

<p><b><u>CORESO Engineers</u></b></p> <p><b><u>North :</u></b> ROCHET Jonathan</p> <p><b><u>South :</u></b> HECKMANN Steffi</p>	<p><b>Day Ahead report for</b></p> <p><b>03 February 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: Critical constraints detected on SI-IT border which requires pentilateral reduction of 200 MW for the off-peak and 1000 MW for the peak.</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 Pentilateral 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]	10 500	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	6	3000
				Boxberg		500	2	2800
						900	2	
				Schw. Pumpe		800	2	1600
				Lippendorf		920	2	1840
RTE			RTE	Gravelines	Pmax (MW)	900	5	4500
Peak load [MW]	73 000	13:00		Chooz		1500	2	3000
				Cattenom		1300	3	3900
Generation Margin	Sufficient			Fessenheim		900	1	900
				Penly		1300	2	2600
NATIONAL GRID (UK time)				Paluel		1300	3	3900
Peak load [MW]	44000	17:45		Nogent s/ Seine		1300	2	2600
				Bugey		900	4	3600
Generation Margin	Sufficient			St Alban		1300	1	1300
				Cruas		900	3	2700
TERNA				Tricastin		900	4	3600
Peak load [MW]	39072	19:30						
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:

**CWE:** Forced outage of Gravelines 1 and Cattenom 4. Gravelines 4 outage is canceled. Margin remains sufficient.

CWE / CEE

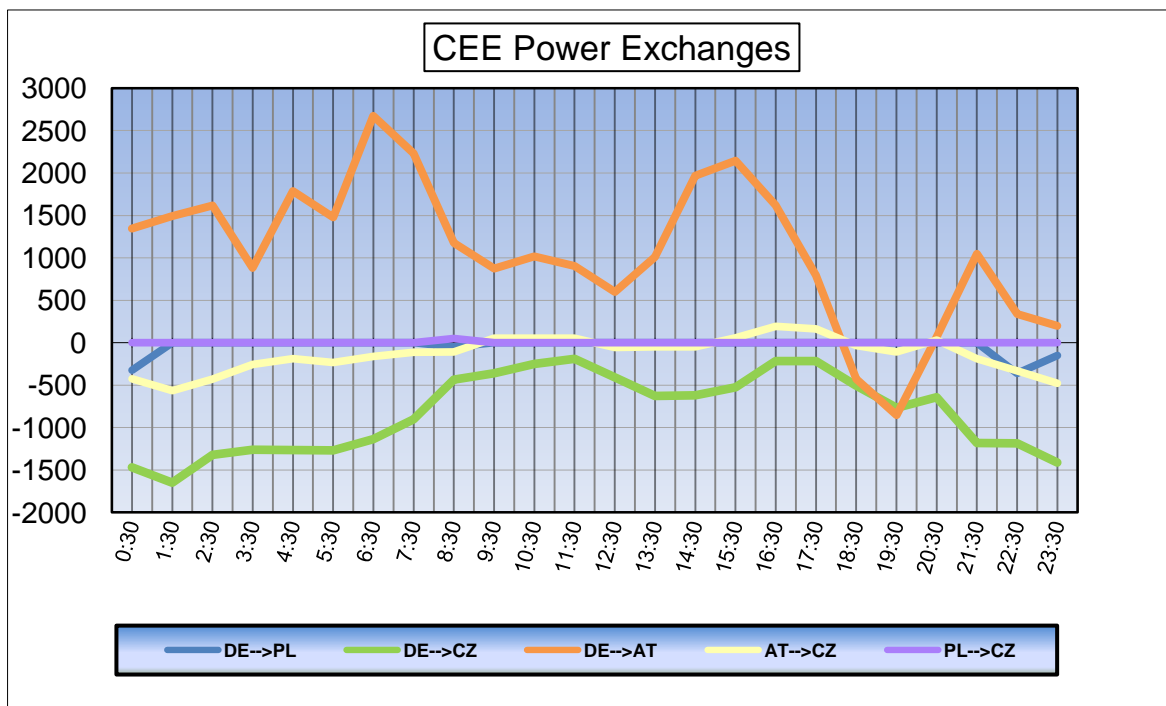
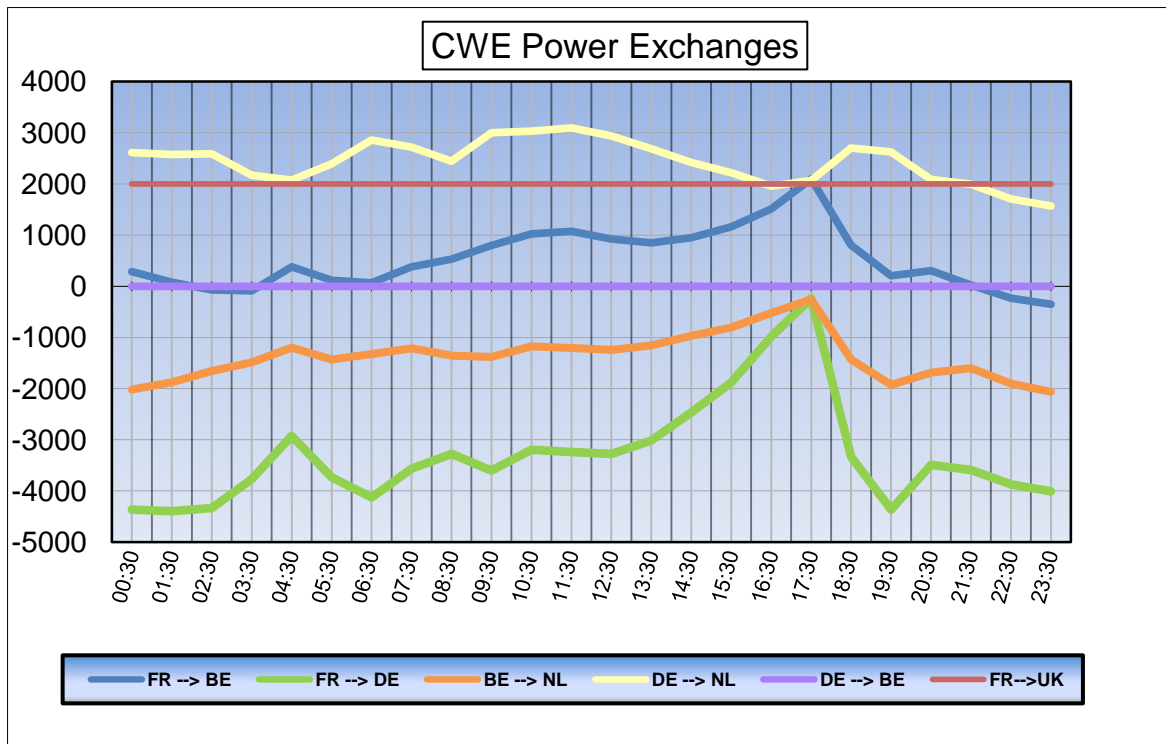
CSE

