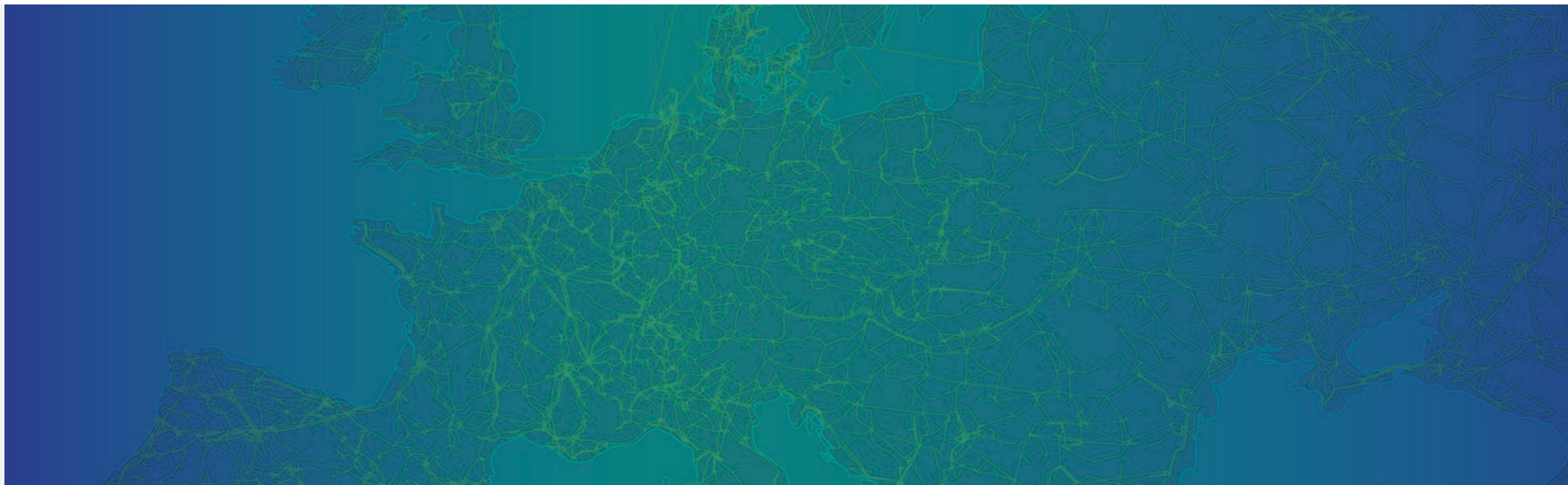


# System Operation Stakeholders Committee

Materials for meeting 16th September 2020



# 1.1 Review of the Agenda

Time	Agenda Topics	Documents	Lead
13:30-13:35	1. Opening		Uros Gabrijel
13:35-13:45	1.1 Review of the agenda	Agenda	
13:45-13:55	1.2 Review and approval of minutes from previous meeting	Minutes	
13:55-14:15	1.3 Review of actions	Slides	Ana Cigaran
	2. Update on the implementation actions at pan-EU level	Slides	Ana Cigaran
14:15-14:30	3. System Operation Guideline	Slides	
14:30-15:00	3.1 Cost Benefit Analysis for FCR providers by Limited Energy Reservoirs: Status update		Luca Ortolano
15:00-15:15	3.2 Information on Exchange\Sharing of reserves		Mohamed El Jafoufi
15:15-15:45	4. CGM Program Implementation Update		Derek Lawler
	5. NC ER Implementation update	Slides	Rafal Kuczynski
15:45-16:00	5.1 Update on TCM Status according to Art. 4.		
16:00-16:15	6. Information on Low frequency Pump disconnection & energy storage units		Rafal Kuczynski\Walter Sattinger
16:15-16:30	6.1 Why low frequency pump disconnection is triggered at different frequencies across Europe?		
	6.2 Outlook on the plans for the energy storage units		
	7. AOB - Next meeting 9 <sup>th</sup> December		Uros Gabrijel



# 1.3 Review of actions

Ana Cigaran

## 1.3 Review of actions (I)

ACTION	ANSWER	STATUS
1. Note for future SO GL active library to include pre-qualification process aFRR, mFRR, RR.	Preparation for SO GL Active Library is in good progress both for the Digital and content part.	Open
2. Pending questions concerning CGM related topics to be sent to ENTSO-E.	Topic 4 in today's Agenda	Close
3. GC ESC Expert Group on Pump Storage Hydro: Provide arguments why low frequency pump disconnection is triggered at different frequencies across Europe?	Topic 6.1 in today's Agenda	Close
4. National implementation of KORRR	Update to be provided Top 2	Open
5. ENTSO-E to provide an update about TCM status according to NCER Article	Topic 5.1 in today's Agenda	Open

## 1.3 Review of actions (II)

ACTION	ANSWER	STATUS
6. ENTSO-E to extend the topic of low frequency behaviour of PSH to all possible Storage devices and deliver an answer during SO ESC in September.	Topic 6.2 in today's Agenda	Open
7. Jean-Philippe (ENTSO-E) will write directly to Jean-Noel Marquette to clarify the pending question on CGM implementation.	Topic 4 in today's Agenda	Close
8. ENTSO-E will update the webinar slides in order for the answer on the cost assumptions of the CBA LER to be available for everybody.	Cost assumption information was already in ENTSO-E slides. No further feedback received from SmartEN.	Close
9. ENTSO-E to check the possibility of expanding the survey on exchanging/Sharing of reserves.	Topic 3.2 in today's Agenda	Open
10. Jonas Peter Hasselbom Jacobsen (ENTSO-E) agrees to get back to Jakub Fijalkowski (EC) with the answers to this question after having consulted the market experts on the impact of sharing and exchanging of the reserves on the cross-border capacities.	We leave this question as open until we present the results of the updated survey later this year.	Open
11. ACER to bring up the topics covered in the AOB during the meeting with the NRA on Friday 5th June.	Uros will give a verbal update on this action	Close
12. ENTSO-E will provide at next ESC SO meeting an updated overview of implementation status for E&R NC.	Topic 5 in today's Agenda	Close



