Asahi Kasei's Challenge
― Working toward a hydrogen society ―

June 24th, 2021

Nobuko Uetake

Deputy Senior General Manager,
Green Solution Project

Asahi Kasei Corporation

Brief introduction of Asahi Kasei

- Diversified chemical company with three business sectors
- 44,497 employees over 15 countries, headed in Tokyo Japan
- Around ¥2,106 billion (USD 19.0B) net sales (2020)

*Exchange Rate: 1USD = 111JPY

Head Office	Chiyoda, Tokyo, Japan
Founding	1922
Employees	44,497 as of March 31, 2021
Fiscal 2020 result	Net sales: ¥ 2,106 billion (USD 19.0B) Operating income: ¥ 172 billion (USD 1.6B)

Asahi Kasei Corp. [holding company function]

Material

- Asahi Kasei Corp. [operating function]
- Asahi Kasei Microdevices Corp.

Homes

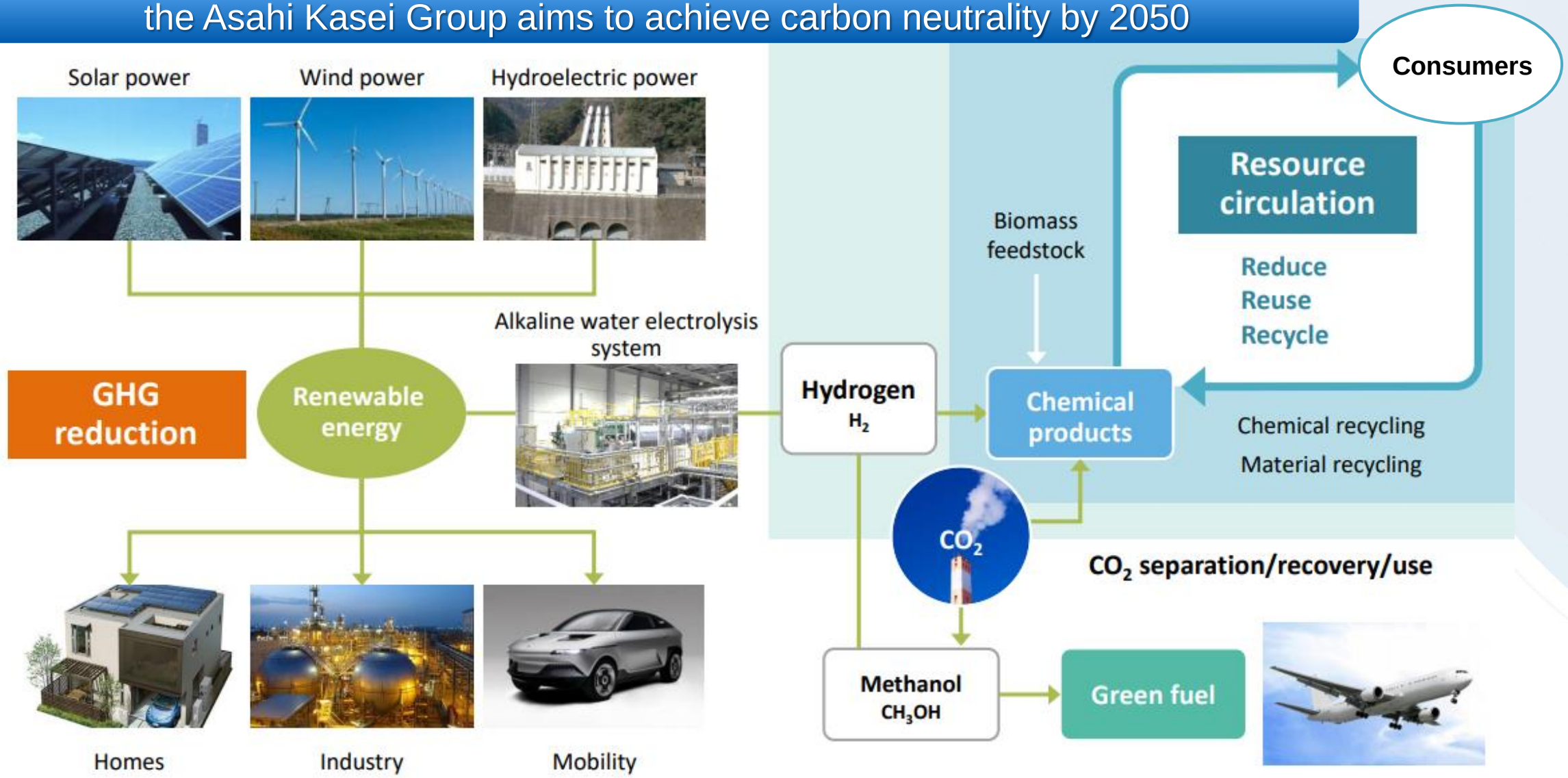
- Asahi Kasei Homes Corp.
- Asahi Kasei Construction Materials Corp.

