WAVES OF CHANGE

Harnessing Technology to Power the Sustainable Blue Economy

Korean Energy Case Studies

Offshore Wind

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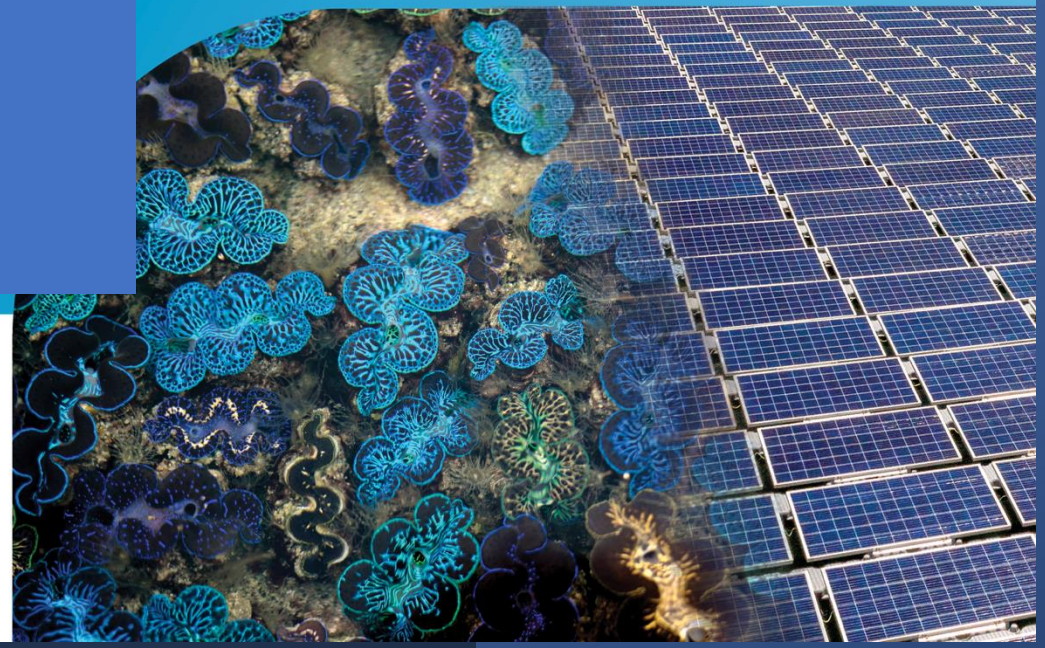
ADB

Ministry of Oceans and Fisheries



Korean Industry Heavily Dependent on Fossil Fuel


동 아 일 보 The Dong-A Ilbo 日刊 제16066호

"이스라엘 占領地철수하라"

