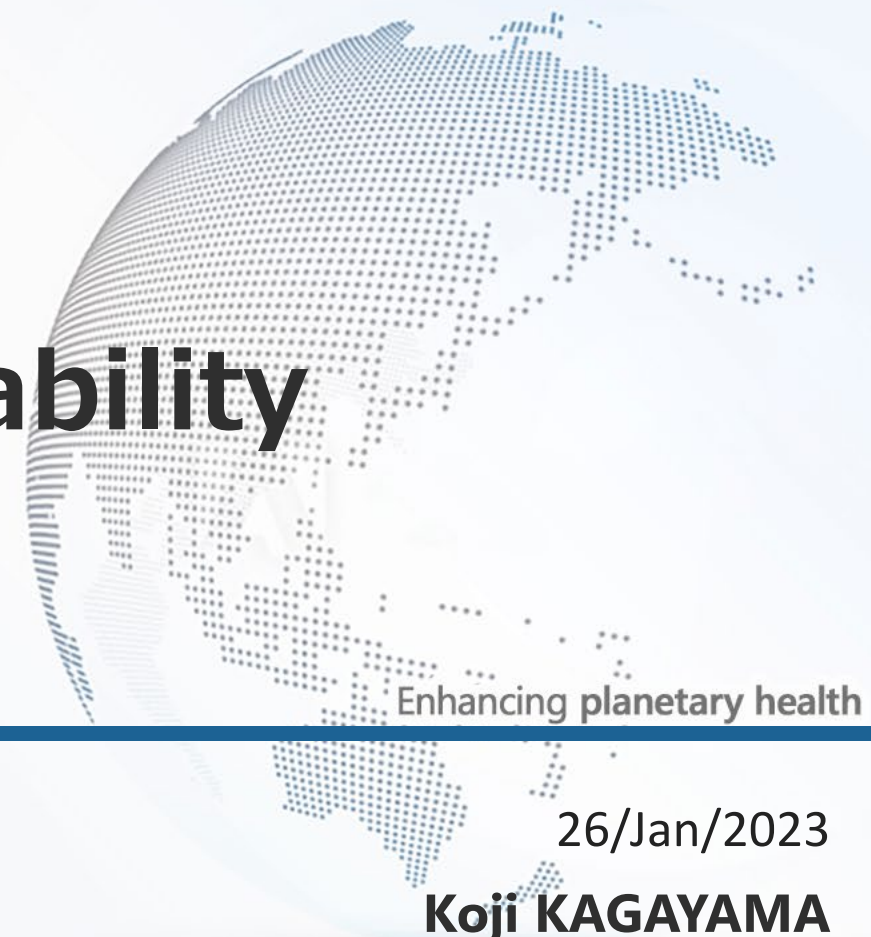


JGC Group's Initiatives toward Sustainability - Green Refinery Project -



Enhancing planetary health

26/Jan/2023

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JGC Holdings Corporation

Sustainability Co-Creation Department

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Long-term Group Management Strategy : 2040 Vision

Purpose

Enhancing planetary health

Our Vision in 2040

Factors behind the Establishment of the 2040 Vision

Coping with the dramatically changing business environment

Materializing a long-term growth that grasps social changes

A Corporate Group that contributes to enhancing Planetary Health via the following 5 business fields

- Energy Transformation
- Healthcare/ Life Science
- Functional Material
- Circular Economy
- Industrial/ Urban Infrastructure



The 3 transformations

contributing to the materialization of the 2040 Vision

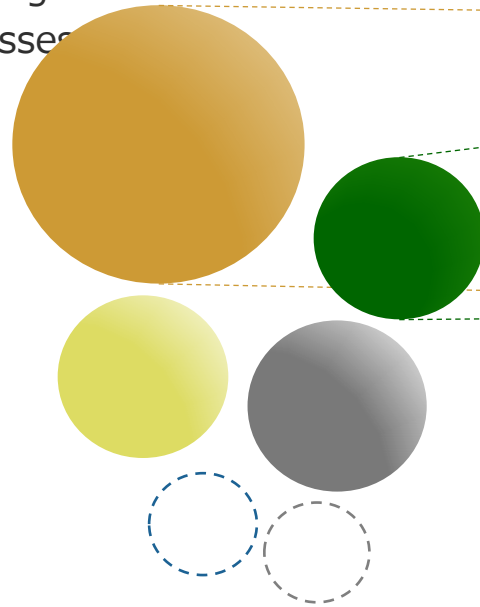
Business Fields	Oil & Gas focused	> Business field expansion that copes with energy transformation
Business Model	EPC Model, Manufacturing Model	> Deepening the EPC business model and diversification of non-EPC business models
Organization	Management in Japan · Execution organizations catered for large-scaled EPC projects	> Regional management structure and strengthening of an environment encouraging innovation

Carbon Neutral in 2050

JGC Group's Medium Term Business Plan (2021-2025)

Present

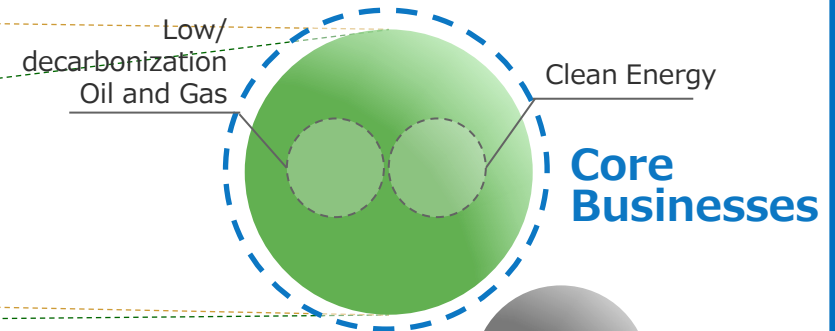
- Advancing into the renewable energy field
- Growth of the functional material manufacturing field
- Sowing the seeds for sustainability-related businesses



5 years of challenges (2021~2025)