## 2. Update on the Implementation Actions

Ana Cigaran

# Pan-European or regional deliverables 2020: SOGL

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## CSAm

Adopted by ACER on 21 June 2019, requests all TSOs to develop two amendments (Article 21 and 27) to this methodology within 18 months (ie by 21 December 2020) - [Public Consultation](#) is running from 13 August - 23 September 2020

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## Regional Proposals for CSA (Art 76-77)

In Q2 2020, NRAs provided their feedback on the submitted methodologies. The final versions of the methodologies are being dealt with by TSOs/NRAs/ACER.

# Pan-European deliverables 2020: CEP

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RCC Establishment  
proposals (Art 35  
ER)

The approval of the RCC establishment proposals by regulators of each SOR is expected by end of year.

Risk  
Preparedness

Risk Preparedness Regional Electricity Scenario Methodology approved by ACER on 6th March triggering a 6 month period to implement the methodology. A final report ranking the regional electricity crisis scenarios was established by 7th September 2020.

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# National Implementation

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## KORRR

The planning for KORRR National Implementation Workshop is postponed due to covid crisis. We will update as soon as possible when planning can be defined for an online Workshop Q4 2020 (tentative date).

## Operational Agreements

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All the Synchronous Area Operational Agreements are available on [Transparency platform](#).

Additionally ENTSO-E has taken actions to facilitate the (optional) publication of LFC data in the [Transparency Platform](#) the LFC Block Operational Agreements from Austria, Belgium, Germany, Spain, France, Hungary, Great Britain, Slovenia/Croatia/Bosnia i Herzegovina, Slovak Republic, Ireland/Northern Ireland and Nordic are available on the Platform.

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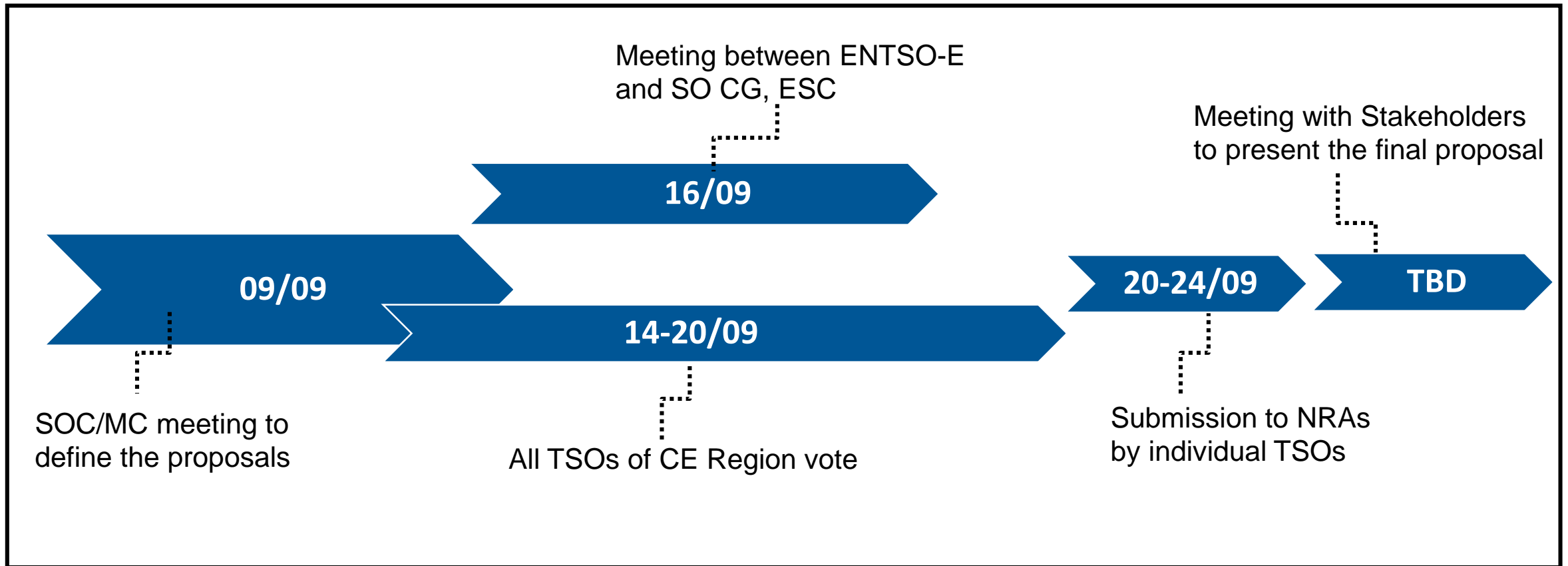
## 3. System Operation Guideline

### 3.1 Cost Benefit Analysis for FCR providers by Limited Energy Reservoirs: Status update

Luca Ortolano

# Next Steps

The following diagram shows a draft of the scheduled activities toward the conclusion of the process, also describing the foreseen Stakeholders involvement.





