

**Idemitsu's contribution to the energy transition
by decarbonization efforts
including black-pellet commercialization.**

The 32nd Clean Coal Day International Symposium 2023

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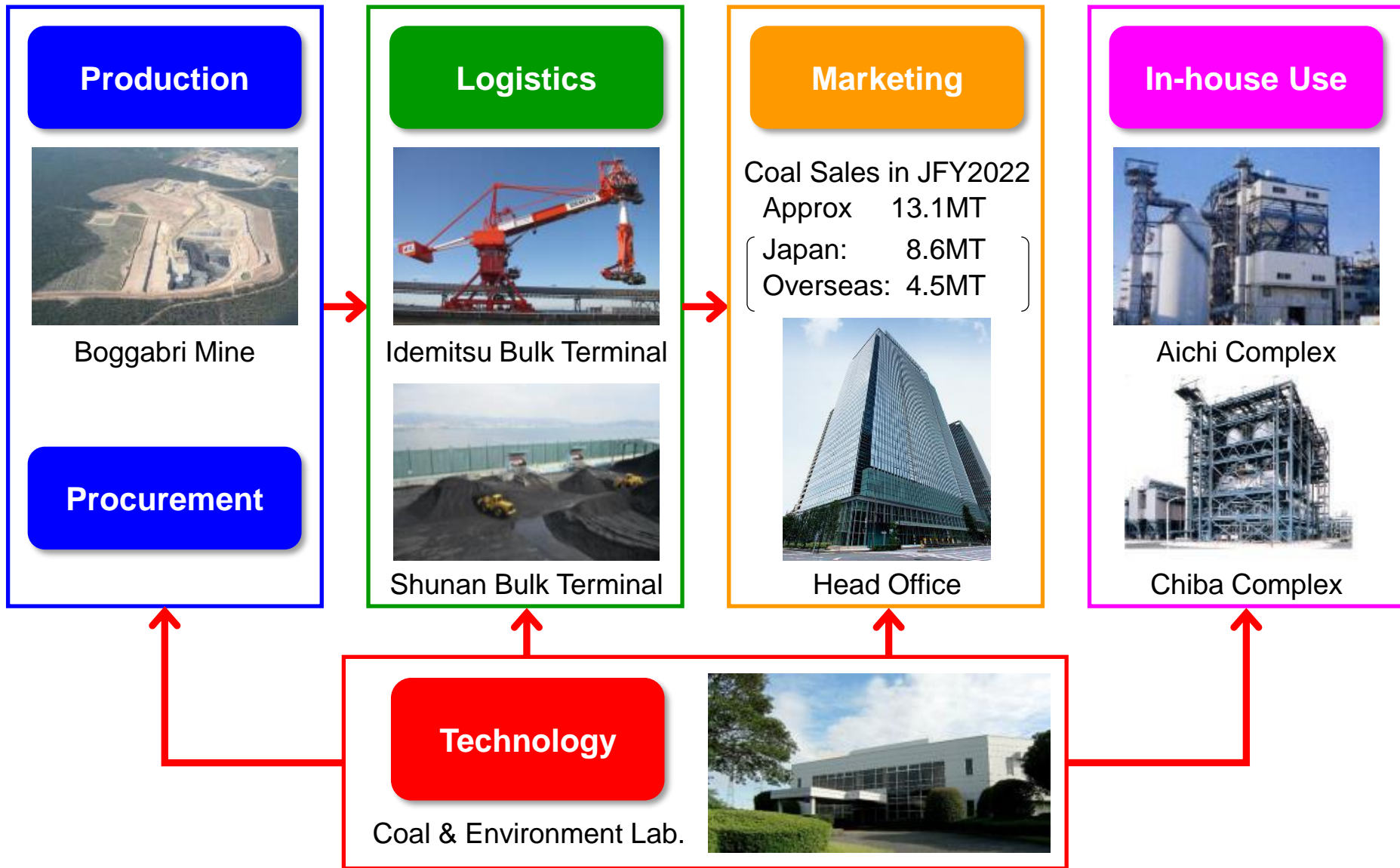
Idemitsu Kosan Co.,Ltd.