Health Care

- Asahi Kasei Pharma Corp.
- Asahi Kasei Medical Co., Ltd.
- ZOLL Medical Corporation
- Veloxis Pharmaceuticals Inc.

Concept for carbon neutral and sustainable world

To realize a sustainable society,
the Asahi Kasei Group aims to achieve carbon neutrality by 2050



Project for decarbonization

Working with other companies to achieve a hydrogen society, increasing our own use of renewable energy

Green Solution Project (from April 2021)

- Aiming to create businesses that can provide value to society with an overview of the entire carbon neutral-related market

Working toward a hydrogen society

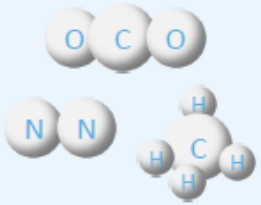
- Contributing to the achievement of a hydrogen society through large-scale water electrolysis demonstrations, etc.
- Participation in Japan Hydrogen Association

NEDO project
Fukushima Hydrogen Energy Research Field (FH2R)

ALIGN-CCUS
water electrolysis system
(Niederaussem, Germany)

Achieving CO_2 adsorption and utilization

Mixed gases of CO_2, nitrogen, and methane from factories and power plants



CO_2 separation and recovery

CO_2 selective adsorption

CO_2 chemistry

Use of CO_2 as raw material

- Polycarbonate
- Isocyanate
- Various chemicals

- Developing a new zeolite-based CO_2 separation and recovery system
  - **Significant improvement in CO_2 adsorption performance** compared to conventional adsorbents

Asahi Kasei's electrolysis technology

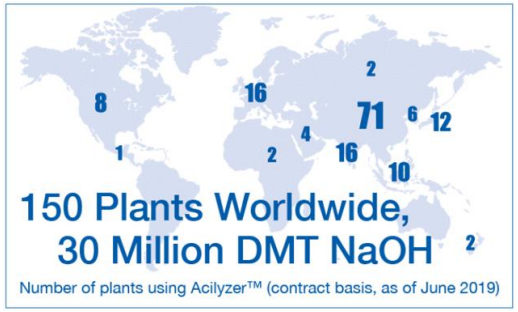
AsahiKASEI

1923
- **Begins manufacturing hydrogen by water electrolysis** as raw material for ammonia in Nobeoka, founding place of Asahi Kasei

Casale's synthetic ammonia process monument (Certified chemical heritage)

1975
- Commercializes **Chlor-alkali electrolysis** by Ion exchange membrane. Asahi Kasei is the only company in the world that can provide electrolyzer, membrane and electrode. Ion-exchange membrane "Aciplex™" is No.1 share in WW.

Chlor-alkali electrolyzer "Acilyzer™"



2010
- **Begins R&D of Alkaline water electrolysis** based on Chlor-alkali electrolysis technology.

2013
- Contracts with NEDO on "Leading R&D business of hydrogen usage" project (～FY2019)

2018
- Sets up Alkaline water electrolysis for R&D in Souma (Fukushima) and Herten (Germany)