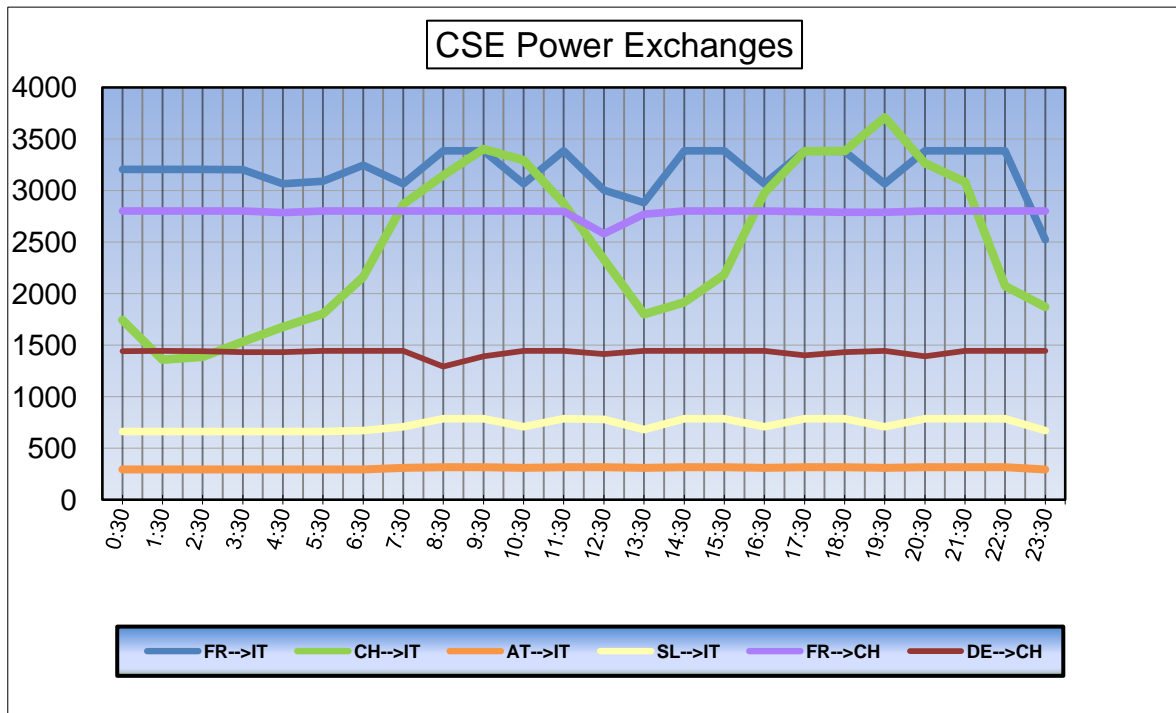
## Outages table

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	EULA _ Wolkramhausen 357 220 kV	28/01/2018	04/02/2018		
50HzT	Line	HAGENWERDER _ SCHMÖLLN 554 400 kV	22/01/2018	09/02/2018	permanently	
50HzT	Line	RAGOW _ WUSTERMARK 521 400 kV	28/01/2018	04/02/2018		
50HzT	Line	WOLMIRSTEDT _ WUSTERMARK 494 400 kV	28/01/2018	04/02/2018		
AMP / TEN DE	Line	NEHDEN _ TWISTETAL W 400 kV	08/01/2018	23/02/2018	daily	
CEPS / SEPS	Line	NOSOVIC _ VARIN 404 400 kV	15/01/2018	02/03/2018	permanently	
CREOS	Line	BERTRANGE _ SCHIFFLANGE West 220 kV	08/01/2018	02/03/2018		
ELES / HOPS	Line	KRSKO _ TUMBRI 1 400 kV	22/01/2018	02/03/2018	permanently	
ELIA	Line	DOEL _ MERCATOR 52 400 kV	01/02/2018	07/02/2018	permanently	
ELIA	Line	GEZELLE _ MAERLANT 109 400 kV	25/01/2018	09/02/2018	permanently	
ELIA	Line	GEZELLE _ STEVIN 111 400 kV	19/09/2017	02/03/2018	permanently	
ELIA	Line	MAERLANT _ GEZELLE 110 400 kV	25/01/2018	09/02/2018	permanently	
ELIA	Nuc.Gen	DOEL _ Unit 3 (1000MW) 400 kV	23/09/2017	16/04/2018	forced outage	
PSE	Fossil.Gen	DOLNA ODRA _ Unit 7 400 kV	30/01/2018	07/02/2018		
PSE	Fossil.Gen	KOPANINA _ Laziska Unit 12 225 kV	31/01/2018	04/02/2018		
PSE	Line	LESNIOW _ MIKULOWA 220 kV	02/02/2018	04/02/2018	permanently	
RTE	Line	CHEVALET _ ARGOEUVES 1 380 kV	24/01/2018	23/02/2018		
RTE	Line	CHEVALET _ ARGOEUVES 1 380 kV	24/01/2018	23/02/2018		
RTE	Line	CREYS _ ST VULBAS 1 400 kV	31/01/2018	07/02/2018		
RTE	Line	GENISSIAT _ VIELMOULIN 1 400 kV	29/01/2018	23/02/2018		
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	CHAMOSON _ MUHLEBERG "Sanetsch 2" 220 kV	24/10/2017	30/03/2018		
S.GRID	Line	CHATELARD _ NANT DE DRANCE 400 kV	16/01/2018	27/04/2018		
S.GRID	Line	HANDECK _ MOREL 220 kV	17/01/2018	06/02/2018		
S.GRID	Line	LIMMERN _ TIERFEHD 1 400 kV	28/01/2018	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	
S.GRID	Transformer	BASSE COURT _ Transformer 400 kV	13/12/2017	31/03/2018	Trfo 32	
TENNET DE	Generation	KUHTAI _ Unit 1 220 kV	02/10/2017	31/01/2019	142 MW	
TENNET DE	Generation	KUHTAI _ Unit 2 220 kV	01/01/2017	01/10/2019	142 MW	
TENNET DE	Generation	SILZ _ 2 220 kV	01/10/2017	01/10/2019	250 MW	
TENNET DE	Generation	SILZ _ Unit M1 TIWAG 220 kV	01/10/2017	31/12/2018	250 MW	
TENNET DE	Hydro.Gen	WALDECK _ UNIT 5 400 kV	15/01/2018	30/11/2018	240 MW	
TENNET DE	Hydro.Gen	WALDECK _ UNIT 6 400 kV	15/01/2018	14/02/2018	240 MW	
TENNET DE	Line	JARDELUND _ AUDORF Grün 380 kV	22/01/2018	05/02/2018	daily	

