Selection of Projects of Energy Community Interest (PECIs/PMIs)

2nd PECI/PMI Gas and Oil Working Group Meeting

Presentation REKK / DNV GL

Vienna 19.03.2020

Agenda

1. Overview of project submissions and prescreening (eligibility, data verification)
2. Summary of country data received and introduction of scenarios (data sources and assumptions)
3. Application of assessment methodology on a dummy project and finalization of open methodological questions

Summary of project submissions

	Elec-tricity trans-mission	Elec-tricity storage	Gas trans-mission	Gas storage	LNG	Smart grid	Oil	Total
Number of projects	6	0	19	1	0	0	3	29
Submitted investment cost (million €)	2879	-	8033	75	-	-	416	11403

- More candidates in gas & oil than in el&smart grid; 70% of the CAPEX
- In 2018 we had 34 projects, - most of them were resubmitted
- NEW projects (2 EL, 5 GAS, 1 OIL)
- Not much progress in the last two years: except for 1 project all resubmissions report delay

Summary of Gas Projects – map I.

New projects:

GAS_26: MK-KO*

GAS_27: RO-UA;

GAS_30: RS-BH

Not submitted projects form 2018 list:

- RO-MD (PMI), HU-UA (PMI)

Resubmitted projects are labelled with the 2018 submission codes

Summary of Gas Projects – map II.

NEW:

GAS_28:TANAPX

GAS_29: SCP GE offtake

Not submitted projects form 2018 PECI list:
GAS 20_21_22 Cluster of projects delivering new sources from the Caspian including TANAP, TAP, SCPX and SCP(f)X

Summary of Oil Projects – map

Summary of the eligibility check

	Electricity trans-mission	Electricity storage	Gas trans-mission	Gas storage	LNG	Smart grid	Oil	Total
Submitted projects	6	0	19	1	0	0	3	29
Eligible projects	6	0	18	1	0	0	2	27

- 2 NON ELIGIBLE PROJECTS:
- GAS_12 Serbia Montenegro Including Kosovo*: not a joint submission
- OIL_03: oil storage in BH & HR, does not meet infrastructure critera

List of gas projects 1.

Code	Name	Project Promoter	Description	Date of commissioning
GAS_01	Northern Gas Interconnection Pipeline of BiH - HR (Slobodnica (HR) – Brod (BiH) - Zenica)	BH-Gas d.o.o. Sarajevo Plinacro	New interconnector is going to be part of the EnC gas ring and provide BiH more diversified sources	2026
GAS_02	Western Gas Interconnection Pipeline BiH - HR (Licka Jesenica - Trzac - Bosanska Krupa with branches to Bihac and Velika Kladusa)	BH-Gas d.o.o. Sarajevo Plinacro	New interconnector to improve the utilization of Croatia's already existing transmission infrastructure	2027
GAS_03	Southern Gas Interconnection Pipeline BiH - HR (Zagvozd-Posusje-Novi Travnik with a main branch to Mostar)	BH-Gas d.o.o. Sarajevo Plinacro	New interconnector is going to provide BiH safer supply considering the limited capacity and age of the existing supply route	2024
GAS_04B	Gas interconnection Greece - North Macedonia	Hellenic Gas TSO (DESFA) S.A. JSC for performing energy activities NATIONAL ENERGY RESOURCES Skopje in state ownership	New interconnector will allow North Macedonia to have a second supply source, improve the utilization of alreay existing infrastructure hence reduce tariffs.	2023
GAS_08	Gas Interconnector Serbia-Romania	Public Enterprise Srbijagas Novi Sad SNTGN TRANSGAZ SA	New interconnector between Serbia and Romania to improve security of supply and market integration	2021

List of gas projects 2.

Code	Name	Project Promoter	Description	Date of commissioning
GAS_09	Gas Interconnector Bulgaria- Serbia	Public Enterprise Srbijagas Novi Sad Bulgartransgaz EAD	New interconnector between Serbia and Bulgaria to improve security of supply and market integration	2022
GAS_10	Gas Interconnector Serbia-Croatia	Plinacro d.o.o. Public Enterprise Srbijagas Novi Sad	New interconnector will enable Serbia access to Croatian UGS, LNG and enable supply of gas from Austria, Slovenia and Italy by the Croatian gas transmission system.	2028
GAS_11	Gas interconnection Serbia - North Macedonia	Public Enterprise Srbijagas Novi Sad Joint Stock Company for performing energy activities NATIONAL ENERGY RESOURCES Skopje in state ownership	New interconnector between Serbia and North Macedonia to improve security of supply and market integration	2023
GAS_12	Gas Interconnector Serbia Montenegro (incl. Kosovo)	Public Enterprise Srbijagas Novi Sad	New interconnector to foster regional energy market integration	2028
GAS_13	ALKOGAP	Government of Albania, Ministry of Economy, Employment, Trade, Industry, Entrepreneurship and Strategic Investments in Kosovo	Submitted project is the Albanian part of the planned Albania-Kosovo interconnector, compressor station and internal pipeline	2027

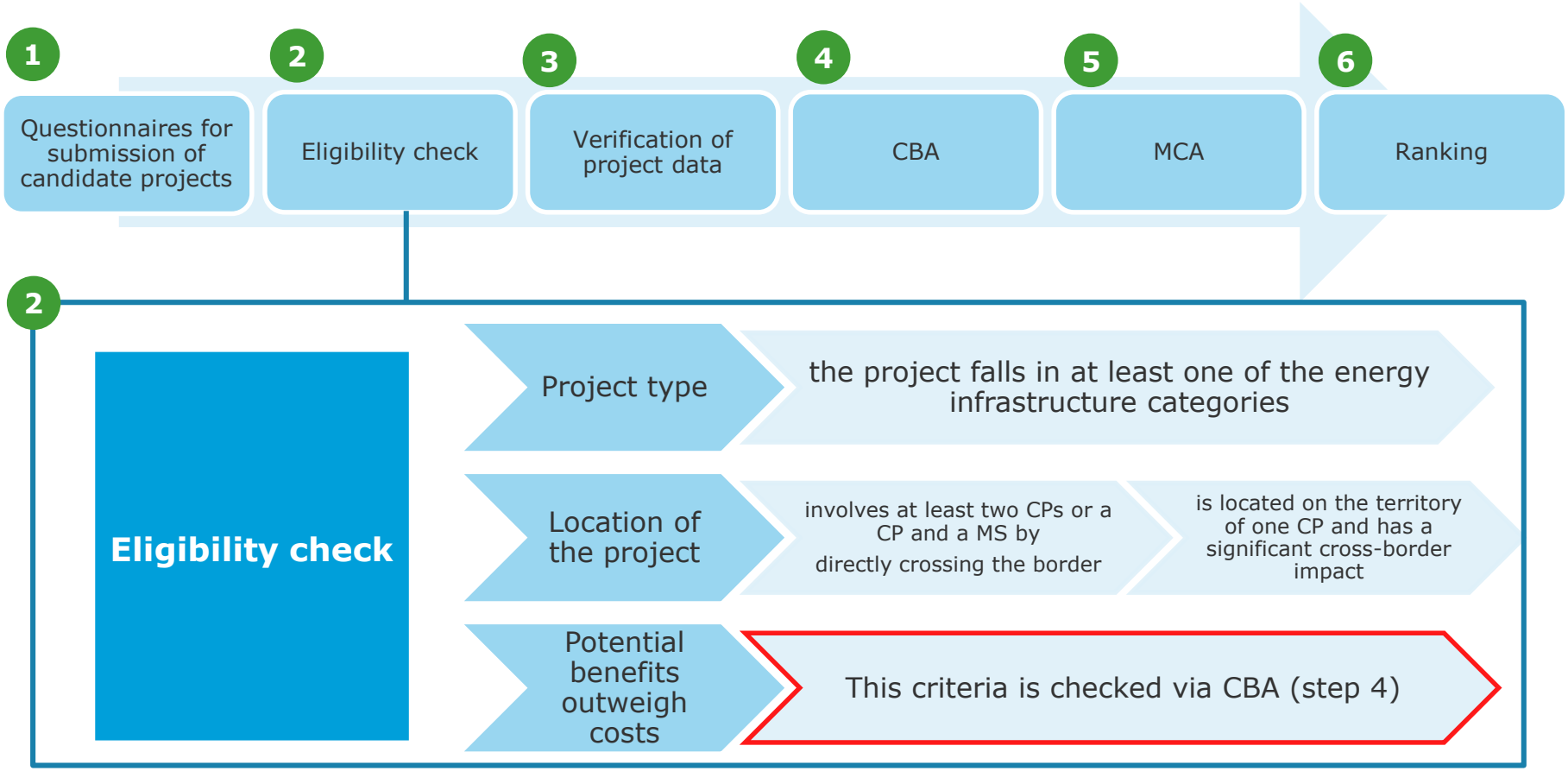
List of gas projects 3.

Code	Name	Project Promoter	Description	Date of comm.
GAS_16	Ionian Adriatic Pipeline (IAP)	Plinacro d.o.o. Montenegro Bonus d.o.o. Albgaz Sh.a. BH GAS d.o.o	New interconnector to connect the existing Croatian gas transmission system, via Montenegro and Albania with the TAP system or a similar project	2025
GAS_19	White Stream	White Stream Company Limited	New cross-Black Sea infrastructure (interconnector and compressor station) will transport Turkmen gas received via the second string of the Trans-Caspian (TCP) and expanded South-Caspian (SCP) in Georgia, directly to Romania and other EU Member States	2024
GAS_22	SCPFX	SOCAR Midstream Operations Limited	The project's objective is to expand the existing SCP gas transportation system capacity delivered to the GE-TR border	2024
GAS_25	Trans-Balkan Corridor Bidirectional Flow between MD and UA	"Gas TSO of Ukraine" LLC Moldovatransgaz LLC	The project enables reverse flow on an existing pipeline to facilitate export of natural gas from Romania to CEE Region	2021
GAS_26	Gas Interconnection North Macedonia – Kosovo	JSC for performing energy activities NATIONAL ENERGY RESOURCES Skopje in state ownership Ministry of Economy, Employment, Trade, Industry, Entrepreneurship and Strategic Investments in Kosovo	The project consists of a new interconnector between the gas transmission systems of North Macedonia and Kosovo	2024

List of gas projects 4.

