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DESFA's Energy Transition Strategy Towards a Sustainable Future in Greece

SESSION V: THE ROLE OF TRANSITION FUELS IN TRANSFORMING THE SECTOR

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#ERRAConference2025



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DESFA at glance

DESFA counts over 17 years of successful operation

- ✓ Established in March 2007, **DESFA owns & operates the Greek Natural Gas System (NNGS)**, which consists of the National Natural Gas Transmission System & the LNG Terminal in the islet of Revithoussa.
- ✓ DESFA was certified as an Ownership Unbundled Operator following the completion of its privatization process in 2018 (**66% owned by “Senfluga” an international Consortium of SNAM S.A., Enagas S.A., Fluxys and 34% by the Greek State**)
- ✓ DESFA operates, maintains & develops the Greek NNGS in a safe, reliable, and economically efficient way, offering **Third Party Access services** in a transparent and non-discriminatory way, as well as a **range of other services to national & international clients.**
- ✓ DESFA holds a **20% stake in the Alexandroupolis FSRU Terminal (Gastrade)**, a **7% stake in the Hellenic Energy Exchange (HEEx)**, and a **100% stake in *desfa solutions***



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We implement an ambitious Development Plan, promoting Greece as an energy gateway for SE Europe

 ~1,4 bn€ Capex Plan

71 Projects of high added value 

 All new pipelines and MR stations are **H2 ready**



Our commitment to growth: DESFA's 2024 performance



LNG Revithoussa Terminal: An important energy asset for Greece



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- ✓ The **Revithoussa LNG Terminal** belongs among the **forty (40) LNG terminals** that operate **today in the wider Mediterranean region** and in Europe and the one of two in Greece that receives LNG cargoes, temporarily stores and degasifies LNG and supplies the National Natural Gas Transmission System.
- ✓ With a storage capacity of 225,000 m³ LNG and a regasification capacity of 1400 m³/h as a Sustained Maximum Send out Rate, the Terminal is an important energy asset for Greece.
- ✓ Revithoussa Terminal is designed in accordance with the strictest safety standards both for its employees and for the residents of the surrounding areas while the used LNG technology procedures and operations (loading, storage and gasification) are environmentally friendly and strictly compliant with Greek and European legislation.

The Revithoussa LNG Terminal plays a key role:

- ✓ in the daily operation of the National Natural Gas System;
- ✓ in the opening of the Greek Gas Market since 2010;
- ✓ in the security of supply of the Greek gas Market as it was proved in crises of 2009, 2012, and 2016-17 and especially in the current emergency situation;
- ✓ in the diversification of supply sources in the whole South-Eastern Europe region feeding with gas Countries with no alternative supply sources.



Our existing presence in Kuwait, where we are awarded since 2020 the Operation & Maintenance Services to the Al-Zour LNG Terminal, is indicative of our commitment to establish a presence in the Middle East...



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In 2020, DESFA was awarded the **Operation and Maintenance of the Al-Zour LNG Terminal by Kuwait Integrated Petroleum Industries Company (KIPIC)**. The project began in May 2021, including a familiarization phase, while the full O&M operations commenced in May 2022. **Since then, we have successfully mobilized a team of more than 160 highly skilled employees constantly proving that health and safety, quality and operational excellence are our top priorities.**



The Terminal, is **continuously achieving 100% supply on natural gas demand, and has achieved high Overall Terminal Efficiency since its commissioning.** Moreover, in July 2024, we achieved the significant milestone of **reaching 1 Million Safe Man-hours without a single Lost Time Injury.**



Our **dedication to operational excellence** has been further recognized through a number of awards we have received, such as the **6th edition of CEO HSSE Award** in the 2nd Contractor HSSE Day & Seminar, several **KIPIC HSSE Promotional Program Awards** and the **Silver Award for HSE Excellence in Oil and Gas in GCC region** by the **American Society of Safety Professional (ASSP).**



We remain committed in expanding our collaboration and knowledge sharing with our counterparts in Kuwait, as we did last February when we hosted an energy related event *"Unlocking the future of Energy: a deep dive into DESFA"* that aimed to showcase our innovative strategies and technological advancements, while focusing on the exploration of collaboration opportunities with other Kuwaiti Companies, and the overall strengthening of synergies among the two countries. The event was well received by a broad audience of local energy experts and Authorities and local media.

