

HYSouthMarmara

South Marmara Hydrogen Shore

Türkiye

Mehmet Volkan DUMAN

South Marmara Development Agency

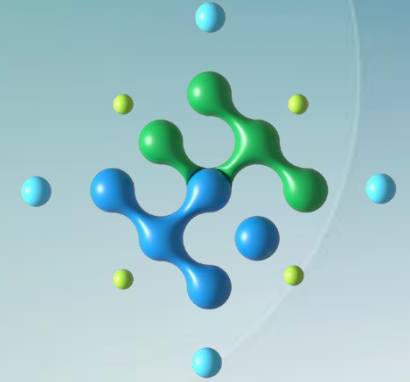
www.hysouthmarmara.org

mvduman@gmka.gov.tr

**KICK-OFF
MEETING
28 NOVEMBER**

H

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HY South
Marmara



EUROPEAN PARTNERSHIP



Co-funded by
the European Union



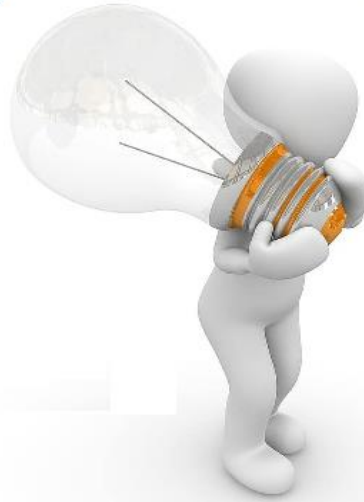


TÜRKİYE'NİN ELEKTRİĞİNİ ÜRETİYORUZ

TR22 Bölgesi **7,8** GW kurulu kapasitesi ile 2021 yılında Türkiye elektrik enerjisinin yaklaşık % **12,80**'inini üretmiştir.

www.gmka.gov.tr

GÜNEY MARMARA KALKINMA AJANSI



WE ARE GENERATING TURKEY'S ELECTRICITY

With an installed capacity of **7,8** GW, TR22 Region generated approximately **12,80** % of Türkiye's total electricity in 2021.

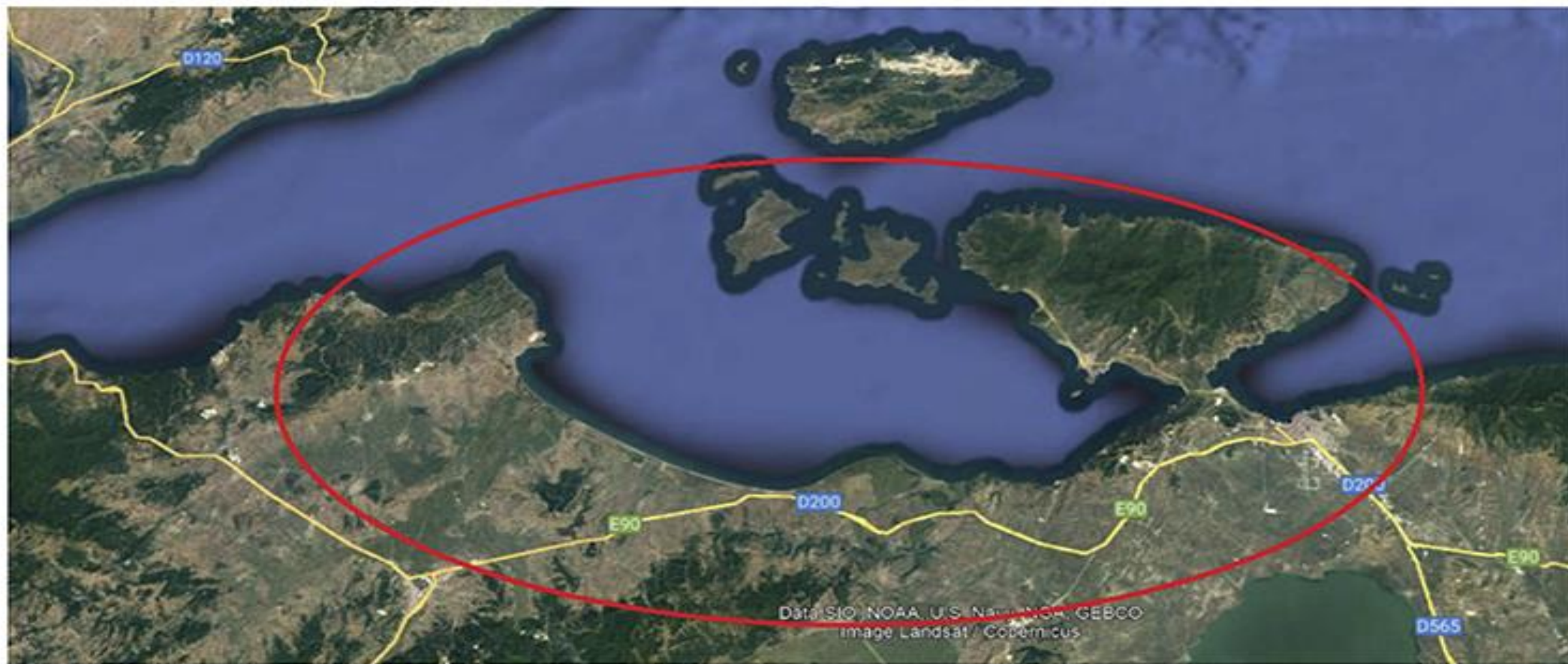
www.gmka.gov.tr

SOUTH MARMARA DEVELOPMENT AGENCY

Renewable Installed Capacity by Technology (MW) - 2021

	Balıkesir	%	Çanakkale	%	TR22 Bölgesi	%	TR	%
Wind	1.313,91	83,96	934,85	91,74	2.248,76	87,03	10.606,98	19,92
Solar	133,59	8,54	17,44	1,71	151,03	5,85	7.815,63	14,68
Biomass	81,95	5,24	23,15	2,27	105,09	4,07	1.644,52	3,09
Geothermal	0,00	0,00	30,45	2,99	30,45	1,18	1.676,17	3,15
Hydro	35,45	2,27	13,09	1,28	48,54	1,88	31.492,58	59,16
Total RE	1.564,90	100,00	1.018,98	100,00	2.583,87	100,00	53.235,88	100,00

South Marmara Hydrogen Shore



Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus

ELECTRICITY STATISTICS 2020 – WIND ENERGY

WPP	Installed Capacity (MW)
Bandırma	392,20
Karesi	292,50
Gelibolu	198,20
Ezine	181,00
Susurluk	176,40
Altıeylül	154,50
Lapseki	153,00
Çanakkale Merkez	124,00
Kepsut	90,90
Bayramiç	63,80
Biga	60,00