Code	Name	Project Promoter	Description	Date of comm.
GAS_27	Interconnector Romania - Ukraine	"Gas TSO of Ukraine" LLC SNTGN TRANSGAZ SA	New interconnector between Romania and Ukraine to improve security of supply and market integration	2025
GAS_28	TANAPX	State Oil Company of the Republic of Azerbaijan (SOCAR)	The project is an expansion of existing infrastructure and aims to extend transportation capacities from Azerbaijan through Turkey to Europe	2025
GAS_29	SCP Georgian Offtake Expansion for EU LNG Swap	JSC Georgian Oil and Gas Corporation	The project aims to enable reverse swap on the SCP pipeline	2023
GAS_30	New Eastern gas interconnection Serbia - Bosnia and Herzegovina with new transmission pipeline Bijeljina – Banja Luka – Novi Grad and new gas hub Bijeljina	GASRES doo, Banjaluka, Bosnia and Herzegovina Srbijagas JP, Novi Sad, Serbia	New interconnection between BiH and the Republic of Srpska (RS) to improve market integration with Europe	2025
GAS_ST_01	UGS Dumrea	Ministry of Albania	Storage facility in Albania	2028

Eligibility criteria



Projects will qualify as a PECI or as a PMI (Art 4 para 5 and 6.)

Eligibility of gas projects 1.

CODE	NAME	From country - to country	Crossing border of two CPs + MSs	Type of infastructure	Reverse flow (RF) or capacity increase over 10% (CI)	TYNDP 2020/ NNDP	Candidate for (PCI/ PECI-PMI/-)	Joint subm.
GAS_01	Northern Gas Interconnection Pipeline of BiH - HR	HR-BA	yes	New interconnector	CI	TRA-N-224 and TRA-N-66	PMI	yes
GAS_02	Western Gas Interconnection Pipeline BiH - HR	HR-BA	yes	New interconnector	CI-one	TRA-N-910 and TRA-N-303	PMI	yes
GAS_03	Southern Gas Interconnection Pipeline BiH - HR	HR-BA	yes	New interconnector	CI	TRA-N-851 and TRA-A-302	PMI	yes
GAS_04 B	Gas interconnection Greece - North Macedonia	GR-MK	yes	New interconnector	CI-one	TRA-N-967 and TRA-N-980	PMI	yes
GAS_08	Gas Interconnector Serbia- Romania	RS-RO	yes	New interconnector	CI	TRA-A-1268	PMI	yes
GAS_09	Gas Interconnector Bulgaria- Serbia	BG-RS	yes	New interconnector	CI	TRA-N-137	PECI	yes
GAS_10	Gas Interconnector Serbia-Croatia	RS-HR	yes	New interconnector	CI	TRA-A-070	PMI	yes

Eligibility of gas projects 2.

CODE	NAME	From country - to country	Crossing border of two CPs + MSs	Type of infastructure	Reverse flow (RF) or capacity increase over 10% (CI)	TYNDP 2020/ NNDP	Candidate for (PCI/ PECI-PMI/-)	Joint sub m.
GAS_11	Gas interconnection Serbia - North Macedonia	RS-MK	yes	New interconnector	CI	TRA-N-965	PECI	yes
GAS_12	Gas Interconnector Serbia Montenegro (incl. Kosovo)	RS-ME	yes	New interconnector	CI	n/a	PECI	no
GAS_13	ALKOGAP	AL-KO*	yes	New interconnector New compressor station Internal pipeline	CI	TRA-F-1028 ENE-005	PECI	yes
GAS_16	Ionian Adriatic Pipeline (IAP)	HR-AL	yes	New interconnector	CI	TRA-A-068	PMI	yes
GAS_19	White Stream	GE-RO	yes	New interconnector New compressor station	CI-one	TRA-N-053	PMI	yes
GAS_22	SCPFX	AZ-GR-TR	yes	Existing pipeline extension	CI-one	TRA-N-1138	PECI	yes
GAS_25	Trans-Balkan Corridor Bi-directional Flow between MD-UA	MD-UA	yes	Reverse flow possibility on existing pipeline	RF	TRA-F-1169	PECI	yes

Eligibility of gas projects 3.

CODE	NAME	From country - to country	Crossing border of two CPs + MSs	Type of infastructure	Reverse flow (RF) or capacity increase over 10% (CI)	TYNDP 2020/ NNDP	Candidate for (PCI/ PECI-PMI/-)	Joint subm.
GAS_26	Gas Interconnection North Macedonia – Kosovo	MK-KO*	yes	New interconnector	CI	TRA-N-966	PECI	yes
GAS_27	Interconnector Romania - Ukraine	RO-UA	yes	New interconnector	CI-one	TRA-N-502 and TRA-N-596	PMI	yes
GAS_28	TANAPX	GE-GR	yes	New compressor station	n/a	TRA-A-782	PECI	yes
GAS_29	SCP Georgian Offtake Expansion for EU LNG Swap	TR-GE	yes	Reverse swap	CI	n/a	PMI	yes
GAS_30	New Eastern gas interconnection Serbia - Bosnia and Herzegovina with new transmission pipeline	RS-BA	yes	New interconnector Internal pipeline	CI-one	n/a	PECI	yes
GAS_ST_01	UGS Dumrea	AL	no	Storage	n/a		PECI	n/a

Summary on eligibility and data verification

- **GAS_12 (RS-ME)**: without being jointly submitted the project is not eligible.
- **UGS Dumrea storage** and **TANAPX** did not disclose necessary technical data, so it will not be possible to assess in CBA.
- Two modifications have been made regarding **label candidacy**:
  - RO-UA (GAS_27) project applied for PECI but it is not a PCI on the 4th list, for this reason it will be labeled as PMI.
  - RS-BiH (GAS_30) applied for PMI but it's a PECI, as it connects two EnC CPs.

Cost verification of gas projects (m€, real 2020) based on ACER

CODE	NAME	Total CAPEX	Total CAPEX (estimated, average prices)	Diff.	Total CAPEX (estimated, median prices)	Diff.	NOTE
GAS_01	Northern Gas Interconnection Pipeline of BiH - HR	94	109	-16%	98	-4%	OK
GAS_02	Western Gas Interconnection Pipeline BiH - HR	49	74	-51%	65	-33%	Below estimated cost
GAS_03	Southern Gas Interconnection Pipeline BiH - HR	116	138	-19%	124	-7%	OK
GAS_04 B	Gas interconnection Greece - North Macedonia	103	116	-12%	108	-4%	OK
GAS_08	Gas Interconnector Serbia-Romania	63	73	-15%	66	-4%	OK
GAS_09	Gas Interconnector Bulgaria-Serbia	164	128	22%	116	29%	Above estimated cost
GAS_10	Gas Interconnector Serbia-Croatia	156	199	-28%	186	-20%	OK
GAS_11	Gas interconnection Serbia - North Macedonia	23	41	-81%	36	-58%	Much below the range
GAS_12	Gas Interconnector Serbia Montenegro (incl. Kosovo)	60	85	-42%	77	-28%	Below estimated cost
GAS_13	ALKOGAP	152	159	-4%	143	6%	OK
GAS_16	Ionian Adriatic Pipeline (IAP)	586	571	2%	546	7%	OK
GAS_19	White Stream	4105	2505	39%	2409	41%	OK

Cost verification of gas projects (m€, real 2020) based on ACER

CODE	NAME	Total CAPEX	Total CAPEX (estimated, average prices)	Diff.	Total CAPEX (estimated, median prices)	Diff.	NOTE
GAS_22	SCPFX	1048	229	78%	216	79%	Could not be verified due to missing technical data
GAS_25	Trans-Balkan Corridor Bi-directional Flow between Moldova and Ukraine	14	0	0%	0	0%	Could not be verified due to missing technical data
GAS_26	Gas Interconnection North Macedonia –Kosovo	72	64	10%	58	19%	OK
GAS_27	Interconnector RO-UA	162	142	12%	130	20%	OK
GAS_28	TANAPX	750	4693	-526%	4548	-506%	Could not be verified due to missing technical data
GAS_29	SCP Georgian Offtake Expansion for EU LNG Swap	8	0	0%	0	0%	Could not be verified due to technical features
GAS_30	New Eastern gas interconnection RS-BiH with new transmission pipeline	183	207	-13%	183	0%	OK

Suggested clustering of projects for the modelling

- SCPFX (GAS_22) project will be modelled three way: alone, clustered with White Stream (GAS_19), clustered with TANAPX (GAS_28);
- TANAPX (GAS_28) will be evaluated with SCPFX
- Whitestream (GAS_19) will be modelled with SCPX and assuming the existence of Trans Caspian Pipeline
- Southern Gas Interconnection Pipeline BiH-HR (GAS_03) will be clustered with IAP (GAS_16)
- ALKOGAP (GAS_13) will be modelled clustered with IAP (GAS_16)

Summary of gas projects – key data I.

Code	NAME	From (country A)	To (country B)	Capacity, A to B (GWh/day)	Capacity, B to A(GWh/day)	CAPEX (m€)	YEAR OF COMM
GAS_01	Northern BiH - HR	HR	BA	162	42	94	2026
GAS_02	Western BiH - HR	HR	BA	81	0	49	2027
GAS_03	Southern BiH - HR	HR	BA	81	38	116	2024
GAS_03a	Southern BiH-HR + IAP	HR	BA	81	38	116	2024
		AL	ME	137	137	586	
		ME	HR	117	117		
		TAP	AL	?	-		
GAS_04B	Greece - North Macedonia	GR	MK	77	77	103	2023
GAS_08	Serbia- Romania	RS	RO	35	35	63	2021
GAS_09	Bulgaria- Serbia	BG	RS	59	3	164	2022

Summary of gas projects – key data II.