... as during 2024 several initiatives were undertaken in this direction



✓ Participation in ADIPEC 2024

- DESFA attended with a delegation of energy experts the **ADIPEC 2024 in Abu Dhabi** where we were given the opportunity to interact and exchange views around further areas of collaboration with UAE delegates.
- In fact, a meeting was held with representatives of the Ministry of Energy and Investments of the UAE.
- **Our initial discussions focused on the prospect of signing an MoU between the Ministry and DESFA aimed at:**
 - ✓ formalizing a **collaboration framework** for knowledge sharing
 - ✓ organization of **workshops to facilitate the exchange of expertise, best practices, and operational insights** between both parties
 - ✓ establish at an **institutional level a bridge between the UAE and the European framework for energy transition**



ADIPEC - 2024



✓ Established presence through a strategic partner covering our presence in the region

- We have an **established cooperation with “Energy Services Middle East – ESME”** acting as our local agents in Kuwait and **strategic partners** facilitating our **liaison with local Authorities and energy experts in the Middle East** as well as the **development of new areas of cooperation and synergies.**

✓ Continuously exploring networking opportunities through our active participation in the Arab-Hellenic Chamber of Commerce & Development

- We are **active members of the Arab-Hellenic Chamber** and maintain regular contact at institutional with delegates and representatives from Arab countries including the UAE.
- This engagement provides a valuable platform for **fostering bilateral relations, exploring potential business opportunities, and enhancing mutual understanding.**



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Strategic pillars

DESFA Strategy focuses on addressing the Energy Trilemma & Leveraging on our Key Competences



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I Natural Gas

Security of Supply



DESFA is implementing a Development Plan with NG investments of utmost importance for Greece's establishment as a hub for the whole SEE Region



II CCS

Affordability



DESFA focuses on being integral part and constituting a vital role of the development of CCUS business in Greece, activated in the transmission, liquefaction and storage part of the value chain



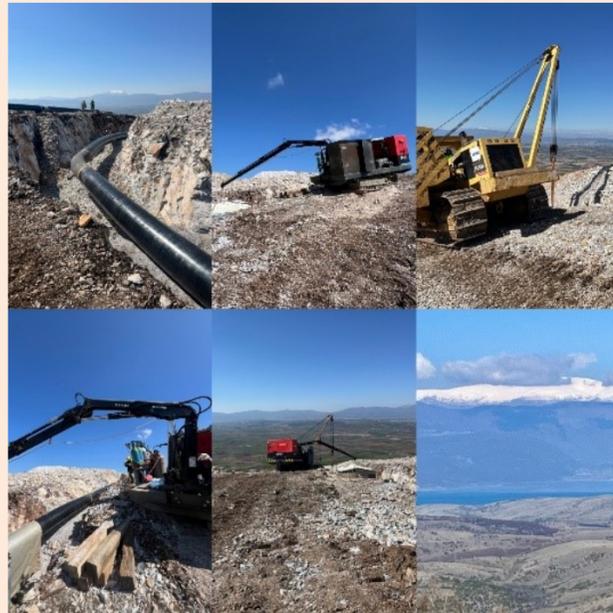
III Hydrogen

Sustainability



Based on EU targets, the Greek TSO has set as one of its main strategic goals the development of H₂ sector in Greece through the assessment of Smart Gas Grid and H₂ pipelines projects

DESFA is steadily expanding its portfolio of NRS and we keep pursuing selected new opportunities also leveraging on DESFA Solution



- **West Macedonia Pipeline – Under construction, COD planned Q3 25**
 - Designed to support the decarbonization policy of West Macedonia and to supply the CHP unit in Kardias, will be used for the new CCGT of Ptolemaida and Aghis Stefanos announced by PPC by 2027
 - 100% technically ready to transport H₂, to be integrated in the H₂ grid in the future - **An extension of the West Macedonia pipeline to the Western Coast of Greece has already been included in the ENTSOG’s TYDP, as future connection to the hydrogen pipeline towards Italy**
 - The project will be connected to the **new Amyntaio- Komnina H₂ pipeline** (new project in TYDP “24-33”) transporting blend of CH₄ & H₂ to the CHP unit in Kardias

- **Karperi – Komotini Pipeline – FID expected by July 25/COD by Mid 27**
 - Will provide firm capacity to the CCGT in Alexandroupolis under construction & increase the capacity available from FSRU Alexandroupolis to serve the Greek gas market

- **Patras high-pressure pipeline – Fix planned by Mid 25/COD by Mid 27**
 - **Replacement of the oil consumption** Patras’s industrial area with the more environmentally friendly natural gas



- **New jetty for small-scale LNG in Revithoussa – COD by Q2 27**
 - **Potential supply of new areas** through large scale LNG vessels to LNG satellites to coastal areas (e.g., islands)
 - **Decarbonization of the coastal areas** that still consume oil for heating and electricity production purposes
 - **Opening of the LNG bunkering sector in Greece**
 - **New technical solution of a Floating Platform Storage is under tendering procedure**

