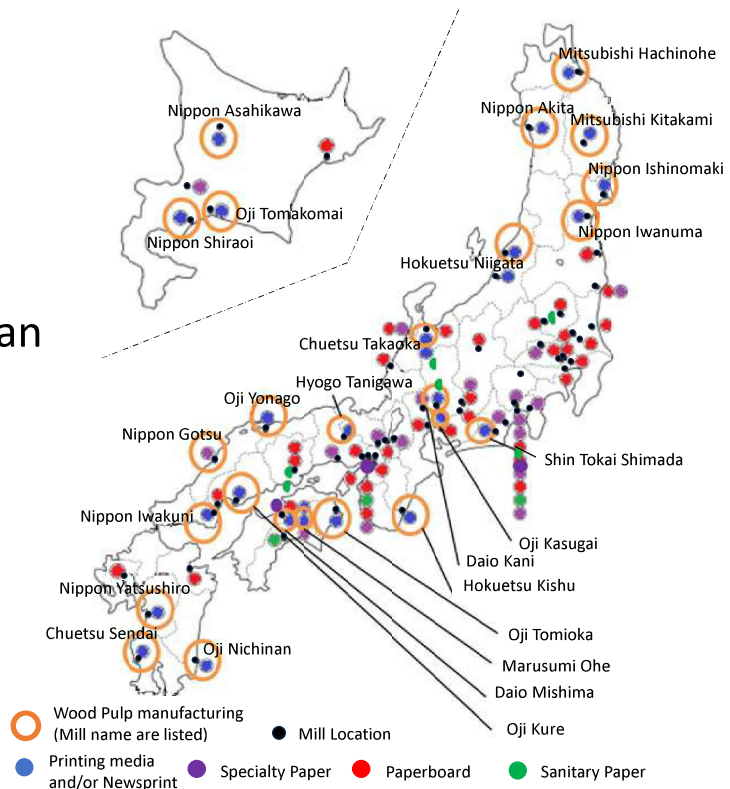


# Issues in the Japanese Paper Industry & Initiatives towards net zero CO<sub>2</sub>

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Locations of major  
Pulp and Paper mills in Japan

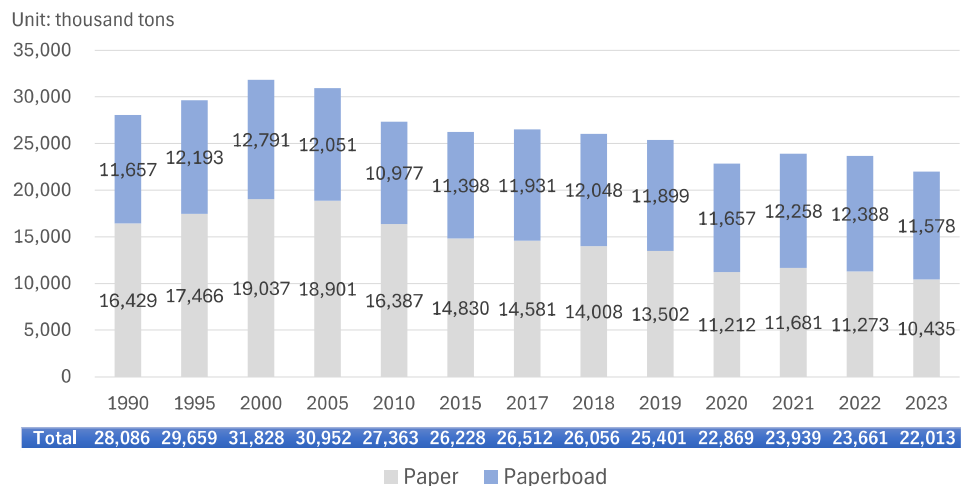


Map source  
<https://www.meti.go.jp/press/2023/12/20231222005/20231222005-03.pdf>

## Issues in the Japanese Paper Industry

### Paper and Paperboard production (1990-2023)

- As domestic demand declined, production volume also decreased. Paper and Paperboard production volume in 2023 was 69% of the peak in 2000. Especially, it was 55% in paper.



Reference <https://www.jpap.gr.jp/states/paper/index.html>

## Issues in the Japanese Paper Industry

### Accelerating the business transformation

- The decline in demand for paper (especially newsprint and paper for printing media) is expected to continue.