Code	NAME	From (country A)	To (country B)	Capacity, A to B (GWh/d)	Capacity, B to A (GWh/d)	CAPEX (m€)	YEAR OF COMM
GAS_10	Serbia-Croatia	HR	RS	42	33	29	2025
GAS_10a	Serbia-Croatia phase 2	HR	RS	186	33	156	2028
GAS_11	Serbia - North Macedonia	RS	MK	10	42	23	2023
GAS_12	Serbia Montenegro (incl. Kosovo)	RS	KO*	26	26	60	2028
GAS_13	ALKOGAP + IAP	AL	KO*	64	22	214	2027
		AL	ME	137	137		
		ME	HR	117	117		
		TAP	AL	?	-		
GAS_16	Ionian Adriatic Pipeline (IAP)	AL	ME	137	137	586	2025
		ME	HR	117	117		
		TAP	AL	?	-		

Summary of gas projects – key data III.

Code	NAME	From (country A)	To (country B)	Capacity, A to B (GWh/d)	Capacity, B to A (GWh/d)	CAPEX (m€)	YEAR OF COMM
GAS_19	White Stream	GE	RO	500	500	4105	2024
		AZ	GE	150	0		
		TM	GE	980	0		
GAS_22	SCPFX	AZ	GE	151	151	1048	2024
		GE	TR	151	151		
GAS_22 a	SCPFX + TANAPX	AZ	GE	151	151	1798	2025
		GE	TR	151	151		
		GE	TR	?	?		
		TR	GR	?	?		
GAS_25	Trans-Balkan Bi-directional Flow	MD	UA	248	0	14	2021
GAS_26	North Macedonia – Kosovo	MK	KO*	42	42	72	2024

Summary of gas projects – key data IV.

Code	NAME	From (country A)	To (country B)	Capacity, A to B (GWh/day)	Capacity, B to A(GWh/day)	CAPEX (m€)	YEAR OF COMM
GAS_27	Interconnector Romania - Ukraine	RO	UA	58	58	162	2025
GAS_28	TANAPX	GE	TR	?	?	750	2025
		TR	GR	?	?		
GAS_29	SCP Georgian Offtake Expansion for EU LNG Swap	AZ	GE	29	0	8	2023
GAS_30	New Eastern gas interconnection Serbia - BiH	RS	BA	20	20	183	2025
GAS_ST_01	UGS Dumrea	AL	AL	?	?	75	2028

Remaining clarifications for gas projects 1.

Code	Name	Issues which require further clarification/decision
GAS_01	Northern BiH - HR	No further clarification is needed
GAS_02	Western BiH - HR	Submitted cost is slightly below the estimated range
GAS_03	Southern BiH - HR	a, Technical entry capacity data is not consistent b, Confirm please that the project shall be clustered with IAP
GAS_04B	Greece - North Macedonia	No further clarification is needed
GAS_08	Serbia- Romania	No further clarification is needed
GAS_09	Bulgaria- Serbia	Lesser rule applied; Clarification needed on incremental capacity, as it has changed significantly since last PECI submission. Our current understanding: BG>RS 59 GWh/day, RS>BG 3 GWh/day
GAS_10	Serbia-Croatia	No further clarification is needed. Lesser rule applied. Two phases of the project are analysed separately. Please confirm cost data applied for the separate phases: Phase 1: 29 M€

Remaining clarifications for gas projects 2.

Code	Name	Issues which require further clarification/decision
GAS_11	Serbia - North Macedonia	a, Submitted CAPEX is below above the range b, Project does not connect to any existing infrastructure in Serbia
GAS_12	Serbia Montenegro (incl. Kosovo)	a, TYNDP/NNDP code is missing for Kosovo* part b, Letter of consent is needed from Kosovo* c, Submitted CAPEX is slightly below the range
GAS_13	ALKOGAP + IAP	a, Confirm please that the project shall be clustered with IAP b, Clarification needed on capacity data, as it has been changed since last PECI submission from bidirectional 53 GWh/day to: AL>KO* 64 GWh/day, KO*>AL 22 GWh/day.
GAS_16	Ionian Adriatic Pipeline (IAP)	Clarification: TAP entry to AL 166 GWh/day with IAP realisation? How much is the entry to Albania from TAP without IAP? IAP submission by Albania contradicts the joint submission
GAS_19	White Stream	No further clarification is needed
GAS_22	SCPFX	Cost could not be verified due to missing technical data

Remaining clarifications for gas projects 3.

Code	Name	Issues which require further clarification/decision
GAS_25	Trans-Balkan Bi-directional Flow	Cost could not be verified due to missing technical data. Please clarify in capacity increment is only one direction
GAS_26	North Macedonia – Kosovo	Please clarify if it is project in the reference setup or a project to be analysed
GAS_27	Interconnector Romania - Ukraine	No further clarification is needed
GAS_28	TANAPX	Cost could not be verified due to missing technical data. Can not be assessed if no capacity data is provided. Is an expansion of TAP needed with 10 bcm for this project?
GAS_29	SCP Reverse Swap	Cost cannot be verified due to technical features of the project
GAS_30	Eastern RS-BiH	Ask whether Serbia wants to have it modelled as a PECI or not
GAS_ST_01	UGS Dumrea	Technical data for injection and withdrawal capacity is needed for cost estimation and for modelling

Eligibilty check of the oil projects

	Name of the project	Infrastructure	CPs and MSs included	Cross border impact	PECI or PMI
OIL_01	Brody Adamovo oil pipeline project	Oil transmission pipeline	Ukraine and Poland	YES	PCI 9.1 in 2019 Eligible for PECI status
OIL_02	Transportation of different crudes of oil via Southern Druzhba pipeline	Oil transmission pipeline	Georgia aand Ukraine	YES	PMI in 2018 Eligible for PMI status
OIL_03	Bosnia and Herzegovina: Reconstruction of continental oil storage capacities of Federation of Bosnia and Herzegovina - Operator-Terminali Federacije Ltd (OTF); Croatia: Modernization and development of maritime terminals in Ploče - Naftni terminali federacije Ltd (NTF)	Reconstruction of oil storage but **not related to any pipeline operation** Maritime terminal modernization	Bosnia and Herzegovina and Croatia	?	Not eligible

Further Clarification need on the OIL projects

CODE	Issues which require further clarification/decision
OIL_01	No further clarification is needed
OIL_02	Clarification on the benefits of the project to UA and GE if the SK part is not being implemented
OIL_03	Do we understand correct that the project sites are connected by railway and not by pipeline? How would the project contribute to interoperability in this case? Are there any capacity increments? How is the project having a cross-border nature?

Agenda

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3. Application of assessment methodology on a dummy project and finalization of open methodological questions

Overview of the received country data

Country data	Gas	Electricity
Albania	X	
Bosnia and Herzegovina	X	X
Georgia	X	X
Kosovo*		X
Moldova		
Montenegro	X	X
North Macedonia	X	X
Serbia	X	X
Ukraine	X	X
Romania		X

Introduction to scenarios - Gas

- Two scenarios will be analysed:
  - **Green Trend scenario**– primarily based on submitted country data, if no data is supplied for the Green scenario, BAU scenario will be applied. For the EU28, EUCE3232.5 OR Long-term strategy data will be used
  - **Energy Community BAU scenario** – primary based on submitted country data. For the EU28, ENTSOs National Trends scenario is used
  - Submitted country data cross-checked with previous PECI submission

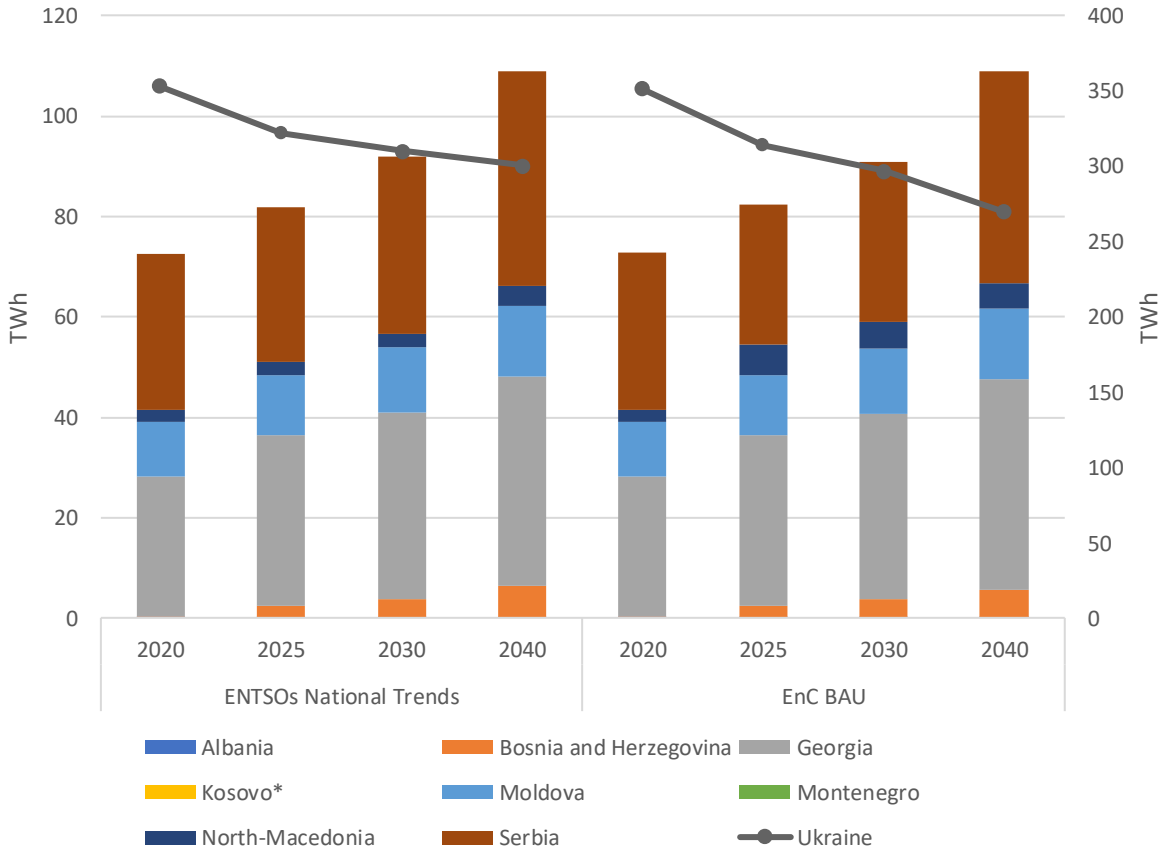
	Green scenario				EnC BAU				With project
	2020	2025	2030	2040	2020	2025	2030	2040	
Albania	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2018
Bosnia and Herzegovina	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2018	PECI 2018	PECI 2018	PECI 2018	PECI 2020
Georgia	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020
Kosovo*	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	PECI 2018
Moldova	PECI 2018	PECI 2018	PECI 2018	PECI 2018	PECI 2018	PECI 2018	PECI 2018	PECI 2018	PECI 2018
Montenegro	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	PECI 2020
North Macedonia	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020
Serbia	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020
Ukraine	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020	PECI 2020