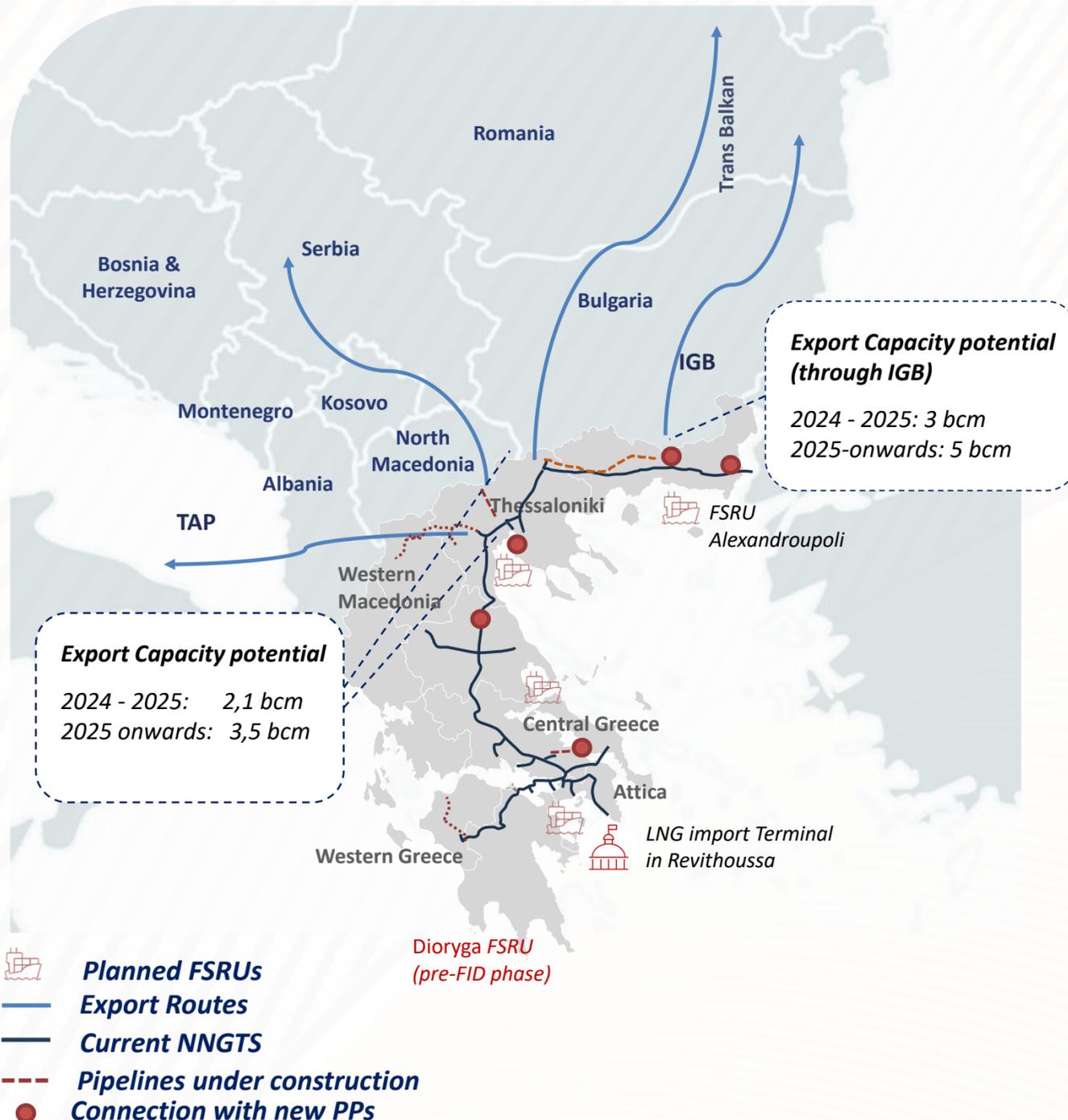
...& to serve regional market needs in line with the RepowerEU targets for security & diversification of NG supplies and with Greece's role as an energy gateway to SEE



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Key highlights



As-is status end 2024- beg 2025

- Revithoussa & Alexandroupolis LNG Terminals
- Total Firm Import capacity: 12,3bcm.
- 2 connections to Bulgaria: Export capacity: 2,1bcm firm capacity at Sidirokastro + 3bcm route capacity to IGB
- 2 FSRUs under assessment (in Volos and Thessaloniki) and Dioryga FSRU still in pre-FID status

Short-term (’25-’26)

- CS Ampelia and CS Komotini planned COD Q3 25:
 - firm export capacity: 3,5 bcm (from NNGTS to all IPs)
 - up to 5bcm to IGB so total export capacity from NNGTS may reach 8,5 bcm in 2026
- From early 2026, Nea Messimvria booster compressor, will enable physical gas flows of up to 3 bcm towards TAP (to Italy, Albania and Bulgaria via IGB)
- Greece - North Macedonia interconnection is planned in 2026; initial capacity ca. 1bcm