## **3. System Operation Guideline**

### **3.2 Information on Sharing/Exchange of reserves**

Jonas Peter Hasselbom Jacobsen

# Reserve sharing and exchange - Previous Survey Questions for LFC Blocks

- *Are there any agreements for exchange or sharing of reserves?*
- *If yes, is it exchange or is it sharing?*
- *Is it within a SA or between two SAs?*
- *What is the volume in MW and which direction?*
- *What is the timeframe of the contract, daily, weekly, monthly, yearly?*
- *If available, how are these reserves priced?*

**→ On the three following slides the overall result of the survey will be presented.**

# List of TSOs that answered the Survey

ENERGINET



nationalgrid

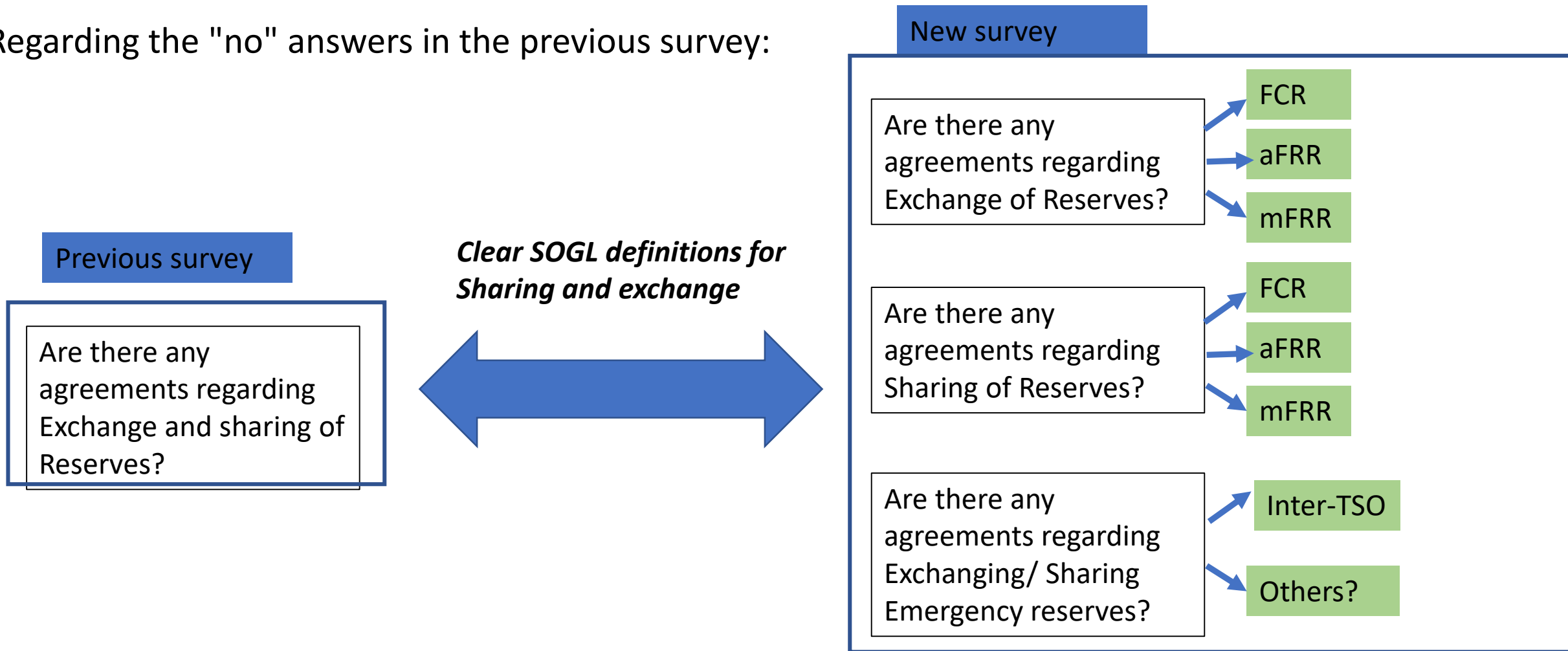


# Actions from the last SO ESC Meeting 03/06/2020

- **reach out to the TSOs who answered ‘no’ and ask the background of the answer**
- **agrees to update the slides presented with the references to the Art 3 of SOGL including the definitions for “exchange of reserves” and sharing of reserves”**

# Survey is extended in order to gather more data

Regarding the "no" answers in the previous survey:





# New sending to TSOs

- We will distribute the updated survey to All TSOs for them to answer again together with the clarifications below and a clear distinction between exchanged, shared and Emergency reserves
- The additional data will be collected in the coming weeks and the results will be presented at the next SO-ESC meeting.

‘exchange of reserves’ means the possibility of a TSO to access reserve capacity connected to another LFC area, LFC block, or synchronous area to fulfil its reserve requirements resulting from its own reserve dimensioning process of either FCR, FRR or RR and where **that reserve capacity is exclusively for that TSO, and is not taken into account by any other TSO** to fulfil its reserve requirements resulting from their respective reserve dimensioning processes;

‘sharing of reserves’ means a mechanism in which **more than one TSO takes the same reserve capacity, being FCR, FRR or RR, into account** to fulfil their respective reserve requirements resulting from their reserve dimensioning processes;

Emergency Exchanges: We consider to clearly remove them from the first two. This contains all reserves that can be used (bilateral contracts) in case of emergency situations or all kind of Inter-TSO.