● Making the energy transition field one of JGC's core business fields

- Active investment in growing businesses
- Building prospective business basis



● Oil & Gas

● Renewable Energy

● Energy Transition

● Functional material

● Health/ Life Science

● Circular Economy

● Industrial/ Urban Infrastructure

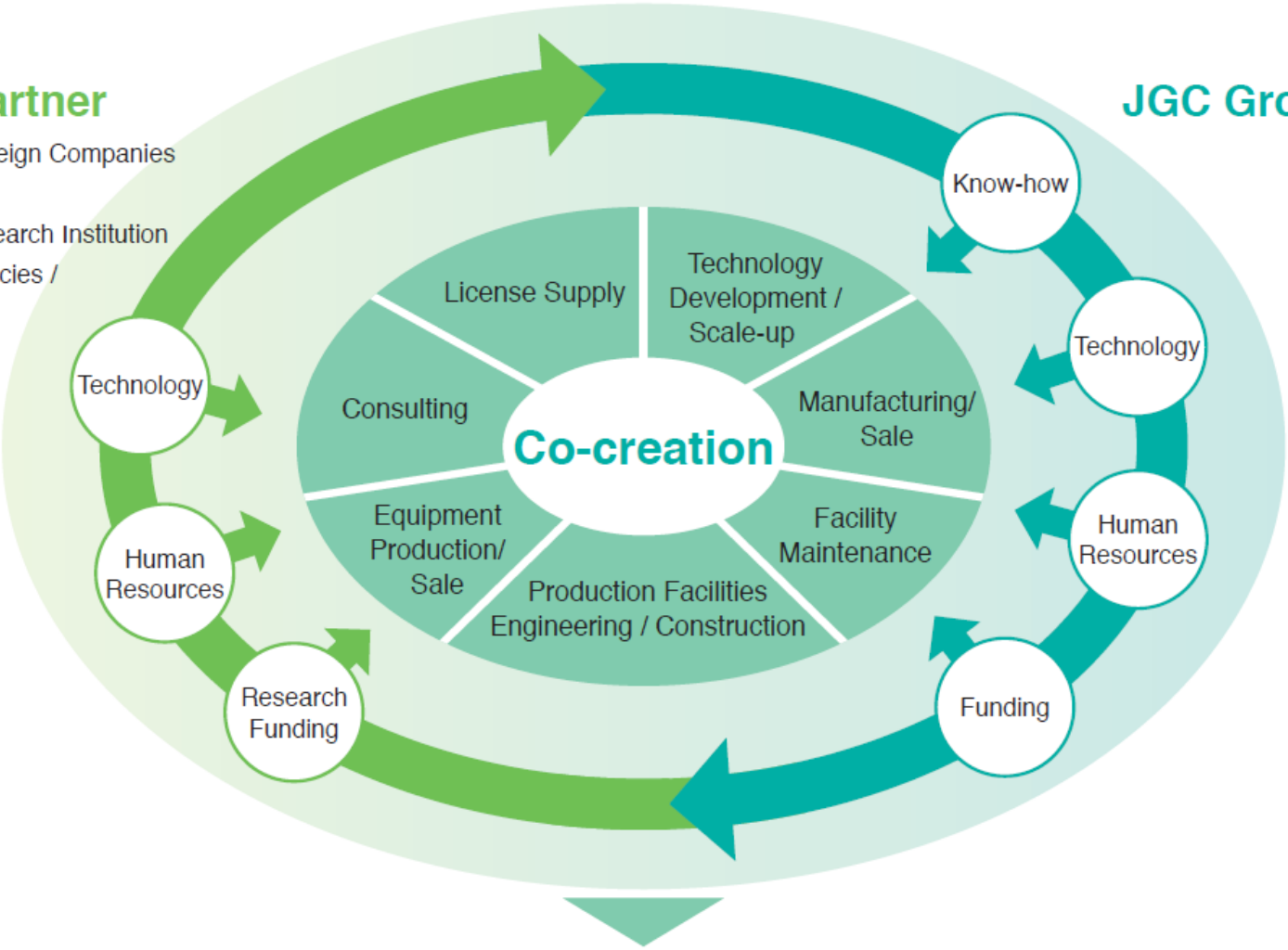
Timeline

Placing a Focus on “Value Chain” and “Co-Creation”

