

<p><b><u>CORESO Engineers</u></b></p> <p><b><u>North :</u></b> PREVOST Raphaël</p> <p><b><u>South :</u></b> BOYER Jonathan</p>	<p><b>Day Ahead report for</b></p> <p><b>11 January 2018</b></p>
<p><b>Security Levels:</b></p> <p><b>CWE: No constraint detected.</b></p> <p><b>CEE: No constraint detected.</b></p> <p><b>CSE: Pentalateral reduction is needed to solve constraints.</b></p>	

#### Key overall conditions

#### Outages table

#### Exchange program forecasts

#### ELIA expected flows & PSTs tap position

#### CEE Renewable Power Generation & Forecast

#### CWE, CSE & SWE Renewable Power Forecast (D-1 and D-2)

#### RTE flows on cross-border lines

#### N state flows at 10:30 and 19:30

#### Special topologies at 10:30 and 19:30

#### North analyses results

Constraints on Elia, RTE (North) and 50HzT 400kV grids and tie-lines

Constraints greater than 100% on NL + Amprion 400kV grids and greater than 120% on DE, CZ, PL and SK 400kV grids

Constraints on ELIA 220/150kV grid at 10:30

50HzT DC loopflows sensitivity

#### South analyses results

#### N state flows Off-Peak & Peak

#### Special topologies

Sensitivity coefficients for the Pentalateral instruction

Constraints on APG, Eles, RTE (South), Swissgrid and Terna 400kV grids and tie-lines

Final PSTs settings

#### Conclusion

## Key overall conditions

Load & Generation margin forecast			Main generating units connected to the grid in DACF					
ELIA			Elia	Doel	Pmax (MW)	1000	1	1900
						450	2	
Peak load [MW]	11 900	18:00		Tihange		1000	2	2900
						450	2	
Generation Margin	Sufficient			Coo		230	3	1170
						160	3	
			50HzT	Rostock	Pmax (MW)	530	1	530
				Janschwalde		500	5	2500
				Boxberg		500	2	2800
						900	2	
				Schw. Pumpe		800	2	1600
				Lippendorf		920	2	1840
RTE			RTE	Gravelines	Pmax (MW)	900	6	5400
Peak load [MW]	77 100	19:00		Chooz		1500	2	3000
				Cattenom		1300	4	5200
Generation Margin	Sufficient			Fessenheim		900	1	900
				Penly		1300	2	2600
NATIONAL GRID (UK time)				Paluel		1300	3	3900
Peak load [MW]	48 000	17:30		Nogent s/ Seine		1300	2	2600
				Bugey		900	4	3600
Generation Margin	Sufficient			St Alban		1300	2	2600
				Cruas		900	3	2700
TERNA				Tricastin		900	4	3600
Peak load [MW]	43 500	17:30						
			Generation Margin	Sufficient				

### Generation margin legend:

**Green:** Sufficient margin available. No risk for need of inter-TSO solicitation due to margin issues.

**Orange:** Tight margin available. Low risk for need of inter-TSO solicitation due to margin issues.

**Red:** Insufficient margin available. High risk for need of inter-TSO solicitation due to margin issues.

### Comments:

**RTE:** High load adjustments found for timestamps 02:30, 04:30 and 05:30 (up to 2000 MW). Be warned that the quality of our results could be affected for those timestamps.

