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ULSAN PORT AUTHORITY

Port Infrastructure Innovation

Achieved Through Remodeling and Maintenance Dredging of Aging Berths at Ulsan Port

Infrastructure

Safety and Efficiency of Ulsan Port Enhanced by Onshore Performance Improvement and Offshore Maintenance Dredging

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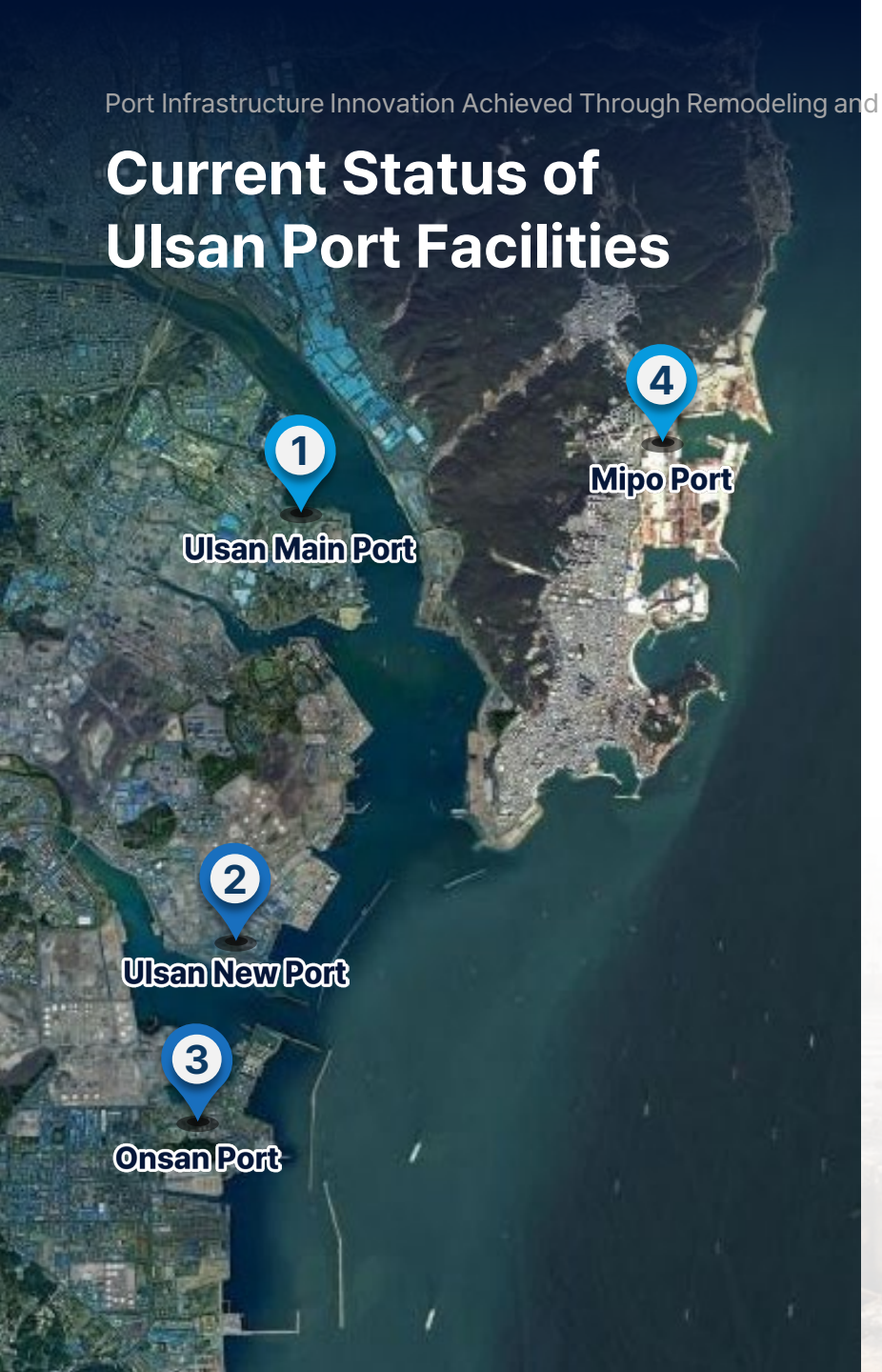
Current Status of Ulsan Port Facilities