親아랍聲明 발표

政府、中東정책 大轉換

東亞日報

親아랍急旋回의 實利主義

팔레스타인人 主張인정

이지역國家 生存權존중돼

文全明聲

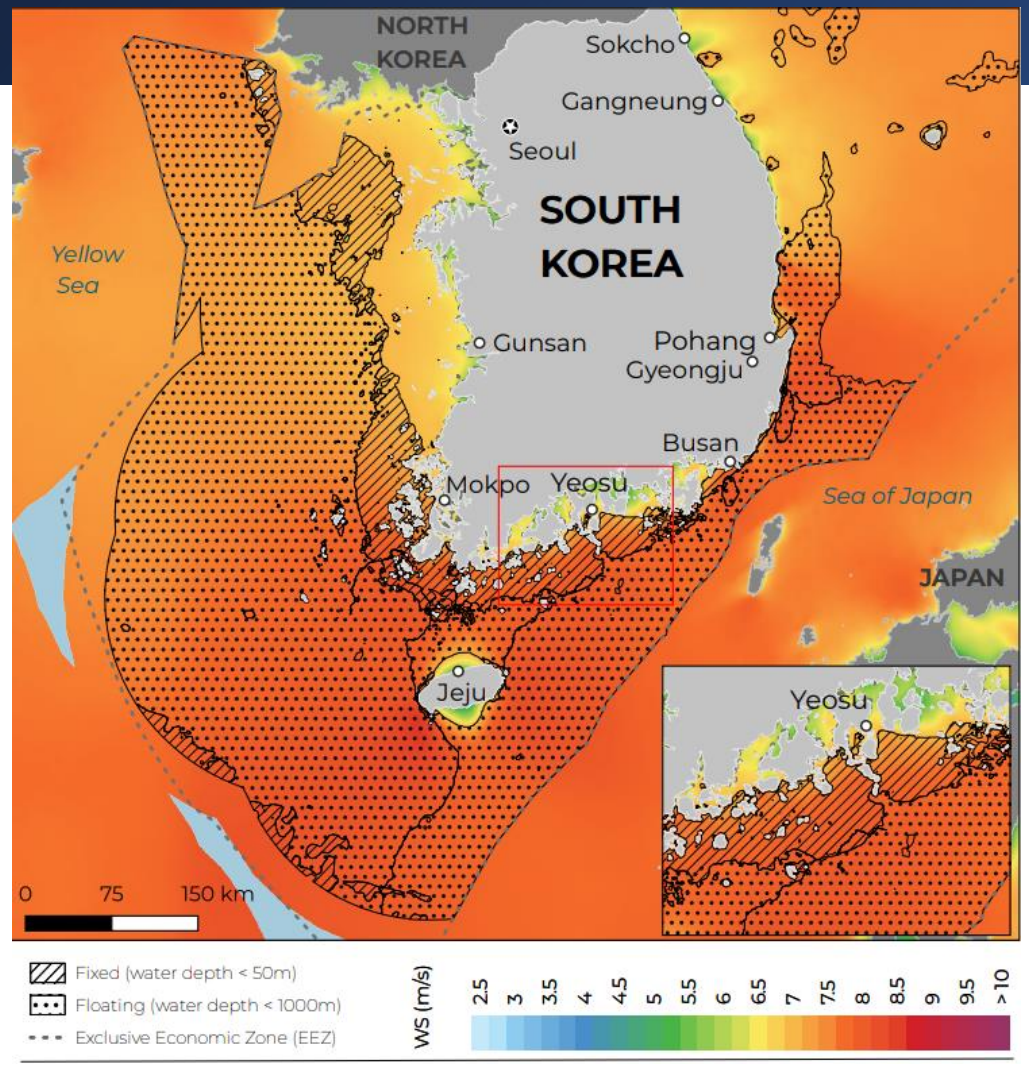
- On 17 December 1973, the Korean government delivered a statement urging Israel to withdraw from occupied territories in the Middle East.
- Despite being a strong US ally, Korea had to take a pro-Middle East stance.
- Korea imports all of its oil and gas from foreign countries, with 71% sourced from the Middle East region.
- The oil and gas industry boosted the Korean economy (e.g., heavy industries, chemicals, and shipbuilding). As a result, Korea recognized the need to reduce its dependence on fossil fuels and explore alternative energy sources.

History of Wind Development in South Korea

Image: First wind power generator installed on 27 Feb 1975 (Source: 24 Dec 2025, KBS News)

- (1975) First wind power generator installed in Jeju Island
- (1998) First commercial-scale wind farm became operational and connected to the grid
- (2011) A roadmap to develop a 2.5GW offshore wind farm in Seonamhae region was announced
- (2012) Renewable Portfolio Standard enacted to enforce renewable energy
- (2017) Renewable Energy Plan 3020 announced to build 12GW of offshore wind by 2030
- (2025) Offshore Wind Special Act enacted to streamline the permit/consent process and to allow the government to drive planned siting for renewable energy

Offshore Wind Potential in South Korea



Source: Global Wind Energy Council

- Surrounded by three bodies of water and characterized by mountainous terrain, South Korea has limited options for onshore renewable energy – making offshore wind the primary solution.
- 624GW of technical potential comprising 78GW of fixed-bottom and 546GW of floating

Private Developers Identified 112 Offshore Wind Projects, 34GW with Electricity Business License

- Previous private developer-led system allowed rapid identification of potential offshore wind sites.
- However, uncoordinated and unconstrained development often led to delays in final permit/consent and delivery of the project.

