

SE Europe's Hydrocarbon Resources Enhanced As Natural Gas Assumes Central Role in Region's Economic Development

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FOR SOUTH EAST EUROPE



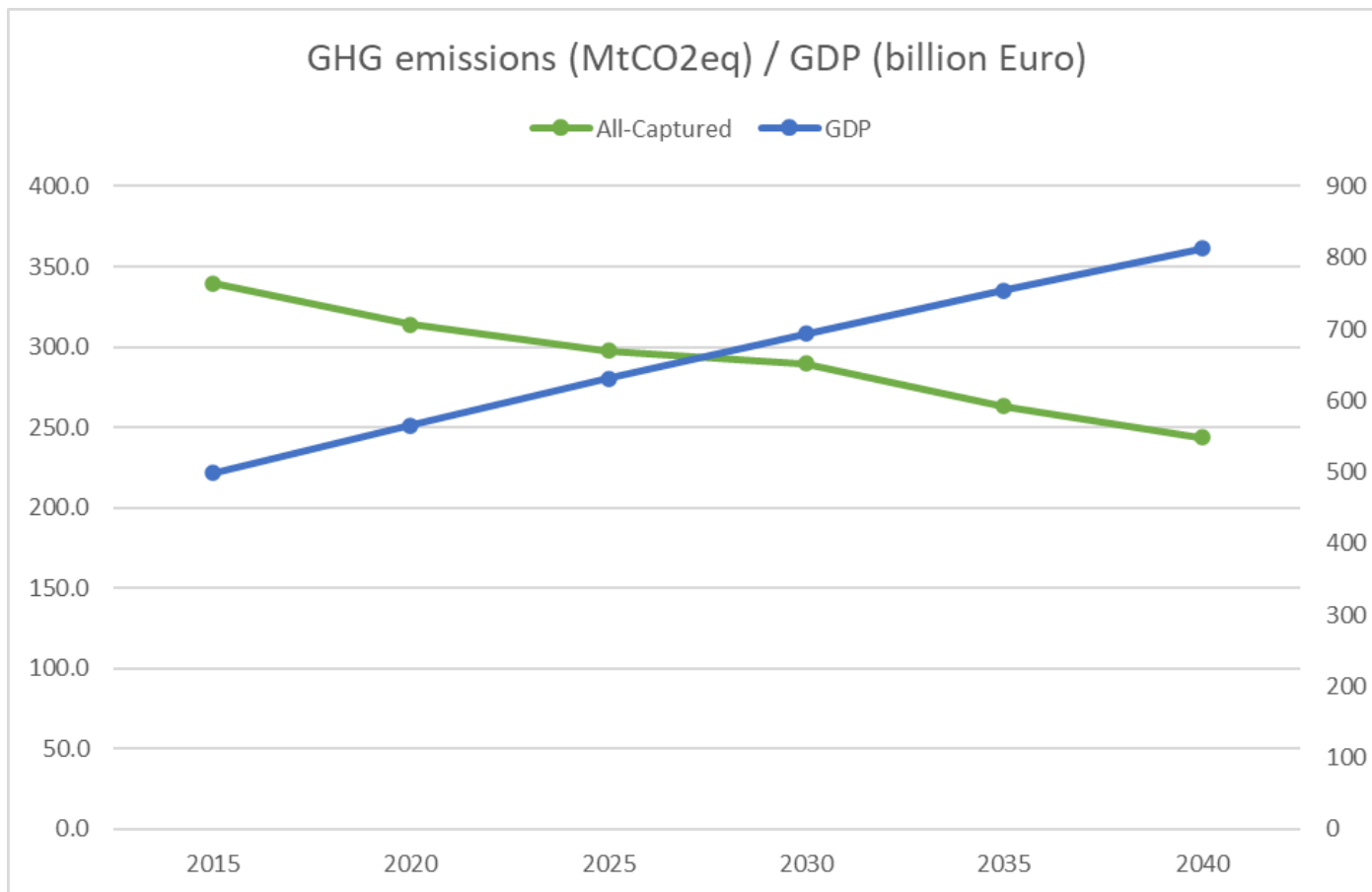
Key Energy Challenges for SE Europe (I)

- ❑ As the world, and Europe in particular, has entered a critical Energy Transition phase, SEE faces a multitude of challenges.
- ❑ These challenges stem from decisions taken at the highest EU level (with lukewarm support from some member countries) and set targets which aim for a radical overhaul of the current energy mix by 2030
- ❑ Over the last 18 months, the energy debate in Europe is literally driven by EU's Green Deal and the "imminent" switch to clean fuels to the exclusion of everything else (even zero emission nuclear power)
- ❑ Let us remind ourselves which are the energy and emission targets for 2030 set by EU, following adoption of its much touted Green Deal introduced in 2020
 - GHG Emissions (55%)
 - RES (38%-40%)
 - Energy Efficiency (36%-37%)
- ❑ Surprisingly enough EU policy makers have refrained from setting policy goals and specific targets for both the upstream and downstream sectors. It is implied though, in no uncertain terms, that oil & gas use is to be discouraged by any means possible, with the oil & gas industry being targeted as the main culprits for EU's (and the world's) perceived environmental woes.

Key Energy Challenges for SE Europe (II)

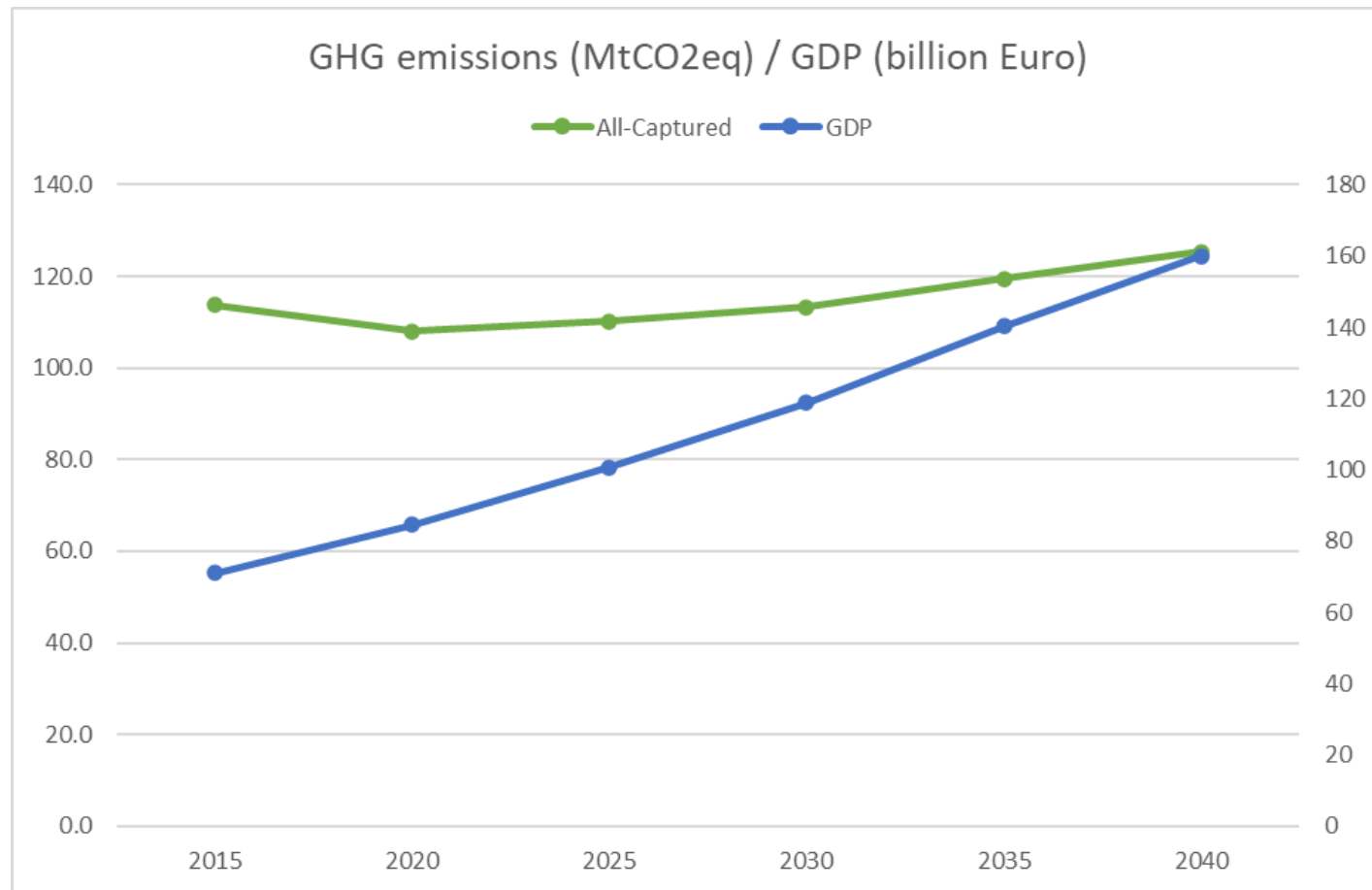
- ❑ As part of EU's establishment anti hydrocarbon drive, both the EIB and EBRD (under instructions from Brussels) have taken firm decisions to stop - since the start of 2021 - any funding for oil, gas and coal projects.
- ❑ Through a combination of policy goals and police type measures, the EU is trying to effect lasting changes in consumer behaviour and industry growth. The alternatives being the heavy promotion of all types of electric vehicles and "green hydrogen" whose extremely high costs make the setting of targets for future use very uncertain.
- ❑ Yet, nobody is talking seriously about the impact of a fast growing electric driven transport sector on power generation and the role of gas in particular - which given EU's frantic determination to eliminate coal - will have to provide much needed base load for power generation, without which no sizeable RES penetration can be achieved.
- ❑ According to latest euro thinking, the interim introduction and use of "blue hydrogen" is for the moment to be tolerated on condition that it will soon be replaced by environmentally correct "green hydrogen". One should note though that "blue hydrogen" has not even started being used in any notable scale.
- ❑ It is against this negative background that we must consider the prospects for the upstream sector in SE Europe and the East Mediterranean.
- ❑ In the next series of slides, and based on IENE's latest work, I shall explain how the nexus of pursued policies is going to affect oil and gas use in the region - includes 3 basic groups: EU countries, West Balkans and Turkey.

