

# RISK MANAGEMENT IN ENERGY



## Global Energy Crisis as a Catalyst for Energy Transition & a Test for Energy Security

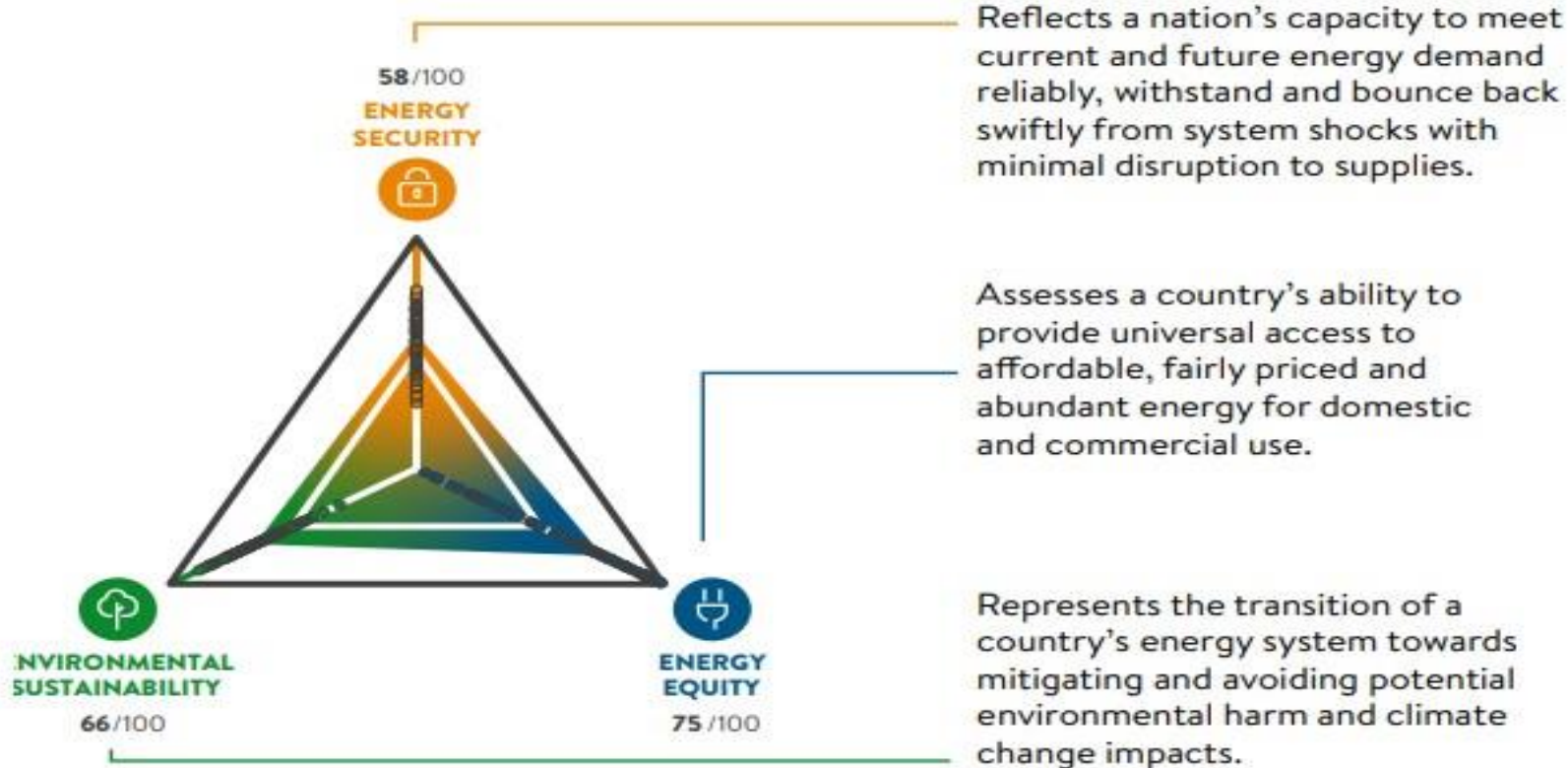
1. World Energy Trilemma
2. Black Sea Region: Security and Vulnerability
3. Recent Events
4. The BSTDB and its Activities in Energy

# The World Energy Trilemma

**The World Energy Trilemma are three competing issues that drive energy competition, namely:**

- 1. Energy Security – nation's capacity to meet current and future needs**
- 2. Energy Equity – country's ability to provide universal and affordable access**
- 3. Environmental Sustainability – transition of country's energy system**

