Risikogruppe „Gasversorgung Ost, Ukraine" (BG, CZ, DE, EL, HR, IT [Koordination], LU, HU, AT, PL, RO, SI, SK):

1. ***Beschreibung des Netzes***

1.1. Geben Sie eine kurze zusammengefasste Beschreibung des regionalen Gasnetzes für jede Risikogruppe (2), an der der Mitgliedstaat teilnimmt, mit folgenden Angaben:
a) die wichtigsten Gasverbrauchszahlen (3): jährlicher Endgasverbrauch (Mrd. m3 und MWh) und Aufschlüsselung nach Art der Kunden (4), Spitzennachfrage (insgesamt und aufgeschlüsselt nach Kategorie der Verbraucher in Mio. m3/Tag),
b) eine Beschreibung der Funktionsweise des/der Gasnetze(s) in den betreffenden Risikogruppen: Hauptgasflüsse (Einspeisung/Ausspeisung/Durchleitung), Kapazität der Infrastruktur der Einspeise-/Ausspeisepunkte für den Transport in die und aus der/den Region(en) der Risikogruppen und je Mitgliedstaat (einschließlich Nutzungsrate), LNG-Anlagen (maximale tägliche Kapazität, Nutzungsrate und Zugangsregelung) usw.,
c) eine prozentuale Aufschlüsselung, soweit möglich, der Gasimportquellen nach Herkunftsland (5),
d)eine Beschreibung der Rolle der für die Risikogruppe relevanten Speicheranlagen, einschließlich des grenzüberschreitenden Zugangs:
i) Speicherkapazität (insgesamt und Arbeitsgas) im Vergleich zur Nachfrage während der Heizperiode, ii) maximale tägliche Entnahmekapazität bei unterschiedlichen Füllständen (idealerweise bei vollen Speichern und bei Füllständen am der am Ende der Heizperiode);
e) eine Beschreibung der Rolle der heimischen Produktion in der/den Risikogruppe(n):
i) Produktionsmenge im Vergleich zum jährlichen Endgasverbrauch,
ii) maximale tägliche Produktionskapazität sowie eine Beschreibung, wie diese den maximalen täglichen Verbrauch decken kann;
f) eine Beschreibung der Rolle von Gas bei der Stromerzeugung (z. B. Bedeutung und Rolle als Ersatz für erneuerbare Energien) unter Einbeziehung der Erzeugungskapazität von Gaskraftwerken (insgesamt (MWe) und als Prozentsatz der gesamten Erzeugungskapazität) und der Kraft-Wärme-Kopplung (insgesamt (MWe) und als Prozentsatz der gesamten Erzeugungskapazität).

Bulgaria

The transmission system in Bulgaria consists of 2765 km of pipelines. The transmission network has cross-border interconnections with Romania (Negru Voda / Kardam and Ruse / Giurgiu), Greece (Kulata / Sidirokastro), Former Yugoslavian Republic of Macedonia (Gueshevo / Jidilovo) and Turkey (Strandja / Malkoclar). 97% of gas demand is secured by Negru Voda entry point (Russian gas). There are also entry points from local production onshore (GMS Dolni Dabnik) and offshore (GMS Galata) and an interconnection with the Chiren storage infrastructure.

Domestic production covers 2-3% of annual consumption.

Chiren UGS has a technical volume of 550 million cubic meters (1300 MSm3 of total gas volume minus 750 MSm3of cushion gas).

In 2016 natural gas consumption amounted to 3 GSm3.

Czech Republic

Czech gas transmission system has a total length of 2.637 km. Furthermore there is another 1.181 km of national transmission gas pipelines (the actual data for 2018). There are six cross-border interconnections, three with Germany (Hora Svaté Kateřiny, Brandov, Waidhaus), one with Poland (Cieszyn), one with Slovakia (Lanžhot) and one entry only point again from Germany (Olbernhau). Storage system is composed of eight sites (Tvrdonice, Dolní Dunajovice, Štramberk, Lobodice, Třanovice, Háje, Uhřice, Dambořice) with an overall volume of 3.177 Mm3.

In 2017 natural gas consumption was 8.527 Mm3.