SOUTH MARMARA TOTAL GENERATION


5.157.686.836 kWh

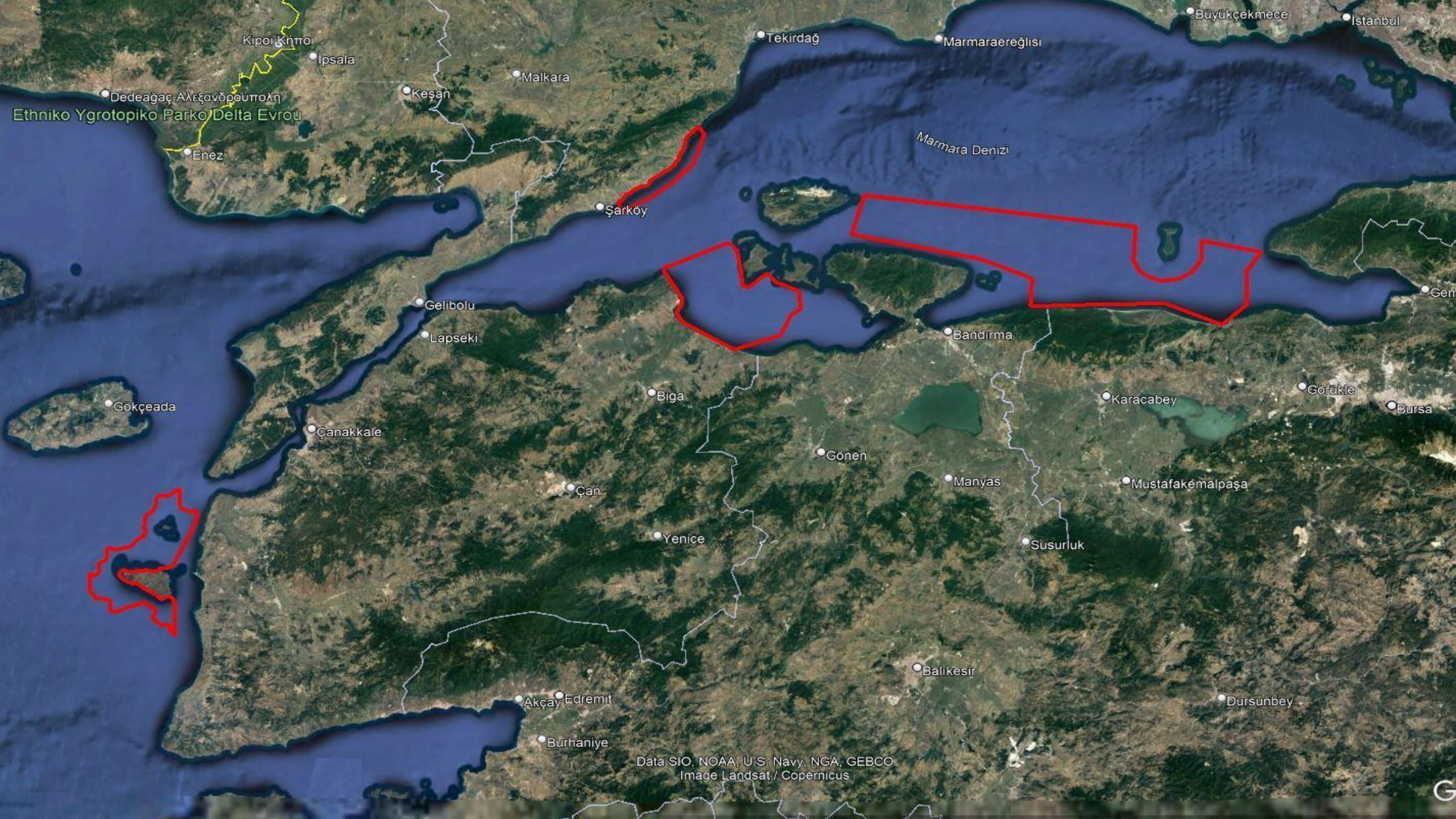
BANDIRMA-BİGA

1.412.724.212 kWh

BANDIRMA-BİGA

GÜNEY MARMARA

 **% 30**



Κίρσι Κήποι

Ipsala

Keşan

Malkara

Tekirdağ

Marmaraereğlisi

Büyükçekmece

İstanbul

Dedeağaç Αλεξανδρούπολη

Ethniko Ygrotopiko Parko Delta Evrou

Enez

Şarköy

Marmara Denizi

Gelibolu

Lapseki

Bandırma

Genç

Gökçeada

Çanakkale

Biga

Gönen

Karacabey

Görükle

Bursa

Çan

Manyas

Mustafakemalpaşa

Yenice

Susurluk

Balıkesir

Dursunbey

Akçay Edremit

Burhaniye

Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Image Landsat / Copernicus

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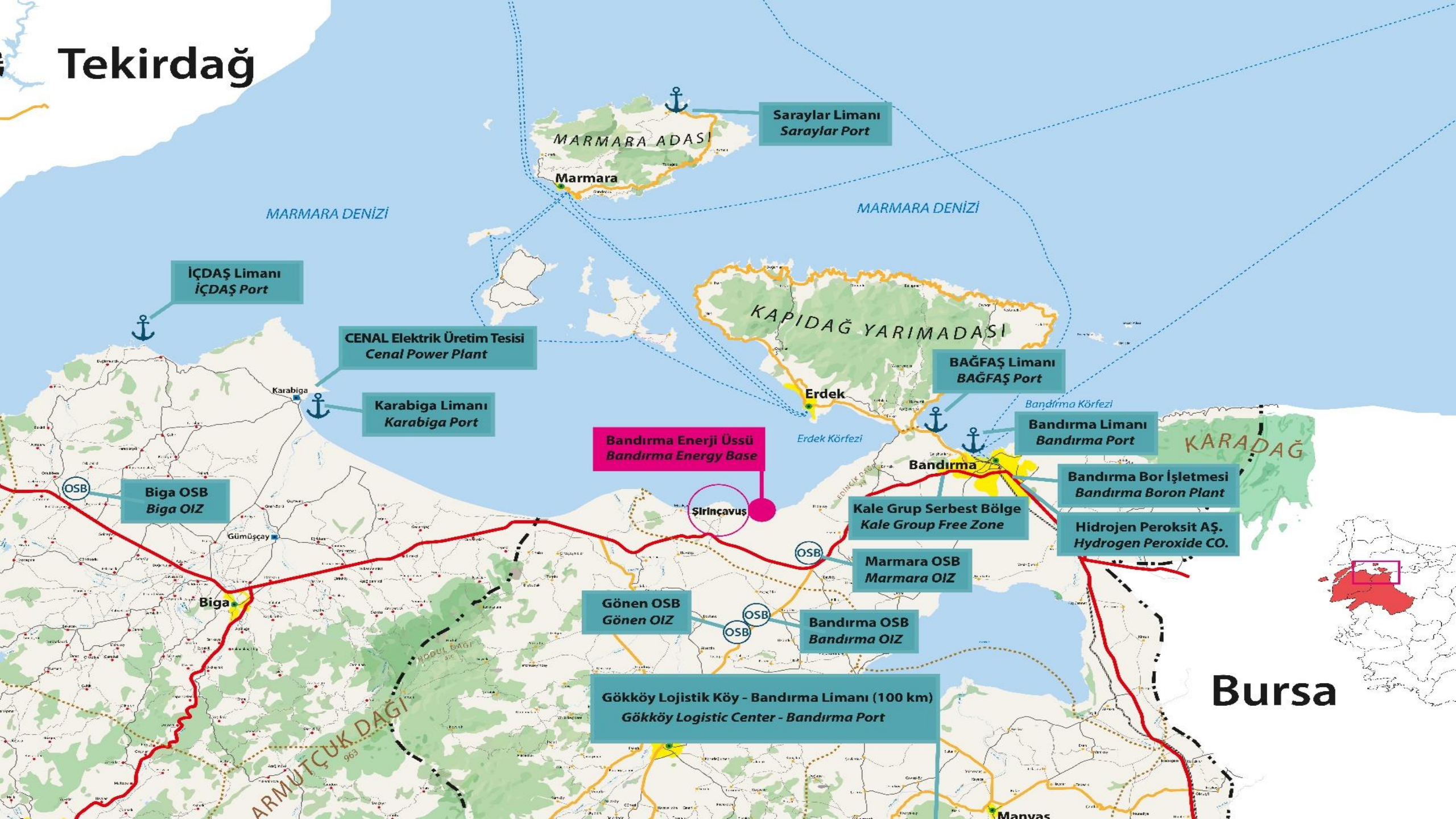


Area 1

Area 2

Area 3

Tekirdağ



Saraylar Limanı
Saraylar Port

İÇDAŞ Limanı
İÇDAŞ Port

CENAL Elektrik Üretim Tesisi
Cenal Power Plant

Karabiga Limanı
Karabiga Port

Biga OSB
Biga OIZ

Bandırma Enerji Üssü
Bandırma Energy Base

Şirincevus

Kale Grup Serbest Bölge
Kale Group Free Zone

Marmara OSB
Marmara OIZ

Gönen OSB
Gönen OIZ

Bandırma OSB
Bandırma OIZ

Gökköy Lojistik Köy - Bandırma Limanı (100 km)
Gökköy Logistic Center - Bandırma Port

BAĞFAŞ Limanı
BAĞFAŞ Port

Bandırma Limanı
Bandırma Port

Bandırma Bor İşletmesi
Bandırma Boron Plant

Hidrojen Peroksit AŞ.
Hydrogen Peroxide CO.

Bursa



BOTAS Pipelines

2021

- Ham Petrol Boru Hattı
Crude Oil Pipeline
- Doğal Gaz Boru Hattı
Natural Gas Pipeline
- BTO Ham Petrol Boru Hattı
BTC Crude Oil Pipeline
- Türk Akım
TurkStream
- + Mevcut Ham Petrol Akış Yünü
Current Crude Oil Flow Direction
- + Mevcut Doğal Gaz Akış Yünü
Current Natural Gas Flow Direction
- + CS (Kompresör İstasyonu)
Compressor Station
- + PS/PT (Pompa İstasyonu)
Pump Station
- + LNG Gazlaştırma Tesisi
LNG Regasification Facility
- + Yer Altı Depolama Tesisi
Underground Storage Facility
- + FSRU
FSRU
- + Ham Petrol Depolama ve Yükleme Tesisi
Crude Oil Storage and Loading Facility

DOĞAL GAZ GİRİŞ KAPASİTELERİ		
	Geriaklıyım	Hedeflenen
Rusya - Sibirya Akımı	47,3 milyon m ³ /gün	
BOTAŞ Marmara LNG Terminali	27 milyon m ³ /gün	
Sığirci LNG Terminali	40 milyon m ³ /gün	
Bibi Liwan FSRU	20 milyon m ³ /gün	
TANAP	17,3 milyon m ³ /gün	
Tuz Gölü Yer Altı Doğal Gaz Depolama Tesisi	20 milyon m ³ /gün	80 milyon m ³ /gün
BOTAŞ Dörtayak FSRU	20 milyon m ³ /gün	
Azerbaycan	19,1 milyon m ³ /gün	
İran	20,8 milyon m ³ /gün	
BOTAŞ Saray FSRU		20 milyon m ³ /gün
Silvan Yer Altı Doğal Gaz Depolama Tesisi	25 milyon m ³ /gün	75 milyon m ³ /gün