Owner	Type of element	Line name	start	end	Comments
TENNET NL	Line	BLEISWIJK _ KRIMPEN WT 400 kV	29/01/2018	03/02/2018	
TENNET NL	Line	BLEISWIJK _ KRIMPEN ZT 400 kV	29/01/2018	03/02/2018	
TENNET NL	Line	ENS _ ZWOLLE WT 400 kV	03/02/2018	09/02/2018	
TransnetBW	Fossil.Gen	RHEINHAFEN _ Unit RDK Block 8 400 kV	01/01/2018	05/02/2018	800 MW
TransnetBW	Line	BUNZWANGEN _ LAICHINGEN Grün 380 kV	01/01/2018	24/02/2018	
TransnetBW	Line	NEUROT _ PHILIPPSBURG RT 400 kV	15/01/2018	07/02/2018	daily

## Exchange program forecasts





## ELIA expected flows & PSTs tap position

		Node 1	Node 2	Order	03:30	07:30	08:30	10:30	11:30	12:30	16:30	17:30	18:30	19:30	20:30	23:30
BE	FR	ACHENE	LONNY	380.19	257	297	209	84	69	113	-45	-191	224	319	289	424
BE	FR	AUBANGE	MONT ST MARTIN	220.51	25	58	6	-60	-59	-58	-83	-105	-12	12	30	58
BE	FR	AUBANGE	MOULAIN	220.51	15	39	-10	-76	-75	-69	-95	-118	-24	-2	17	43
BE	FR	AVELGEM	AVELIN	380.80	-47	51	-55	-92	-159	-118	-463	-704	-166	123	84	308
BE	FR	AVELGEM	MASTAING	380.79	-189	-209	-266	-355	-376	-342	-441	-580	-358	-240	-214	-95
BE	FR	MONCEAU	CHOOZ	220.48	-134	-140	-149	-179	-181	-170	-181	-217	-175	-146	-125	-100
BE	NL	VAN EYCK 1	MAASBRACHT	380.27	-606	-661	-608	-634	-627	-629	-469	-425	-673	-749	-686	-760
BE	NL	VAN EYCK 2	MAASBRACHT	380.28	-346	-353	-267	-219	-204	-227	0	138	-190	-390	-402	-548
BE	NL	ZANDVLIET	BORSSELE	380.29	-297	-427	-592	-554	-553	-566	-456	-407	-619	-704	-685	-568
BE	NL	ZANDVLIET	GEERTRUIDENBERG	380.30	-117	-120	-67	3	26	3	180	273	-89	-239	-200	-382
BE	LU	BELVAL	SCHIFFLANGE	220.511	28	-139	-95	-131	-154	-118	7	-36	-164	-127	-117	-105

BE	FR	TOTAL		-73	96	-265	-678	-781	-644	-1308	-1915	-511	66	81	638
BE	NL	TOTAL		-1366	-1561	-1534	-1404	-1358	-1419	-745	-421	-1571	-2082	-1973	-2258
BE	LU	TOTAL		28	-139	-95	-131	-154	-118	7	-36	-164	-127	-117	-105
TOTAL BELGIAN IMPORT/EXPORT				-1411	-1604	-1894	-2213	-2293	-2181	-2046	-2372	-2246	-2143	-2009	-1725