Contents

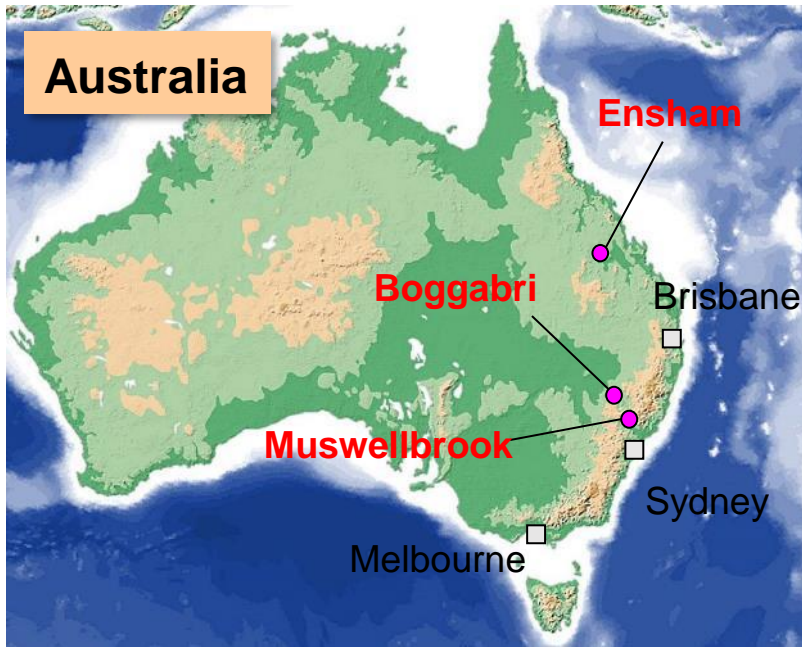
1. Idemitsu's Coal Business
2. Idemitsu Green Energy Pellet (Black Pellet)
3. Blue Ammonia
4. Carbon Recycling – Carbonation
5. Conclusion

1. Idemitsu's Coal Business

1-1. Idemitsu's Coal Business



1-2. Energy transition policy of Idemitsu



	Boggabri	Ensham	Muswellbrook	Maninau
Annual Production	6.5 MT	4.0 MT	0.8 MT	4.0 MT
Equity	80%	85%	100%	30%
Status	Continuation	Sale of its stake	End of mine life	Sale of its stake

Idemitsu continues coal production at Boggabri mine for stable supply.

1-3. Requirements for fuel in transition period

Similar handling
properties to coal

Good affinity with
coal in co-firing

Start from smaller
size facilities

No need for
big technical challenges

High co-firing ratio with coal will contribute to largely reduce CO₂ emission.

2. Idemitsu Green Energy Pellet (Black Pellet)

2-1. What is black pellet ?



Wood scraps



Sawdust

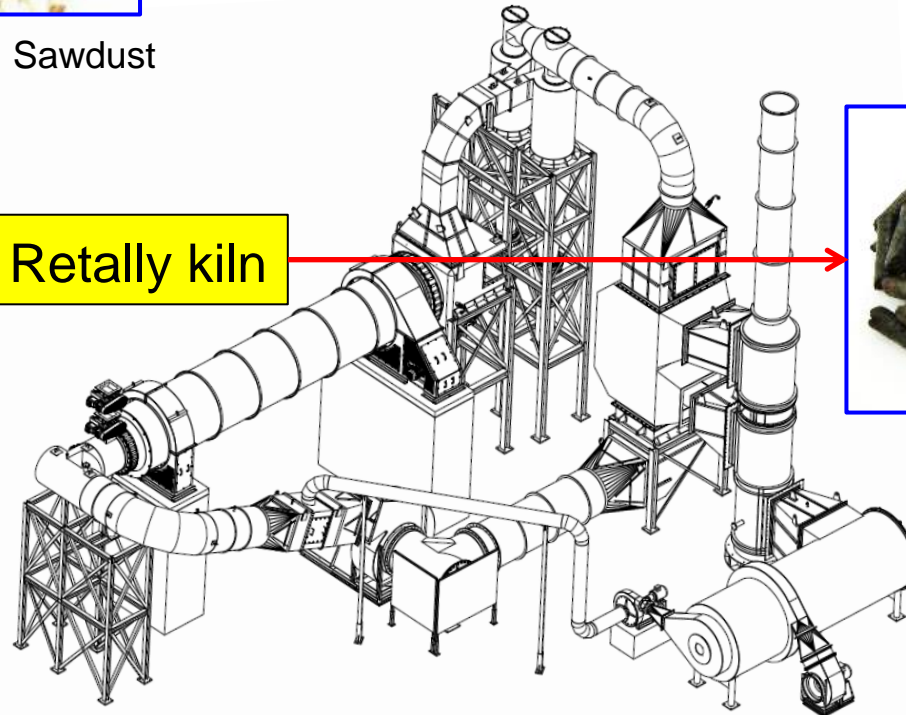
- ❑ Black pellet is produced through the mild pyrolysis process performed at temperature of 200-300°C in inert atmosphere.