European Hydrogen Backbone Maps

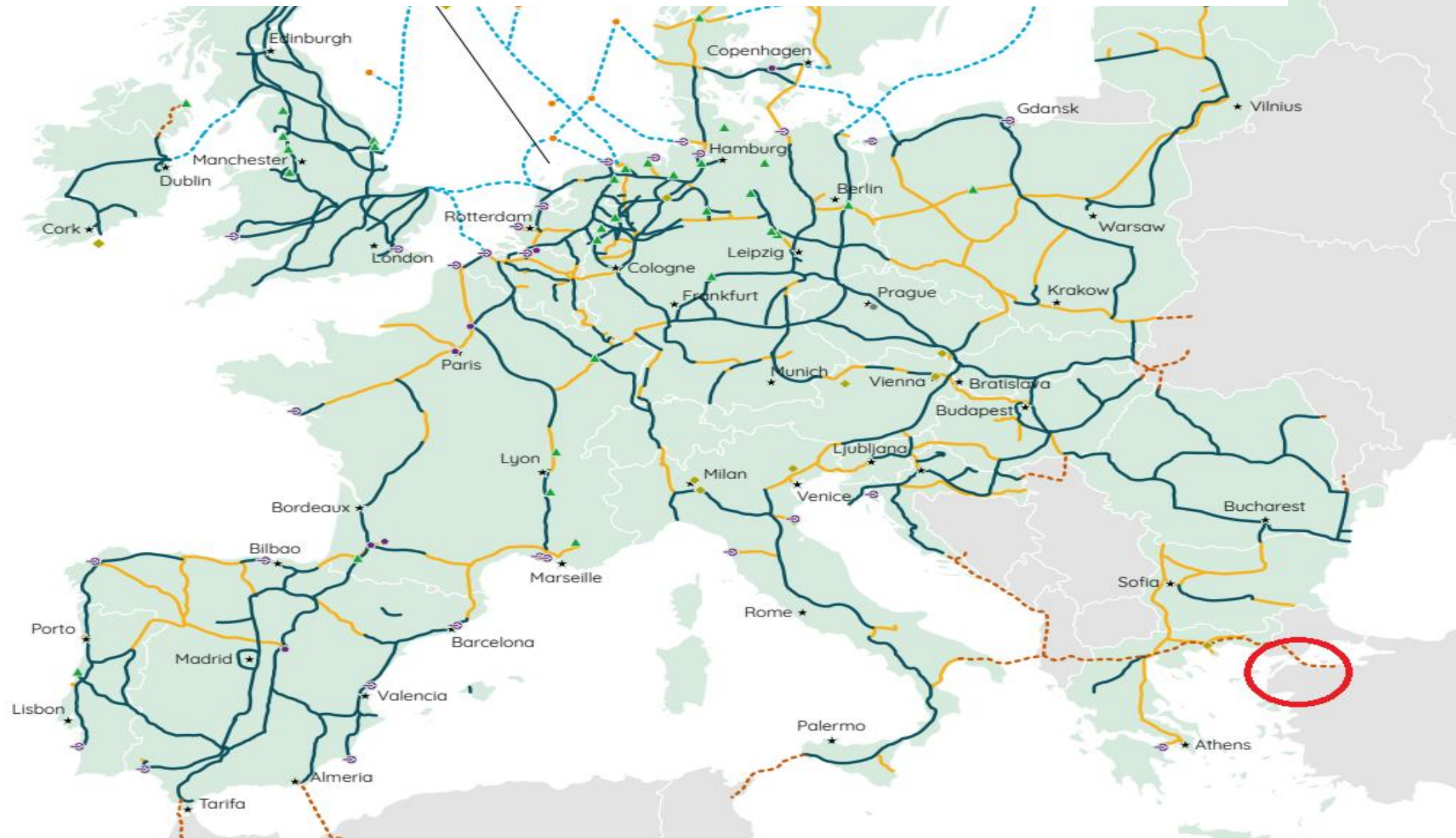
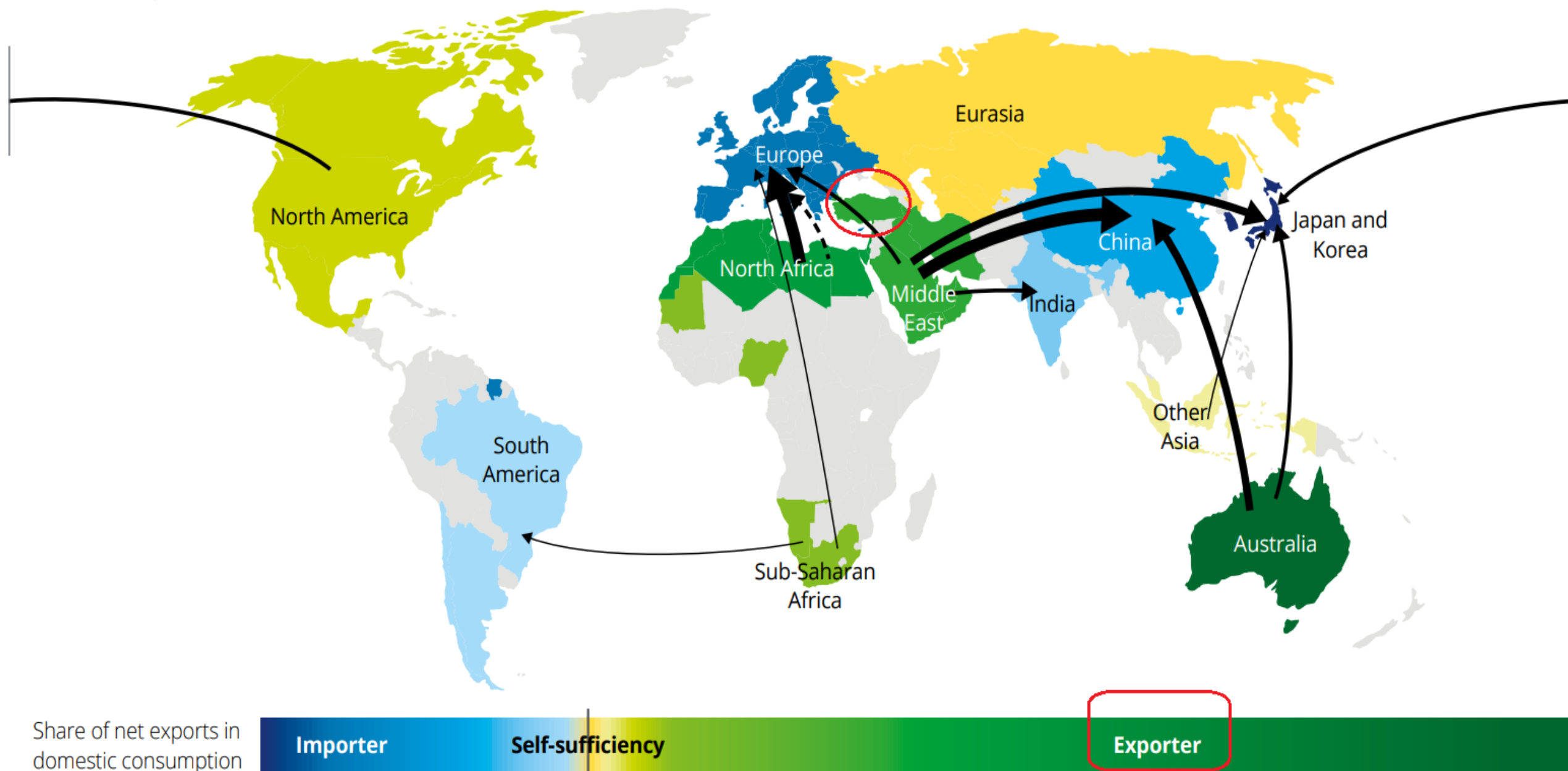
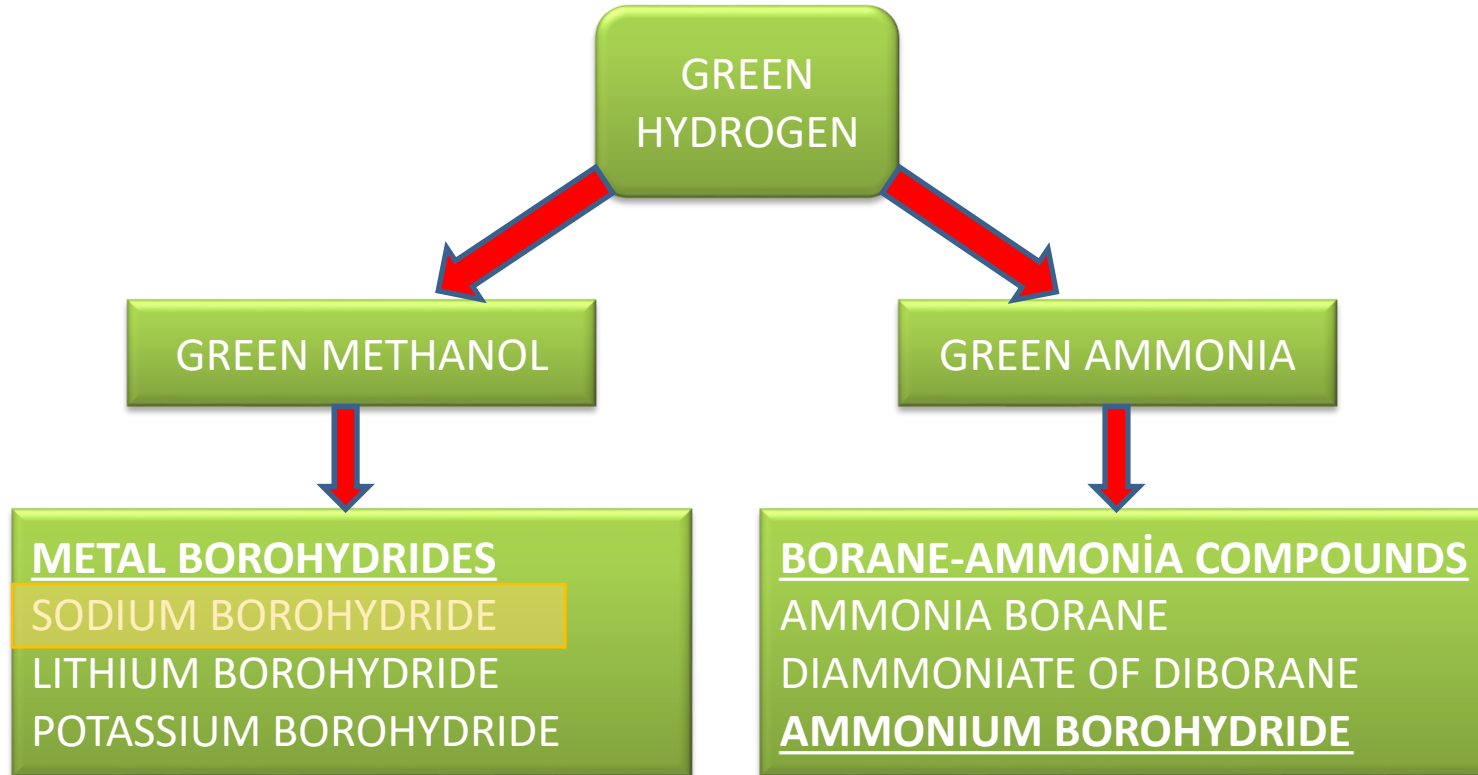