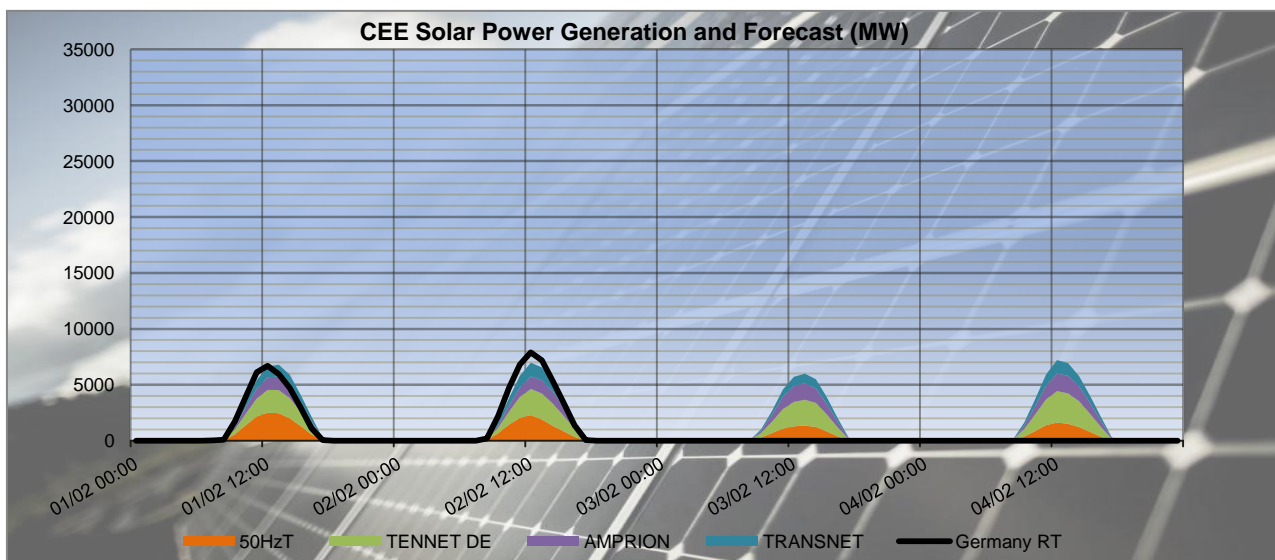
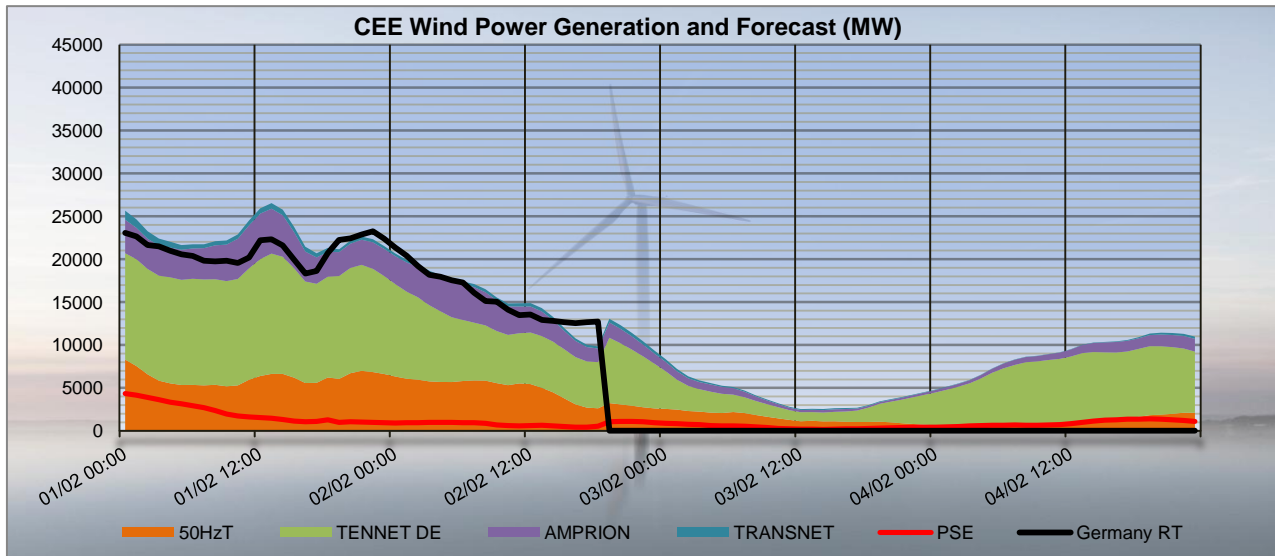
PST taps in DACF	Zandvliet 1	12	12	12	12	12	12	12	12	12	12	12	12	12
	Zandvliet 2	12	12	12	12	12	12	12	12	12	12	12	12	12
	Van Eyck 1	15	15	15	15	15	15	15	15	15	15	15	15	15
	Van Eyck 2	15	15	15	15	15	15	15	15	15	15	15	15	15
	Average	14	14	14	14	14	14	14	14	14	14	14	14	14

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

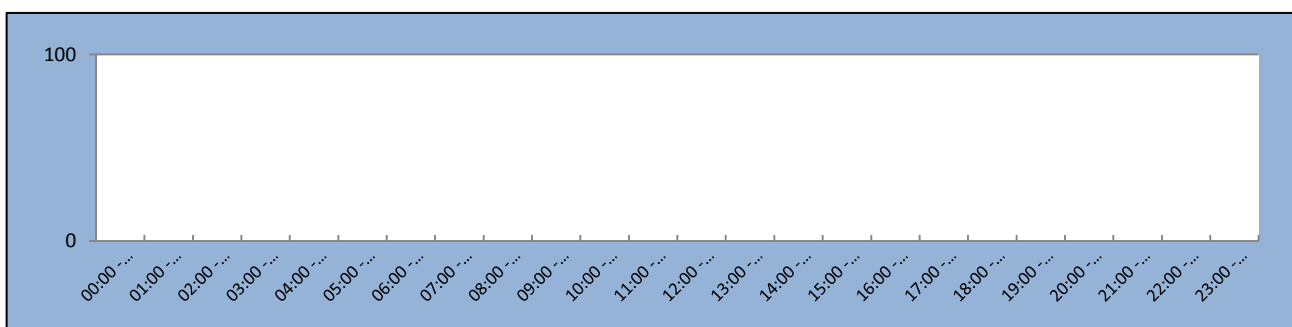
Timestamps	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
PSTs																								
Zandvliet PST 1	[1;35]	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Zandvliet PST 2	[1;35]	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12
Van Eyck PST 1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



