

The Net-Zero Game Changer Initiatives



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I. Introduction



✓ Incheon Port Authority(IPA)? ...

IPA was established in 2005 based on the Port Authority Act as a public enterprise under the Ministry of Oceans and Fisheries in South Korea, with the aim of developing Incheon Port into a competitive maritime logistics hub



Infrastructure construction
(International Ferry Terminal and etc)

Location Songdo(Incheon city)

Port hinterland development and supply

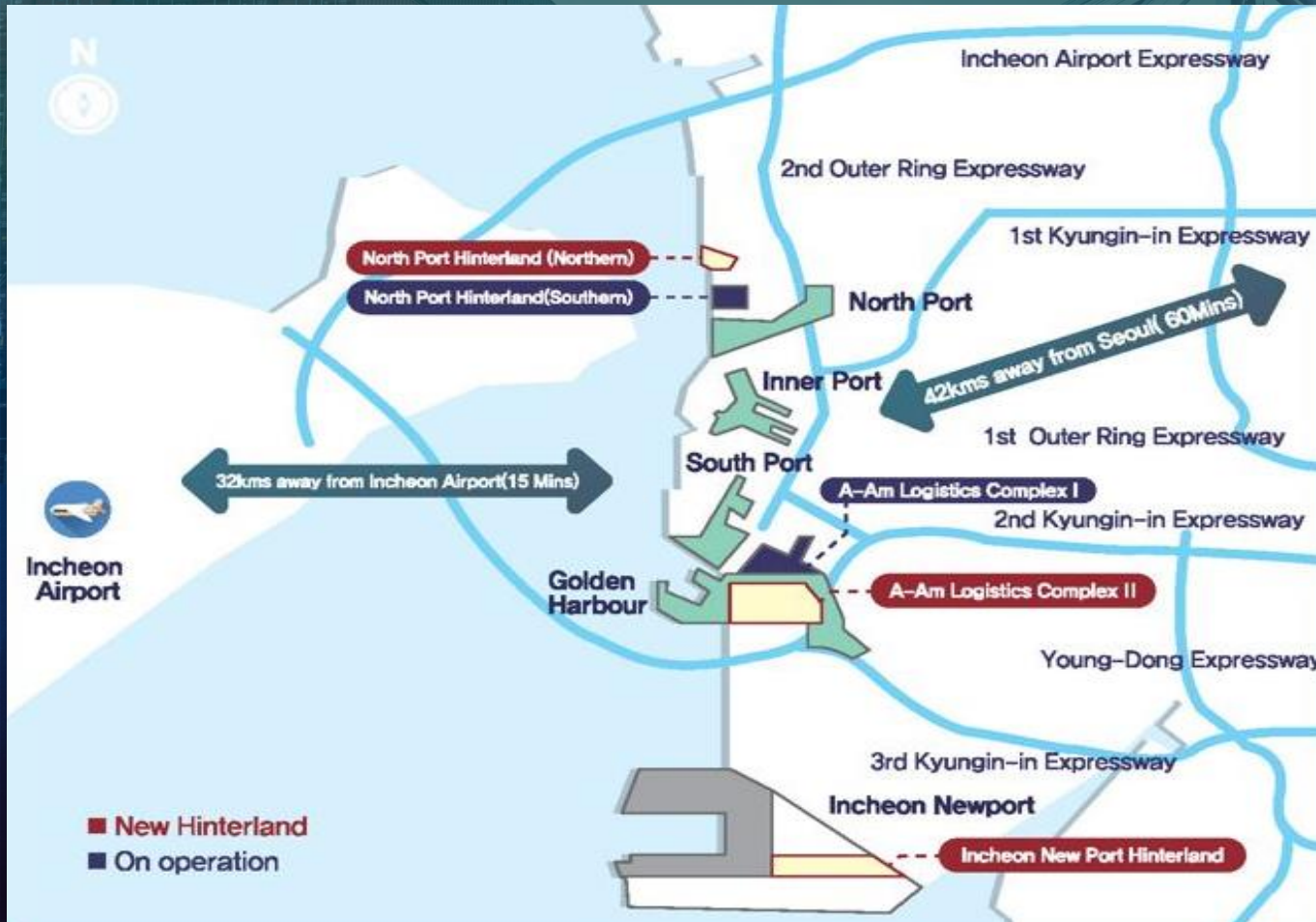
Organization 3 Division, 5 Office
13 Department
290 Employee