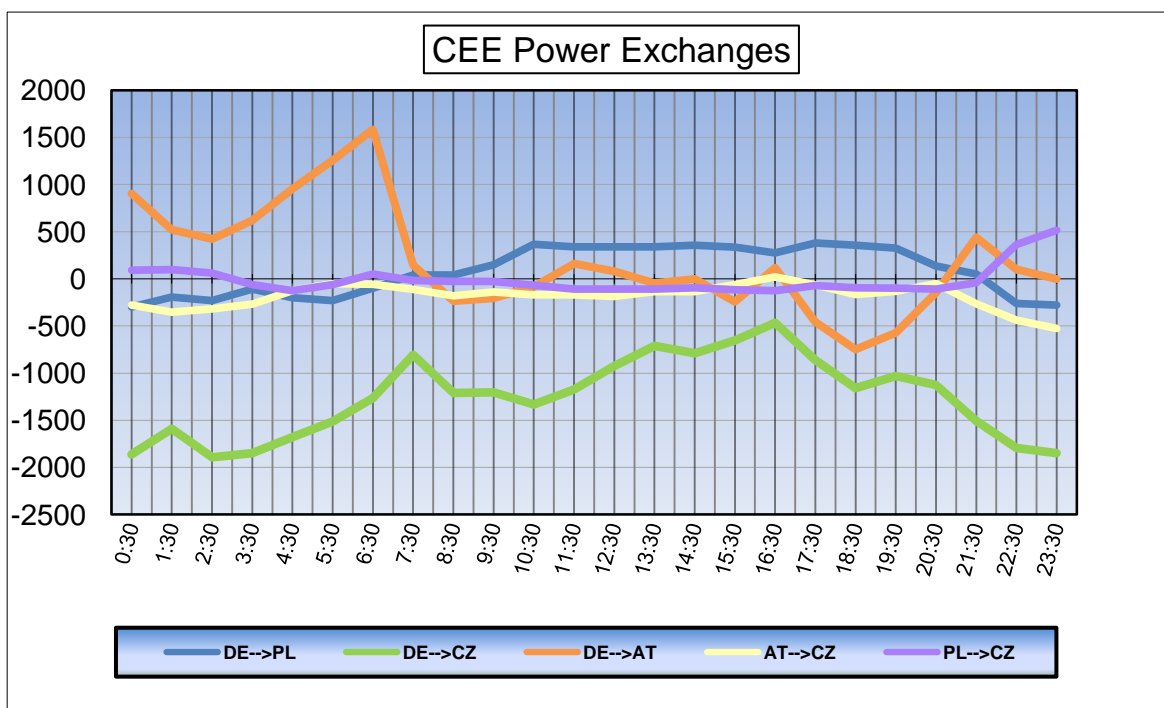
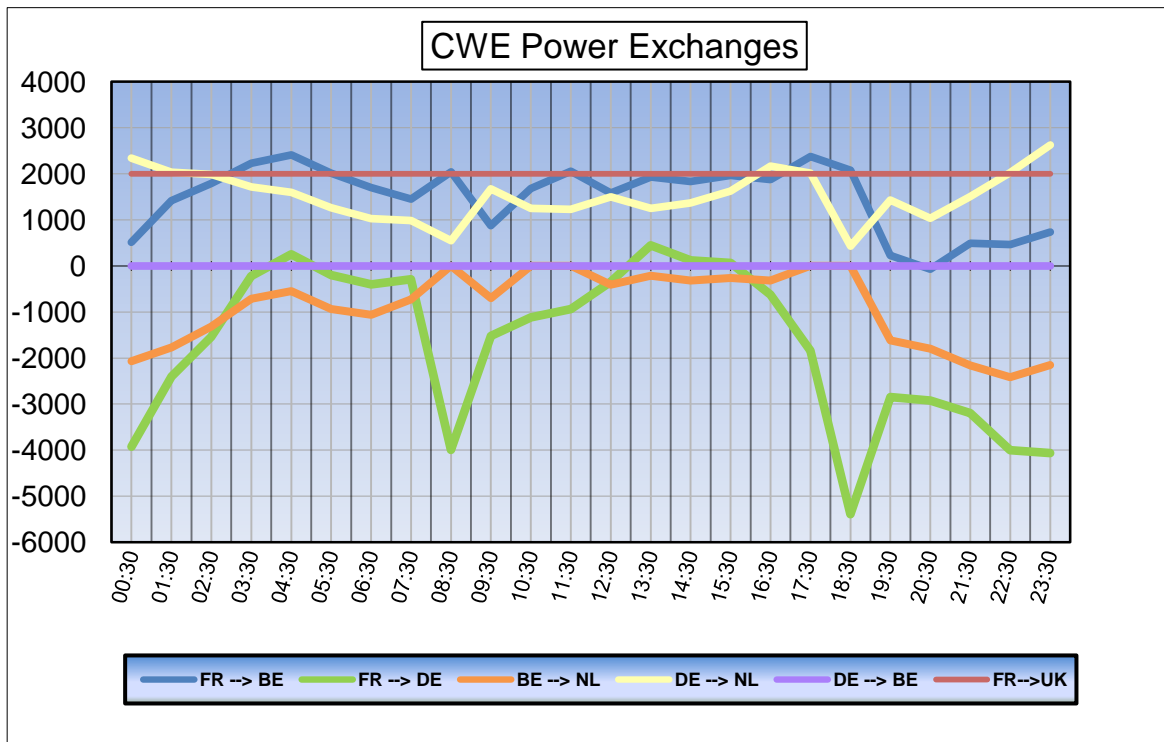
**ELES:** The PST of Divaca will be at tap -26 all day long due to technical issue

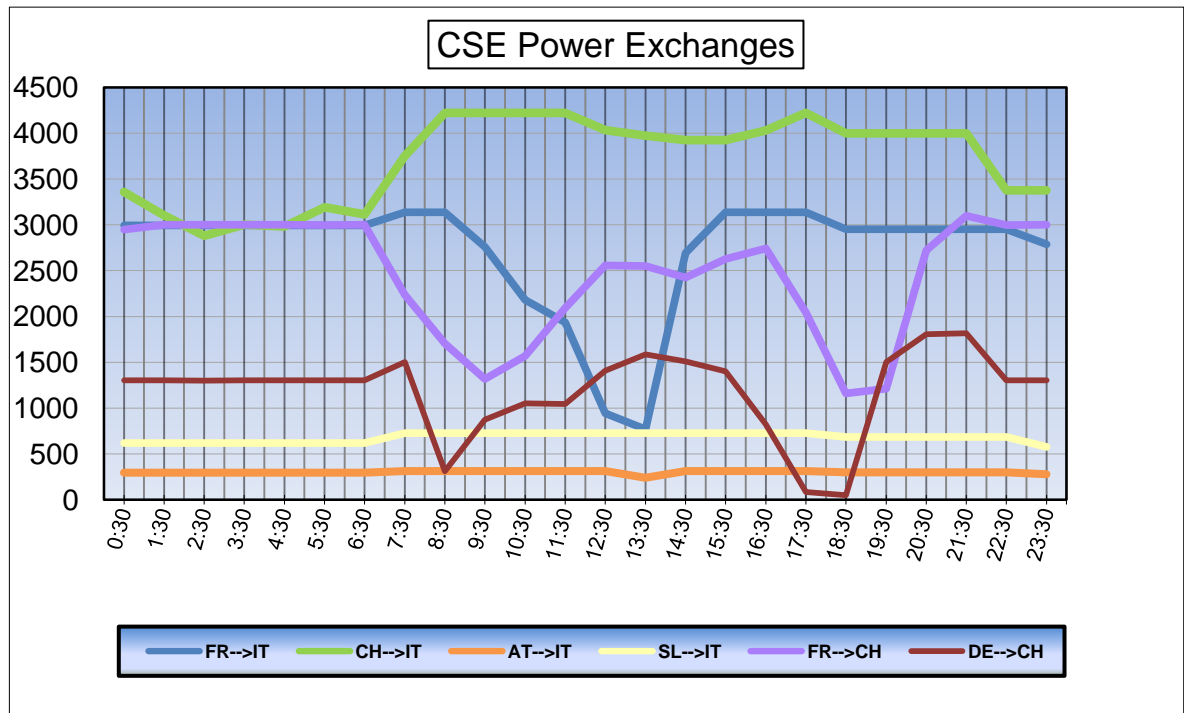
**Terna/SWG:** The 380kV line Sils-Soazza will be out of service from 00:00 till 12:30 due to technical issue. Both Transformers of Soazza will be in service with the regulated one at tap 18.