EU Member States in SEE: GHG Emissions and GDP Projections (2015-2040)



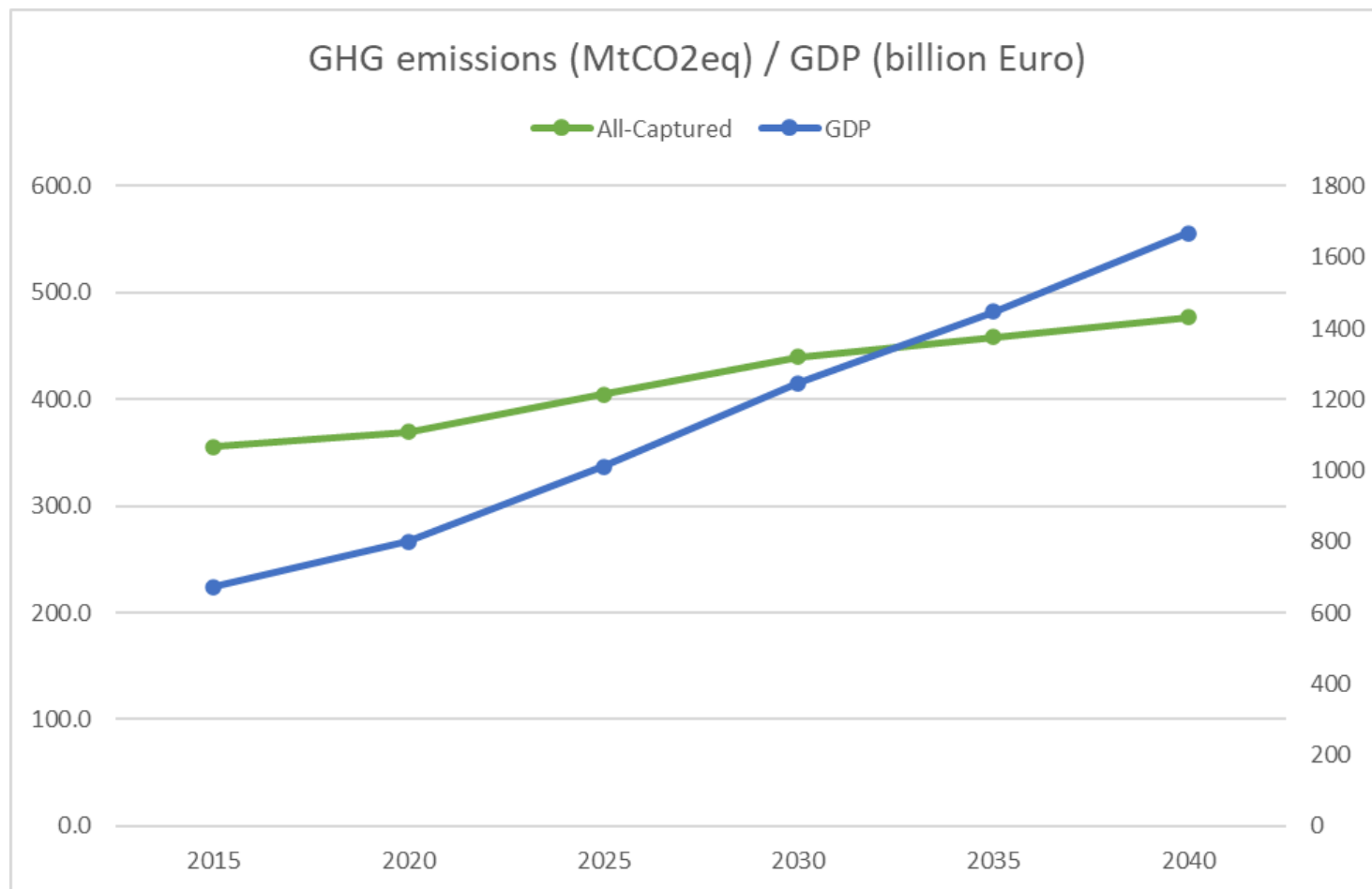
Source: IENE's "SEE Energy Outlook 2020/2021"

Western Balkans: GHG Emissions and GDP Projections (2015-2040)



Source: IENE's "SEE Energy Outlook 2020/2021"

Turkey: GHG Emissions and GDP Projections (2015-2040)

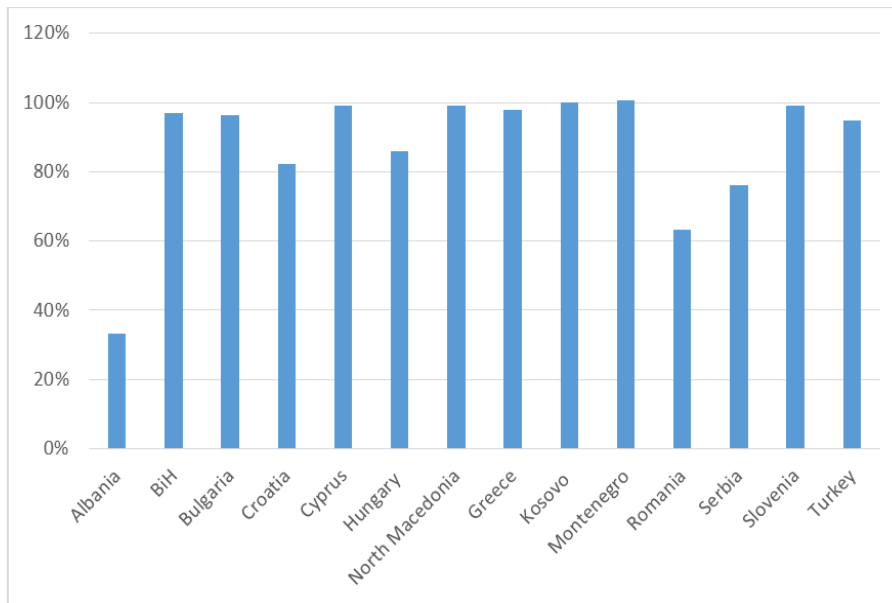


Source: IENE's "SEE Energy Outlook 2020/2021"

High Oil and Gas Import Dependence in SE Europe

□ Currently, SE Europe is relied highly on oil and gas imports.

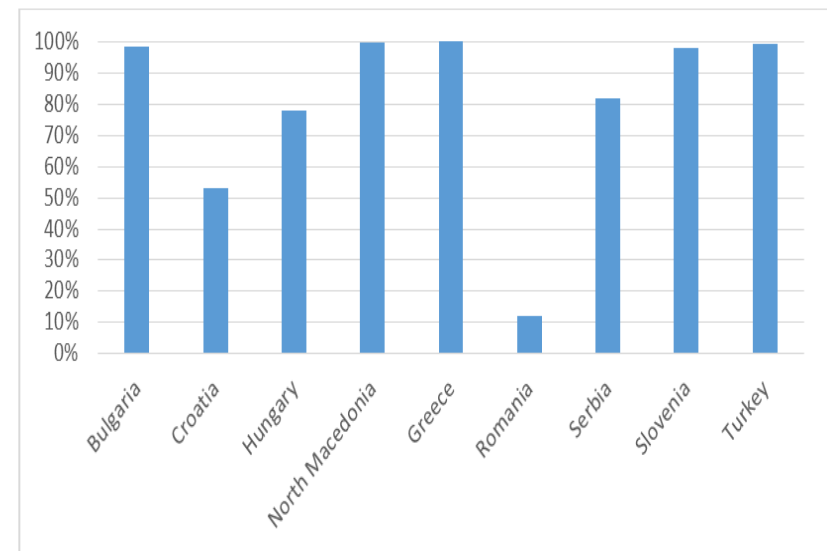
Figure 5: Total Oil and Petroleum Products Dependence (%) in SE Europe (2018)



Notes: A dependency rate in excess of 100% relates to the build-up of stocks.

Source: Eurostat

Figure 6: Gas Dependence (%) in SE Europe (2018)

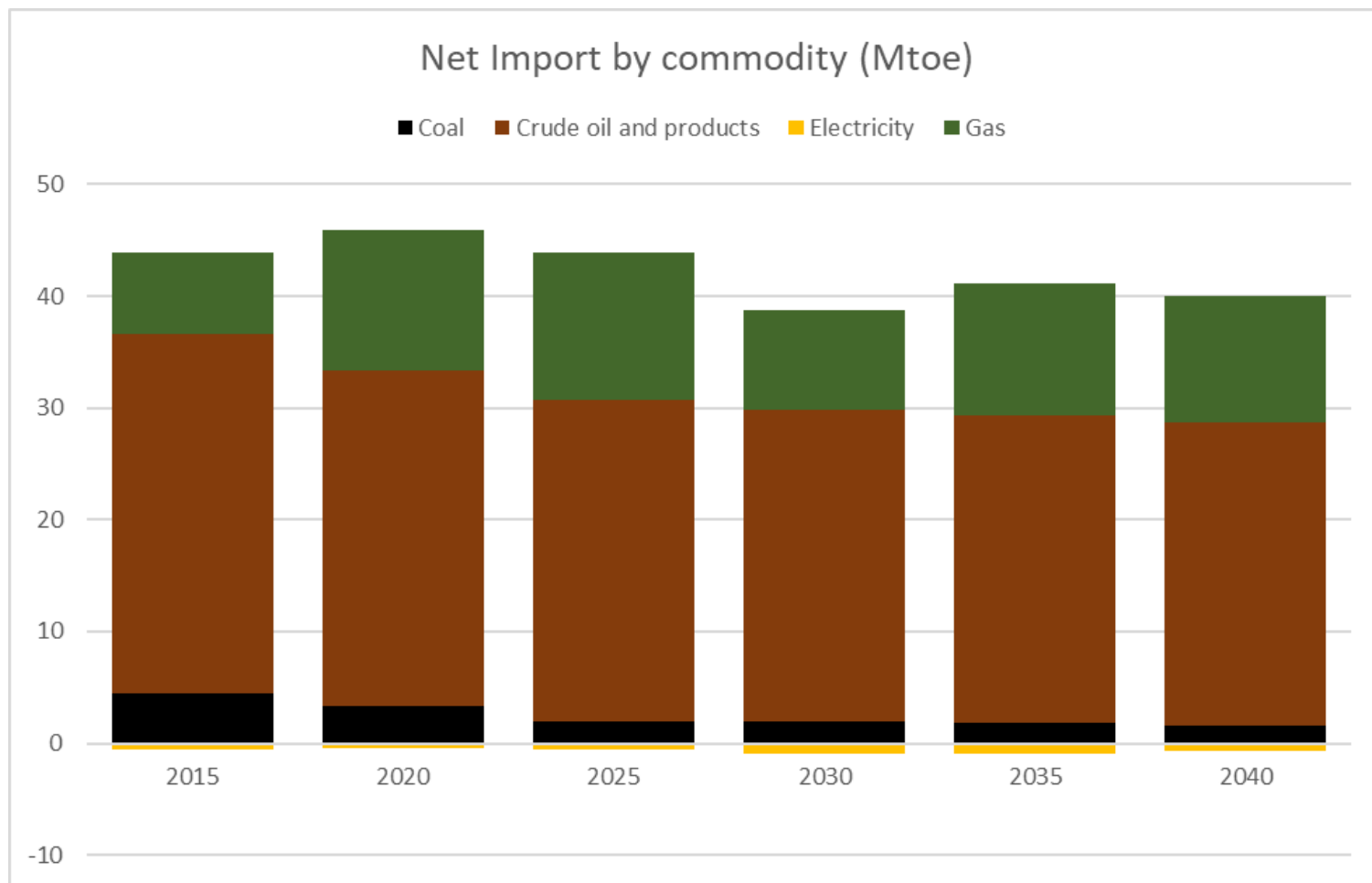


Note: Albania, Kosovo, Cyprus and Montenegro do not import natural gas.

