Feasibility study for the Balkan Gas Hub, part of PCI 6.25.4 - Interim report

Balkan Gas Hub

12 June 2018

Brussels

Markus Schneider

Co-financed by the Connecting Europe Facility of the European Union

CONTENT

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I. GENERAL OVERVIEW AND COMMERCIAL SECTION

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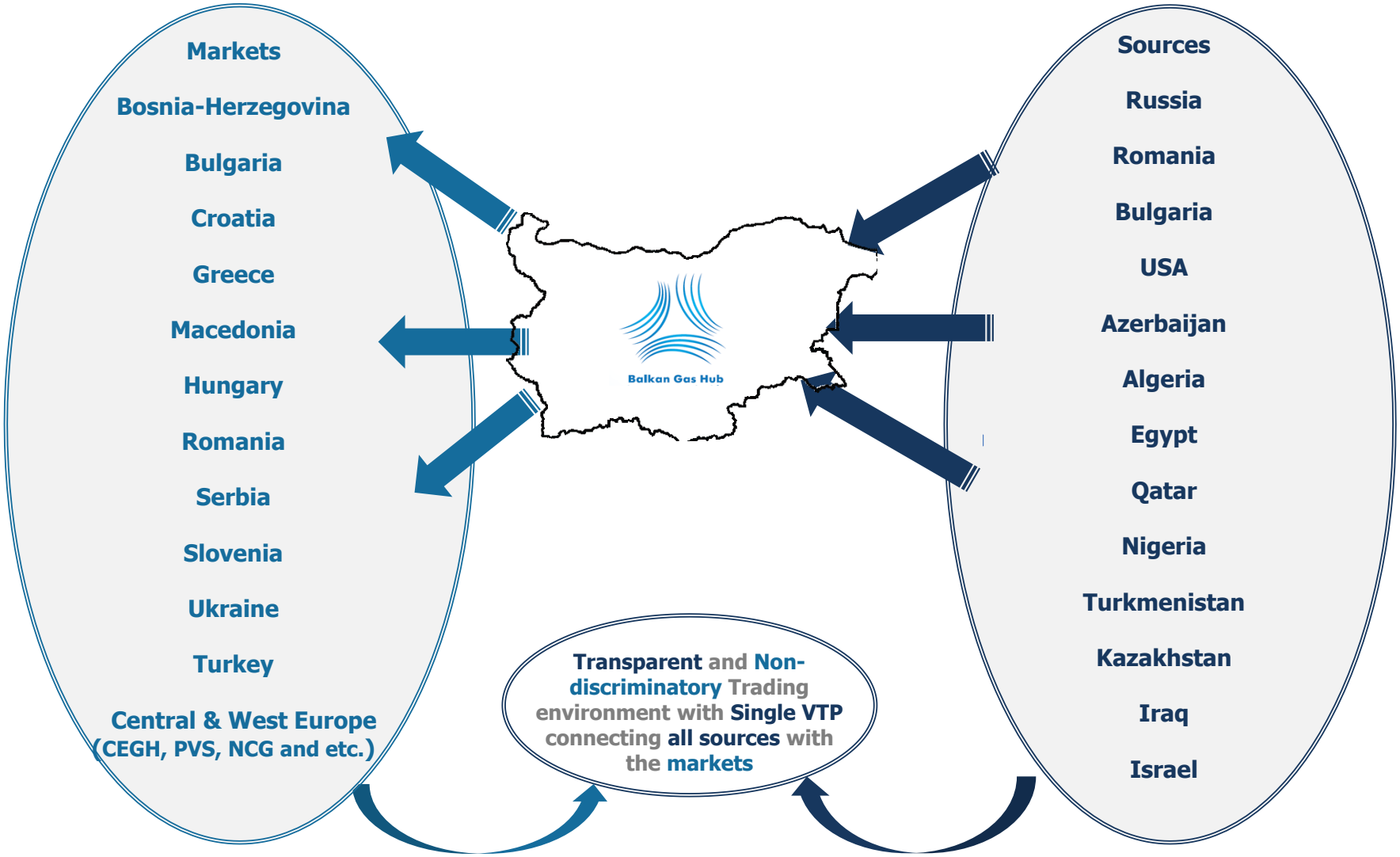
The Balkan Gas Hub guarantees European consumers transparent and non-discriminatory access to a wide range of supply sources



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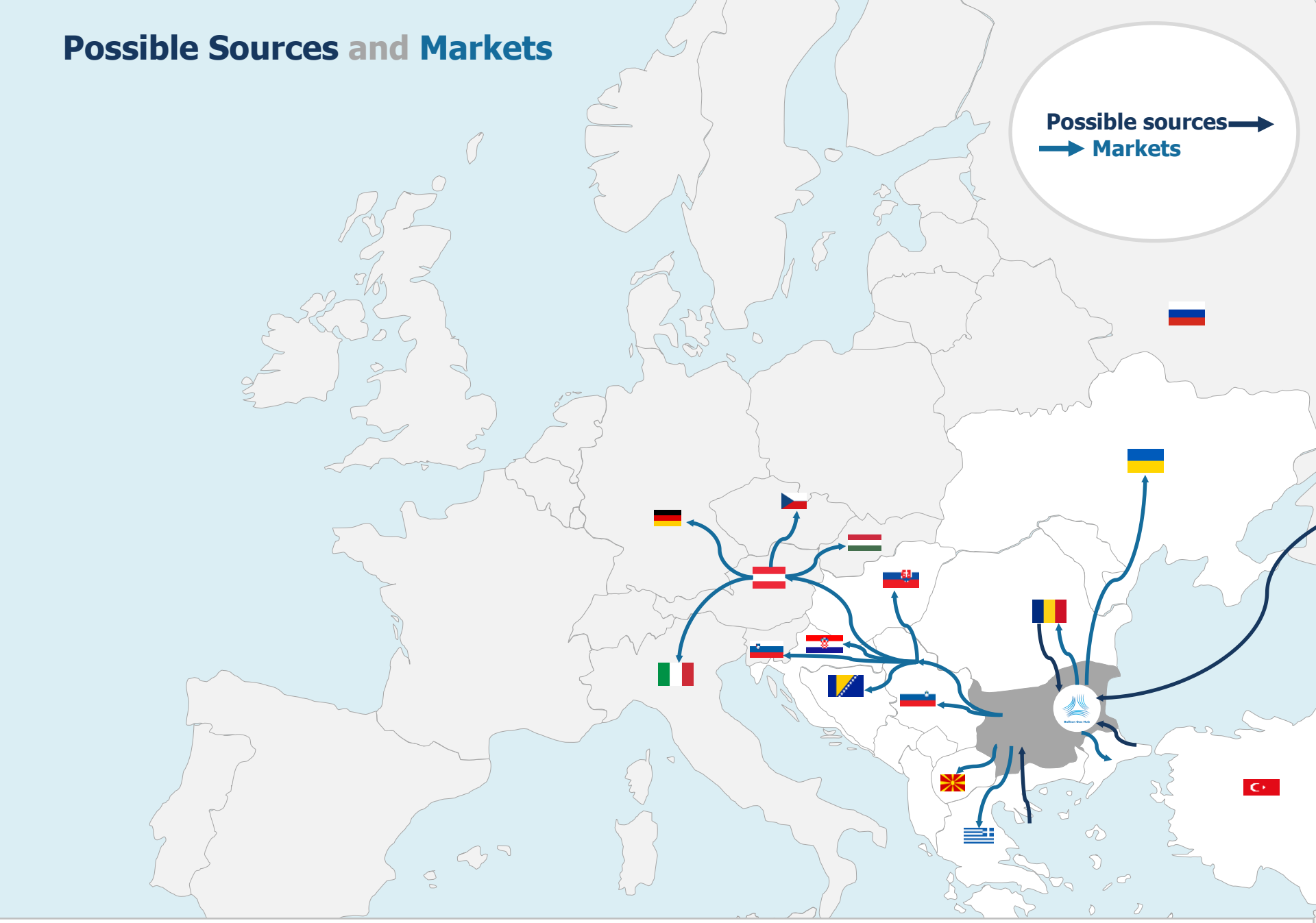
Possible Sources and Markets



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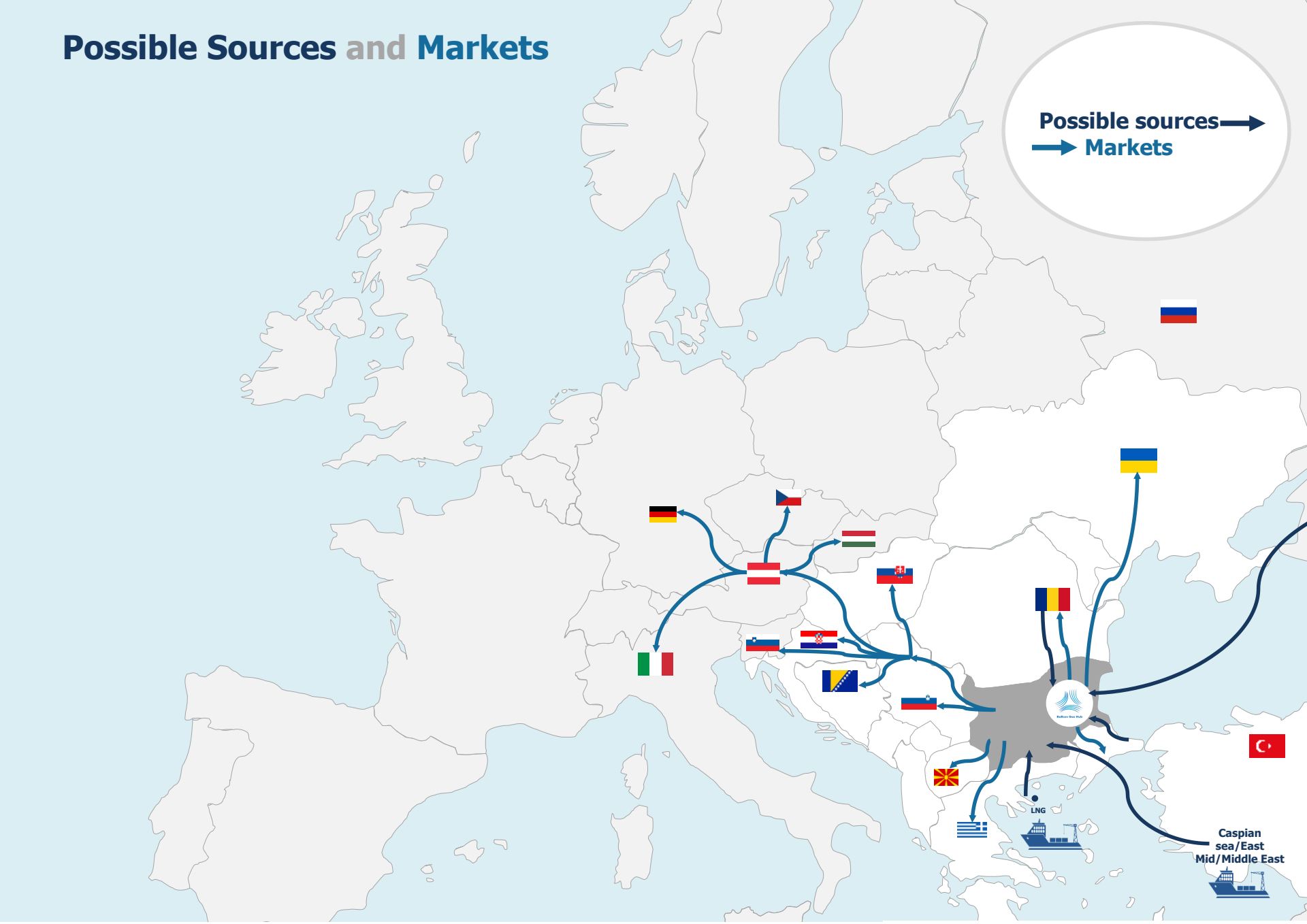
Possible Sources and Markets