Data submitted, no further request

Data submitted, clarification needed

Data was not submitted

Demand assumptions for scenarios



Right axis: Ukraine

Left axis: all other CPs

Clarifications for country data

- For Albania, submitted gas demand was greatly lagging behind 2018 data submission.
- For Bosnia: We suggest to distinguish between demand increase related to specific projects (GAS_02), using the 2018 data for the without the Bosnian projects scenario and the 2020 submission when Bosnian projects are analysed.
- For Kosovo* use the 2018 demand submission for project-specific demand
- For Moldova, use the 2018 demand submission
- For Montenegro we use the submitted demand only if the pipeline infrastructure is there

Infrastructure and contractual assumptions

- Turkstream 2 is commissioned and online from 2020. Contracts of Turkey, Bulgaria, Macedonia and Greece from Russia are transiting the TurkStream 2. TransBalkan pipeline is not used for transit from North to South.
- In 2020, the ship-or-pay transit deal of Russian gas via Ukraine is in force for 65 bcm/year. For 2021-2024, a ship-or-pay of 40 bcm/year is assumed. From 2025, the ship-or-pay contract expires.
- Nord Stream 2 is operational from 2025. Long-term contracts transiting via Ukraine are re-routed to Nord Stream 2 from 2025. UA system can be used for flexibility needs.
- Krk LNG terminal is operational from 2023
- TAP is operational from 2020, transmitting 10 bcm/year gas. An exit point to Albania is assumed with 40 GWh/day (without IAP)
- If any expansion of SCP is assumed (at the project evaluation) then TAP capacities are increased accordingly, to allow for the gas to reach Italian markets

Modelling security of supply scenario

- Security of supply scenario is based on the disruption of the most important supply infrastructure to the region, which will be the Turk Stream pipeline system.
- A one-month total cut of this pipeline is assumed (January). Trans-Balkan pipeline can be used from North-to-South direction in case of such disruption.
- Valuation of SoS at 5% is based on the probability of shock scenario of one-in-twenty occurrence. The 5% weight assumes 100% chance of occurrence of one month full Turk Stream disruption within the next 20 years, which is a strong statement and this means that SoS is strongly considered together with the calculated indicator

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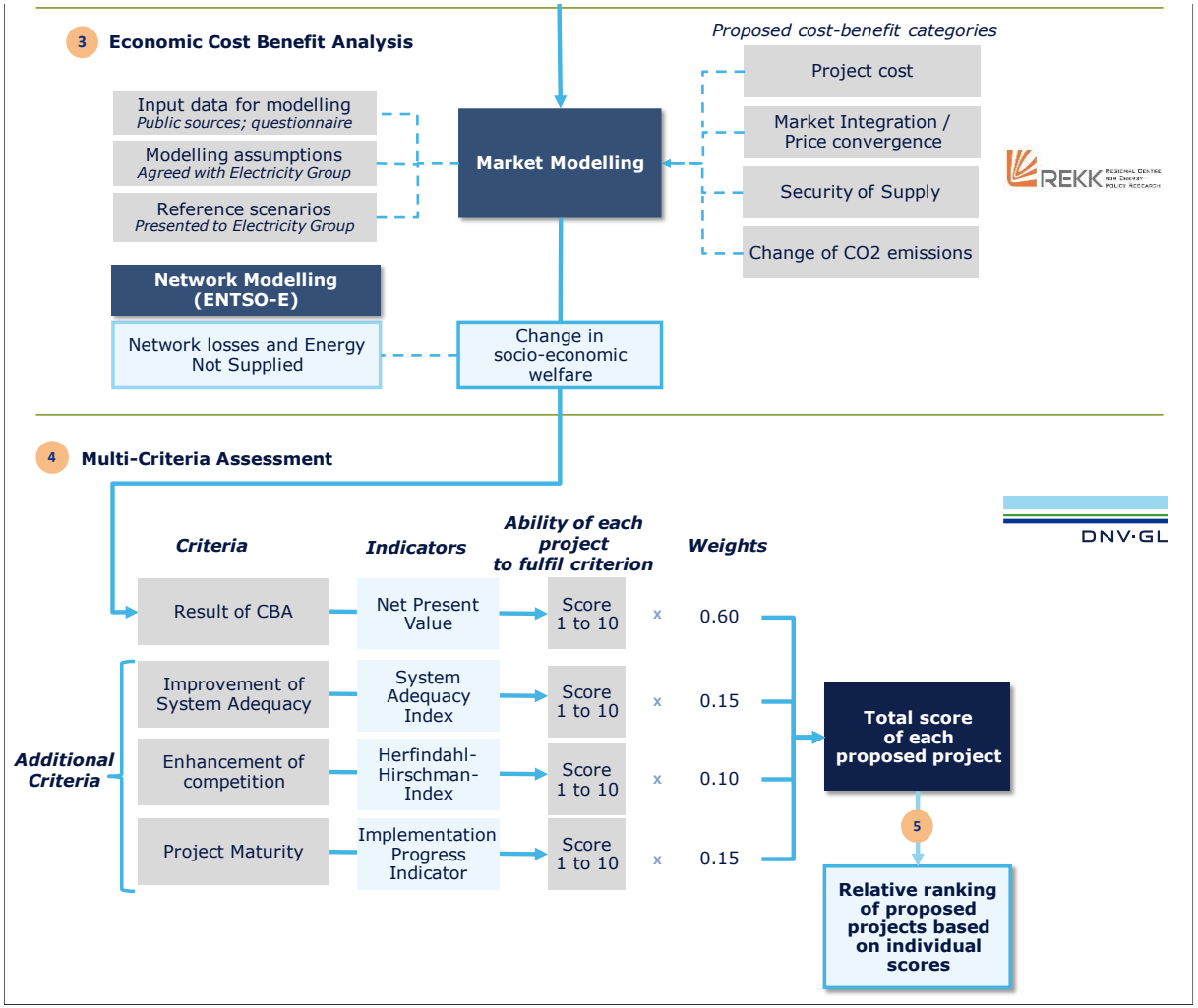
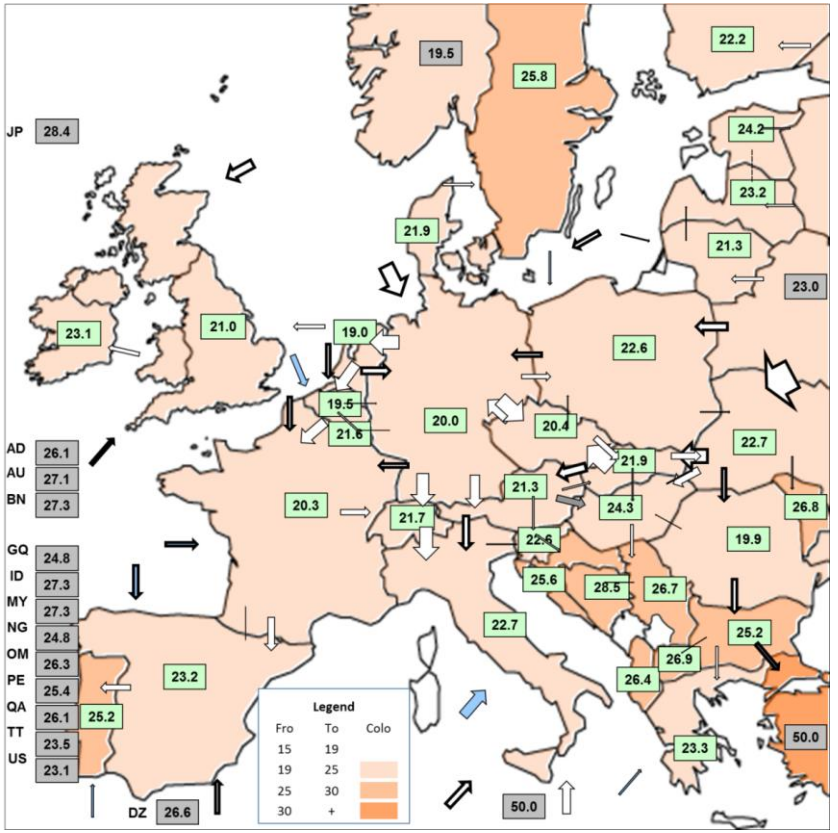
Conceptual framework for the assessment