## Outages table

OUTAGES						
Owner	Type of element	Line name	start	end	Comments	
50HzT	Hydro.Gen	MARKERSBACH _ Unit D 400 kV	28/09/2017	27/04/2018	160 MW	
50HzT	Line	CROSSEN _ RÖHRSDORF 211 220 kV	08/01/2018	12/01/2018	Alternating	
50HzT	Line	CROSSEN _ RÖHRSDORF 212 220 kV	08/01/2018	12/01/2018	Alternating	
50HzT	Line	EULA _ Wolkramhausen 357 220 kV	06/10/2017	16/03/2018		
50HzT	Line	GORRIES _ GUSTROW 423 400 kV	10/01/2018	11/01/2018		
50HzT	Line	GUSTROW _ WESSIN 424 400 kV	10/01/2018	11/01/2018		
50HzT	Line	HAMBURG Nord _ HAMBURG Ost 961 400 kV	08/01/2018	12/01/2018		
50HzT	Line	LUBMIN _ WIKINGER 281 220 kV	26/09/2017	31/01/2018		
50HzT	Line	RAGOW _ Förderstedt 531 400 kV	02/01/2018	14/01/2018		
50HzT	Line	RAGOW _ FORDERSTEDT 532 380 kV	02/01/2018	14/01/2018		
50HzT / PSE	Line	KRAJNIK _ VIERRADEN 507 225 kV	22/06/2016	31/05/2018	Long term outage	
50HzT / PSE	Line	KRAJNIK _ VIERRADEN 508 225 kV	22/06/2017	31/05/2018	Long term outage	
AMP / TEN DE	Line	NEHDEN _ TWISTETAL W 400 kV	08/01/2018	23/02/2018		
APG	Line	TAUERN _ PST 220 kV	14/12/2017	15/01/2018		
CEPS	Line	DASNY _ KOCIN 473 400 kV	08/01/2018	26/01/2018		
CREOS	Line	BERTRANGE _ SCHIFFLANGE West 220 kV	08/01/2018	02/03/2018		
ELIA	Line	GEZELLE _ STEVIN 111 400 kV	19/09/2017	02/03/2018		
ELIA	Line	GEZELLE _ STEVIN 112 400 kV	19/09/2017	02/03/2018		
ELIA	Nuc.Gen	DOEL _ Unit 3 (1000MW) 400 kV	23/09/2017	16/04/2018	Forced outage	
PSE	Fossil.Gen	TUROW _ Unit 2 225 kV	01/03/2017	12/01/2018		
PSE	Line	BYCZYNA _ TUCZNAWA 400 kV	11/01/2018	11/01/2018		
PSE	Line	POLANIEC _ TARNOW 400 kV	08/01/2018	12/01/2018		
PSE	Line	TUCZNAWA _ RZESZOW 400 kV	08/01/2018	12/01/2018		
RTE	Nuc.Gen	CRUAS _ Unit 2 (900MW) 400 kV	02/12/2017	30/03/2018		
RTE	Nuc.Gen	FESSENHEIM _ Unit 2 (900MW) 400 kV	01/01/2017	15/03/2018		
RTE	Nuc.Gen	PALUEL _ Unit 2 (1300MW) 400 kV	01/08/2015	15/04/2018		
S.GRID	Line	LIMMERN _ TIERFEHD 1 400 kV	28/01/2017	31/07/2018		
S.GRID	Nuc.Gen	BEZNAU _ BEZNAU G11 220 kV	13/03/2015	28/02/2018	182 MW	
S.GRID	Nuc.Gen	BEZNAU _ BEZNAU G12 220 kV	13/03/2015	28/02/2018	182 MW	
TENNET DE	Line	TWISTETAL _ BORKEN 3 400 kV	16/05/2017	11/10/2018		
TENNET DE	Line	WURGASSEN _ GROHNDE 2 400 kV	08/01/2018	12/01/2018		
TENNET NL	Line	HENGEL _ ZWOLLE WT 400 kV	08/01/2018	12/01/2018		
TERNA	Line	PIAN CAMUNO _ S.FIORANO 358 400 kV	05/01/2018	31/01/2018	Forced outage	
TransnetBW	Line	DAXLANDEN _ PHILIPPSBURG GE 400 kV	08/01/2018	12/01/2018		
TransnetBW	Line	DAXLANDEN _ PHILIPPSBURG RT 400 kV	09/01/2018	12/01/2018		

## Exchange program forecasts





## ELIA expected flows & PSTs tap position

		Node 1	Node 2	Order	03:30	04:30	07:30	08:30	10:30	11:30	12:30	15:30	17:30	19:30	22:30	23:30
BE	FR	ACHENE	LONNY	380.19	-225	-254	101	296	199	71	119	-58	1	470	469	331
BE	FR	AUBANGE	MONT ST MARTIN	220.51	-168	-161	-83	-55	-77	-113	-131	-130	-144	17	9	0
BE	FR	AUBANGE	MOULAIN	220.51	-167	-167	-92	-65	-90	-123	-140	-143	-149	2	-3	-14
BE	FR	AVELGEM	AVELIN	380.80	-727	-800	-241	76	-121	-205	-95	-454	-425	409	110	39
BE	FR	AVELGEM	MASTAING	380.79	-476	-502	-373	-264	-347	-389	-327	-455	-475	-107	-175	-229
BE	FR	MONCEAU	CHOOZ	220.48	-212	-215	-103	-83	-103	-116	-101	-121	-143	-37	-136	-169
BE	NL	VAN EYCK 1	MAASBRACHT	380.27	-621	-596	-618	-735	-625	-629	-638	-527	-609	-828	-988	-969
BE	NL	VAN EYCK 2	MAASBRACHT	380.28	-376	-347	-208	-354	-103	-171	-229	-104	-105	-569	-823	-772
BE	NL	ZANDVLIET	BORSSELE	380.29	-198	-183	-668	-715	-596	-590	-620	-580	-592	-860	-756	-617
BE	NL	ZANDVLIET	GEERTRUIDENBERG	380.30	128	154	34	-97	128	131	104	248	179	-300	-484	-362
BE	LU	BELVAL	SCHIFFLANGE	220.511	88	100	51	-71	44	54	51	83	62	-64	-120	-143