Port management and operation

Asset About 2.7B \$ ('22Y)

I. Introduction

Incheon Port Overview



Accessibility

- (Kyung-in Exp.) **Within 20 Mins.**
- (Outer Ring Exp.) **Within 30 Mins.**
- (Airports) **Within 15~30 Mins.**
- Easy Connection with 1st/2nd/3rd Kyung-In Exp. and Young-Dong Expressway

Nearest Industrial Zone

 **290** National / Local Ind. Zones
Easy Access To Incheon Port

 **Within 90minutes**
Incheon Port to all Ind. Zones
At Metropolitan Area

Refrigerated Warehouses

 **98(30%)** Refrigerated warehouses
At Metropolitan Area

 **Within 90minutes**
Connection to Incheon port
And Refrigerated warehouses



II. Background and Strategy for Green

① Background for Net-Zero

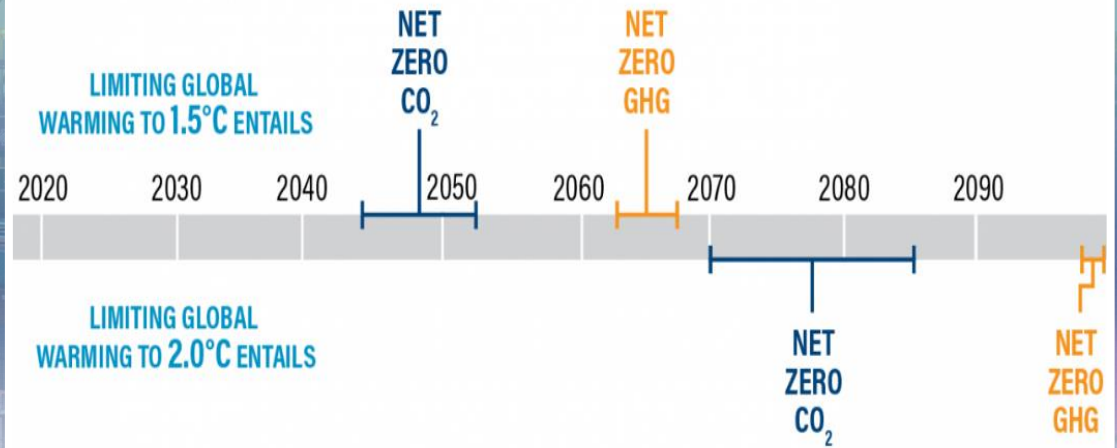
◇ The Paris Climate Agreement

- Established during the 21st Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) held in Paris, France in 2015, aimed to pursue efforts to maintain the global average temperature rise by the end of the 21st century to below 2°C and to strive for 1.5°C or lower
- Countries worldwide submitted Long-Term Low-Emission Development Strategies (LEDS) containing greenhouse gas reduction targets until 2050 by 2020, as well as Nationally Determined Contributions (NDC) every five years.

Carbon Neutrality refers to achieving net-zero emissions of CO₂ among the six major greenhouse gases, while Climate Neutrality aims at net-zero emissions of all six major greenhouse gases. Net-Zero denotes the neutralization of net emissions from any entity. GHG (Greenhouse Gas) commonly refers to the six major greenhouse gases

- However, the Korean government defines "Carbon Neutrality" practically as "Climate Neutrality" (net-zero emissions for all six major greenhouse gases)
- The Basic Law on Carbon Neutrality and Green Growth aims to address climate crisis through carbon neutrality and green growth strategies