Source: Eurostat

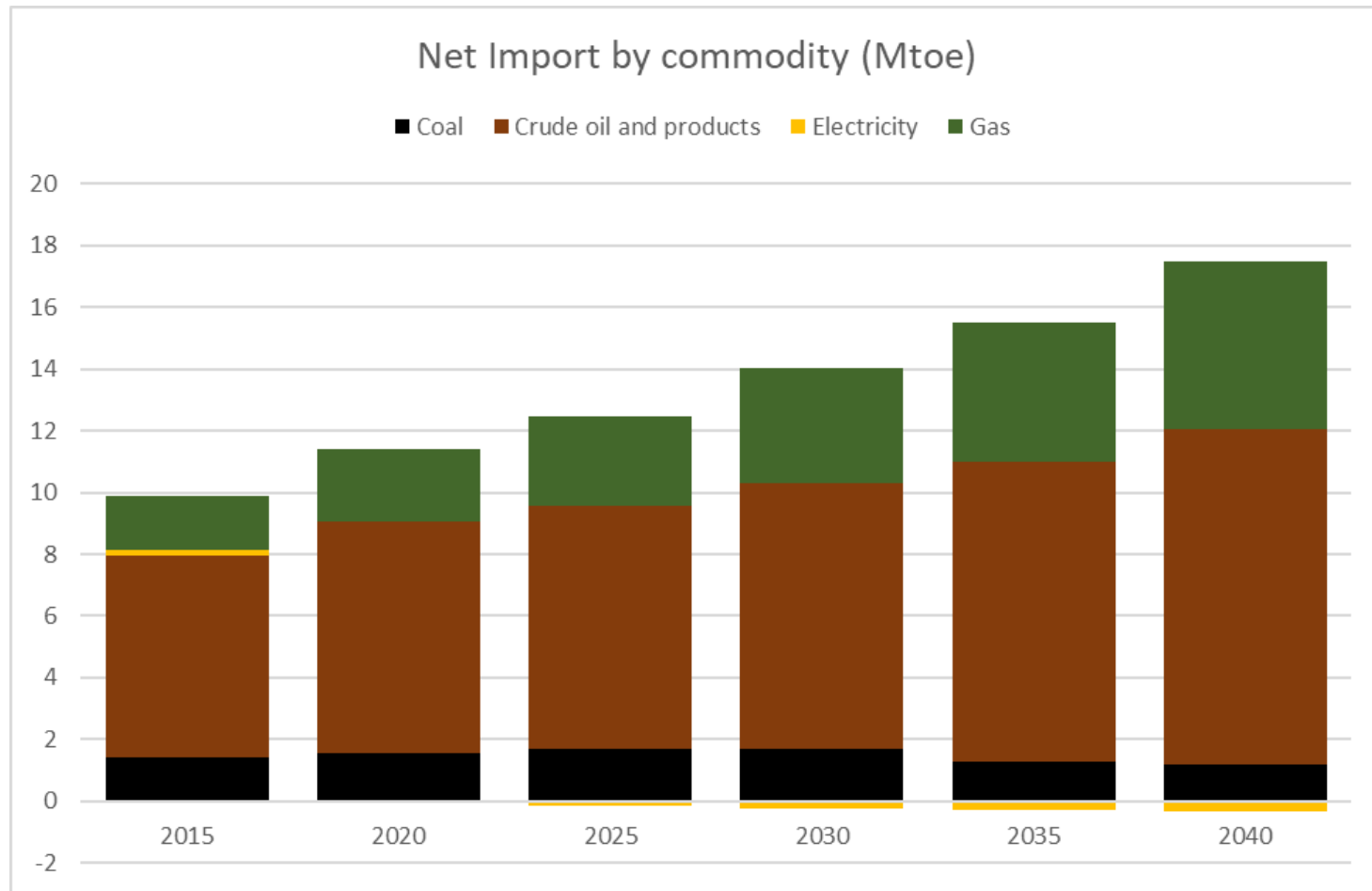
□ Taking into account EU energy and climate targets and according to IENE estimates, the SE European countries, including EU member states, Western Balkans and Turkey, will continue to be main importers of oil and gas by 2040, while oil and gas consumption will remain at relatively high levels.

EU Member States in SEE: Net Imports by Energy Form (2015-2040)



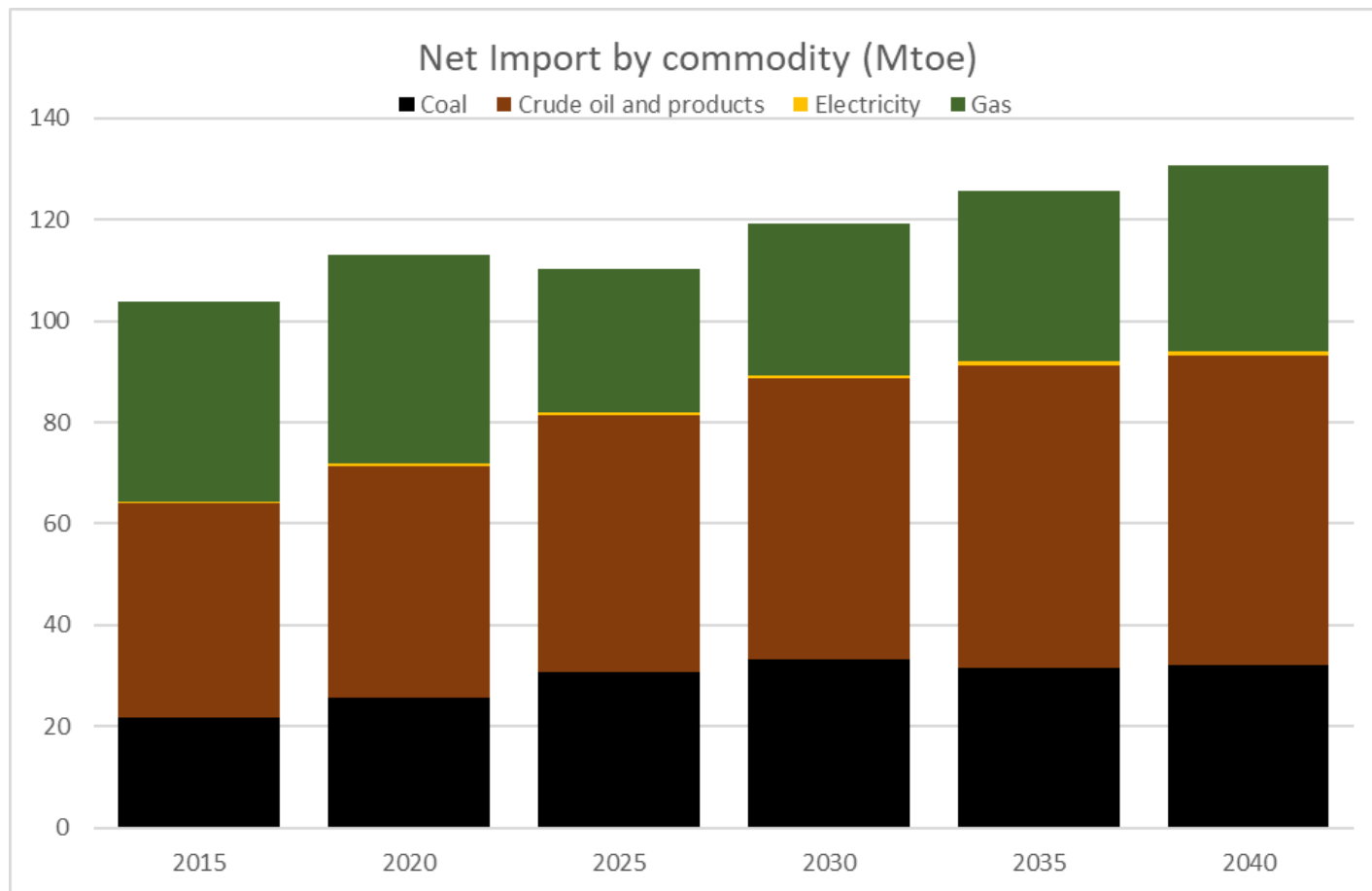
Source: IENE's "SEE Energy Outlook 2020/2021"

Western Balkans: Net Imports by Energy Form (2015-2040)



