
Annexes and Explanatory Note for the determination of LFC blocks proposal for Synchronous Area Continental Europe

Date 15/07/2018

ANNEX 1. LFC blocks, LFC areas and monitoring area of non-EU countries

Due to the existing interdependencies and cooperation between EU and non-EU countries regarding the Load Frequency Control, the list presented below shows the LFC block, LFC areas and monitoring areas in Continental Europe for non EU countries.

The scope of cooperation with third country TSOs, until concluding the agreement in accordance with Article 13 of SO GL (as set in article 1.2 of LFC blocks determination), are determined by the individual agreements between the respective TSOs of LFC block and/or with Continental Europe. These individual agreements have to comply with the EU Legislation, due to the fact that EU TSOs are the ultimate responsables for this.

Country	TSO (full company name)	TSO (short name)	Monitoring Area	LFC AREA	LFC Block
Albania	Operatori sistemit transmetimit	OST	OST	OST	OST
Bosnia and Herzegovina	Nezavisni operator sustava u Bosni i Hercegovini	NOS BiH	NOS	NOS	SHB
Montenegro	Crnogorski elektroprenosni sistem AD	Crnogorski elektroprenosni sistem	CGES	CGES	SMM
FYR of Macedonia	Macedonian Transmission System Operator AD	MEPSO	MEPSO	MEPSO	SMM
Ukraine	National Power Company "Ukrenergo"	Ukrenergo	Burstyn PP Island	Burstyn PP Island	PSE + Burstyn PP Island (Polish Control Block)
Serbia	Joint Stock Company Elektromreža Srbije	EMS	EMS	EMS	SMM
Switzerland	Swissgrid AG	Swissgrid	SG	SG	SG
Turkey	TEIAS	TEIAS	TEIAS	TEIAS	TEIAS

- SMM: Control Block Serbia, Macedonia, Montenegro
- SHB: Control Block Slovenia, Croatia and Bosnia/Herzegovina

Table 1. List of Monitoring Areas, LFC Areas and LFC Blocks of non-EU countries

ANNEX 2. LFC blocks, LFC areas and monitoring area interconnectors in Continental Europe

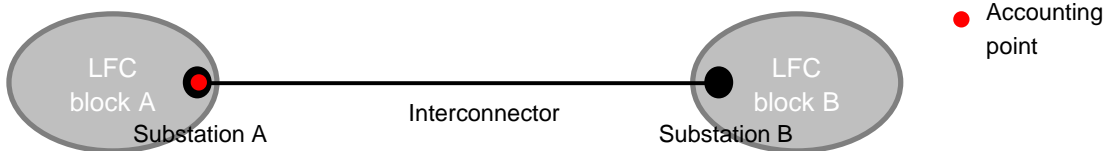
Each monitoring area, LFC area or LFC block is delimited by the points of measurement, in such a way that each network element inside is part of only one of them.

However, interconnectors between two monitoring areas, LFC areas or LFC blocks represent special elements that could be misinterpreted as single network element belonging to two different monitoring areas, LFC areas or LFC blocks. In order to avoid this confusion, an interconnector between two monitoring areas, LFC areas or LFC blocks shall be considered as two network elements:

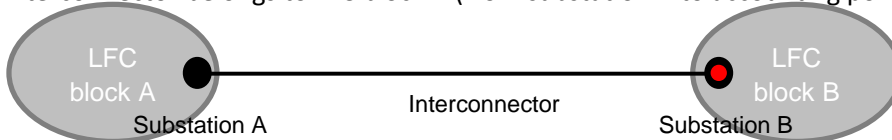
- Network element A: From substation A to Accounting Point* – interconnector belongs to area/block A
- Network element B: From substation B to Accounting Point* – interconnector belongs to area/block B

*Accounting Point is defined as the agreed energy delivery point between two TSOs. The accounting value may be equal to a physical metered data or calculated by using meters on both sides, and is used for the calculation and accounting of unintentional deviations and grid losses.

Case 1: Interconnector belongs to LFC block B (from substation B to accounting point)



Case 2: Interconnector belongs to LFC block A (from substation A to accounting point)



Case 3: Interconnector belongs to LFC block A (from substation A to accounting point) and to LFC block B (from substation B to accounting point)

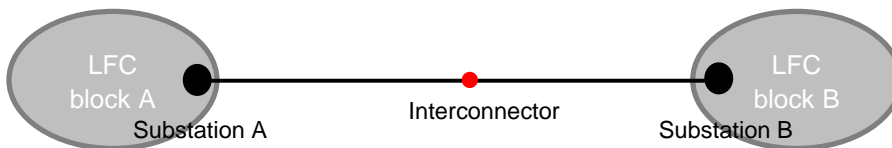


Figure 1. Allocation of Tie-Lines

Nevertheless, each TSO performs the load-frequency control in real time by using the measurement values from one side of the interconnector in a coordinated way. The other side of the interconnector is used for redundancy reasons. For this the TSOs deliver redundant measurement values for their tie-lines to the TSOs responsible for the respective ACE calculation of the monitoring areas, LFC areas and LFC blocks.

ANNEX 3. List of interconnectors in Synchronous Area Continental Europe

The following table shows the list of interconnectors in Synchronous Area Continental Europe, the Accounting Points and the monitoring area/LFC area/LFC block where they belong.