## World Energy Trilemma Index

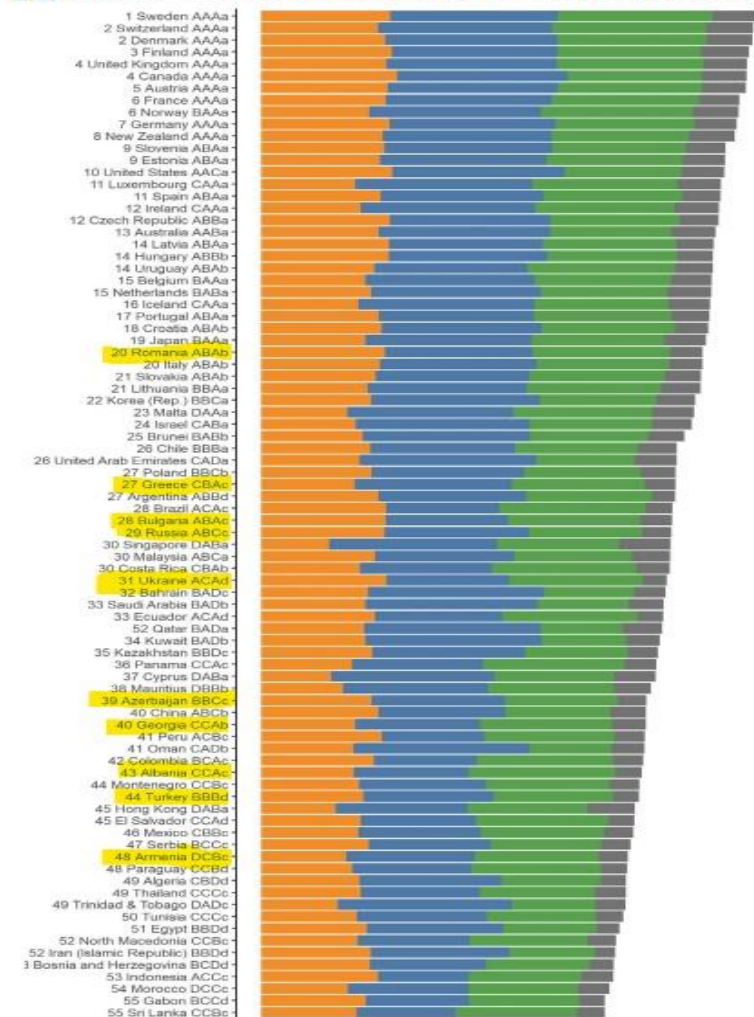


Source: World Energy Council

# 2022 World Energy Trilemma Index

## ANNEX A

### 2022 WORLD ENERGY TRILEMMA INDEX

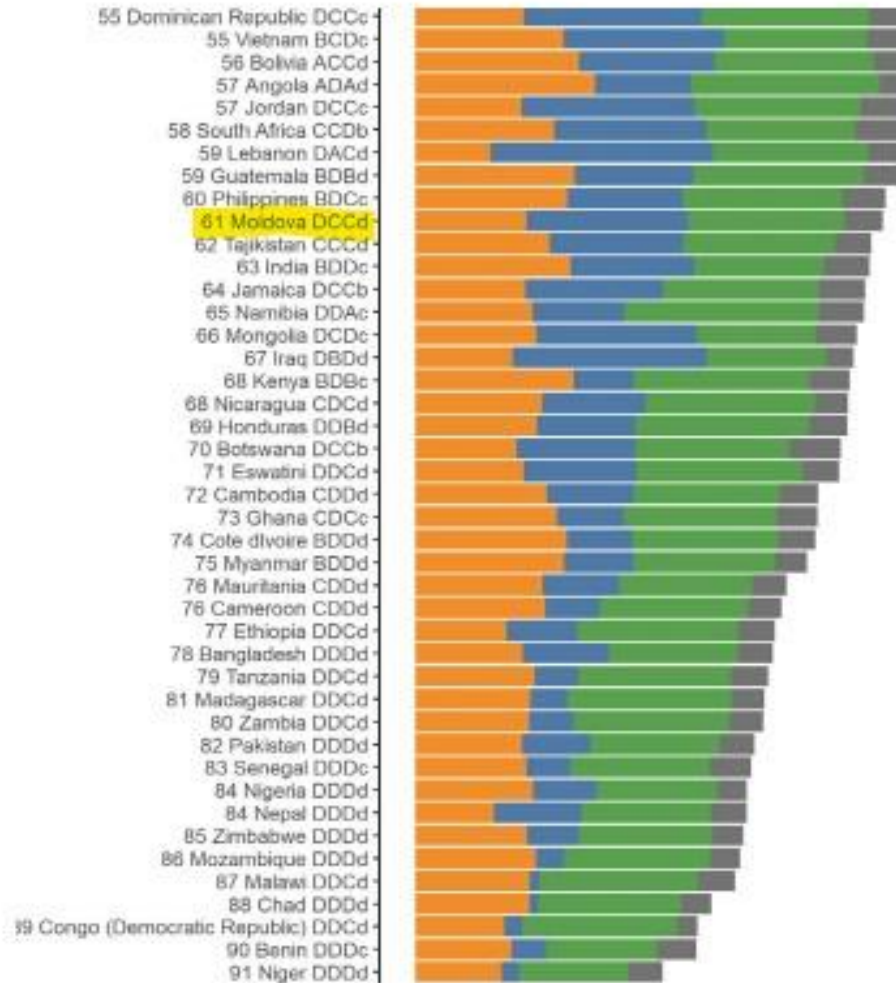


Top ranking countries are:  
Sweden, Switzerland, Denmark,  
Finland, UK and Canada.

How do BSTDB Countries  
compare:

- Romania (20) ranks highest of BSTDB Countries
- Followed by Greece (27), Bulgaria (28), Russia (29), Ukraine (31), Azerbaijan (39), Georgia (40), Albania (43), Turkey (44), Armenia (48), and Moldova (61)