# Top 4. CGM Program Implementation Update

Derek Lawler



## **Top 5. NC ER Implementation update**

### **5.1 Update on TCM Status according to Art. 4.**

Rafal Kuczynski

# Article 4(2) of NC ER – summary (status on 15.11.2019)

	Y	N	NA
Article 4(2)(a) – defence service provider - contract	7	9	14
Article 4(2)(b) – restoration service provider - contract	10	16	4
Article 4(2)(c) – list of SGUs and list of measures	13	12	5
Article 4(2)(d) – list of high priority SGUs	12	10	8
Article 4(2)(e) – suspension and restoration of market activities	11	19	0
Article 4(2)(f) – imbalance settlement	11	19	0
30 EU (TSOs)			
Y - approved by NRA			
N - submitted to NRA			
NA - not applicable			

# Article 4(2) of NC ER – summary (status on 15.02.2020)

	Y	N	NA
Article 4(2)(a) – defence service provider - contract	7	9	14
Article 4(2)(b) – restoration service provider - contract	11	15	4
Article 4(2)(c) – list of SGUs and list of measures	15	10	5
Article 4(2)(d) – list of high priority SGUs	14	8	8
Article 4(2)(e) – suspension and restoration of market activities	13	17	0
Article 4(2)(f) – imbalance settlement	13	17	0
Article 4(2)(g) – test plan – missed due to extraordinary situation	1	21	
30 EU (TSOs) – red colour new value compare to 15.11.2019			
Y - approved by NRA			
N - submitted to NRA			
NA - not applicable			

# Article 4(2) of NC ER – summary (status on 31.07.2020)

	Y	N	NA
Article 4(2)(a) – defence service provider - contract	8	7	15
Article 4(2)(b) – restoration service provider - contract	17	8	5
Article 4(2)(c) – list of SGUs and list of measures	17	8	5
Article 4(2)(d) – list of high priority SGUs	17	6	7
Article 4(2)(e) – suspension and restoration of market activities	14	16	0
Article 4(2)(f) – imbalance settlement	14	16	0
Article 4(2)(g) – test plan (Transelectrica, NGESO & IPTO missed)	11	14	2
30 EU (TSOs) – green colour new value compare to 15.02.2020			
Y - approved by NRA			
N - submitted to NRA			
NA - not applicable			

# Article 4(2) of NC ER – details (1)

	<b>Article 4(2)(a) – defence service provider - contract</b>
Approved by NRA	AT (APG), BG (ESO), CZ (CEPS), EE (Elering), FI (Fingrid), FR (RTE), HR (HOPS), LV (AST)
Submitted to the NRA, not yet approved	DK (energinet), ES (REE), EL (IPTO), UK (NGESO, SONI), IE (EirGrid), RO (Transelectrica)
Not Applicable	BE (Elia), DE (Amprion, 50Hertz, TenneT DE, Transnet BW), HU (Mavir), IT (Terna), LT (Litgrid), LU (Creos), NL (TenneT NL), PL (PSE), PT (REN), SE (SvK), SI (ELES), SK (SEPS)

# Article 4(2) of NC ER – details (2)

	<b>Article 4(2)(b) – restoration service provider - contract</b>
Approved by NRA	AT (APG), BE (Elia), BG (ESO), CZ (CEPS), DE (Amprion, 50Hertz, TenneT DE, Transnet BW), EE (Elering), FI (Fingrid), FR (RTE), HR (HOPS), HU (Mavir), LV (AST), NL (Tennet NL), PL (PSE), SK (SEPS)
Submitted to the NRA, not yet approved	DK (energinet), ES (REE), EL (IPTO), UK (NGESO, SONI), IE (EirGrid), PT (REN), RO (Transelectrica),
Not Applicable	IT (Terna), LT (Litgrid), LU (Creos), SE (SvK), SI (ELES)



# Article 4(2) of NC ER – details (3)

	<b>Article 4(2)(c) – list of SGUs and list of measures</b>
Approved by NRA	AT (APG), BE (Elia), BG (ESO), CZ (CEPS), EE (Elering), FI (Fingrid), FR (RTE), HR (HOPS), HU (Mavir), IT (Terna), LT (Litgrid), LV (AST), NL (Tennet NL), PL (PSE), SE (SvK), SI (ELES), SK (SEPS)
Submitted to the NRA, not yet approved	DK (energinet), ES (REE), EL (IPTO), UK (NGESO, SONI), IE (EirGrid), LT (Litgrid), PT (REN), RO (Transelectrica)
Not Applicable	DE (Amprion, 50Hertz, TenneT DE, Transnet BW), LU (Creos)

# Article 4(2) of NC ER – details (4)

	Article 4(2)(d) – list of high priority SGUs
Approved by NRA	AT (APG), BE (Elia), BG (ESO), CZ (CEPS), EE (Elering), FI (Fingrid), FR (RTE), HR (HOPS), HU (Mavir), IT (Terna), LT (Litgrid), LV (AST), NL (Tennet NL), PT (REN), SE (SvK), SI (ELES), SK (SEPS)
Submitted to the NRA, not yet approved	ES (REE), EL (IPTO), UK (NGESO, SONI), IE (EirGrid), LT (Litgrid), RO (Transelectrica),
Not Applicable	DE (Amprion, 50Hertz, TenneT DE, Transnet BW), DK (energinet), LU (Creos), PL (PSE),

# Article 4(2) of NC ER – details (5)

	Article 4(2)(e) – suspension and restoration of market activities
Approved by NRA	AT (APG), BG (ESO), CZ (CEPS), FI (Fingrid), FR (RTE), HR (HOPS), HU (Mavir), IT (Terna), LV (AST), TennetT NL, PL (PSE), SE (SvK), SI (ELES), SK (SEPS)
Submitted to the NRA, not yet approved	BE (Elia), DE (Amprion, 50Hertz, TenneT DE, Transnet BW), DK (energinet), EE (Elering), ES (REE), EL (IPTO), UK (NGESO, SONI), IE (EirGrid), LT (Litgrid), LU (Creos), PT (REN), RO (Transelectrica)
Not Applicable	