Germany

German transmission network is about 38.000 km long, and is divided in two areas, one supplied with L-Gas and the other with H-Gas. The H-Gas system is interconnected with Denmark (1 interconnection), with Norwegian and north sea gas fields (2 interconnections), with the Netherlands (2 interconnections), with Belgium (1 interconnection), with Luxemburg (1 interconnection), with France (1 interconnection), with Switzerland (1 interconnection), with Austria (2 interconnections: Überackern/Burghausen and Kiefersfelden), with Czech Republic (5 interconnections: Brandov/Stegal, Olbernhau/Hora Svaté Kateřiny, Hora Svaté Kateřiny/Deutschneudorf, Opal/Brandov and Waidhaus), with Poland (2 interconnections: Mallnow and Lasów) and with Russia (1 interconnection). L-Gas system has 4 interconnection points with The Netherlands. Storage system is composed of 37 sites with a total amount of 25,3 GSm3 (2,1 GSm3 for L-Gas only). Domestic production in 2016 amounted to more than 6,5 GSm3 against a domestic consumption of approximately 84 GSm3. There is no LNG regasification terminal in Germany.

Greece

Greek gas transmission network extends for 954 km. The network has cross-border interconnection points with Bulgaria (Kulata/Sidirokastron) and with Turkey (Kipi). Greece is also supplied through one LNG terminal (Revythoussa) equipped of two storage tanks with an overall capacity of 130.000 m3. In Greece there is no local production nor any underground storage. Greek network is going to be strengthen by the construction of TAP by 2020 and supposed to be further developed with other pipeline and LNG projects.

In 2016, total natural gas consumption amounted to 4 GSm3.

Croatia

Croatian gas transmission network has a total length of 2.694 km of transportation pipelines. The natural gas transmission network has cross-border interconnections with Slovenia (Rogatec) and Hungary (Dravaszerdahely) usually utilised to import gas. There are also 7 entry points from production plants and one interconnection with the underground storage facility of Okoli.
The upstream pipelines in the Adriatic sea are used to export Croatian natural gas from the production platforms to Italy. Panon gas fields are connected by upstream pipelines to the transmission network and to the underground gas storage facility at the Okoli site.

The Okoli gas storage infrastructure (553 million cubic meters) is located at Okoliand and it is part of the Underground Gas Station d.o.o..

Croatia is going to build an LNG terminal on the island of Krk, with a storage capacity from up to 265.000 m3 of LNG; nominal regasification capacity of 8 billion m3 of gas per year.
In 2016 natural gas consumption amounted to 106 MSm3.

Italy

Italian gas transmission network extends for more than 32.000 km. The national network has cross-border interconnection points with Austria (Tarvisio/Arnoldstein), Slovenia (Gorizia/Sempeter) and with Switzerland (Griess Pass). Italy is also supplied through two off shore interconnectors: Transmed (with Tunisia and Algeria) and Greenstream (Libya). A new interconnection facility (TAP) is in progress and will be operational in 2020. There are three entry points from LNG terminals (Panigaglia, Livorno and Cavarzere) and twelve entry exit point from storage plants for an overall volume of approximately 17 GSm3. Local production (5.6 GSm3/y in 2016) shows a historical decreasing trend due to the decline of domestic sources, not sufficiently offset by new production developments.

In 2017, total natural gas consumption amounted to 75,1 GSm3.

Luxembourg

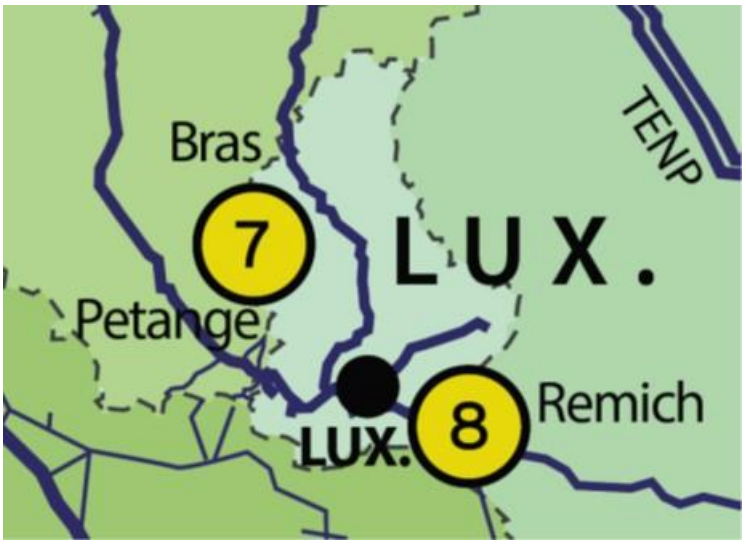
The natural gas transmission system of Luxembourg comprises 281,8 km of high pressure pipe line. The transmission gas infrastructure is owned and operated by Creos Luxembourg. The gas supply of Luxembourg is ensured by mainly 3 physical entry points, two from Belgium and one from Germany. A small connection with France is not in operation since 2016 anymore. The two entry points with Belgium ensure a total capacity of 180.000 Nm3/h. The capacity at the German IP is limited to 150.000 Nm3/h and a minimum of 90.000 Nm3/h is necessary to fulfil the N-1 obligation.