Ulsan Port, a Hub for Industrial Logistics and Large Vessels,
Centered Around Liquid Cargo and Automobiles

Quay Length	Berthing Capacity	Water Area
22,427m	**123 vessels** 4,785,500 DWT	**116km²**

Classifi-cation	① Ulsan Main Port Multi-purpose Port Complex	② Ulsan New Port Northeast Asia Energy Hub	③ Onsan Port Logistics Hub for National Industrial Complex	④ Mipo Port Support Port for Shipbuilding Industry
Overview				
Length	10,085m	7,059m	5,073m	210m
Berthing Capacity	60 vessels (1,815,500 DWT)	29 vessels (1,143,000 DWT)	33 vessels (1,807,000 DWT)	1 vessel (20,000 DWT)
Cargo Type	Automobiles, Liquid Chemicals, General Cargo, Coal, etc.	LNG, Liquid Chemicals, Containers	Liquid Chemicals, Other Ores, Containers	Steel Products

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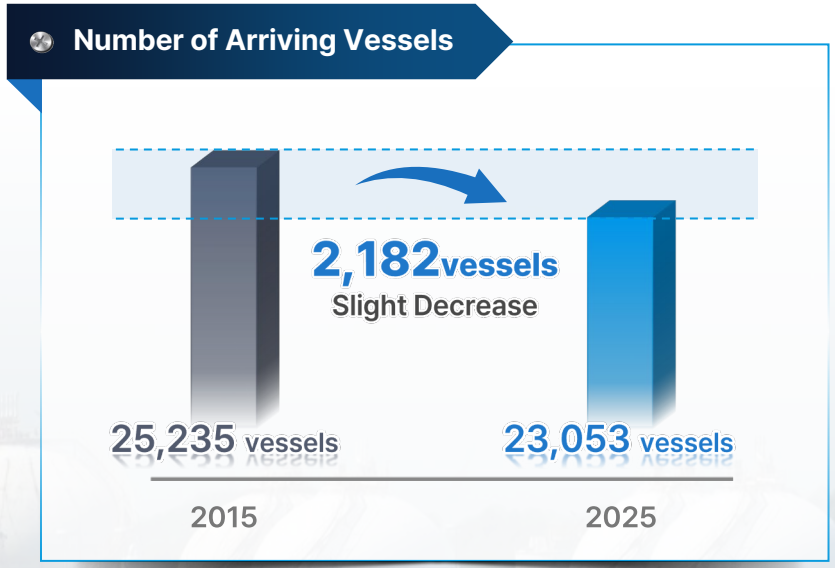
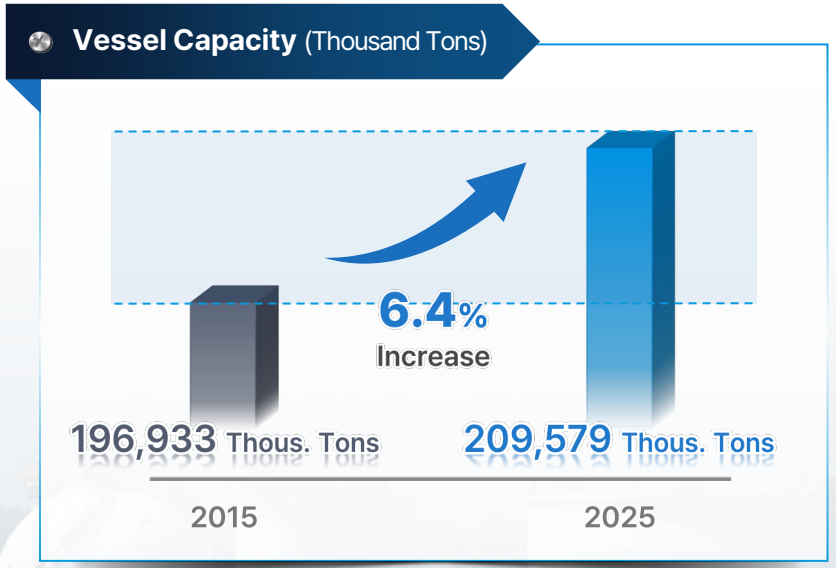
Background

Dawn of the Megaship Era

While the number of arriving vessels has decreased, vessel capacity has increased, shifting Ulsan Port's logistics environment toward "fewer, larger ships."