BE	FR	TOTAL		-1975	-2099	-791	-95	-539	-875	-675	-1361	-1335	754	274	-42
BE	NL	TOTAL		-1067	-972	-1460	-1901	-1196	-1259	-1383	-963	-1127	-2557	-3051	-2720
BE	LU	TOTAL		88	100	51	-71	44	54	51	83	62	-64	-120	-143
TOTAL BELGIAN IMPORT/EXPORT				-2954	-2971	-2200	-2067	-1691	-2080	-2007	-2241	-2400	-1867	-2897	-2905

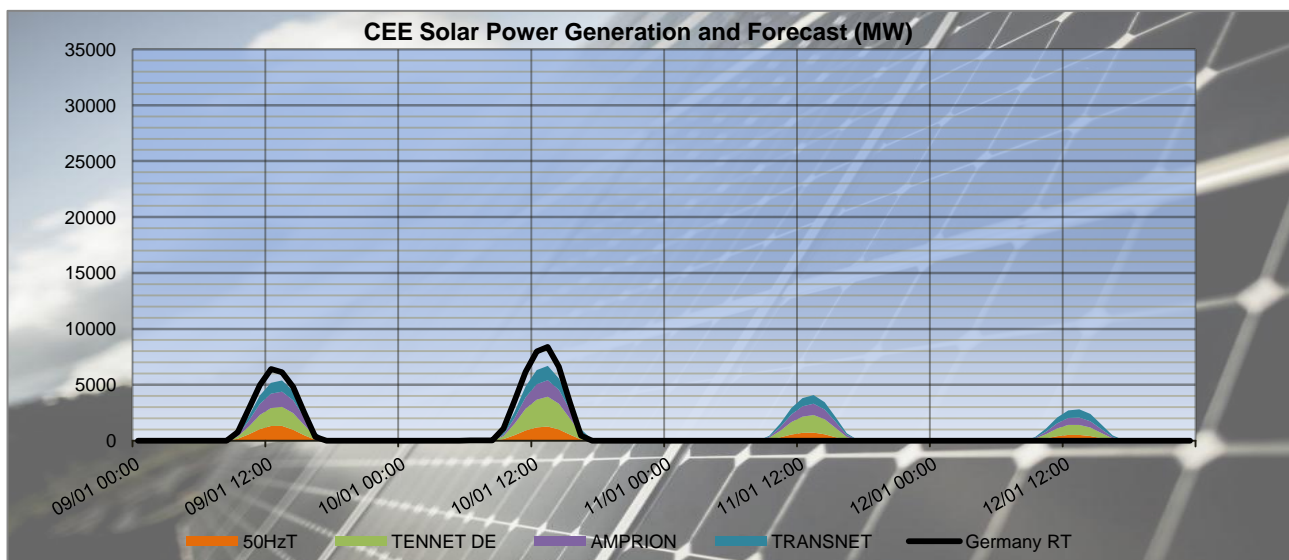
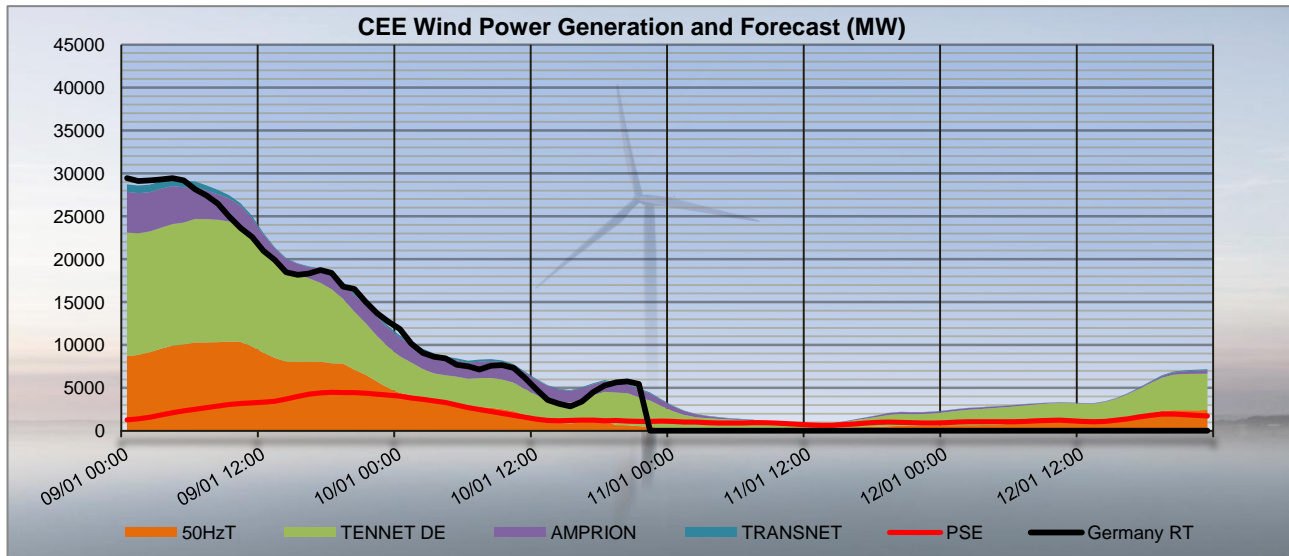
PST taps in DACF	Zandvliet 1	12	12	12	12	12	12	12	12	12	12	12	12	12
	Zandvliet 2	12	12	12	12	12	12	12	12	12	12	12	12	12
	Van Eyck 1	18	18	18	18	18	18	18	18	18	18	18	18	18
	Van Eyck 2	18	18	18	18	18	18	18	18	18	18	18	18	18
	Average	15	15	15	15	15	15	15	15	15	15	15	15	15

CREOS PST in DACF	Schiffange	17	17	17	17	17	17	17	17	17	17	17	17	17
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### Proposal for real time after D-1 studies