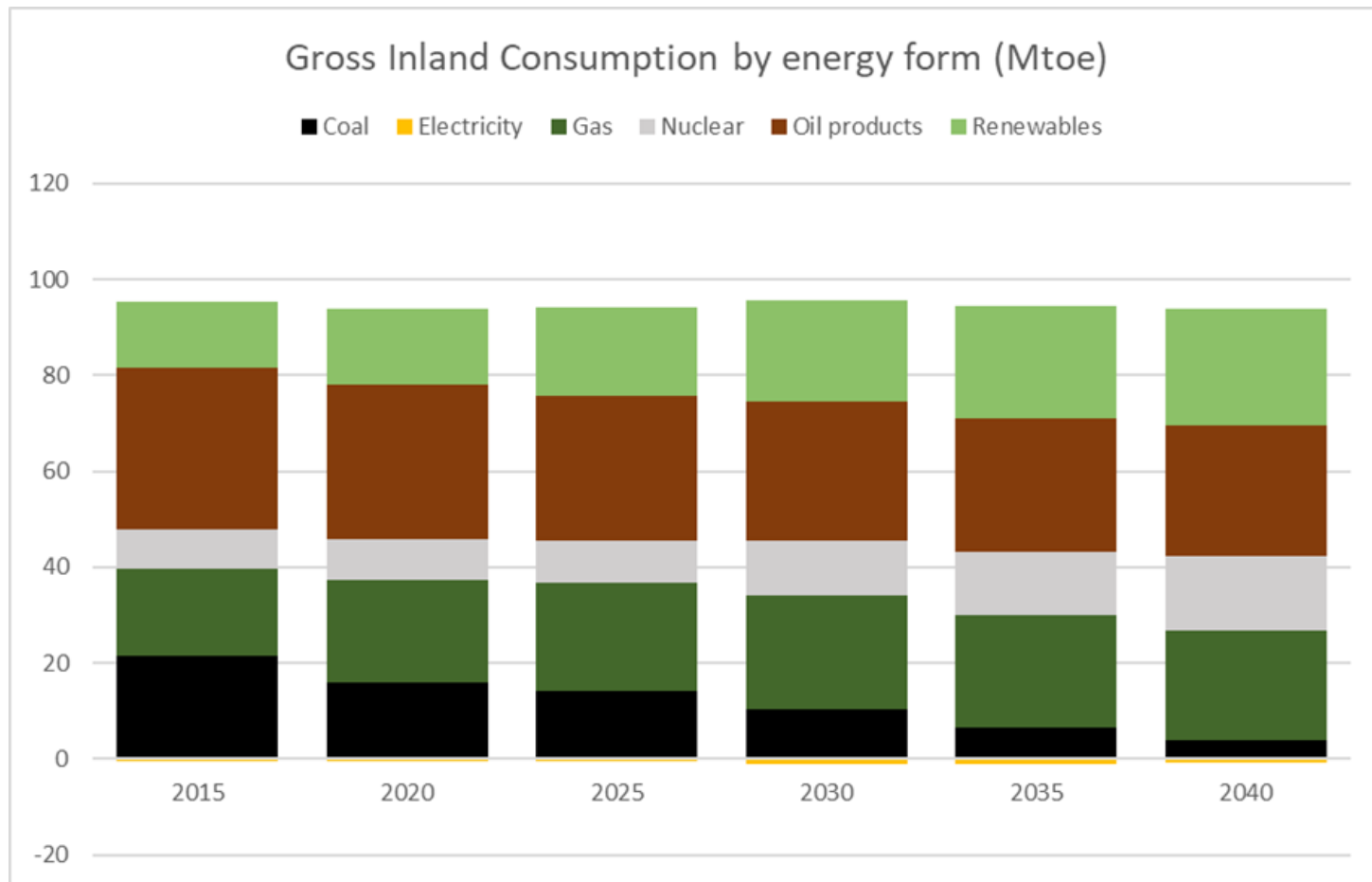
Source: IENE's "SEE Energy Outlook 2020/2021"

Turkey: Net Imports by Energy Form (2015-2040)



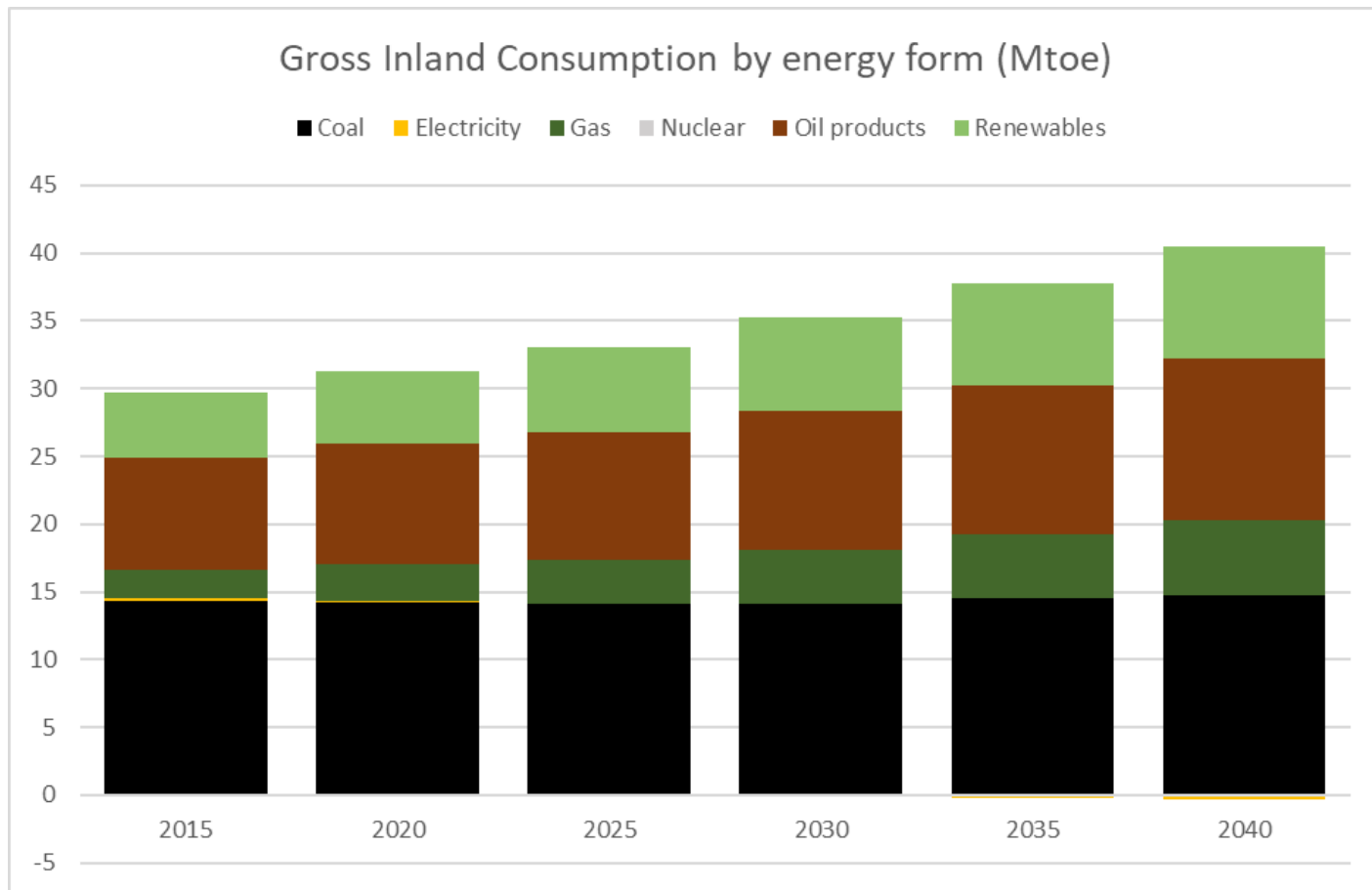
Source: IENE's "SEE Energy Outlook 2020/2021"

EU Member States in SEE: Gross Inland Consumption (2015-2040)



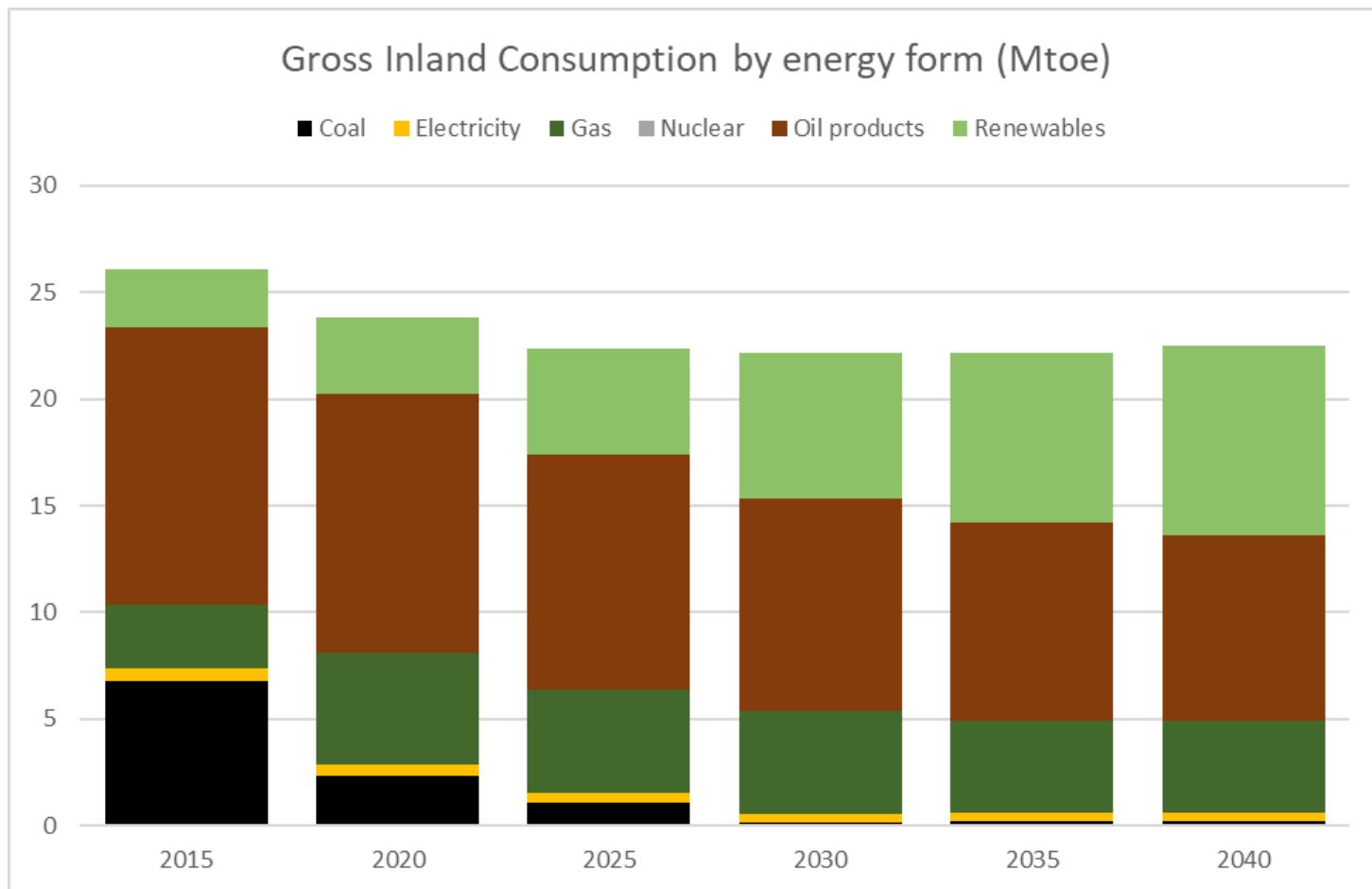
Source: IENE's "SEE Energy Outlook 2020/2021"