Comparison Data of Vessels and Cargo Volume at Ulsan Port





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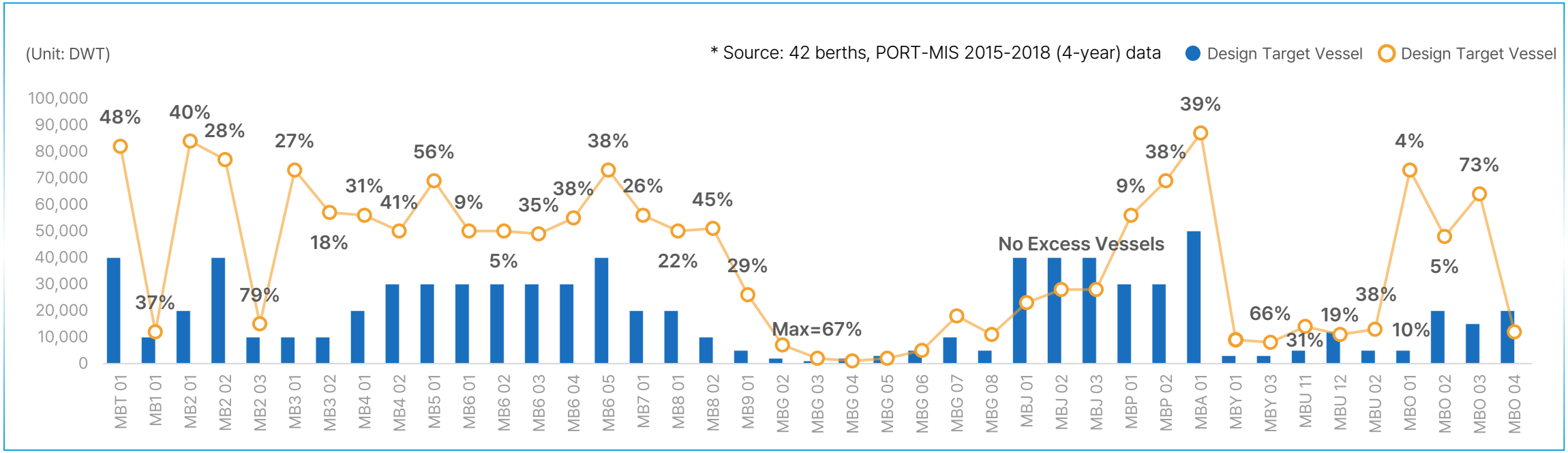
Background

Limitations of Existing Infrastructure

Numerous aging mooring facilities built over 30 years ago remain in use, and vessels exceeding the design capacity frequently arrive at the port

· Analysis Table of Excess Vessel Arrivals/Departures at Ulsan Port



An analysis of 42 berths confirmed the arrival of vessels exceeding capacity at multiple berths, urgently requiring measures to secure mooring stability.

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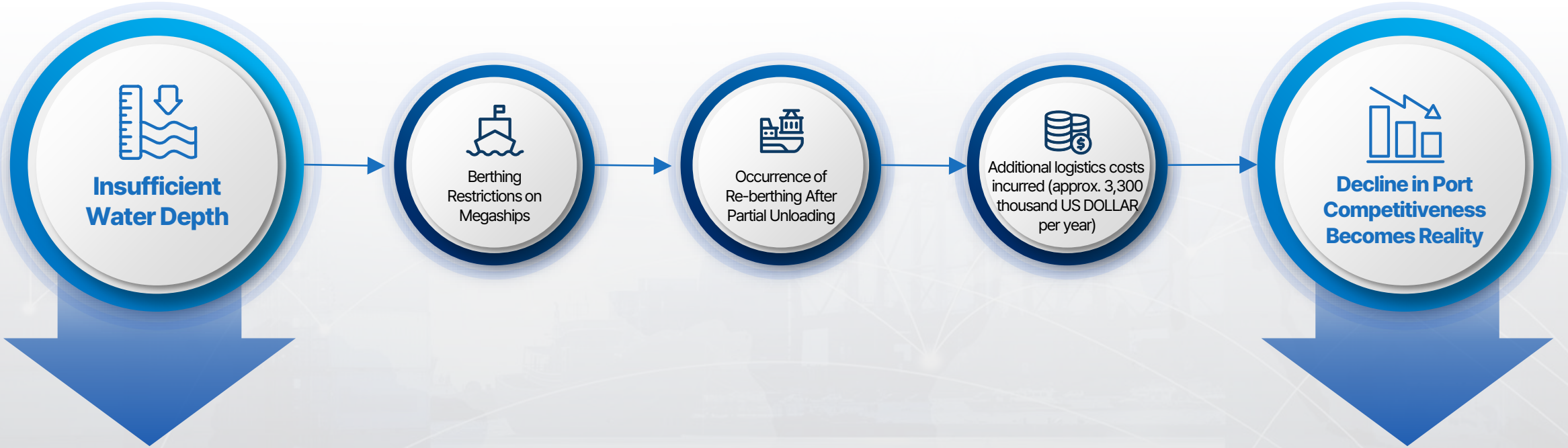
Background

