

New challenges and opportunities of UNIDO-Japan cooperation

**Accelerating the circular economy and carbon neutrality for ISID
and a green recovery**

Innovative approaches by Chemical industry for low carbon and circular economy

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**Japan Chemical Industry Association (JCIA)
MAKINO HIDEAKI**



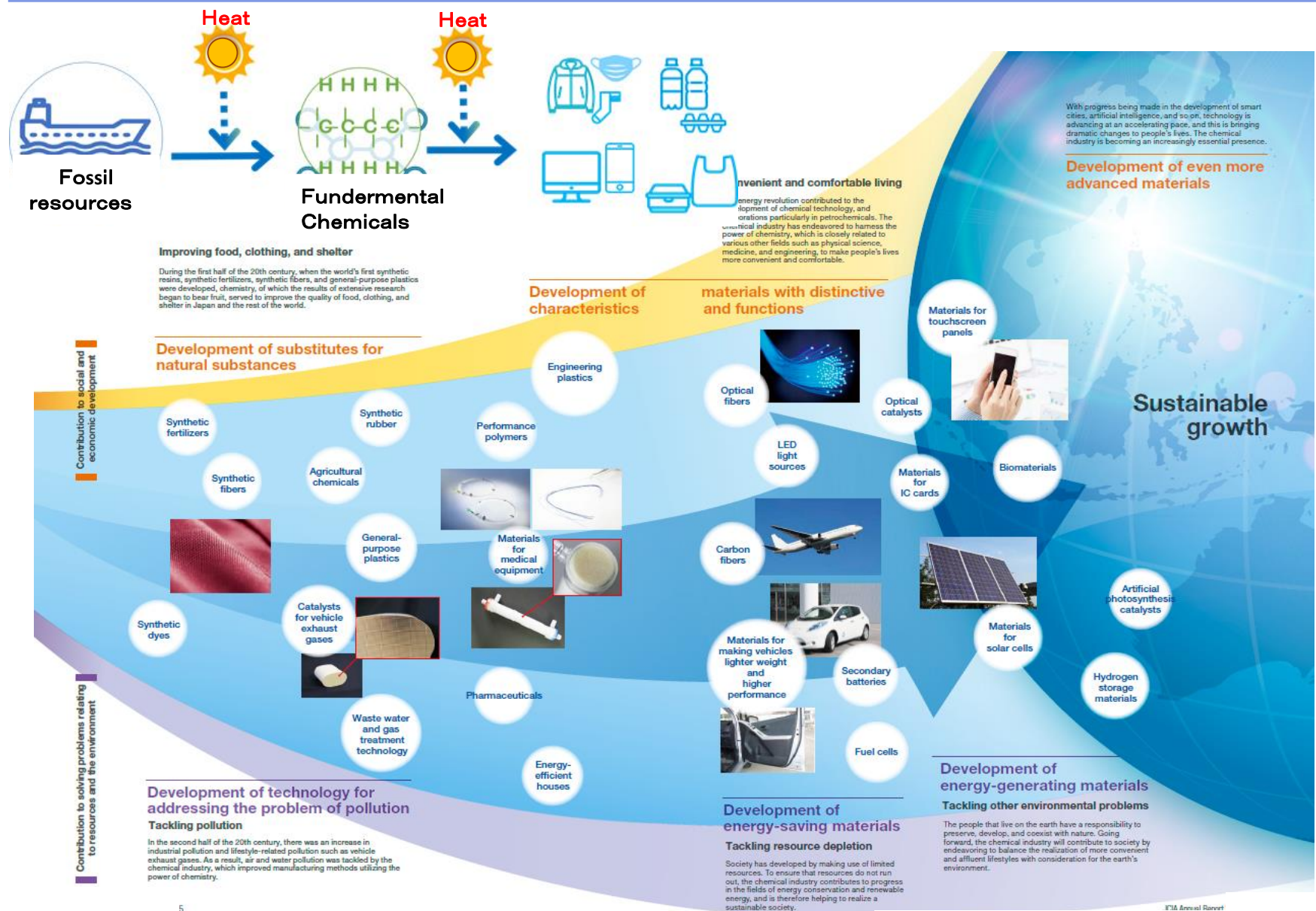
1. Introduction of JCIA
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3. JCIA's Commitment to a Low carbon Society
4. Actual situation on Plastic Waste issues
5. Advantages of Chemical Recycling and its actual situation
6. Circular model for Plastics Waste
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8. JCIA's approach to Chemical Recycling