External Partner

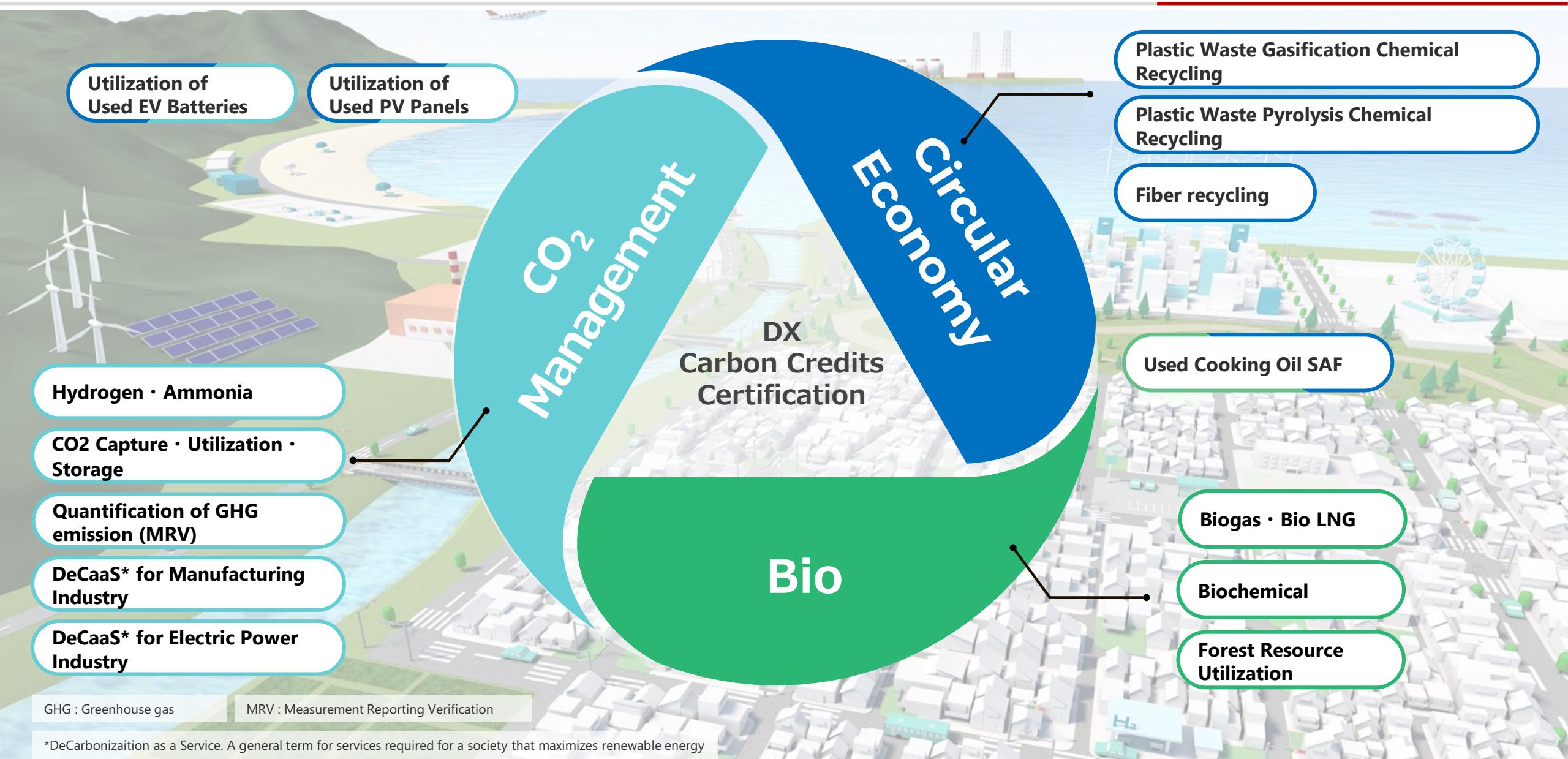
Domestic and Foreign Companies
Venture Company
Universities / Research Institution
Government Agencies / Municipalities

JGC Group



Solving Global Issues

Focused Areas



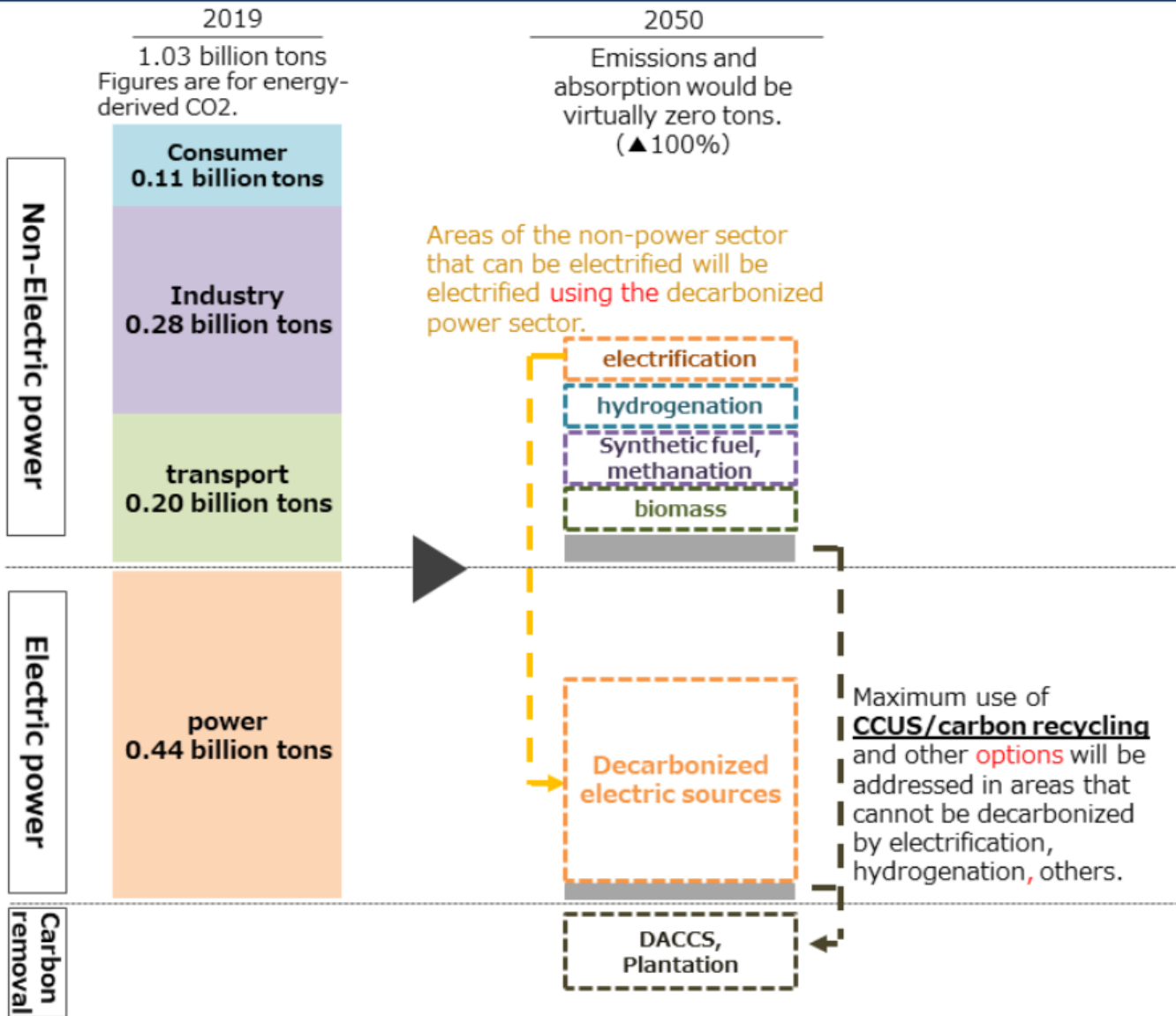
GHG : Greenhouse gas

MRV : Measurement Reporting Verification

*DeCarbonization as a Service. A general term for services required for a society that maximizes renewable energy

Domestic Approach for Carbon Neutrality

How we realize 2050 CN ?