Limitations of Existing Infrastructure

Safety of large vessels cannot be guaranteed due to insufficient water depth and limited mooring capacity

Berthing restrictions have led to an increase in
cases where vessels are required to first unload part of their cargo at other berths before re-berthing.*



* (Berth S) An additional logistics cost of approximately 3,300 thousand US DOLLAR is incurred annually due to demurrage charges, ship waiting charges, and service costs (towage, pilotage, etc.).

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Objectives

Building Sustainable Ports

Need to expand port facilities for the safe berthing and handling of megaships

For Megaships Capable of Safe Berthing and Handling
Sustainable Port Infrastructure Need for Expansion

- Responding to the increasing size of vessels and structural shifts in cargo volumes
- Securing port competitiveness and operational safety

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Implementation Efforts

1 Adopting a Remodeling Strategy Tailored to Ulsan Port Conditions

Structural Limitations

Adjacent to hinterland industrial complexes (factories, etc.) and limited port limits

+

Structural limitations in pursuing full-scale redevelopment like other ports*

* (Example) For Busan Port, relocation is relatively easy after building a new berth, but for Ulsan Port, industrial facilities (factories, etc.) are densely packed near the berths, presenting severe constraints on berth relocation and redevelopment.

Response Strategy

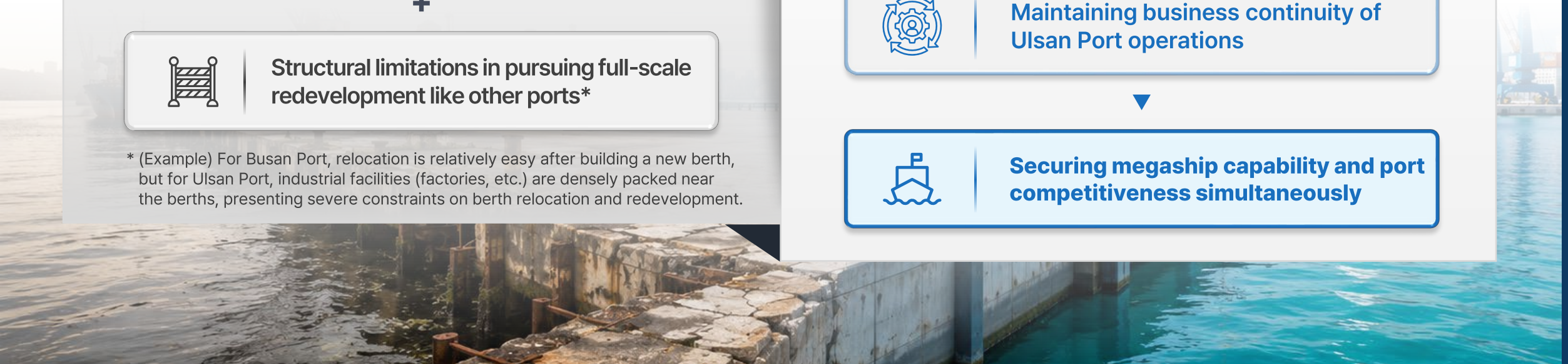
Adopting a remodeling strategy utilizing existing assets

▼

Maintaining business continuity of Ulsan Port operations

▼

Securing megaship capability and port competitiveness simultaneously



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Implementation Efforts

1 Adopting a Remodeling Strategy Tailored to Ulsan Port Conditions

Solutions for Improving Berth Capacity

Full Redevelopment

- Berth operations suspended during redevelopment
- Astronomical costs required

Inefficient / Uneconomical

Remodeling Aging Berths

- Reduces costs and project duration by utilizing existing assets
- Maintains port operation continuity