# 2022 World Energy Trilemma Index - 2

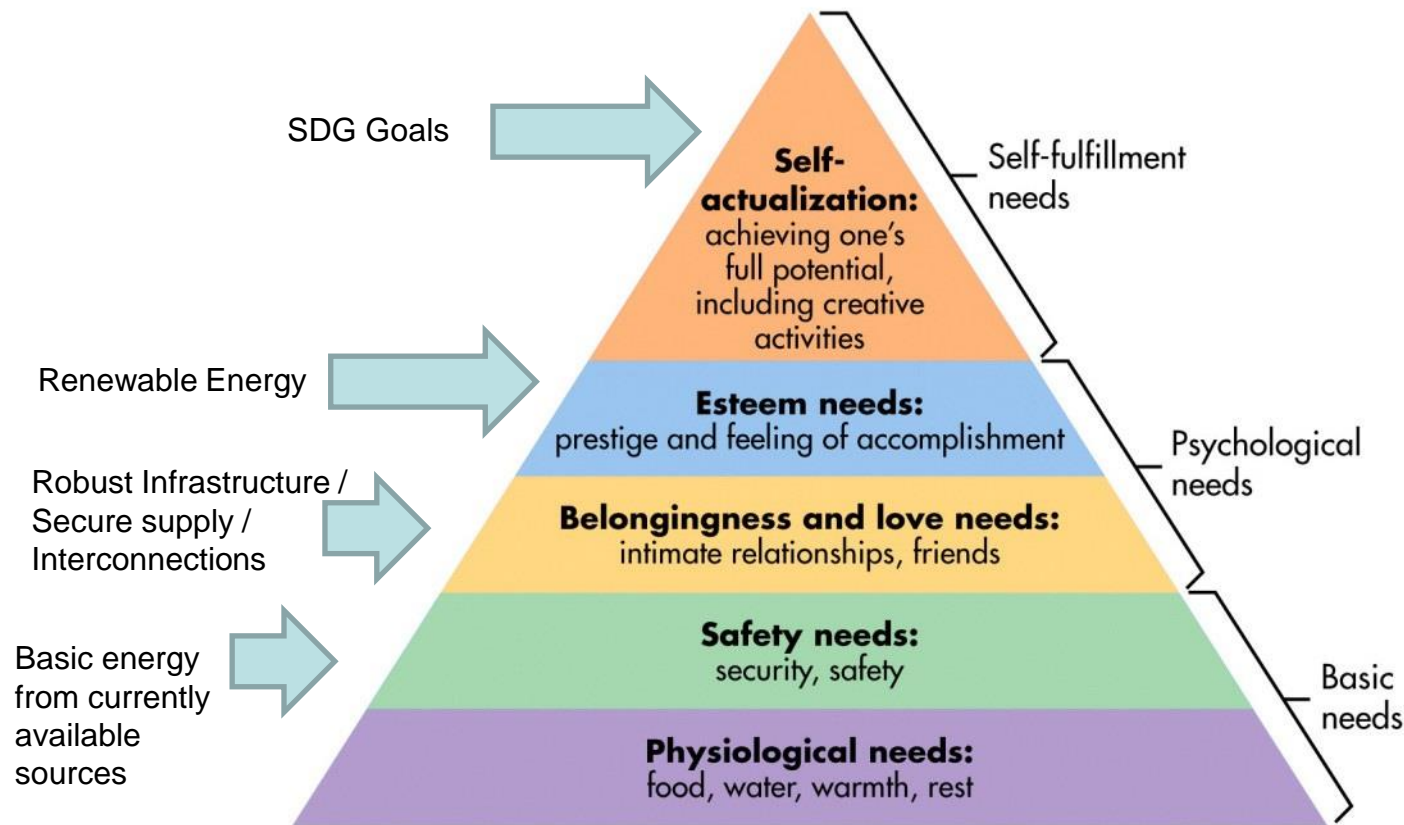


Source: World Energy Council

# Maslow's Hierarchy applied to Energy

## Applying Maslow's Hierarchy to Energy:

1. Developing Countries still fulfilling basic needs
2. As more developed increase focus on Renewables
3. Only most developed can focus on SDGs



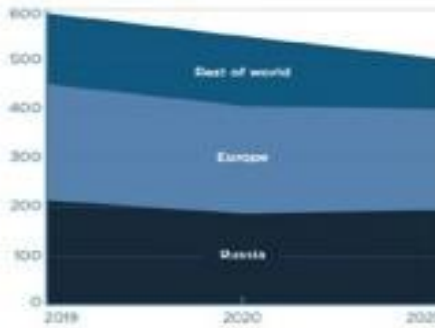


- Europe – was balanced but recent gas & energy shocks changed that. Need for more coordination
- BSEC Countries – primarily focused on Basic Needs & Security of Supply / Connectivity with some Renewables. Affordability is key.
- Not all BSEC Countries at same stage of Maslow's Hierarchy as applied to Energy. But changes are forcing acceleration.

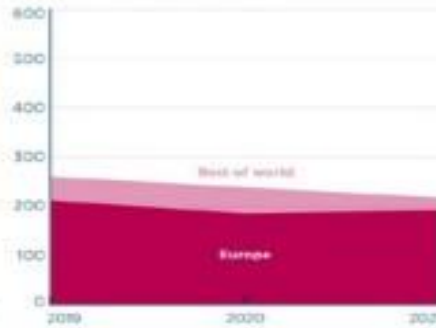
# The Black Sea Region: Energy Security and Vulnerability

## Europe's Gas Market Relies on Russian Supply

a. European gas supply by source, billions of cubic meters



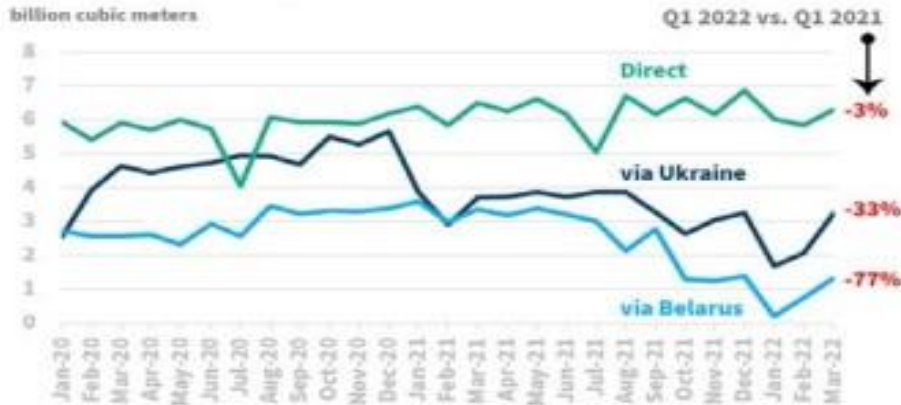
b. Russian gas exports by destination, billions of cubic meters



Sources: BP Statistical Review of World Energy 2020 and 2021, Bloomberg, ENTSOG, European Commission, Eurostat, Gazprom, IEA

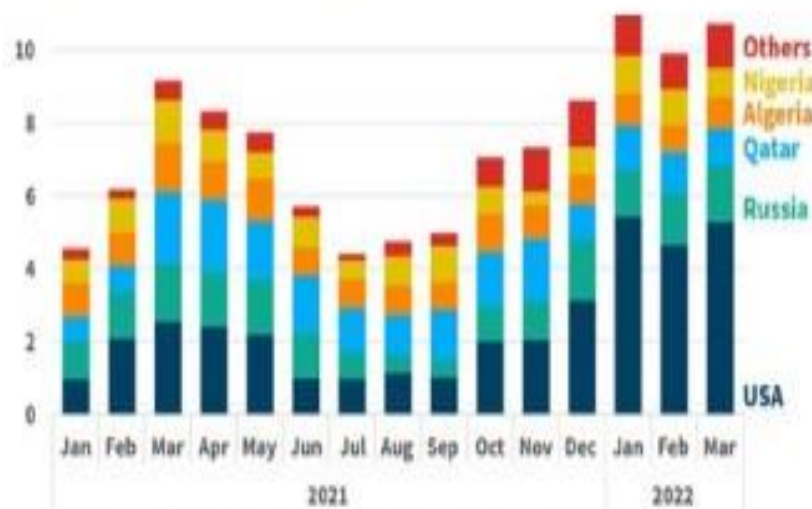
- Recent energy crisis is forcing changes
- Reducing reliance on Russian gas
- Actively seeking alternative sources of supply

## Russian pipeline gas exports to the European Union



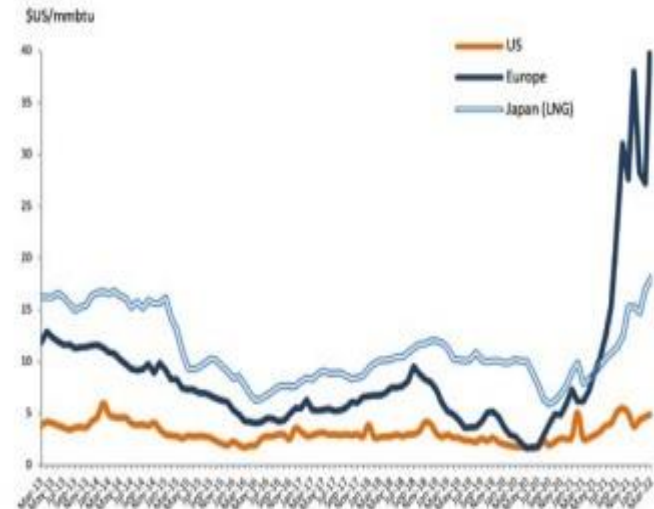
Source: Gazprom, Actual Supplies to the European Union

### European LNG imports by source



Source: Kpler LNG Service (data downloaded on April 1, 2022)