Souma IHI green energy center Alkaline water electrolysis system

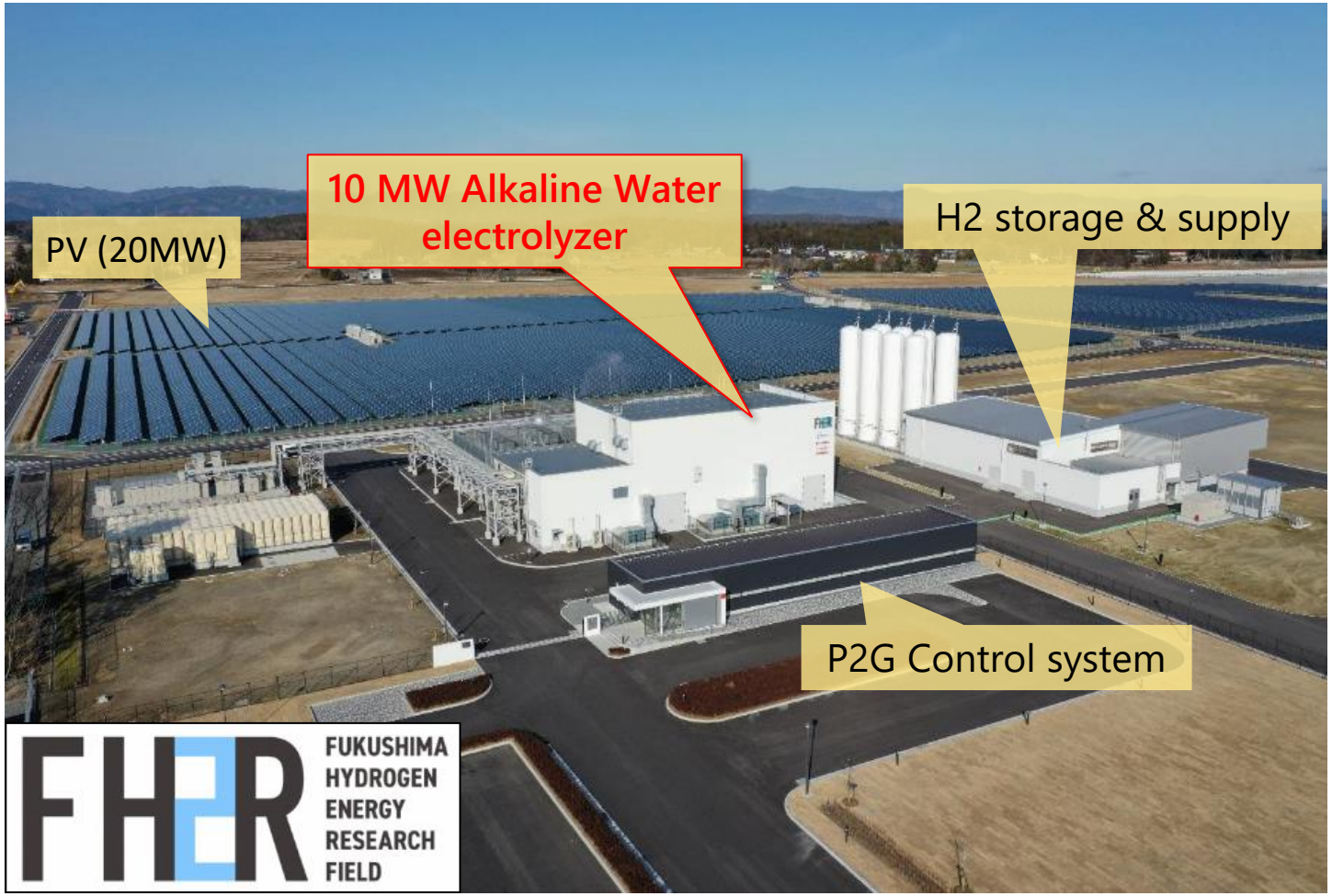
2020
- Sets up **10MW large-scale alkaline water electrolysis** and operation begins as NEDO project "Fukushima hydrogen energy research field (**FH2R**)"
- Contracts with NEDO on "R&D of construction Hydrogen society technology" project (～FY2022)
- Sets up Alkaline water electrolysis in Niederraussem (Germany) for EU-fund "**ALIGN-CCUS**"

ALIGN-CCUS Water electrolysis system (Niederraussem, Germany)

NEDO project in FH2R (Fukushima)

Fukushima Hydrogen Energy Research Field (FH2R)

NEDO TOSHIBA Tohoku Electric Power Co., Inc. Tohoku Electric Power Network Co., Inc. Iwatani AsahiKASEI



Namie town in Fukushima

- National project* in Japan
- Hydrogen production using electricity from solar panels
- 10MW electrolyser as a single unit
- Started operation in March 2020

* FH2R is a project commissioned by the New Energy and Indsutrial Technology Development Organization (NEDO).