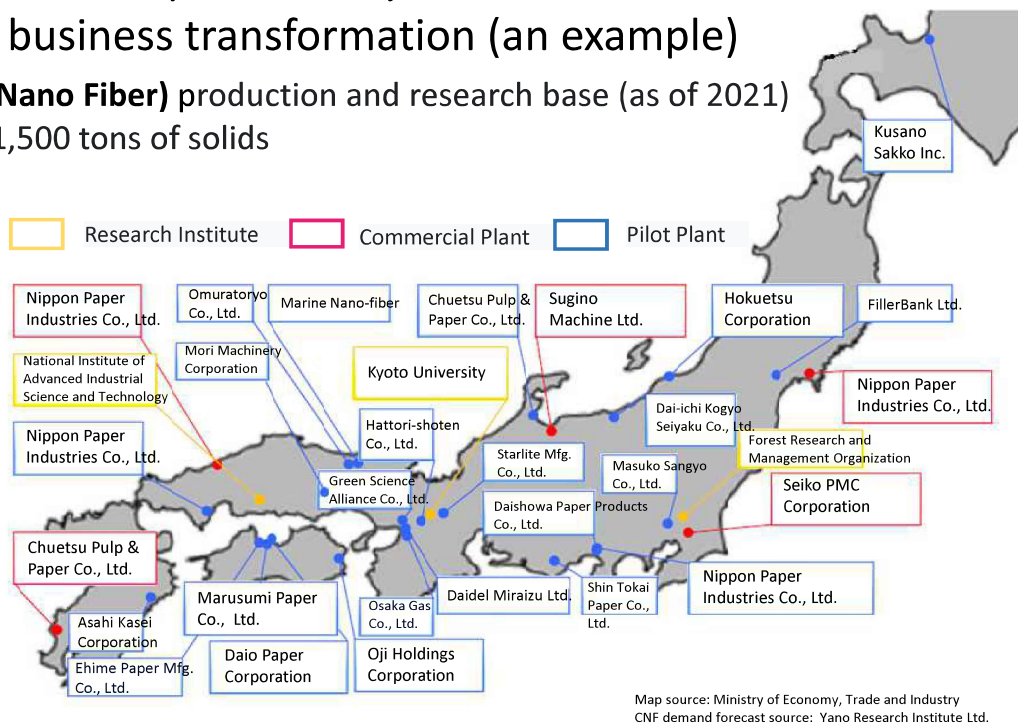
#### Actions for the business transformation:

- Stopping paper machines or Switching to liner and corrugating medium production
- Strengthening the household paper field
- Strengthening paper containers and packaging products (Alternative to plastic ones)
- Strengthening power generation business using biomass fuel
- Utilization of wood pulp as a biomass resource
  - CNF (Cellulose Nano Fiber)
  - Biochemicals from non-edible source such as, Bioethanol, SAF (Sustainable Aviation Fuels), Biodegradable bioplastic etc.

## Issues in the Japanese Paper Industry

### Accelerating the business transformation (an example)

- **CNF (Cellulose Nano Fiber)** production and research base (as of 2021)
- 2030 forecast: 1,500 tons of solids



## Issues in the Japanese Paper Industry

### Accelerating the business transformation and Initiatives towards net zero CO<sub>2</sub> (an example)

- Production of **ethanol and polylactic acid from woody biomass**, which is the raw material for SAF and bioplastics

Quoted from recent news releases

Company	Date of announced	Summary of announcement
Nippon Paper Industries Co., Ltd.	Feb. 03, 2023	Commercial production of bioethanol and development of biochemical products (Aiming to start in 2027)
Oji Holdings Corporation	May 12, 2023	Installing pilot production equipment for ethanol/sugar solution (Operation will start in 2024.)
Rengo Co., Ltd.	Feb. 20, 2024	Commercial production of bioethanol from construction waste wood (Aiming to start in 2027)

# Current Status of CO<sub>2</sub> Emission

## (1) GHG total Emissions in the world (2022)

	Unit: million tons-CO <sub>2</sub> eq.	Ratio
Total	53,786	-
China	15,685	29.2%
USA	6,017	11.2%
India	3,943	7.3%
EU(27)	3,588	6.7%
Russia	2,580	4.8%
Japan	1,183	2.2%

- GHG breakdown
- Energy (fuel) derived CO<sub>2</sub>
  - Non-fuel derived CO<sub>2</sub>
  - Methane
  - Nitric oxide
  - CFC substitutes, etc.

Reference [https://edgar.jrc.ec.europa.eu/report\\_2023](https://edgar.jrc.ec.europa.eu/report_2023)

## (2) Energy (fuel) derived CO<sub>2</sub> Emissions in Pulp & Paper Manufacturing (2021FY)

	Unit: million tons-CO <sub>2</sub> eq.	Ratio
Japan as a whole*	988	-
In Pulp & Paper Manufacturing **	15.8	1.6%