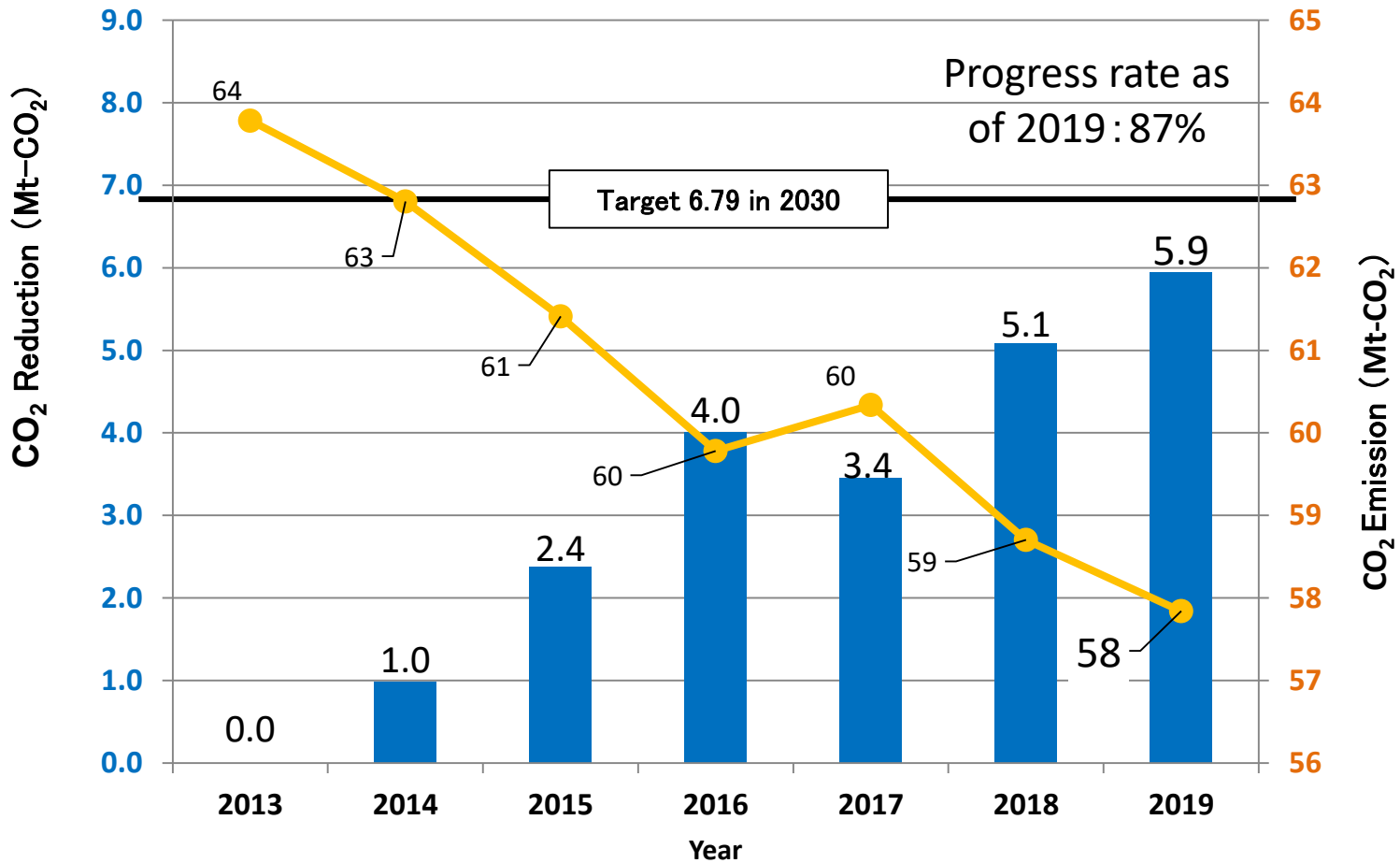
Established : April 1948 JCIA formed as a voluntary association
Number of members : 182 companies and 80 associations (as of June, 2021)