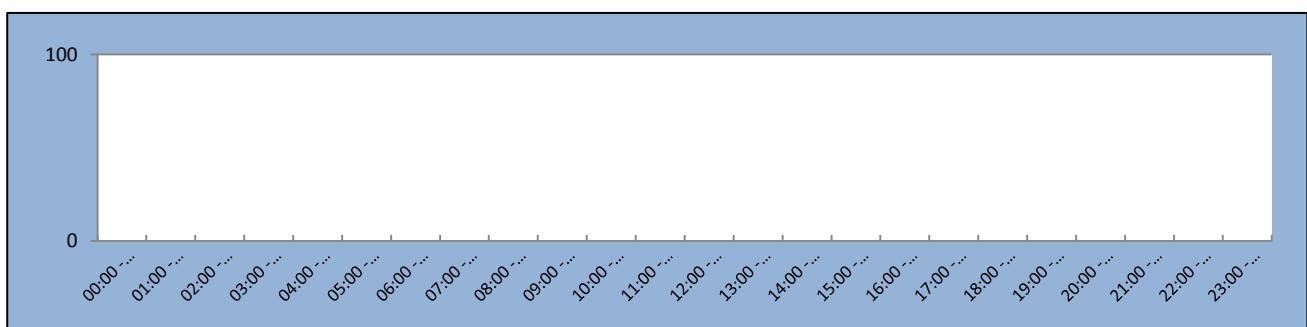
Timestamps	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
PSTs																								
Zandvliet PST 1	[1;35]	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Zandvliet PST 2	[1;35]	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Van Eyck PST 1	[1;35]	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Van Eyck PST 2	[1;35]	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Schiffange PST 1	[1;35]	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17	17

## CEE Renewable Power Generation & Forecast

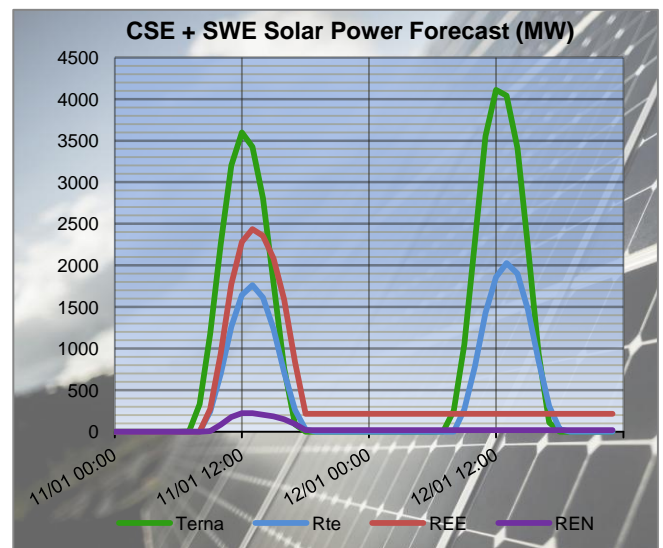
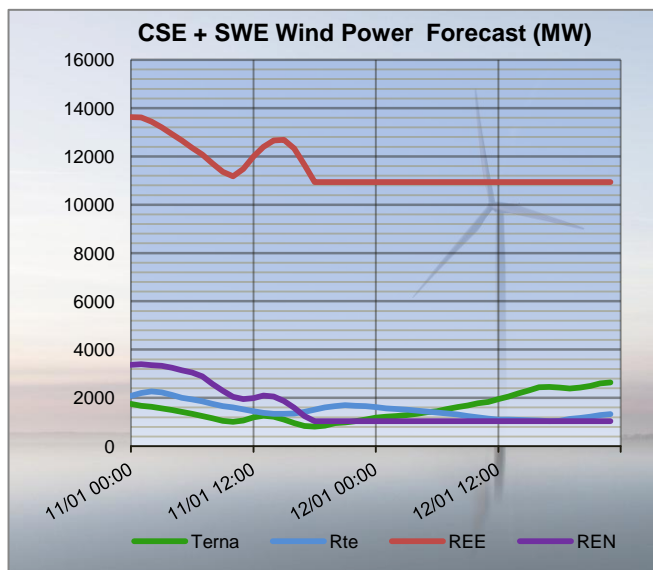
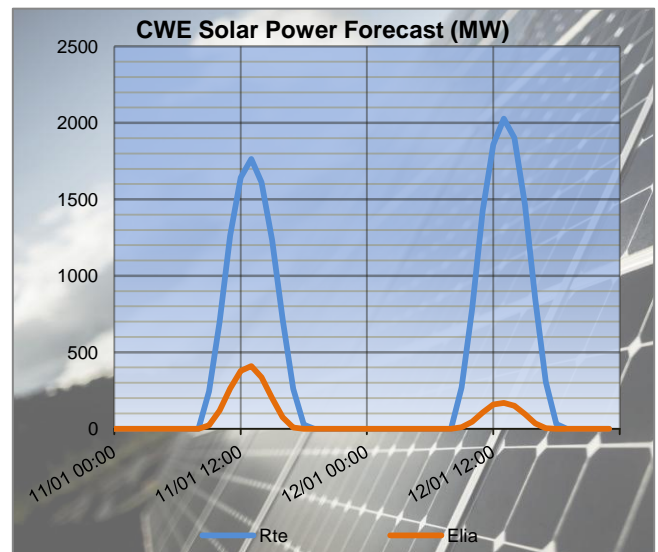
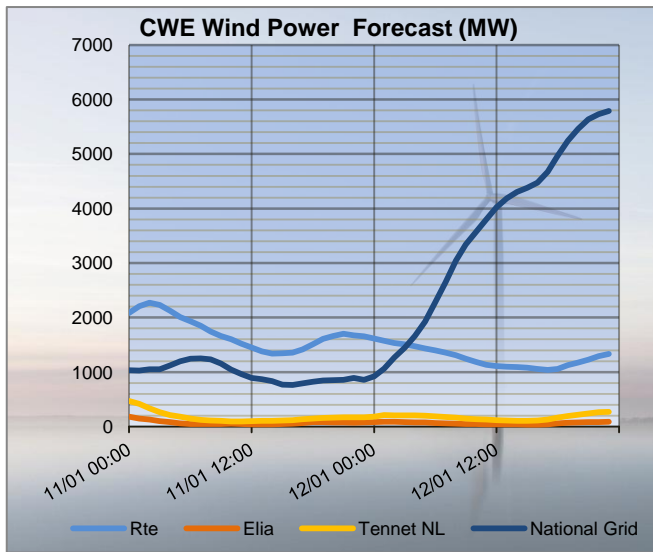