# Article 4(2) of NC ER – details (6)

	<b>Article 4(2)(f) – imbalance settlement</b>
Approved by NRA	AT (APG), BG (ESO), CZ (CEPS), FI (Fingrid), FR (RTE), HR (HOPS), HU (Mavir), IT (Terna), LV (AST), TennetT NL, PL (PSE), SE (SvK), SI (ELES), SK (SEPS)
Submitted to the NRA, not yet approved	BE (Elia), DE (Amprion, 50Hertz, TenneT DE, Transnet BW), DK (energinet), EE (Elering), ES (REE), EL (IPTO), UK (NGESO, SONI), IE (EirGrid), LT (Litgrid), LU (Creos), PT (REN), RO (Transelectrica)
Not Applicable	

# Article 4(2) of NC ER – details (7)

	Article 4(2)(g) – test plan
Approved by NRA	AT (APG), BG (ESO), CZ (CEPS), FI (Fingrid), HR (HOPS), IT (Terna), LT (Litgrid), NL (Tennet NL), PL (PSE), SI (ELES), SK (SEPS)
Submitted to the NRA, not yet approved	BE (Elia), DE (Amprion, 50Hertz, TenneT DE, Transnet BW), DK (energinet), ES (REE), FR (RTE), UK (SONI), HU (Mavir), IE (EirGrid), LV (AST), PT (REN), SE (SvK)
Not Applicable	EE (Elering), LU (Creos)

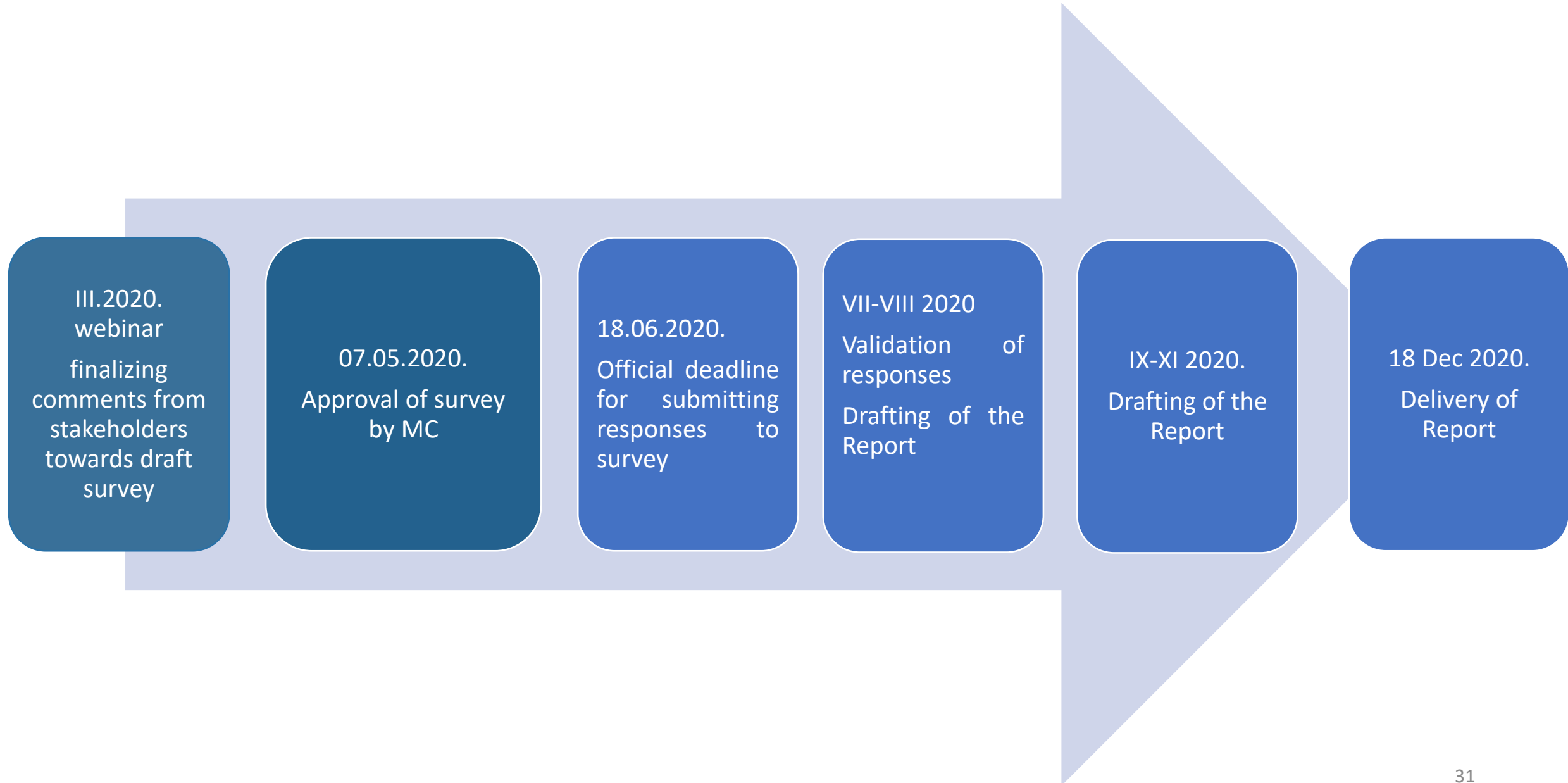
# Article 4(2) of NC ER – links to the approved TCM


Document on national implementation are available on ENTSO-E public web page :

<https://www.entsoe.eu/active-library/codes/er/>

Next update (status of NC ER implementation on 31.12.2020)