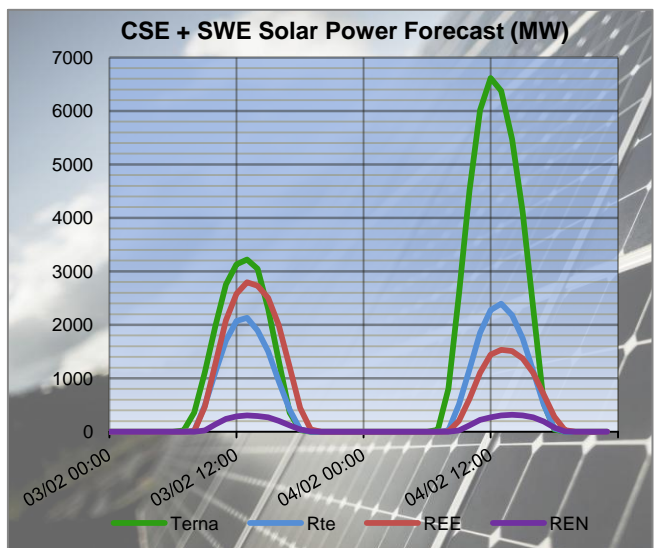
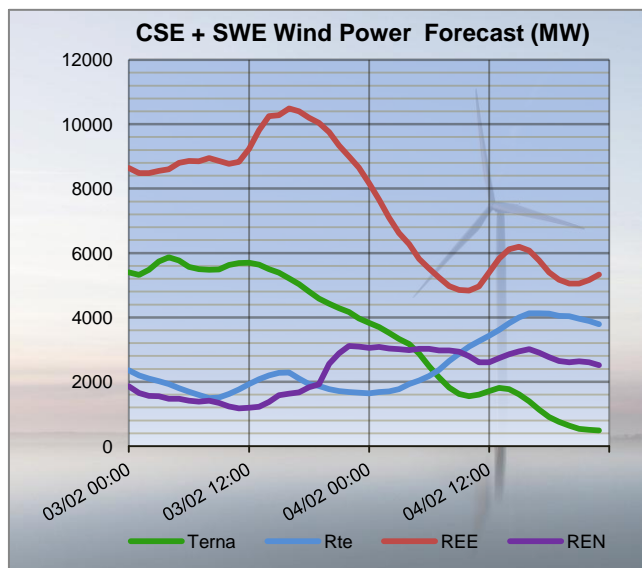
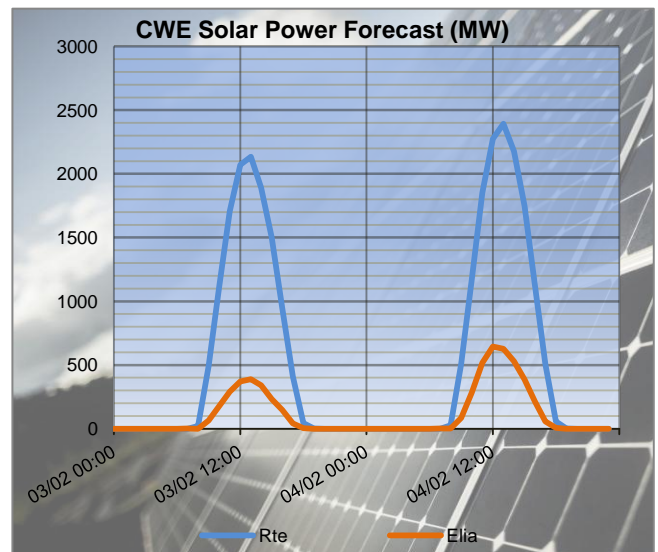
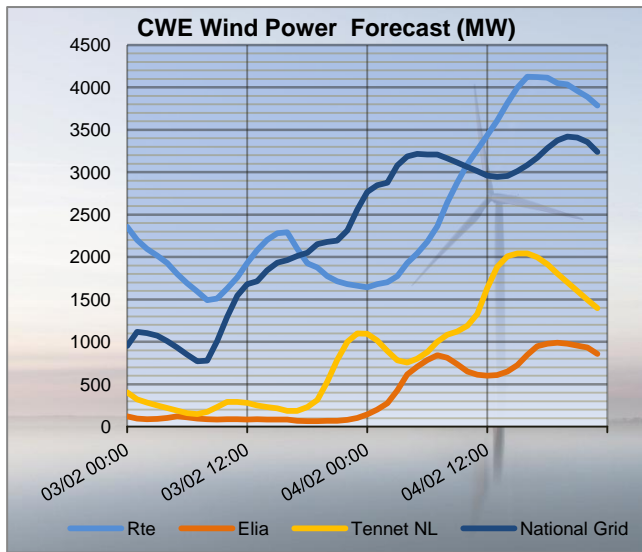
The charts above show the wind and solar generation forecasts for the TSOs in CEE (most significant) from D+1 until D-2 and the realised generation in Germany in real time. Source: Meteologica and 50HzT (RT)