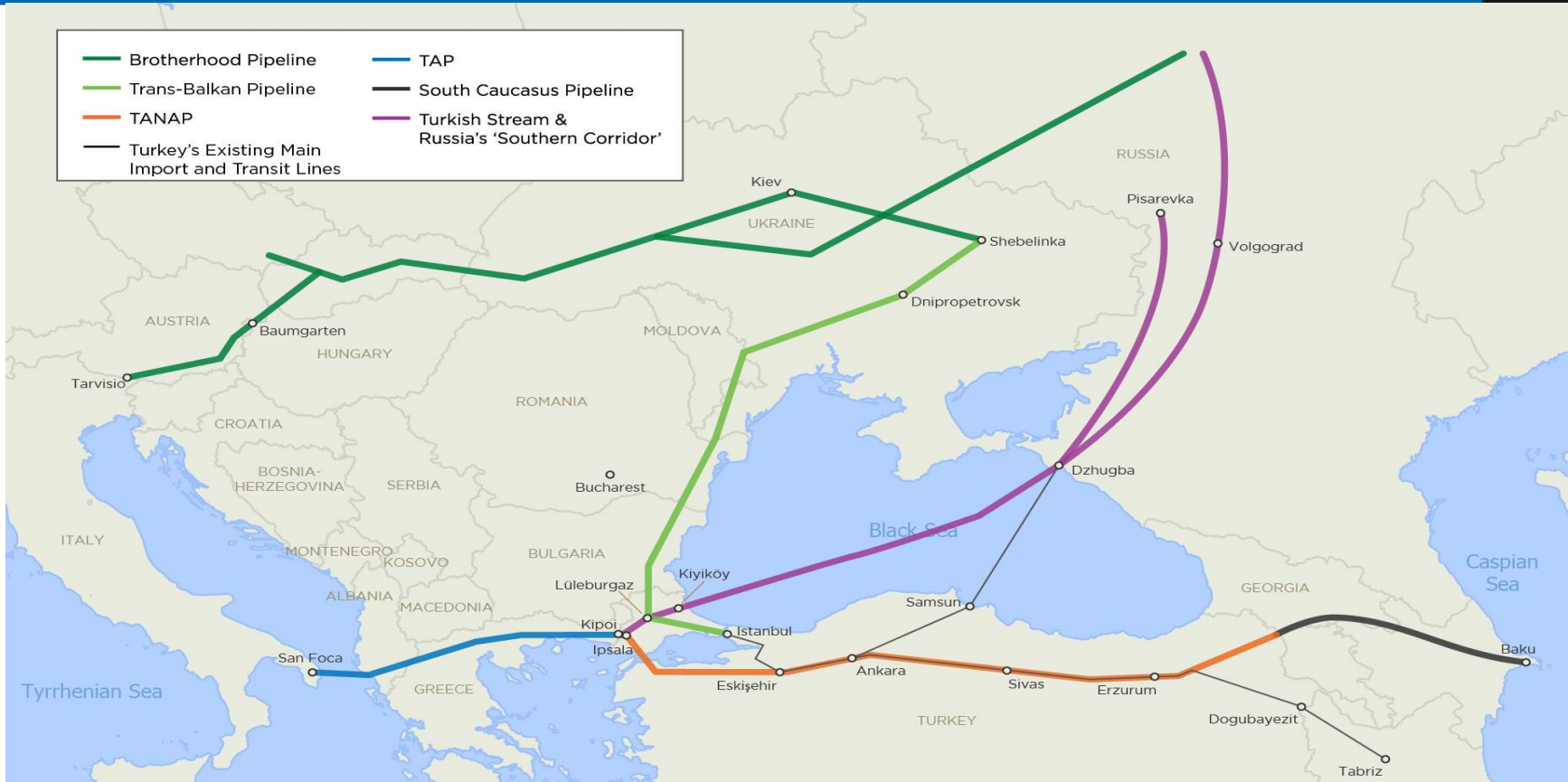
### Natural Gas Prices



Source: World Bank

- Increase of LNG imports
- Natural Gas price shocks are unbalanced

# Black Sea Region: Piped Gas Supply



- The SGC and the Turkish Stream were to diversify supply routes.

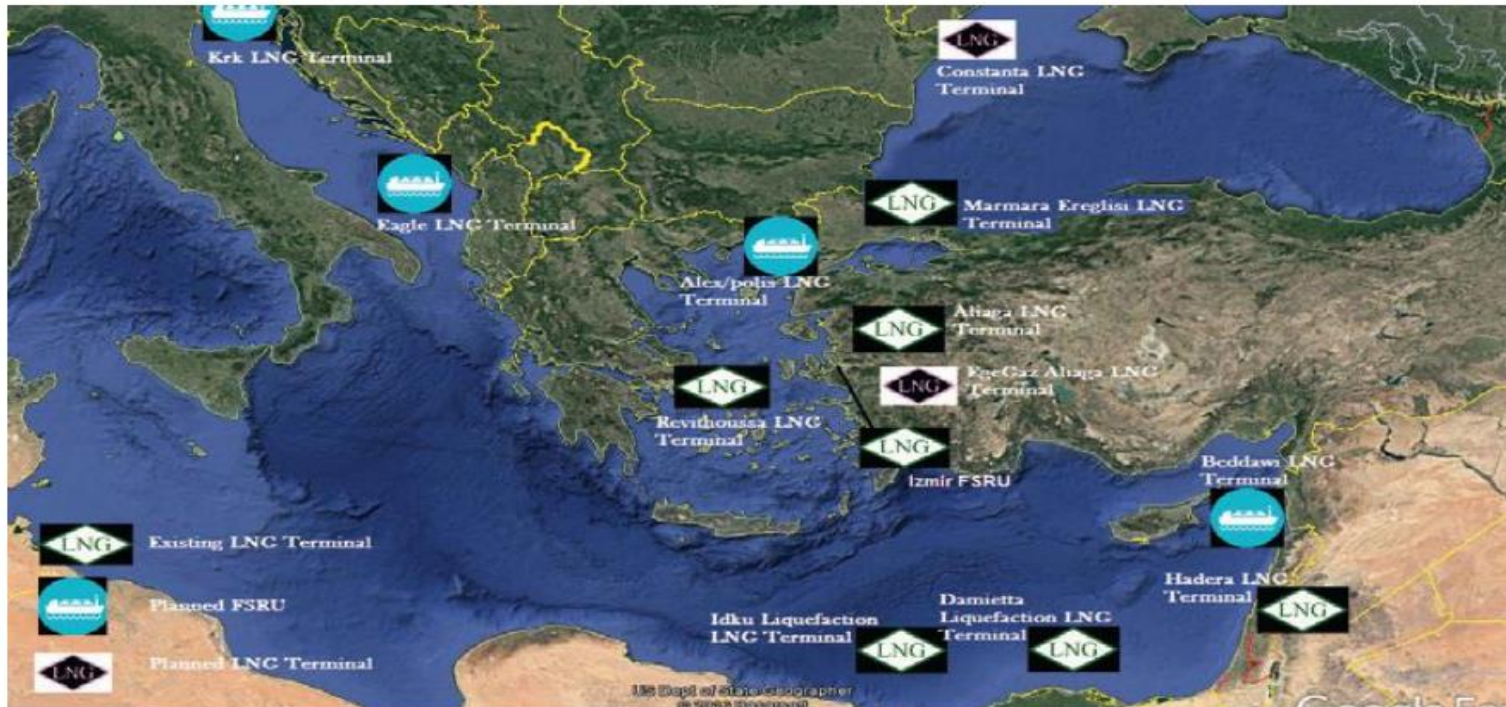
# Black Sea Region - Gas Interconnectors