Figure 15. Global hydrogen trade among key regions, 2030

a) World map of trade

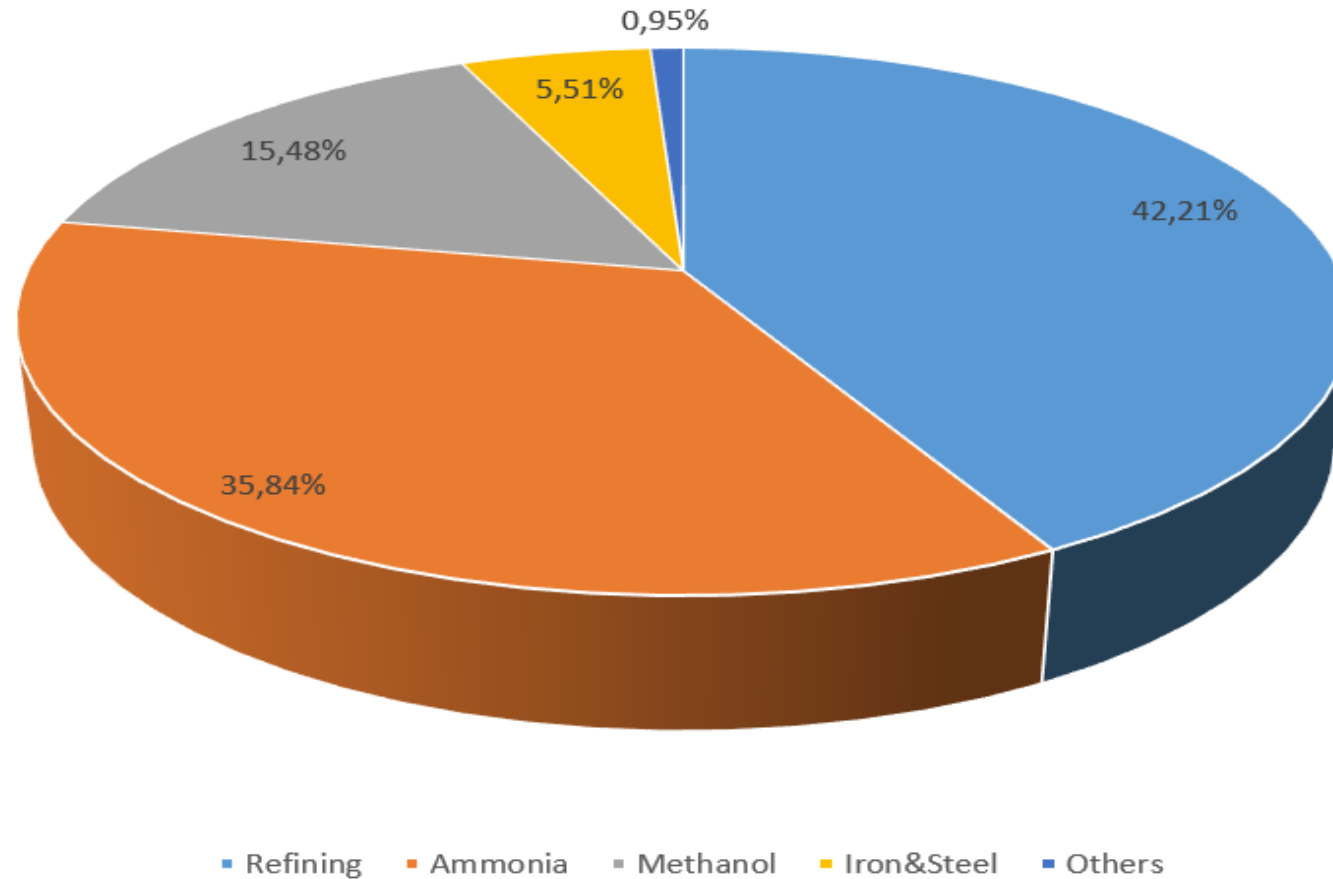


Framework of the Green Hydrogen Value Chain in South Marmara



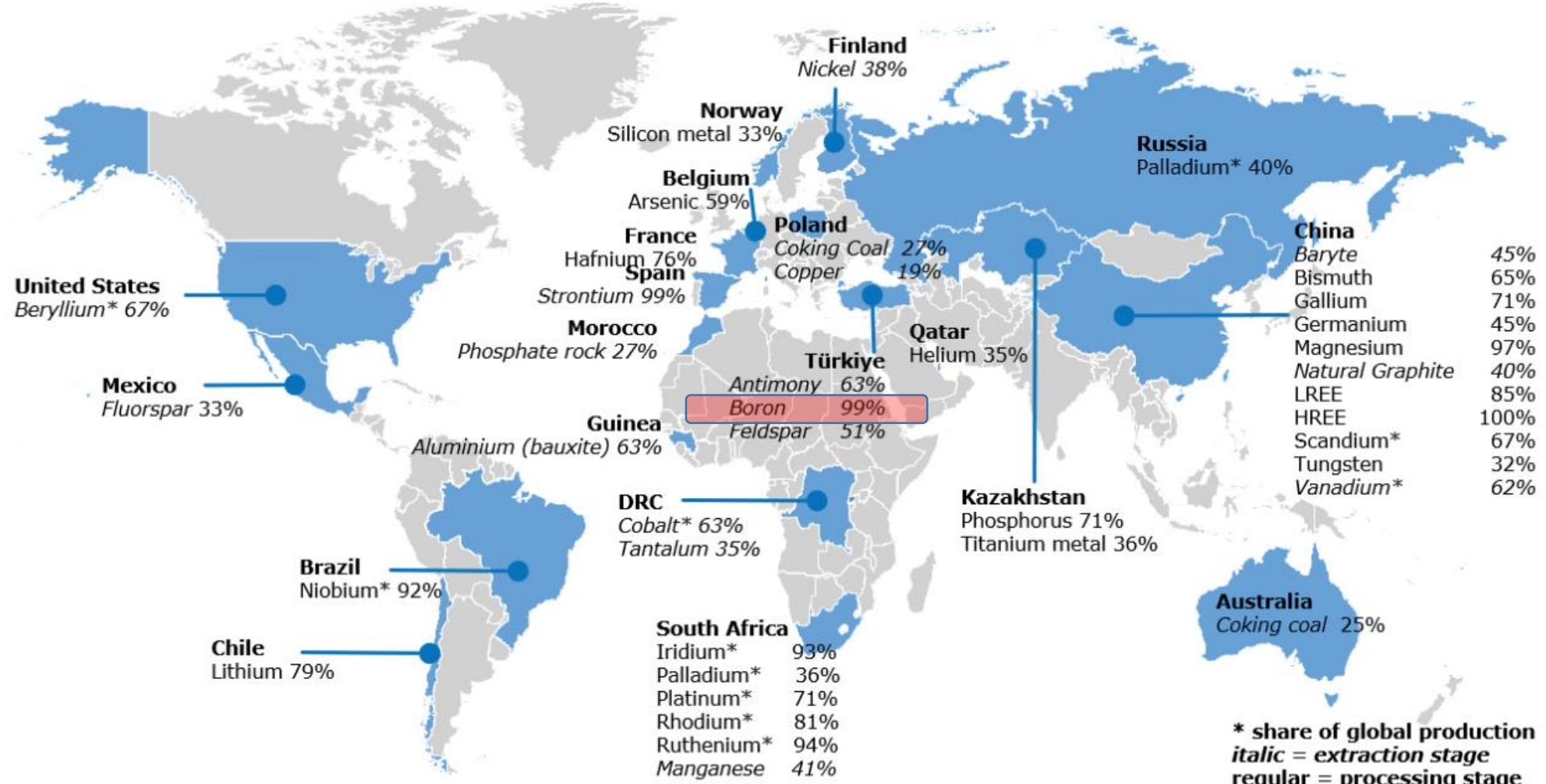
Hydrogen Demand Worldwide

Global Hydrogen Demand by Sector, IEA 2021



STUDY ON THE CRITICAL RAW MATERIALS FOR THE EU - 2023

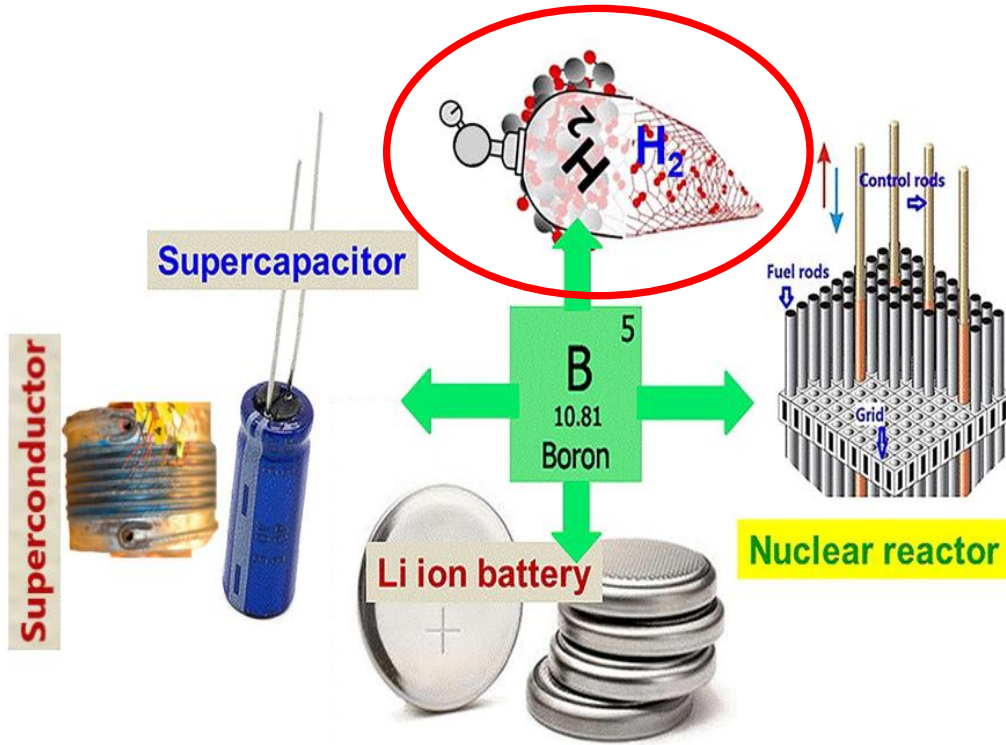
Major EU supplier countries of CRMs



* share of global production
italic = extraction stage
 regular = processing stage



Green Transition vs. Boron



1. Boron reduces carbon emissions by being used as a co-catalyst in coal, natural gas, gasoline and diesel systems.
2. Boron provides insulation due to its heat absorption feature.
3. **BORON** contributes to **HYDROGEN** production through its role in SynGas production from CO.