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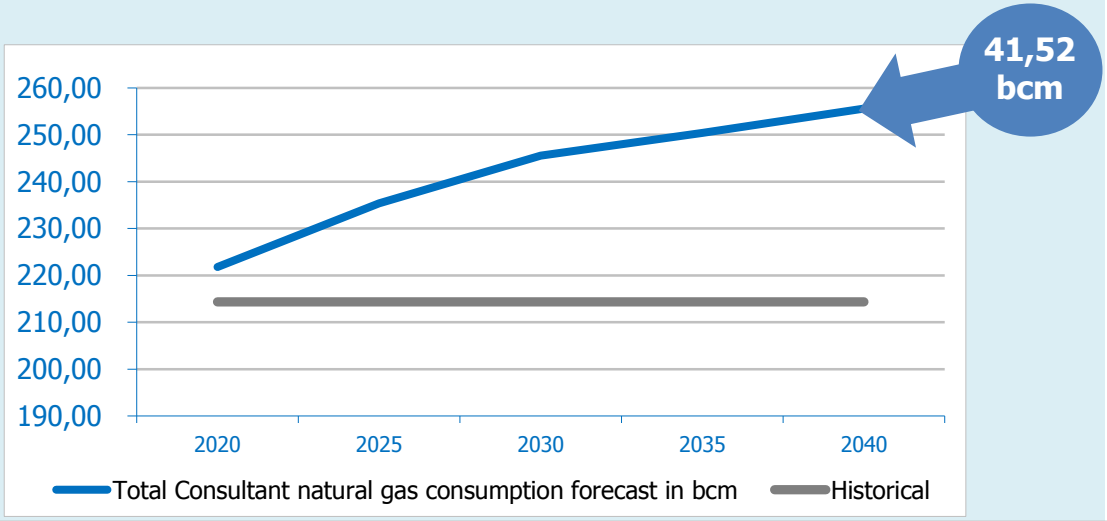
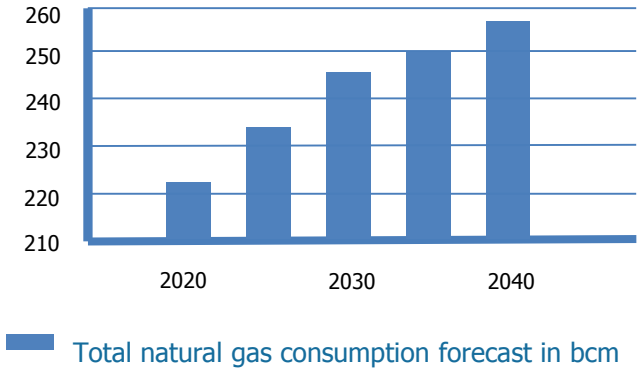
Projected increase in natural gas demand

Consultant natural gas consumption forecast in bcm					
COUNTRY	**2020**	**2025**	**2030**	**2035**	**2040**
AT Austria	7,5	7,3	7,1	7	6,9
BG Bulgaria	4	4,2	4,3	4,5	5
GR Greece	5	5,2	5,41	5,62	5,85
HR Croatia	3,7	3,8	3,9	4	4,1
HU Hungary	11	10,5	10	9,5	9
IT Italy	71,3	79,2	83,8	83,5	83,5
MK Macedonia	0,1	0,1	0,13	0,15	0,18
RO Romania	13	13,5	13,5	13	13
SI Slovenia	1,2	1,2	1,3	1,3	1,3
SK Slovakia	7	7,2	7,3	7,4	7,5
RS Serbia	2,2	2,25	2,3	2,4	2,5
Turkey	60	65	70	75	80
Ukraine	35,8	36	36,5	37	37
Total Consultant natural gas consumption forecast in bcm	**221,8**	**235,45**	**245,54**	**250,37**	**255,83**
increase in natural gas demand in bcm	**7,49**	**21,14**	**31,23**	**36,06**	**41,52**
2016/2017	**214,31**				



Balkan Gas Hub

EU Incremental demand assessment 2017 results for the target markets – approx. 40 bcm/y new demand



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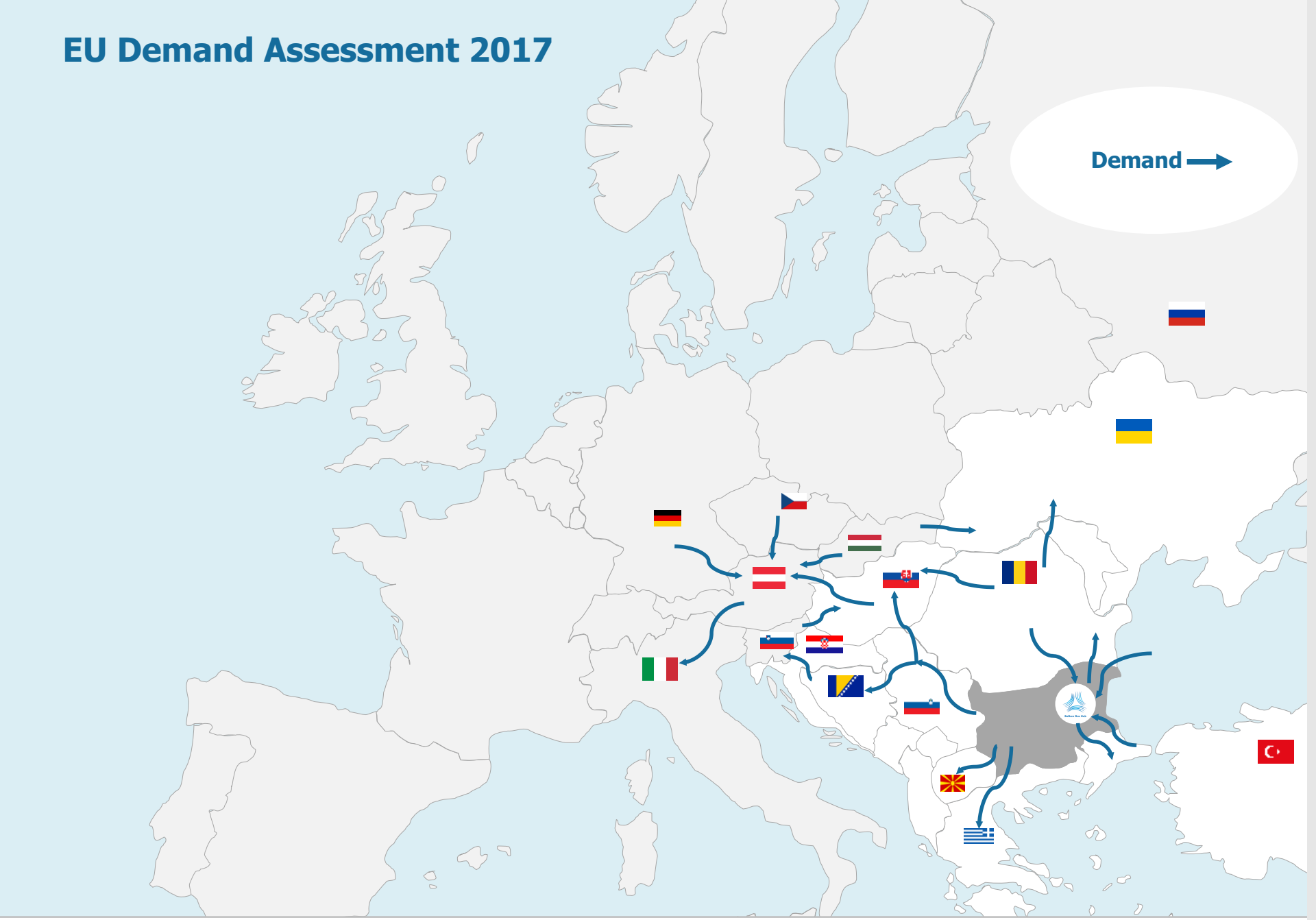
EU Demand Assessment 2017



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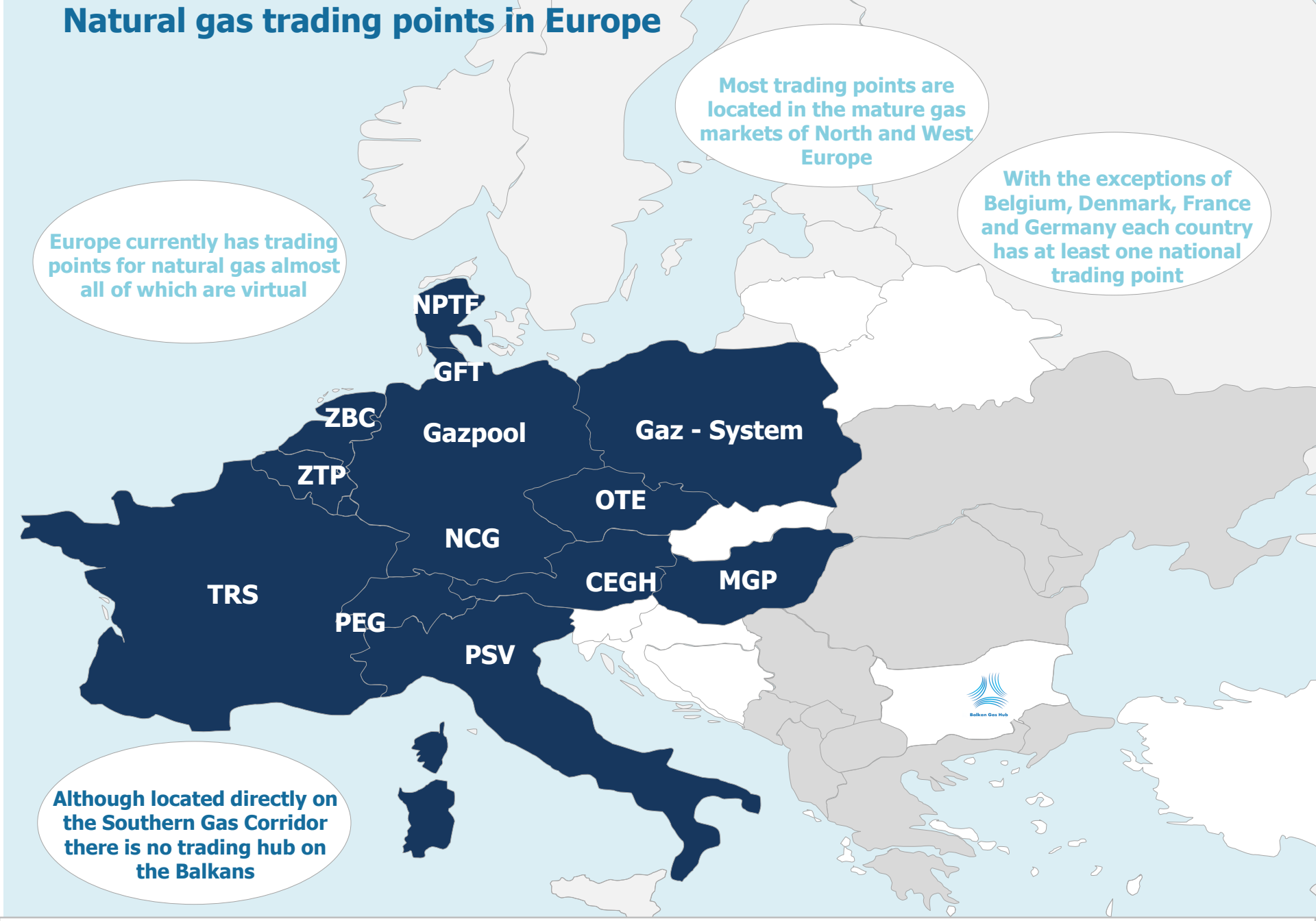
Natural gas trading points in Europe