Monitoring area / LFC area / LFC block	Interconnector (voltage level, from substation – to substation)	Accounting point
Monitoring Area TTG	380 kV Jardelund - Kassø 1	Jardelund
	380 kV Jardelund - Kassø 2	Jardelund
	220 kV Flensburg - Enstedvaerket	Enstedvaerket
	220 kV Flensburg - Kassø	Kassø
	380 kV Diele - Meeden 1	Meeden
	380 kV Diele - Meeden 2	Meeden
	380 kV Dörpen West/Niederlangen – Meppen	Meppen
	380 kV Dörpen West – Hanekenfähr	Hanekenfähr
	380 kV Wehrendorf – Ohlensehlen	Wehrendorf
	380 kV Dettingen – Großkrotzenburg	Großkrotzenburg
	380 kV Urberach – Großkrotzenburg	Großkrotzenburg
	380 kV Bechterdissen – Gütersloh	Bechterdissen
	220 kV Gütersloh - Bielefeld Ost	Bielefeld Ost
	380 kV Nehden - Twistetal 3 (Twistetal Ost-3)	Nehden
	380 kV Nehden - Twistetal 4 (Twistetal West-4)	Twistetal
	380 kV Dauersberg – Aßlar (Westerwald West 1)	Aßlar
	380 kV Dauersberg – Dillenburg (Westerwald Ost 2)	Dillenburg
	380 kV Kriftel - Frankfurt SW/Karben	Kriftel
	380 kV Meitingen – Oberbachern (Oberbachern S 420)	Meitingen
	380 kV Meitingen – Oberbachern (Oberbachern N 419)	Meitingen
	380 kV Grafenrheinfeld - Höpfingen 411 (Tauber)	Grafenrheinfeld
	380 kV Grafenrheinfeld - Stalldorf 416 (rot)	Grafenrheinfeld
400 kV Hradec - Etzenricht	Etzenricht	
400 kV Prestice - Etzenricht	Etzenricht	

Monitoring Area TTG	380 kV Redwitz – Remptendorf 413	Remptendorf
	380 kV Redwitz - Remptendorf 414	Remptendorf
	380 kV Helmstedt - Wolmirstedt 491 - 1	Helmstedt
	380 kV Helmstedt - Wolmirstedt 492 - 2	Helmstedt
	380 kV Mecklar - Vieselbach 449 - 1	Mecklar
	380 kV Mecklar - Eisenach 450 - 2	Mecklar
	380 kV Brunsbüttel 949	Brunsbüttel
	380 kV Krümmel 993	Krümmel
	380 kV Krümmel 994	Krümmel
	380 kV Dollern Hamburg Süd 981	Dollern
	380 kV Dollern Hamburg Süd 982	Dollern
	220 kV HAN - HH Nord Grün	Hamburg Nord
	220 kV HAN - HH Nord Rot	Hamburg Nord
	380 kV Altenfeld - Redwitz 459	Altenfeld
	380 kV Altenfeld - Redwitz 460	Altenfeld
	220 kV St. Peter - Simbach	Sankt Peter
	220 kV St. Peter - Altheim	Sankt Peter
	220 kV St. Peter - Pirach	Sankt Peter
	220 kV St. Peter - Pleinting	Sankt Peter
	110 kV Ranna – Hauzenberg/Passau (156/1)	Ranna
	110 kV Braunau - Neuötting	Braunau
	110 kV Braunau - Stammham	Braunau
	110 kV Ering - St. Peter (182/5)	Ering
	110 kV Ering - St. Peter (182/6)	Ering
	110 kV Egglfing - Antiesenhofen (188/3b)	Egglfing
	110 kV Egglfing - St. Peter (188/5)	Egglfing
	110 kV Passau-Ingling - Aigerding (188/1)	Passau - Ingling
	220 kV Silz - Oberbrunn 250	Silz
	220 kV Silz - Oberbrunn 251	Silz
	110 kV Oberaudorf - Ebbs (176/7)	Oberaudorf

Monitoring Area TTG		
LFC Block REE	110 kV Oberaudorf - Kufstein (176/6)	Oberaudorf
	220 kV Arkale-Argia	On the border
	220 kV Biescas-Pragneres	On the border
	400 kV Hernani-Argia	On the border
	400 kV Vic-Baixas	On the border
	400 kV Santa Llogaia-Baixas 1	On the border
	400 kV Santa Llogaia-Baixas 2	On the border
	150 kV Benos-LacDoo	On the border
	132 kV Irún-Errondena	On the border
	220 kV Aldeadavila-Pocinho 2	Aldeadavila
	220 kV Aldeadavila-Pocinho 1	Aldeadavila
	400 kV Brovales-Alqueva	On the border
	400 kV Cartelle-Lindoso 1	Lindoso
	400 kV Cartelle-Lindoso 2	Lindoso
	400 kV Cedillo-Falagueira	Cedillo
	220 kV Saucelle-Pocinho	Saucelle
	400 kV Aldeadavila-Lagoaça	Aldeadavila
	400 kV Puebla De Guzmán-Tavira	On the border
132 kV Conchas-Lindoso	Conchas	
LFC Block ELIA	400 kV Zandvliet – Borssele	Zandvliet
	400 kV Zandvliet – Geertruidenberg	Zandvliet
	400 kV Van Eyck – Maasbracht 1	Maasbracht
	400 kV Van Eyck – Maasbracht 2	Maasbracht
	220 kV Schifflange PST - Schifflange	On the LFC Block border
	400 kV Achêne – Lonny	On the border
	400 kV Avelgem – Avelin	On the border
	400 kV Avelgem – Mastaing	On the border
	220 kV Aubange – Mont Saint-Martin	On the border
	220kV Aubange - Moulaine	On the border
	220 kV Monceau - Chooz	On the border

LFC Block ELIA	63 kV Momignies – Fourmies 1	On the border
	63 kV Momignies - Fourmies 2	On the border
LFC Area ELES	400 kV Kainachtal - Maribor 1	On the border
	400 kV Kainachtal - Maribor 2	On the border
	220 kV Obersielach – Podlog	On the border
	400 kV Melina – Divaca	On the border
	220 kV Pehlin – Divaca	On the border
	400 kV Tumbri - Krsko 1	On the border
	400 kV Tumbri - Krsko 2	On the border
	220 kV Zerjavinec – Cirkovce	On the border
	110 kV Buje – Koper	On the border
	110 kV Matulji - Ilirska Bistrica	On the border
	110 kV Nedeljanec – Formin	On the border
	220 kV Padriciano – Divaca	On the border
	400 kV Redipuglia – Divaca	On the border
LFC Area HOPS	220 kV Gradacac - Dakovo	On the border
	400 kV Mostar - Konjsko	On the border
	220 kV Mostar - Zakucac	On the border
	220 kV Prijedor - Meduric	On the border
	220 kV Tuzla - Dakovo	On the border
	400 kV Ugljevik - Ernestinovo	On the border
	220 kV Prijedor - Sisak	On the border
	220 kV Trebinje - Plat 1	On the border
	110 kV Trebinje - Komolac	On the border
	110 kV Grahovo - Knin	On the border
	110 kV Orašje - Županja	On the border
	110 kV Livno - Buško Blato	On the border
	110 kV Grude - Imotski	On the border
	110 kV Čapljina - Opuzen	On the border
110 kV Neum - Ston	On the border	