CBA Modelling with EGMM

- Not only EnC CPS, but whole Europe is modelled (Georgia and Armenia also included)
- Competitive prices by countries; price modelled for each 12 months
- Modelled welfare components: Total welfare change for Market Integration and Security of Supply = CS + PS+ TSO + LTC holder + SSO + LSO
  - CS: Consumer surplus change in the countries of the area of analysis compared to reference
  - PS: Producer surplus change in the countries of the area of analysis
  - TSO, SSO, LSO: Change in profit
  - Change in LTC contract holder's profit
  - Investment cost: verified investment cost
- CO2 effect calculated as a change of CO2 emission due to change in gas demand (gas replacing more polluting fuels)

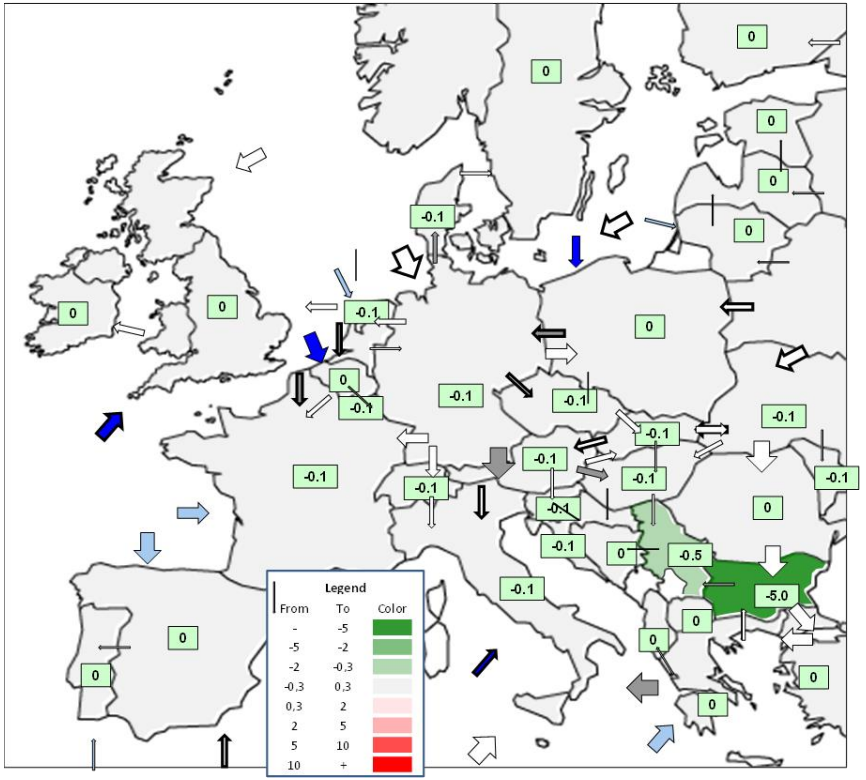


Dummy project: a new transmission pipeline between Greece and Bulgaria (BAU scenario)

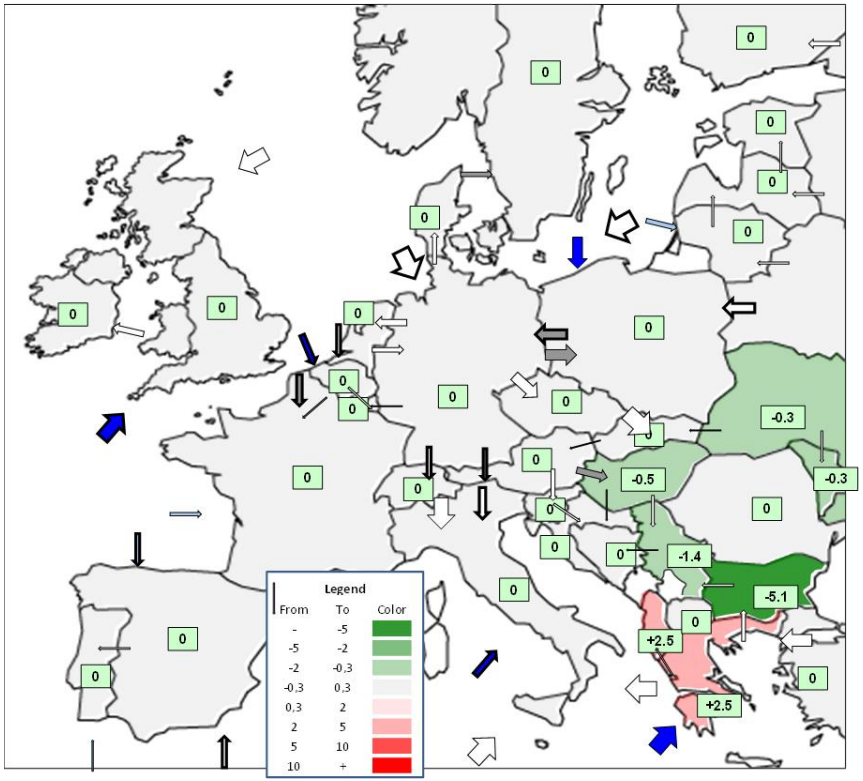
- Bidirectional pipeline:
  - capacity of 90 GWh/day from Greece to Bulgaria and
  - 90 GWh/day capacity form Bulgaria to Greece.
- Commissioning year of the project is 2020.
- The total investment cost is 220 m€, distributed evenly between the two countries and spent evenly:
  - BG: 110 m€
  - GR: 110 m€

Price effect of the Dummy project (BG-GR) in a sample year, 2030

Gas wholesale price change (€/MWh) „normal”



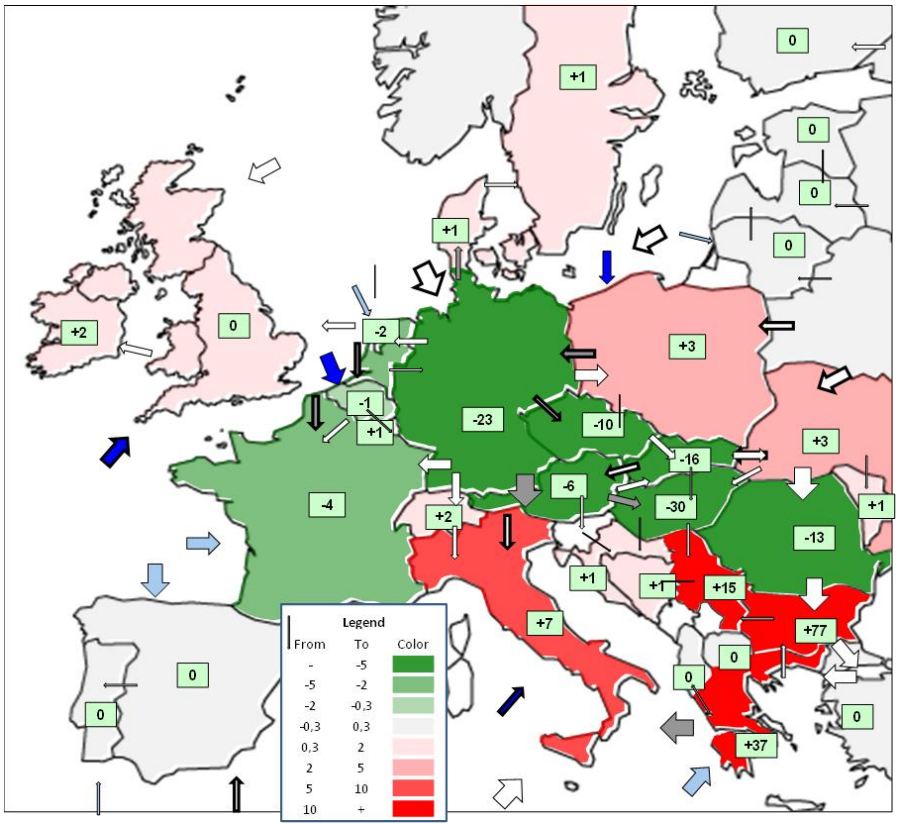
Gas wholesale price change (€/MWh) „SOS”



- A new bi-directional interconnector is commissioned connecting BG and GR (capacity 151 GWh/day)
- Effect: spot LNG gas flows may reach Serbia

GR-BG Interconnector Welfare Change Effects for 2030 - normal

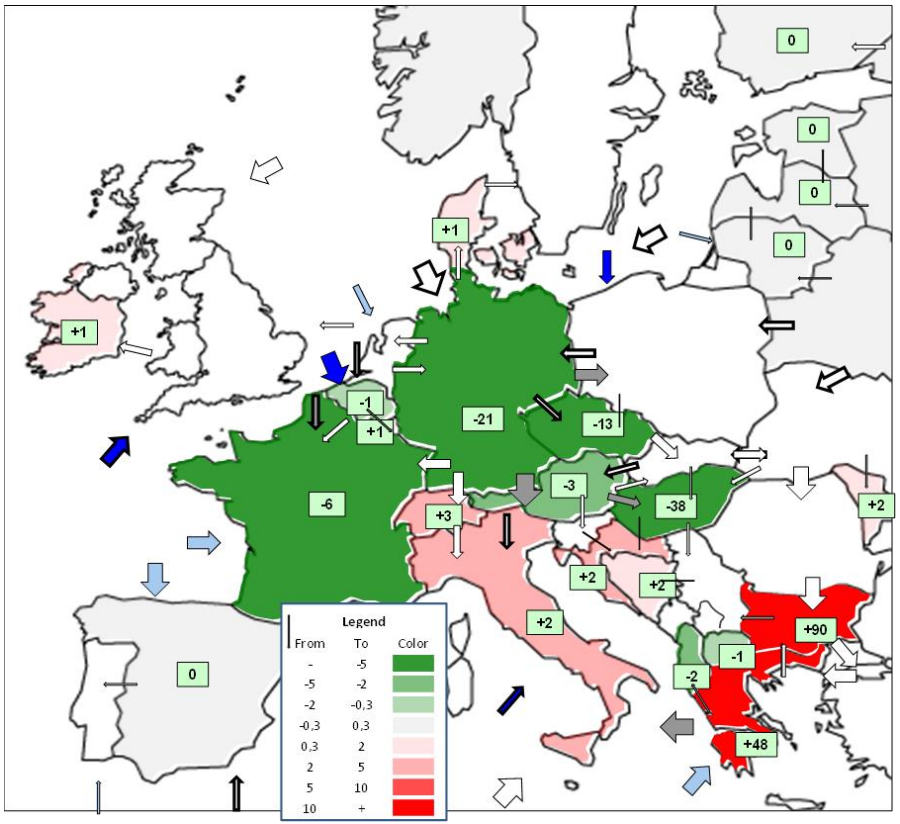
Change in welfare (m€), „normal”