EV

H2

Clean Energy

Carbon recycling

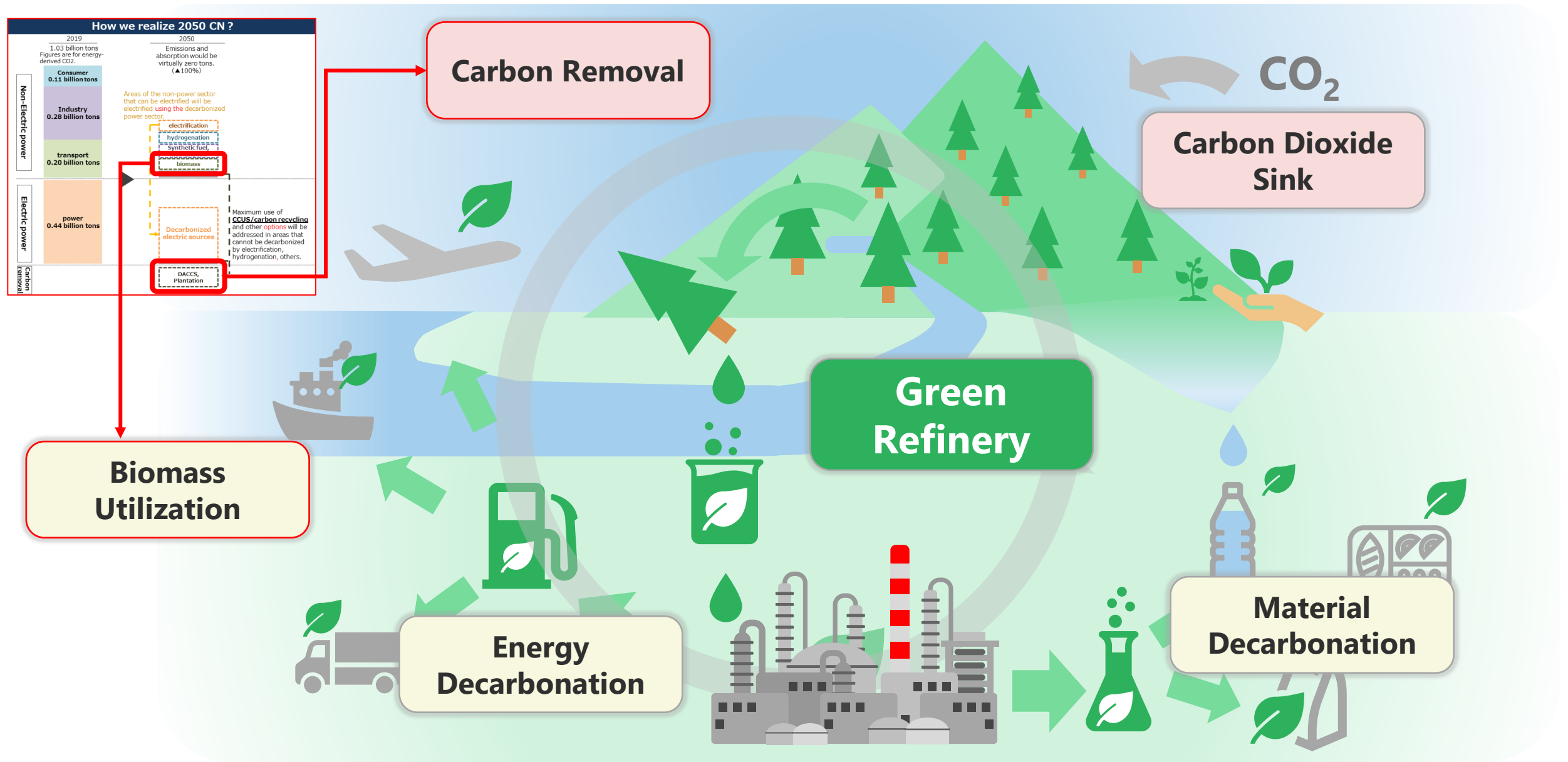
Biomass Utilization

CCS/CCUS

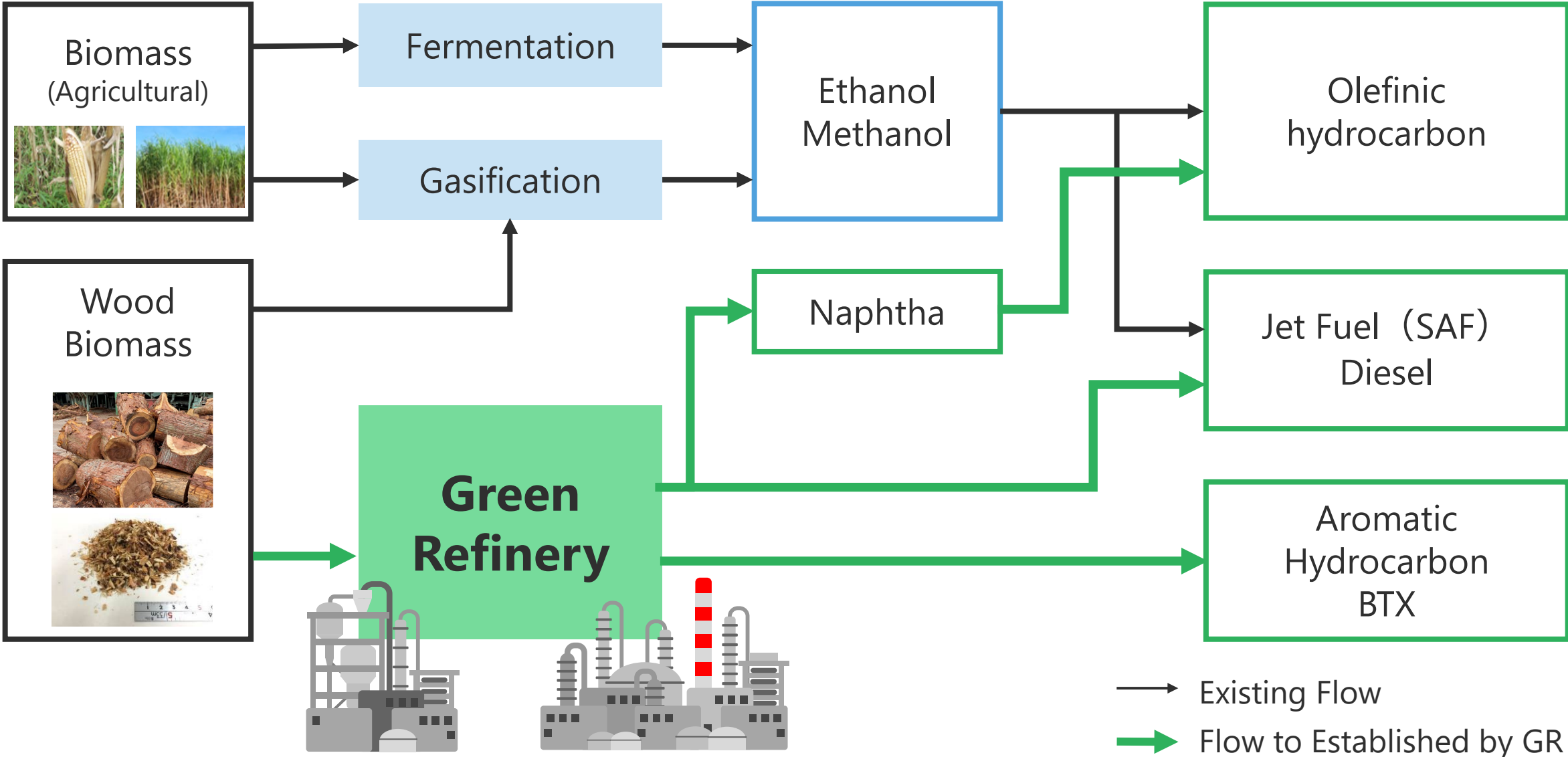