FH2R 10MW Alkaline water electrolysis system

Aqualyzer™

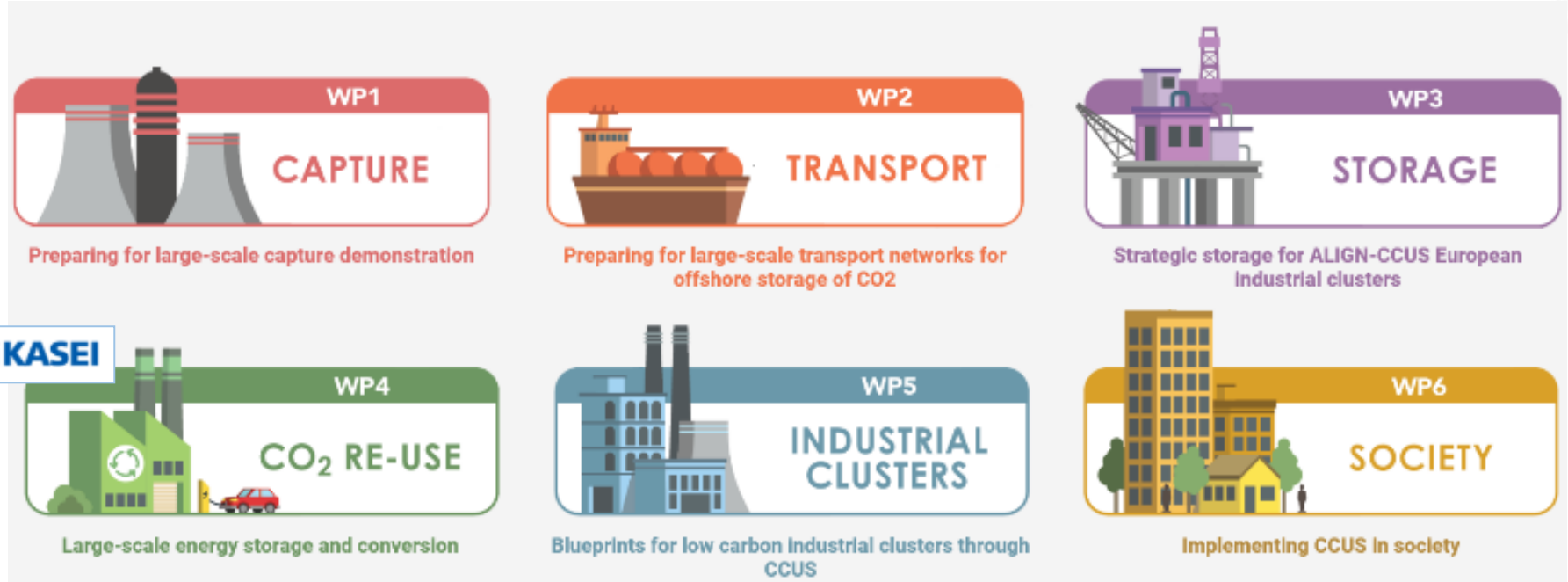
Max. H2 supply：2,000Nm^3/h
(World's largest size as one unit)
Cell area：about 3m^2/cell
Number of cells ：170cells

December 2017	: Started design works for the 10MW of water electrolysis system
January 2019	: Started installation works at the site
November 2019	: Produced Hydrogen gas
March 2020	: Held opening ceremony at the site
July 2020	: Delivered the water electrolysis system to the project

ALIGN CCUS Project

- ALIGN CCUS Project on technologies for CCS and CO2 utilization
- R&D project which consists of six Work Packages
- Asahi Kasei joined in WP4

*ACT: Accelerating CCS technologies, funding program under Horizon2020.
*ALIGN: Accelerating Low CarboN Industrial Growth through-CCUS Project