Global timeline to reach net-zero emissions



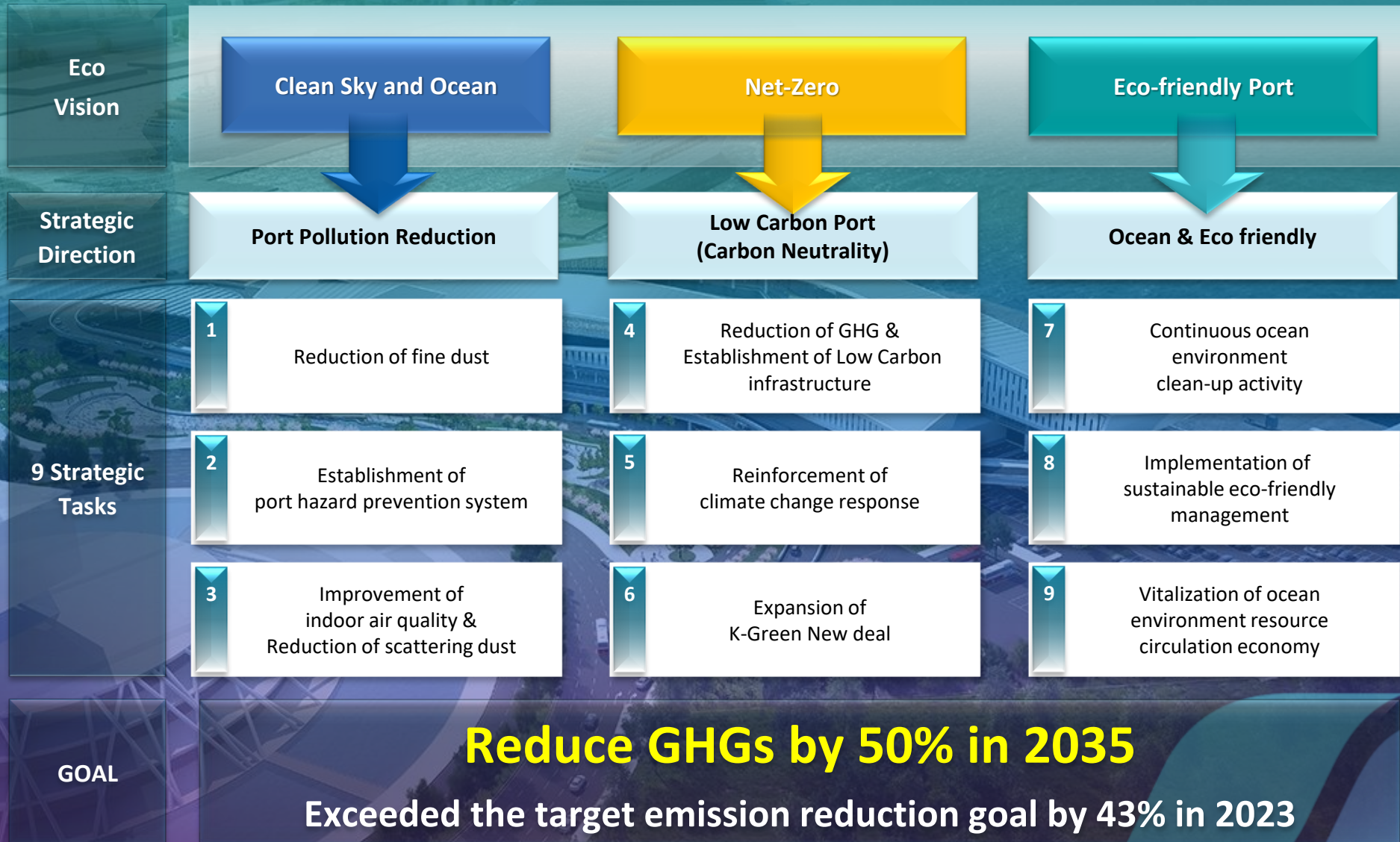
Source: IPCC Special Report on Global Warming of 1.5°C

WORLD RESOURCES INSTITUTE

[Timeline for Achieving Carbon Neutrality by Temperature Targets]

II. Background and Strategy for Green

② Incheon Port's Net-Zero Strategy





III. Net-Zero Initiatives

III-1. MARITIME

1.1 Vessel Speed Reduction

1.2 AMP Vitalization

1.3 LNG Powered Vessels

III-2. VEHICLE/PORT EQUIPMENT

2.1 Aged Vehicle Management System

2.2 Reduction of Emissions

2.3 Equipment Conversion

III-3. RENEWABLE ENERGY

3.1 Solar Power Plant

3.2 Cold Chain Cluster



III Net-Zero Initiatives

① Maritime: **1.1 Vessel Speed Reduction**

A Container Ship can achieve up to
a **60% reduction** in maximum
Fine dust emissions

as of December 2020, according to the Ministry of Ocean and Fisheries

< Vessel Speed Reduction Program >

- Vessels entering ports navigate at speeds below the recommended speed in slow-speed navigation zones
 - **Container ships & Car Carriers** Operates at **12 Knots**
 - **Other Vessels** Operates at **10 Knots**