LFC Area HOPS	110 kV Neum - Opuzen	On the border
	110 kV Kulen Vakuf - Gračac	On the border
	110 kV Bosanski Brod - Slavonski Brod	On the border
	110 kV Ljubuški - Vrgorac	On the border
	400 kV Zerjavinec - Heviz 1	On the border
	400 kV Zerjavinec - Heviz 2	On the border
	400 kV Pecs - Ernestinovo 1	On the border
	400 kV Pecs - Ernestinovo 2	On the border
	110 kV Beli Manastir - Apatin	On the border
	110 kV Nijemci - Sid	On the border
	400 kV Melina - Divaca	On the border
	220 kV Pehlin - Divaca	On the border
	400 kV Tumbri - Krsko 1	On the border
	400 kV Tumbri - Krsko 2	On the border
	220 kV Zerjavinec - Cirkovce	On the border
	110 kV Buje - Koper	On the border
	110 kV Matulji - Ilirska Bistrica	On the border
110 kV Nedeljanec - Formin	On the border	
400 kV Ernestinovo - Sremska Mitrovica	On the border	
LFC Area 50HZT	380 kV Bentwisch – Bjaewerskov (KONTEK)	Bentwisch
	380 kV Hamburg Nord – Kummerfeld	Hamburg Nord
	380kV Hamburg Nord – Audorf	Hamburg Nord
	380 kV Brunsbüttel – Brunsbüttel TTG	Brunsbüttel TTG
	380 kV Hamburg Nord - Brunsbüttel TTG (Brunsbüttel)	Brunsbüttel TTG
	380 kV Hamburg Nord - Brunsbüttel TTG (Brunsbüttel)	Brunsbüttel TTG
	380 kV Hamburg Süd – Dollern	Dollern
	380 kV Hamburg Süd – Dollern	Dollern
	380 kV Krümmel – Krümmel TTG	Krümmel TTG
	380 kV Krümmel – Krümmel TTG	Krümmel TTG
	220 kV Hamburg Nord – Hamburg Nord TTG	Hamburg Nord

LFC Area 50HZT	220 kV Hamburg Nord – Hamburg Nord TTG	Hamburg Nord
	110 kV Wedel – Wedel Mitte	Wedel
	380 kV Wolmirstedt – Helmstedt	Helmstedt
	380 kV Wolmirstedt – Helmstedt	Helmstedt
	110 kV Sommersdorf – Helmstedt	Helmstedt
	110 kV Sommersdorf – Helmstedt	Helmstedt
	380 kV Vieselbach – Mecklar	Mecklar
	380 kV Eisenach – Mecklar	Mecklar
	380 kV Altenfeld – Redwitz	Altenfeld
	380 kV Altenfeld – Redwitz	Altenfeld
	380 kV Remptendorf – Redwitz	Remptendorf
	380 kV Remptendorf - Redwitz - Würgau	Remptendorf
	380 kV Röhrsdorf – Hradec	Hradec
	380 kV Röhrsdorf – Hradec	Hradec
	380 kV Hagenwerder – Mikulowa	Hagenwerder
	380 kV Hagenwerder – Mikulowa	Hagenwerder
380 kV Vierraden – Krajnik	Vierraden	
380 kV Vierraden – Krajnik	Vierraden	
LFC Block REN	400 kV Alqueva-Brovaes	On the border
	400 kV Falagueira-Cedillo	Cedillo
	220 kV Lagoaca-Aldeadavila	Aldeadavila
	400 kV Lindoso-Cartelle 1	Lindoso
	400 kV Lindoso-Cartelle 2	Lindoso
	132 kV Lindoso-Conchas	Conchas
	220 kV Pocinho-Aldeadavila 1	Aldeadavila
	220 kV Pocinho-Aldeadavila 2	Aldeadavila
	220 kV Pocinho-Saucelle	Saucelle
	400 kV Tavira-Puebla de Guzman	On the border
Monitoring Area AMP	110 kV Weiler – Zell	Weiler
	220 kV Vöhringen – Werben	Werben

Monitoring Area AMP	220 kV Tiengen/Hoheneck - Werben	Werben
	380 kV Westtirol - Leupholz	Westtirol
	220 kV Westtirol - Memmingen	Westtirol
	220 kV Tiengen – Beznau (Aare Ost)	Tiengen
	380 kV Tiengen – Beznau (Aare West)	Tiengen
	380 kV Laufenburg - Kühmoos	Laufenburg
	380 kV Laufenburg - Tiengen	Laufenburg
	380 kV Gronau - Hengelo 1	Hengelo
	380 kV Gronau - Hengelo 2	Hengelo
	400 kV Oberzier - Maasbracht	Maasbracht
	380 kV Siersdorf - Maasbracht	Maasbracht
	220 kV Enseldorf - St.Avold	On the border
	400 kV Enseldorf – Vigy 1	On the border
	400 kV Enseldorf – Vigy 2	On the border
	220 kV Bürs - Vöhringen	Bürs
	380 kV Daxlanden - Kühmoos	Daxlanden
	380 kV Daxlanden - Kühmoos	Kühmoos
	220 kV Daxlanden - Maximiliansau	Daxlanden
	380 kV Daxlanden - Weingarten	Daxlanden
	380 kV Dellmensingen - Vöhringen	Dellmensingen
	380 kV Dellmensingen - Vöhringen/Hoheneck	Dellmensingen
	380 kV Großgartach Trafo 414	Großgartach
	380 kV Herbertingen/Metzingen - Hoheneck	Herbertingen/Metzingen
	380 kV Herbertingen - Tiengen	Herbertingen
	220 kV Kühmoos - Tiengen	Kühmoos
	380 kV Pulverdingen - Hoheneck	Hoheneck
	220 kV Rheinau - Rheinau (Trafo 23)	Rheinau
	220 kV Tiengen - Gurtweil	Gurtweil
	220 kV Tiengen/Hoheneck - Bürs	Bürs
	380 kV Aßlar – Dauersberg	Aßlar