	Project Stage				Total
	Permit Preparation	Permit Underway	Under Construction	Operational	
Number of Projects	55	40	6	11	112
Planned Capacity (MW)	18,598.8	14,603.5	1,071.2	351.9	34,625.4

Source: Ministry of Climate, Energy and Environment, as of Jan 2026

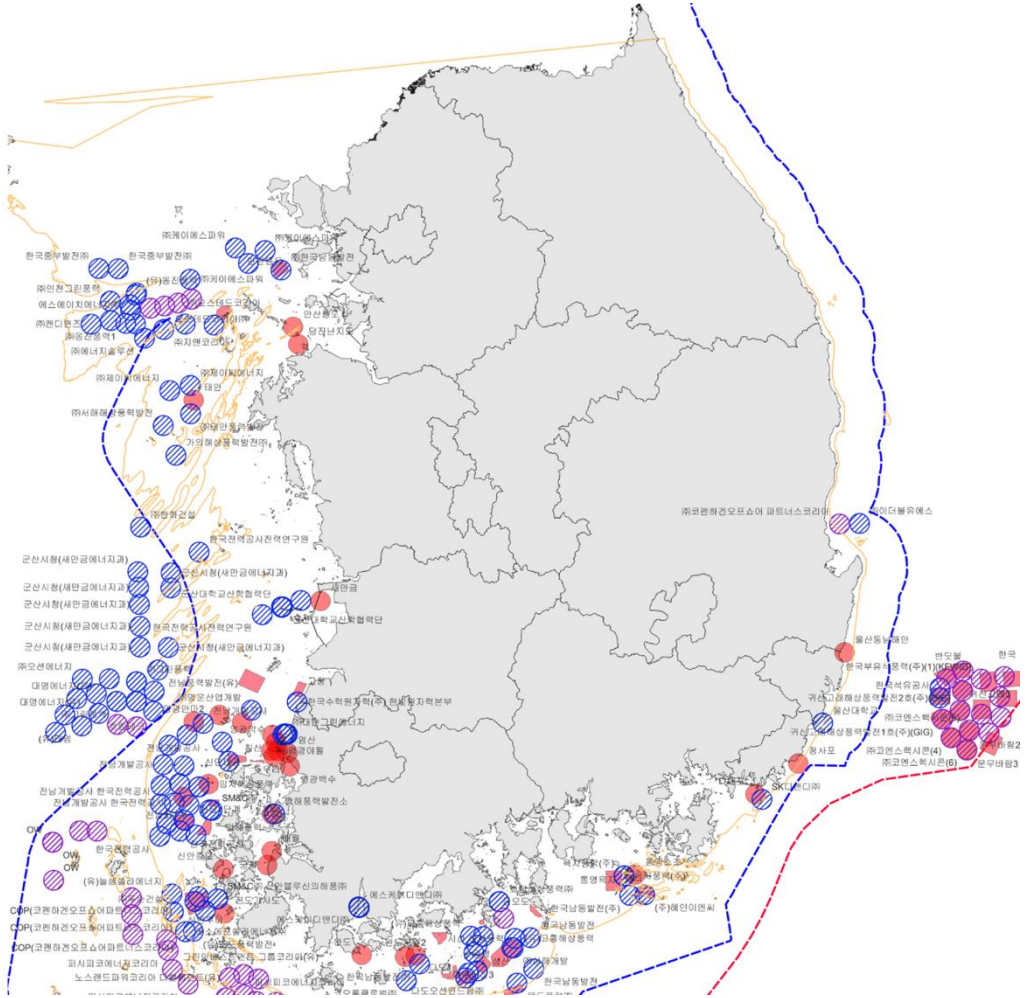
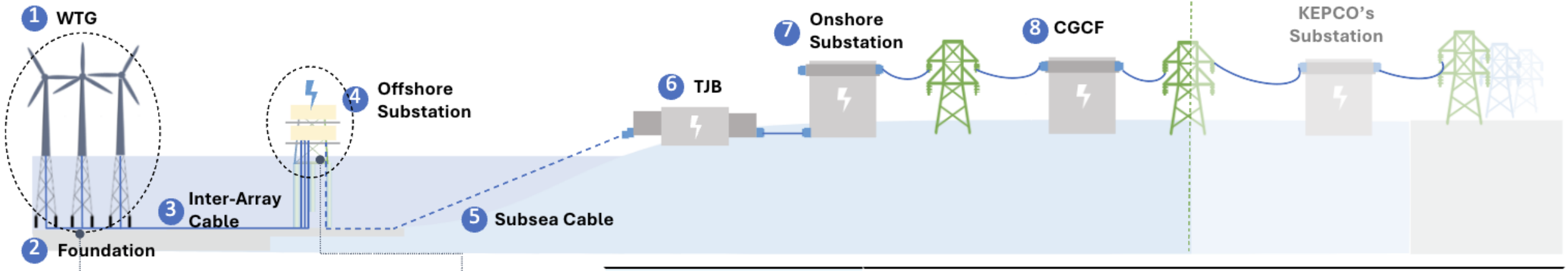