Carbon removal

Referred to METI HP

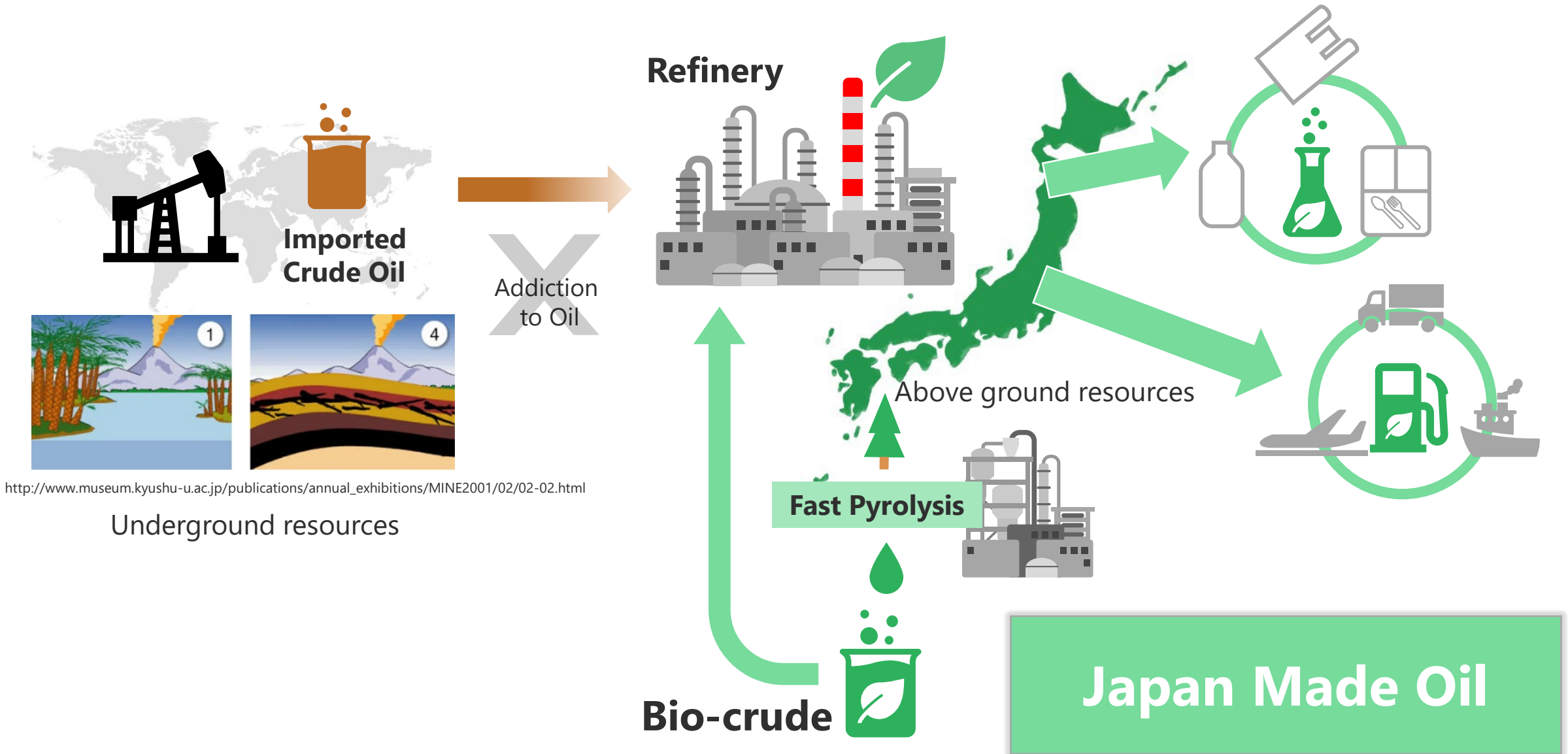
JGC's Approach for Carbon Neutrality - **Green Refinery** -