Monitoring Area AMP	380 kV Bechterdissen - Gütersloh	Bechterdissen
	220 kV Bielefeld Ost - Gütersloh/Hesseln/Lüstringen	Bielefeld Ost
	380 kV Dillenburg - Dauersberg	Dillenburg
	380 kV Hanekenfähr – Dörpen West	Hanekenfähr
	380 kV Kriftel - Frankfurt SW/Karben	Kriftel
	380 kV Großkrotzenburg - Dettingen	Großkrotzenburg
	380 kV Großkrotzenburg - Urberach	Großkrotzenburg
	380 kV Ohlensehlen - Wehrendorf	Wehrendorf
	380 kV Meppen - Dörpen West/Niederlangen	Meppen
	380 kV Oberbachern – Meitingen (Oberbachern S 420)	Meitingen
	380 kV Oberbachern – Meitingen (Oberbachern N 419)	Meitingen
	380 kV Twistetal – Nehden 3	Nehden
	380 kV Twistetal – Nehden 4	Twistetal
	220 kV Trier - Blooren	On the border
	220 kV Quint - Heisdorf	On the border
	220 kV Bauler - Roost	On the border
220 kV Bauler - Flébour	On the border	
LFC Area PSE	400 kV Mikulowa - Hagenwerder	Hagenwerder
	400 kV Mikulowa - Hagenwerder	Hagenwerder
	400 kV Krajnik - Vierraden	Vierraden
	400 kV Krajnik – Vierraden	Vierraden
	400 kV Dobrzen – Albrechtice	Albrechtice
	400 kV Wielopole – Nosovice	Wielopole
	220 kV Bujakow – Liskovec	Liskovec
	220 kV Kopanina – Liskovec	Liskovec
	400 kV Krosno Iskrzynia – Lemesany (1.line)	Krosno Iskrzynia (1.line)
	400 kV Krosno Iskrzynia – Lemesany (2.line)	Krosno Iskrzynia (2.line)
LFC Block PSE	400 kV Velke Kapusany – Mukachevo	Velke Kapusany
	750 kV Albertirsa - ZahidnoUkrainska	Albertirsa

LFC Block PSE	400 kV Sajószöged - Mukachevo	Mukachevo
	220 kV Kisvárda - Mukachevo	Kisvárda
	220 kV Tiszalök - Mukachevo	Tiszalök
	400 kV Rosiori – Mukachevo	On the Border
LFC Block SEPS	400 kV Gabcikovo – Gyor	Gabcikovo
	400 kV Levice – God	God
	400 kV Velke Kapusany – Mukachevo	Velke Kapusany
	400 kV Lemesany – Krosno Iskrz (1.line)	Krosno Iskrzynia (1.line)
	400 kV Lemesany – Krosno Iskrz (2.line)	Krosno Iskrzynia (2.line)
	400 kV Varin – Nosovice	Varin
	400 kV Krizovany – Sokolnice	Sokolnice
	400 kV Stupava – Sokolnice	Sokolnice
	220 kV Povazska Bystrica – Liskovec	Povazska Bystrica
	220 kV Senica – Sokolnice	Senica
Monitoring Area CREOS	220 kV Schifflange – Schifflange PST	On the control area border
	220 kV Blooren – Trier	On the border
	220 kV Heisdorf – Quint	On the border
	220 kV Roost – Bauler	On the border
	220 kV Flébour – Bauler	On the border
LFC Area TNG	220 kV Bürs - Vöhringen (Dellmensingen Ost)	Bürs
	380 kV Daxlanden - Kühmoos (Rheingraben)	Daxlanden
	380 kV Daxlanden - Kühmoos (Rheingraben)	Kühmoos
	220 kV Daxlanden - Maximiliansau (Goldgrund)	Daxlanden
	380 kV Daxlanden - Weingarten (Germesheim Süd)	Daxlanden
	380 kV Dellmensingen - Vöhringen (Donau West)	Dellmensingen
	380 kV Dellmensingen - Vöhringen/Hoheneck (Donau Ost)	Dellmensingen
	380 kV Großgartach - Großgartach (Trafo 414)	Großgartach
	380 kV Herbertingen/Metzingen - Hoheneck (Herbertingen West)	Herbertingen/Metzingen

LFC Area TNG	380 kV Herbertingen - Tiengen (Tiegen Nord)	Herbertingen
	220 kV Kühmoos - Tiengen (Kühmoos)	Kühmoos
	380 kV Laufenburg - Kühmoos (Seelbach)	Laufenburg
	380 kV Pulverdingen - Hoheneck	Hoheneck
	220 kV Rheinau - Rheinau (Trafo 23)	Rheinau
	220 kV Bürs - Tiengen/Hoheneck	Bürs
	220 kV Gurtweil - Tiengen	Gurtweil
	220 kV Westtirol - Bürs (weiß)	Bürs
	400 kV Westtirol - Bürs (rot)	Bürs
	110 kV Bürs - Rauz Süd (179/9)	Rauz
	110kV Bürs - St Jakob Nord (172/8)	Bürs
	20 kV Summe Kops - TIWAG (Paznaun)	Kops
	220 kV Bürs - Meiningen (406A)	Bürs
	220 kV Bürs - Walgau (405A)	Bürs
	110 kV Bürs - Nenzing (197/2)	Bürs
	110 kV Bürs - Bürs VKW (rot 197/10)	Bürs
	20 kV Bürs - Vorarlberger Netz (Summe Bürs VKW 20 kV)	Bürs
	110 kV Tschagguns Trafo1	Tschagguns
	110 kV Tschagguns Trafo2	Tschagguns
	110 kV Wangen - Biesenberg (Biesenberg)	Biesenberg
	380 kV, Grafenrheinfeld - Höpfingen (Tauber 411)	Grafenrheinfeld
	380 kV, Grafenrheinfeld - Stalldorf (rot 416)	Grafenrheinfeld
	400 kV Asphard - Sierentz (Wiesental Süd)	Sierentz
	400 kV Eichstetten - Muhlbach	Muhlbach
	220 kV Eichstetten - Vogelgrun	Vogelgrün
	380 kV Kühmoos - Asphard (Wehra)	Asphard
	400 kV Sierentz - Asphard (Wiesental Süd)	Asphard
	220 kV Laufenburg - Laufenburg (Trafo 20)	Laufenburg
	220 kV Gurtweil - Laufenburg (Alb Nord)	Laufenburg
	220 kV Gurtweil - Laufenburg (Alb Süd)	Laufenburg