Western Balkans: Gross Inland Consumption (2015-2040)



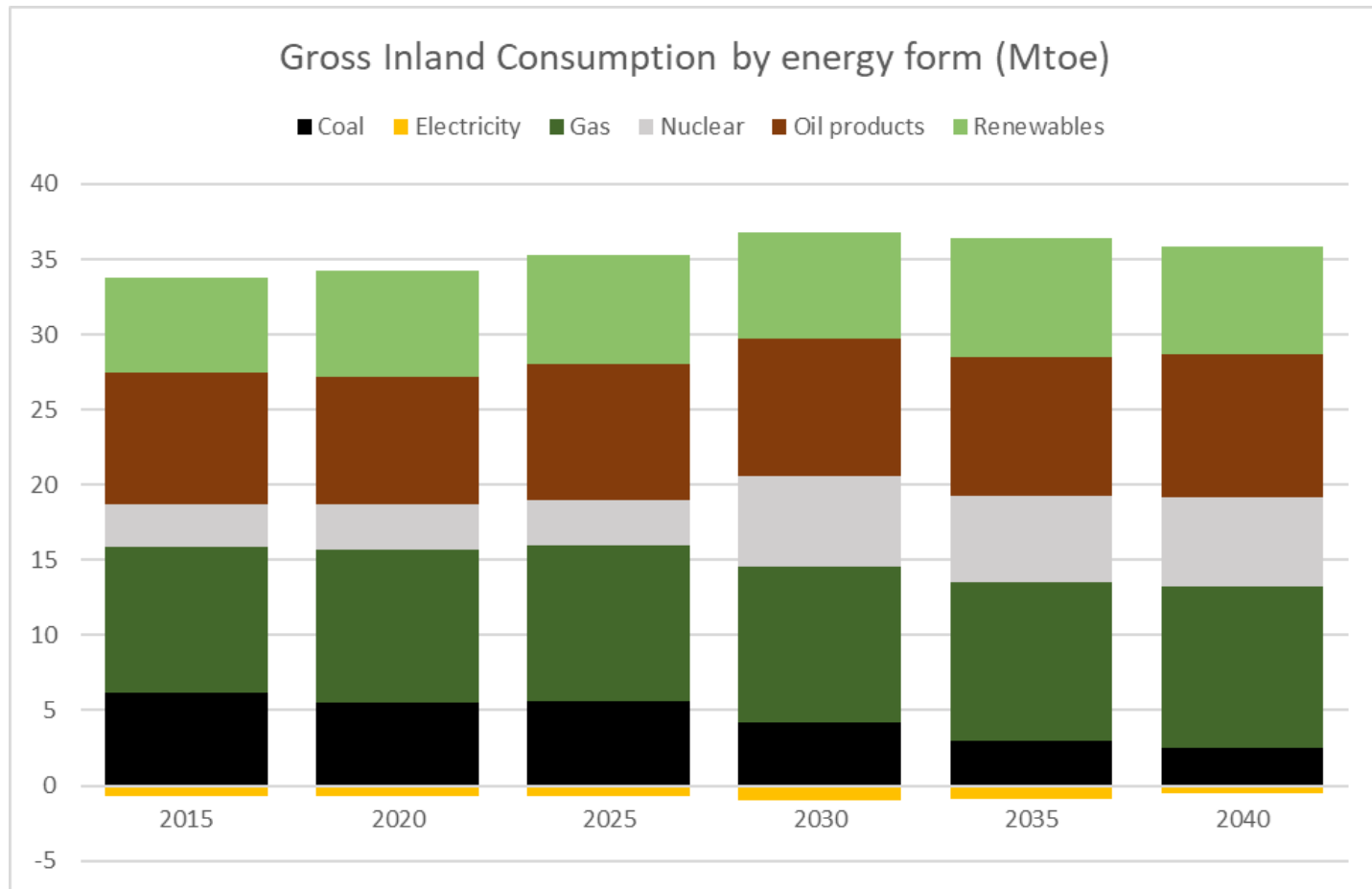
Source: IENE's "SEE Energy Outlook 2020/2021"

Greece: Gross Inland Consumption (2015-2040)



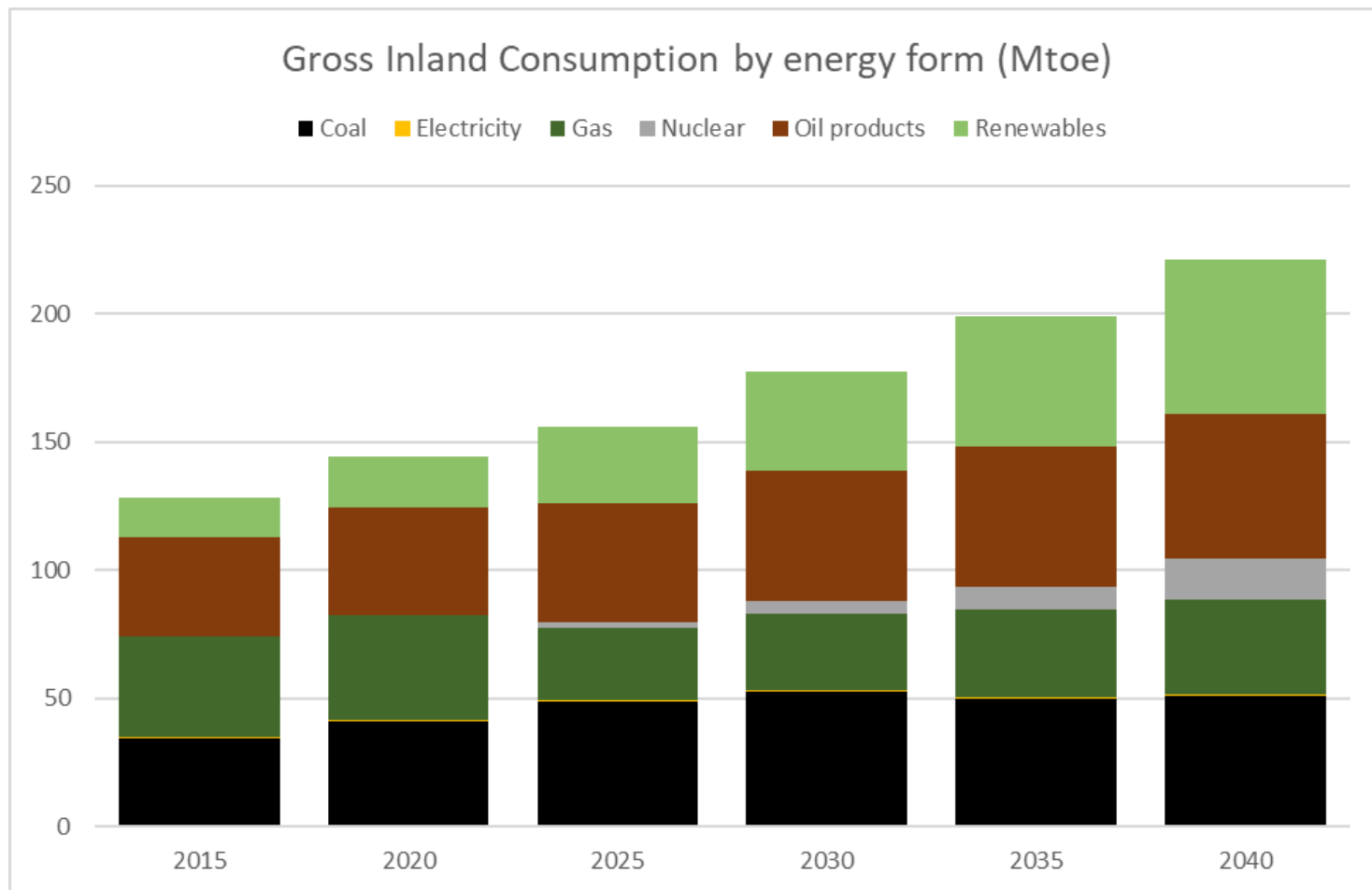
Source: IENE's "SEE Energy Outlook 2020/2021"

Romania: Gross Inland Consumption (2015-2040)



Source: IENE's "SEE Energy Outlook 2020/2021"

Turkey: Gross Inland Consumption (2015-2040)



Source: IENE's "SEE Energy Outlook 2020/2021"

Significant Hydrocarbon Reserves in the Eastern Mediterranean and SEE (I)

- The broad SE Europe and East Mediterranean region is a highly promising area of established geological interest with significant proven oil & gas reserves at a growing rate.
- We encounter four main areas of interest:
 - The Adriatic, Ionian, Crete axis (onshore and mainly offshore)
 - The Aegean
 - The Black Sea
 - The East Mediterranean, including offshore Israel, Lebanon, Cyprus and Egypt
- All above regions include several oil and gas producing areas, but also have a fair amount of commercially unexploited reserves (classed as proven, contingent and in place).
- The total volume of gas discovered in the East Mediterranean from 2009 to 2019 amounts to approximately 2.5 trillion cubic meters and hence the region holds important energy reserves in close proximity to European and African energy hungry economies.

Significant Hydrocarbon Reserves in the Eastern Mediterranean and SEE (II)

□ **The Adriatic and Balkans**

Croatia, Montenegro and Albania have proven petroleum systems offshore and Croatia and Albania have production in shallow water depths. The US Geological Survey estimated a mean Yet-To-Find of 1.1 Bboe for the basin, with an upside of 2.2 Bboe.

□ **Greece**

According to independent estimates and latest work by HHMR, Greece's hydrocarbon reserves (mostly prospective and contingent) amount to 85.0 to 105.0 tcf or 14.5-17.6 bboe located in various basins offshore in the Ionian, south of Crete, North Aegean and onshore in Western Greece.