Pelletizer

White pellet



Retally kiln

Black pellet



Black pellet is fuel with high CV produced by torrefaction of wood pellet.

2-2. Comparison between black and white pellet

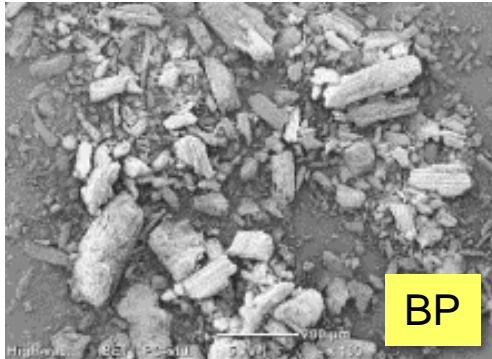
	Black pellet	White pellet
Appearance		
Calorific value, kcal/kg	5,500 - 4,300	4,000 - 3,600
Logistics efficiency	High	Medium
Storage	Outdoor	Indoor (Silo, Warehouse)
Grindability	Good	Medium
Suitability for co-firing	○	△

Black pellet is the most suitable biomass fuel for co-firing with coal.

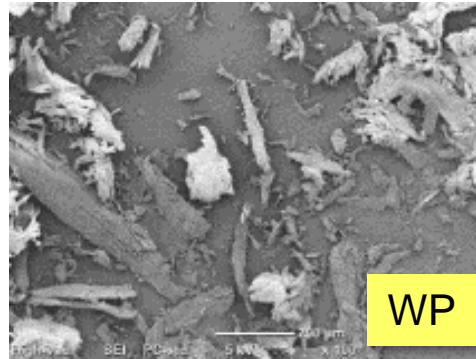
2-3. Advantages of black pellet

- ❑ Calorific value : High
- ❑ Grindability : Good

Appearance after grinding



Granular like coal



Fiber shape

- ❑ Waterproof : Good

Since black pellet does not collapse with water, additional facilities such as silo and warehouse are not needed for the storage.

Change of appearance after wetting

	Black pellet	White pellet
0 min		
1 min		
1 day		

2-4. Commercial plant in Vietnam

- ❑ Feedstock : Woody biomass (Acacia)
- ❑ Technology : TSI's rotary kiln
- ❑ Capacity : 120,000 ton/year