LFC Area TNG	380 kV Trossingen - Laufenburg (Wutach)	Laufenburg
	380 kV Kühmoos - Laufenburg (Heimbach)	Laufenburg
	380 kV Kühmoos - Laufenburg (Murg)	Laufenburg
	220 kV Kühmoos - Laufenburg/Lindenholz (Eggberg)	Laufenburg
	220 kV Kühmoos - Laufenburg (Hotzenwald)	Laufenburg
Monitoring Area EN	380kV Kassø1 – Jardelund 1	Jardelund
	380kV Kassø2 – Jardelund 2	Jardelund
	220kV Kasso- Flensburg	Kassø
	220kV Ensted- Flensburg	Enstedvaerket
	150kV Tjele-Kristiansand SK1	On the Border
	150kV Tjele-Kristiansand SK2	On the Border
	400kV Tjele-Kristiansand SK3	On the Border
	400kV Tjele-Kristiansand SK4	On the Border
	400KV Vester Hassing - Lindome KS1	Vester Hassing
	400KV Vester Hassing - Lindome KS2	Vester Hassing
400kV Fraugde-Herslev	Fraugde	
LFC Block APG	400 kV Kainachtal - Maribor 1	On the Border
	400 kV Kainachtal - Maribor 2	On the Border
	220 kV Obersielach - Podlog	On the Border
	220 kV Sokolnice - Bisamberg (243)	Bisamberg
	220 kV Sokolnice - Bisamberg (244)	Bisamberg
	400 kV Slavetice - Dürnrrohr (437)	Dürnrrohr
	400 kV Slavetice - Dürnrrohr (438)	Slavetice
	400 kV Westtirol - Pradella (428)	On the Border
	400 kV Westtirol - Pradella (427)	On the Border
	220 kV Meiningen - Rüthi (407)	Meiningen
	220 kV Meiningen - Rüthi (408)	Meiningen
	110 kV Eschen - Feldkirch (197/11)	Eschen
	220 kV Lienz - Soverzene	On the border
	132 kV Greuth - Tarvisio	Greuth

LFC Block APG	220 kV Westtirol - Memmingen	Westtirol
	400 kV Westtirol - Leupolz	Westtirol
	220 kV Tiengen/Hoheneck - Werben (403A)	Werben
	220 kV Vöhringen - Werben (404A)	Werben
	110 kV Weiler - Zell	Weiler
	220 kV Westtirol - Bürs (weiß)	Bürs
	400 kV Westtirol - Bürs (rot)	Bürs
	110 kV Bürs - Rauz Süd (172/9)	Bürs
	110 kV Bürs - St. Jakob Nord (172/8)	Bürs
	20 kV Summe Kops - TIWAG (Paznaun)	Kops
	220 kV Bürs - Meiningen (406A)	Bürs
	220 kV Bürs - Walgau (405A)	Bürs
	110 kV Bürs - Nenzing (197/2)	Bürs
	110 kV Bürs-VKW rot (197/10)	Bürs
	20 kV Summe Bürs	Bürs
	110 kV Tschagguns Trafo1	Tschagguns
	110 kV Tschagguns Trafo2	Tschagguns
	110 kV Biesenberg	Biesenberg
	220 kV St. Peter - Simbach	St. Peter
	220 kV St. Peter - Altheim	St. Peter
	220 kV St. Peter - Pirach	St. Peter
	220 kV St. Peter - Pleinting	St. Peter
	110 kV Ranna - Hauzenbg./Passau (156/1)	Ranna
	110 kV Braunau - Neuötting	Braunau
	110 kV Braunau - Stammham	Braunau
	110 kV Ering - St. Peter (182/5)	Ering
	110 kV Ering - St. Peter (182/6)	Ering
	110 kV Egglfing - Antiesenhofen (188/3B)	Egglfing
	110 kV Egglfing - St. Peter (188/5)	Egglfing
	110 kV Passau-Ingling - Aigerding (188/1)	Passau - Ingling

LFC Block APG	110 kV Oberaudorf - Kufstein (176/6)	Oberaudorf
	110 kV Oberaudorf - Ebbs (176/7)	Oberaudorf
	220 kV Westtirol-Silz (274E)	Silz
	220 kV Westtirol-Silz (413)	Silz
	220 kV Westtirol-Silz (414)	Silz
	220 kV Silz-Thaur/Vill (273C)	Silz
	220 kV Silz-Thaur/Vill (274C)	Silz
	220 kV Wien-Südost - Gyor	Gyor
	220 kV Neusiedl - Gyor	Neusiedl
	400 kV Zurndorf - Gyor	Gyor
	400 kV Zurndorf - Szombathely	Zurndorf
LFC Block IPTO	400 kV Thessaloniki – Blagoevgrad	On the Border
	400 kV Thessaloniki – Dubrovo	On the Border
	400 kV Meliti – Bitola	On the Border
	400 kV Arachthos-Galatina	¼ of the length of the cable from Arachthos
	400 kV Nea Santa – Babaeski	On the Border
	400 kV Kardia – Zemblak	On the Border
	154 kV Mourtos – Bistrica	On the Border
LFC Block TEL	400 kV Rahman-Dobrudja	On the Border
	400 kV Stupina -Varna	On the Border
	400 kV Tantareni-Koslodui 1	On the Border
	400 kV Tantareni-Koslodui 2	On the Border
	400 kV Rosiori-Mukacevo	On the Border
	400 kV Portile de Fier-Djerdap	On the Border
	(400 kV Resita-Pancevo)	not in operation yet, will be in the next future
	110 kV Ostrovul Mare-Kusjac	On the Border
	110 kV Jimbolia-Kikinda	On the Border
	110 kV Gura Vaii-Sip	On the Border