4. Boron-doped permanent magnets are used in traction motors of electric vehicles and wind energy generators.
5. Supercapacitor technology is based on an electrolyte containing small amounts of boron.
6. Boron is used in the production of superconductors.
7. The use of boron instead of lithium in the batteries of electric vehicles is another important subject under research.
8. There are studies and patents on energy generation by **BORON-HYDROGEN** fusion. With the development of the system, it could be a very strategic field in the future.
9. **BORON** is good at storing **HYDROGEN**.

Project Overview

Call year:
[2022]

Call topic:
HORIZON-JTI-
CLEANH2-2022-
06-02: Hydrogen
Valleys (small-
scale)

Project dates:
[01.07.2023 - 01.07.2028]

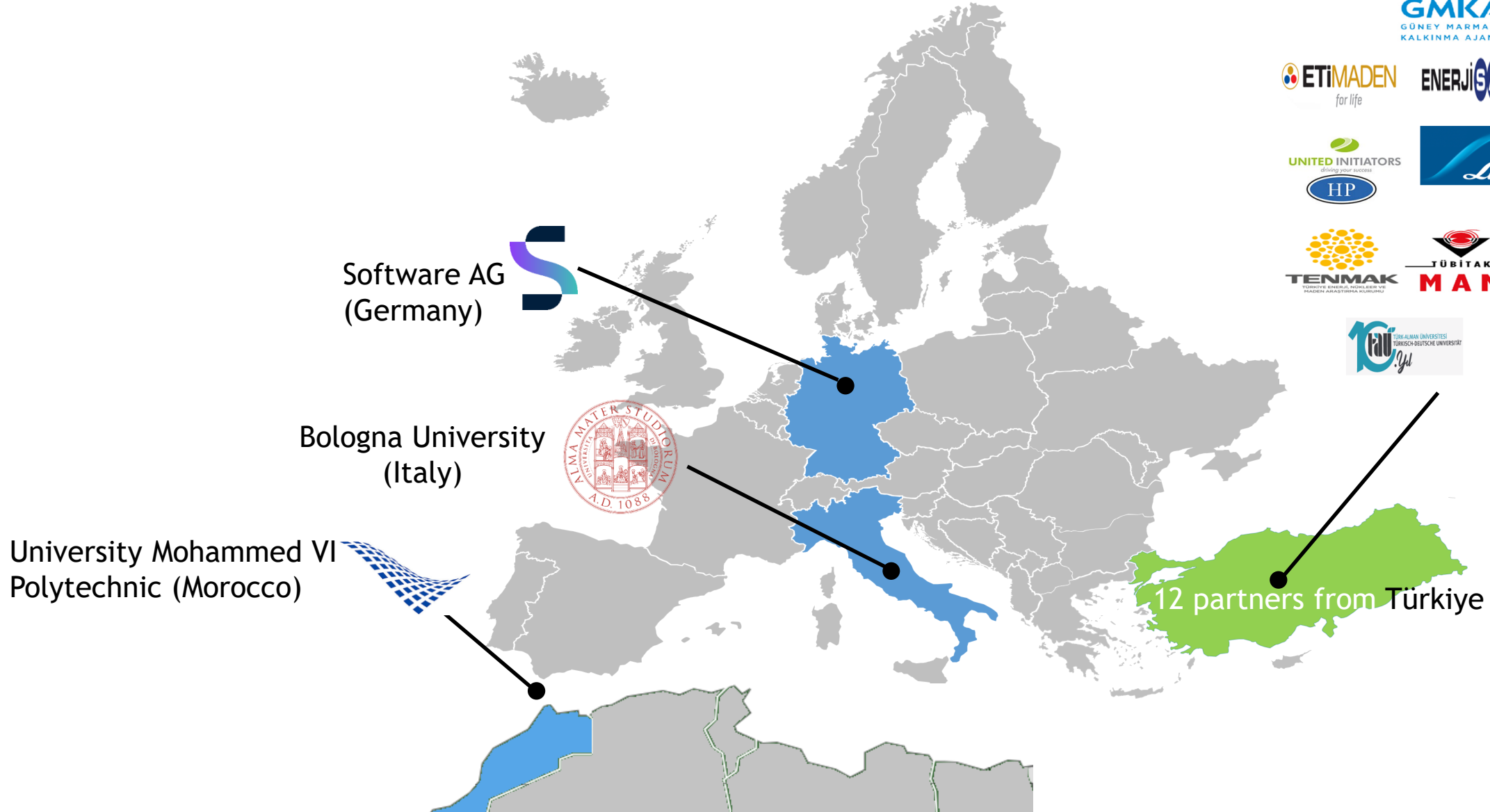
Total project budget:
[37.798.575,00 €]

HYSouthMarmara

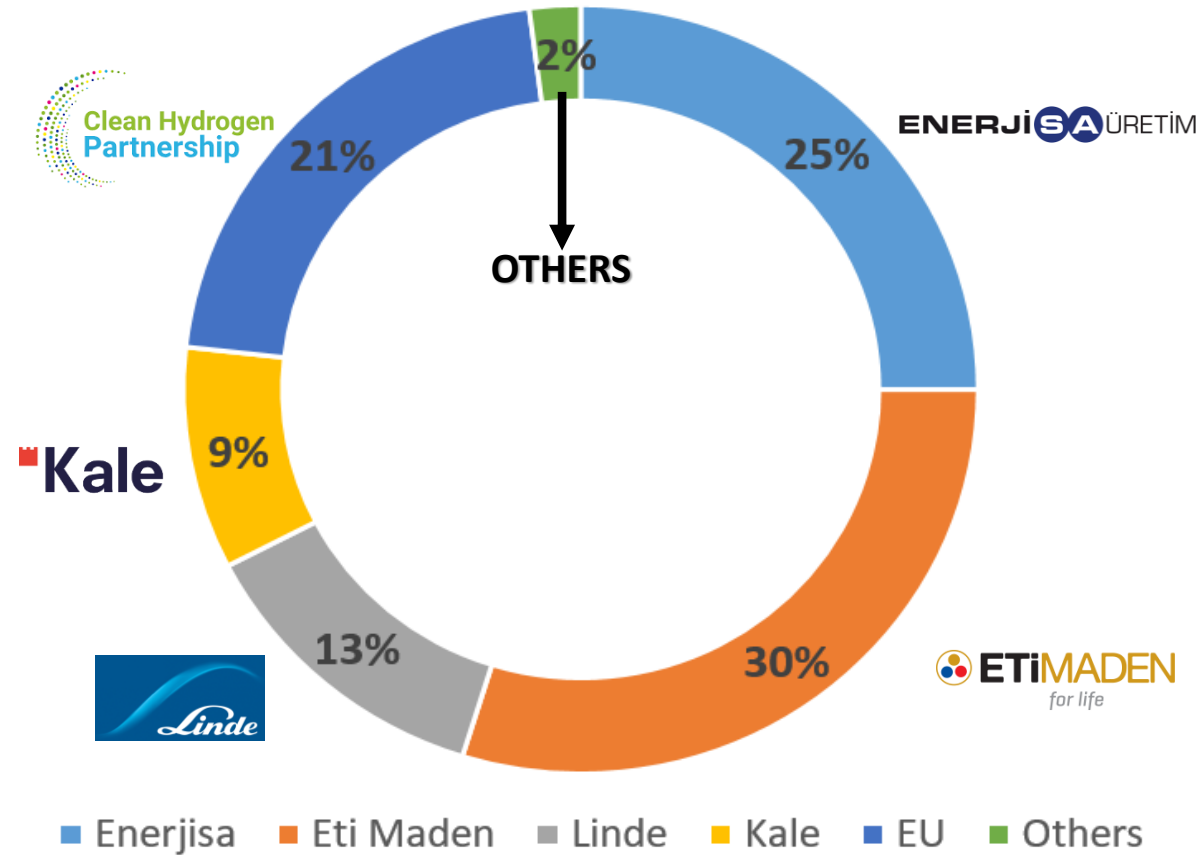
% stage of implementation
01/11/2023: [5 %]