2-5. Completion ceremony - 2023.7.28



2-6. Production facilities – Torrefaction plant



2-7. Production facilities - Silo



2-8. Site video



2-9. Utilization of domestic biomass



Shunan City

Local industry development
by effective use of
city-owned forestry

Companies

**Idemitsu, Tokuyama
Tosoh, Marubeni**

Biomass use at their coal
boilers in Shunan area

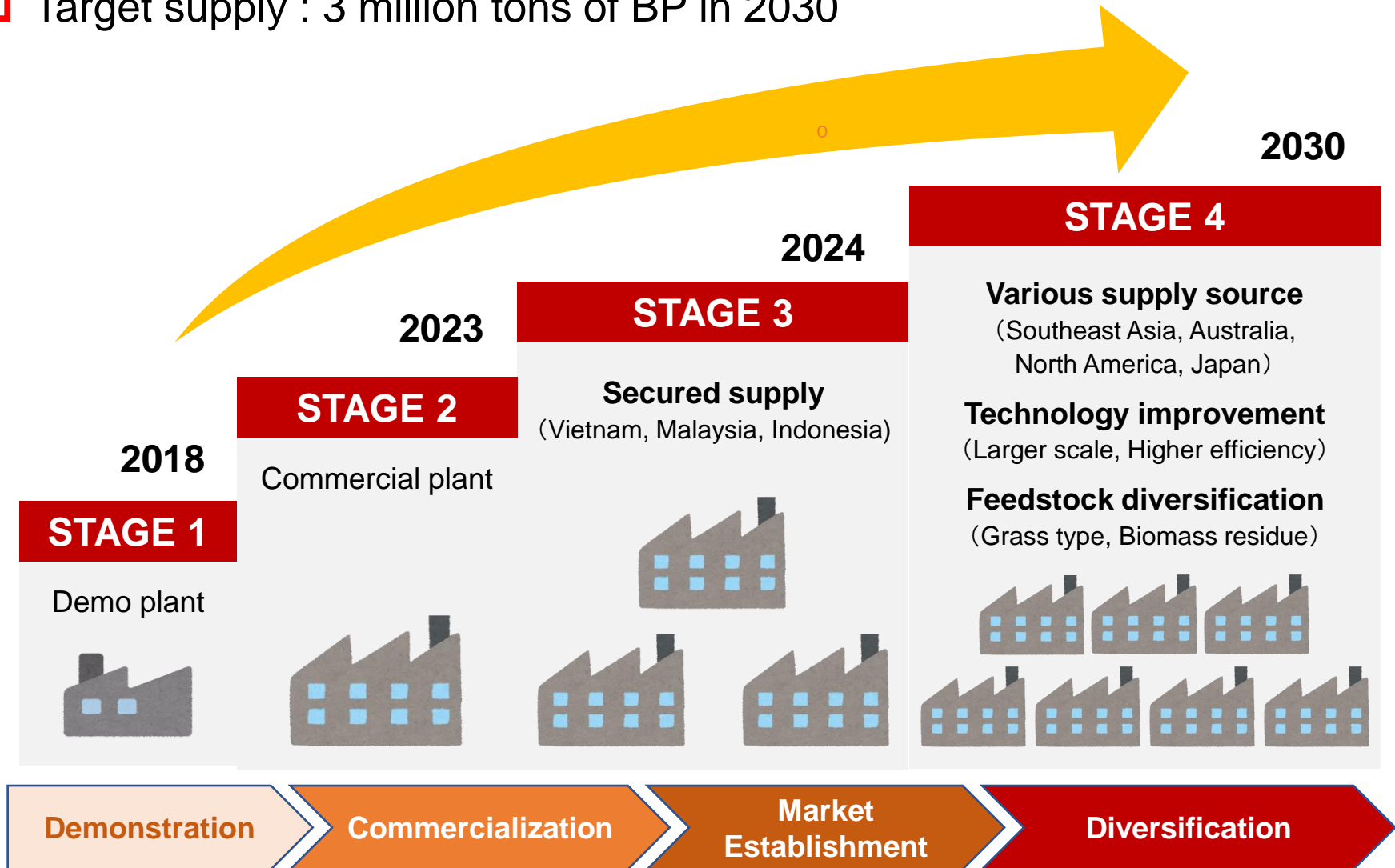


As joint activity, test plantation of fast-growing trees is on going at the city-owned land.

Effective use of both imported and domestic biomass is important to increase the supply of black pellet.