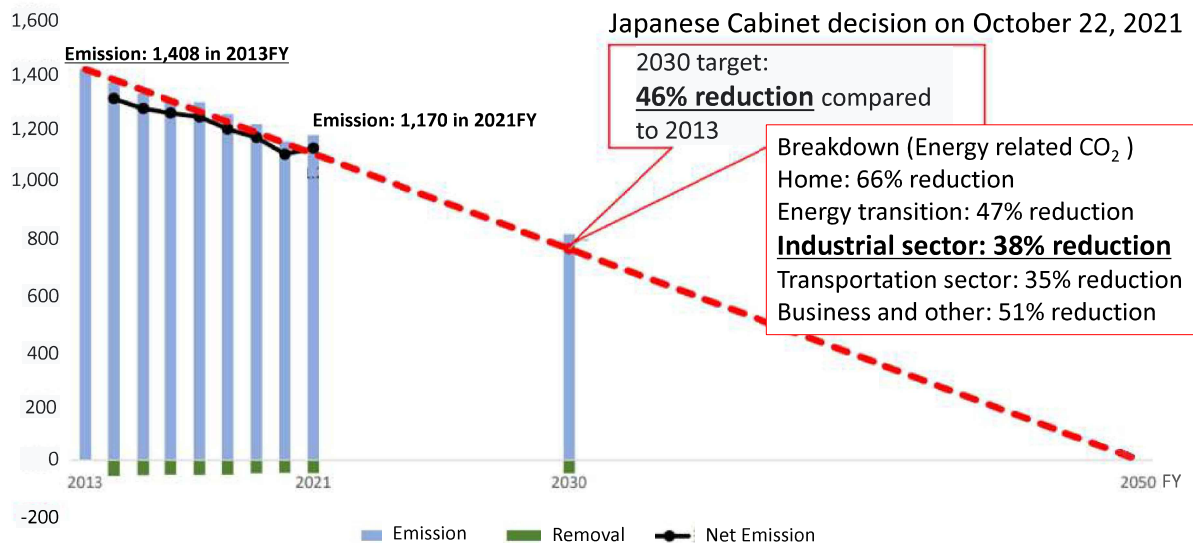
\* In Japan, energy derived CO<sub>2</sub> accounts for approximately 84% of all GHG emissions.

\*\* This survey covers paper and paperboard production equipment (covering 91% of production)

Reference <https://www.nies.go.jp/whatsnew/2023/20230421-e-attachment01.pdf>  
Reference <https://www.jpa.gr.jp/file/topics/20230920110848-1.pdf>

# Towards zero CO<sub>2</sub> emissions in 2050 2030 target (Japan as a whole )

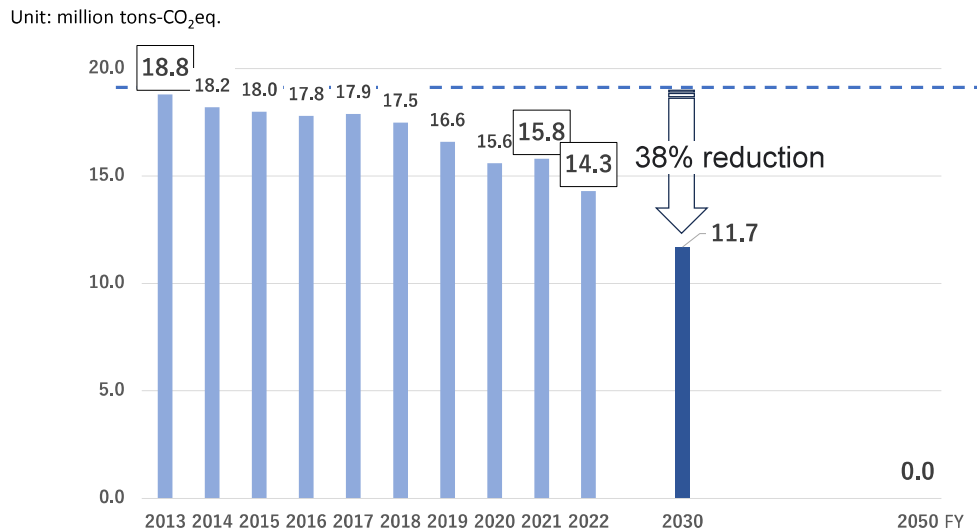
Unit: million tons-CO<sub>2</sub>eq.



Reference <https://www.env.go.jp/content/000128749.pdf>  
Japanese Cabinet decision on October 22, 2021

## Towards zero CO<sub>2</sub> emissions in 2050 2030 target in Pulp & Paper manufacturing

- In April 2022, Japan Paper Association enhanced its target on fossil energy-derived CO<sub>2</sub> reduction to 38% (base year 2013FY).