- Connectivity is paramount as it allows for diversity of supply routes.
- In SEE & Black Sea region, the development of ancillary gas infrastructure and regional market integration are of particular importance. Gas will be further diversified into the Balkans and Central Europe.



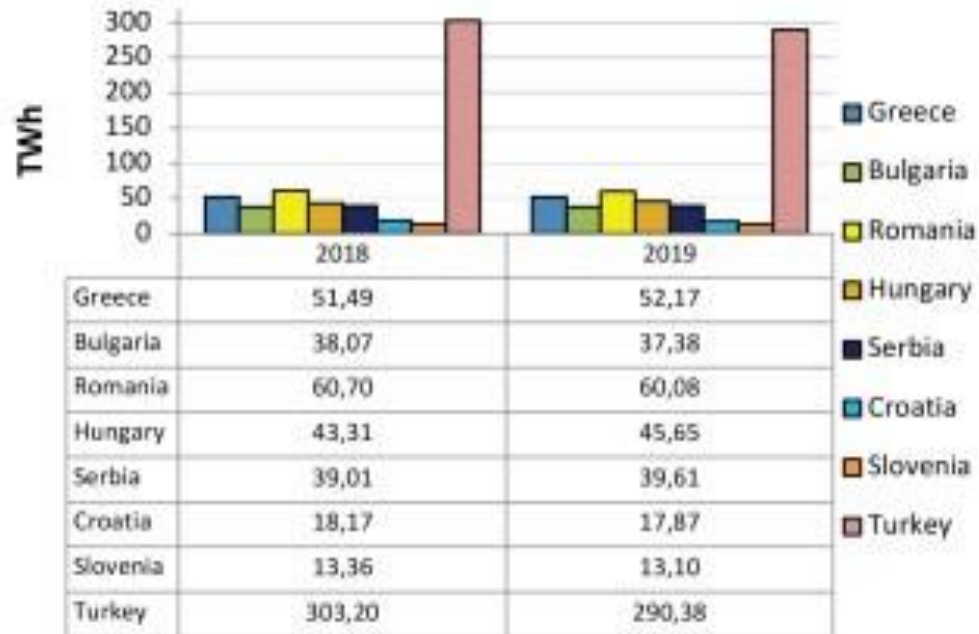
## LNG Terminals in SE Europe



Source: IENE study "South East Europe Energy Outlook 2016/2017", Athens, 2017

LNG as an alternative to pipe gas has become more important

## Electricity Demand in SEE Markets (2018 – 2019)



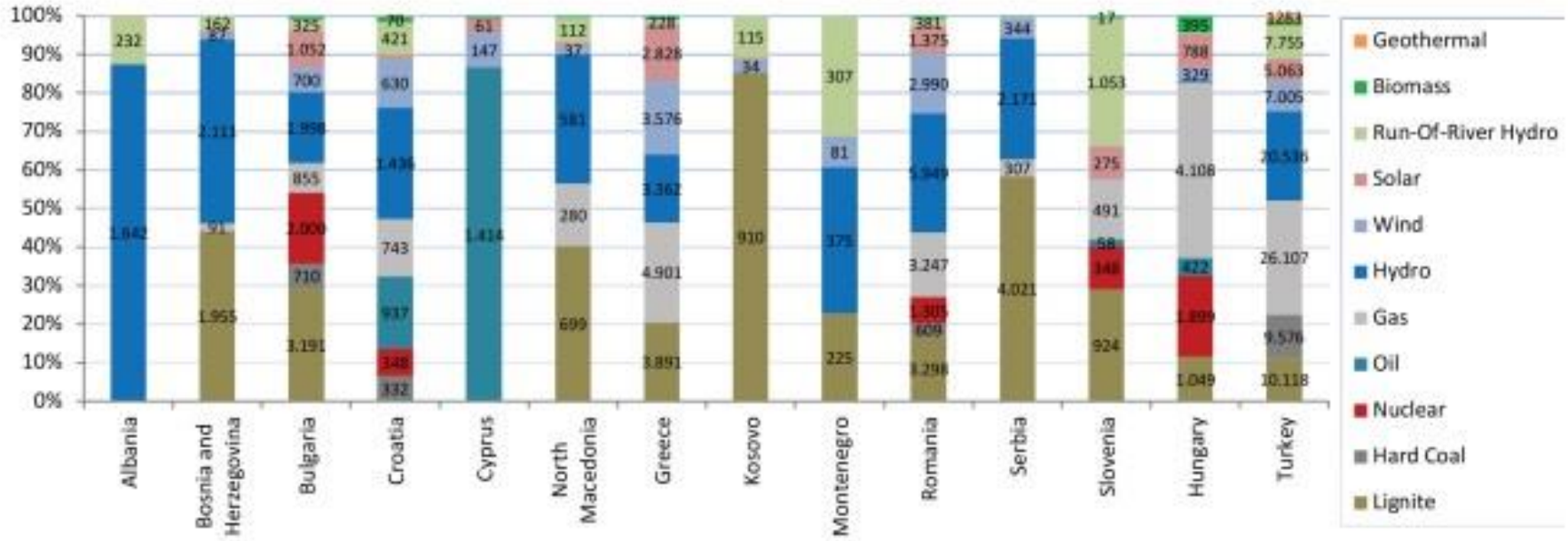
- Electricity Demand is growing
- Turkey by far greatest Demand

\* Greece's Electricity Demand does not include demand in the non-interconnected islands