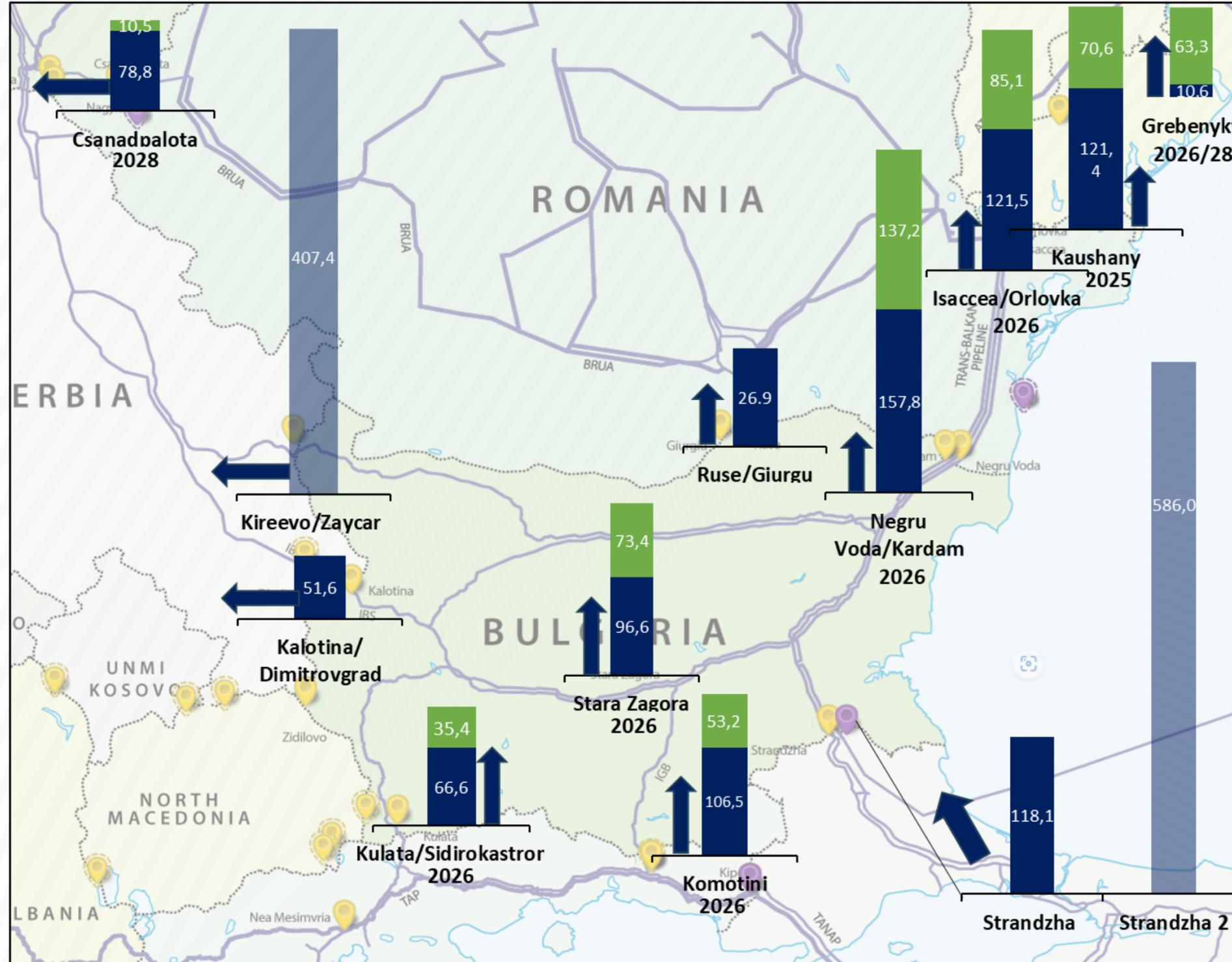
Mid-term (’27-onwards)

- Duplication of HP branch Karperi – Komotini providing firm capacity from VTP to IGB up to 2bcm & increasing the capacity available from FSRU Alexandroupolis to the Greek gas market and exports to the West (TAP, North Macedonia and Sidirokastro)
- Duplication of HP branch Patima - Livadia, allowing firm capacity to Dioryga FSRU, subject to FID of the FSRU