Balkan Gas Hub

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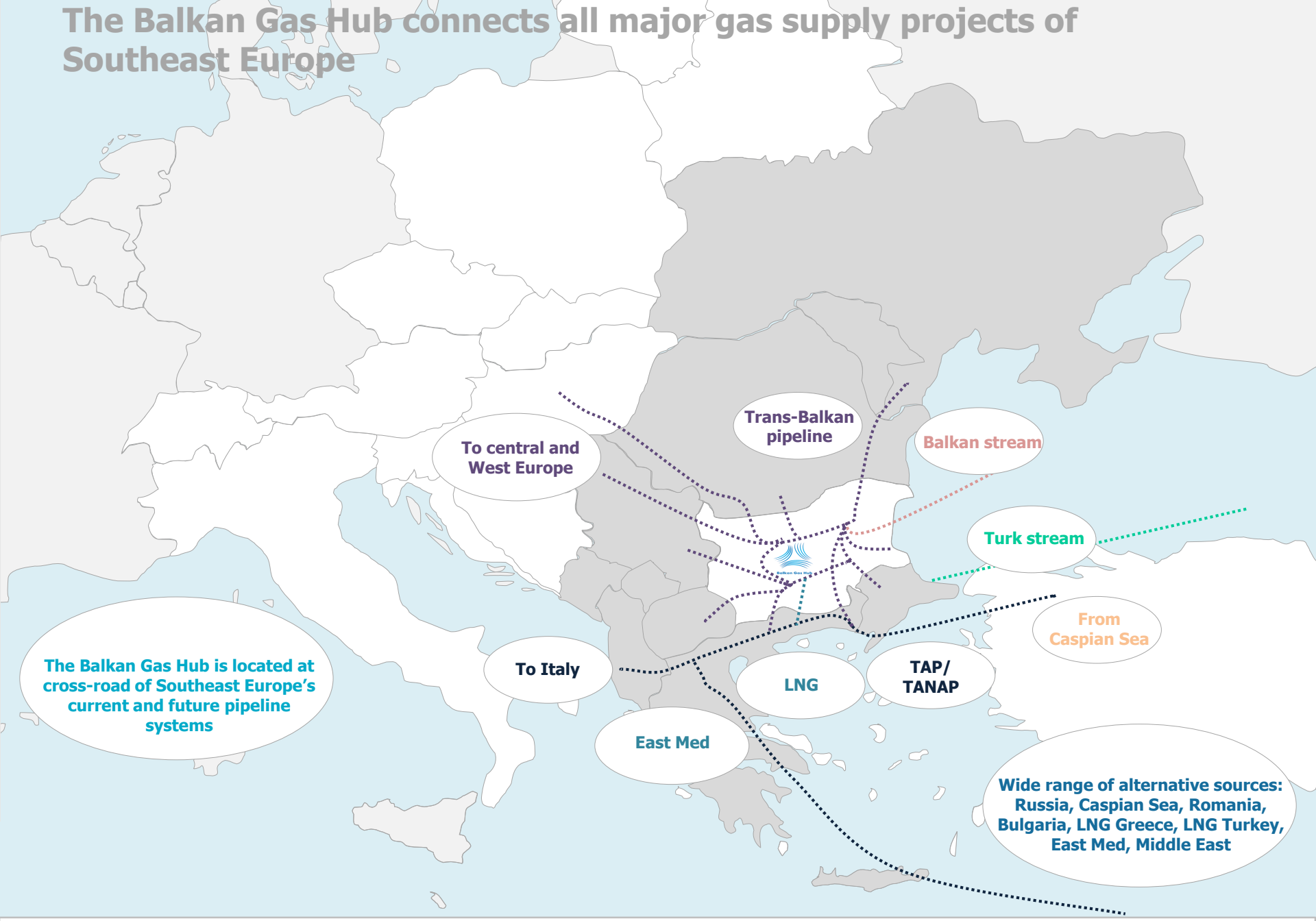
The Balkan Gas Hub connects all major gas supply projects of Southeast Europe



Balkan Gas Hub

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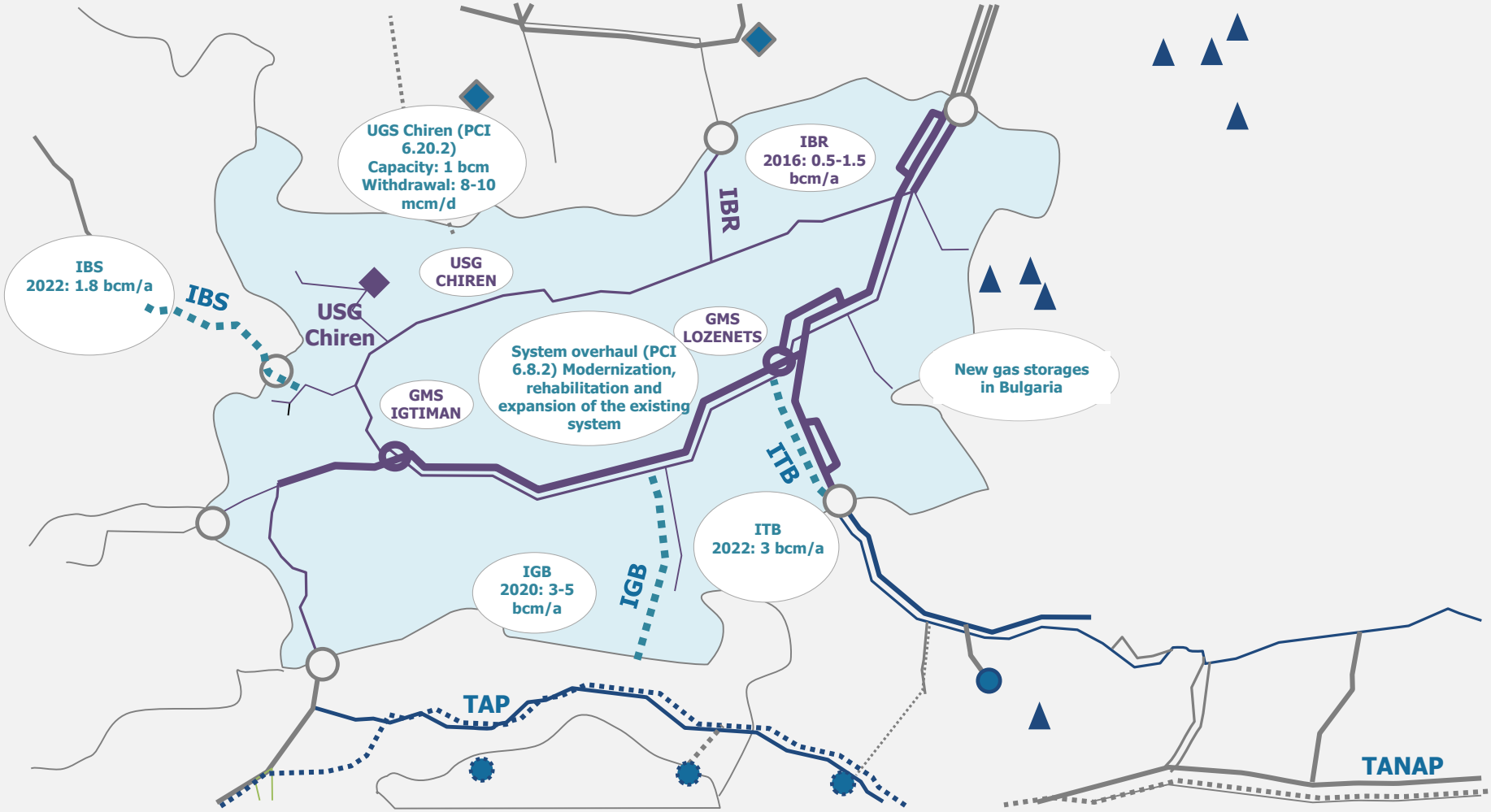
The **ongoing** infrastructure projects and the **existing** infrastructure represent the basis for the hub development inside Bulgaria



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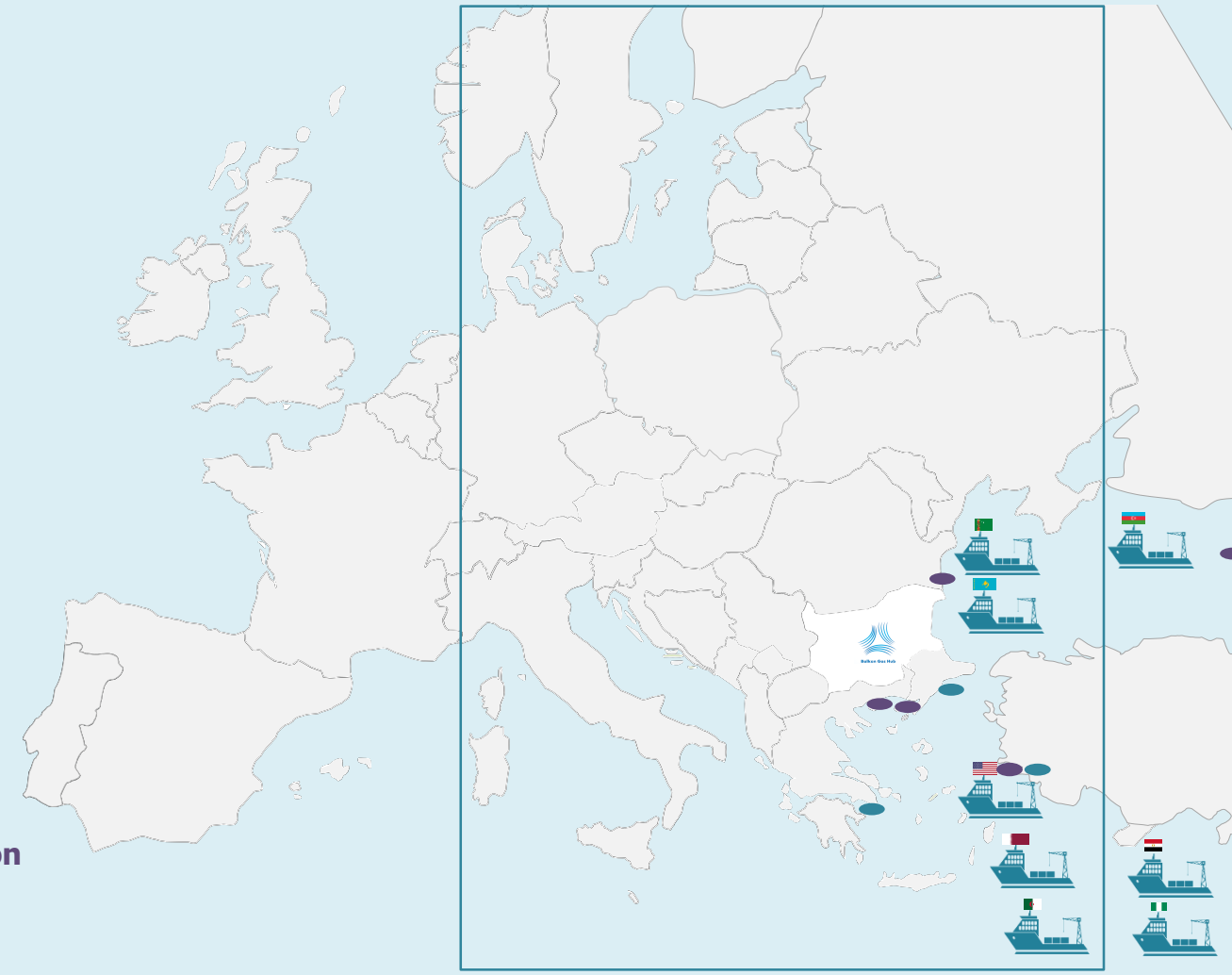
The increasing number of LNG regasification terminals is developing into a real alternative to pipeline-based imports