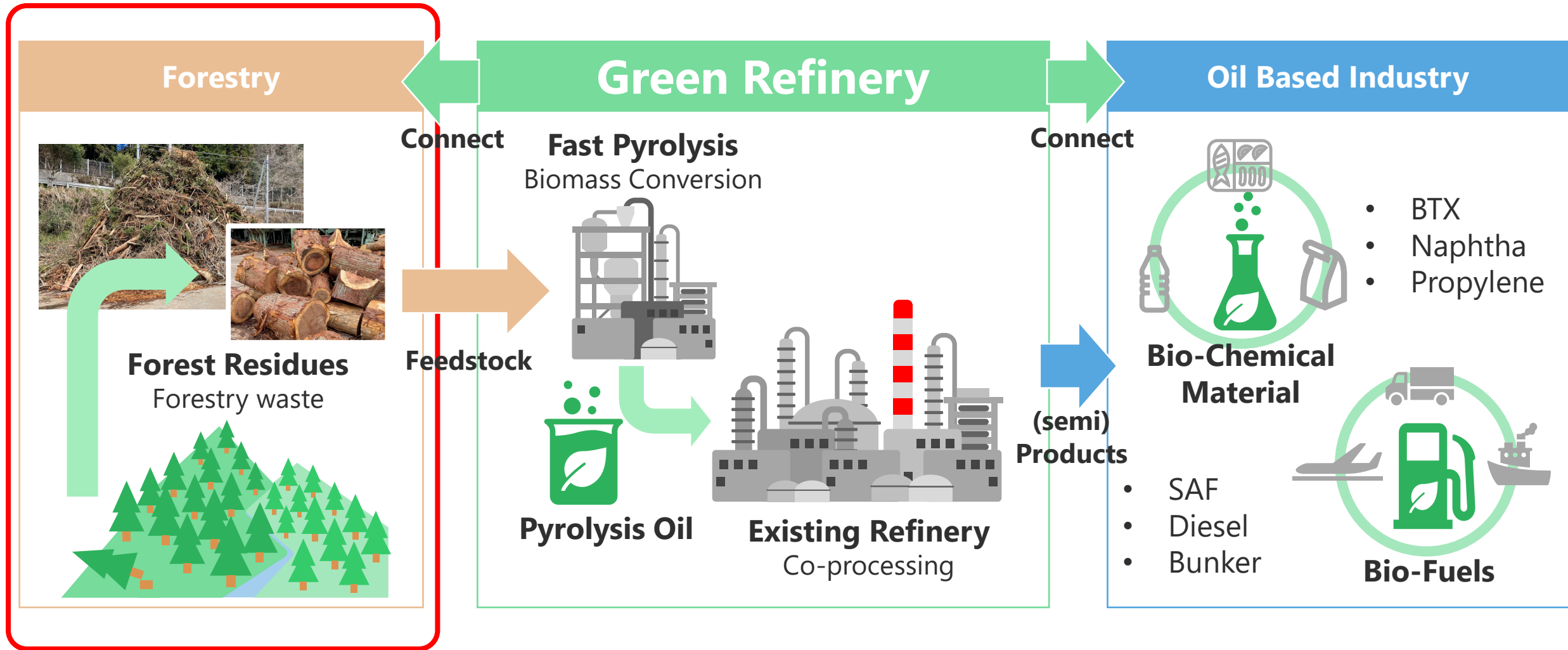
Material Decarbonation thru Green Refinery