The charts above show the wind and solar generation forecasts for the TSOs in CEE (most significant) from D+1 until D-2 and the realised generation in Germany in real time. Source: Meteologica and 50HzT (RT)

## 50HzT Preventive Redispatch



## CWE, CSE & SWE Renewable Power Forecast (D-1 and D-2)



The charts above show the latest wind and solar generation forecasts for D-1 and D-2 for all the European TSOs in CWE, CSE and SWE with a significant installed capacity. Source: Meteologica



## RTE flows on cross-border lines

With last provided tap position on Belgian PSTs:

				03:30			07:30			10:30			12:30		
		Node 1	Node 2	DACF	Merge	Delta	DACF	Merge	Delta	DACF	Merge	Delta	DACF	Merge	Delta
FR	BE	LONNY	ACHENE	298	225	-73	94	-101	-195	35	-199	-234	179	-119	-298
FR	BE	MONT ST MARTIN	AUBANGE	135	168	33	60	83	23	98	77	-21	154	131	-23
FR	BE	MOULAIN	AUBANGE	135	167	32	69	92	23	109	90	-19	161	140	-21
FR	BE	AVELIN	AVELGEM	570	727	157	207	241	34	163	121	-42	192	95	-97
FR	BE	MASTAING	AVELGEM	402	476	74	359	373	14	383	347	-36	393	327	-66
FR	BE	CHOOZ	MONCEAU	186	212	26	127	103	-24	92	103	11	122	101	-21
FR	DE	MUHLBACH	EICHSTETTEN	490	399	-91	463	396	-67	135	209	74	85	229	144
FR	DE	VOGELGRUN	EICHSTETTEN	40	42	2	57	37	-20	-2	13	15	13	33	20
FR	DE	ST AVOLD	ENSDORF	0	0	0	0	0	0	0	0	0	0	0	0
FR	DE	VIGY	ENSDORF 1	239	509	270	372	478	106	264	418	154	306	413	107
FR	DE	VIGY	ENSDORF 2	237	531	294	499	614	115	347	523	176	401	528	127

				17:30			19:30			23:30		
		Node 1	Node 2	DACF	Merge	Delta	DACF	Merge	Delta	DACF	Merge	Delta
FR	BE	LONNY	ACHENE	322	-1	-323	-238	-470	-232	-5	-331	-326
FR	BE	MONT ST MARTIN	AUBANGE	164	144	-20	35	-17	-52	80	0	-80
FR	BE	MOULAIN	AUBANGE	167	149	-18	47	-2	-49	90	14	-76
FR	BE	AVELIN	AVELGEM	586	425	-161	-304	-409	-105	177	-39	-216
FR	BE	MASTAING	AVELGEM	589	475	-114	183	107	-76	376	229	-147
FR	BE	CHOOZ	MONCEAU	171	143	-28	61	37	-24	156	169	13
FR	DE	MUHLBACH	EICHSTETTEN	145	274	129	-130	-30	100	-187	19	206
FR	DE	VOGELGRUN	EICHSTETTEN	14	46	32	-76	-13	63	-92	-20	72
FR	DE	ST AVOLD	ENSDORF	0	0	0	0	0	0	0	0	0
FR	DE	VIGY	ENSDORF 1	344	539	195	-269	57	326	-340	14	354
FR	DE	VIGY	ENSDORF 2	433	662	229	-256	108	364	-411	-12	399

				03:30			07:30			10:30			12:30		
		Node 1	Node 2	DACF	Merge	Delta	DACF	Merge	Delta	DACF	Merge	Delta	DACF	Merge	Delta
FR	CH	SIERENTZ	ASPHARD	436	423	-13	256	330	74	26	126	100	3	96	93
FR	CH	MAMBELIN	BASSECCOURT	34	33	-1	-112	-87	25	-287	-205	82	-238	-168	70
FR	CH	SIERENTZ	BASSECCOURT	424	368	-56	361	366	5	291	305	14	297	298	1
FR	CH	BOIS TOLLOT	ROMANEL	287	238	-49	150	122	-28	11	-210	-221	77	19	-58
FR	CH	SIERENTZ	LAUFENBURG	417	336	-81	147	153	6	-41	-22	19	-50	29	79
FR	CH	CORNIER	RIDDES	39	63	24	-3	36	39	-65	-58	7	-31	-6	25
FR	CH	CORNIER	ST TRIPHON	34	45	11	-3	19	22	-68	-71	-3	-24	-2	22
FR	CH	PRESSY	VALLORCINES	-34	-5	29	-83	-27	56	-152	-144	8	-102	-70	32
FR	CH	BOIS TOLLOT	VERBOIS	230	177	-53	235	224	-11	173	262	89	226	250	24
FR	CH	GENISSIAT	VERBOIS	181	136	-45	157	140	-17	112	113	1	146	145	-1
FR	CH	GENISSIAT	VERBOIS	181	136	-45	158	140	-18	112	113	1	146	145	-1
FR	IT	ALBERTVILLE	RONDISSONE	1029	862	-167	1000	871	-129	898	732	-166	823	690	-133
FR	IT	ALBERTVILLE	RONDISSONE	1143	895	-248	1113	911	-202	989	745	-244	900	707	-193
FR	IT	MENTON	CAMPOROSSO	250	619	369	142	572	430	154	619	465	153	532	379
FR	IT	VILLARODIN	VENAUS	353	235	-118	513	461	-52	370	302	-68	250	194	-56