Operational and planned LNG terminals (regasification) in region

LNG terminal by country

	operational	new
GR	1	1
RO	-	1
TR	2	2
GEO		1
Σ	3	5



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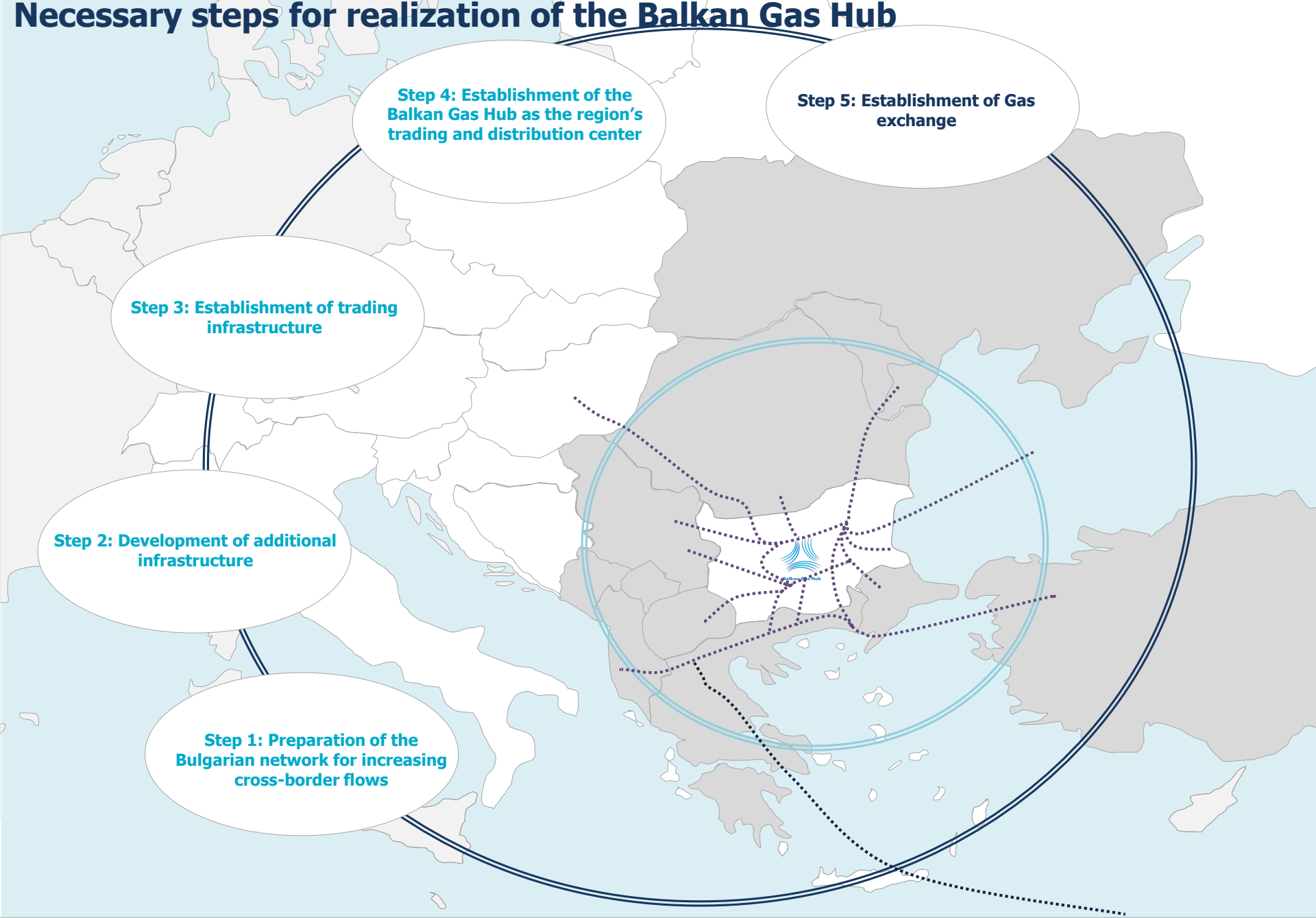
Necessary steps for realization of the Balkan Gas Hub



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Single VTP and organized markets

Balkan Gas Hub

Single VTP in the Gas hub Balkan

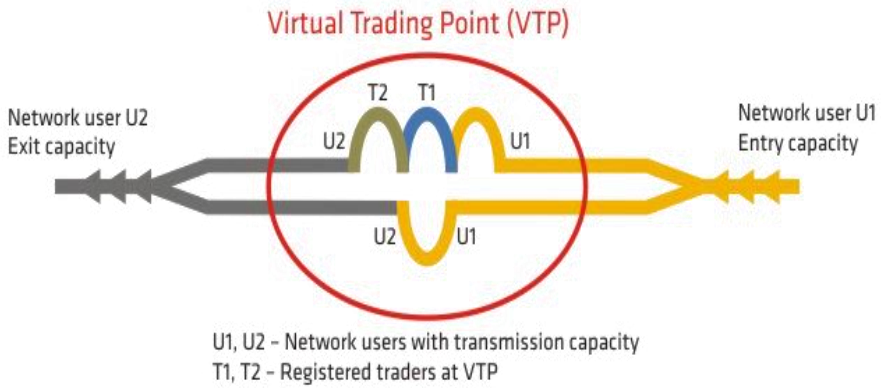
What is it? VTP allows NU to trade physically or "in paper" quantities of gas

What does it do?

VTP

- Enables trading
- Increases liquidity
- Enables gas exchange and financial trades
- Market price determination
- Invented to facilitate the commercial daily balancing regime

VTP introduced by BG in 2017:



2019

Trading platform – "over the counter" deals:

- Standardized deals
- Bilateral contracts

-Dealt direct or via broker

-Counter party risk management

2019 ?

Gas Exchange:

- Standardized products incl. Futures market
- Anonymity
- Credit risk
- Price determination
- OTC and Spot markets possible

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Market participants, BTG and the Energy and Water Regulation Commission are working toward full implementation of the Third Energy Package

Regulation in compliance with the EU's Third Energy Package

Regulatory and Market actions

FINISHED ACTIVITIES

- Signed interconnection agreements with Transgaz (RO), and DESFA (GR)
- Defined rules for balancing the natural gas
- Introduced entry-exit tariff model
- Established capacity booking platform
- Defined congestion management procedures
- VTP with "paper" traders in place
- All rules and regulations are fully complaint with European and Bulgarian Law
- Transparent and non-discriminatory market access in place

ACTIVITIES IN PROGRESS

- Interconnection agreements with TSO's from Turkey, Macedonia and Serbia in preparation phase
- General switch to energy units for DSO and storage contracts
- Rules for access and tariff model for Chiren UGS will be amended
- Trading platform will be developed
- Gas exchange will be introduced
- Single VTP connecting all transmission routes in design

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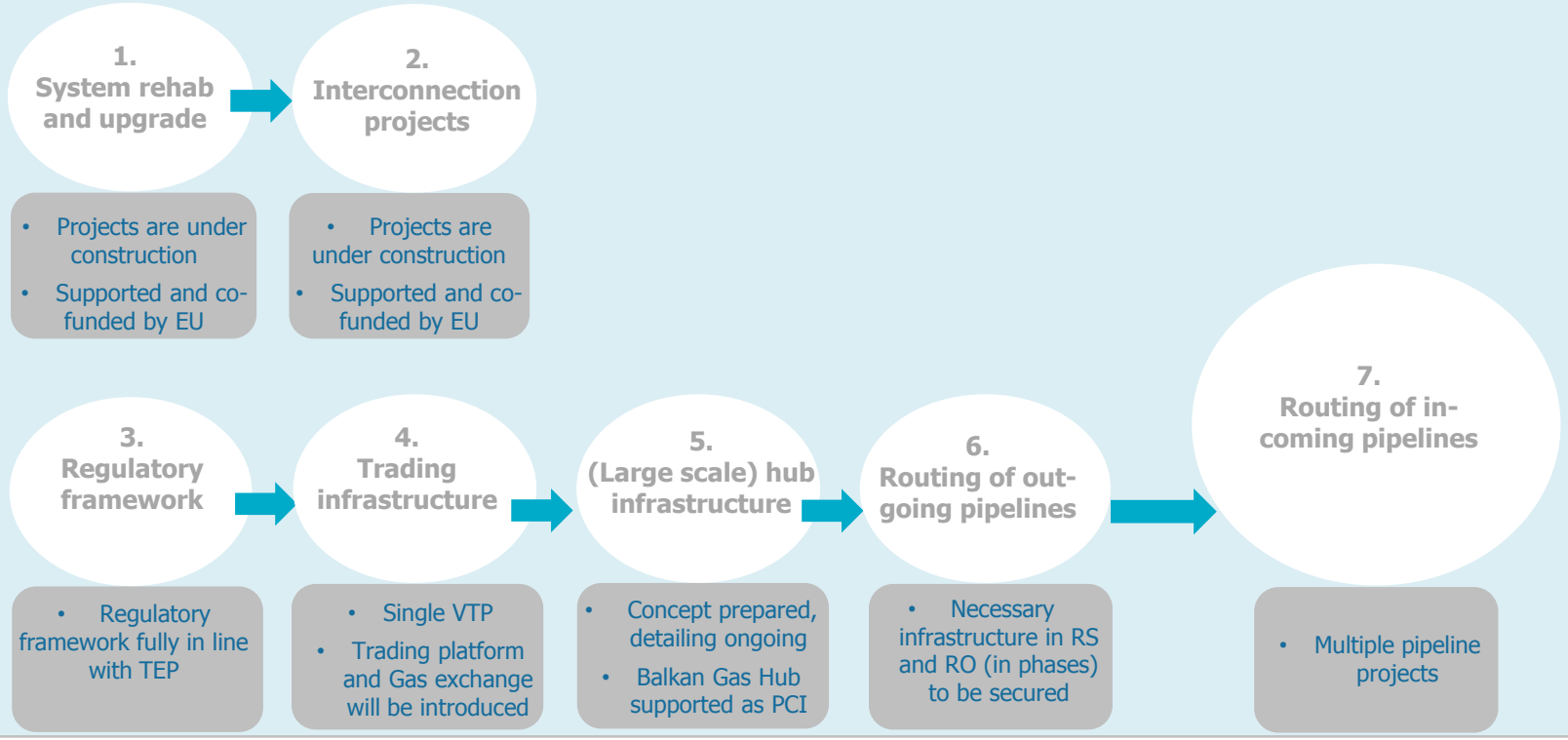
Bulgaria and its European partners decisively move the project forward to ensure that all necessary pre-conditions are fulfilled

Preconditions for the development of Balkan Gas Hub
Actions of Bulgarian and EU-partners influence routing of incoming pipelines



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FEASIBILITY STUDY FOR THE BALKAN GAS HUB, PART OF THE PROJECT OF "COMMON INTEREST" 6.25.4

Balkan Gas Hub - North Route (two options)

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FEASIBILITY STUDY FOR THE BALKAN GAS HUB, PART OF THE PROJECT OF "COMMON INTEREST" 6.25.4

Balkan Gas Hub - South Route (two options)

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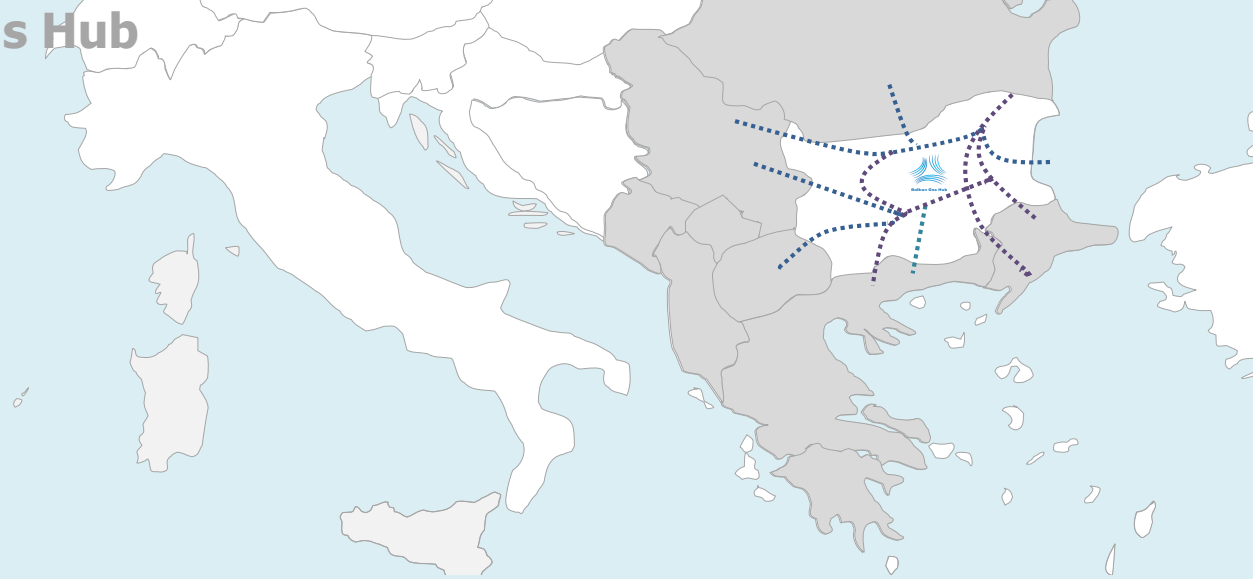
FEASIBILITY STUDY FOR THE BALKAN GAS HUB, PART OF THE PROJECT OF "COMMON INTEREST" 6.25.4

Balkan Gas Hub - Western Route

Benefits of the Balkan Gas Hub

REGIONAL BENEFITS

- Supply diversification of former source countries
- Increased security of supply in Bulgaria and the Balkan region
- Lower price for household and industrial customers
- Enhanced access to natural gas



The **combination** of the benefits provides strong economic and political justification for the **Balkan Gas Hub**

REGIONAL BENEFITS
EUROPE WIDE BENEFITS

EUROPE-WIDE BENEFITS

- **Enhanced security of supply through access to additional, high capacity supply streams**
- **Deeper integration of Southern Gas Corridor into the European gas transmission system**
- **Continued liberalization of the European gas market**

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Benefits of the Balkan Gas Hub

REGIONAL BENEFITS
EUROPE WIDE BENEFITS

WHY IN BULGARIA ?