Image: Sites under development by private developers, Korea Wind Energy Industry Association

Offshore Wind Project Drives Demand for Shipbuilding and Heavy Industries



Block Island Wind Farm, USA (AP Photo/Julia Nikhinson)

1 **WTG**	Wind Turbine Generator
2 **Foundation**	Fixed bottom foundation for less than 60m water depth, and floating for 60m or deeper
3 **Inter-array Cable**	Electricity generated from each WTG is transmitted via inter-array cables and consolidated at the offshore substation
4 **Offshore Substation**	Electricity transmitted through inter-array cable is stepped via a transformer to minimize transmission losses, and then transmitted to the onshore substation
5 **Subsea Cable**	A separate high-voltage cable designed for offshore power transmission
6 **Transition Joint Bay**	Section where the subsea cable connects to the onshore cable at the landfall point
7 **Onshore Substation**	Power brought inland is stepped up to match the domestic transmission voltage and transmitted to KEPCO's substation
8 **CGCF**	Infrastructure that collectively gathers electricity generated from nearby offshore wind farms and connects them to a KEPCO-owned substation

Offshore Wind Project Drives Demand for Shipbuilding and Heavy Industries

Offshore Wind Supply Chain

- Detailed Design
- Wind Turbine and Tower
- Foundation
- Subsea Cable
- Offshore Substation
- Onshore Cable
- Onshore Substation
- Transport & Installation (WTG, Foundation, Subsea Cable and Offshore Substation)
- WTG Installation Vessel
- Martialing Port
- SCADA
- Certification
- Marine Warranty Service
- Geophy./Geotech./UXO
- Navigational Aids
- Lighted Buoy
- Marine Traffic Control. System

Offshore Wind Project Drives Demand for Shipbuilding and Heavy Industries

<table>
<tr><th colspan="2">SoW</th><th>WTG</th><th>Foundation</th><th>Export Cable</th><th>OSS</th><th colspan="2">ONSS</th></tr>
<tr><td rowspan="8">EPC</td><td>Design</td><td rowspan="4">WTG Supply</td><td>Foundation Engineering</td><td rowspan="7">Offshore Export Cable EPCI</td><td rowspan="3">Offshore Substation EPC</td><td rowspan="7">Onshore Cable EPC</td><td rowspan="7">Onshore Substation EPC</td></tr>
<tr><td>Procurement</td><td rowspan="2">Foundation PC</td></tr>
<tr><td>Construction</td></tr>
<tr><td>T&I</td><td rowspan="4">Foundation T&I</td></tr>
<tr><td>Vessel</td><td>WTG Inst. Vessel</td><td rowspan="3">Offshore Substation T&I</td></tr>
<tr><td>Marshalling Facility</td><td>Marshalling Facility</td></tr>
<tr><td>Site Investigations</td><td colspan="6">Geophysics / Geotech</td></tr>
<tr><td rowspan="2">O&M</td><td>O&M</td><td>SAA</td><td colspan="5">BoP O&M Contractor</td></tr>
<tr><td>Port</td><td colspan="6">O&M Port</td></tr>
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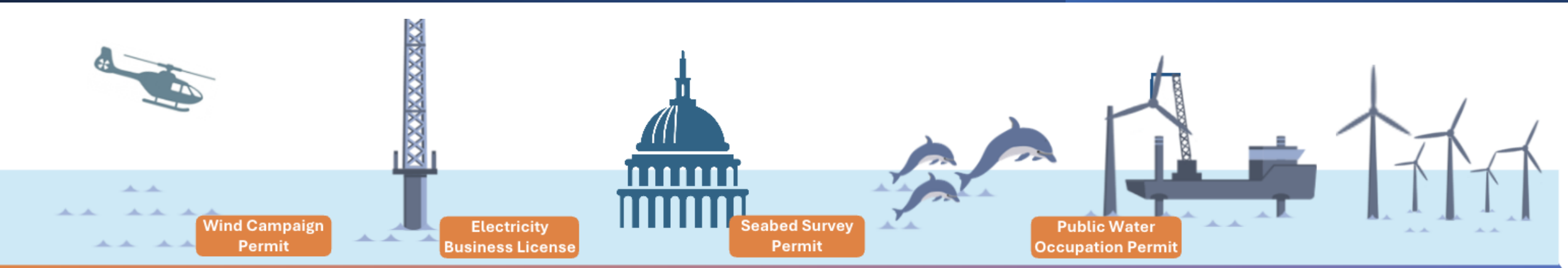
Offshore Wind Projects Awarded 20-Year Fixed-Price PPAs