- **BG:**
  - Consumer surplus surges due to lower prices
  - Producer surplus and LTC holder profit drops, since the domestic production can be marketed at a lower price
- **GR**
  - TSO profits and LNG terminal operator profits increase, due to higher utilisation of infrastructure
  - Consumer surplus decrease is outweighted by TSO and LSO profit increase

GR-BG Interconnector Welfare Change Effects for 2030 - SOS

Change in welfare (m€), „SOS”



- **BG:**
  - Consumer surplus surges due to lower prices is much higher – the pipeline offers an alternative rout to a prviously isolated country
  - TSO operating profits increase due to higher flows on the newly commissioned pipeline
- **GR**
  - TSO profits and LNG terminal operator profits increase, due to higher utilisation of infrastructure

Summary table of the CBA results (2020-2045)

	Normal welfare	SoS welfare	Welfare 95% normal +5% SoS	CO_2	Investment	NPV
AL	-22	-45	-23	0	0	-23
BA	52	72	53	0	0	53
BG	1244	1654	1264	9	110	1163
GR	527	650	533	0	110	423
HR	28	14	28	0	0	28
HU	-280	-492	-291	0	0	-291
IT	-123	-163	-125	2	0	-124
KO*	0	0	0	0	0	0
ME	0	0	0	0	0	0
MK	-4	-14	-5	0	0	-5
MD	23	24	23	0	0	23
PL	95	79	94	0	0	94
RO	-219	-258	-221	0	0	-221
RS	523	664	530	2	0	531
SK	-323	-396	-326	0	0	-326
UA	45	16	43	1	0	44
Region	1565	1807	1577	14	220	1371

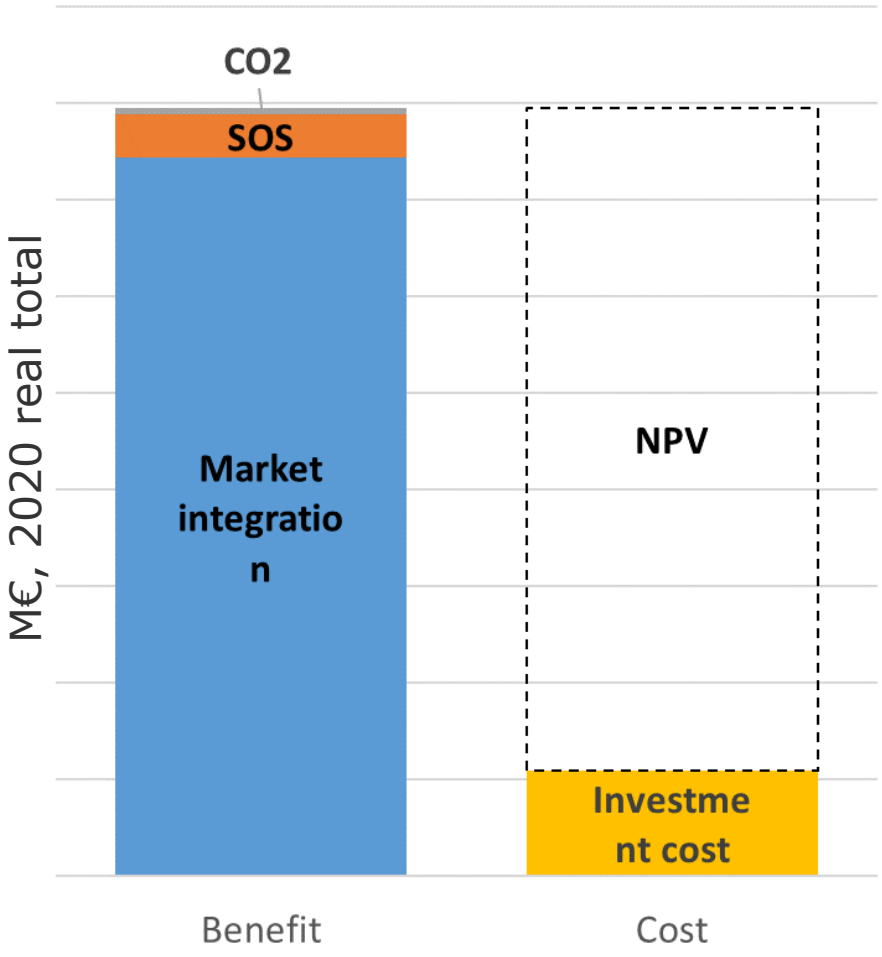
Graphic representation of the results of CBA for the BAU scenario

Regional welfare change due to the project in SOS case 25 years

(5% weight)

Regional welfare change due to the project in 25 years under normal conditions

(95% weight)



Green scenario is evaluated similarly.

Overview on Multi-Criteria Assessment Methodology

Rationale for MCA

- Not all dimensions of impacts may be monetised (which is necessary for inclusion within economic CBA)
- MCA allows to integrate qualitative criteria with results of the CBA

Step-wise methodology of Multi-Criteria Assessment

1. Identification and definition of criteria
2. Specification of indicators to measure criteria
3. Weighting of criteria (using the AHP approach)
4. Assessment of the fulfilment of each criterion by each investment project
5. Calculation of a final score for each project
   → ∑ score of each criterion * weight of each criterion
6. Relative ranking of projects based on the project scores

Overview of Project Assessment Criteria

Source of criteria	
	▪ EU Regulation 347/2013 as adopted by the Ministerial Council Decision ▪ Assessment approach for EU Projects of Common Interest (PCI) ▪ ENTSO-E and ENTSOG methodologies with feedback provided from ACER ▪ Consultant's expertise from previous PECI 2016 and 2018 selection

	Criterion	*Indicator*
Result of CBA	Change in socio-economic welfare	1 Net Present Value(NPV) or Benefit/Cost ratio
Additional Criteria of MCA	Improvement of System Reliability	2 System Reliability Index (SRI)
	Enhancement of competition	3 Import Route Diversification Index (IRD)
	Project Maturity	4 Implementation Progress Indicator (IPI)

Project Assessment Criteria – Change in Socio-Economic Welfare

1

Change in socio-economic welfare

- Within the economic CBA, *incremental changes in socio-economic welfare from project implementation* measures the project's impact on:
  - **Market integration** via the impact on wholesale price changes (convergence) resulting from reduced congestion, access to sources with lower production costs and enhancement of competition
  - **Security of supply** via change in economic welfare in case of a gas supply disturbance
  - **CO_2 emissions** via impact of changes in gas consumption on the primary energy mix
- The change in socio-economic welfare is measured by the net present value (NPV) or the Benefit/Cost (B/C) ratio
- The higher the NPV (or the B/C ratio) the larger the net benefit
- Score of 1 assigned to project with smallest NPV (or B/C ratio) above zero
- Project with NPV negative but close to zero, will be assigned a score of 0

Dummy project example Bulgaria – Greece interconnector

NPV values of dummy project and three other gas infrastructure projects calculated within CBA

NPV	Value (m€)	Score
Project 1	18.25	1.00
Project 2	350	3.02
Project 3	1500	10.00
IP GR-BG	**1371**	**9.22**

Project Assessment Criteria – System Reliability Index

2

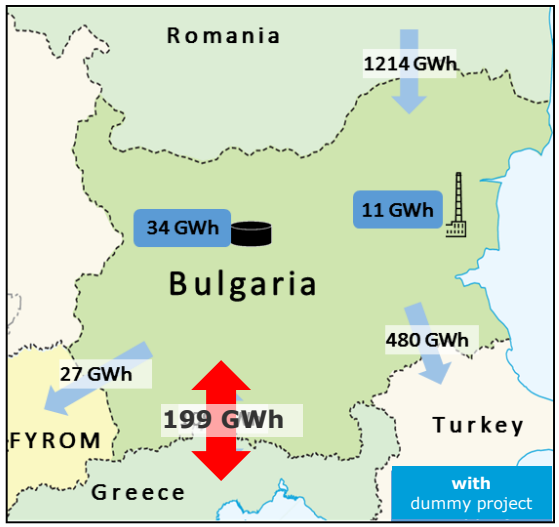
Improvement of System Reliability

- The incremental *improvement of overall system reliability* with regards to the daily operational flexibility and ability of the system to withstand extreme conditions is calculated as the change of the **System Reliability Index (SRI)** with and without the individual project
- The higher the value of the index the higher the level of system reliability

$$SRI = \frac{(\text{import cap.} + \text{production} + \text{storage} + \text{LNG}) - \text{single largest infr.}}{\text{daily peak demand}}$$

- **Calculation of index**
  - with and without the individual project
  - for the year of commissioning of the project
  - as aggregate of the impacts in the countries on each end of the interconnector
- **Scoring of index**
  - Score of 1 and 10 assigned to projects with the smallest and largest change in the indicator respectively
  - Scores of projects with changes in-between calculated by linear interpolation between min and max values of the change of the indicator

MCA Example of Dummy Project – System Reliability Index



$$\frac{(1323 + 11 + 34 - 1214)}{168} = 0.917$$

SRI for Bulgaria without project

daily peak demand of 168 GWh/d

$$\frac{(1323 + 90 + 11 + 34 - 1214)}{168} = 1.452$$

SRI for Bulgaria with project

Increase of SRI by 0.535 indicates improvement in reliability due to implantation of dummy project