2-10. Business development plan

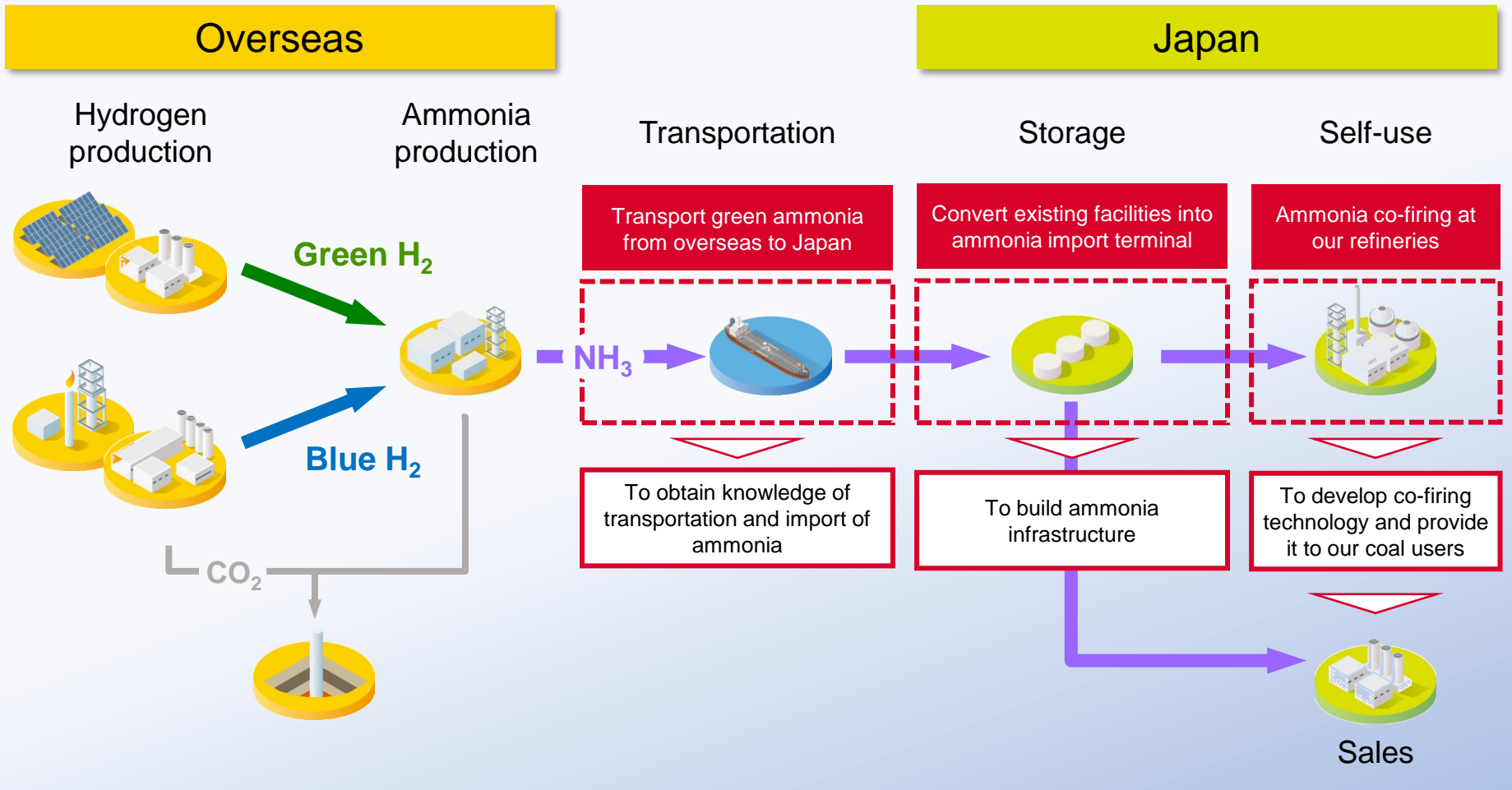
Target supply : 3 million tons of BP in 2030



3. Blue Ammonia

3-1. Development of ammonia supply chain

- Idemitsu is developing the ammonia supply chain for Japanese users utilizing sources from overseas.