Sources: ENTSOE, YTBS



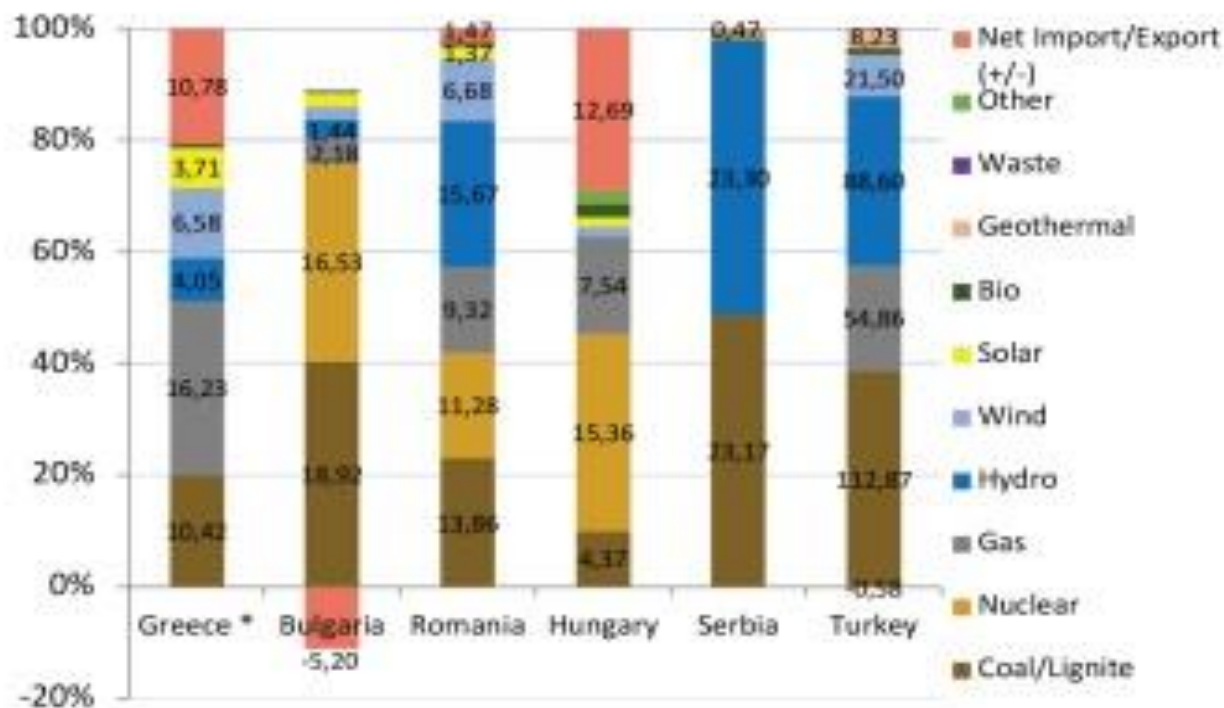
### Installed Capacity per Country and Production Type in SE Europe (MW) (2019)



Sources: IENE, ENTSOE, Republic of Cyprus, Ministry of Innovation and Technology of Hungary

Though many moving towards Renewable sources, many still rely on fossil fuels

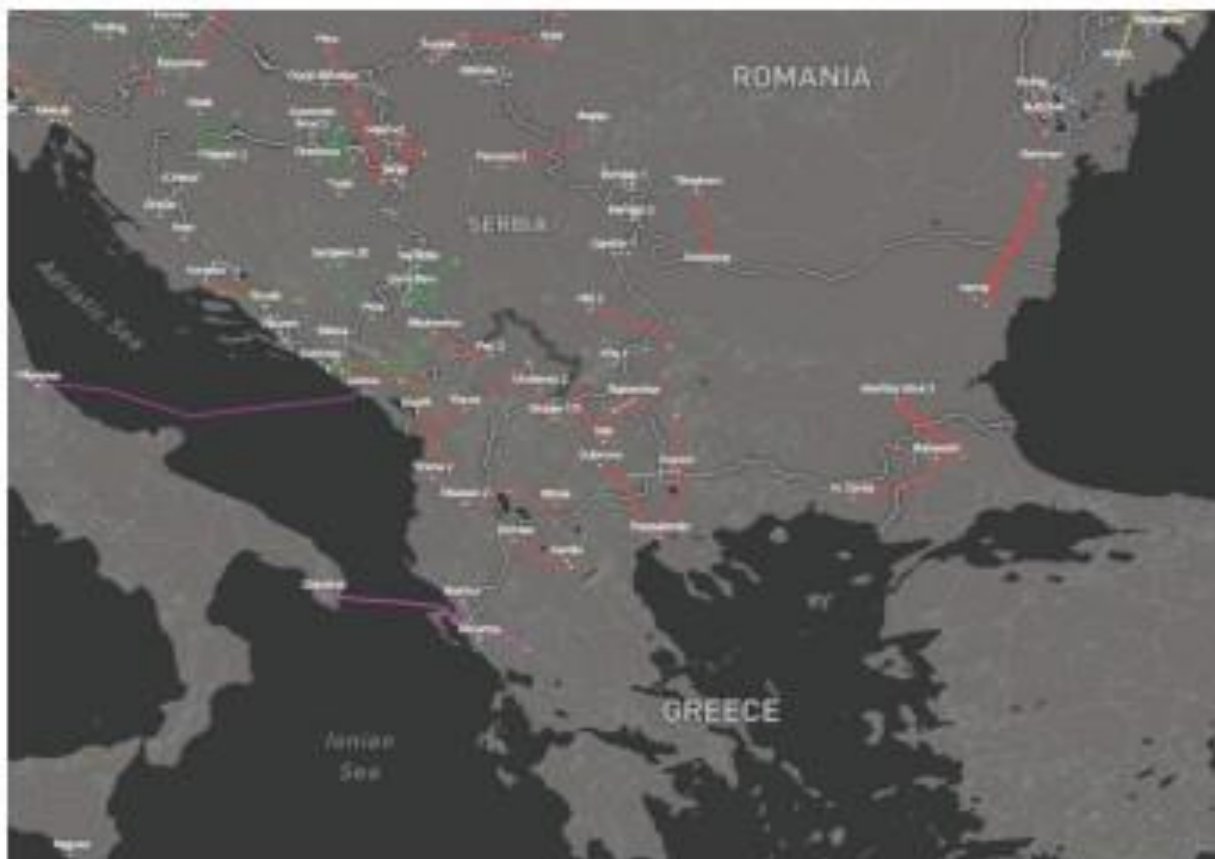
## Electricity Mix in SEE Markets (TWh) (2019)



\* Electricity mix of Greece does not include power generation in non-interconnected islands