LFC Block TEL	400 kV Arad-Sandorfalva	Arad
	400 kV Nadab-Bekescsaba	Bekescsaba
	400 kV Isaccea-Vulcanesti	On the Border
	110 kV Stanca-Costesti	On the Border
	110 kV Husi-Cioara	On the Border
	110 kV Tutora-Ungheni	On the Border
LFC Block TEIAS	400 kV Hamitabat - Maritsa 3	On the Border
	400 kV Hamitabat - Maritsa 3	On the Border
	400 kV Babaeski - Nea Santa	On the Border
LFC Block OST	400 kV Zemblak - Kardia	On the Border
	400 kV Tirana2 - Podgorica2	On the Border
	400 kV Tirana2 - KosovaB	On the Border
	220 kV Fierza - Prizren	On the Border
	220 kV Koplik - Podgorica1	On the Border
	154 kV Bistrice - Mourtos	On the Border
LFC Block MAVIR	400 kV Gyor - Gabcikovo	Gabcikovo
	400 kV Göd - Levice	God
	400 kV Gyor - Zurndorf	Gyor
	400 kV Szombathely - Zurndorf	Zurndorf
	220 kV Gyor - Wien Südost	Gyor
	220 kV Gyor - Neusiedl	Neusiedl
	400 kV Sandorfalva - Subotica	On the border
	400 kV Sandorfalva - Arad	Arad
	400 kV Bekescsaba - Nadab	Bekescsaba
	750 kV Albertirsa - ZahidnoUkrainska	Albertirsa
	400 kV Sajószöged - Mukachevo	Mukachevo
	220 kV Kisvárda - Mukachevo	Kisvárda
	220 kV Tiszalök - Mukachevo	Tiszalök
	400 kV Heviz - Zerjavinec 1	On the Border
	400 kV Heviz - Zerjavinec 2	On the Border

LFC Block MAVIR	400 kV Pecs - Ernestinovo 1	On the Border
	400 kV Pecs - Ernestinovo 2	On the Border
	120 kV Lenti - Nedeljenac	Lenti / under establishment
	120 kV Siklós - Donji Miholjac	Siklós / under establishment
Monitoring Area NOS	400 kV Mostar - Konjsko	On the Border
	400 kV Ugljevik - Ernestinovo	On the Border
	400 kV Trebinje - Podgorica	On the Border
	400 kV Ugljevik – S. Mitrovica	On the Border
	220 kV Sarajevo 20-Piva	On the Border
	220 kV Trebinje-Perucica	On the Border
	220 kV Visegrad-Vardiste	On the Border
	220 kV Tuzla-Dakovo	On the Border
	220 kV Gradacac-Dakovo	On the Border
	220 kV Prijedor-Medjuric	On the Border
	220 kV Prijedor-Sisak	On the Border
	220 kV Mostar-Zakucac	On the Border
	220 kV Trebinje-Dubrovnik	On the Border
	220 kV Trebinje-Dubrovnik2	On the Border
	110 kV B.Grahovo - EVP L. D. Polje	On the Border
	110 kV B.Grahovo - Strmica	On the Border
	110 kV Janja - Lesnica	On the Border
	110 kV Bileća - Nikšić	On the Border
	110 kV Višegrad - (HE Potpeć - Pljevlja)	On the Border
	110 kV Čapljina - Opuzen	On the Border
110 kV Drvar - EVP L.D.Polje	On the Border	
110 kV EVP Kulen Vakuf - D. Lapac (Gracac)	On the Border	
110 kV Grude - Imotski	On the Border	
110 kV Livno - Busko Blato (Podgradina)	NOSBiH	
110 kV Ljubuški - Vrgorac	On the Border	

LFC Block MAVIR	110 kV Neum - Opuzen	On the Border
	110 kV Neum - Ston	On the Border
	110 kV Trebinje - Herceg Novi	On the Border
	110 kV Trebinje - Komolac	On the Border
	110 kV Orašje - Županja	On the Border
LFC Block ESO	400 kV Blagoevgrad -Thessaloniki	On the Border
	110 kV Breznik - He Vrla	On the Border
	400 kV Chervena Mogila - Stip	On the Border
	400 kV Koslodui – Tintareni 1	On the Border
	400 kV Koslodui – Tintareni 2	On the Border
	110 kV Kula - Zajecar	On the Border
	400 kV Maritsa 3 - Hamitabat 1	On the Border
	400 kV Maritsa 3 - Hamitabat 2	On the Border
	110 kV Skakavica - Palanka	On the Border
	400 kV Dobruja - Rahman	On the Border
	400 kV Sofia Zapad - Nis	On the Border
	400 kV VARNA - STUPINA	On the Border
	110 kV Petric - Susica	On the Border
400 kV Kozlodui - Tintareni1	On the Border	
LFC Block TTB	DC NorNed	Eemshaven
	DC BritNed	Maasvlakte
	380 kV Meeden – Diele 1	Meeden
	380 kV Meeden – Diele 2	Meeden
	380 kV Hengelo – Gronau 1	Hengelo
	380 kV Hengelo - Gronau 2	Hengelo
	380 kV Maasbracht - Siersdorf	Maasbracht
	400 kV Maasbracht - Oberzier	Maasbracht
	400 kV Maasbracht - Van Eyck 1	Maasbracht
	400 kV Maasbracht - Van Eyck 2	Maasbracht
	400 kV Geertruidenberg - Zandvliet	Zandvliet