				17:30			19:30			23:30		
		Node 1	Node 2	DACF	Merge	Delta	DACF	Merge	Delta	DACF	Merge	Delta
FR	CH	SIERENTZ	ASPHARD	7	143	136	-16	24	40	91	171	80
FR	CH	MAMBELIN	BASSECCOURT	-275	-145	130	-383	-305	78	-359	-279	80
FR	CH	SIERENTZ	BASSECCOURT	217	252	35	329	335	6	441	406	-35
FR	CH	BOIS TOLLOT	ROMANEL	12	-215	-227	-42	-143	-101	54	-30	-84
FR	CH	SIERENTZ	LAUFENBURG	-47	38	85	-13	-47	-34	105	112	7
FR	CH	CORNIER	RIDDES	-66	-47	19	-84	-61	23	-64	-38	26
FR	CH	CORNIER	ST TRIPHON	-90	-76	14	-108	-66	42	-83	-64	19
FR	CH	PRESSY	VALLORCINES	-168	-171	-3	-181	-137	44	-173	-138	35
FR	CH	BOIS TOLLOT	VERBOIS	124	231	107	115	230	115	169	199	30
FR	CH	GENISSIAT	VERBOIS	88	98	10	81	119	38	108	104	-4
FR	CH	GENISSIAT	VERBOIS	88	98	10	81	119	38	108	104	-4
FR	IT	ALBERTVILLE	RONDISSONE	979	838	-141	884	642	-242	803	629	-174
FR	IT	ALBERTVILLE	RONDISSONE	1113	900	-213	1016	696	-320	899	662	-237
FR	IT	MENTON	CAMPOROSSO	148	480	332	148	468	320	143	436	293
FR	IT	VILLARODIN	VENAUS	524	450	-74	513	313	-200	226	156	-70

## N state flows at 10:30 and 19:30

The I<sub>max</sub> and load values in the table below are extracted from the merged TSOs' DACF.

TSO	Line (380 kV)	10:30		19:30	
		I <sub>max</sub> (A)	% of I <sub>max</sub>	I <sub>max</sub> (A)	% of I <sub>max</sub>
ELIA	Champion - Gramme (32)	2448	47	2448	42
	Doel - Mercator (51)	2239	30	2239	41
	Doel - Mercator (52)	2239	30	2239	41
	Doel - Mercator (54)	2448	30	2448	41
	Doel - Zandvliet (25)	2326	8	2349	26
	Mercator - Horta (73)	2569	28	2569	47
	Courcelles - Gramme (31)	2348	50	2349	45
	Mercator - Rodenhuize/Horta (74)	2349	33	2349	53
RTE	Attaques - Warande 2	3780	57	3780	58
	Avelin - Gavrelle	2622	34	2622	55
	Avelin - Warande	3458	13	3458	5
	Lonny - Seuil	4149	22	4149	27
	Mandarins - Warande 1	3780	53	3780	55
	Muhlbach - Scheer	2598	16	2598	14
	Revigny - Vigy	2596	37	2596	46
	Warande - Weppes	3458	19	3458	10



X < 50 % of I<sub>max</sub>

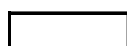


50 ≤ X < 75 % of I<sub>max</sub>



X ≥ 75 % of I<sub>max</sub>

TSO	Voltage	Line (380 kV)	10:30		19:30	
			I <sub>max</sub> (A)	% of I <sub>max</sub>	I <sub>max</sub> (A)	% of I <sub>max</sub>
50 HzT	380 kV	Eisenach - Mecklar (450-2)	2520	20	2520	15
		Hagenwerder - Mikulowa (567)	2520	12	2520	13
		Hagenwerder - Mikulowa (568)	2520	12	2520	13
		Remptendorf - Redwitz (413)	3485	29	3507	31
		Remptendorf - Redwitz (414)	3485	29	3507	31
		Röhrsdorf - Hradec (445)	2520	8	2520	10
		Röhrsdorf - Hradec (446)	2520	8	2520	10
		Vieselbach - Mecklar (449-1)	2520	24	2520	20
		Wolmirstedt - Helmstedt (491-1)	2400	1	2400	4
		Wolmirstedt - Helmstedt (492-2)	2400	1	2400	4
	220 kV	Vierraden - Krajnik (507)	1352	0	1352	0
		Vierraden - Krajnik (508)	1352	0	1352	0



X < 50 % of I<sub>max</sub>



50 ≤ X < 75 % of I<sub>max</sub>



X ≥ 75 % of I<sub>max</sub>

## Special topologies at 10:30 and 19:30

Nodes in North area				
			10:30	19:30
380 kV	Elia	Doel	1	1
		Avelgem	1	1
	Rte	Warande	1	1
		Cergy	2	2
		Terrier	1	1
		Plessis Gassot	1	1
		Mery/Seine	2	2
		Muhlbach	1	1
		Vigy	2	2
	Transnet bw	Eichstetten	1	1
	Amprion	Uchtelfangen	1	1
	Tennet DE	Redwitz	1	1
	50 HzT	Remptendorf	1	1
		Wolmirstedt	1	1
	CEPS	Hradec Vychod	1	1
220 kV	50 HzT	Pasewalk	1	1

## North analyses results

Security analyses have been performed for 24 timestamps.

All remedial actions have been agreed with concerned TSO during the day ahead process.

### Constraints on Elia, RTE (North) and 50HzT 400kV grids and tie-lines

TSO	Validity	Contingency				Constraint					Timestamps of max
		U (kV)	Substation 1	Substation 2	Code	Overload	U (kV)	Substation 1	Substation 2	Code	
		No constraint detected.									

### Constraints greater than 100% on NL + Amprion 400kV grids and greater than 120% on DE, CZ, PL and SK 400kV grids

TSO	Validity	Contingency				Constraint					Timestamps of max
		U (kV)	Substation 1	Substation 2	Code	Overload	U (kV)	Substation 1	Substation 2	Code	
		No constraint detected.									

### Constraints on ELIA 220/150kV grid at 10:30

Contingency				Constraint					Comments
U (kV)	Substation 1	Substation 2	Code	Overload	U (kV)	Substation 1	Substation 2	Code	
400	Avelgem	Busbar	1	121%	150	Brugge	Slykens		07:00 - 21:00
400	Avelgem	Busbar	2	112%	150	Izegem	Wevelgem		07:00 - 15:00
400	Mercator	Busbar	2A	130%	150	Lillo	Zandvliet		06:00 - 24:00

## 50HzT DC loopflows sensitivity

Vierraden-Krajnik 220kV axis in long term outage till 2018.