The Japan Chemical Industry Association (JCIA) engages in various activities with the aim of contributing to the sustainable development of human society. It does this by providing value to its members and the public, while at the same time monitoring changes in the environment surrounding the Japanese chemical industry and working with government bodies, related organizations, academic associations, and the International Council of Chemical Associations (ICCA)

2. Role and contribution of chemical industry





CO₂ emission is steadily decreasing.
 Progress rate is also increasing steadily.

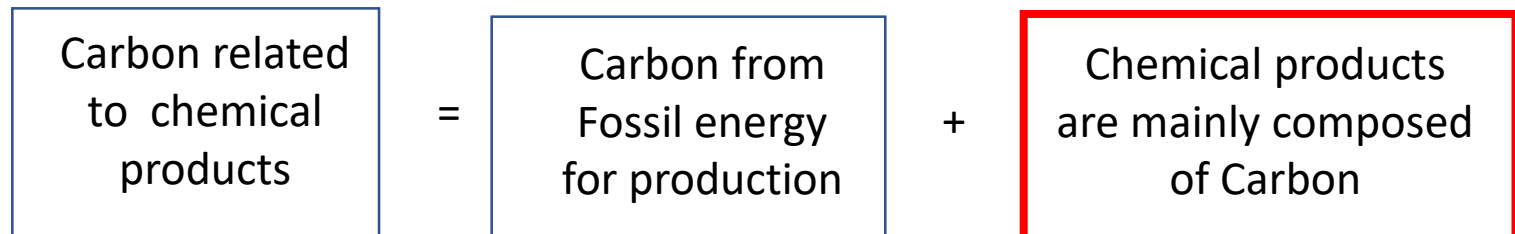
✓ Marine Plastic litter (Marine Debris)

- The Japanese government formulated the “**Osaka Blue Ocean Vision**” with a focus on how to prevent of littering, illegal dumping and unintentional leakage of waste into the oceans without restricting economic growth.

- 1/promotion of proper waste management system,
- 2/prevention of littering, illegal dumping and unintentional leakage of waste into the oceans
- 3/collection of scattered waste on land,
- 4/collection of plastic litter in the oceans,
- 5/innovation in development of alternative materials,
- 6/collaboration with stakeholders,
- 7/international cooperation with emerging countries by sharing best practices
- 8/research on actual situations and development of scientific knowledge.

✓ Global warming (GHG emission reduction)

- In the situation where the recycling of resources is necessary, “**Promotion of recycling of waste plastic**” contributes to the reduction of GHG emissions is an urgent issue in the chemical industry.



✓ What is Chemical Recycling ?

- CR is a method of decomposing the resin contained in Plastic waste and **converting it into chemical raw materials** such as various monomers, and the chemical raw materials, which can be reused as resources.

✓ Advantages of Chemical Recycling

- **Materials with the same composition, the same performance, and the same quality as virgin products can be obtained.**

As a result

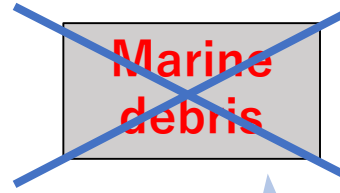
- It can be mixed with virgin products in any ratio.
(In other words, we need verification system to distinguish it from virgin products.)
- It can be **used again and again** so that CR can contribute to a **“True Circular Society”** that is the recycling system, in which resources keep being used efficiently and **repeatedly**, with a substantial reduction in GHG emissions.