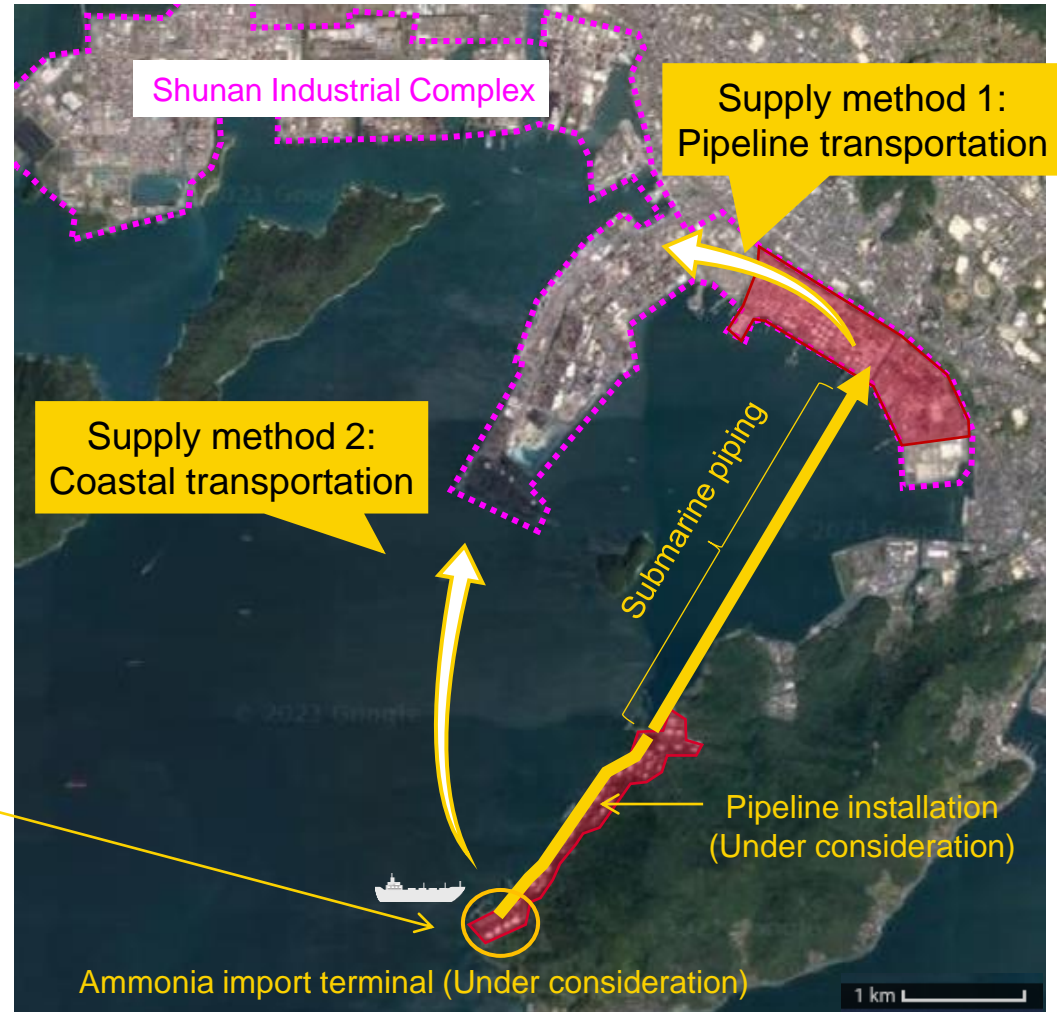
3-2. Ammonia import terminal at Shunan Complex

- Feasibility study is carried out considering to convert existing LPG tanks and jetty into ammonia terminal.

LPG Jetty



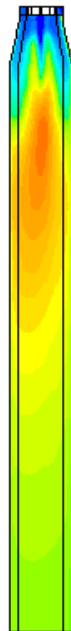
LPG Tanks (Refrigerated Storage Tanks)



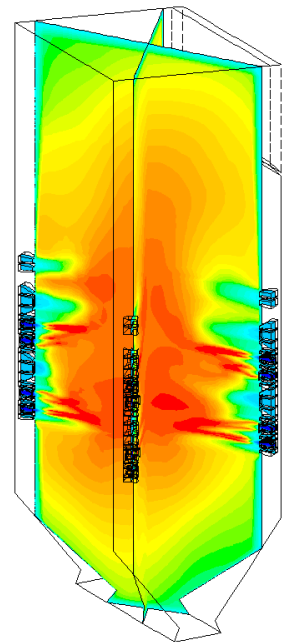
3-3. Ammonia co-firing tests

- ❑ Idemitsu is conducting bench and actual scale combustion tests in order to establish ammonia co-firing technology for coal boilers at general industries.
- ❑ Numerical simulation is also carried out for applying various test data to other boilers at our coal users.