Clean Hydrogen Partnership max. contribution: [7.999.937,50 €]
Other financial contribution:
[29.798.637,50 €]

Partners and location of the Hydrogen Valley



Project financing and funding



Calendar for project implementation and progress

Start Date: 01 July 2023



WORKPACKAGES			Y1	Y2	Y3	Y4	Y5
WP1	South Marmara Hydrogen Shore Road-map, with Strategic Business Model Development	GMKA					
WP2	Installing Green Hydrogen Plant, Digital Twin of the Plant & Monitoring Platform	ENERJİSA ÜRETİM					
WP3	Storage and Distribution of the Hydrogen	LINDE					
WP4	Industrial Use Cases 1& 2: Direct Intake/Replacement	SISECAM					
WP5	Industrial Use Case 3: Hydrogen as a fuel in energy-intensive industrial ceramic tile fast firing process	KALE					
WP6	Industrial Use Case 4: Installing Sodium Borohydride (NaBH ₄) Pilot Plant, Development of Sodium Borohydride-based Power Supply	TÜBİTAK MAM					
WP7	Dissemination and Engagement Activities	SU					
WP8	Project Management	ENERJİSA ÜRETİM					

TÜRKİYE'NİN Enleri-İlkleri

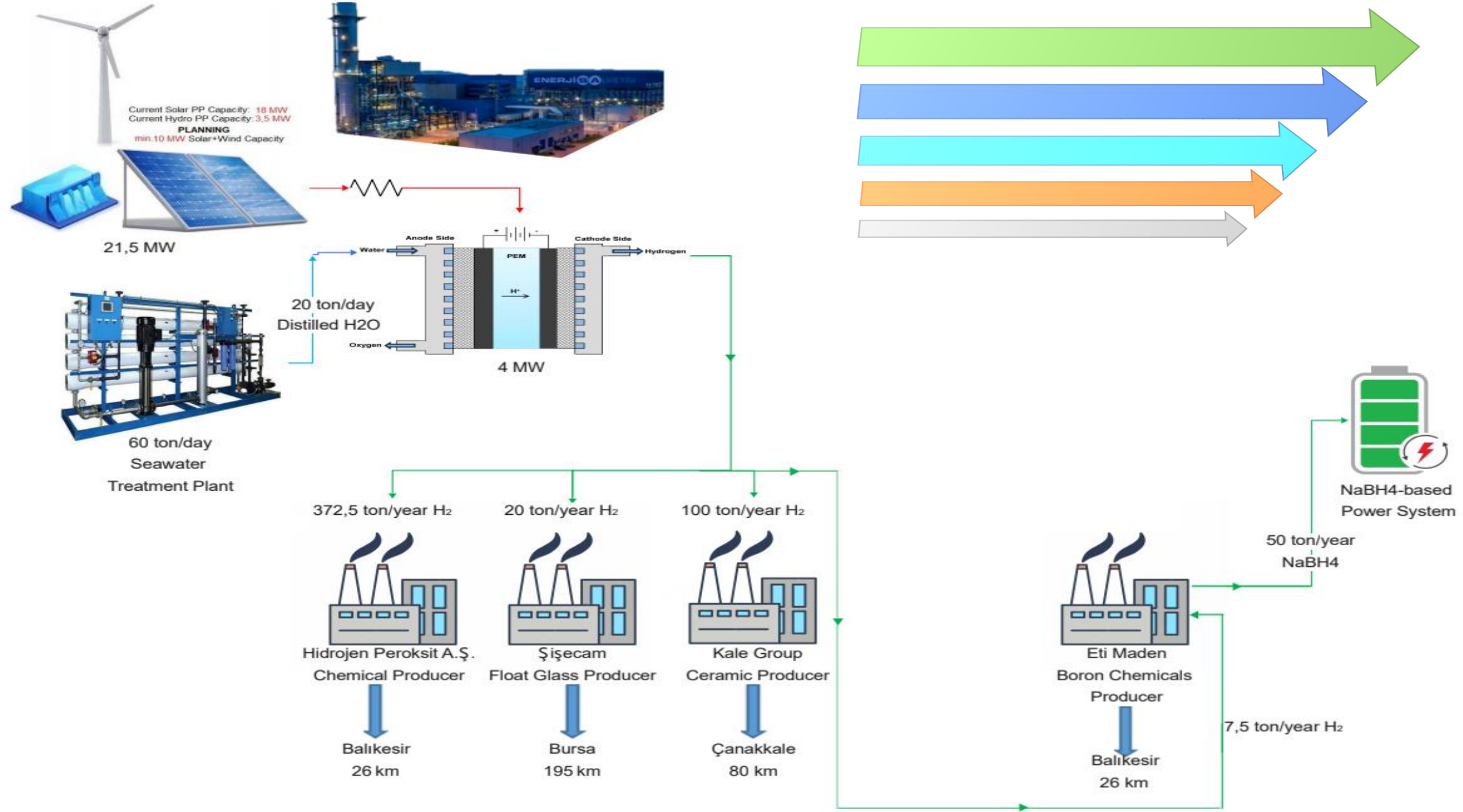


HYSOUTHMARMARA H₂ VALLEY PROJECT

- Largest Capacity Green Hydrogen Plant of the Turkish Industry
- Türkiye's First Regional Hydrogen Roadmap
- Investment Feasibilities in the Production of Green Hydrogen Derivatives
- First Commercial Production of a New Boron Chemical : Solid Phase Hydrogen Storage Material – Sodium BoroHydride
- Sodium BoroHydride-based New Power System
- Turkey's First Domestic Hybrid Ceramic Tile Kiln Using Hydrogen

SOUTH MARMARA H₂ SHORE PLATFORM

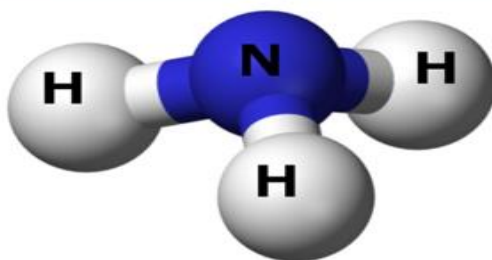
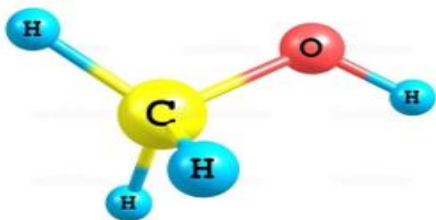
- First Domestic Green Hydrogen Plant of the Turkish Industry
- Türkiye's First Renewable Energy Park: Bandırma Energy Base
- Türkiye's First & Largest Hydrogen Platform
- Türkiye's First 100 % Green Hydrogen Industrial Zone
- Türkiye's First Hydrogen Training Center





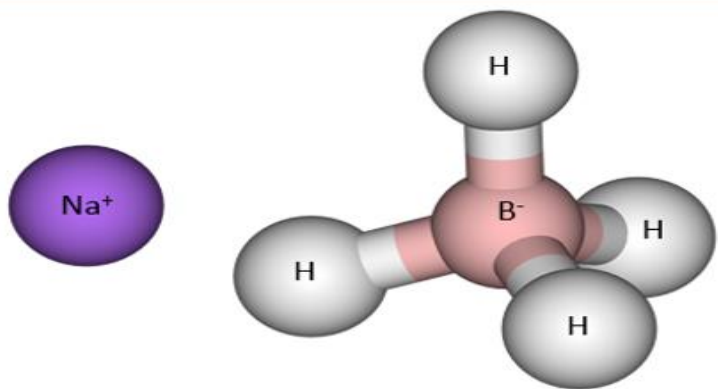
Green Hydrogen: **GAS**

- CHEMICAL INDUSTRY-1 (Hidrojen Peroksit A.Ş.)
- CHEMICAL INDUSTRY-2 (Eti Maden)
- GLASS INDUSTRY (Şişecam)
- CERAMIC INDUSTRY (Kale)