✓ The actual situation of Chemical Recycling

- Although there are CR technologies that were commercialized in the past, they didn't work well in many cases, because the raw materials were not stably and systematically supplied.

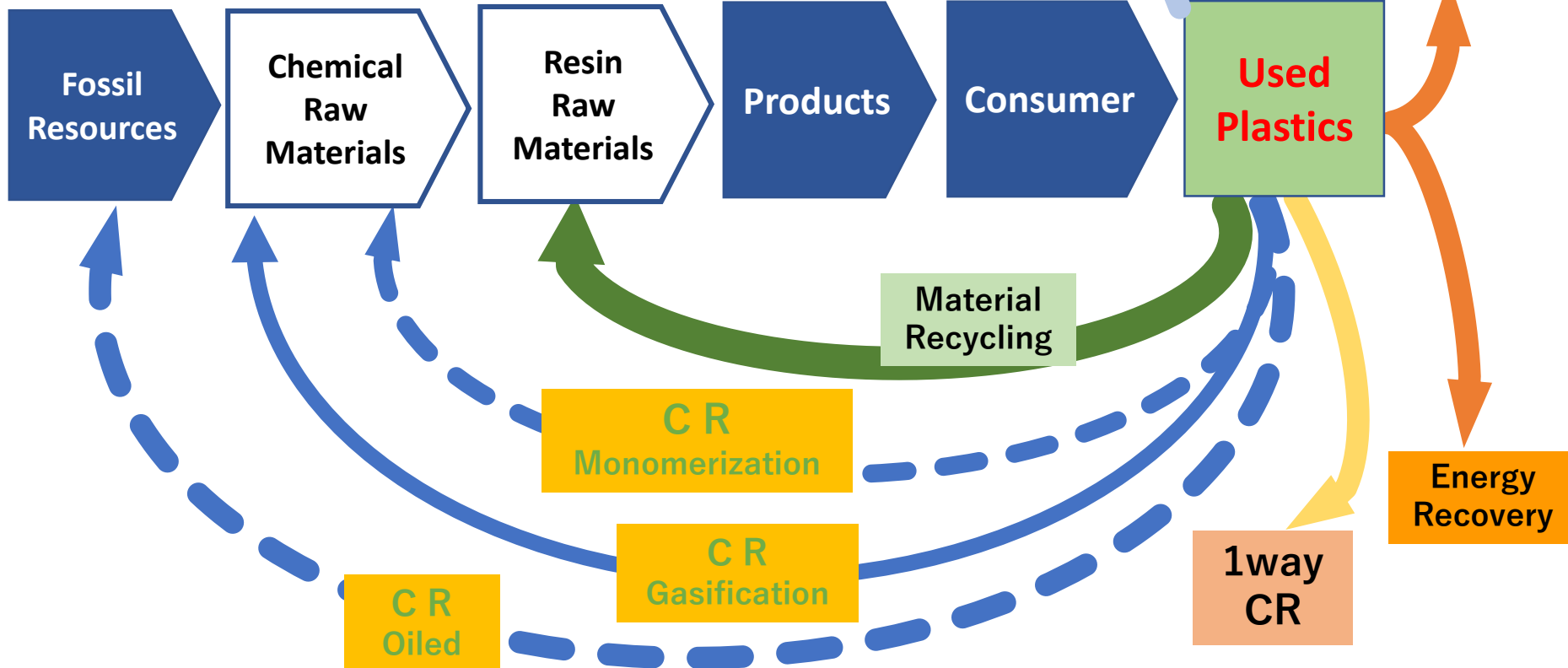
6. Circular model for Plastics

Need great efforts to minimize Waste disposal



Landfill

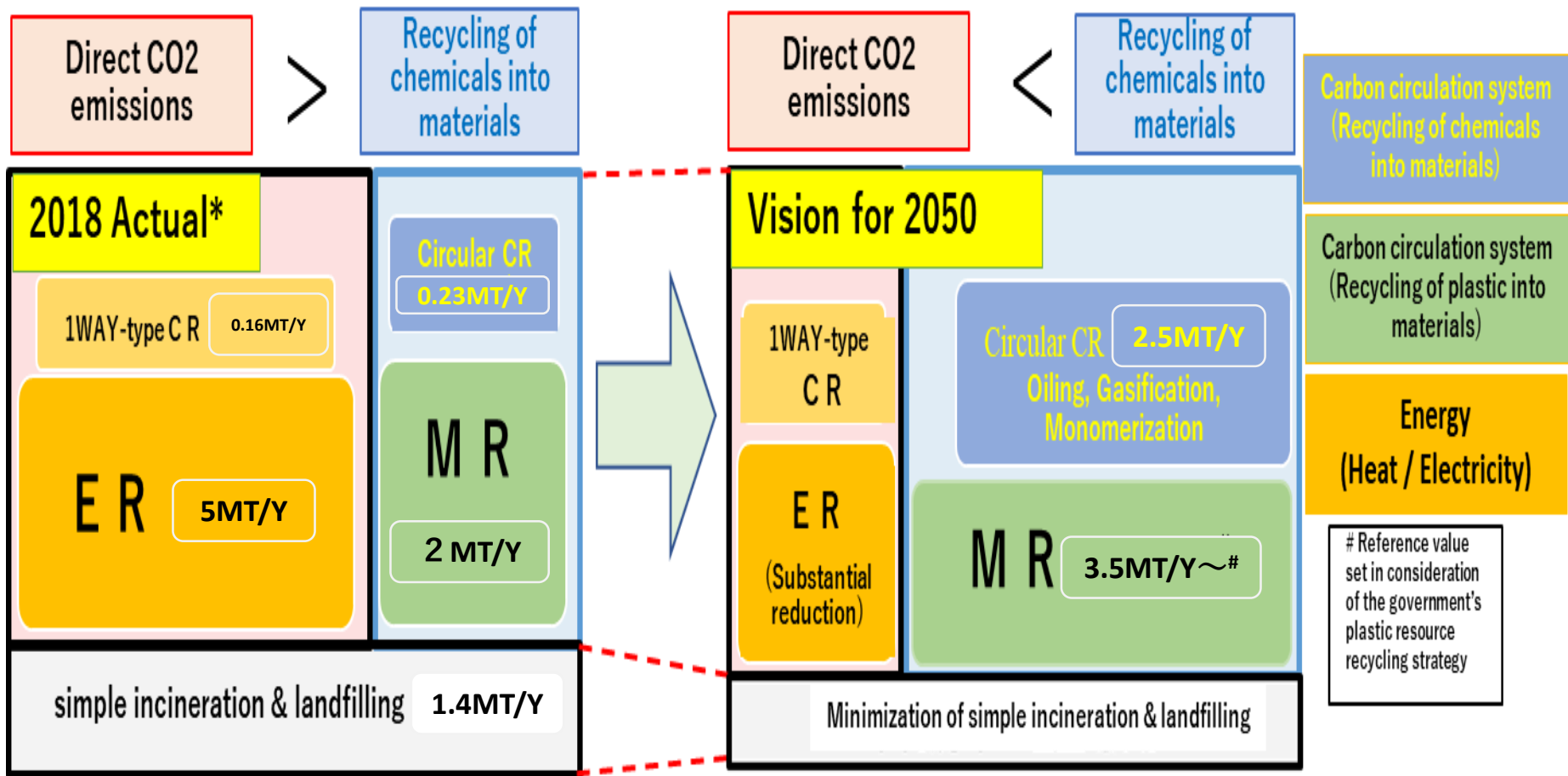
Incineration



Dotted line : Not commercialized with some exceptions

- ✓ **The target of Chemical Recycling technology**
 - Replace “One-way CR” in coke ovens and ER (which make plastic waste simply burn and emit CO₂ directly) with “circular CR”, such as “gasification, oiling, and monomerization“ technologies that do not emit CO₂ in principle.
- ✓ **Challenges for social implementation (established a business model)**
 - Develop a foundation and technologies that can be commercialized as a business.
- ✓ **The specific subjects to be solved are;**
 - To secure a stable supply system of waste plastic equivalent to the profitable scale
 - To develop high efficiency (high yield with low energy consumption) CR technology
 - To create a market for CR products with a certification system and brand strategy

7. The Chemical Industry's Future Vision on the Chemical Recycling of Plastic Waste (Schematic)



*Source: Results in 2018 (annual treatment amount) by Plastic Waste Management Institute

Important points for the realization of the vision for 2050

- (1) Ensure a feasible size: Build a rational & large and highly efficient collection system and plastic waste collection data platform, and product design (for recycling into mono-materials)