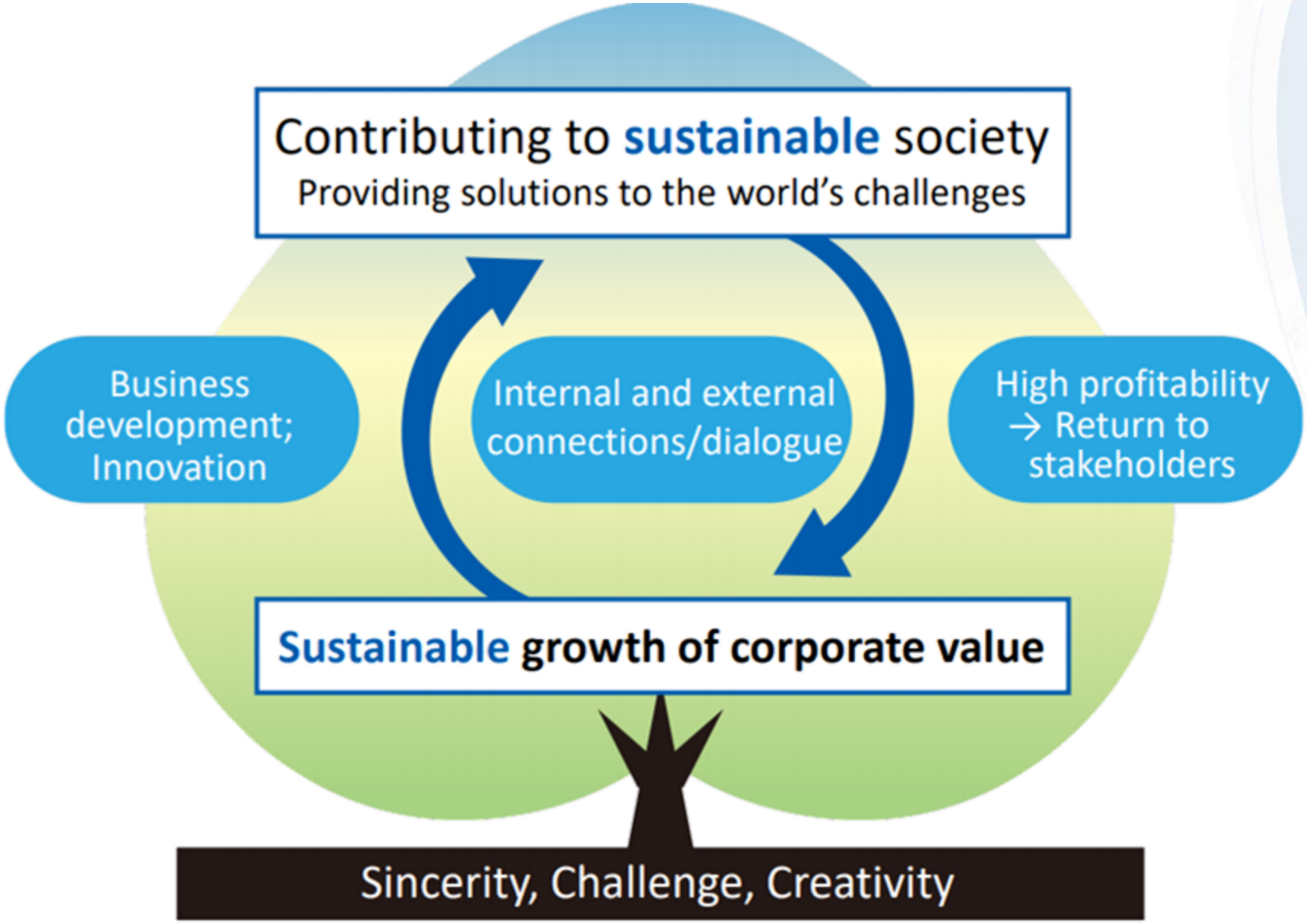
ALIGN CCUS Project Working Package 4

RWE

Capturing capability:
300kg/hour

RWE · JÜLICH FORSCHUNGSZENTRUM · BOSCH Technik fürs Leben · AsahiKASEI · TNO innovation for life · RWTH AACHEN UNIVERSITY · ECN Your energy. Our passion. · DEUTZ · MHPS GROUP

Sustainability for Asahi Kasei



AsahiKASEI

Creating for Tomorrow

THE COMMITMENT OF THE ASAHI KASEI GROUP:

To do all that we can in every era to help the people of the world
make the most of life and attain fulfillment in living.
Since our founding, we have always been deeply committed
to contributing to the development of society,
boldly anticipating the emergence of new needs.
This is what we mean by “Creating for Tomorrow.”