□ **Eastern Balkans and Western Black Sea**

On the basis of known petroleum volumes (amount produced to date plus remaining reserves), the Carpathian-Balkan province has a total of 5.9 billion barrels of oil, 7.3 tcf of gas, and 100 million barrels of natural gas liquids, for a total of 7.2 barrels of oil equivalent (Klett et.al, 1997).

□ **The Eastern Mediterranean**

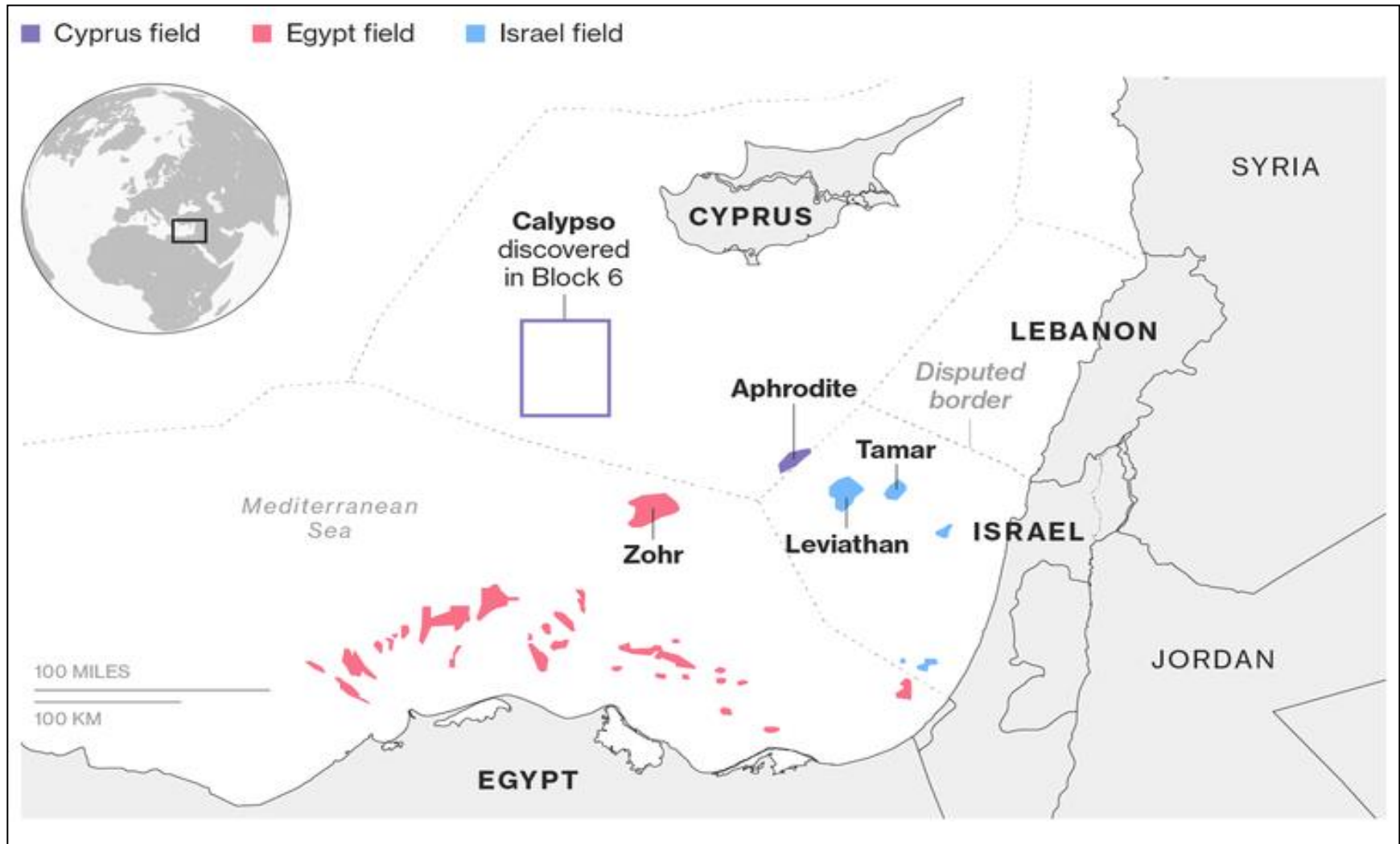
The Eastern Mediterranean has recently become a center of exploration, production and transport of hydrocarbons. The total gas reserves discovered over the last decade in Egypt, Israel and Cyprus are estimated at 80 tcf, with two dominating large producing fields, Zohr in Egypt (30 tcf) and Leviathan in Israel (22 tcf).

Indicative Offshore Gas Reserves in the Eastern Mediterranean

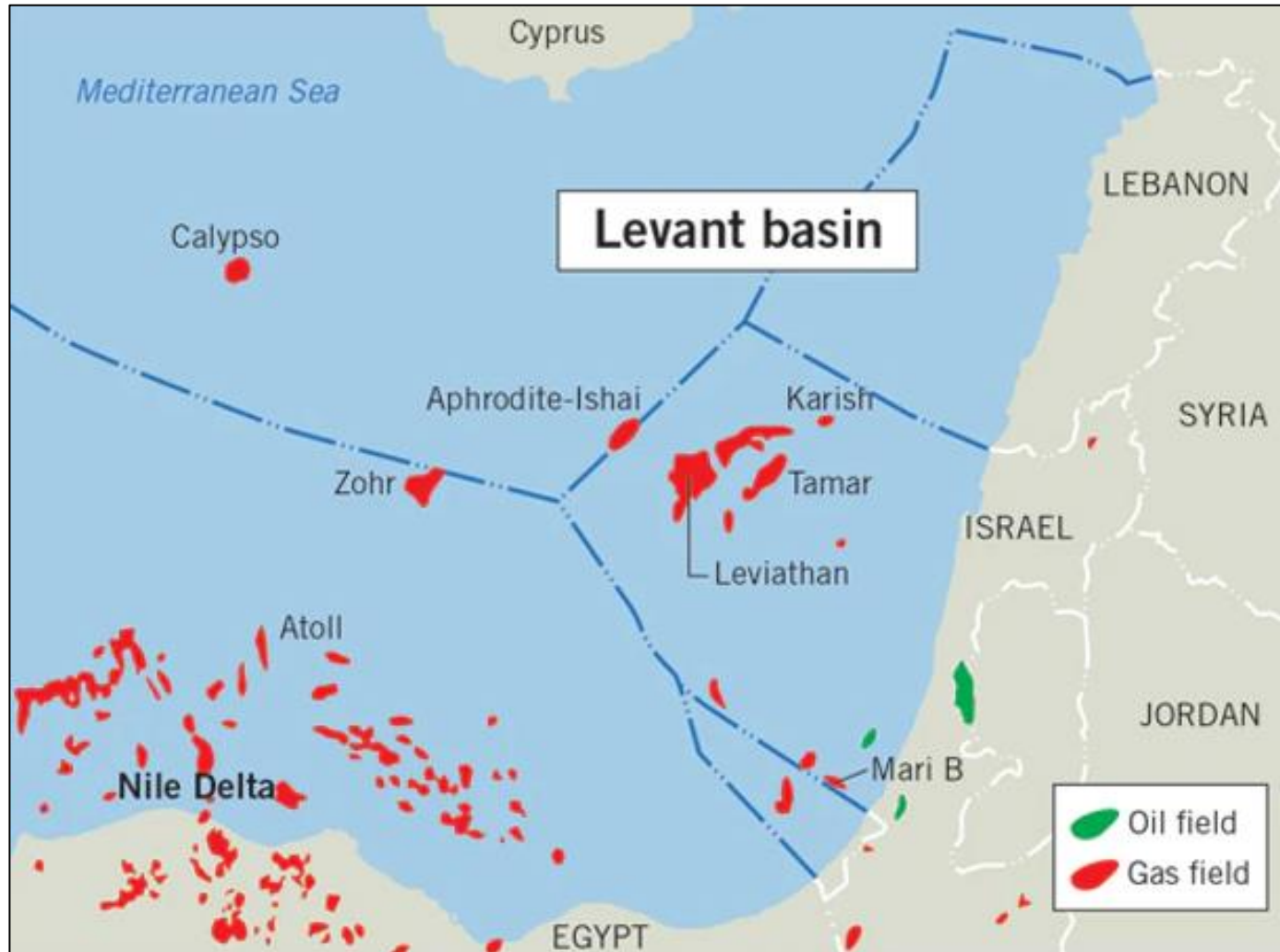
	Field name	Year discovered	Estimated amount (trillion cubic feet)	Production status
Cyprus	Aphrodite	2011	4.5	Pending development
	Calypso	2018	6.0-8.0	Further appraisal needed
	Glaucus	2019	5.0–8.0	Further appraisal needed
Israel	Noa	1999	1.2	Nearly depleted
	Mari-B	2000	1.6	Nearly depleted
	Tamar	2009	8.4	In production
	Leviathan	2010	22.0	In production
	Tanin	2012	0.92	Under development
	Karish	2013	1.4	Under development
Egypt	Zohr	2015	30.0	In production