Crude oil to **Bio-crude for oil refining**



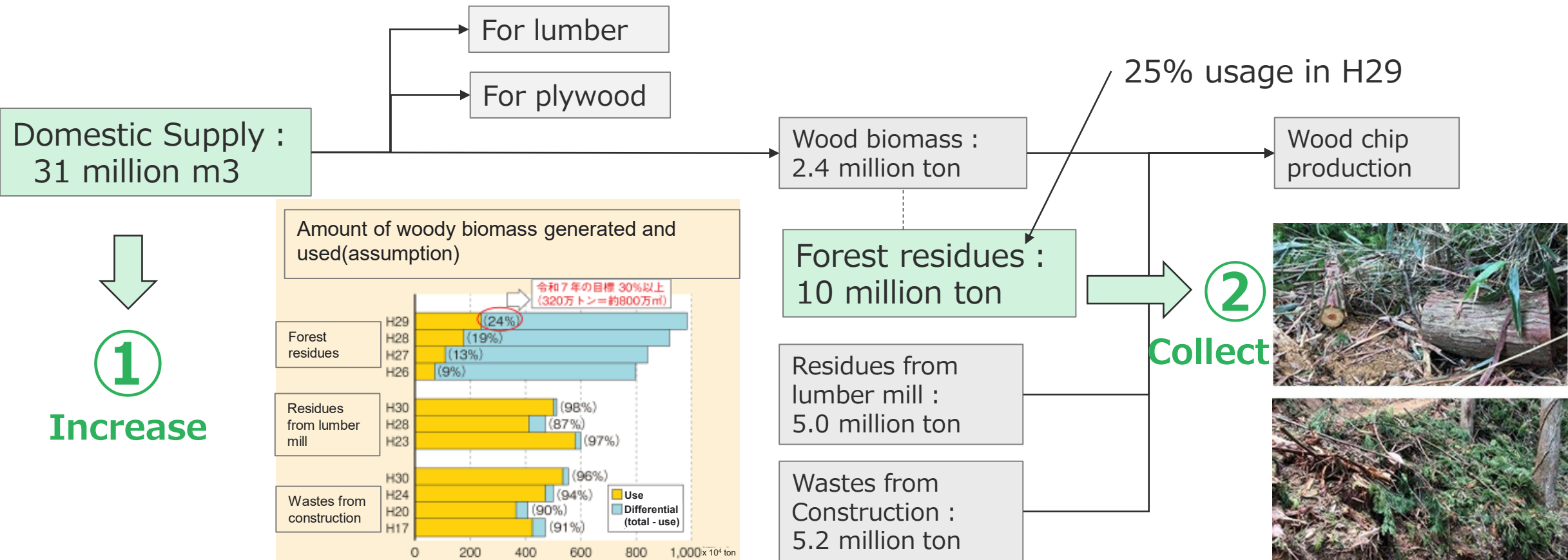
Value Chain of Green Refinery



Approach for **Green Refinery Feedstock** Securement

① **Increase the log production**

② **Collect the forest residues**



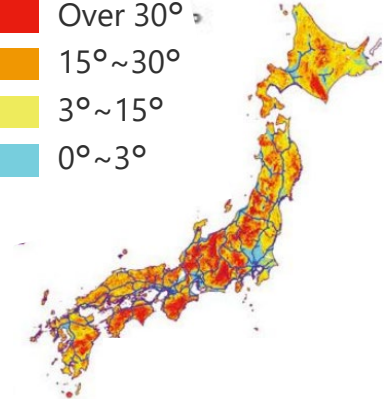
Challenges for Japanese Forestry

- ✓ Steep slope forest (35° over)
- ✓ Shortage of forestry manpower
- ✓ Forestry profitability
- ✓ Segmentalized forest ownership



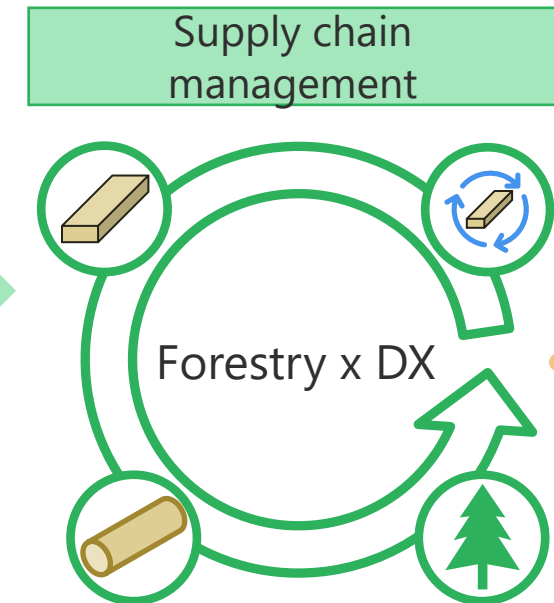
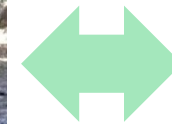
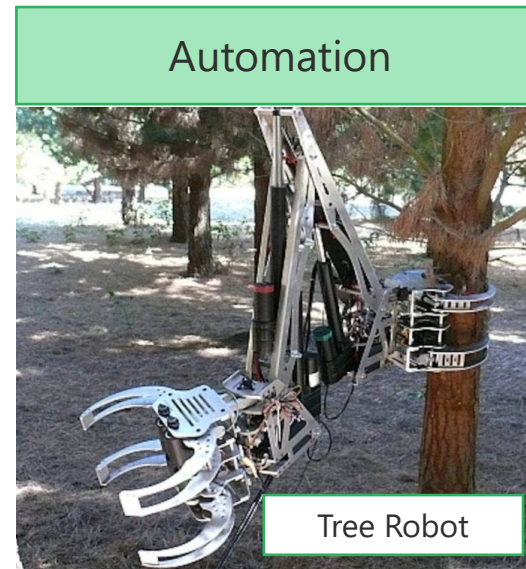
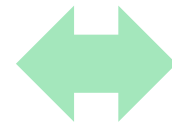
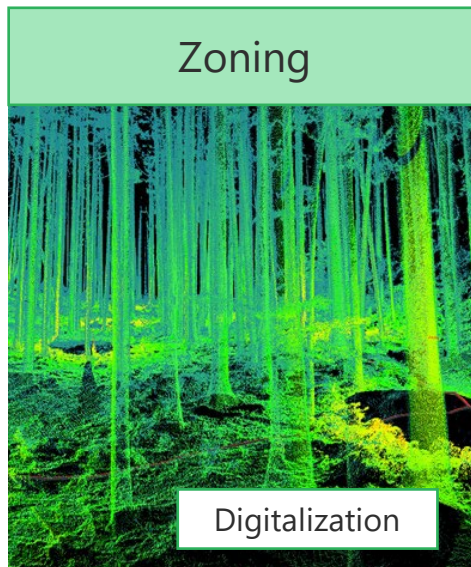
Legend