The total capacity of the transmission system amounts to 330.000 Nm3/h.

The transmission system transports natural gas to 59 pressure-reduction substations (distribution system and customers). No transit is currently possible due to operational constraints and gas odorization at the German and Belgian border. No storage are connected to the transmission system.

The main peak load registered in the last ten years dated from 2012 and amounts to 296,550 Nm3/h. However due to the decommissioning in July 2016 of a CCGT gas power plant with a capacity of 375 MWel, the peak load decreased significantly to 204.780 Nm3/h in 2016.

Due to the market integration and the shutdown of the CCGT in Luxembourg, more gas volumes are currently delivered from Belgium than from Germany to Luxembourg. In 2016 70,7 % of the flows were delivered from the Belgium entry points.



Hungary

Hungarian gas transmission network has a total length of 5.928 km of transportation pipelines. The natural gas transmission network has cross-border interconnections with Ukraine (Beregdaroc), with Slovakia (Balassagyarmat), with Austria (Mosonmagyarovar), with Croatia (Dravaszerdahely), with Romania (Csanadpalota) and an exit only point to Serbia (Kiskundorozsma). Storage system is composed of five plants with a total working gas volume of 6,330 GSm3. The average total consumption is between 9 and 10 GSm3 annually according to the last few years at the TSO level. The local production could be up to 20 % of yearly consumption, but in average it is 1,61 GSm3/y (2014-2016).

Poland

At the end of 2016, the gas transmission system in Poland consisted of high pressure gas pipelines with the total length of 10,989 km. The transmission network consists of two cooperating systems covering the high- and low-calorific gas. In addition, there is the Yamal-Europe Pipline with the length of 684 km.

The Polish transmission system is historically dependent on gas supplies from the Eastern direction. There are six major physical entry points into the transmission network that are located in Drozdowicze (IP with Ukraine), Wysokoje (Belarus), Lwówek and Włocławek (on the Yamal-Europe pipeline), Lasów (Germany), Cieszyn (Czech Republic). As of June 2016, the transmission system in Poland can also be supplied via the LNG terminal in Świnoujście (5 billion cubic meters per year).

Poland is currently developing investment projects along the North-South axis with the aim of improving the energy security and competitiveness of Poland and other countries in Central-Eastern Europe and the Baltic Sea region. The Polish main priorities are the expansion of the LNG

Terminal in Świnoujście and the Baltic Pipe project. The terminal in Świnoujście will be upgraded in order to increase the regasification capacity and provide a wider range of LNG services. The Baltic Pipe project is underway in cooperation with Denmark to provide a direct access to Norwegian supplies. These two investments, in conjunction with the expansion of the domestic transmission infrastructure and the construction of cross-border interconnections with adjacent systems, will provide the basis for a secure and competitive gas market in the CEE and Baltic regions. Polish gas system has 7 underground Gas Storages with an overall volume of 3,150 billion cubic meters

In 2016, total natural gas consumption amounted to 16,9 GSm3.

Romania

Romanian gas transmission network extends for more than … km. The national network has cross-border interconnection points with Moldova (Ungheni), with Ukraine (Orlovka/Isaccea and Medisul Aurit/Tekovo), with Bulgaria (Negru Voda/Kardam and Giurgiu/Ruse) and with Hungary (Csanapadlota/Nadlac). Romanian storage system has an overall working gas capacity of 3,130 GSm3.

In 2017 local production was 10,3 GSm3.

In 2016, total natural gas consumption amounted to 70,9 GSm3.

Slovenia

The Slovenian transmission network has cross-border interconnections with Austria (Murfeld/Ceršak interconnection point), with Italy (Gorizia/Šempeter) and an exit only point with Croatia (Rogatec). Slovenian gas system has no storage facilities nor any local gas production. The gas consumption figures from 2014 to 2016 has continuously grown up to 860 MSm3.