## 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	-225	-257	-32	-106	-297	-191	60	-84	-144	102	-113	-215
FR	BE	MONT ST MARTIN	AUBANGE	-53	-25	28	-21	-58	-37	51	60	9	40	58	18
FR	BE	MOULAIN	AUBANGE	-41	-15	26	-5	-39	-34	67	76	9	51	69	18
FR	BE	AVELIN	AVELGEM	36	47	11	8	-51	-59	64	92	28	36	118	82
FR	BE	MASTAING	AVELGEM	212	189	-23	261	209	-52	356	355	-1	308	342	34
FR	BE	CHOOZ	MONCEAU	126	134	8	146	140	-6	200	179	-21	215	170	-45
FR	DE	MUHLBACH	EICHSTETTEN	-97	161	258	-200	146	346	-195	17	212	-249	0	249
FR	DE	VOGELGRUN	EICHSTETTEN	-95	-14	81	-87	2	89	-65	14	79	-83	13	96
FR	DE	ST AVOLD	ENSDORF	0	0	0	0	0	0	0	0	0	0	0	0
FR	DE	VIGY	ENSDORF 1	-163	84	247	-126	-18	108	-43	123	166	-131	94	225
FR	DE	VIGY	ENSDORF 2	-308	-21	287	-117	29	146	-44	150	194	-135	118	253

				17:30			19:30			23:30		
		Node 1	Node 2	DACF	Merge	Delta	DACF	Merge	Delta	DACF	Merge	Delta
FR	BE	LONNY	ACHENE	429	191	-238	-63	-319	-256	-97	-424	-327
FR	BE	MONT ST MARTIN	AUBANGE	102	105	3	-41	-12	29	-48	-58	-10
FR	BE	MOULAIN	AUBANGE	115	118	3	-26	2	28	-33	-43	-10
FR	BE	AVELIN	AVELGEM	618	704	86	-294	-123	171	-277	-308	-31
FR	BE	MASTAING	AVELGEM	536	580	44	155	240	85	130	95	-35
FR	BE	CHOOZ	MONCEAU	254	217	-37	181	146	-35	145	100	-45
FR	DE	MUHLBACH	EICHSTETTEN	363	469	106	-195	-74	121	-217	19	236
FR	DE	VOGELGRUN	EICHSTETTEN	42	78	36	-92	-21	71	-90	-19	71
FR	DE	ST AVOLD	ENSDORF	0	0	0	0	0	0	0	0	0
FR	DE	VIGY	ENSDORF 1	388	516	128	-445	-24	421	-418	-89	329
FR	DE	VIGY	ENSDORF 2	503	641	138	-465	-15	450	-468	-96	372