LFC Block TTB	400 kV Borssele - Zandvliet	Zandvliet
	400 kV Doetinchem - Niederrhein 1	Niederrhein (will be ready in the near future)
	400 kV Doetinchem – Niederrhein 2	Niederrhein (will be ready in the near future)
LFC Block RTE	400 kV Avelin – Avelgem	On the Border
	400 kV Lonny – Achêne	On the Border
	400 kV Mastaing - Avelgem	On the Border
	220 kV Chooz – Monceau	On the Border
	220 kV Mont Saint-Martin – Aubange	On the Border
	220kV Moulaine – Aubange	On the Border
	63 kV Fourmies – Momignies 1	On the Border
	63 kV Fourmies – Momignies 2	On the Border
	400 kV Vigy – Ensdorf 1	On the Border
	400 kV Vigy – Ensdorf 2	On the Border
	220 kV St Avold – Ensdorf	On the Border
	400 kV Sierentz (Wiesental Süd) – Asphard	Sierentz
	400 kV Muhlbach – Eichstetten	Muhlbach
	220 kV Vogelgrun - Eichstetten	Vogelgrun
	400 kV Bois Tollot – Romanel	On the Border
	400 kV Bois Tollot – Verbois	On the Border
	400 kV Sierentz – Laufenbourg	On the Border
	400 kV Sierentz – Bassecourt	On the Border
	400 kV Mambelin – Bassecourt	On the Border
	225 kV Génissiat-Verbois 1	On the Border
225 kV Génissiat-Verbois 2	On the Border	
225 kV Cornier-Riddes	On the Border	
225 kV Cornier-St Triphon	On the Border	
225 kV Pressy - Vallorcine	Vallorcine	

LFC Block RTE	400 kV Albertville - Rondissone 1	On the Border
	400 kV Albertville - Rondissone 2	On the Border
	400 kV Villarodin – Venaus	On the Border
	220 kV Trinité Victor / Menton - Camporosso	Camporosso
	400 kV Argia – Hernani	On the Border
	400 kV Baixas – Vic	On the Border
	400 kV Baixas – Santa LLogaia 1	On the Border
	400 kV Baixas – Santa LLogaia 2	On the Border
	220 kV Argia – Arkale	On the Border
	220 kV Pragnères – Biescas	On the Border
	150 kV Lac d’oo – Benos	On the Border
	132 kV Errondenia – Irun	On the Border
	400 kV Madarins – Sellindge 1	Mid-channel
	400 kV Madarins – Sellindge 1	Mid-channel
LFC Block ČEPS	400 kV Hradec – Röhrsdorf 1 (445)	Hradec
	400 kV Hradec – Röhrsdorf 2 (446)	Hradec
	400 kV Hradec - Etzenricht (441)	Etzenricht
	400 kV Prestice – Etzenricht (442)	Etzenricht
	400 kV Slavetice - Dürnrohr (437)	Dürnrohr
	400 kV Slavetice - Dürnrohr (438)	Slavetice
	220 kV Sokolnice - Bisamberg (243)	Bisamberg
	220 kV Sokolnice - Bisamberg (244)	Bisamberg
	400 kV Nošovice - Varin (404)	Varin
	400 kV Sokolnice - Krizovany (424)	Sokolnice
	400 kV Sokolnice - Stupava (497)	Sokolnice
	220 kV Liskovec - Povazska Bystrica (270)	Povazska Bystrica
	220 kV Sokolnice – Senica (280)	Senica
	400 kV Albrechtice – Dobrzen (443)	Albrechtice
	400 kV Nosovice – Wielopole (444)	Wielopole
220 kV Liskovec – Bujakow (245)	Liskovec	

LFC Block ČEPS	220 kV Liskovec – Kopanina (246)	Liskovec
LFC Block SG	400 kV Westtirol-Pradella 1 (Inn Nord)	On the Border
	400 kV Westtirol-Pradella 2 (Inn Süd)	On the Border
	220 kV Meiningen-Rüthi (Falknis)	Meiningen
	220 kV Meiningen-Rüthi (Stoss Süd)	Meiningen
	110 kV Feldkirch-Eschen	Eschen
	380 kV Asphard-Kühmoos (Wehra)	Asphard
	380 kV Beznau-Tiengen (Aare West)	Tiengen
	220 kV Beznau-Tiengen (Aare Ost)	Tiengen
	380 kV Laufenburg-Trossingen (Wutach)	Laufenburg
	220 kV Laufenburg-Gurtweil (Alb Nord)	Laufenburg
	220 kV Laufenburg-Gurtweil (Alb Süd)	Laufenburg
	380 kV Laufenburg-Kühmoos (Heimbach)	Laufenburg
	380 kV Laufenburg-Kühmoos (Seelbach)	Laufenburg
	380 kV Laufenburg-Kühmoos (Murg)	Laufenburg
	220 kV Laufenburg-Kühmoos (Eggberg)	Laufenburg
	220 kV Laufenburg-Kühmoos (Hotzenwald)	Laufenburg
	380 kV Laufenburg-Tiengen (Andelsbach)	Laufenburg
	380 kV Wiesental Sued (Wiesental Süd)	Asphard
	220 kV Laufenburg Trafo 20	Laufenburg
	400 kV Bassecourt-Mambelin	On the Border
	400 kV Bassecourt-Sierentz	On the Border
	400 kV Bois-Tollot Romanel	On the Border
	400 kV Laufenburg-Sierentz (Wiesental Nord)	On the Border
	225 kV Riddes-Cornier (Morgins Süd)	On the Border
	225 kV Saint-Triphon - Cornier (Morgins Nord)	On the Border
	225 kV Vallorcine - Pressy	Vallorcine
	400 kV Verbois - Bois Tollot	On the Border
	225 kV Verbois - Génissiat 1 (Verbois 1)	On the Border
	225 kV Verbois - Génissiat 2 (Verbois 2)	On the Border