Participating vessels receive incentives equivalent to reduced port fees, with a **15-30% discount**

III Net-Zero Initiatives

① Maritime: 1.2 AMP Vitalization

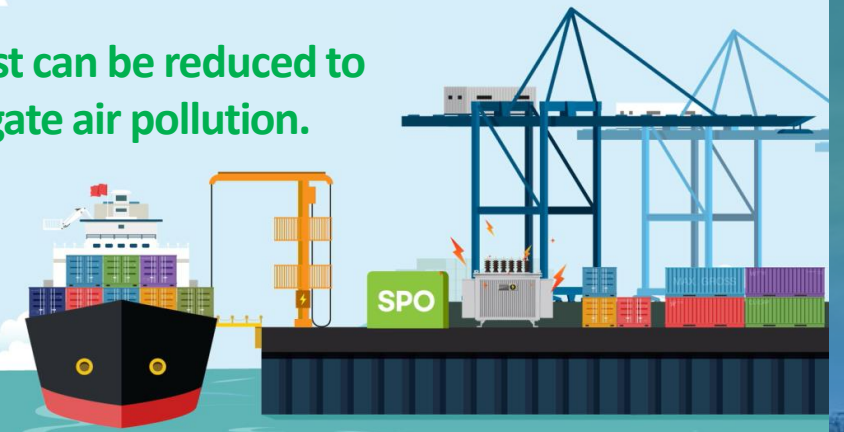


- Sulfur Oxides
- Nitrogen Oxides
- Fine Dust

Vessels operating their own fuel-powered generators (B.C., diesel) to meet essential electricity needs even while docked

Resulting in significant emissions of air pollutants (SO_x, NO_x, fine dust, etc.) and greenhouse gases (CO₂, etc.) compared to conventional vessel fuel generators.

Fine dust can be reduced to mitigate air pollution.



Reduction Effect With the use of AMP
(Alternative Maritime Power)

Up to
97%

- SO_x
- NO_x
- Fine Dust

Air Pollutants

40%

• CO₂

Greenhouse Gas

* **AMP(Alternative Maritime Power):** Facilities for supplying power from shore to meet the power needs of docked vessels

III Net-Zero Initiatives

① Maritime: 1.3 LNG Powered Vessels



- Introduction and operation of **the first LNG-powered vessel in Northeast Asia**, the 'Eco-Nuriho', which has been utilized as an Incheon Port guide ship since 2013



Eco-Nuriho
CO2 reduction
=100 TON



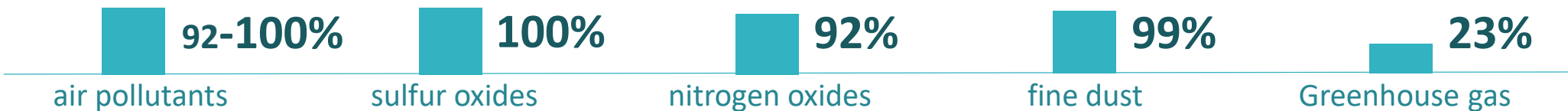
Carbon absorption
per year by
20,000 pine trees



- The construction of **the first domestically produced LNG-powered pilot vessel** (2019–2021), the 'Songdo-ho'.
- The Aged pilot vessel was replaced with an eco-friendly pilot vessel (LNG-fueled vessel)

Reduction Effect

With the introduction of LNG-powered vessels, compared to existing vessels (based on MDO 1% S standard)



III Net-Zero Initiatives

② Vehicle/Port Equipment: 2.1 Aged Vehicle Management System



During the government's seasonal management period (December to March), the operation of grade 5 aged vehicles is restricted

BUT! Ports remain a blind spot in this management

Among the three major emission sources at ports (ships, handling equipment, vehicles), there is an increasing need to strengthen the management of vehicles