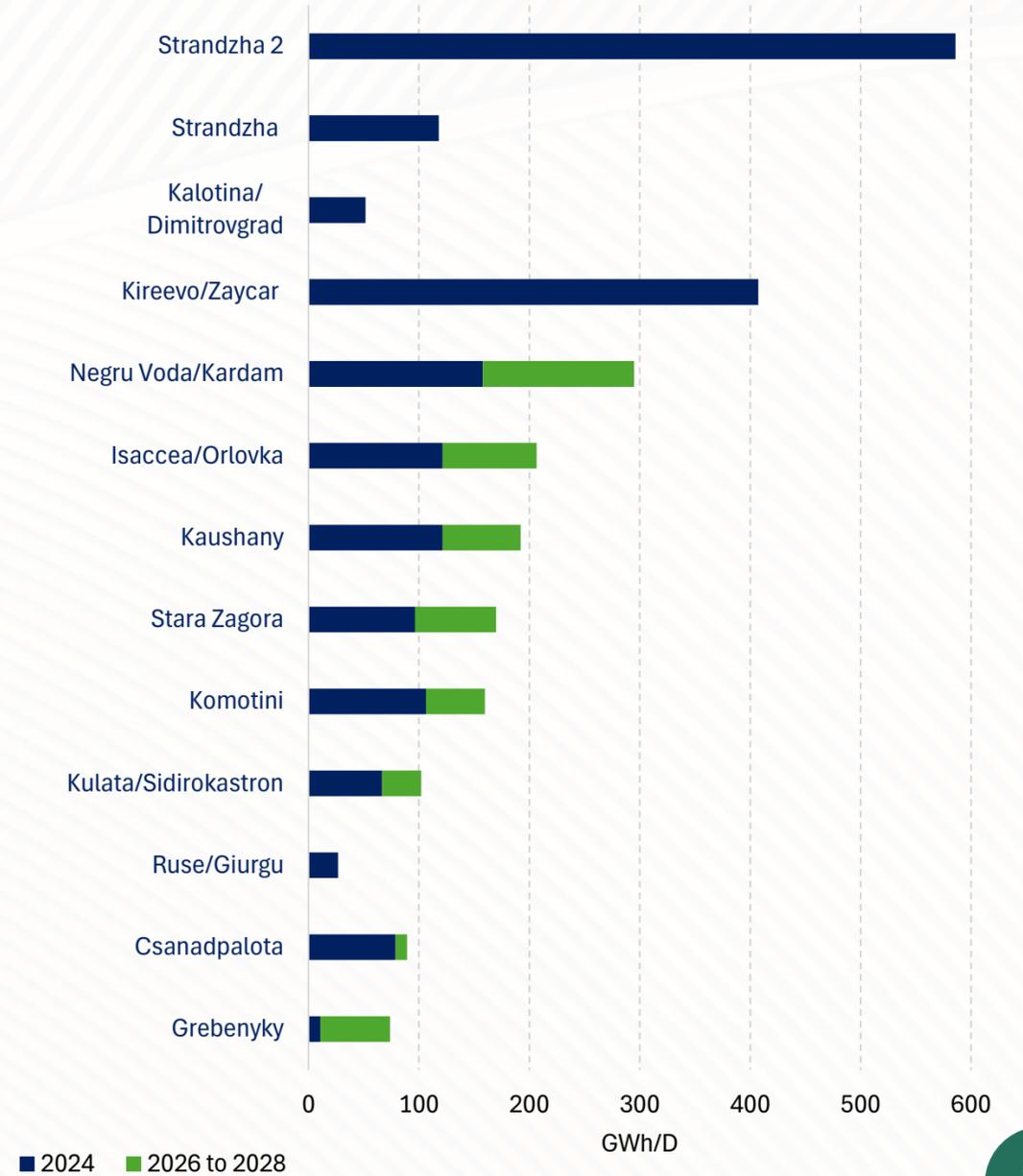
...while existing transmission infrastructure, reinforced by the infrastructure under construction mainly in Greece and Bulgaria, offers significant gas transmission capacity between Greece and Ukraine



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Existing & Forseen Capacities per IP