Source: Oxford Institute of Energy Studies

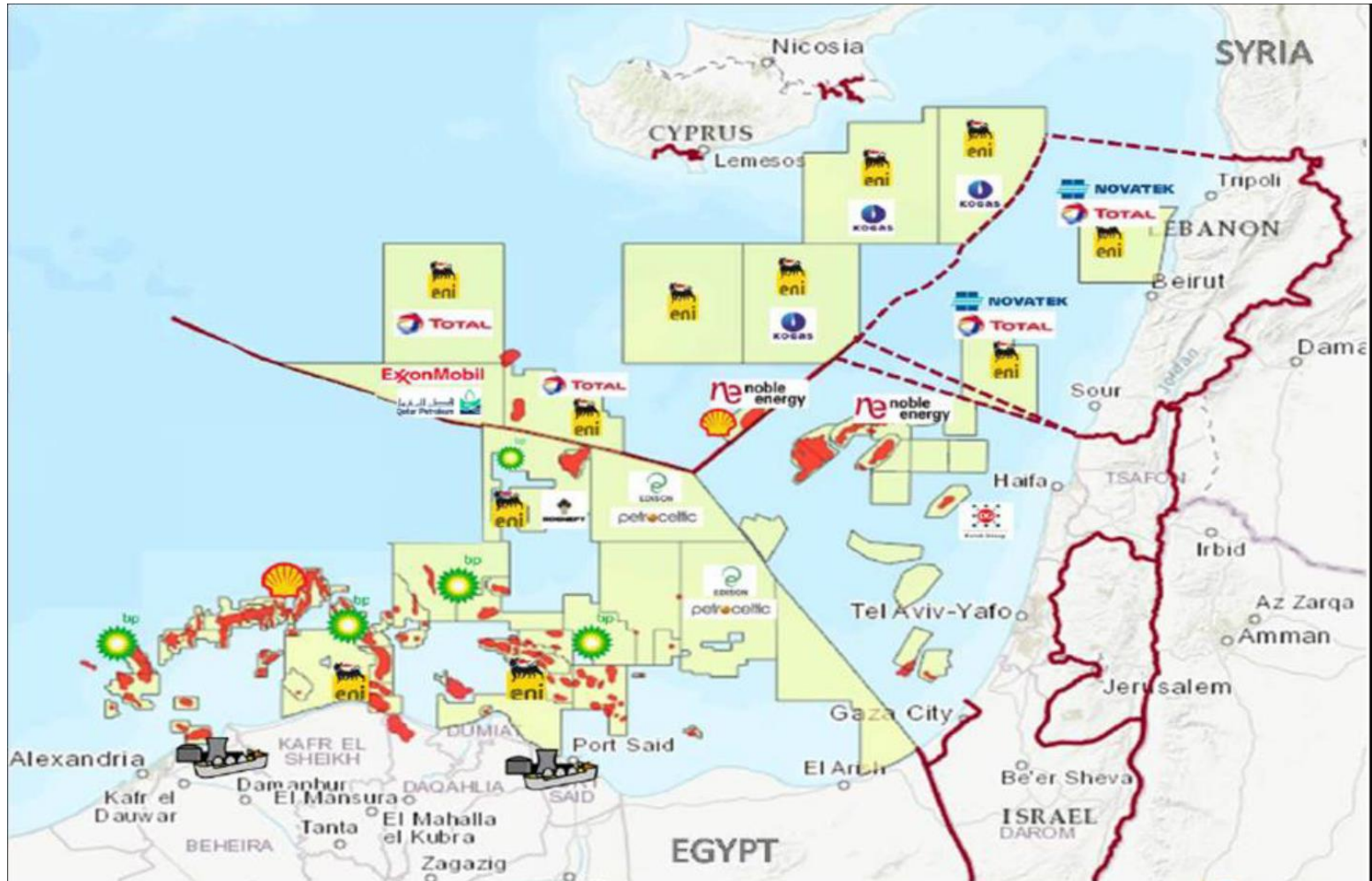
The East Mediterranean Gas Resources (I)



The East Mediterranean Gas Resources (II)



The East Mediterranean Exploration Blocks



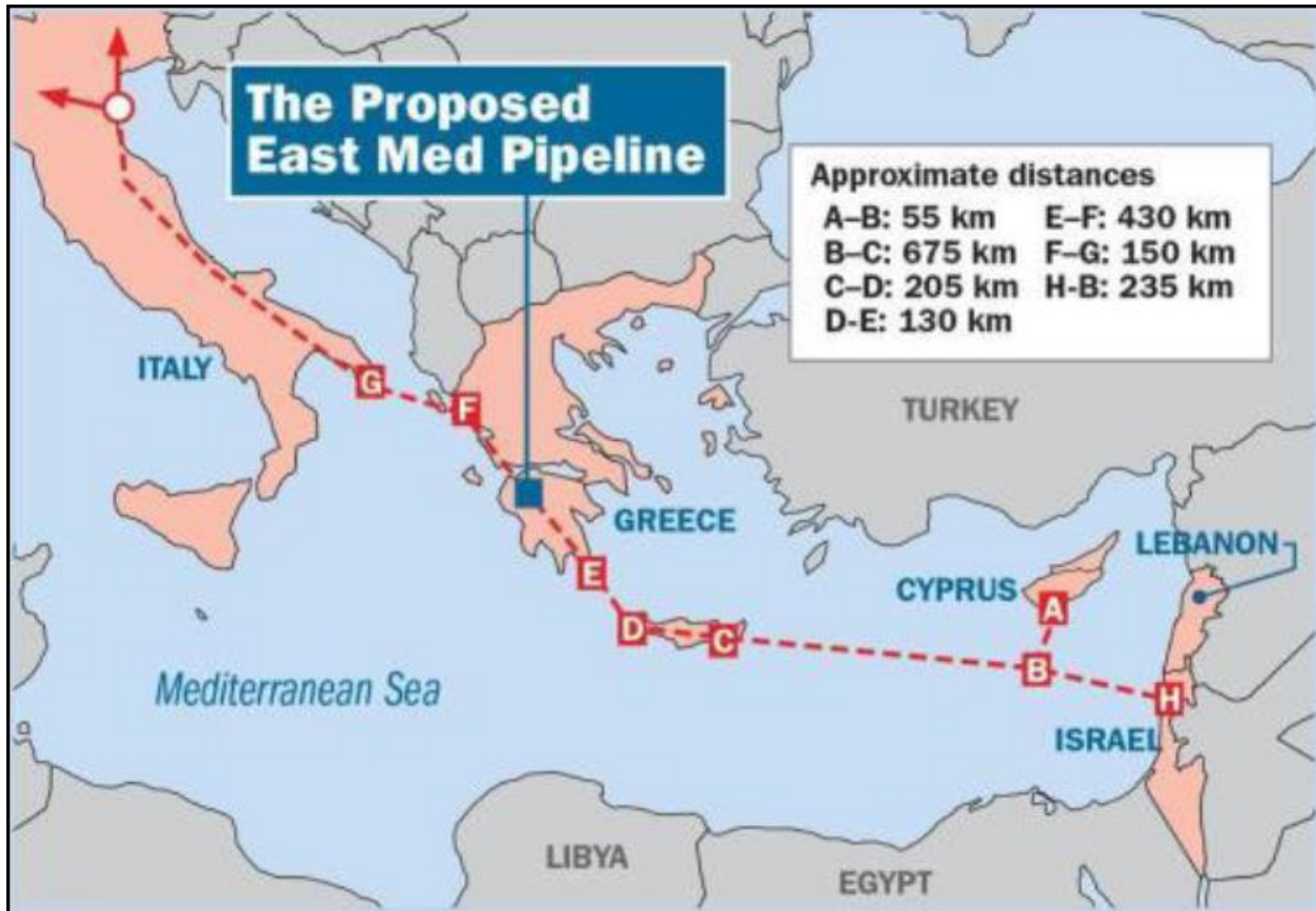
Uncertainty Surrounding the East Med Pipeline (I)

- ❑ The planned East Med pipeline is the region's biggest gas infrastructure project under consideration. The pipeline project is expected to start about 170 km off Cyprus's southern coast and stretch for 2.200 km to reach Otranto, Italy, via Crete and the Greek mainland. Gas is to be promoted by various deposits in the region. It is widely assumed at this stage that the pipeline will start from the vicinity of the Leviathan and the Karish and Tanin fields, offshore in Israel.

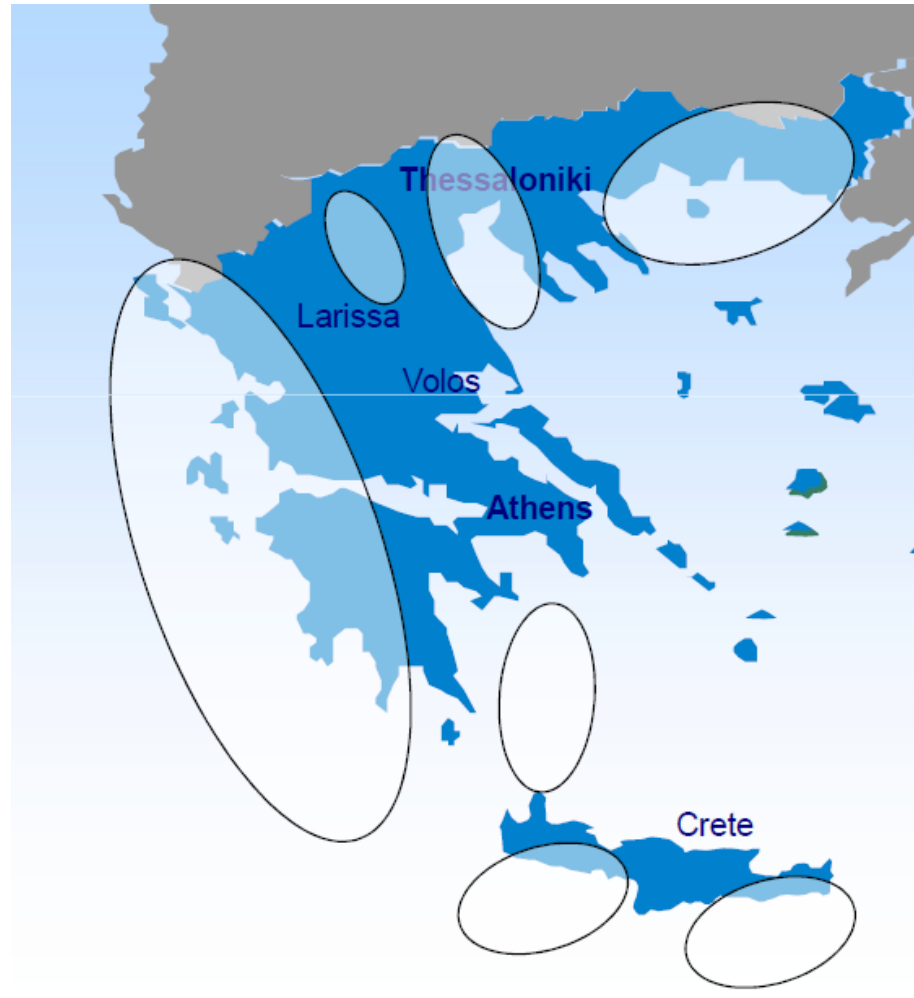
- ❑ The project is being promoted by Italy's Edison, an EDF Group company, and Greece's Public Gas Corporation (DEPA) and has already received some €35 million in funding from the European Commission as a Project of Common Interest (PCI). The project is currently designed to carry 10 bcm/year – 16 bcm/year from the East Med to Greece, about 1.900 km, where it will connect to the 300 km Poseidon pipeline in Italy. The East Med pipeline so far has secured the support of four governments (i.e. Greece, the Republic of Cyprus, Israel and Italy) and the European Commission.