Achieves both business continuity and infrastructure improvement

Status Quo

- Decline in berth safety
- Decline in port competitiveness

Unsustainable

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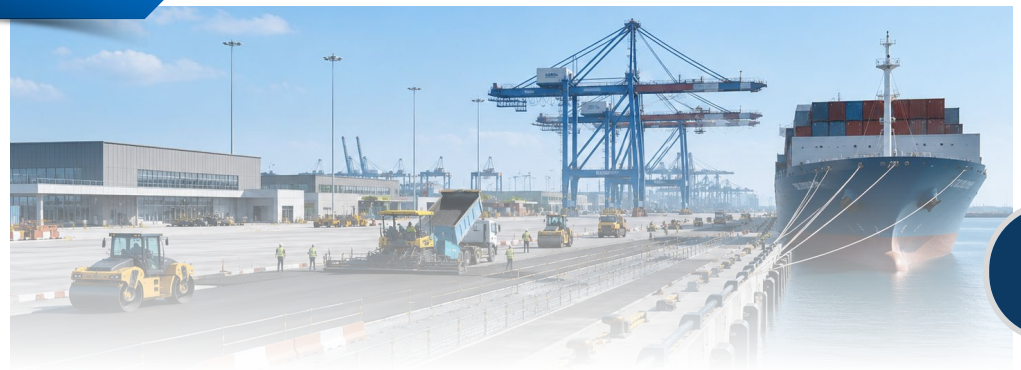
Implementation Efforts

2 Implementing Integrated Onshore and Offshore Infrastructure Improvements

Pursued as an integrated infrastructure improvement project

that bundles onshore (performance improvement) and offshore (maintenance dredging) into a single package, rather than simple facility repairs

Onshore



To secure mooring safety **for megaships**

Conducting large-scale improvement works

Offshore

To secure water depth **for megaships**

Conducting large-scale dredging works

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Implementation Efforts

2 Implementing Integrated Onshore and Offshore Infrastructure Improvements

Classification	Overview of Ulsan Port Onshore-Offshore Improvement Project		
Phase	**Phase 1 (~'23)**	**Phase 2 (~'24)**	**Phase 3 (~'26)**
Onshore	Basic & Detailed Design	Quay & Berthing Facility Reinforcement (1st)	Quay & Berthing Facility Reinforcement (2nd)
Offshore	Dredging Work Design	Dredging Work Execution (140,000 m³)	Dredging Work Execution (360,000 m³)

Onshore Overview of Performance Improvement Works

Construc-tion Cost	Approx. 11.39 million USD
Construc-tion Period	Dec 2023 – Feb 2027
Scope of Work	Securing mooring safety for megaships

- Reinforcement of superstructure (22 berths)
- Seismic reinforcement (5 berths), etc.

Overview of Large-scale Dredging Works Offshore

Construc-tion Cost	Approx. 9.88 million USD
Construc-tion Period	Nov 2024 – Nov 2026
Scope of Work	Securing safe arrival conditions for megaships

- Dredging of channels, turning basins, and berth fronts, etc.
- Dredging Volume / Area: 496,000 m³ / 502,000 m²

Implementing an onshore-offshore integrated improvement project with a total budget of approximately $21,266,000 USD

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Implementation Efforts

3 Realizing a Construction Model Without Operational Disruption via Stakeholder-driven Collaboration

Obstacle Challenges in concurrently maintaining Ulsan Port operations and executing improvement projects without the cooperation of port businesses and organizations

Classification	Operational Restrictions by Stakeholder	Impact on Construction Execution
Pilots	Restrictions on construction to ensure safe arrivals and departures	Dredging restricted in vessel transit zones
VTS	Restrictions on offshore construction due to channel adjustments and traffic control	Increased waiting times and Reduced operational efficiency
Shipping Lines	Prioritizing vessel operations such as berthing schedule adjustments	Difficulties in managing and predicting construction schedules
Stevedores	Schedule management based on berth and cargo handling operations	Construction delays due to restricted berth usage

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Implementation Efforts

3 Realizing a Construction Model Without Operational Disruption via Stakeholder-driven Collaboration

Solution Establishing a system to concurrently manage Ulsan Port operations and the improvement project via an integrated Onshore-Offshore Task Force

- Formed an integrated Onshore-Offshore Task Force with about 30 Ulsan Port clients and related companies
- Operated regular communication channels and hotlines

