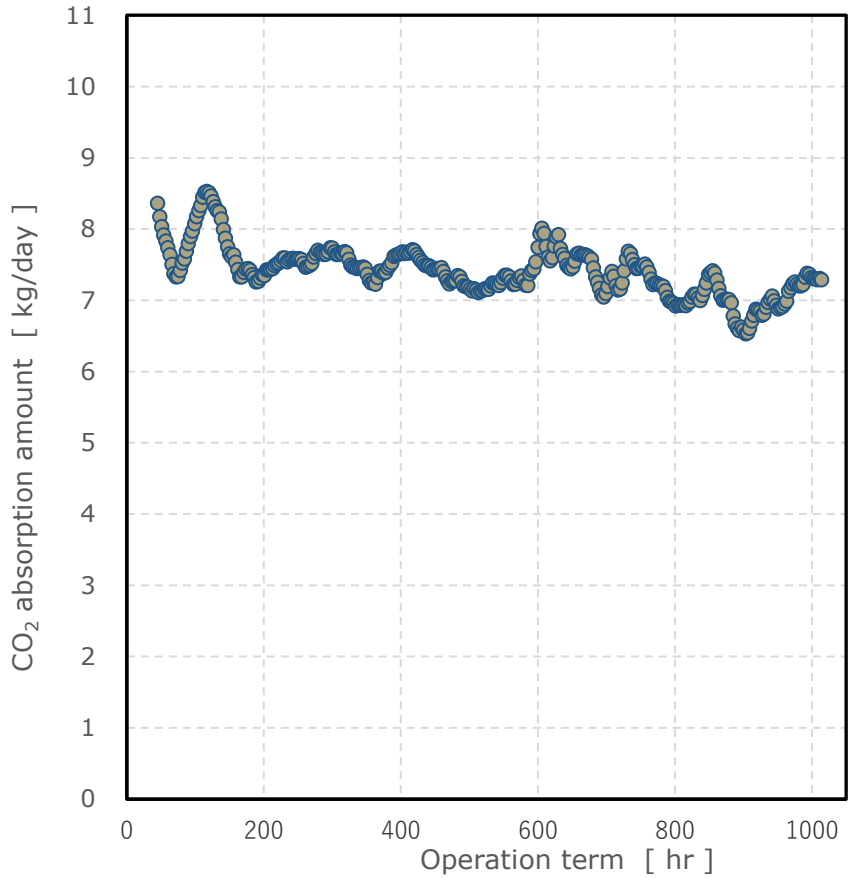
DAC development had been supported by MOEJ for 3 years.
CO2 capture material and system were developed, and life cycle assessment of our system were conducted.



CO2 Removal demonstration

- Developed amine sorbent is installed
- Captured >5kg-CO_2/day with >95% purity
- 1000hr operation demonstrated