Slovakia

In 2016 the total gas transmission, for the total length of the gas transmission network of almost 2,270 km, amounted to 60.6 bcm. Due to the amount of transported gas eustream remains one of the most important TSO based on the volume of gas transported within the EU.

Four compressor stations are part of the transmission network – Veľké Kapušany, Jablonov nad Turňou, Veľké Zlievce and Ivanka pri Nitre – which provide a pressure differential needed for the flow of gas with a total output of 600 MW. The total transmission capacity of the network is more than 90 bcm per year. Natural gas from the transmission network in the defined territory gets through intrastate stations into the distribution networks and is transported to the final customers.

On 30 November 2011 implementing measures were completed that allow reverse flow within the transmission network in Slovakia. In this mode it is possible to transport in the west – east direction the amount of gas that is higher than the highest consumption in Slovakia in the winter months. Slovakia interconnection with neighboring countries on the level of transmission networks currently exists with Austria [border point Baumgarten], Czech Republic [border point

Lanžhot], Hungary [border point Veľké Zlievce] and Ukraine [border point Veľké Kapušany and border point Budince].

Interconnection with the Czech Republic since 2009 and with Austria since 2010 are prepared so that it will be possible in case of crisis situation (emergency level respectively) to ensure physical reverse flow of gas to Slovakia.

Slovakia has in its territory several geological formations which are suitable for construction of underground gas storage facilities. Currently there are two companies active on the market, that are storage system operators - NAFTA a.s., Bratislava and POZAGAS a.s., Malacky. Total storage capacity in Slovakia is 3.35 bcm, which represents more than 65% of total consumption. The facilities are located in the southwestern part of the country near the border with Austria and the Czech Republic.

2. Infrastrukturstandard (Artikel 5)

viii) Falls mit den zuständigen Behörden der betreffenden Risikogruppen(n) oder mit direkt verbundenen Mitgliedstaaten vereinbart, gemeinsame Berechnung(en) des N – 1-Formel:
— Berechnung der N – 1-Formel gemäß Anhang II Nummer 5,
— Beschreibung der Werte, die für alle Elemente in der N – 1 Formel verwendet werden, einschließlich der für ihre Berechnung verwendeten Zwischenwerte (falls diese von den unter Nummer 2 Buchstabe a Unternummer iii beschriebenen Werten abweichen),
— Angabe der für die Berechnung der Parameter in der N – 1 Formel (z. B. Dmax) zugrunde gelegten Methodologien und etwaigen Annahmen (Verwendung von Anhängen zwecks ausführlicher Erläuterungen)
— Erläuterung der Vereinbarungen, die getroffen wurden, um die Einhaltung der N – 1-Formel sicherzustellen;

N-1 formula calculation

As provided for by article 5.5 of the Regulation, the competent authorities of relevant Member States may agree to provide the calculation of the N – 1 formula at regional level in the common risk assessment (art. 7), following the provisions of point 5 of Annex II of the Regulation.

The N – 1 formula describes the ability of the technical capacity of the gas infrastructures to satisfy total gas demand in the calculated area in the event of disruption of the single largest gas infrastructure during a day of exceptionally high gas demand occurring with a statistical probability of once in 20 years(Dmax).

For this extent Member States have provided their national Dmax as follow:

[MSm^3/d]	**D_{max} 2018/2019**	**D_{max} 2020/2021**
Austria	*55,3*	*55,3*
Bulgaria	*18,2*	*20,3*
Croatia	*16,6*	*16,6*
Czech Republic	*68,2*	*68,2*
Germany	*474,8*	*474,8*
Greece	*20,1*	*21,1*
Hungary	*84,0*	*89,5*
Italy	*443,0*	*438,0*
Luxembourg	*4,8*	*4,8*
Poland	*86,7*	*77,4*
Romania	*72*	*83,3*
Slovakia	*45,1*	*34,7*
Slovenia	*4,9*	*6,1*

As provided for by Annex II of the Regulation, for the calculation of the "N – 1 formula at regional level", the single largest gas infrastructure of common interest shall be used; the single largest gas infrastructure of common interest for the Eastern gas supply risk group Ukraine is Uzhgorod interconnection point.