→ Laying the foundation to stably implement **onshore-offshore improvement projects (remodeling)** while maintaining port operations

Task Force Participating Companies (30+ companies)

KG 케미칼, CJ 대한통운 korea express, SK 에너지, 고려항만(주), HALLA CEMENT, LS MnM, 대주중공업, HYUNDAI, TAEYOUNG 태영인더스트리, DONGBANG, Vopak, S-OIL, ㈜신흥사

Task Force Meeting (Ad-hoc)

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Implementation Efforts

Phased Execution of Onshore-Offshore Improvement Projects

Onshore

Timely execution of performance improvement works to secure mooring safety for megaships

2024

Performance improvement completed for 16 locations in Ulsan Port

Fenders	60EA
Bollards	126EA
Coping Reinforcement	449m

2025

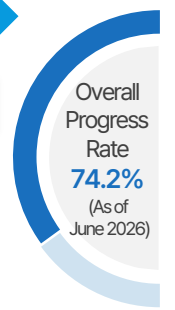
Performance improvement completed for 7 locations in Ulsan Port

Fenders	74EA
Bollards	19EA
Coping Reinforcement	183m
Seismic Reinforcement	338m

2026

Performance improvement underway for 6 locations in Ulsan Port

Fenders	151EA
Bollards	32EA
Coping Reinforcement	240m
Seismic Reinforcement	60m



Offshore

Timely execution of maintenance dredging works to secure safe arrival conditions for megaships

2024

Maintenance dredging completed for 4 locations in Ulsan Port

Ulsan New Port (North Port) 2 Berths	6,435m³
3rd Fairway	196,746m³
1st Fairway	48,963m³

2025

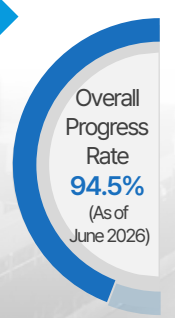
Maintenance dredging completed for 18 locations in Ulsan Port

Ulsan Main Port 12 Berths	143,989m³
Ulsan New Port (North Port) 4 Berths	6,766m³
Approach Channel	10,195m³
3rd Fairway	61,580m³

2026

Maintenance dredging underway for 23 locations in Ulsan Port

Ulsan Main Port 15 Berths	11,584m³
Ulsan New Port (North Port) 4 Berths	6,912m³
Ulsan New Port (South Port) 3 Berths	2,896m³



Continuously expanding the capacity to accommodate large vessels by executing annual performance improvements and maintenance dredging

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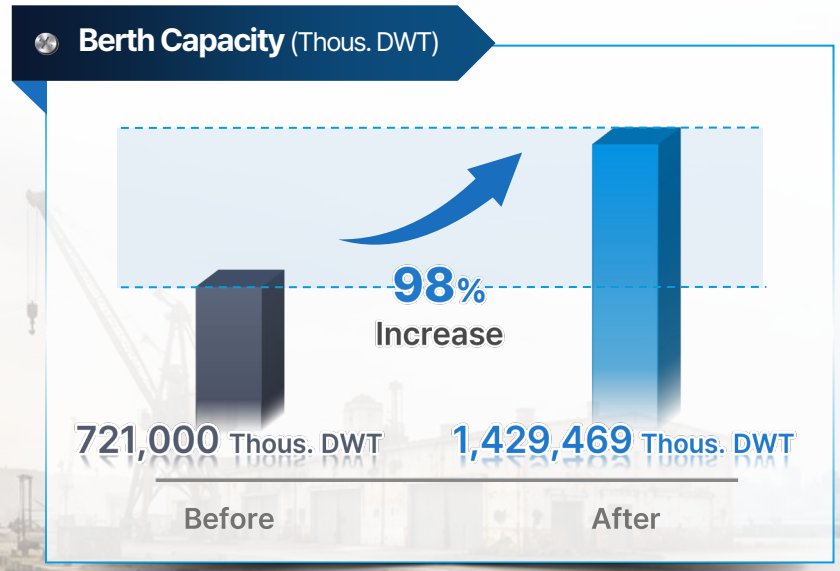
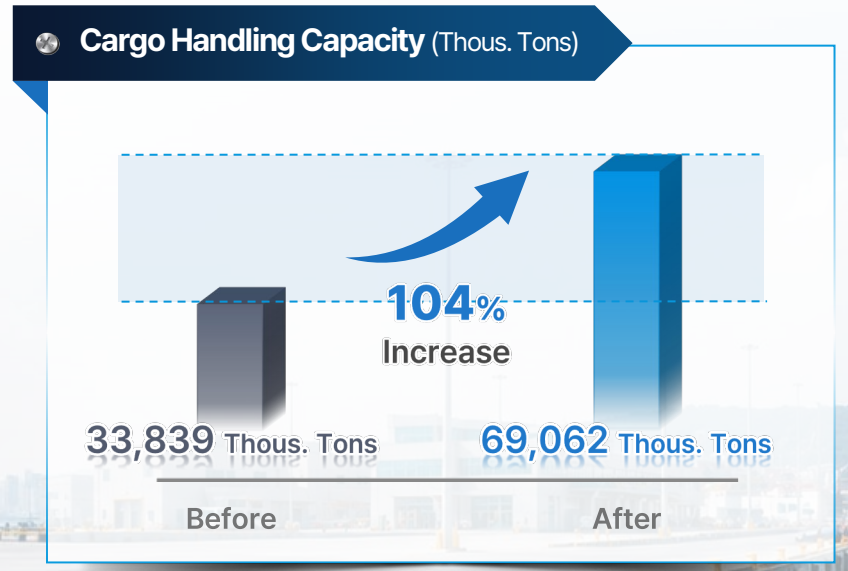
Key Milestones & Achievements