NATURAL GAS

Vertical Corridor Initiative

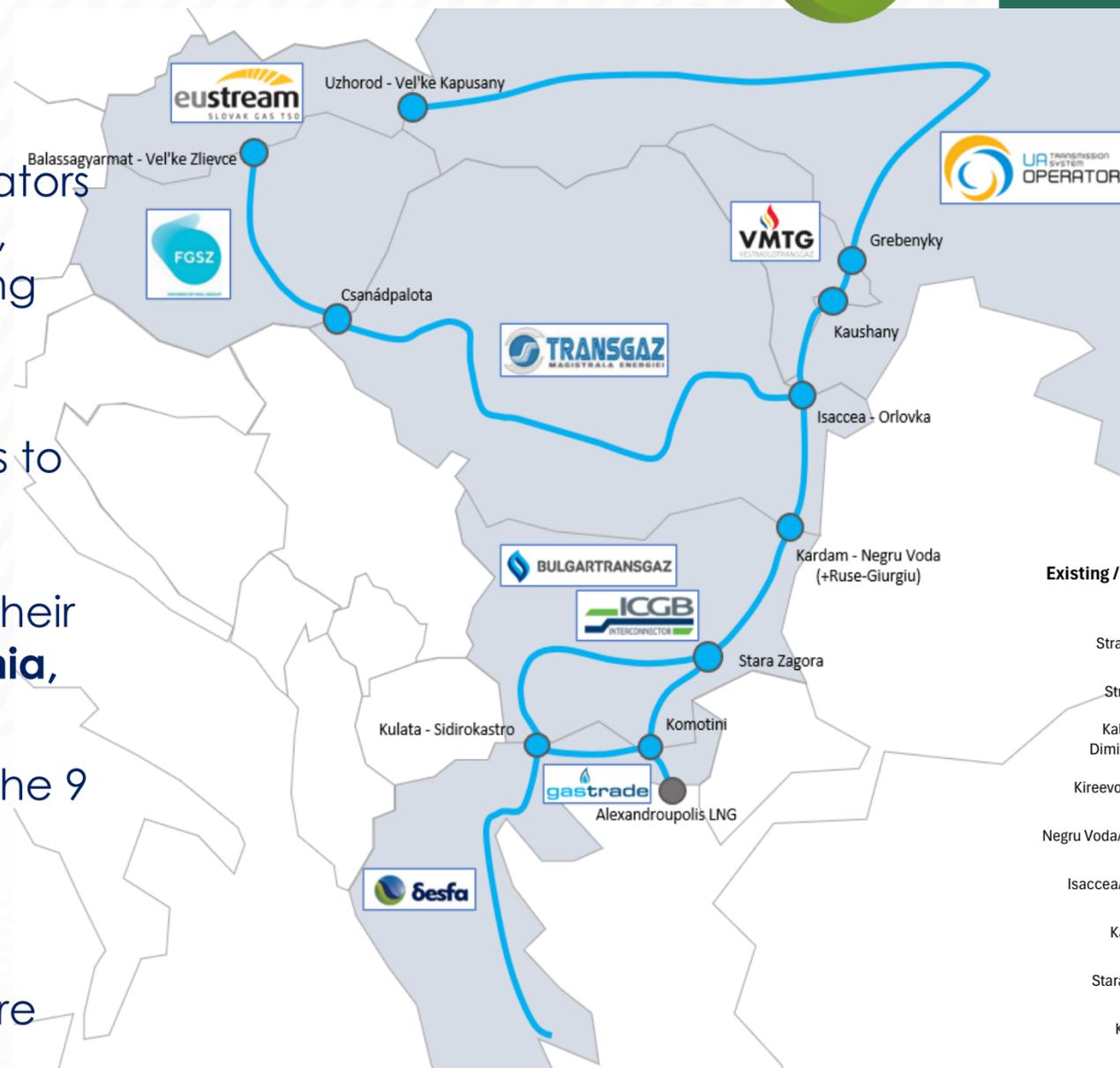
The Vertical Corridor is an initiative of **9 gas system operators** from **7 8 countries** (Greece, Bulgaria, Romania, Hungary, Slovakia, Moldova and Ukraine), aiming exploiting existing and under construction gas transportation capacity to provide gas flows from South-to-North

In H1 2024 the TSOs jointly identified the required projects to upgrade the capacity of the systems along the way to Ukraine, most of which are already ongoing. The effort enabled to identify **synergies among the networks** and their **ability to support diversification of gas supplies to Romania, Moldova, Ukraine, Hungary and Slovakia**

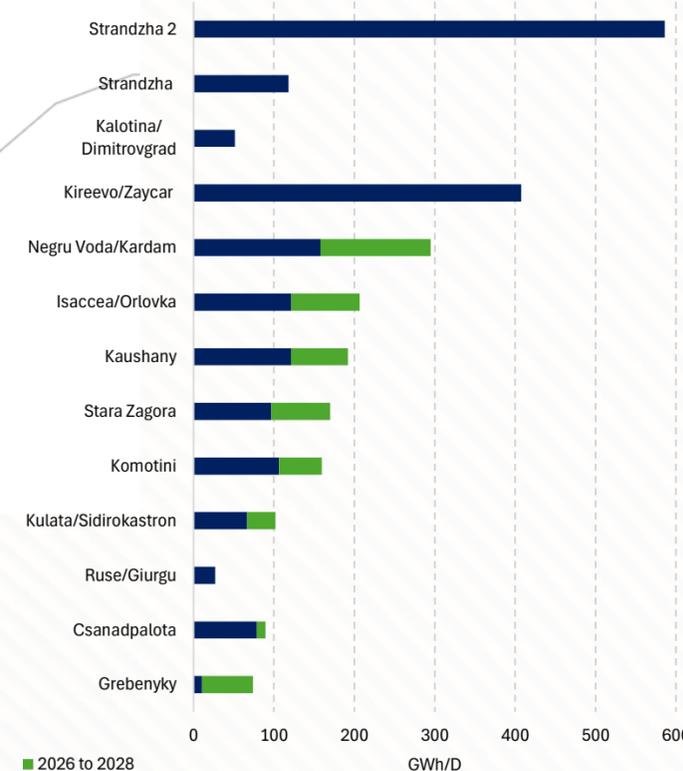
In July 2024 a joint Market Test has been conducted by the 9 TSOs

The 9 TSOs **kept intact their commitment to the Vertical Corridor** initiative, proceeded with projects that were already planned and are pursuing advancement of more projects that are required for the full deployment of the Corridor's potential.