The formula used for the calculation of the "N – 1 formula at regional level" is the one provided by the point 4 of Annex II "Calculation of the N – 1 formula using demand-side measures":

$$N-1[\%]=\frac{EP_m+P_m+S_m+LNG_m-I_m}{D_{\max}-D_{eff}}\times 100, N-1\geq 100\%$$

The terms of the formula have been calculated as follows:

EP_m	*Import capacity available in the time period considered. This means the capacity that is technically available when the demand D_{max} occurs.*
P_m	*Maximum technical production capacity.*
S_m	*Maximum technical deliverability of storage defined as the sum of the maximum daily withdrawal capacity of all the storage facilities that can be delivered to the entry points of the national network, taking into account their respective physical characteristics. As specified in the Regulation, the maximum capacity used in the calculation is evaluated considering all storages at the 100% and 30% of their working volumes.*
LNG_m	*Maximum technical capacity of the LNG plants, i.e., the maximum daily send-out of the facilities connected to the national network, taking into account the critical elements like unloading, ancillary services, temporary storage, regasification of LNG and the interconnection capacity with the transport network.*
I_m	*Maximum technical capacity of the major entry point.*
D_{max}	*The demand of the entire group, determined by considering the forecast of market consumption in exceptional weather conditions evaluated with the probability of occurrence of once every 20 years.*
D_{eff}	*The portion of the demand that, in case the supply is interrupted, can be adequately and promptly covered using market-based demand measures.*

Tables below are calculated taking into account the following interruptions:

- Uzhgorod as the single larger infrastructure (Im) as requested by the SOS regulation;
- total disruption of Ukrainian route. Even if not requested by the Regulation, this could be a relevant scenario to evaluate in order to have a sensitivity analysis, as emerged during the 2009 Russian - Ukraine crisis.

As provided by the Regulation, the N-1 formula has been computed taking into account the 100% of underground storage working gas volume and also taking into account the 30% of the same value. The index has been calculated taking into account 2018/2019 scenario and 2020/2021 scenario.

In each case the index results far above the 100% meaning that regional gas infrastructures are properly dimensioned in order to cover maximum demand of the involved Member States.

However N-1 index doesn't take into account possible existence of internal bottlenecks or problems induced by malfunctioning of internal interconnection points or due to lack of available capacity to attract gas. All these risks are evaluated in the following risk analysis.

The following tables summarise the data set used for N-1 formula calculation.

Table 1: Data [MSm3/d] for 2018/2019 scenario

Disruption (I_m)	Capacity
Uzhgorod	***227,4***
Ukraine route	***336,5***

Member State	Ep_m	LNG_m	S 100%	S 30%	P_m	D_{max}
Austria	-	-	*66,4*	*44,4*	*3,4*	*55,3*
Bulgaria	-	-	*4,2*	*2,9*	*0,6*	*18,2*
Croatia	-	-	*5,8*	*3,2*	*3,5*	*16,6*
Czech Republic	-	-	*59,1*	*41,0*	*0,5*	*68,2*
Germany	*471,0*	-	*612,4*	*479,3*	*26,2*	*474,8*
Greece	*4,5*	*13,2*	-	-	-	*20,1*
Hungary	*71,3*	-	*78,6*	*69,5*	*4,8*	*84,0*
Italy	*133,6*	*51,9*	*263,2*	*171,8*	*15,5*	*443,0*
Luxemburg	*4,3*	-	-	-	-	*4,8*
Poland	*137,7*	*14,4*	*51,5*	*40,7*	*7,2*	*86,7*
Romania	*103,7*	-	*29,0*	*18,7*	*29,5*	*72,0*
Slovakia	*250,9*	-	*52,61*	*39,5*	*0,2*	*45,1*
Slovenia	-	-	-	-	-	*4,9*
TOT	1.177,0	79,5	1.170,2	911,0	91,4	1.393,7