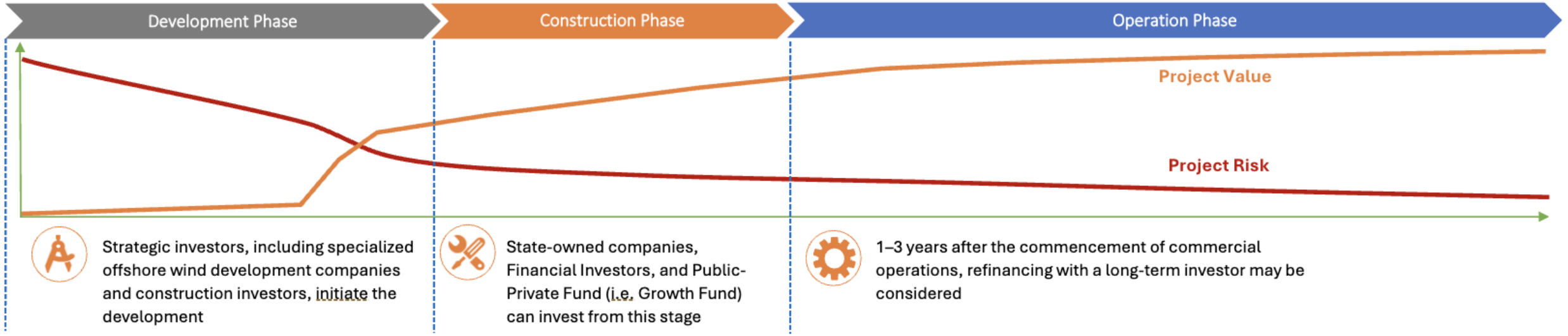
Calendar Year	Project	Capacity	Sponsors	WTG	Current Status
2022	Jeonnam 1	99MW	SK E&C, CIP	SGRE 9.9MW	Operational
2023	Wando Guemil	600MW	KOEN	Vestas 15MW	Reaching FID
	Sinan Ui	390MW	SKI, Hanwha Ocean	Vestas 15MW	Reaching FID
	Yeongang Nakwol	365MW	MyeongUn, Bigrimm	Vensys 5.7MW	Under Construction
	Gochang	76MW	DNI	MingYang 6.35MW	Reaching FID
2024	Taean	500MW	Vena, CIP	-	Reaching FID
	Anma	532MW	Equis	SGRE-Doosan 14MW	Reaching FID
	Yawol	104MW	Doosan Geosolution	Doosan 8MW	Reaching FID
	Firefly	750MW (floating)	Equinor	SGRE-Doosan 14MW	PPA not signed
2025	Dadaepo	99MW	KOEN	Doosan 10MW	Reaching FID
	Seonamhae	400MW	Genco Consortium	Doosan/Unison	Reaching FID
	HandongPyeongdae	100MW	EWP, Jeju Energy	Doosan 10MW	Reaching FID
	Aphae	80MW	KEPCO E&C, CGO	Doosan 10MW	Reaching FID

Under the previous regime, the private developer-led development process required a substantial amount of time



Site Identification	Wind Campaign	Electricity Business License	Permit/Consent/Survey/Design	Construction	Operation
1-2 years	> 1 year	~ 6 months	5-7 years	3~4 years	25~27 years
• Site Identification through private developer's site screening • Consultation with potentially interested parties	• Electricity Business License required a wind campaign of more than 1 year on site	• Preliminary review by Ministries of Ocean and Fisheries, National Defense, Climate, Energy, and Environment • Review of development capability of the developer	• 29 Permit & Consent processes including National Heritage Survey, Maritime Traffic Safety Assessment, Environment Impact Assessment, Disaster Impact Assessment, Consultation with Military • Survey & Design • Grid Connection Agreement	• Public Water Occupation Permit • Project Financing	• Operation

Each Phase Requires Different Capabilities and a Different Profile of Investors



- The development risk is high, which is not desirable for attracting sound investment; thus, the government is to introduce government-led offshore wind development
- During the construction phase, various financial investors and public-private funds such as the “Growth Fund” are supporting the construction phase with favorable capital costs
- During construction, Korean public gencos tend to control O&M, and increase their stake in the project