Mooring Safety and Cargo Handling Capacity for Large Vessels More Than Doubled through The Performance Improvement of Aging Facilities

Performance improvement completed and underway for 22 aging berths





Case of Maximum Increase in Berth Capacity: 1,976% increase for 6 berths of the General Pier

Case of Maximum Increase in Cargo Handling Capacity: 329% increase for Ulsan Port Pier 4

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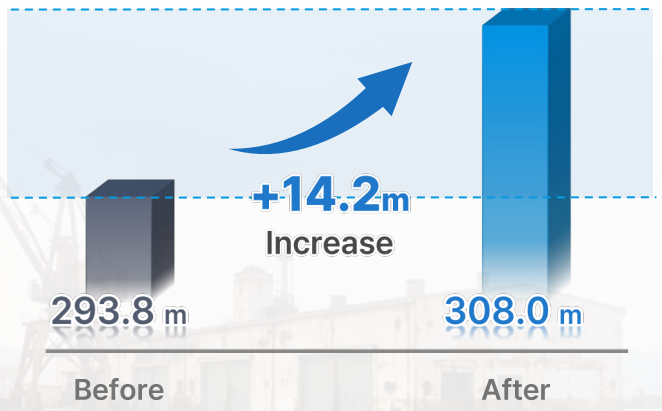
Key Milestones & Achievements

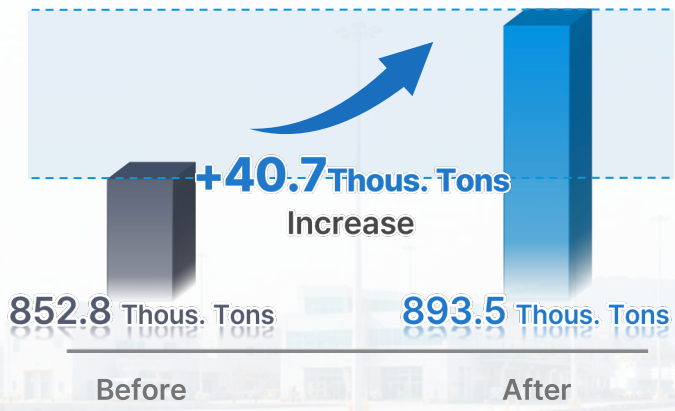
Securing Additional Safe Water Depth and Capacity to Accommodate Large Vessels through Maintenance Dredging

Dredging completed and underway for channels, turning basins, and 23 berths

Cumulative Depth (m)



Average Capacity (Thous. Tons)



Ulsan Main Port
Cumulative depth increased by +9.9m
Cumulative capacity
increased by +32.9 Thous. Tons

Ulsan New Port (North Port)
Cumulative depth increased by +1.6m
Cumulative capacity
increased by +5.4 Thous. Tons

Ulsan New Port (South Port)
Cumulative depth increased by +0.7m
Cumulative capacity
increased by +2.4 Thous. Tons