Table 2: Data [MSm3/d] for 2020/2021 scenario

Disruption (I_m)	Capacity
Uzhgorod	***191,7***
Ukraine route	***294,0***

Member State	Ep_m	LNG_m	S 100%	S 30%	P_m	D_{max}
Austria	-	-	*66,4*	*44,4*	*3,4*	*55,3*
Bulgaria	*14,6*	-	*4,2*	*2,9*	*1,1*	*20,3*
Croatia	-	-	*5,8*	*3,2*	*3,5*	*16,6*
Czech Republic	-	-	*59,1*	*41,0*	*0,4*	*68,2*
Germany	*471,0*	-	*612,4*	*479,3*	*26,2*	*474,8*
Greece	*36,1*	*13,2*	-	-	-	*21,1*
Hungary	*71,3*	-	*78,6*	*69,5*	*3,6*	*89,5*
Italy	*152,9*	*51,9*	*291,3*	*190,8*	*18,9*	*438,0*
Luxemburg	*4,3*	-	-	-	-	*4,8*
Poland	*137,7*	*14,4*	*51,5*	*40,7*	*7,2*	*77,4*
Romania	*103,7*	-	*29,0*	*18,7*	*25,7*	*83,3*
Slovakia	*204,3*	-	*52,61*	*39,5*	*0,3*	*34,7*
Slovenia	-	-	-	-	-	*6,1*
TOT	*1.200,0*	*79,5*	*1.198,3*	*930,0*	*90,2*	*1.390,2*

Table 3 : N-1 index values

		2018/2019	2020/2021
Uzhgorod	**UGS 100%**	***164%***	***171%***
	UGS 30%	***146%***	***152%***
Ukraine route	**UGS 100%**	***157%***	***164%***
	UGS 30%	***138%***	***144%***

Cooperation mechanism for Eastern gas supply risk group - Ukraine under Regulation (EU) 2017/1938 concerning measures to safeguard the security of gas supply to conduct the common risk assessment

Italy will take the lead of the Ukraine risk group and its secretariat for the purpose of the preparation of the **first common risk assessment as provided for by article 7 of Regulation (EU) 2017/1938**. This includes call for meetings, drafting of minutes, call for written contributions, coordination of tasks, final drafting of the common risk assessment and notification to the Commission.

- The aim of this document is to establish a permanent cooperation mechanism for the Ukraine risk group in order to:
  a) prepare and notify the "Ukrainian" common risk assessment, according to Article 7 by 1st October 2018;
  b) prepare and notify the regional chapters for national preventive action plans and emergency plans, according to Article 8;
  c) coordinate in case of declaration of any crisis level in the emergency plans, according to Annex VII;
  d) any coordination task to be addressed within the group of risk.
- Ukraine risk group is composed of: Austria, Bulgaria, Croatia, Czech Republic, Germany, Greece, Hungary, Italy, Luxembourg, Poland, Romania, Slovenia, Slovakia. A contact list will follow in the Annex of this document. Members States commit to update this list whenever it is necessary.
- Decisions of the group are taken by consensus.
- The working language is English.
- Italy will chair the meetings with regards to the task under the previously mentioned letter a). At the end of a task, the coordinator can :
  - propose to continue to have this role subject to the agreement of the other competent authorities
  - or ask to give the role to another competent authority. In this case, a new coordinator may be defined by consensus taking into account the role competent authorities may have in other risk groups. Alphabetical order as defined on the Annex I of the Regulation may be used to define the next coordinator.
- All the Member States commit to submit information necessary for the preparation of the risk assessment and to support work carried out to prepare assessments, plans and other documents as far as possible. Professional secrecy principles shall be guaranteed by Competent Authorities at the same level than in the Gas Coordination Group.

- Meetings can be arranged as web-conferences, telephone-conferences or ordinary meetings based on a rotary hosting principle. The format of the meetings will depend on the issues to be discussed and the circumstances.
- Italy will make the call for meetings. After consultation with the members of the group, Italy will prepare and submit an agenda in due time before the meetings. Each Competent Authority of the group may request to convene a meeting.
- Italy will prepare minutes of the meetings to be adopted by the members of the group.
- The kick-off meeting is scheduled to take place as soon as possible after ENTSOG has presented the Union-wide security of gas simulation. The venue of the meeting remains to be agreed upon within the group.
- At the kick-off meeting, working and process plans will be discussed in order to ensure a timely preparation of the common work and to meet the deadlines. The various scenarios of exceptionally high demand for gas and disruption of gas supply for the risk group will be discussed and identified based on the ENTSOG simulation of Union-wide gas supply and infrastructure disruption scenarios.
- Whether Member States individually so decide, experts not belonging to Competent Authorities, such as Transport System Operators or National Regulatory Authorities (if they are not the Competent Authority) shall be authorised to attend meetings and to develop certain tasks under their surveillance. Competent Authorities shall be responsible of ensuring professional secrecy.
- Each member of the risk group is overtaking his own travel expenses.