Special Act on Offshore Wind enacted to streamline permit/consent and government-led development

Identification of Preliminary Site	• Offshore Wind Committee to collect and review site information and discuss with relevant government branches • MOND, MOLIT, MCEE, MOF to provide relevant data and evaluation criteria for fishing, military operation, aerospace, birds
Designation of Preliminary Site	• Offshore Wind Committee to review and approve the resolution for designation of preliminary site • MCEE, MOF to designate preliminary site upon approval from Offshore Wind Committee
Preparation of Basic Design	• Offshore Wind Committee to establish basic design and plan for environmental impact survey • MCEE, MOF to provide comments on the environmental impact survey
Private-Public Committee	• Offshore Wind Committee to support operation of Private-Public Committee • Local government to run Private-Public Committee and discuss profit sharing with residents
Designation of Offshore Wind Site	• Offshore Wind Committee to review and approve resolution for designation of offshore wind site • MCEE, MOF to designate offshore wind site
Selection of Developers	• Offshore Wind Committee to review and approve the resolution for the tender process to select developers • MCEE, MOF to run tender process and select a developer
Implementation Planning	• Offshore Wind Committee to consolidate 29 permit/consent processes under a single office, and approve the implementation plan • MCEE, MOF to proceed environmental consultation • Local government to issue public water occupation permit for construction and operation of offshore wind projects

Introduction of Local Committee and Private-Public Committee for stakeholders' acceptance

- **Local Committee** 'may be' established for private-led offshore wind projects

- to share and discuss the project plan, compensation plan, and resident participation scheme, among other matters

- the local committee's resolution is non-binding; therefore, failure to reach a conclusion in the committee does not affect the remaining permitting process

- The composition of the Committee shall be as follows

Representatives in the Committee	Portion
Project related persons	less than 10%
Resident, fishermen, and other interested parties	not less than 40%
Professional	not less than 20%
Relevant public servants	

- **Private-Public Committee** 'shall be' established by the local government for the projects under the Special Act on Offshore Wind

- Private-Public Committee shall discuss (i) basic design, (ii) designation of the site, (iii) resident participation and profit-sharing scheme, (iv) promotion of fishing industries and boosting of the local economy, and (v) other related matters regarding local stakeholders' acceptance

- The composition of the Committee shall be as follows

Representatives in the Committee	Portion
Fishermen and resident	not less than 50%
Relevant public servants	
Professional	not less than 20%

Various Acts provides schemes for compensation and profit sharing with interested parties

	Compensation	Support	Profit Sharing
Law	- Offshore Wind Special Act - Fisheries Act - Land Compensation Act	- Power Plants Adjacent Area Supporting Act - Transmission Facilities Adjacent Area Supporting Act	- Offshore Wind Special Act - New and Renewable Energy Act
Beneficiaries	Affected fishermen and residents	Relevant local government	Fishermen and residents participating in resident participation scheme
Funding Source	Project Company	Government (Electricity Industry Foundation Fund)	Electricity Consumer (Climate and Environment Charge)

Special Act on Expansion of National Power Grid enacted to support renewable energy

Summary of the Special Act

- Basic plan and implementation plan for expansion of the national grid to be legislated
- Grid Expansion Committee under the Prime Minister to drive the expansion of the national grid to support renewable energy, AI, and data centers
- Streamlining the permit/consent process: 35 permit/consent processes to be deemed approved to speed up the development of the national grid
- Special support for compulsory land acquisition (eminent domain) and compensation to speed up consent process

Grid Expansion Projects Selected by the Committee

	Projects	Power Transmission		Power Transformation	
		Projects	km	Projects	MVA
National Competitive Projects	10	6	85.1	4	3,500
Connected to Carbon Free Power Plants	73	55	3,679.2	18	28,000
Related Projects	16	9	90.9	7	10,500
Total	**99**	**70**	**3,855.2**	**29**	**42,000**