## South analyses results

Security analyses have been performed for these 2 timestamps:

- Off-peak period (23:00 – 07:00): **05:30**
- Peak period (07:00 – 23:00): **08:30**

Adaptations made on merged DACFs:

### Off-peak:

- SI → IT physical flow adapted to the target flow : **800 MW** , Divaca PST forced to tap -26
- Mendrisio-Cagno flow adapted to the schedule : **150 MW**
- PST of Lienz adapted to **150 MW**
- PST of Camporosso adapted to **150 MW**

### Peak:

- SI → IT physical flow adapted to the target flow : **800 MW** , Divaca PST forced to tap -26
- Mendrisio-Cagno flow adapted to the schedule : **200 MW**
- PST of Lienz adapted to **150 MW**
- PST of Camporosso adapted to **150 MW**

## Special topologies

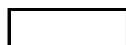
Nodes in South area				
			Off Peak	Peak
380 kV	Swissgrid	Sils	1	1
		Robbia	2	2
	Rte	Génissiat	1	1
		Albertville	2	2
		Grande Ile	1	1
	Terna	Turbigo	1	1
		Baggio	1	1
		Bovisio	<b>1</b>	<b>2</b>
		Ostiglia	1	1

## N state flows Off-Peak & Peak

The I<sub>max</sub> and load values in the table below are extracted from the **adapted** merged TSOs' DACF.

TSO	Voltage	Line (380 kV)	Off Peak		Peak	
			I <sub>max</sub> (A)	% of I <sub>max</sub>	I <sub>max</sub> (A)	% of I <sub>max</sub>
Terna	380 kV	Albertville - Rondissone 1	2370	54	2370	54
		Albertville - Rondissone 2	2370	56	2370	56
		Bulciago - Soazza	2300	23	2300	23
		Cagno - Mendrisio	855	42	855	42
		Musignano - Lavorgo	2270	73	2270	73
		Redipuglia - Divaca	2700	37	2700	37
		Robbia - San Fiorano	2530	73	2530	73
		Robbia - Gorlago	2530	78	2530	78
		Venaus - Villarodin	2715	25	2715	25
	220 kV	Airolo - Ponte	900	20	900	20
		Lienz - Soverzene	750	49	750	49
		Menton - Campo Rosso	1165	33	1165	33
		Padriciano - Divaca	960	66	960	66
		Riddes - Avise	1010	0	1010	0
		Riddes - Valpelline	1010	82	1010	82
		Serra - Pallanzeno	900	58	900	58

For Terna:



X < 50 % of I<sub>max</sub>



50 ≤ X < 75 % of I<sub>max</sub>



X ≥ 75 % of I<sub>max</sub>

### Sensitivity coefficients for the Pentalateral instruction

The amount of the control program curtailment on peak and off-peak can be calculated thanks to the sensitivities in the table below:

		FR → IT	CH → IT	AT → IT	SI → IT
Off Peak	Initial physical flows on adapted base case	2585	3459	146	865
	Compensation ratio (calculated from NTC)	39%	49%	4%	8%
	Pentalateral impact on physical flows	-27%	-55%	-4%	-15%
Peak	Initial physical flows on adapted base case	2373	4925	148	942
	Compensation ratio (calculated from NTC)	37%	50%	4%	9%
	Pentalateral impact on physical flows	-28%	-53%	-4%	-15%

## OFF PEAK

### Off Peak constraints on APG, Eles, RTE (South), Swissgrid and Terna 400kV grids and tie-lines

	TSO	Contingency				Constraint				
		U (kV)	Substation 1	Substation 2	Code	Overload	U (kV)	Substation 1	Substation 2	Code
Off Peak	RTE	380	Albertville	Grande Ile	N-K	106% 1'	220	Albertville	Longefan	
						96% 1'	220	Passy	Pressy	
						101% 20'	220	Malgovert	Pressy	
		Preventive action : 2 nodes in Malgovert substation => 114% 20' remaining on Albertville longefan. Curative action : Thermal monitoring (Night thresholds) or increase taps on La Praz PST.								
	Terna / APG / Eles	380	Redipuglia Planais	ATD	N-K	103%	220	Lienz	Soverzene	

## PEAK

### Peak constraints on APG, Eles, RTE (South), Swissgrid and Terna 400kV grids and tie-lines

	TSO	Contingency				Constraint				
		U (kV)	Substation 1	Substation 2	Code	Overload	U (kV)	Substation 1	Substation 2	Code
Peak	SWG / TERNA / APG	380	Robbia	Filisur	N-K	121%	380	Lavorgo	Musignano	
				Pradella - Sils		123%	220	Lienz	Soverzene	
		<b><u>Preventive actions</u></b> : la Praz PST in tap 1 and increase 5 taps on Lavorgo PST => respectively 119% and 114% remaining <b>THEN</b> <b>900MW CH-IT bilateral reduction =&gt; respectively 98% and 102%remaining.</b> <b>=&gt; <u>Pentalateral procedure</u> will be required with 1100MW pro quota.</b>								
		<b><u>Curative action</u></b> : decrease 1 tap on Lienz PST => 95% remaining								
	SWG / TERNA	380	La Punt	Sils	N-K	110%	380	Filisur	Sils	
Pradella				111%		380	Filisur	Robbia		
Respectively 97% and 98% remaining after applying above preventive remedial actions.										

### Final PSTs settings

The tables below present the tap positions and the physical flows on different PSTs with the adaptations described at the top of the page (IT-SI target flow...) and preventive actions (before Pentalateral reduction).

PST	Off Peak	
	Tap position	Physical flow to Italy (MW)
La Praz (1/33)	17	470
Rondissone 1 (1/33)	30	891
Rondissone 2 (1/33)	33	845
Camporosso (-32/32)	2	151
Lienz (-32/32)	-27	149
Padriciano (1/33)	33	252
Divaca (-32/32 each)	-26	691

PST	Peak	
	Tap position	Physical flow to Italy (MW)
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Rondissone 2 (1/33)	33	845
Camporosso (-32/32)	2	151
Lienz (-32/32)	-27	149
Padriciano (1/33)	33	252
Divaca (-32/32 each)	-26	691

## Conclusion

CWE: No constraint detected.

CEE: No constraint detected.

CSE: Pentalateral reduction is needed to solve constraints.