The First Nationwide Port Access Aged Vehicle Management System



Establishment and Pilot Operation of the First Nationwide **Port Access Aged Vehicle Management System** (since Dec. 2020)

- 1** Identification of regulatory improvements for expansion and normal operation across all ports
- 2** Notification and access history tracking for aged vehicles entering ports
- 3** On-site guidance activities for drivers of aged vehicles and information on government support programs

* Aged vehicles: grade 5 emission vehicles (vehicles corresponding to Euro1 to Euro3 standards)

III Net-Zero Initiatives

② Vehicle/Port Equipment: 2.2 Reduction of Emissions



To reduce fine dust emissions from diesel vehicles, IPA is promoting the installation of emission reduction devices

But! To maintain the performance of emission reduction devices (DPF),

Post-maintenance such as filter cleaning is necessary



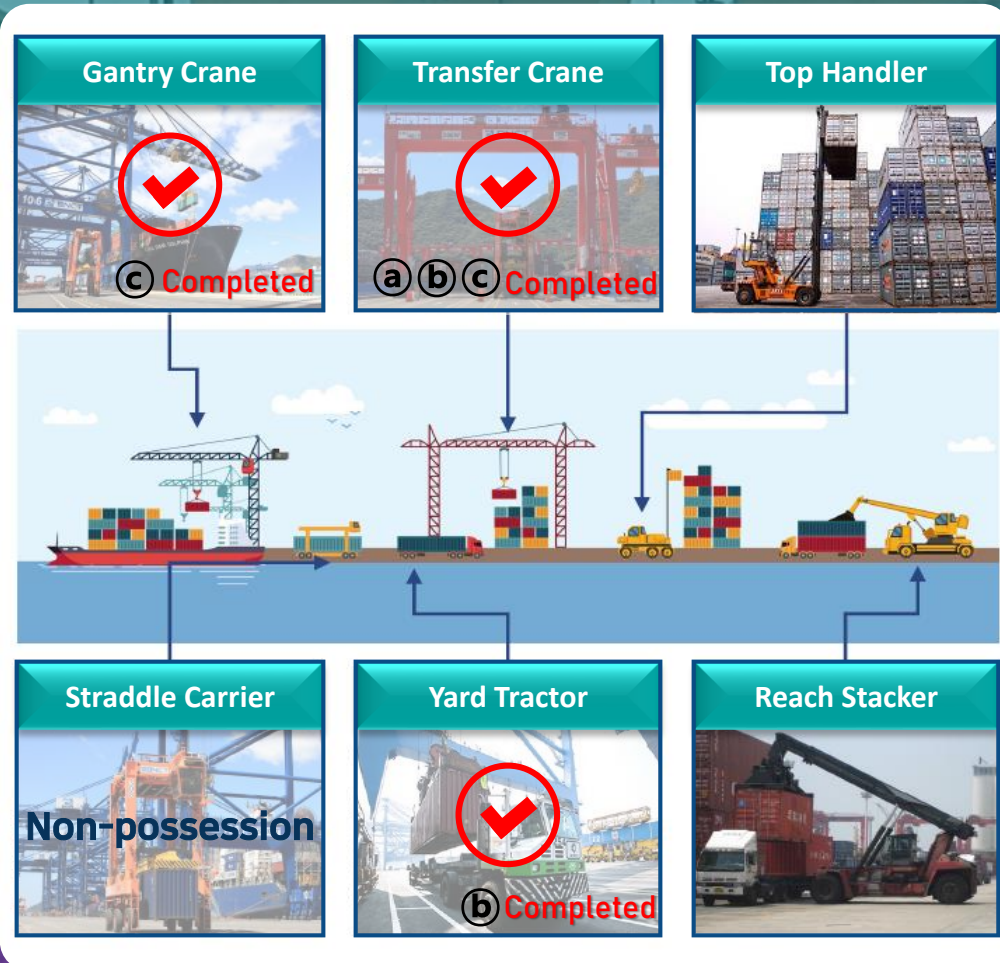
Joint Performance Inspection and Filter Cleaning Service for DPF-Equipped Vehicles Accessing Incheon Port by Related Agencies

Encouraging Participation in Post-Maintenance for DPF equipped Vehicles Guidance Activities and Information on government Support Programs