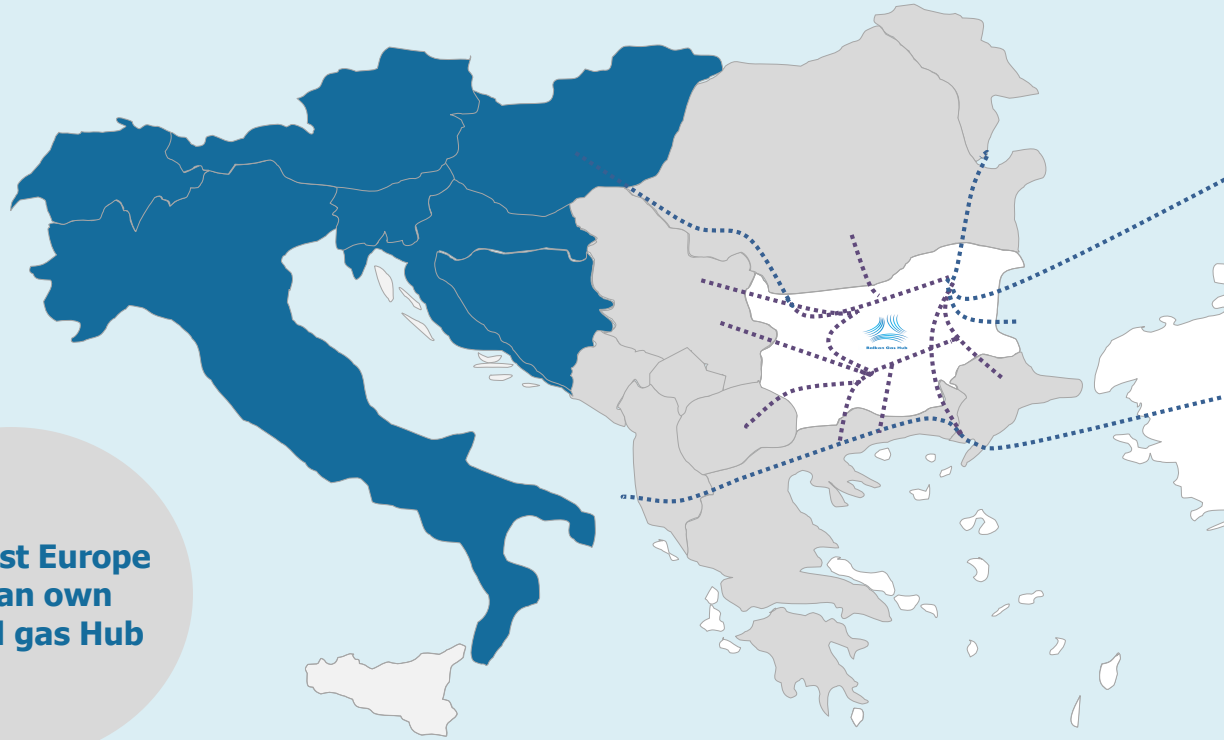
Bulgartransgaz existing GTS is well-suited to be developed into Hub

Regional demand growth forecast is much higher than in rest of Europe

Bulgaria sits at the cross-road of (future) European supply system

Full compliance with European energy market regulation

Bulgaria continues to invest in system upgrades and interconnection



Bulgaria is an EU-member state with strong Hub support from Brussels

Southeast Europe lacks an own regional gas Hub

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2. TECHNICAL SECTION, FINANCIAL ANALYSIS, TARIFFS AND BUSINESS MODELS

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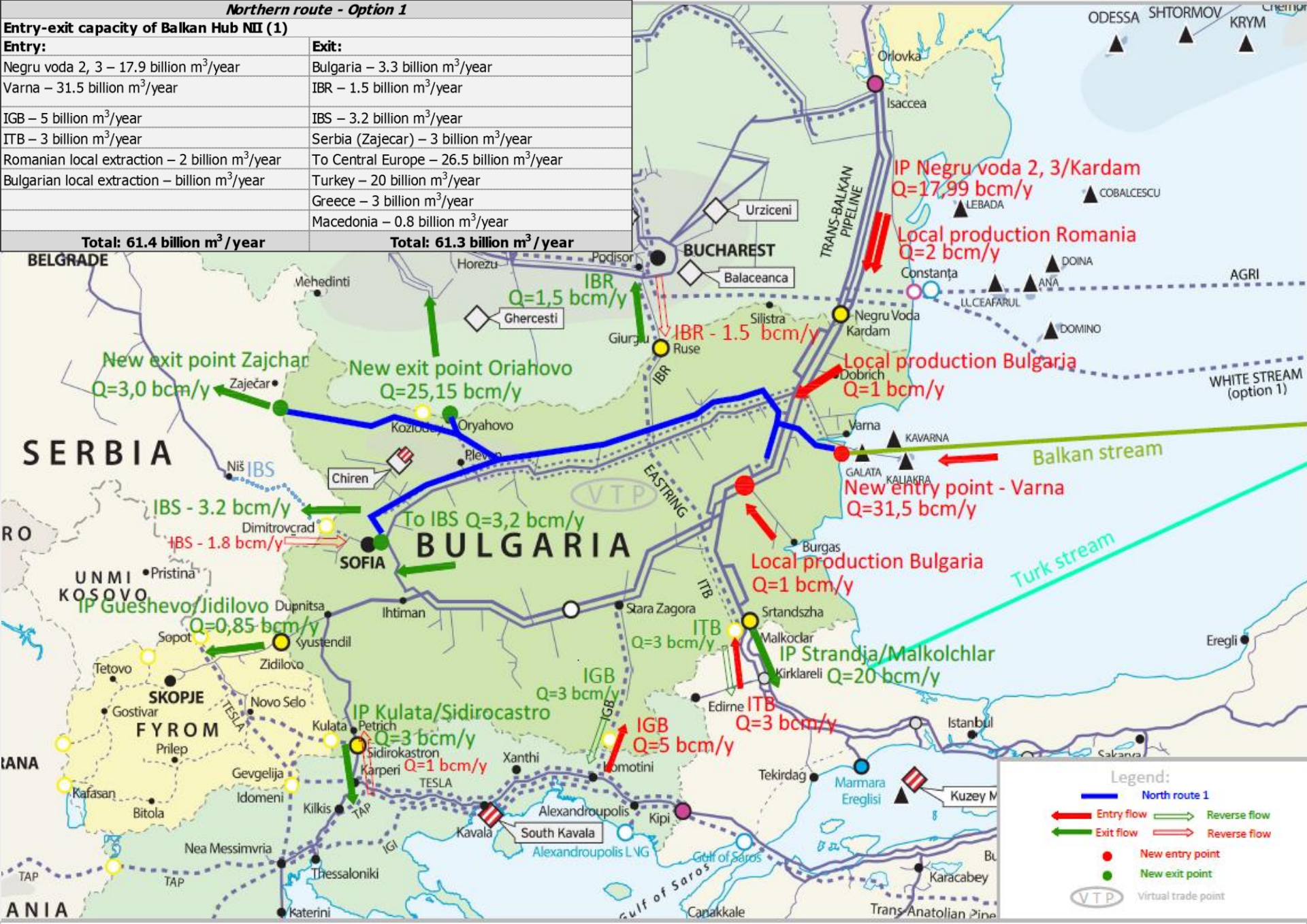
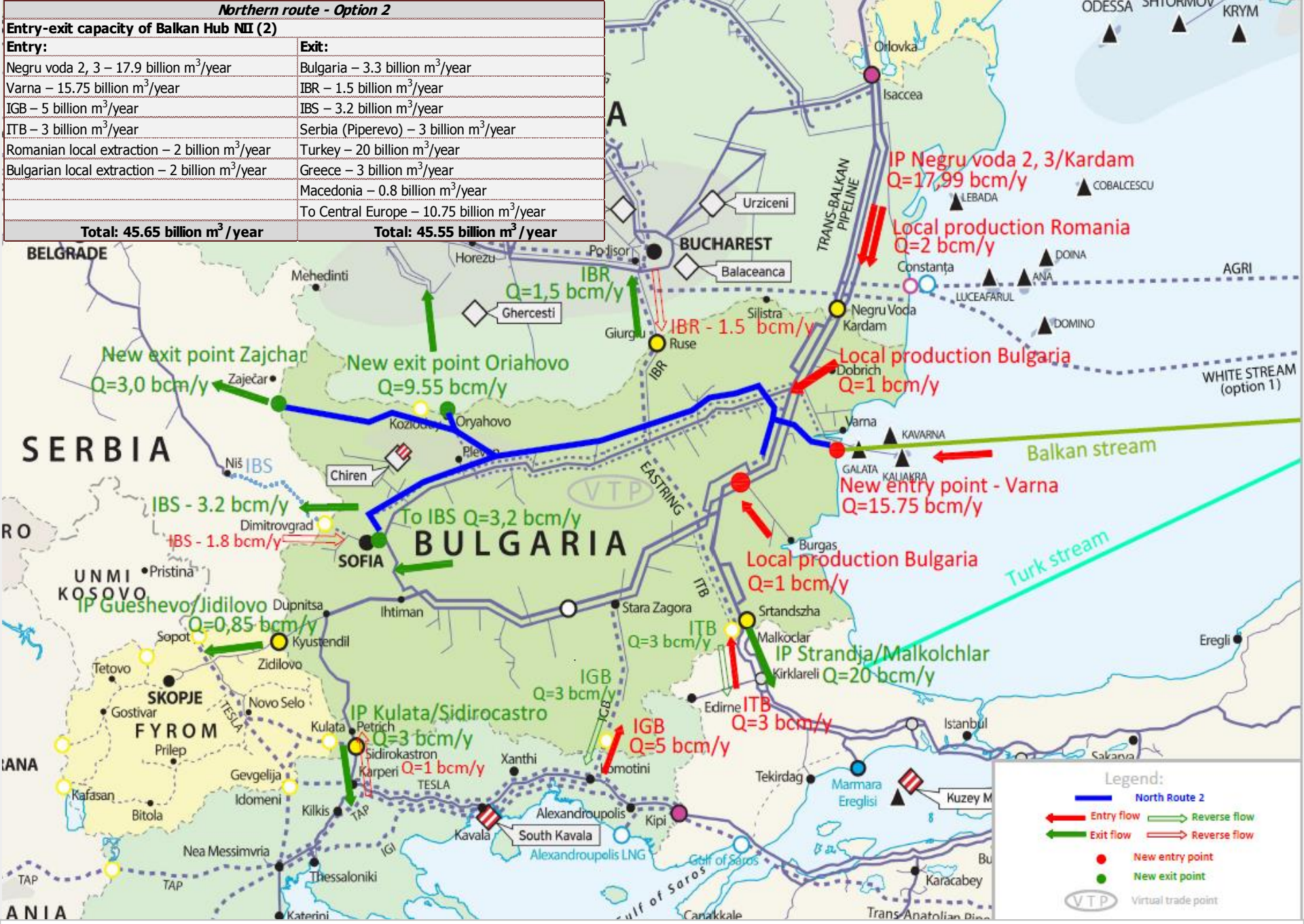
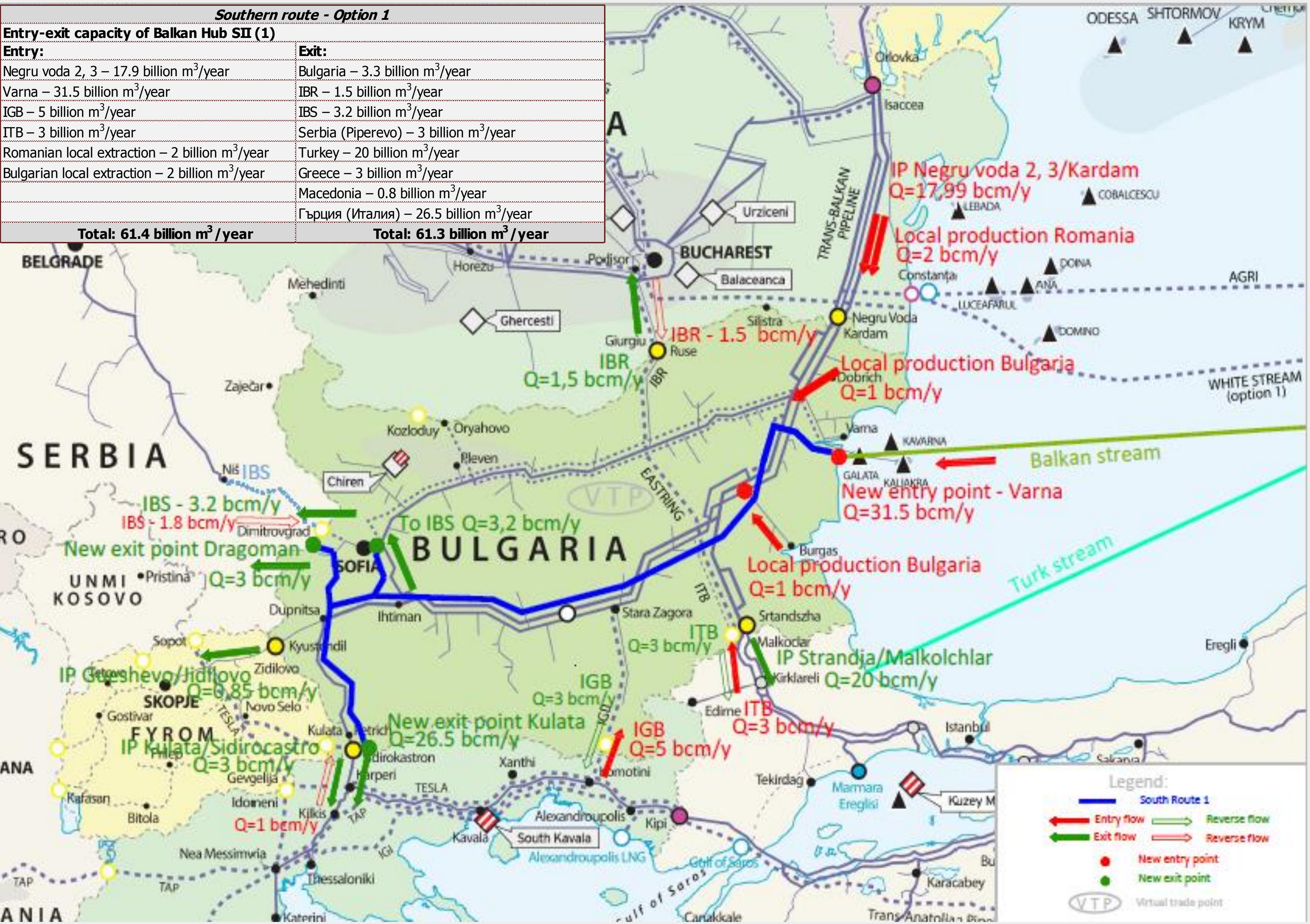
Northern route - Option 1	
Entry-exit capacity of Balkan Hub NII (1)	
Entry:	**Exit:**
Negru voda 2, 3 – 17.9 billion m^3/year	Bulgaria – 3.3 billion m^3/year
Varna – 31.5 billion m^3/year	IBR – 1.5 billion m^3/year
IGB – 5 billion m^3/year	IBS – 3.2 billion m^3/year
ITB – 3 billion m^3/year	Serbia (Zajecar) – 3 billion m^3/year
Romanian local extraction – 2 billion m^3/year	To Central Europe – 26.5 billion m^3/year
Bulgarian local extraction – billion m^3/year	Turkey – 20 billion m^3/year
	Greece – 3 billion m^3/year
	Macedonia – 0.8 billion m^3/year
Total: 61.4 billion m^3/year	**Total: 61.3 billion m^3/year**