Existing transmission infrastructure, reinforced by the infrastructure under construction mainly in Greece and Bulgaria, offers significant gas transmission capacity between Greece and Ukraine



Existing / Foreseen Capacities per IP





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H2 projects

DESFA's hydrogen strategy actively translated through its Hydrogen Backbone project, one of EU Projects of Common Interest



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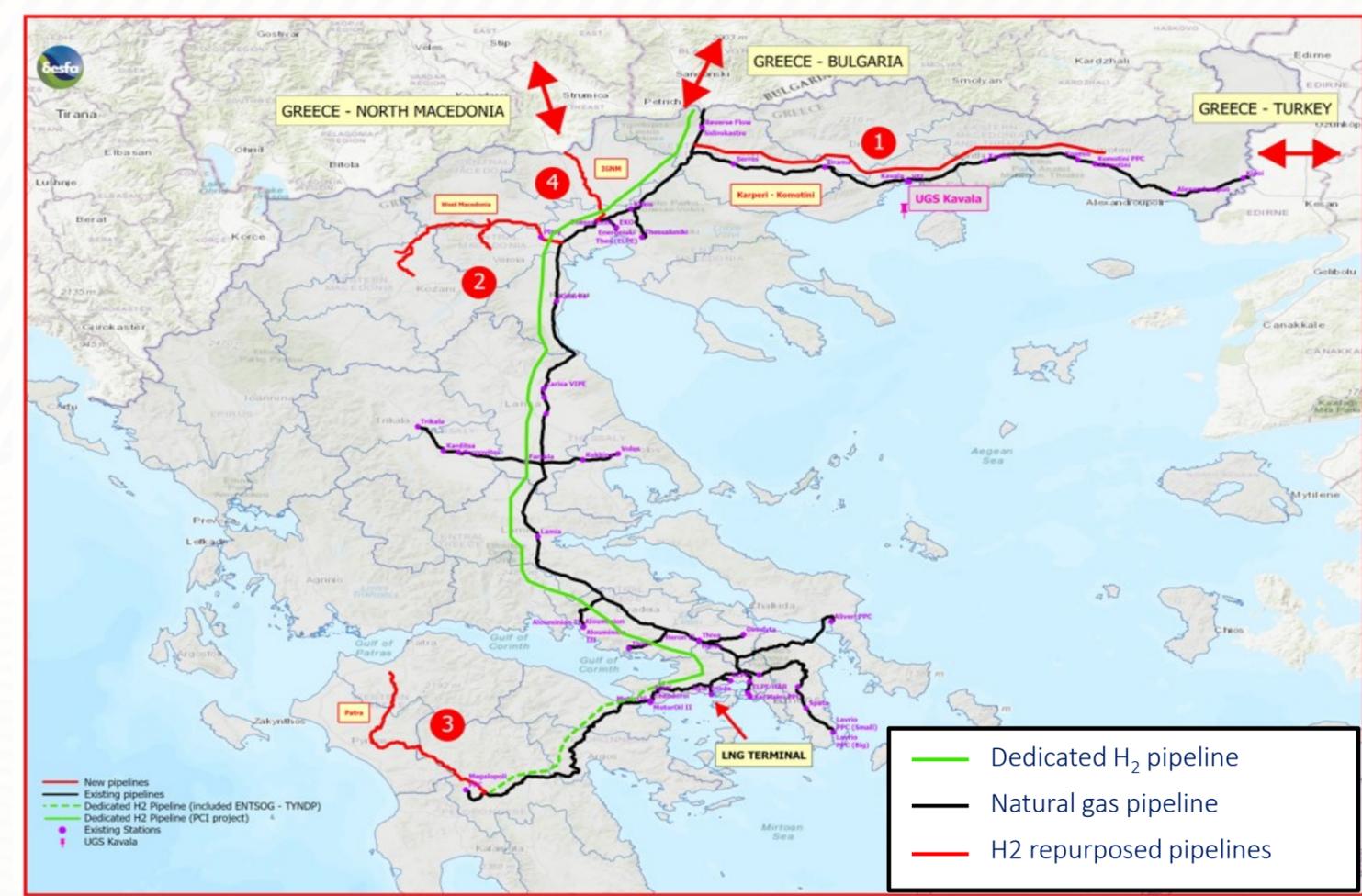
DESFA's H₂ PCI

Pure H₂ transmission mainly from the southern Greece up to the interconnection with Bulgaria, connecting H₂ producers and suppliers throughout Greece and further to Bulgaria and to Central Europe
The project will connect to Bulgartransgaz's corresponding H₂ project



- EU PCI project**
- Part of SEEHyC**
- ~570km length**
- ~1bn€ CapEx**
(pipeline and compressors)
- 60MW total capacity**
of compressor stations
- 80GWh/day maximum capacity**

EU principles and features for the next generation gas infrastructure



At a high level, the creation of two **parallel systems** is the way forward:

- A methane-based infrastructure in which natural gas will progressively be replaced by other renewable sources of methane (e.g. biomethane) and/or be blended with hydrogen up to a certain percentage and
- a hydrogen-based infrastructure which will progressively be developed and complement the network for methane gases.