Sources: ENTSOE, IPTQ, YTBS

## Cross-border Power Interconnections Between SEE and Peripheral Countries (2019)



Source: ENTSOE

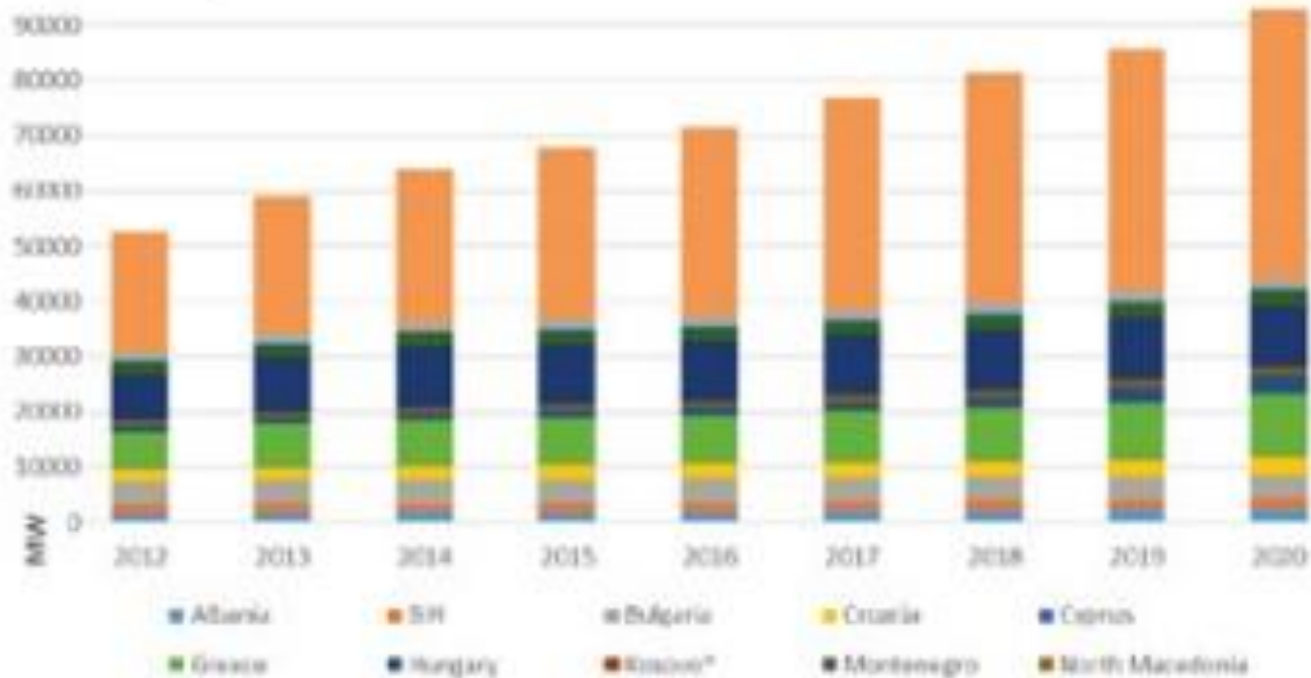
## Power Exchanges in SE Europe and PX Products Offered

Sources: IBEX, CROPEX, HENEX, HUPX, OPCOM, SEEPEX, BSP South Pool, EXIST, Shah D. et al. (2020)

Country	Power Exchanges	Year of Establishment	DAM	IDM	REC	Additional exchange product
Bulgaria	IBEX 	2014	✓	✓	-	Centralized market for bilateral contracts
Croatia	CROPEX 	2014	✓	✓	-	-
Greece	HENEX 	2018	✓	-	-	Forward Market
Hungary	HUPX 	2007	✓	✓	-	-
Romania	OPCOM 	2000	✓	✓	✓	Universal service market and green certificates market
Serbia	SEEPEX 	2015	✓	-	-	Forward market
Slovenia	BSP South Pool 	2008	✓	✓	-	Long term auction
Turkey	EXIST (EPIAS) 	2015	✓	✓	-	Balancing power market and ancillary services market



## Total installed capacity of RES systems by country in SE Europe, 2012-2021



Note: \*Kosovo is presented separately without prejudice to positions on status and in line with the United Nations Security Council Resolution 1244 (1999)

Source: IRENA

# Recent Events

- Conflict in Ukraine has dramatically changed the dynamic. It exposed the vulnerabilities in Europe and sparked a global energy crisis.
- Increased unpredictability and volatility in energy commodity and regulatory markets
- Increased Risks in Energy driven by systematic factors (e.g. current situation in Ukraine, market supply and demand, etc.) rather than unsystematic (company specific) or regulatory risks.
- Focus on alternative sources of supply, restarting closed power plants, focus on Renewables and possibly Nuclear.