# Draft timeline – Market Suspension Report after February 2020:





## **Top 6. Information on Low frequency Pump disconnection & energy storage units**

### **6.1 Why low frequency pump disconnection is triggered at different frequencies across Europe?**

Rafal Kuczynski\Walter Sattinger

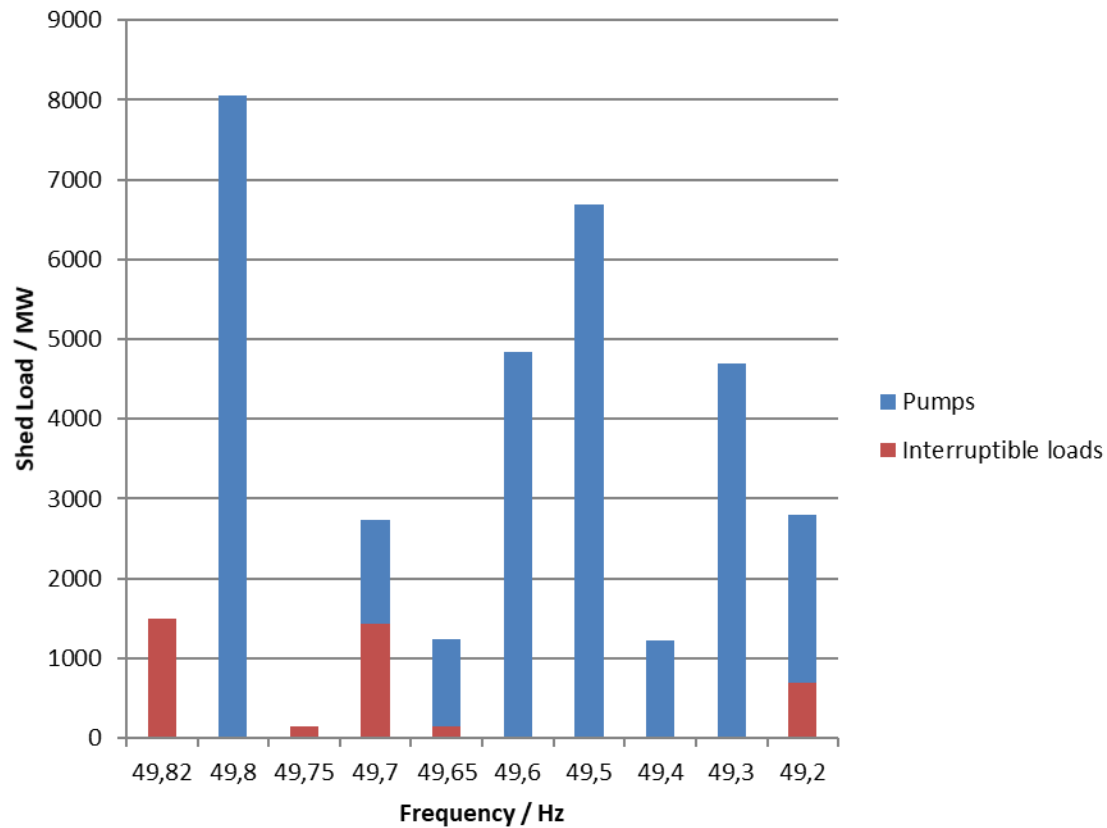


# Data collection for Continental European Power System (CE)

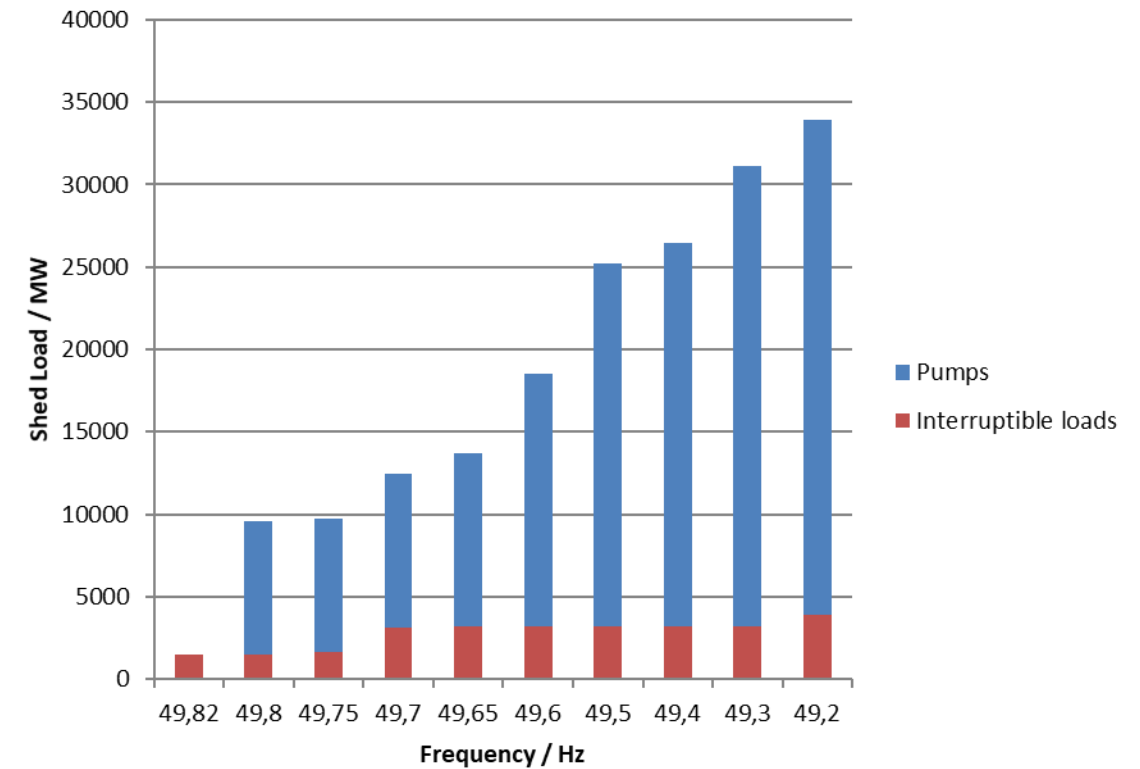
- After the January 10th 2019 event in the CE power system subsequent analysis were performed.
- As the limit of frequency containment reserve (FCR) was reached, the efficiency of the additional system protection schemes were questioned.
- Main focus was oriented on the frequency range 49.0 Hz – 49.8 Hz before the Low Frequency Demand Disconnection (LFDD) scheme becomes active.
- Based on a related detailed questionnaire distributed within the CE TSO community, the related installed capacity as well as the corresponding frequency settings were reported.