Northern route - Option 2	
Entry-exit capacity of Balkan Hub NII (2)	
Entry:	**Exit:**
Negru voda 2, 3 – 17.9 billion m^3/year	Bulgaria – 3.3 billion m^3/year
Varna – 15.75 billion m^3/year	IBR – 1.5 billion m^3/year
IGB – 5 billion m^3/year	IBS – 3.2 billion m^3/year
ITB – 3 billion m^3/year	Serbia (Piperevo) – 3 billion m^3/year
Romanian local extraction – 2 billion m^3/year	Turkey – 20 billion m^3/year
Bulgarian local extraction – 2 billion m^3/year	Greece – 3 billion m^3/year
	Macedonia – 0.8 billion m^3/year
	To Central Europe – 10.75 billion m^3/year
Total: 45.65 billion m^3/year	**Total: 45.55 billion m^3/year**



Southern route - Option 1	
Entry-exit capacity of Balkan Hub SII (1)	
Entry:	**Exit:**
Negru voda 2, 3 – 17.9 billion m^3/year	Bulgaria – 3.3 billion m^3/year
Varna – 31.5 billion m^3/year	IBR – 1.5 billion m^3/year
IGB – 5 billion m^3/year	IBS – 3.2 billion m^3/year
ITB – 3 billion m^3/year	Serbia (Piperevo) – 3 billion m^3/year
Romanian local extraction – 2 billion m^3/year	Turkey – 20 billion m^3/year
Bulgarian local extraction – 2 billion m^3/year	Greece – 3 billion m^3/year
	Macedonia – 0.8 billion m^3/year
	Гърция (Италия) – 26.5 billion m^3/year
Total: 61.4 billion m^3 / year	**Total: 61.3 billion m^3 / year**



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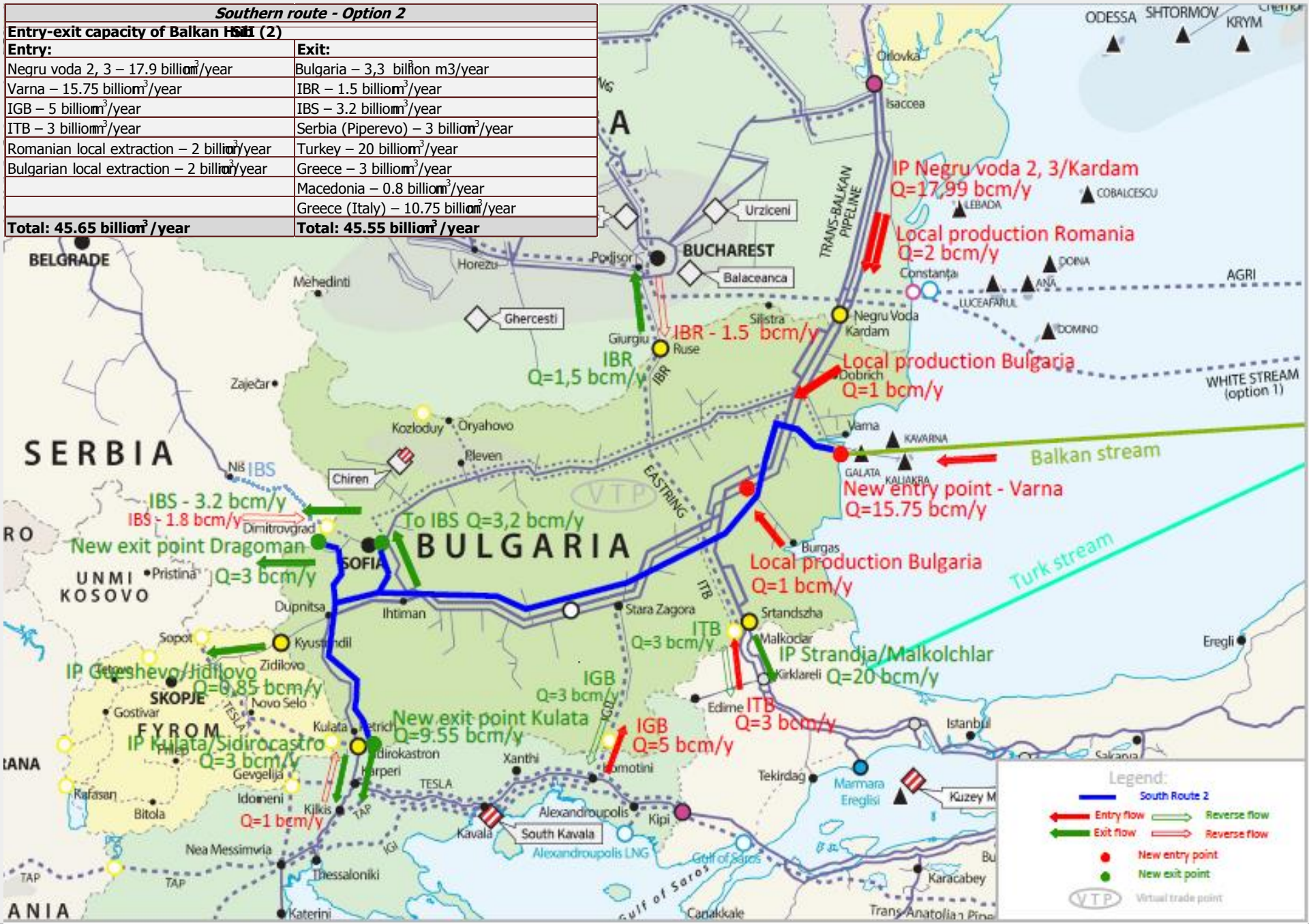
Southern route - Option 2	
Entry-exit capacity of Balkan Hub (2)	
Entry:	**Exit:**
Negru voda 2, 3 – 17.9 billion m^3/year	Bulgaria – 3,3 billion m3/year
Varna – 15.75 billion m^3/year	IBR – 1.5 billion m^3/year
IGB – 5 billion m^3/year	IBS – 3.2 billion m^3/year
ITB – 3 billion m^3/year	Serbia (Piperevo) – 3 billion m^3/year
Romanian local extraction – 2 billion m^3/year	Turkey – 20 billion m^3/year
Bulgarian local extraction – 2 billion m^3/year	Greece – 3 billion m^3/year
	Macedonia – 0.8 billion m^3/year
	Greece (Italy) – 10.75 billion m^3/year
Total: 45.65 billion m^3/year	**Total: 45.55 billion m^3/year**



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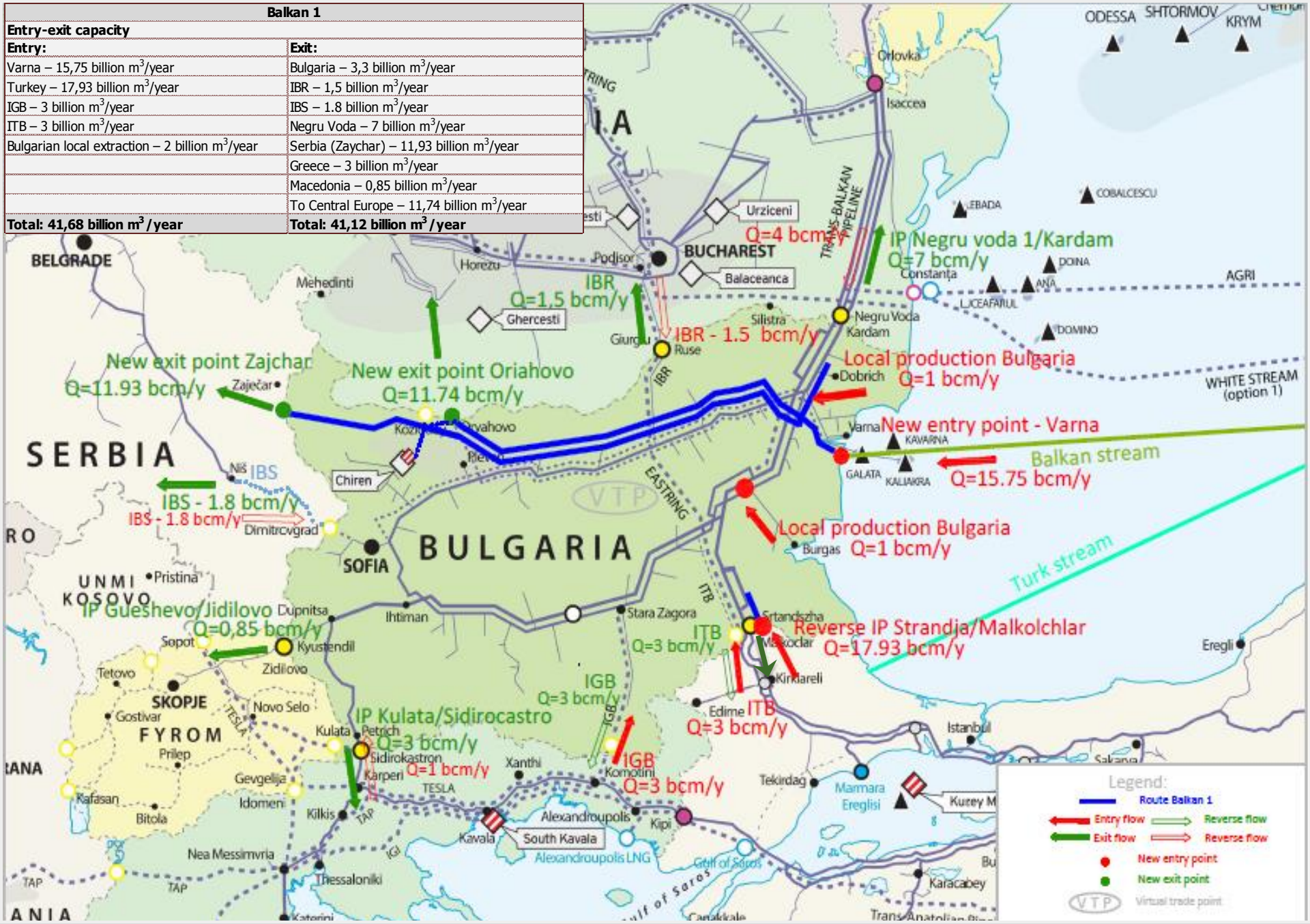
Western route	
Entry-exit capacity	
Entry:	**Exit:**
Negru voda 2, 3 – 17.9 billion m^3/year	Bulgaria – 3.3 billion m^3/year
Turkey – 15.75 billion m^3/year	IBR – 1.5 billion m^3/year
IGB – 5 billion m^3/year	IBS – 3.2 billion m^3/year
ITB – 3 billion m^3/year	Serbia (Piperevo) - 3 billion m^3/year
Romanian local extraction – 2 billion m^3/year	Turkey – 20 billion m^3/year
Bulgarian local extraction – 2 billion m^3/year	Greece – 3 billion m^3/year
	Macedonia– 0,8 billion m^3/year
	Serbia (Zajecar) – to Central Europe – 10.75
Total: 45.65 billion m^3/year	**Total: 45.55 billion m^3/year**