- Over 30°
- 15°~30°
- 3°~15°
- 0°~3°



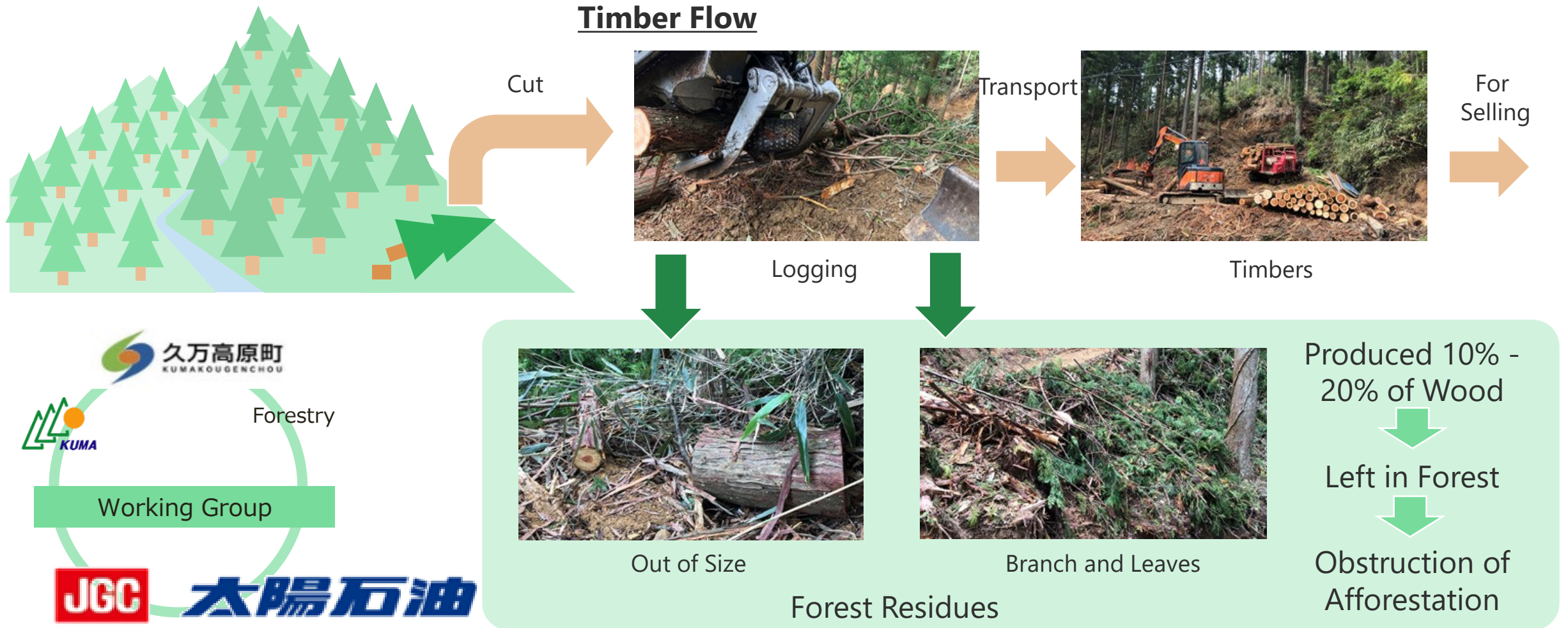
Slope Map

<https://www.skr.mlit.go.jp/road/ir/sir/gyousei/sesaku/seibi/h31pdf/all.pdf> to METI HP



<https://www.fcba.fr/wp-content/uploads/2020/11/fcbainfo-2019-1-robotique-exploitation-forestiere-chakroun-loueiromorais.pdf>

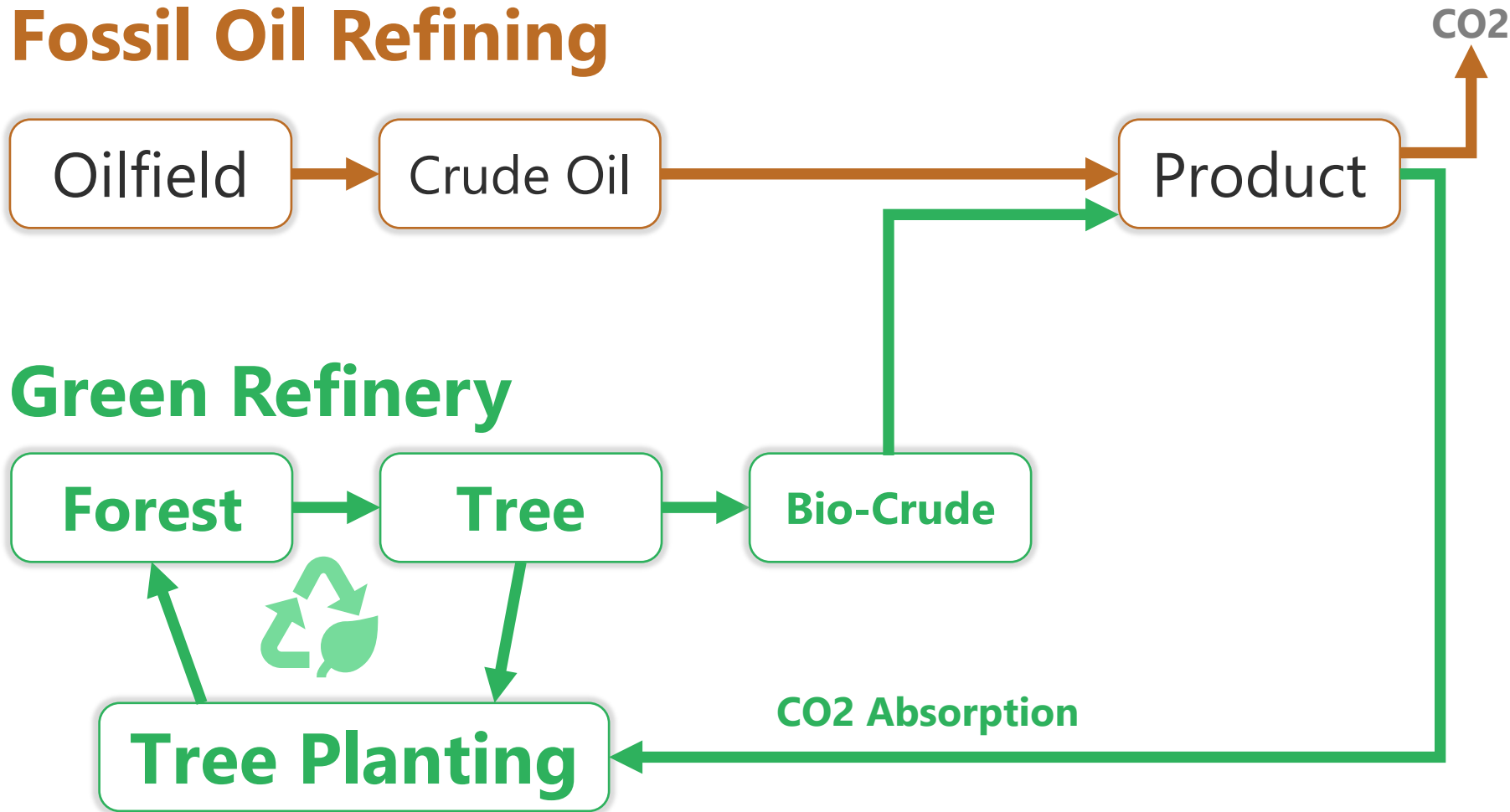
Approaches for Forest Residues Collection



POC (Proof of concept) with Local Government

Sustainable solutions for forestry and oil/chemical industry

Fossil Oil Refining



Forest resources = Sustainable resources

Japan Made Oil



JGC Holdings Corporation

**Sustainability Co-Creation
Department**

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**We accelerate the realization of carbon neutral society by
completing and commercializing immature technologies
through collaborative creation with partners.**