- (2) Market creation: Promote value of recycled products (by Eco Mark, international certification system, LCA) and build a business model.

- ✓ JCIA Published “Future Vision” in December 2020
Full Text is available:
<https://www.nikkakyo.org/newsrelease/press>
- ✓ JCIA's approach to Chemical Recycling
 - Support for creating a system for social implementation with Industry-Government-Academia
 - Make recommendations for the Japanese government's plastic resource recycling policy
 - Set up the Task Force in JCIA
 - to formulate ISO standards and certification systems
 - to evaluate technical methods (CR/MR/ER) by LCA methodology.

The Chemical Industry's Future Vision on the Chemical Recycling of Plastic Waste (Outline)

Introduction

- ✓ It is the urgent challenge to achieve the efficient and circular use of plastic waste in response to world issues, such as resource limitations due to global increased population, plastic litter and climate change.
- ✓ All kinds of plastic waste are important domestic resources, the effective use of which helps mitigate global warming through carbon circulation, etc., and chemical recycling (CR) is a key to achieving this.
- ✓ The chemical industry plays a central role to foster innovation to solve global issues based on the possibilities provided by chemistry.

Future Vision: Become a coordinator for the entire CR value chain to realize a “True Circular Society”

[Premises] State of society in 2050

- ✓ Shift from linear economy to circular economy
- ✓ Continued use of chemical products as basic materials in post-coronavirus society