Bench scale test furnace

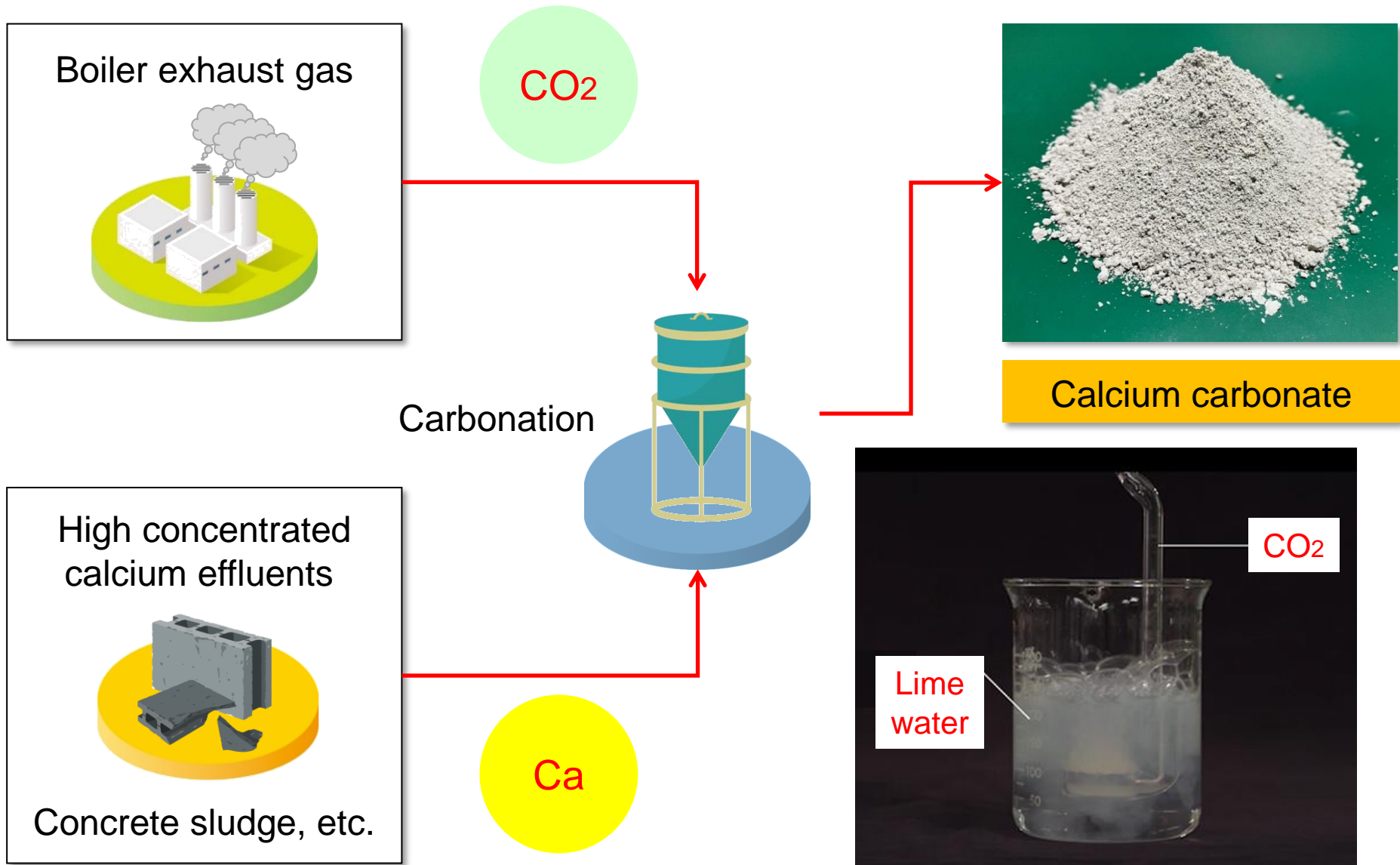


Actual scale coal-fired boiler (140t/h)



4. Carbon Recycling - Carbonation

4-1. CO₂ fixation by carbonation



4-2. Application to road paving material



Idemitsu focused on the replacement of limestone in road pavement.

4-3. Road pavement test



Synthetic calcium carbonate and asphalt for light colored pavement (Idemitsu Meibright A) were used for the test paving at our laboratory.

5. Conclusion

5. Conclusion

Black pellet

- ❑ Commercial production of black pellet (Capacity: 120,000 ton/year) will start soon in Vietnam.
- ❑ Idemitsu is challenging to expand the BP production to 3 million tons in 2030 through a lot of overseas and domestic projects.
- ❑ We believe that BP is the most realistic and efficient solution in energy transition because it has very good affinity with coal in co-firing.

Blue ammonia & Carbon recycling

- ❑ Idemitsu is also developing the blue ammonia supply chain and the carbon recycling technologies.
- ❑ These activities along with BP will strongly secure the achievement of carbon neutrality.

Idemitsu provides effective solutions to contribute the energy transition.

Thank you very much for your kind attention !