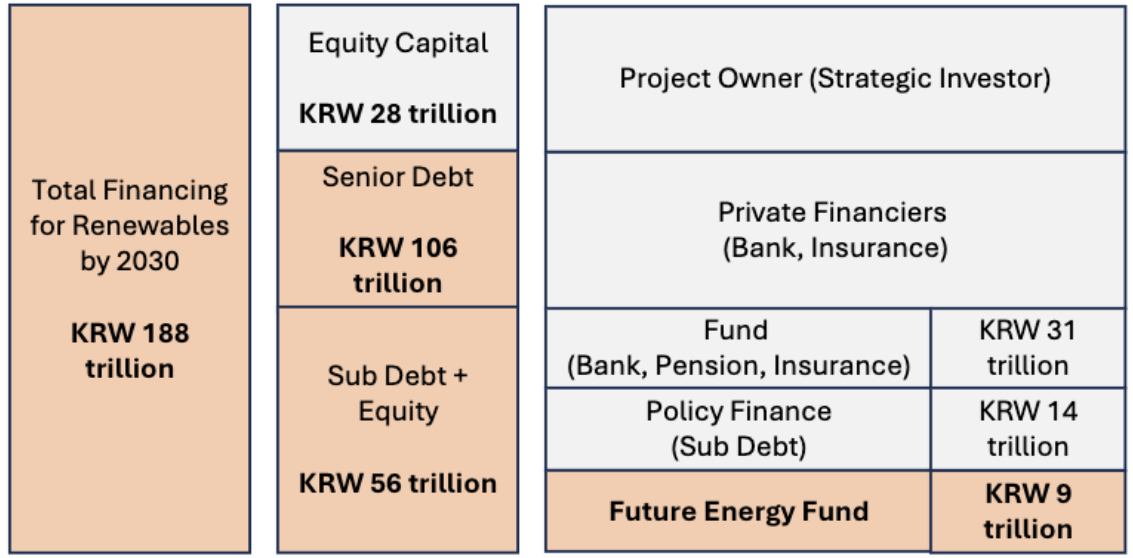
Source: Electric Time, 1 Oct 2025

Private-Public Funds to support project financing and construction of offshore wind projects

Outline of Future Energy Fund

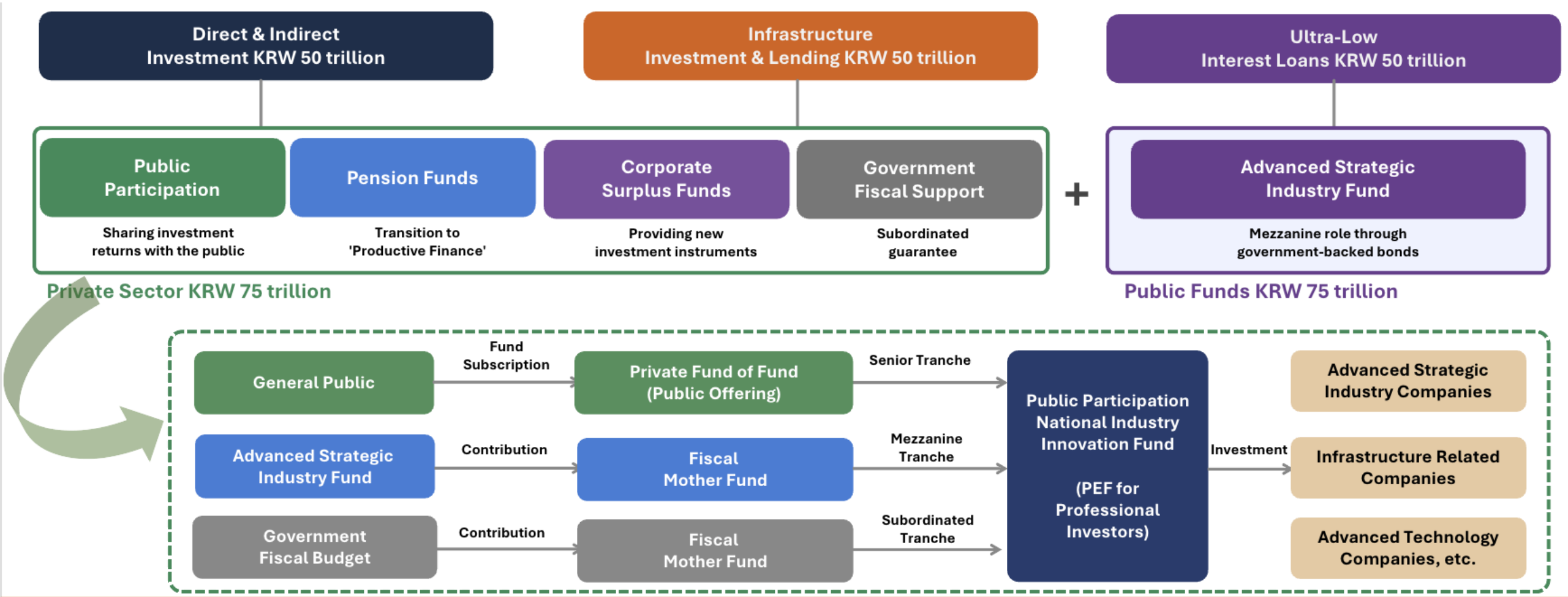
- Korea Development Bank and 5 commercial banks (KB, Shinhan, Hana, Woori, and NH) established a KRW 9 trillion fund to support renewable energy projects
- Funds to invest in equity and subordinated debts when the project reaches FID to support construction
- Series 1 Fund was launched with KRW 1.26 trillion and commenced its investment
- The Fund aims to disburse KRW 9 trillion by 2030