# Results of CE data collection for pump storage units and interruptible industrial loads – installed capacity; freq. settings

Installed capacity in MW per stage



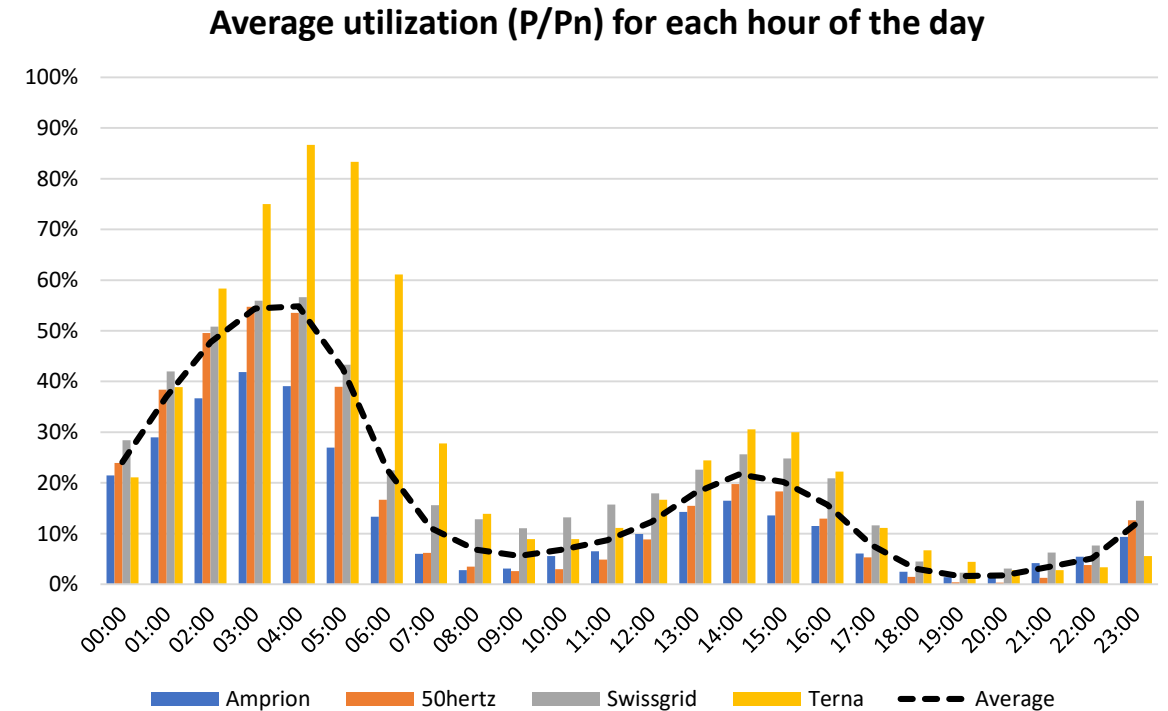
Installed capacity in MW per stage  
(cumulative)



Results show a very even distribution among the different frequency thresholds in the range of 49-50 Hz

# Results of CE data collection for pump storage units – current usage of pump storage power

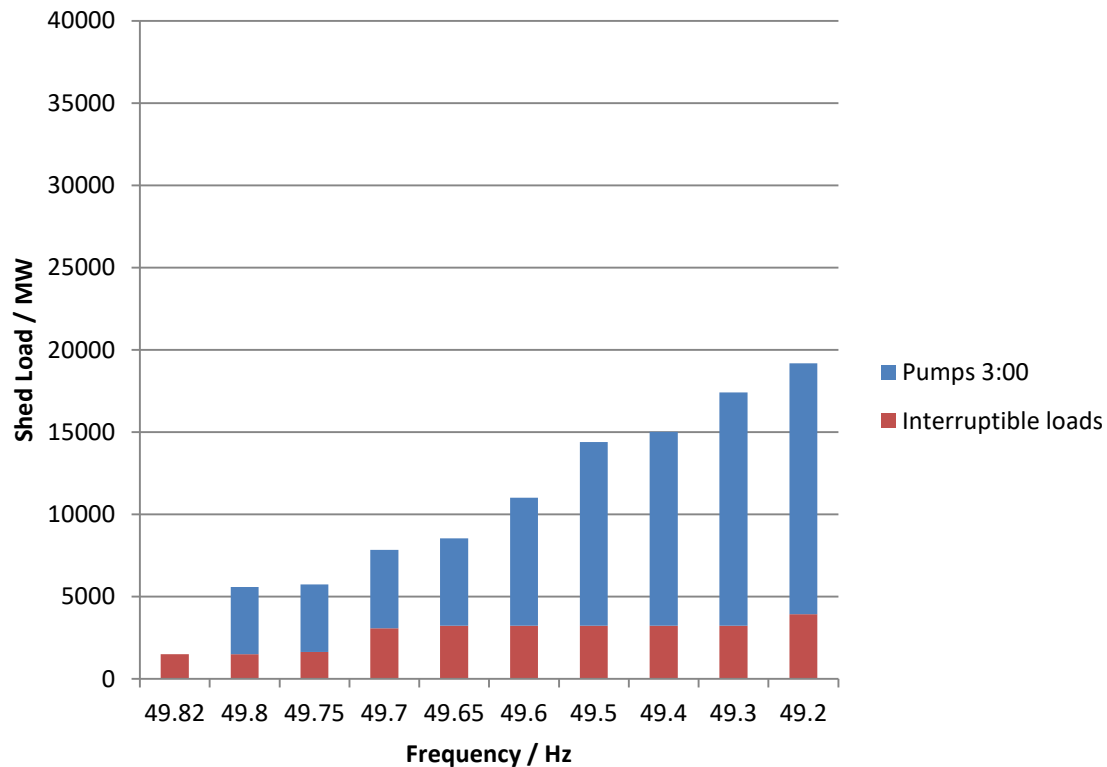
	1. Average number of hours per year (8760 h) in pumping mode	2. Average hours of pumping per day	3. Average hours of pumping per week	4. Most probable pumping time window
RTE	29%	6,8	48	00:00 - 06:00 & 14:00 - 17:00
Tennet GE	-	-	-	-
50 Hertz	45%	10,8	75,65	-
Elia	25%	6,5	45	01:00 - 06:30
REE	50%	12	84	01:00 - 07:00
REN	7%	1,6	11	02:00-6:00 + weekends
TERNA	44%	9,8	68,9	02:00 - 06:00
TransnetBW	12%	-	-	-
Amprion	55%	13	92	00:00 - 06:00 & 13:00 - 16:00
HOPS	22%	5	35	00:00 - 6:00
SEPS	8%	2	14,4	23:00 - 05:00 & 13:00 - 16:00
Swissgrid	59%	14	98	00:00 - 06:00 & 13:00 - 16:00
APG	30%	7	50	23:00 - 05:00 + weekends
EMS	26%	6,1	43	00:00 - 7:00 / 8:00