- ❑ However, much uncertainty surrounds construction prospects in view of EU's blurred gas policies and the anti fossil fuel war waged by EU endorsed NGOs.

Uncertainty Surrounding the East Med Pipeline (II)

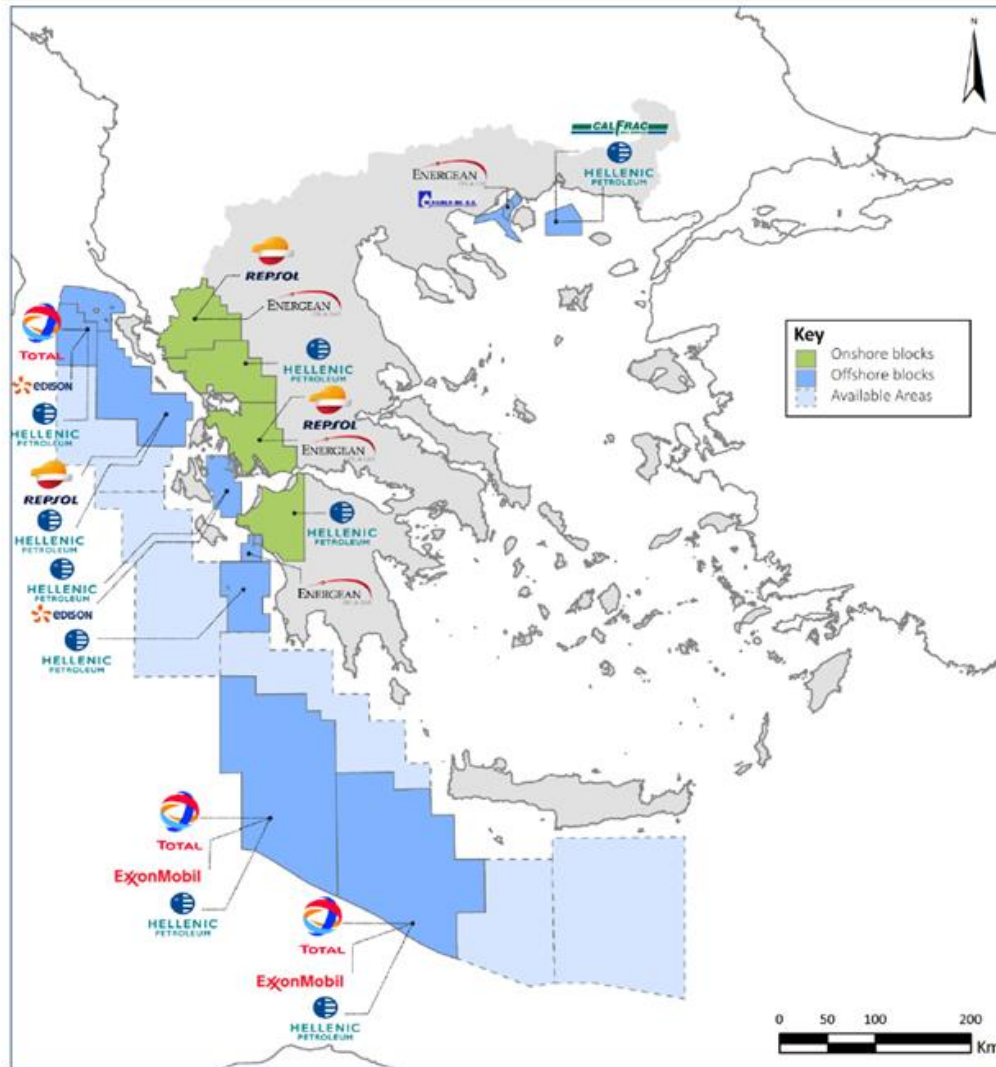


The Case of Greece: Unexplored Areas and Geological Targets



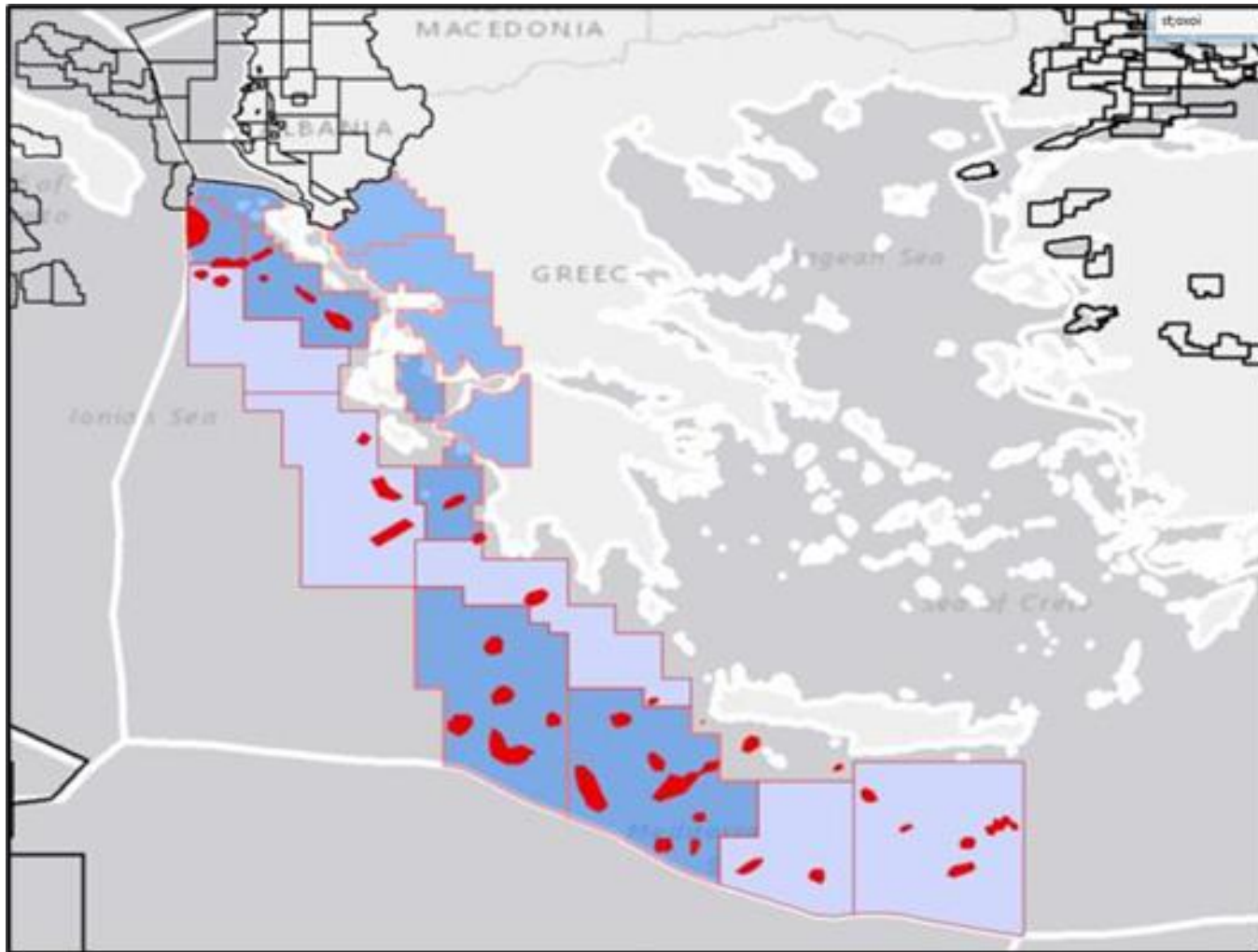
Source: HELPE

Concession Areas in Greece (December 2019)



Source: HHRM

Hydrocarbon Target Areas in Ionian Sea and Crete



Source: HHRM

Anticipated Gas Consumption (bcm) in Selected European Countries (2020, 2025 and 2030)

- Although the prospects for increased gas use in SEE over the next decade appear excellent, there are several pitfalls that are already visible, which, if left unchecked, they could in the long term threaten sustainable production

Country	2020	2025	2030
Austria	7,5	7,3	7,1
Bulgaria	4,0	4,2	4,3
Greece	5,0	5,2	5,41
Croatia	3,7	3,8	3,9
Hungary	11,0	10,5	10,0
Italy	71,3	79,2	83,8
North Macedonia	0,1	0,1	0,13
Romania	13,0	13,5	13,5
Slovenia	1,2	1,2	1,3
Slovakia	7,0	7,2	7,3
Serbia	2,2	2,25	2,3
Turkey	60,0	65,0	70,0
Ukraine	35,8	36,0	36,5
Total gas consumption	221,8	235,45	245,54

Challenges Faced by Oil & Gas Sector

Challenges faced by oil & gas sector in drawing up plans for further hydrocarbon exploration and production in SEE can be summarized as follows:

- Growing **hostility** by EU establishment towards oil & gas industry
- EU's much touted and heavily promoted (by governments and NGOs) **Green Deal is working against upstream sector**
- **Complete ban for the financing of oil and gas infrastructure projects** by EIB, EBRD, WB has created a most negative operational environment
- **Mobilisation of various "environmental" NGOs** is enhanced by EU's adopted green policies and boundless "clean fuel" aspirations
- There is **lack of credible data** on the role of extended gas use in lowering GHG emissions
- The oil & gas industry needs to create and promote its **own story** on the key role of hydrocarbons in energy transition

Concluding Remarks

- ❑ Despite EU "green" policies and the global drive towards "clean fuels", the region is most unlikely to eliminate oil and gas use by 2040
- ❑ According to IENE estimates, we are going to see reduced oil use on account of electrification in the transport sector, but at the same time we will witness increased gas use, because of increased power generation needs and greater gas use by industry, commerce and buildings.
- ❑ Higher gas use is to be curtailed though as "blue hydrogen" enters the energy mix in several countries in the region.
- ❑ The overall long term picture for increased gas use in the broader region remains positive and acts as a much needed pivot which will enable governments to lend their support for continued hydrocarbon exploration work and gas production in particular.



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The background of the slide is a composite image. It shows a view of the Earth from space, with the planet's surface and city lights visible. Overlaid on this are numerous glowing blue lines that form a complex, interconnected network, resembling a global energy grid or a data network. The lines are bright and have a slight glow, creating a sense of dynamic energy and connectivity.

*Thank you
for your attention!*

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