Financing Demand for Renewable Energy until 2030

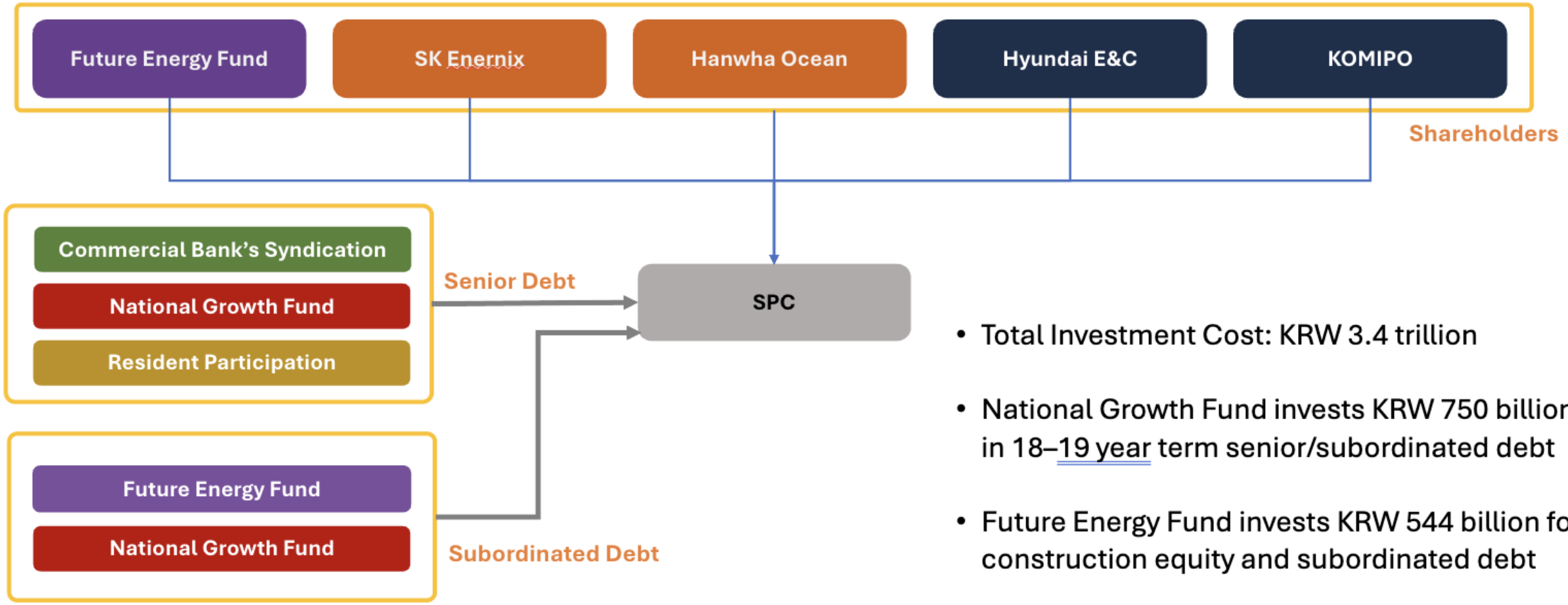


Source: Korea Development Bank, 17 April 2024

KRW 150 Trillion of National Growth Fund may be utilized for offshore wind projects



Combination of Future Energy Fund and National Growth Fund to support offshore wind construction



- Total Investment Cost: KRW 3.4 trillion
- National Growth Fund invests KRW 750 billion in 18–19 year term senior/subordinated debt
- Future Energy Fund invests KRW 544 billion for construction equity and subordinated debt

Source: Financial Services Commission


Thank you!