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CCS



The design and techno-economic aspects of the APOLLOCO₂ CCS hub in a nutshell

APOLLOCO₂ CCS hub

● Industrial emitters — CO₂ pipeline -▶ LCO₂ shipping - - - Potential expansion of CO₂ pipeline

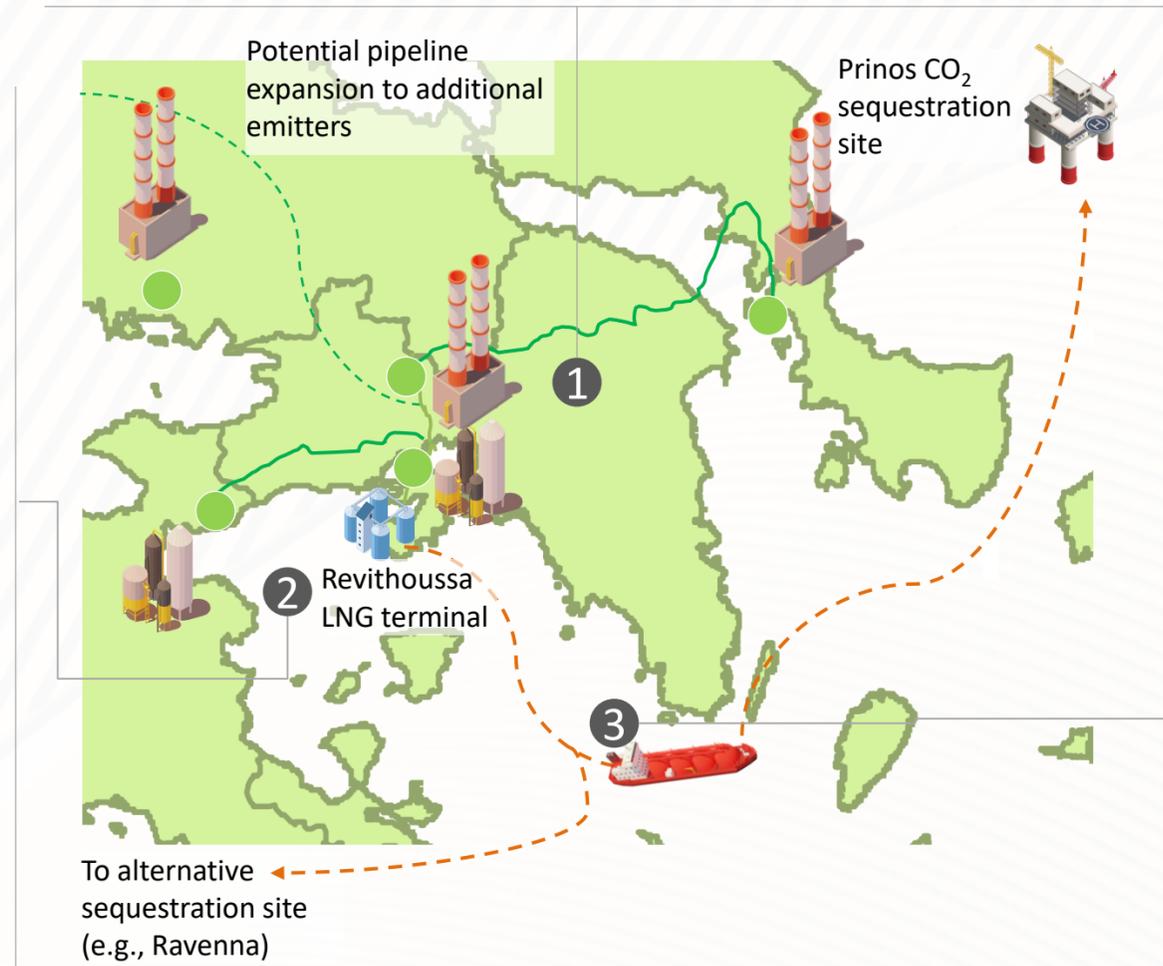
1 Pipeline network to integrate key emitters in South Greece

- Aggregates ~50% industrial emissions in Attica with expansion to Viotia
- From the very beginning, pipeline will be constructed to transfer up to 10 MTPA in case of expansion to additional emitters



CO₂ liquefaction facility with synergies with Revythoussa LNG terminal

- Scalable solution able to accommodate several emitters (expandable up to 10 MTPA)
- The facility will include an onshore and an offshore part i.e., FLSU for the temporary storage and back-up liquefaction of the CO₂
- Cost efficient CO₂ liquefaction, leveraging cold energy with LNG (~65% OpEx savings)



3 Large-scale liquid CO₂ vessel (22-40k cbm)

- Optimised vessel size and routes, considering draft limitations around Attica
- Up to ~60% cost savings from scale and maximising utilisation

Potential Ship Size and Outline Specification

| Ship Dimension | Chinese Yard | Korean Yard |
|----------------|--------------|-------------|
| Length | 180m | 180m |
| Breadth | 25.8m | 27.0m |
| Depth | 11.0m | 12.0m |

Project aspiration

≈ 9 MTPA CO₂

~5 MTPA in Phase 1

~9 MTPA in Phase 2

> 10

participating companies

Project of common interest



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THANK YOU

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