Balkan 1	
Entry-exit capacity	
Entry:	**Exit:**
Varna – 15,75 billion m^3/year	Bulgaria – 3,3 billion m^3/year
Turkey – 17,93 billion m^3/year	IBR – 1,5 billion m^3/year
IGB – 3 billion m^3/year	IBS – 1.8 billion m^3/year
ITB – 3 billion m^3/year	Negru Voda – 7 billion m^3/year
Bulgarian local extraction – 2 billion m^3/year	Serbia (Zaychar) – 11,93 billion m^3/year
	Greece – 3 billion m^3/year
	Macedonia – 0,85 billion m^3/year
	To Central Europe – 11,74 billion m^3/year
Total: 41,68 billion m^3/year	**Total: 41,12 billion m^3/year**



Balkan 2	
Entry-exit capacity	
Entry:	**Exit:**
Turkey – 17,93 billion m^3/year	Bulgaria – 3,3 billion m^3/year
IGB – billion m^3/year	IBR – 1,5 billion m^3/year
ITB – billion m^3/year	IBS – 1,85 billion m^3/year
Bulgarian local extraction – 2 billion m^3/year	Negru Voda – 3,25 billion m^3/year
	Serbia (Zaychar) – 11,3 billion m^3/year
	Greece – 3 billion m^3/year
	Macedonia – 0,8 billion m^3/year
Total: 25,93 billion m^3/year	**Total: 25,00 billion m^3/year**

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Main parameters of all 7 studied options

Main parameters							
Options	Capacity Entry in bcm	Capacity Exit in bcm	Investment costs EUR	OPEX in EUR	TSO annual revenues in EUR	EBITDA in EUR	Residual value in EUR
Northern route - Option 1	61,40	61,30	2 423 148 511	182 681 000	345 371 783	162 690 783	789 872 000
Northern route – Option 2	45,65	45,55	2 193 131 347	120 177 000	264 884 433	144 707 433	795 684 000
Southern route – Option 1	61,40	61,30	3 131 430 262	219 406 000	429 868 548	210 462 548	1 009 504 000
Southern route – Option 2	45,65	45,55	2 692 045 813	121 580 000	298 130 759	176 550 759	1 009 504 000
Western route	45,65	45,55	2 825 368 449	156 171 000	341 511 399	185 340 399	1 063 871 000
Balkan 1	41,68	41,12	3 191 891 868	115 998 000	325 062 421	209 064 421	1 200 496 000
Balkan 2	25,93	25,00	1 414 803 659	78 368 000	170 951 663	92 583 663	540 781 000

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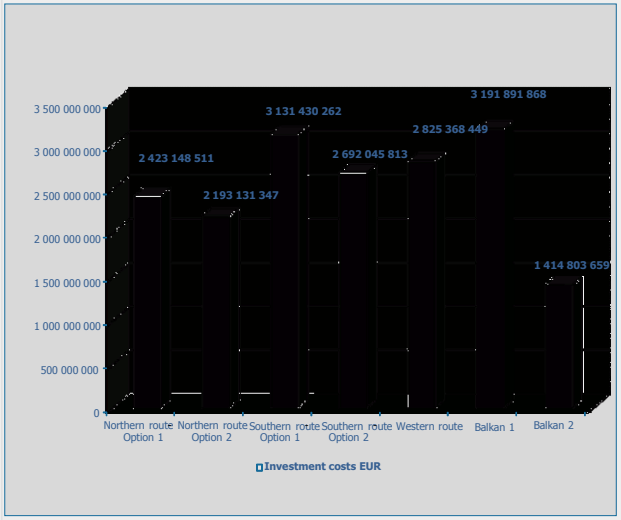
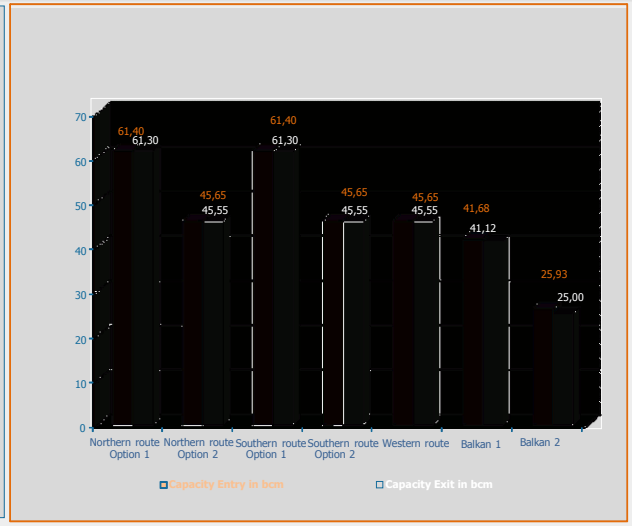
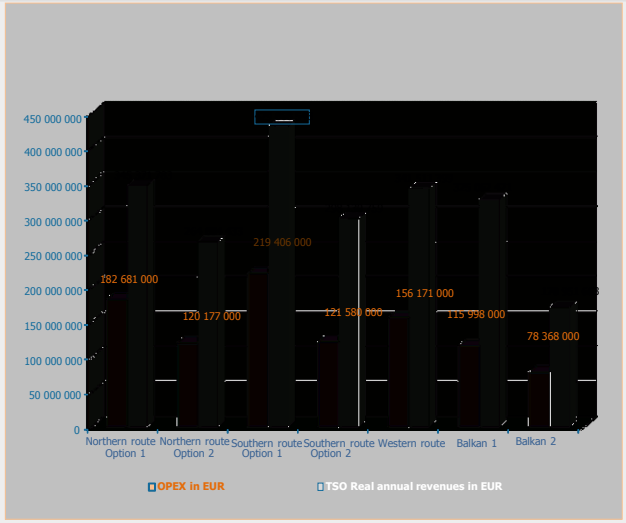
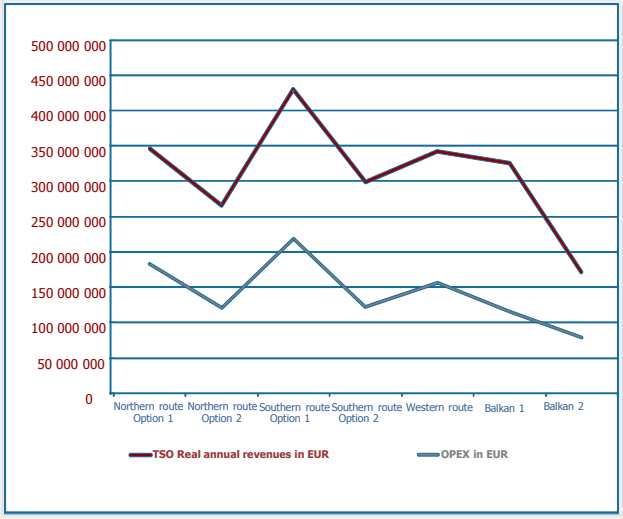
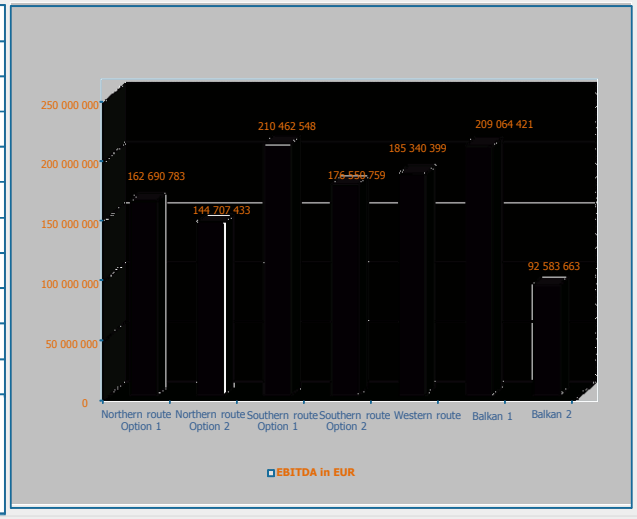
Main parameters of all 7 studied options

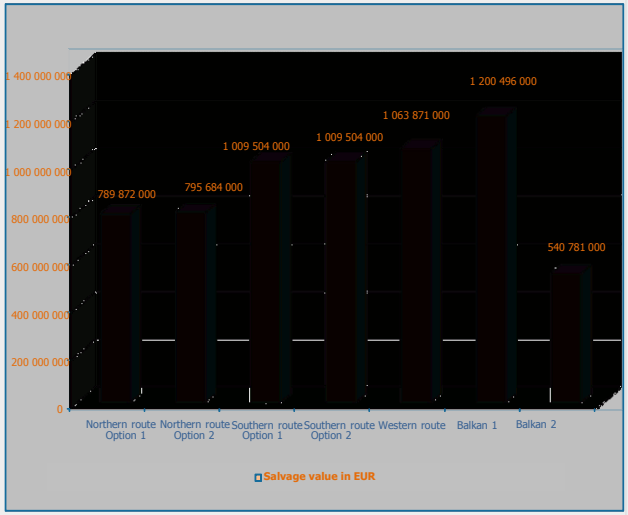












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Option 6 "Balkan 1 – PHASE 1&2"

Marketing results

- The best option for connecting sources with markets
- demand and supply fully covered

Financial results

- Biggest Residual value
- Almost biggest EBITDA
- Positive net cash flows during the whole operational period