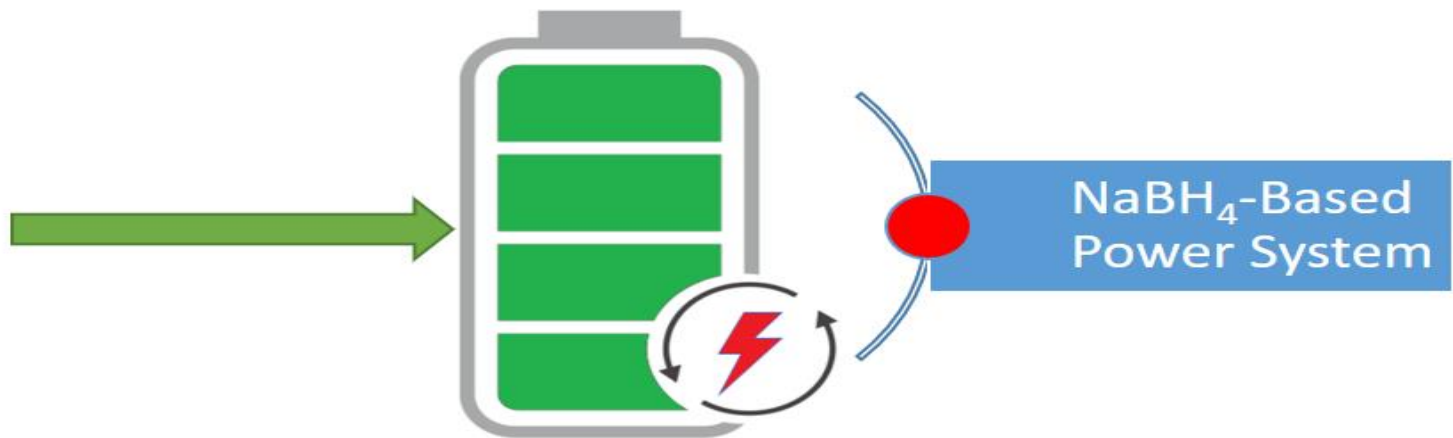


Green Methanol/Ammonia: **LIQUID**

- FORMALDEHYDE GLUE PRODUCTION (Kastamonu Entegre)
- FERTILIZER PRODUCTION (Bağfaş)



Sodium BoroHydride: **SOLID**





Bandırma Boron and Acid Factories

Hydrogen Proxite CO.

Şişecam Float Glass Plant

Enerjisa Üretim
Bandırma Energy Base,
Green Hydrogen
Production Site

Kale Ceramic
Çanakkale Factories

80 km

26 km

26 km

195 km

+

3D



Training and Skills

Title Of the Operation	Renewable Youth Energy (RE-YOU)
Title of the Programme	Employment, Education and Social Policy Sectoral Operational Programme – IPA II
Project Dates	05 August, 2020 - 05 April,2024
Base of Operation	South Marmara
Budget	€ 8 Million
EU Contribution (%)	85
Beneficiary	South Marmara Development Agency
Partners	Balıkesir University, Çanakkale Onsekiz Mart University
Web Site of the Operation	http://reyouproject.org/en/homepage/



Renewable Youth Energy

IPA Period:
[IPA II]

Programme Title:
Employment,
Education and
Social Policy
Sectoral
Operational
Programme

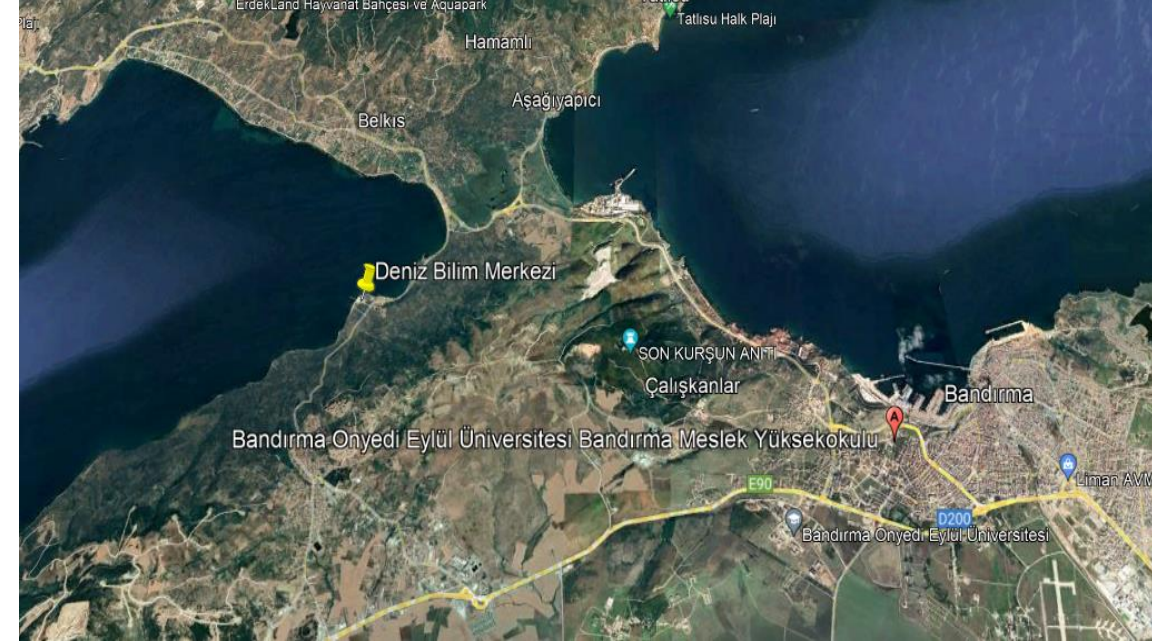
Project dates:
[05.08.2020 - 05.04.2024]

Total project budget:
[8 MEUR]

RE-YOU
Renewable Youth Energy

% stage of implementation
15/11/2023: [90 %]

**Ministry of Labor and Health of the
Republic of Türkiye contribution:**
[15 %]
EU financial contribution: [85 %]



GREEN MARINE INDUSTRY R&D TEST and TRAINING CENTER OFFSHORE WIND and HYDROGEN



Replication activities

Mature H₂ Valleys

HAEVENN: H₂ Energy Applications in Valley Environments for Northern Netherlands



NRL: The model region Northern German Living Lab comprises the federal states of Hamburg and Schleswig-Holstein, western Mecklenburg-Western Pomerania and Bremerhaven.



Young H₂ Valleys

University of Bologna: Realization of a H₂ Valley in the industrial area of Ravenna - ITALY



University Mohammed VI Polytechnic: H₂ Moroccan Scenario - MOROCCO



Communication and Dissemination-1



Signing Ceremony
was held for the
Consortium Agreement
of
HYSouthMarmara

Communication and Dissemination-2

Hydrogen Valleys are truly going global – As of today, we have identified **more than 80 Hydrogen Valleys** under development around the world