* DPF (Diesel Particulate Filter): An exhaust gas aftertreatment device that can reduce particulate matter (PM) by over 80%

III Net-Zero Initiatives

② Vehicle/Port Equipment: 2.3 Equipment Conversion



80% Reduction in fine dust emissions

Eco-Engine DPF Eco-Fuel

Eco-Friendly Measures	Fine Dust Reduction	Nitrogen Oxide Reduction	Greenhouse Gas Reduction
Ⓐ Diesel Equipment with DPF	O	X	X
Ⓑ Diesel Equipment with SCR	X	O	X
Ⓒ Fuel Conversion(Diesel → Electricity)	O	O	O

over **80%** Fine dust NOx
 DPF+SCR attached
 cf. conventional diesel equipment

Reduction effect

100% Fine dust NOx CO2
 Fuel Conversion (Diesel → Electricity)

* Based on direct emission standards, without considering emissions from non-exhaust machinery and indirect emissions.

III Net-Zero Initiatives

③ Renewable Energy: **3.1 Solar Power Plant**

 Electricity generated from the solar plants is capable of providing power for more than 3,400 households



Category	Solar Power(MW)	ESS(WMh)	Completion
IPA solar power plant	0.88(0.57/0.31)	-	1 st Phase 2013 2 nd Phase 2020
Naum solar power plant	0.08	-	2018
IPA north port solar power plant	0.99	3	2019
IPA 2nd solar power plant	0.72(0.55/0.17)	-	1 st Phase 2021 2 nd Phase 2022
Marine solar power plant	0.35	1.6	2021
IPA inner port berth 6 solar power plant	0.05	0.4	2020
IPA north port 2nd solar power plant	0.61	-	2022
IPA north port 3rd solar power plant	0.90	-	2023
Total	4.58	5	-