# The BSTDB and Activities in Energy



# BSTDB Members Countries

## Overview of Greater Black Sea Region

### Romania



Capital: Bucharest  
Population: 21.4m  
GDP: \$169bn  
GDP per cap.: \$7,905

### Moldova



Capital: Chisinau  
Population: 3.6m  
GDP: \$7.3bn  
GDP per cap.: \$2,038

### Ukraine



Capital: Kiev  
Population: 45.6m  
GDP: \$176bn  
GDP per cap.: \$3,864

### Black Sea Region

Population: 327m  
GDP: \$3,594bn  
Weighted av. GDP per cap.: \$10,979

### Bulgaria



Capital: Sofia  
Population: 7.3m  
GDP: \$54.3bn  
GDP per cap.: \$7,243

### Albania



Capital: Tirana  
Population: 3.2m  
GDP: \$12.4bn  
GDP per cap.: \$3,845

### Russia



Capital: Moscow  
Population: 143.1m  
GDP: \$2,007bn  
GDP per cap.: \$14,027

### Georgia



Capital: Tbilisi  
Population: 4.5m  
GDP: \$15.8bn  
GDP per cap.: \$3,520

### Greece



Capital: Athens  
Population: 11.4m  
GDP: \$249bn  
GDP per cap.: \$21,799

### Turkey



Capital: Ankara  
Population: 74.7m  
GDP: \$789bn  
GDP per cap.: \$10,561

### Armenia



Capital: Yerevan  
Population: 3.3m  
GDP: \$9.9bn  
GDP per cap.: \$3,027

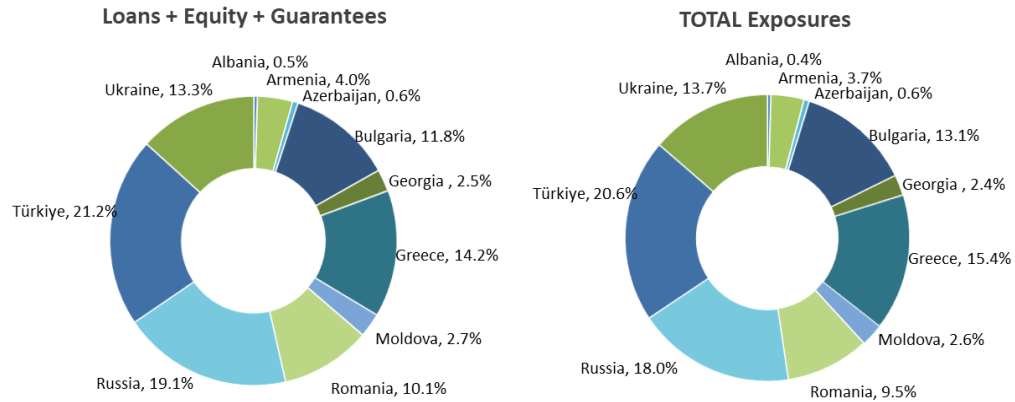
### Azerbaijan



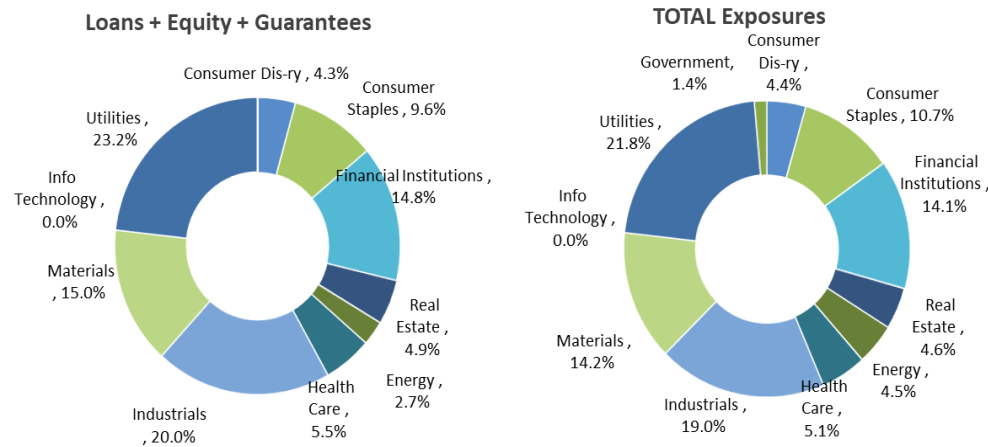
Capital: Baku  
Population: 9.2m  
GDP: \$68.7bn  
GDP per cap.: \$7,442

# Portfolio Across Countries and Sectors

## Portfolio by Country



## Portfolio by Sector



# BSTDB Energy Portfolio

- BSEC Countries focused on basic needs & security of supply
- Carbon usage still high (gas, oil, coal)
- RES growing from very low base
- RES primarily financed with State and MDB support



**Project  
Cost**

**Total: EUR 450 m  
BSTDB: EUR 50 m**

**Borrower**

**Bulgarian Energy Holding**

**Term**

**5 years**

**Sector**

**Utilities**

**Summary**

**Participation in the tap issue of their June 2018 EUR 400m Eurobond issue. The funds will be used for their ongoing capital investment program.**

# EnergoPro (Bulgaria)



**Project  
Cost**

**Total: EUR 370 m  
BSTDB: EUR 42 m**

**Borrower**

**EnergoPro**

**Term**

**5 years**

**Sector**

**Utilities**

**Summary**

**Participation in the primary bond issue as an anchor investor to finance the ongoing improvement and developments of the electricity grid and metering system and of the other markets of EnergoPro operations.**

# Energean Oil & Gas (Greece)



<b>Project Cost</b>	<b>BSTDB: EUR 90m</b>
<b>Borrower</b>	<b>Energean Oil &amp; Gas</b>
<b>Term</b>	<b>8 years</b>
<b>Sector</b>	<b>Natural Resources</b>
<b>Summary</b>	<b>Support the company's existing oil development programme to access additional oil reserves in the Prinos, Prinos North and Epsilon operating oil fields, located offshore Greece (Prinos-Kavala Basin).</b>



<b>Project Cost</b>	<b>Total: EUR 360 m BSTDB: EUR 50 m</b>
<b>Borrower</b>	<b>Eurohold</b>
<b>Term</b>	<b>5 years</b>
<b>Sector</b>	<b>Utilities</b>
<b>Summary</b>	<b>BSTDB participated in an investment regarding the acquisition of CEZ's assets in Bulgaria and/or refinancing of the existing debt.</b>



# Gurmat Geothermal Power Plant (Turkey)

<b>Project Cost</b>	<b>BSTDB: USD 1b</b>
<b>Borrower</b>	<b>Gurmat Electric Uretim</b>
<b>Term</b>	<b>15 years</b>
<b>Sector</b>	<b>Energy</b>
<b>Summary</b>	<b>Financing of the construction and operation of 170MW geothermal power plant southwestern Turkey</b>



# Galnaftogaz (Ukraine)



<b>Project Cost</b>	<b>Total: USD 220 m BSTDB: USD 20 m</b>
<b>Borrower</b>	<b>Concern Galnaftogaz</b>
<b>Term</b>	<b>7 years</b>
<b>Sector</b>	<b>Utilities</b>
<b>Summary</b>	<b>CAPEX program and expansion of the Borrower's gas filling stations network in Ukraine</b>

# Ingulets Solar PV (Ukraine)



**Project  
Cost**

**Total: EUR 56 m  
BSTDB: EUR 19.5 m**

**Borrower**

**Ingulets Solar PV**

**Term**

**10 years**

**Sector**

**Renewable Energy**

**Summary**

**Development, construction and operation of an up to 58 MW solar power plant project Ingulets, to be located in the Mykolvyiv region in Southern part of Ukraine.**



Public Power Corporation S.A.-Hellas  
*Always by your side*

<b>Project Cost</b>	<b>Total: EUR 1.7 b BSTDB: EUR 160 m</b>
<b>Beneficiary</b>	<b>PPC</b>
<b>Term</b>	<b>5 years</b>
<b>Sector</b>	<b>Energy / Utility</b>
<b>Summary</b>	<b>Corporate Loan for financing PPC's capital expenditure program for the period 2019- 2020 which is expected for its electricity distribution networks.</b>



RENGY DEVELOPMENT



Scatec Solar  
Improving our future™

**Project  
Cost**

**Total: EUR 53 m  
BSTDB: EUR 18.5 m**

**Borrower**

**Rengy Bioenergy Solar PV**

**Term**

**10 Years**

**Sector**

**Renewable Energy**

**Summary**

**Development, construction and operation of three solar parks of total capacity of 47 MW: (i) Afanasievka of 14 MW, (ii) Taborovka of 16 MW and (iii) Tokarivka of 17 MW, located in the Mykolaiv region in Southern part of Ukraine**

# Syvash Wind (Ukraine)



## **Project Cost**

**Total: EUR 390 m  
BSTDB: EUR 30 m**

## **Borrower**

**Syvash Wind**

## **Term**

**10 year**

## **Sector**

**Renewable Energy**

## **Summary**

**Development, construction and operation of the wind park of total capacity of 250 MW, to be located in the Kherson region in Southern part of Ukraine**

# Thank you

## BLACK SEA TRADE AND DEVELOPMENT BANK

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