Hydrogen Valley Platform: H2Valleys



Clean Hydrogen Partnership



MISSION INNOVATION



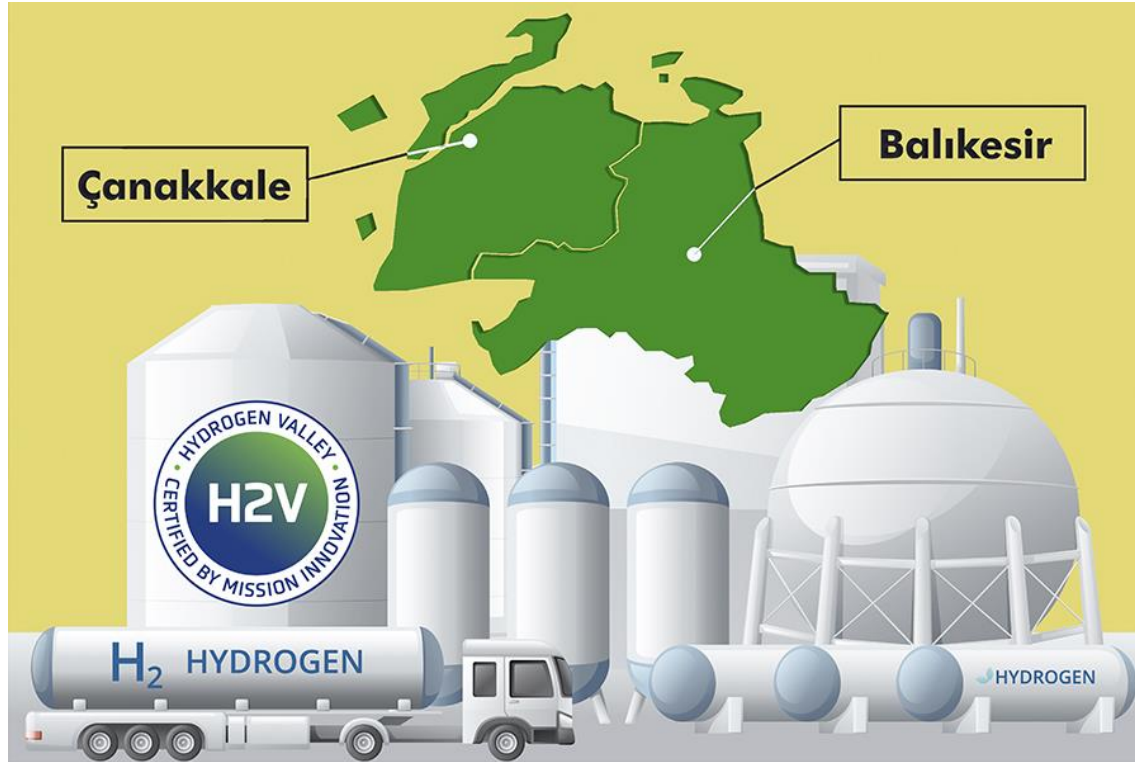
Clean Hydrogen Partnership

EUROPEAN PARTNERSHIP



Co-funded by the European Union

Communication and Dissemination-3

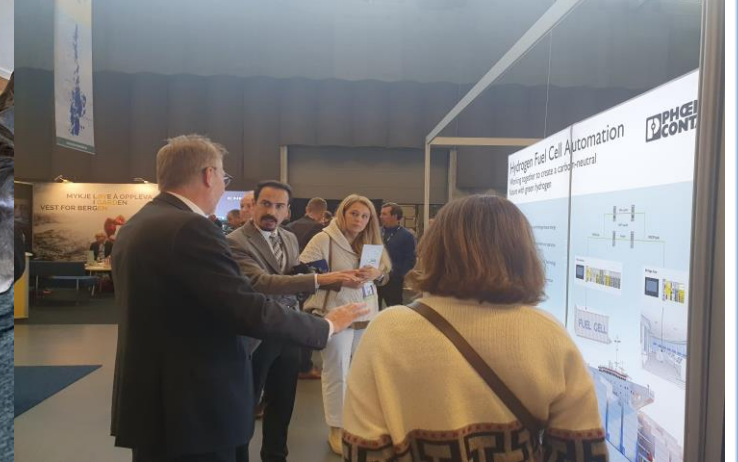


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Communication and Dissemination-4



• Synergies With Other Projects And Programmes - 1

Interactions with projects funded under EU programmes



- Consortium Leader: ETN
- Eigerøy island in Norway.
- 6 MW Electrolyser
- Offtaker: Prima Protein


GREEN HYDROGEN @ BLUE DANUBE

- Consortium Leader: VERBUND
- First Step: 6 MW Electrolyser
- 4 Different Offtakers

18 Partners	10 European countries	4 Years Oct 2020 - Sep 2024
1 Demo island Eigerøy (NO)	2 Follower islands Crete and Western Isles	€8.37 Budget (EU contribution: €7M)

15 Partners	6 European Countries	3 Primary Energy Sourcing
1 Demo Plant	80 Ktonnes/year Green H ₂	5 Billion €

• Synergies With Other Projects And Programmes -2



South Marmara Hydrogen Shore - HYSouthMarmara



South Marmara Hydrogen Shore Platform



Green Transition of Turkish Blue - TURKuoiseMarmara



SAYEM Clean Road Transport

Green Transition of Turkish Blue TURKuoiseMarmara

Participant no.	Participant organisation name	Country
1	Güney Marmara Kalkınma Ajansı (GMKA)	TR
2	Bursa Eskişehir Bilecik Kalkınma Ajansı (BEBKA)	TR
3	Bandırma Onyediy Eylül Üniversitesi (BANU)	TR
4	Software AG Türkiye (SAG)	TR
5	İçdaş Çelik Enerji Tersane ve Ulaşım Sanayi A.Ş. (İÇDAŞ)	TR
6	Enerjisa Enerji Üretim A.Ş. (ENERJİSA)	TR
7	Çelebi Bandırma Uluslararası Limanı İşletmeciliği A.Ş. (CELEBI)	TR
8	Eti Maden Operations General Directorate (ETI MADEN)	TR
9	Türkiye Bilimsel ve Teknolojik Arastırma Kurumu (TUBITAK)	TR
10	Navtek Deniz Teknolojileri A.Ş. (NAVTEK)	TR
11	Elkon Elektrik Sanayi ve Ticaret A. Ş (ELKON)	TR
12	Linde Gaz A.S. (LINDE)	TR
13	Çanakkale Onsekiz Mart Üniversitesi (COMU)	TR
14	Türkiye Gemi İnşa Sanayicileri Birliği (GISBİR)	TR
15	Denizüstü Rüzgar Enerjisi Derneği (DURED)	TR
16	ASELSAN A.Ş. (ASELSAN)	TR
17	GESTAŞ Deniz Ulaşım Turizm Tic. A.Ş. (GESTAŞ)	TR
18	Türkiye Liman İşletmecileri Derneği (TÜRKLİM)	TR
19	Türk Loydu Uygunluk Değerlendirme Hizmetleri A.Ş. (TÜRKLOYDU)	TR
20	Hidroteknik Yat, Gemi ve Deniz Yapıları Tasarım Tek. Ltd. (HİDROTEKNİK)	TR
21	YEKE Denizcilik A.Ş. (YEKE)	TR
22	Piri Reis Üniversitesi (PRÜ)	TR
23	Türk Armatörler Birliği (TAB)	TR
24	Rightship UK Ltd. (RIGHTSHIP)	UK
25	ARTTIC PNO International Management Services Company (ARTTIC)	BE

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GESTAŞ ÇANAKKALE İÇDAŞ PORT ÇELEBİ BANDIRMA PORT GEMLİK PORT

H₂ Green Transition of Turkish Blue H₂
TURKuoiseMarmara
SOUTH MARMARA HYDROGEN SHORE
HYSOUTHMARMARA H₂ VALLEY



WORKPACKAGES of TURKuoiseMarmara

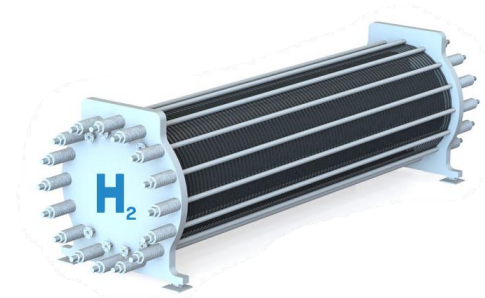
NO	WORK PACKAGE TITLE	WP OWNERS
WP1	Building Emission Inventory of the Ports and Ferry Docks in South Marmara	RIGHTSHIP, HİDROTEKNİK, TÜRK LOYDU
WP2	Creating South Marmara Turquoise Growth Strategy	GMKA, BEBKA, BANU, PRÜ, COMU
WP3	Establishing Green Marine Industry R&D, Test, and Training Center	BANU, DÜRED, ENERJISA, TÜBİTAK
WP4	Digital Twin of Bandırma and İÇDAŞ Ports	SAG, ASELSAN
WP5	Good Practices in Ports Case 1 – Using Zero-Emission Electric Tugboat in the Operations Conducting in Bandırma Port	NAVTEK, ELKON, ÇELEBİ
WP6	Good Practices in Ports Case 2 – Hydrogen-Powered Tugboat in the Operations Conducting in İÇDAŞ Port (Metal Hydrides)	NAVTEK, ELKON, İÇDAŞ, ENERJISA
WP7	Good Practices in Ports Case 3 – Hydrogen-Powered Tugboat in the Operations Conducting in İÇDAŞ Port (Sodium BoroHydride)	TÜBİTAK, TÜRKLOYDU, İÇDAŞ, ETİ MADEN
WP8	Good Practices for Onboard Use Case 4 – Use of Compressed Hydrogen + Fuel Cell Combined Electricity Source for AUX use (mainly Reefer containers) in Cargo Vessels	YEKE, TÜBİTAK
WP9	Good Practices in Ports Case 5 – Use of Electric Ferryboat in GESTAŞ Operations	ELKON, NAVTEK, GESTAŞ
WP10	Dissemination and Communication Activities	BANU, TÜRKKLİM, GİSBİR, TAB
WP11	Project Management	ARTTIC, BANU, GMKA

Risks & challenges -1

➤ **Falling Natural Gas Prices**



➤ **Long Delivery Times for Electrolysers**



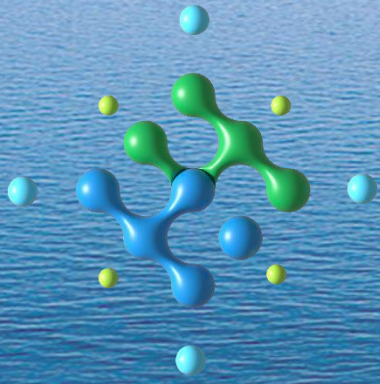
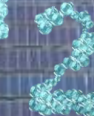
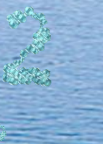
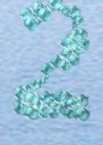
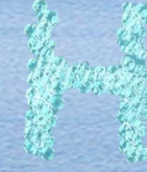
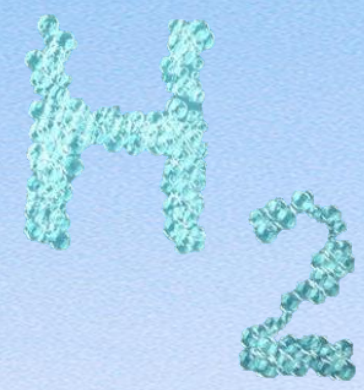
➤ **Incentive Mechanisms for Closing the Cost Gaps**



Green Vision of South Marmara

- **Continue our leadership in green electricity installed capacity in Türkiye**
- **Become a Center for Green Fuel Production**
- **Become Türkiye's first carbon-neutral region on the path toward 2053**
- **Become a Center for Trainings in Renewable Energy Technologies**

TEŞEKKÜR EDERİM...



HY South
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