Technical results

- Technical issues - positive
- Environment issues - positive

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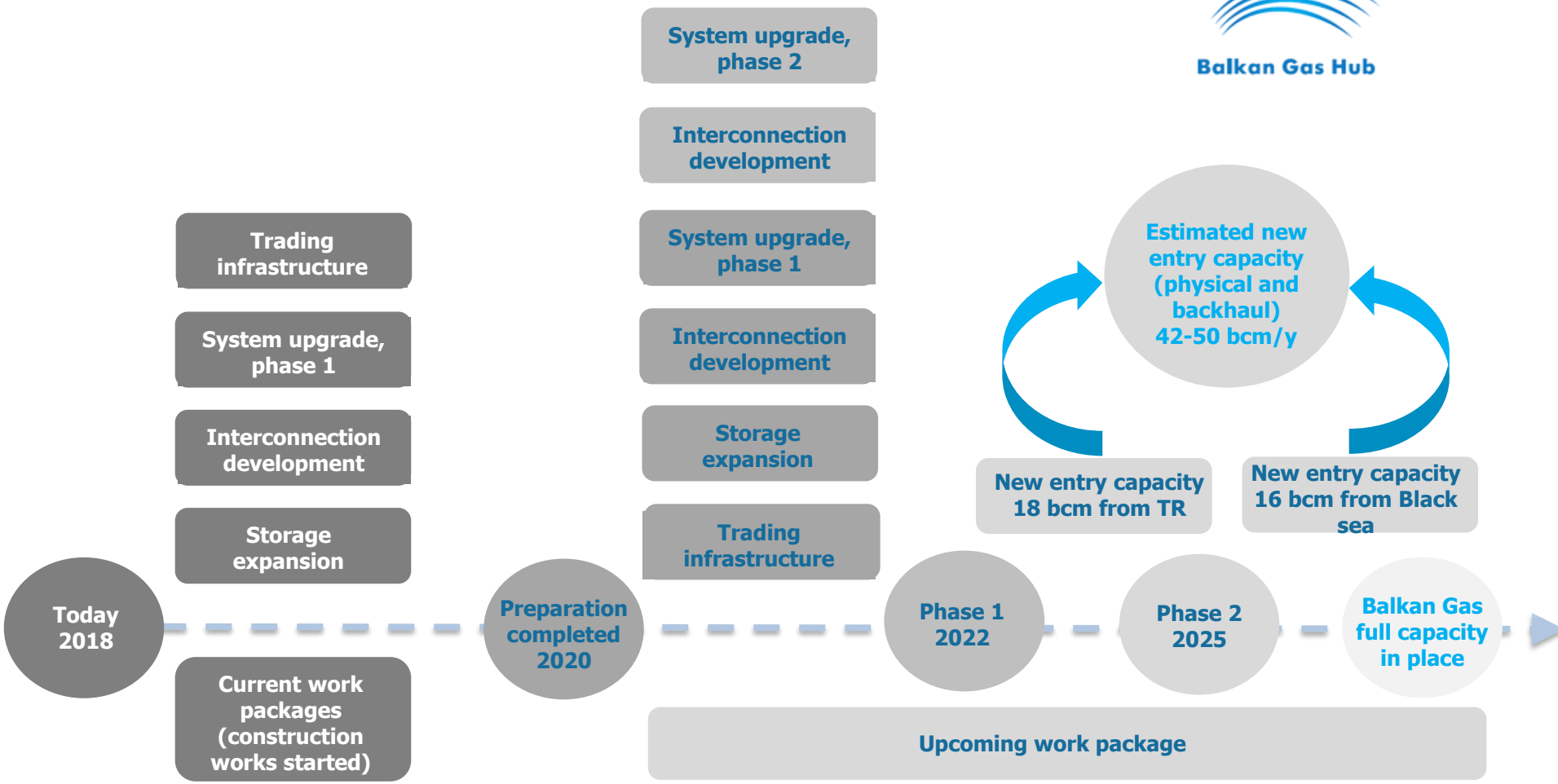
Option 6 "Balkan 1" – PHASE 1

Option 6 "Balkan 1" – PHASE 2

Option 6 – Example of flows in bcm/y

Road map of Balkan Gas Hub project



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Basic Principles for tariff estimation

Tariff estimation

- Multi-year pricing model - "Revenue cap" method
- Recovery by capacity and commodity prices of the required revenues for carrying out the transmission activity
- Setting the capacity and commodity prices at entry and exit points/zones of whole transmission system (including existing pipelines and new pipelines)
- Required revenues – based of existing transmission system and new designed transmission system
- Applying the Capacity weighted distance reference price methodology (CWD)
- Entry-exit split of revenues (capacity and commodity allocated) – 50/50

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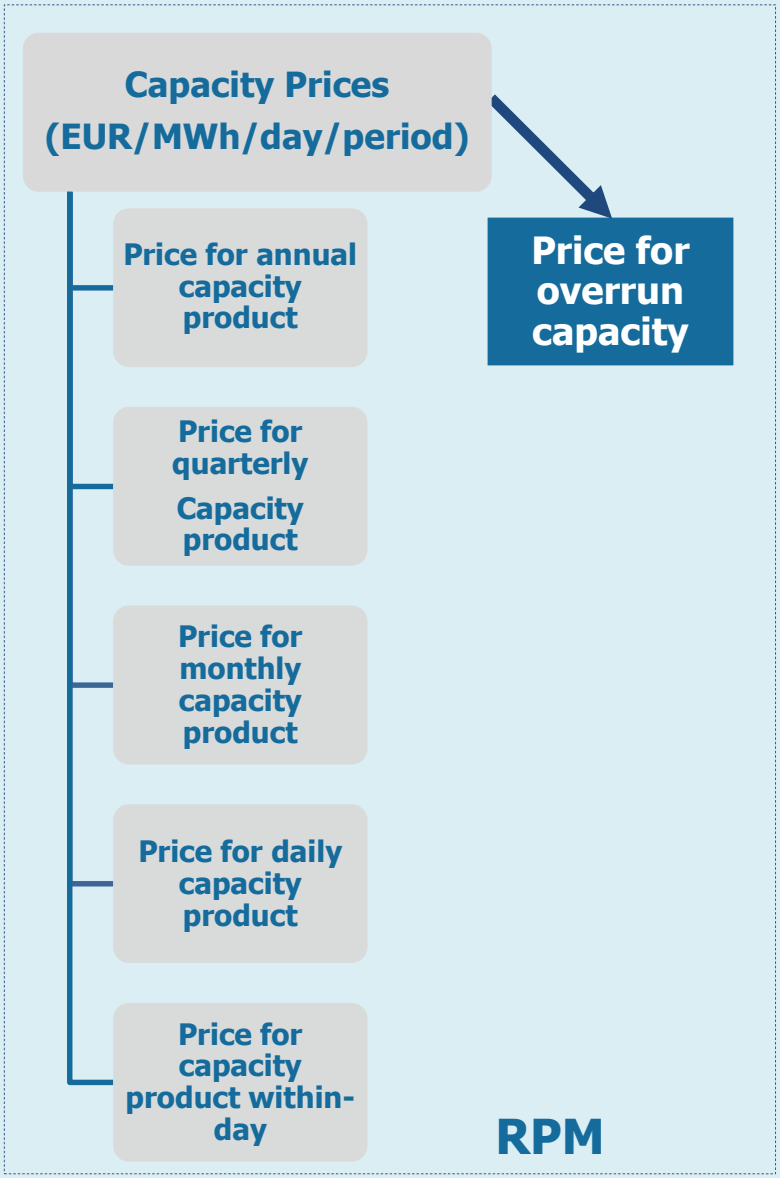
Draft Tariff Structure – transmission tariffs



Commodity Price
(EUR/MWh)

Commodity Price
Cover costs for fuel gas and other cost directly related to the transported gas quantities

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Estimated tariffs option 6

Capacity based tariffs (reference price – firm long term product)

Name	Entry - Exit	Reserve price EUR/MWh/d/year
Varna	Entry	**121,90**
Turkey	Entry	**149,64**
IGB	Entry	**176,92**
ITB	Entry	**137,79**
BG_PRODUCTION	Entry	**106,44**
BG	Exit	**84,34**
IBR	Exit	**97,43**
IBS	Exit	**144,67**
Negru Voda	Exit	**67,97**
Serbia (Zaichar)	Exit	**192,66**
Greece (Striminohori)	Exit	**151,40**
Macedonia (Zhidilovo)	Exit	**159,73**
Romania (Oriahovo)	Exit	**152,22**
AVERAGE		**134,08**

Balkan Gas Hub

Commodity based tariff 0,123 EUR/MWh
(applicable at entry and exit points of the system)

	Hub Balkan	East and Central Europe TSO's	Difference
Average Capacity tariffs, EUR/MWh/d/year	134,084	152,3407	-12%
Average Commodity tariffs, EUR/MWh	0,1227	0,1705	-28%

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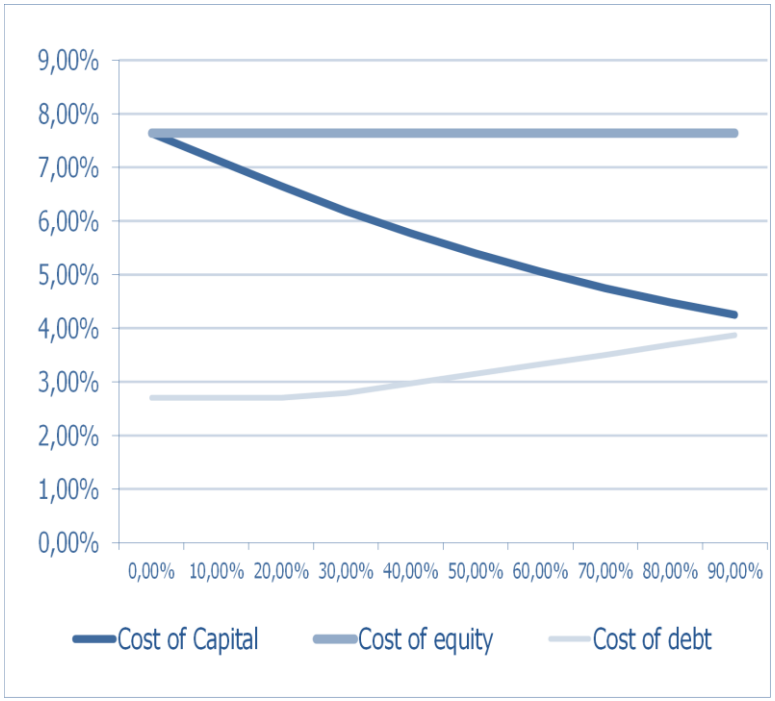
Financial structure of Balkan Gas Hub



Cost of Equity: 7,64 %

Cost of Debt: 2,70 %, rising up to 3,87 % (after tax)

The results show that the Balkan Gas Hub financial structure that is most effective and provides the lowest weighted-average cost of capital is the one that consists of 90% debt and 10% equity.

The optimal capital structure of the project will be established in the range of ratio Debt/ Equity between 70 % and 90 %. In this interval the price of the resource that is used to finance the project will be the lowest. Having in mind the fact that potential creditors may require at least 30 % equity financing from the owners of the Balkan Gas hub, we can expect the ratio Debt/ Equity to be about 70 %/ 30 %.

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Financial instruments

Equity

Financial investors
- Investment funds
- Investment banks
- Pension funds

Strategic investors
- Oil and gas industry companies

EBRD*/ EIB*
-through investment in shares of specialized funds
-through ordinary/ preference shares

Debt

- Commercial banks
- EBRD*
- EIB*
- Export Credit Agencies (ECAs)
- Bonds
- EFSI (Juncker Plan)

Grant

Connecting Europe Facility (INEA)

**** EBRD and EIB may provide equity investment in Balkan Gas Hub as well as project loan***

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Ownership possible structures

Balkan Gas Hub

Model 1.
100% owned by Bulgartransgaz EAD, the company is responsible for operation

Model 2.
100% owned by another company but operated by Bulgartransgaz EAD

Model 3.
Establishment of JSC-majority owner is Bulgartransgaz EAD and the JSC is responsible for the construction and operation of the infrastructure

Model 4.
Public-private partnership

Preliminary challenges and findings for each model

- Using already established Entity
- New certification is not necessary
- The best experience in operation
- Challenges for strategic investors
- ITO model within VIP
- Regulatory favorable

- New Entity owner of the new infrastructure
- Possibly New certification needed
- New Entity has the full property rights of the new infrastructure
- The best experience in operation
- Strategic investors
- Licensing and certification issues under discussion

- New Entity owner of the new infrastructure
- Issues regarding the shares size
- Issues regarding the rights and the obligations of the shareholders
- Issues regarding the roles and the responsibilities of the shareholders
- Joint operation using strategic investors
- Licensing and certification issues under questions
- Favorable with respect of financing

- Defining the PPP form
- Defining the risk and responsibilities between the partners
- Using of strategic investors
- Enables flexible financing but related to high regulatory risk with respect of the licensing regime and certification uncertainty
- Operation uncertainty after contract expires
- Risk of public service performance

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Once more – The Regional and EU Benefits of Balkan Gas Hub

Balkan region

- Removes bottlenecks
- Ends energy isolation
- SoS
- New jobs, business opportunities and lower energy prices

European Union

- Achieving Single European Market
- Integration of the South and Southeast European markets
- Ecological, social and economical benefits
- EU SoS

Balkan Gas Hub

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LET'S START THE PROJECT TOGETHER!

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