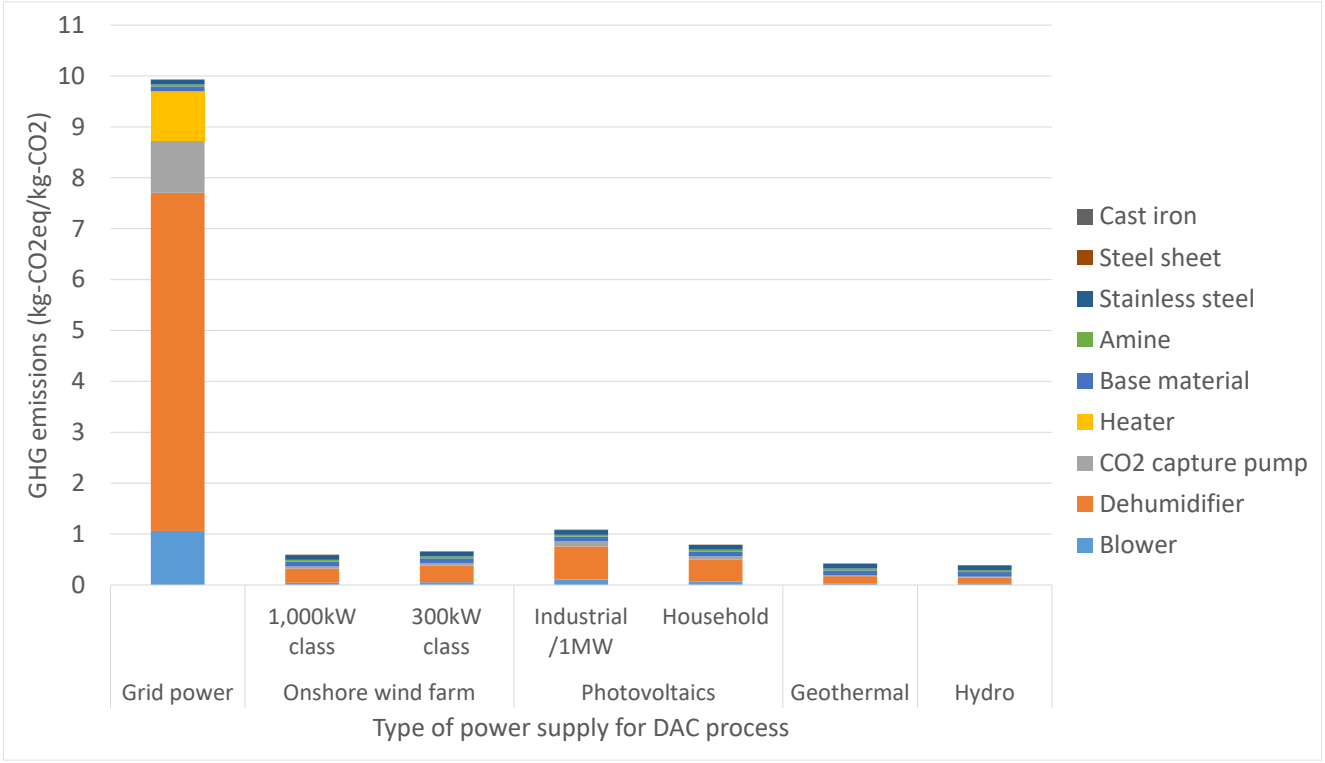




Life cycle assessment

- GHG emission can be < 1 kg/kg by using renewable electricity, except case of industrial photovoltaics.
- Biggest GHG source in our DAC system is dehumidifier of air, which is required to remove moisture of sorbent.

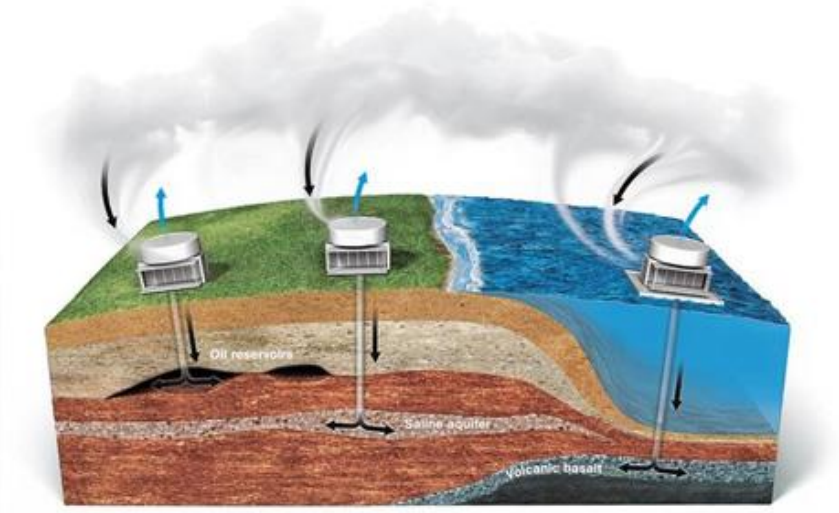
Data based on results of proof-of-concept equipment



Future Target: DAC + Carbon Storage (DACCS)

- One of the key technology to realize negative emission.
- KHI will construct large DACCS plant based on the advantages:
  - having original sorbent enabling low-temp. operation
  - EPC ability of large-scale plant

- Target cost of DAC is not determined because value of negative emission is not established.
- Financial support for DAC is first required for demonstration test, to be trustworthy to market.



Picture from National Geographic: https://natgeo.nikkeibp.co.jp/nng/article/news/14/4724/

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Kawasaki CO2 Capture Technology

- CO_2 captured by amine-containing solid sorbent
- captured CO_2 can be desorbed from sorbent by supplying low-temperature steam (e.g. 60℃).