- Applying same approach for Greece results in increase of SRI by 0.257 (indicating an improvement of reliability).
- Adding up both numbers results in an overall SRI impact of the dummy project of 0.792

	Change in SRI	Score
Project 1	0.655	1.00
Project 2	0.982	10.00
Project 3	0.85	6.37
IP GR-BG	**0.792**	**4.77**

Project Assessment Criteria – Import Route Diversification Index

3

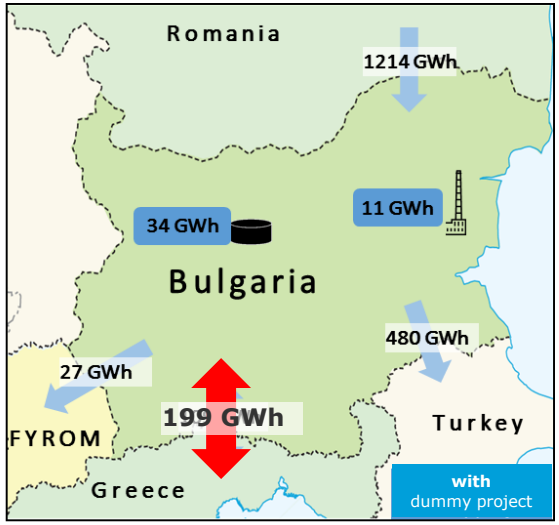
Enhancement of Competition

- *Incremental enhancement of competition* is calculated as change in the simplified **Import Route Diversification (IRD)** index with and without the individual project as aggregate of the impacts in the countries on each end of interconnector
- The higher the value of the index the higher the market concentration

$$\text{IRD} = \sum\left(\frac{\textbf{tech. interconnection capacity at each border}}{\textbf{total system entry capacities}}\right)^2 + \sum\left(\frac{\textbf{tech. send-out capacity at each LNG terminal}}{\textbf{total system entry capacities}}\right)^2$$

- **Calculation of index**
  - with and without the individual project
  - for the year of commissioning of the project
  - as aggregate of the impacts in the countries on each end of the interconnector
- **Scoring of index**
  - Score of 1 and 10 assigned to projects with the smallest and largest change in the indicator respectively
  - Scores of projects with changes in-between calculated by linear interpolation between min and max values of the change of the indicator

MCA Example of Dummy Project – Import Route Diversification



$$\left(100 * \frac{1214}{1323}\right)^2 + \left(100 * \frac{109}{1323}\right)^2] = 8488$$

IRD for Bulgaria without project

$$\left(100 * \frac{1214}{1413}\right)^2 + \left(100 * \frac{199}{1413}\right)^2] = 7580$$

IRD for Bulgaria with project

Decrease of IRD by 908 indicates improvement in competition due to implantation of dummy project

- Applying same approach for Greece results in increase of IRD by 195 (indicating a deterioration of competition).
- Adding up both numbers results in an overall IRD impact of the dummy project of -713

	Change in IRD	Score
Project 1	-312	1.00
Project 2	-520	4.16
Project 3	-905	10.00
IP GR-BG	-713	7.09

Project Assessment Criteria – Implementation Progress Indicator

4

Implemen-tation Progress Index

- The **Implementation Progress Index (IPI)** assesses the preliminary implementation potential of each individual project based on information provided in questionnaires
- A score of 1 is assigned for each project implementation step already under-taken
- Evaluation is conducted separately for each proposed investment project
- Where project maturity is significantly different on each side of a border, progress of least developed part will be applied for calculation
- Favours projects which have a clear implementation plan and/or have already commenced their preparatory activities

- **Scoring of index**
  - A score of 1 is assigned for each project implementation step already undertaken by a project in 2020 (i.e. IPI score between 1-10)
  - IPI score is reduced by 10 points in case no progress is observed for a project compared to previous assessment in 2018

Proposed change

  - Projects with progress as well as new projects (not assessed previously) will receive an IPI score according to the steps already undertaken

MCA Example of Dummy Project – Implementation Progress Indic.

Dummy project example Bulgaria – Greece interconnector

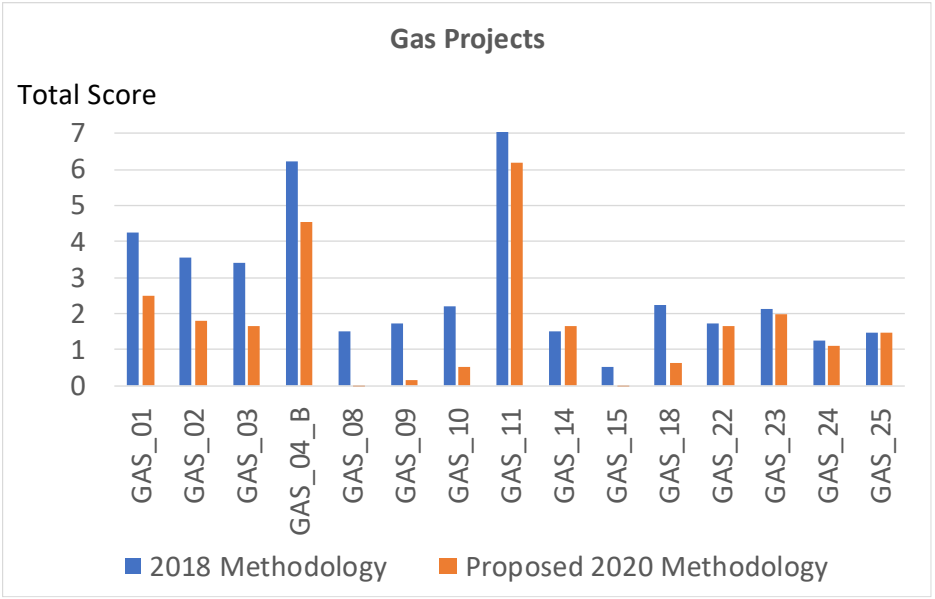
Project implementation steps	Score
Consideration phase	✓ 1
Preparatory studies / pre-feasibility studies	1
Technical feasibility study / Environmental impact assessment	1
Economic feasibility study / cost-benefit analysis	1
Detailed design study (FEED/Main Design)	1
Financing secured	1
Planning approval / permitting	1
Approval by regulatory authority	1
Final investment decision	1
Tendering	1

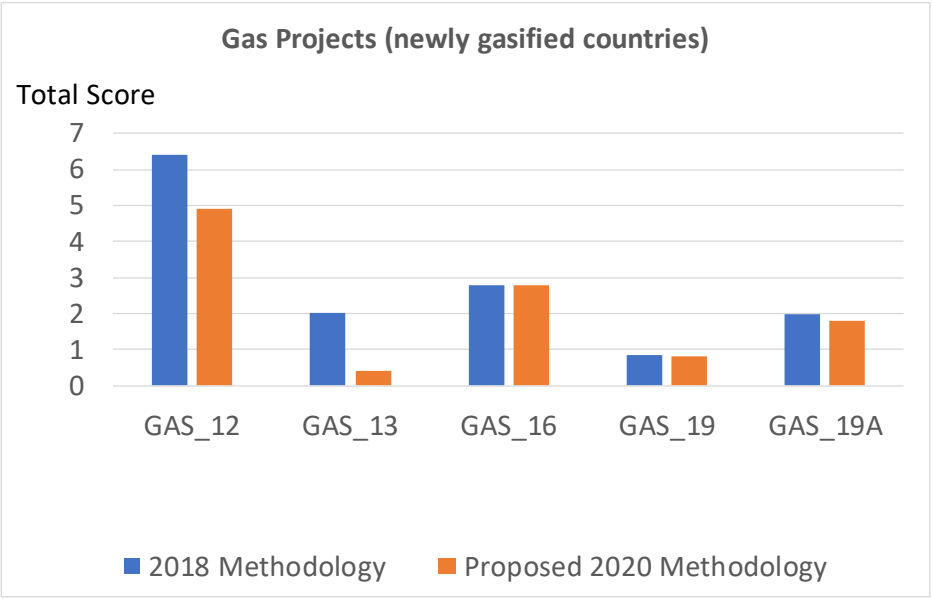
Assumption only **"consideration phase"** has been completed and recorded in questionnaire for the whole interconnection project (i.e. sections located in both countries)

	IPI	Score
Project 1	1.00	1.00
Project 2	1.00	1.00
Project 3	2.00	-8.00
IP GR-BG	**1.00**	**1.00**

Impact of Proposed Adjustments for Assessment of Maturity on 2018 Results (i.e. Change of Weights and IPI Scoring)