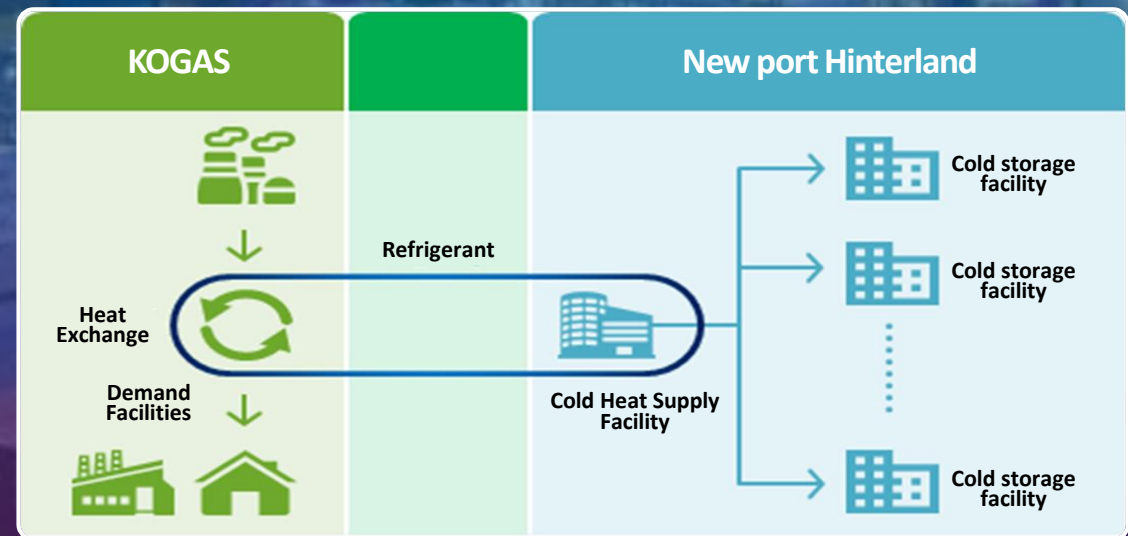
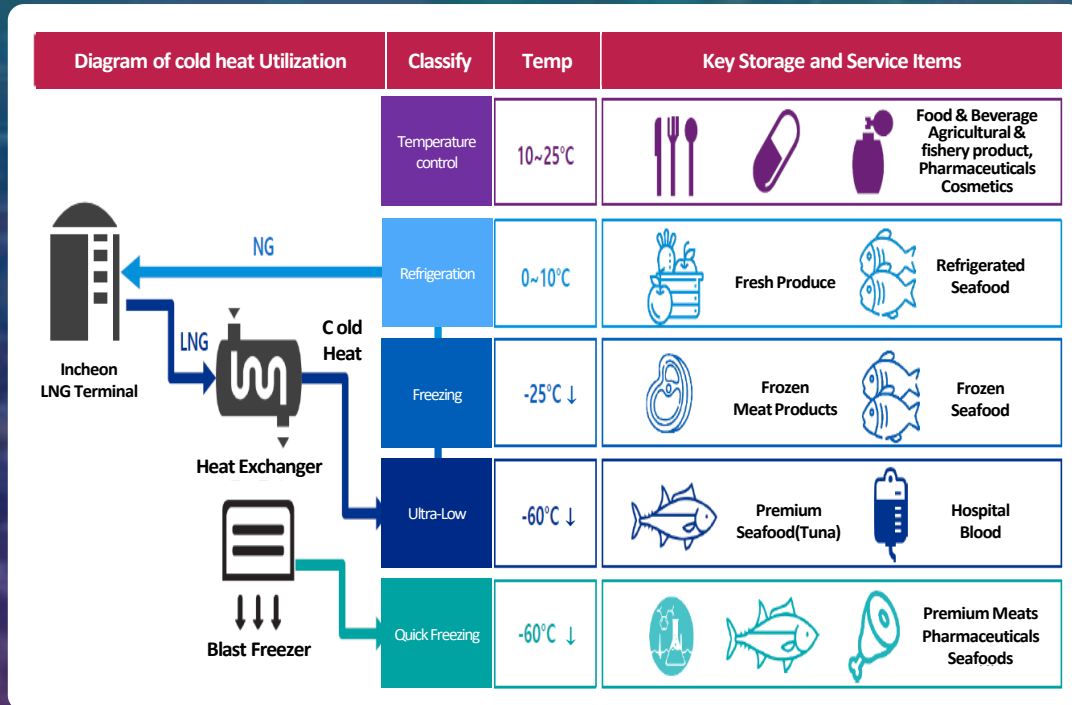
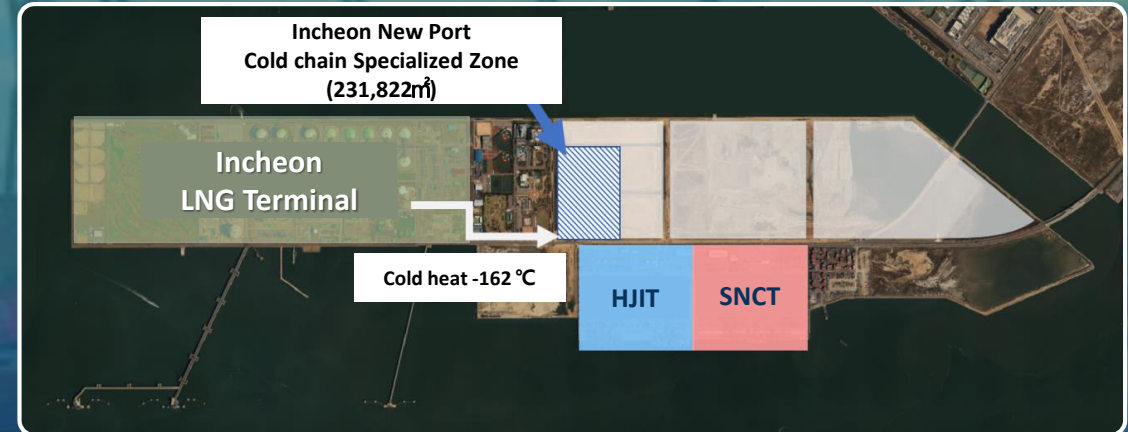
III Net-Zero Initiatives

③ Renewable Energy: 3.2 Cold Chain Cluster



Establishment of Cold Chain Cluster (Refrigerated Logistics Centers)

- Utilization of **discarded** LNG cooling energy (-162°C)
- Min. **30% reduction** in maintenance costs including electricity fees



Incheon Port will continue to carry out
The innovative Net-Zero businesses
As a **Game Changer**
Thank you!