Fairways and Turning Basins
Cumulative depth
increased by +2m

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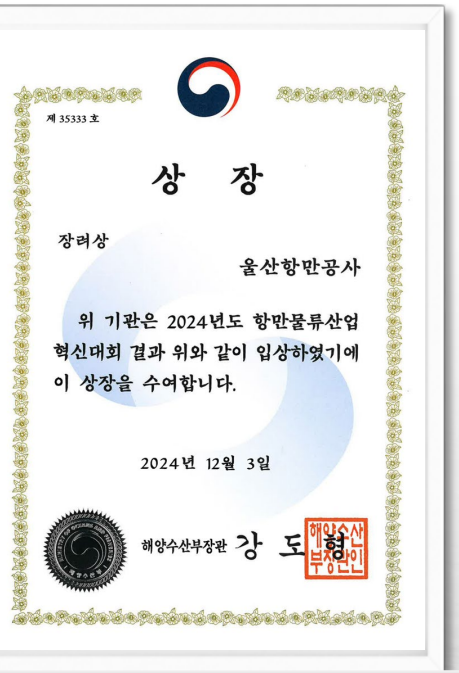
Key Milestones & Achievements

External Recognition for Outcomes of Port Infrastructure Improvement while Maintaining Operations

Presenting an improvement model applicable to aging domestic ports

Received the Minister's Award at the 2024 Port Logistics Industry Innovation Awards (Hosted by the Ministry of Oceans and Fisheries)



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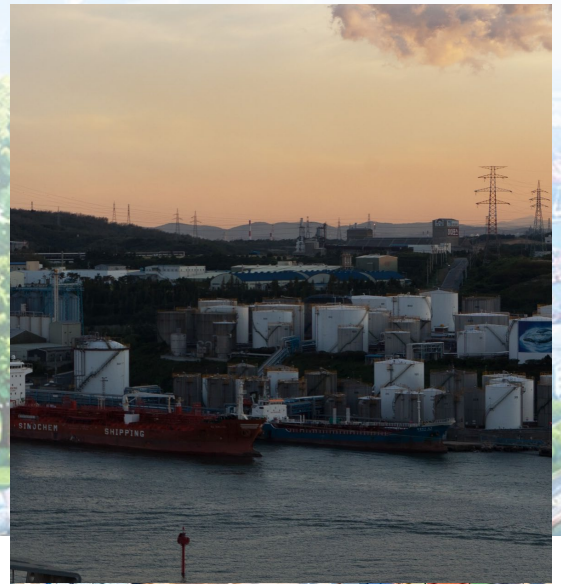
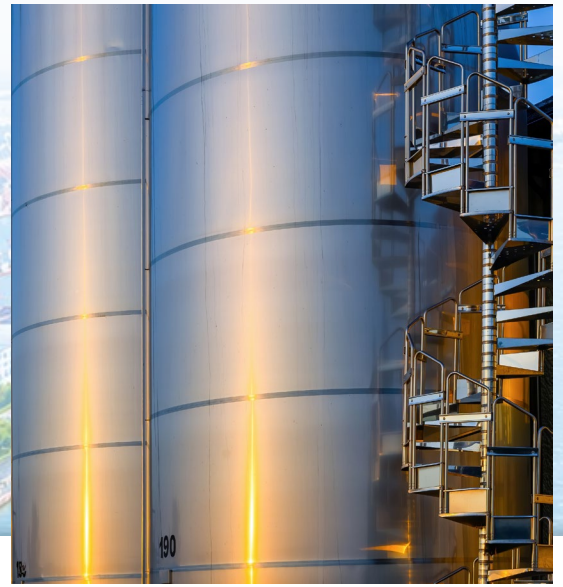
Expected Effects

Comprehensively Improving Onshore and Offshore Infrastructure of Aging Ports



Logistics Efficiency

Cargo handling capacity of Ulsan Port more than doubled



Megaship Capabilities

Securing additional safe water depth (14.2m) and capacity (approx. 41,000 tons) to accommodate large vessels

Business Continuity

Establishing a system to concurrently manage Ulsan Port operations and improvement projects

Feedback of Performance

Gained recognition for stably executing improvement projects while maintaining port operations

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"Sustainable Port Infrastructure Built via Integrated Onshore-Offshore Infrastructure Improvement"

Thank you.