- ✓ Progress with breakaway from the use of fossil resources as carbon source

(1) State of CR technologies

- ✓ Achievement of “cradle to cradle”
- ✓ Circular CR into oil, gases and monomers of equal quality

(2) State of society after the introduction of CR

- ✓ Expanded recycling of plastic waste
CR: 2.5 million tons/year (1.5 tons/year in 2030)
- ✓ Acceptance of recycled materials by the public

Toward the achievement of the vision (Full-scale expansion of CR in society)

(1) Establishment of a feasible business size

- ✓ Plastic waste collection and treatment system
Establishment of a large-scale collection and treatment system
Rational and highly efficient collection system
Building of a collection & management data platform

(2) Establishment of CR technologies

- ✓ Matching of different types of plastic waste to CR technologies
- ✓ Enhancement of plastic waste sorting & treatment technologies
- ✓ Building of a support system
Public finance & industry-government-academia collaboration, etc.

(3) Establishment of economic feasibility and market

- ✓ Nurturing of values among consumers and brand manufacturers
- ✓ Comparison of LCA results between various recycling methods
- ✓ Clarification of recycled products through certification systems
- ✓ Building of a sustainable business model

(4) Expansion to overseas

- Deployment as business in emerging market countries
- Utilization of bilateral talks and international organizations

Build collaboration and social systems to foster social innovations across the value chain

Propose an international certification system, etc. to globally foster CR with economic rationality