LFC Block ČEPS	220 kV Airolo - Ponte	On the Border
	150 kV Campocologno -Tirano (Merchant Line)	On the Border
	220 kV Gorduno - Mese	On the Border
	380 kV Lavorgo - Musignano	On the Border
	220 kV Riddes - Avise	On the Border
	220 kV Riddes - Valpelline	On the Border
	380 kV Robbia - Gorlago	On the Border
	380 kV Robbia - San Fiorano	On the Border
	220 kV Serra - Pallanzeno	On the Border
	380 kV Soazza - Bulciago	On the Border
	132 kV Campocologno - Villa di Tirano	On the Border
	380 kV Cagno - Mendrisio (Merchant Line)	On the Border
LFC Block TERNA	220 kV Avise - Riddes	On the border
	220 kV Valpelline - Riddes	On the border
	220 kV Ponte – Airolo	On the border
	380 kV Musignano - Lavorgo	On the border
	380 kV Bulciago - Soazza	On the border
	220 kV Pallanzeno - Serra	On the border
	220 kV Mese - Gorduno	On the border
	380 kV Gorlago - Robbia	On the border
	380 kV San Fiorano - Robbia	On the border
	380 kV Cagno – Mendrisio (Merchant Line)	On the border
	132 kV Villa di Tirano - Campocologno	On the border
	150 kV Tirano - Campocologno (Merchant Line)	On the border
	400 kV Venaus - Villarodin	On the border
	400 kV Rondissone - Albertville 1	On the border
	400 kV Rondissone - Albertville 2	On the border
	220 kV Camporosso - Trinité Victor / Menton	Camporosso
	220 kV Soverzene - Lienz	On the border
132 kV Tarvisio - Greuth	Greuth	

LFC Block TERNA	400 kV Redipuglia - Divaca	On the border
	220 kV Padriciano - Divaca	On the border
	400 dc kV Galatina - Arachthos	¼ of the length of the cable from Arachthos
LFC Block SMM	400 kV Sandorfalva - Subotica	On the border
	400 kV Portile de Fier - Djerdap	On the border
	400 kV Pancevo 2 – Resita ck.1	On the border
	400 kV Pancevo 2 – Resita ck.2	On the border
	110 kV Ostrovul Mare – Kusjac	On the border
	110 kV Jimbolia – Kikinda	On the border
	110 kV Gura Vaini - Sip	On the border
	400 kV Sofia Zapad – Nis	On the border
	110 kV Susica - Petric	On the border
	110 kV Breznik – He Vrla	On the border
	400 kV Stip - Chervena Mogila	On the border
	110 kV Palanka - Skakavica	On the border
	400kV Bitola – Meliti	On the border
	400kV SS Dubrovo - Thessaloniki	On the border
	400 kV Kosovo B – Tirana 2	On the border
	220 kV Prizren – Fierza	On the border
	400 kV Podgorica 2 – Tirana	On the border
	220 kV Podgorica 1 – Kopljik	On the border
	110 kV Herceg Novi – Trebinje	On the border
	220 kV Perućica – Trebinje	On the border
	400 kV Podgorica 2 – Tebinje	On the border
110 kV Nikšić – Bileća	On the border	
220 kV Piva – Sarajevo	On the border	
400 kV Ugljevik – S. Mitrovica	On the border	
220 kV Visegrad – Vardiste	On the border	
110 kV Janja – Lesnica	On the border	

LFC Block SMM	110 kV Zvornik – He Zvornik	On the border
	110 kV Herceg Novi – Trebinje	On the border
	220 kV Perućica – Trebinje	On the border
	400 kV Podgorica 2 – Tebinje	On the border
	110 kV Nikšić – Bileća	On the border
	220 kV Piva – Sarajevo	On the border
	400 kV Ernestinovo – S. Mitrovica	On the border
	110 kV Beli Manastir – Apatin	On the border
	110 kV Nijemci - Sid	On the border

Table 2. List of interconnectors and Accounting Points

EXPLANATORY NOTE for the determination of LFC blocks proposal for Synchronous Area Continental Europe

The operation of Load-Frequency Control (LFC) processes is based on operational areas, where every area has their individual responsibilities with respect to the LFC structure. The superior structure is the synchronous area in which frequency is the same for the whole area. The synchronous area Continental Europe (CE) consists of several LFC Blocks, each LFC Block consists of one or more LFC Areas. An LFC Area itself consists of one or more Monitoring areas.

The above described hierarchy is illustrated in Figure 1. Each of these operational areas has their own obligations. A Monitoring Area has the obligation to calculate and measure the active power interchange in real-time in that area. A LFC Area has the additional obligation to fulfil the frequency restoration quality target parameters by using the frequency restoration process. A LFC Block is in addition responsible for the dimensioning of frequency restoration reserve (FRR) and replacement reserves (RR). The Synchronous Area has the obligation to fulfil the frequency quality target parameters by using the frequency containment process.

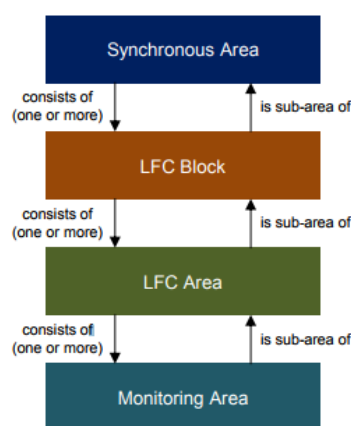


Figure 2. Types and hierarchy of areas operated by TSOs

According to the Article 141(2) of Commission Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation (hereafter referred to as “SO GL”), by 4 months after entry into force of this Regulation, all TSOs of a synchronous area shall jointly develop a common proposal regarding the determination of LFC blocks, which shall comply with the following requirements:

- a monitoring area corresponds to or is part of only one LFC area;
- a LFC area corresponds to or is part of only one LFC block;
- a LFC block corresponds to or is part of only one synchronous area; and
- each network element is part of only one monitoring area, only one LFC area and only one LFC block.

This proposal covers all the previous requirements, taking into account the load-frequency control structure in accordance with Article 139 of SO GL.

Finally, and according to the Article 6(3)(g), this proposal shall be subject to approval by all regulatory authorities of the Synchronous Area Continental Europe.