Reference <https://www.jpaa.gr.jp/file/topics/20230920110848-1.pdf>

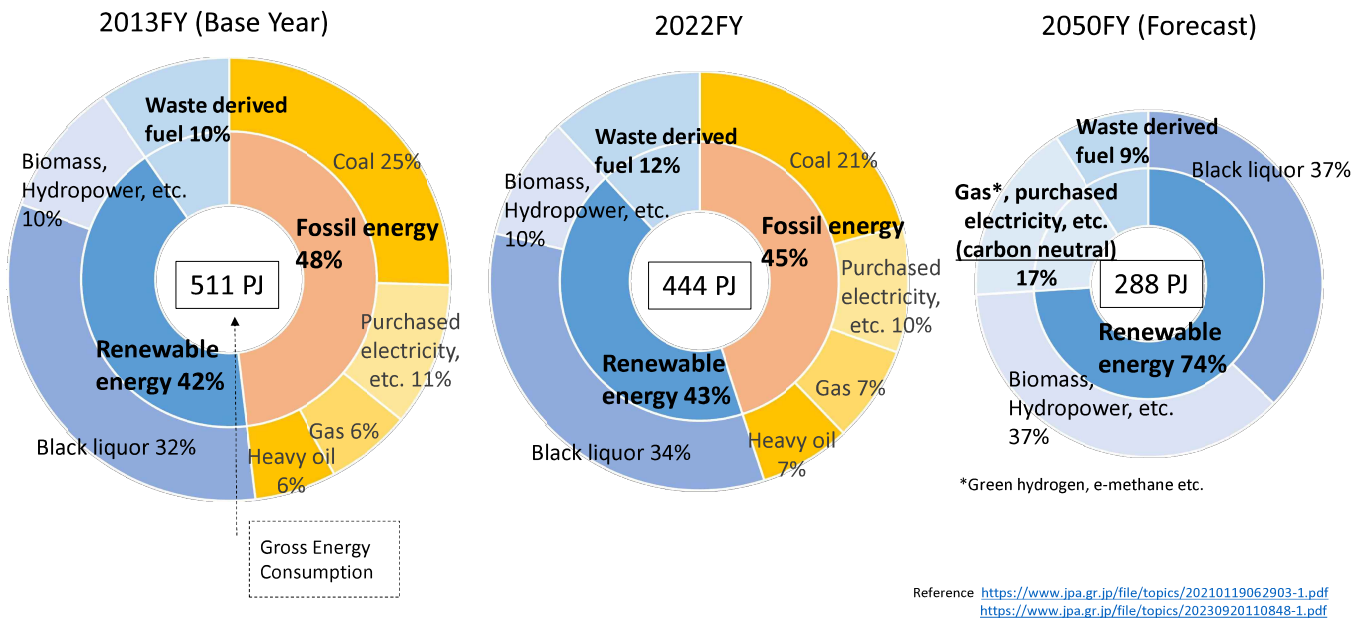
## Towards zero CO<sub>2</sub> emissions in 2050 Actions in Pulp & Paper manufacturing

Actions and Examples	CO <sub>2</sub> Reduction from 2013
<b>(1) Promote energy efficiency efforts</b> <ul style="list-style-type: none"> <li>Introduce the best available energy-efficient technologies</li> <li>Intensify energy management</li> </ul>	4.2 million tons (Contribution: 20%)
<b>(2) Increase the renewable energies in in-house power plants</b> <ul style="list-style-type: none"> <li>Secure stable supply of wood biomass fuel</li> </ul>	8.4 million tons (Contribution: 40%)
<b>(3) Promote the development of innovative technologies related to pulp and paper manufacturing</b> <ul style="list-style-type: none"> <li>Fossil energy free lime kiln</li> <li>Develop energy-efficient black liquor concentration equipment</li> </ul>	2.1 million tons (Contribution: 10%)
<b>(4) Adopt energy-related innovative technologies</b> <ul style="list-style-type: none"> <li>Introduce CCS* and CCUS* technologies</li> <li>Promote the use of carbon-neutral fuels** and electricity</li> </ul>	6.3 million tons (Contribution: 30%)
* CCS: Carbon dioxide Capture and Storage CCUS: Carbon dioxide Capture, Utilization and Storage. ** Green hydrogen, ammonia, e-methane etc.	
<b>Total</b>	<b>21 millions tons</b> (energy-related CO <sub>2</sub> + waste-derived CO <sub>2</sub> )

Reference <https://www.jpaa.gr.jp/file/topics/20210119062903-1.pdf>

## Towards zero CO<sub>2</sub> emissions in 2050

### Energy Composition of the Pulp & Paper manufacturing in 2050



## Concluding Remarks

- Each company is transforming the business portfolios in response to the decline in paper demand.
  - In the short term, Strengthening the product fields that are expected to grow and the power generation business using biomass fuel
  - In the long term, Making wood chemical business such as CNF, biochemicals, and biofuels etc. another pillar
- Carbon neutrality in 2050 is extremely difficult challenge. For realization, innovative technologies are essential and a strong leadership and support for industries of the Japanese government are crucial.