Impact on total score

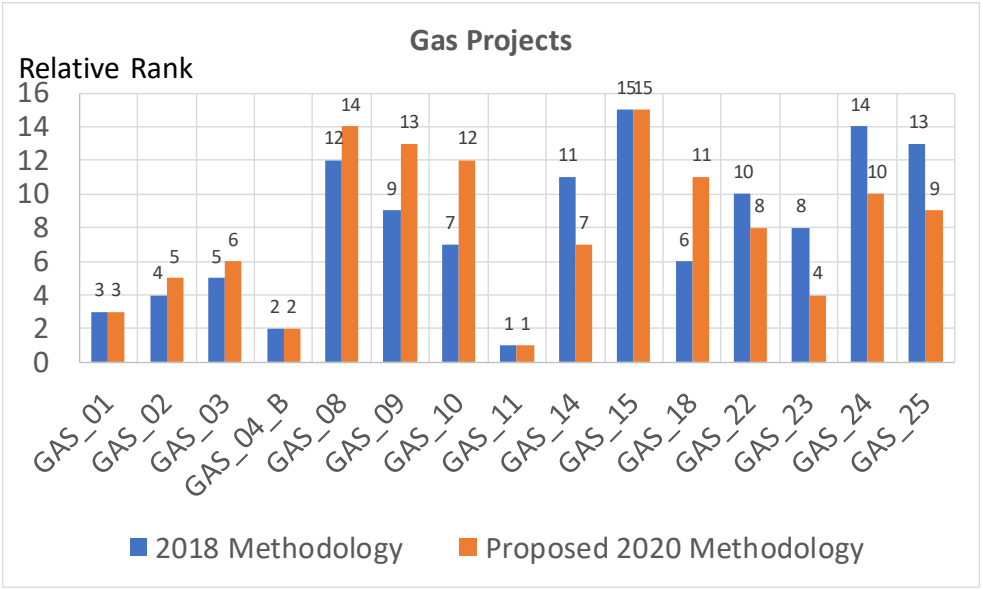




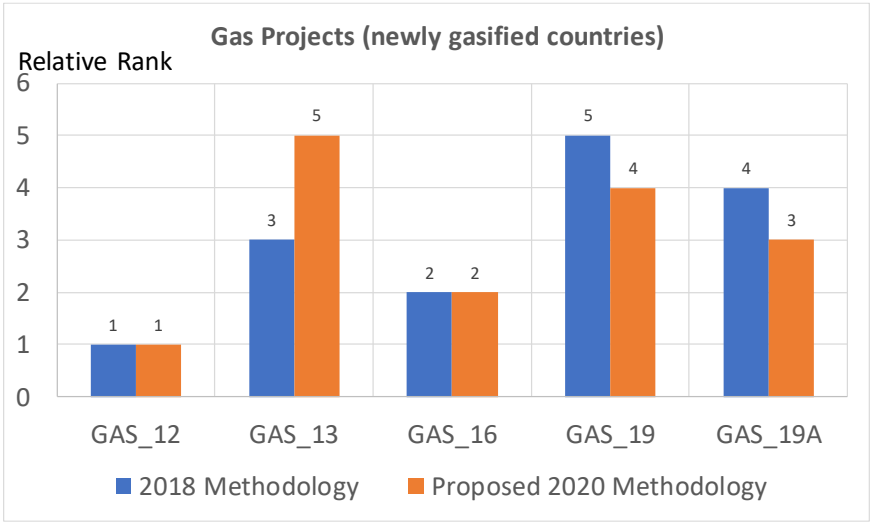
Reduction of IPI Score applied to all projects where no clear progress was reported in questionnaires (2018 vs. 2016)

Impact of Proposed Adjustments for Assessment of Maturity on 2018 Results (i.e. Change of Weights and IPI Scoring)

Impact on relative rank



Top 6 projects remain top 6 projects in both methodologies



No change in relative rank of first two projects in newly gasified countries

Please note that the figure shown at the first meeting of the groups in Vienna (30.1.2020) only reflected the change in scoring not in weighting and did not include the projects in the newly gasified countries

Impact of Proposed Adjustments for Assessment of Maturity on 2018 Results (i.e. Change of Weights and IPI Scoring)

Scoring of Maturity in 2016

Project Phase	Score
Consideration phase	1.00
Planning approval	1.36
Preliminary design studies	1.73
Market test	2.09
Preliminary investment decision	2.45
Public consultation (according to Art. 9(4) of adapted Regulation 347/2013)	2.82
Permitting	3.18
Financing secured	3.55
Final investment decision	3.91
Tendering	4.27
Construction	4.64
Commissioning	5.00

As steps do not fully match: Difficult to compare scores from 2018 with 2016

Scoring of Maturity in 2018

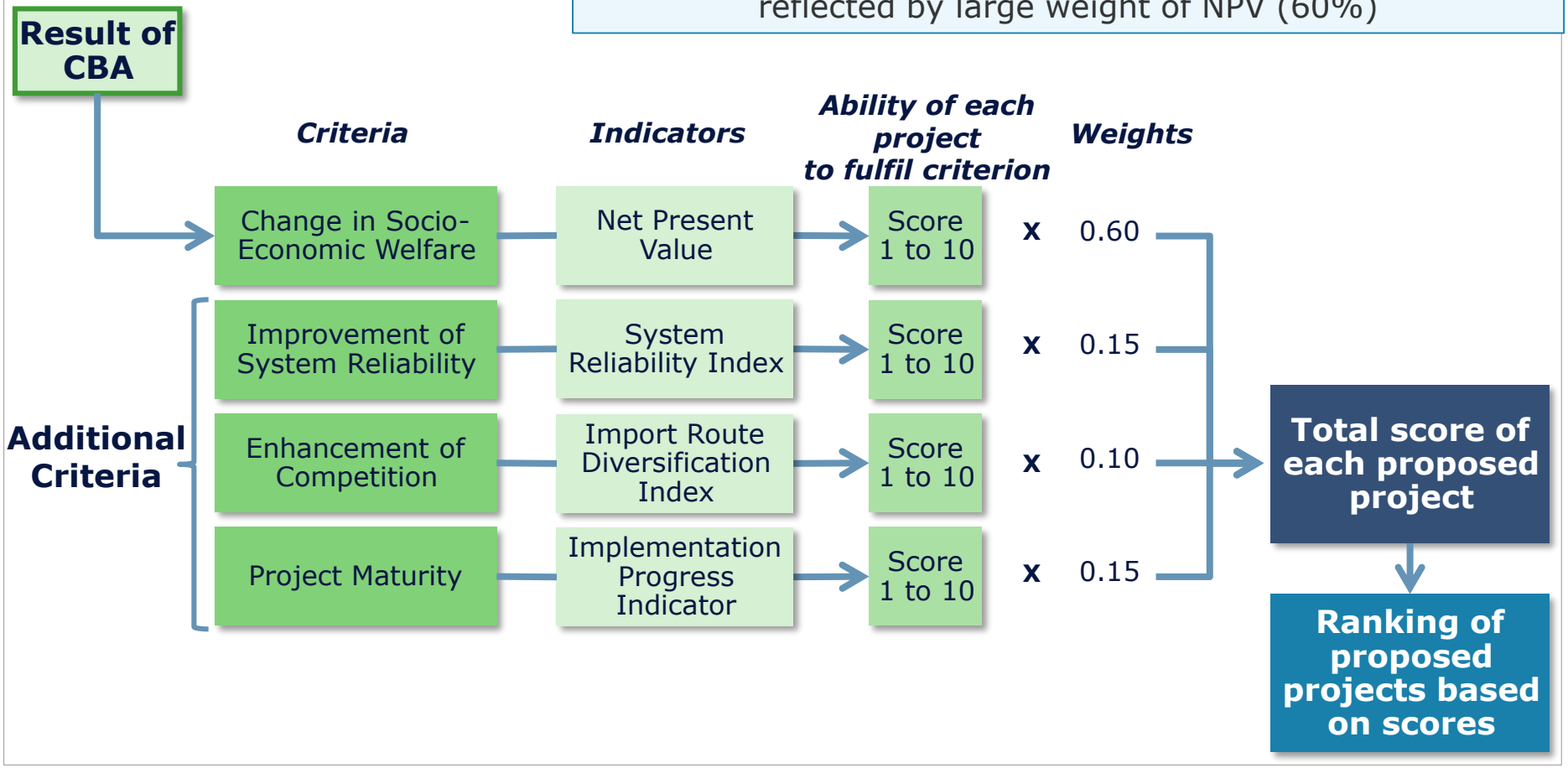
Project implementation steps	Score
Consideration phase	1
Preparatory studies / pre-feasibility test	1
Technical feasibility study / Environmental impact assessment	1
Economic feasibility study / cost-benefit analysis	1
Detailed design study (FEED / Main Design)	1
Financing secured	1
Planning approval / permitting	1
Approval by regulatory authority	1
Final investment decision	1
Tendering	1

Reduced IPI score due to lack of progress reported between 2018 and 2020 may affect potentially 3 out of 19 projects

Overview on Multi-Criteria Assessment Methodology

Multi-Criteria Assessment

Economic assessment of costs and benefits within CBA key element of the net benefit of an investment project, reflected by large weight of NPV (60%)



Relative Ranking of Projects

- Ranking is done by multiplying the score for each criterion, with the weight of each criterion a total score will then calculated for each project or project cluster (previous slide)
- Based on the calculated total scores of each individual project or project cluster a relative ranking of all eligible projects (i.e. a comparison of each individual project with the other submitted projects) will be provided in the final step

Dummy project example Bulgaria – Greece interconnector

Project	Indicators (Scores)				Weights				Indicators (Weighted Scores)				Total Score	Ranking
	Result of the CBA	Improvement of System Adequacy	Enhancement of Competition	Project Maturity	Result of the CBA	Improvement of System Adequacy	Enhancement of Competition	Project Maturity	Result of the CBA	Improvement of System Adequacy	Enhancement of Competition	Project Maturity		
	Net Present Value (NPV)	Import Route Diversification (IRD)	System Reliability Index (SRI)	Implementation Progress Indicator (IPI)	Net Present Value (NPV)	Import Route Diversification (IRD)	System Reliability Index (SRI)	Implementation Progress Indicator (IPI)	indicator * weight					
P 1	1	1	1	1	60%	15%	10%	15%	0.6	0.15	0.1	0.15	1	
P 2	3.02	10	4.16	1	60%	15%	10%	15%	1.812	1.5	0.416	0.15	3.878	
P 3	10	6.37	10	-8	60%	15%	10%	15%	6	0.9555	1	-1.2	6.756	2
IP GR-BG	**9.22**	**4.77**	**7.09**	**1**	**60%**	15%	10%	15%	5.532	0.7155	0.709	0.15	7.107	**1**

New This Year: Scoring and Ranking based on two Scenarios

Both the CBA (market modelling) and the MCA will be done for different scenarios.

Weighting of the two scenarios (ENTSOs National Trends and Enc BAU) conducting additional sensitivity analysis for CO2 prices and demand forecasts

Weight	*Score*		*Weight*	*Score*		
0.5 x	Green Trend	+	0.5 x	EnC BAU	=	**Total score of a project**

Sensitivites: TOOT, Global LNG supply glut, Global LNG supply short, regional demand growth -50%

Thank you!

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