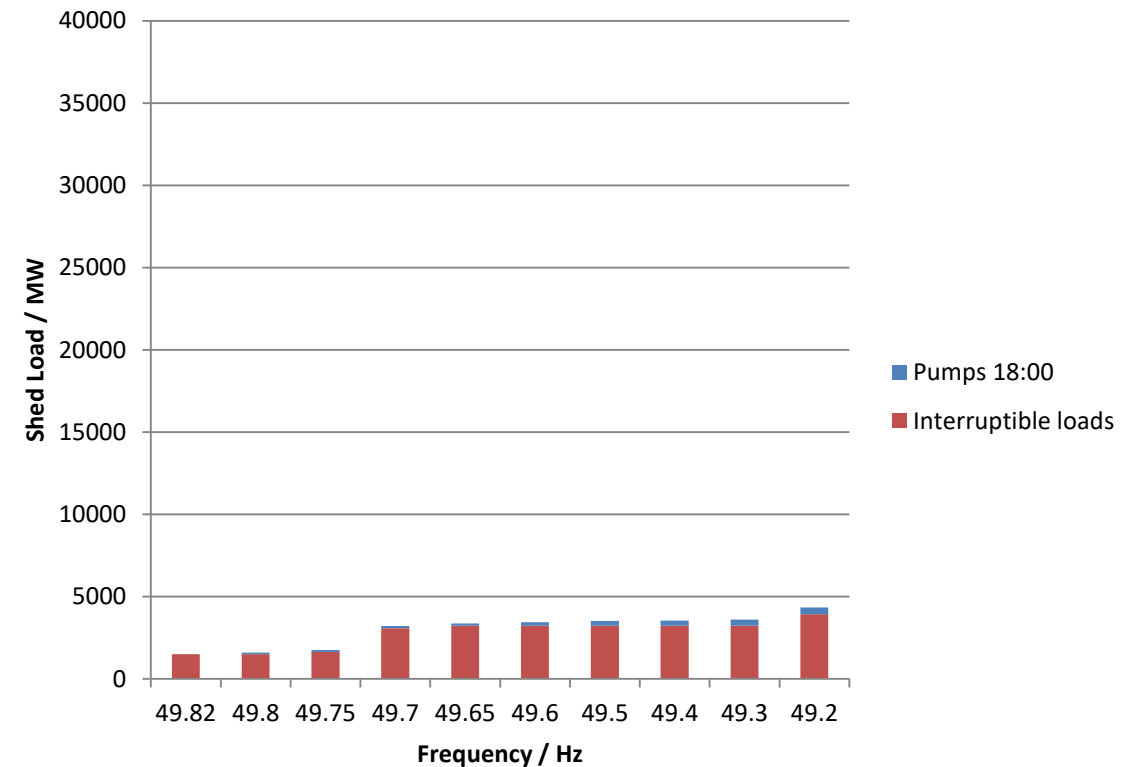
Evaluation shows a time-dependency of the power consumption of pump storages. The highest power consumption occurs at low system load (0:00 – 6:00, 13:00 – 16:00, weekends)

# Results of CE data collection for pump storage units and interruptible loads – time dependency / pumps availability

Active power consumption in MW per stage  
(cumulative)



Active power consumption in MW per stage  
(cumulative)



Collected data indicates a high variation of the shed load by pump storages

# Data collection for Continental European Power System (CE) – Results Analysis

- The current settings have plausible values.
- Additional dynamic model calculations will verify the efficiency of the current settings including the current LFDD settings (48.0 Hz – 49.0 Hz) and also considering the disconnection of non-conform distributed generation settings.



# **Top 6. Information on Low frequency Pump disconnection & energy storage units**

## **6.2 Outlook on the plans for the energy storage units**

Rafal Kuczynski\Walter Sattinger

# Energy storage units

- Information concerning low frequency disconnection of Energy storage units acting as a load – article 15 (3) of NC ER – cooperation on TSO-DSO platform needed (commonly with LFDD issues)



## Top 7. AOB – Dates SO ESC 2020

- 9 December – (Tentative online SO ESC)