				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	225	134	-91	97	150	53	31	-11	-42	45	-64	-109
FR	CH	MAMBELIN	BASSECCOURT	-216	-174	42	-282	-183	99	-241	-195	46	-239	-200	39
FR	CH	SIERENTZ	BASSECCOURT	696	610	-86	571	549	-22	464	423	-41	487	429	-58
FR	CH	BOIS TOLLLOT	ROMANEL	87	18	-69	69	45	-24	-5	37	42	76	84	8
FR	CH	SIERENTZ	LAUFENBURG	217	221	4	107	167	60	42	37	-5	39	28	-11
FR	CH	CORNIER	RIDDES	-78	-35	43	-52	-10	42	-44	-16	28	-34	5	39
FR	CH	CORNIER	ST TRIPHON	-125	-65	60	-90	-42	48	-66	-33	33	-53	-12	41
FR	CH	PRESSY	VALLORCINES	-223	-135	88	-179	-94	85	-161	-112	49	-141	-66	75
FR	CH	BOIS TOLLLOT	VERBOIS	135	188	53	155	0	-155	157	0	-157	167	0	-167
FR	CH	GENISSIAT	VERBOIS	75	89	14	88	131	43	98	152	54	111	175	64
FR	CH	GENISSIAT	VERBOIS	75	89	14	88	131	43	98	152	54	111	175	64
FR	IT	ALBERTVILLE	RONDISSONE	601	348	-253	696	558	-138	821	673	-148	725	499	-226
FR	IT	ALBERTVILLE	RONDISSONE	617	278	-339	756	624	-132	892	706	-186	779	444	-335
FR	IT	MENTON	CAMPOROSSO	259	-39	-298	150	0	-150	154	81	-73	158	106	-52
FR	IT	VILLARODIN	VENAUS	108	219	111	409	464	55	742	738	-4	599	675	76

				17:30			19:30			23:30		
		Node 1	Node 2	DACF	Merge	Delta	DACF	Merge	Delta	DACF	Merge	Delta
FR	CH	SIERENTZ	ASPHARD	370	278	-92	90	-53	-143	45	93	48
FR	CH	MAMBELIN	BASSECCOURT	6	1	-5	-285	-274	11	-269	-197	72
FR	CH	SIERENTZ	BASSECCOURT	403	415	12	543	468	-75	624	552	-72
FR	CH	BOIS TOLLLOT	ROMANEL	-38	109	147	-177	-119	58	-21	-25	-4
FR	CH	SIERENTZ	LAUFENBURG	298	240	-58	110	14	-96	125	143	18
FR	CH	CORNIER	RIDDES	-31	38	69	-94	-51	43	-77	-26	51
FR	CH	CORNIER	ST TRIPHON	-41	23	64	-124	-73	51	-101	-47	54
FR	CH	PRESSY	VALLORCINES	-201	-37	164	-256	-156	100	-193	-121	72
FR	CH	BOIS TOLLLOT	VERBOIS	183	205	22	138	140	2	164	171	7
FR	CH	GENISSIAT	VERBOIS	123	164	41	78	82	4	107	107	0
FR	CH	GENISSIAT	VERBOIS	123	164	41	78	82	4	107	107	0
FR	IT	ALBERTVILLE	RONDISSONE	949	798	-151	762	352	-410	510	211	-299
FR	IT	ALBERTVILLE	RONDISSONE	1058	859	-199	861	609	-252	561	146	-415
FR	IT	MENTON	CAMPOROSSO	151	191	40	152	104	-48	144	23	-121
FR	IT	VILLARODIN	VENAUS	877	855	-22	696	645	-51	366	531	165

## 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	44	2448	45
	Doel - Mercator (51)	2239	43	2239	51
	Doel - Mercator (52)	2239	0	2239	0
	Doel - Mercator (54)	2448	43	2448	51
	Doel - Zandvliet (25)	2278	12	2349	20
	Mercator - Horta (73)	2569	28	2569	38
	Courcelles - Gramme (31)	2348	49	2349	51
	Mercator - Rodenhuize/Horta (74)	2349	34	2349	45
RTE	Attaques - Warande 2	3780	50	3780	58
	Avelin - Gavrelle	2622	30	2622	44
	Avelin - Warande	3458	6	3458	9
	Lonny - Seuil	4149	21	4149	26
	Mandarins - Warande 1	3780	46	3780	54
	Muhlbach - Scheer	2598	15	2598	16
	Revigny - Vigy	2596	40	2596	46
	Warande - Weppes	3458	12	3458	15



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

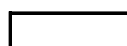


50 ≤ X < 75 % of I<sub>max</sub>



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	36	2520	28
		Hagenwerder - Mikulowa (567)	2520	20	2520	11
		Hagenwerder - Mikulowa (568)	2520	20	2520	11
		Remptendorf - Redwitz (413)	3529	40	3551	38
		Remptendorf - Redwitz (414)	3529	40	3551	38
		Röhrsdorf - Hradec (445)	2520	16	2520	7
		Röhrsdorf - Hradec (446)	2520	16	2520	7
		Vieselbach - Mecklar (449-1)	2520	37	2520	31
		Wolmirstedt - Helmstedt (491-1)	2400	12	2400	5
		Wolmirstedt - Helmstedt (492-2)	2400	12	2400	5
	220 kV	Vierraden - Krajnik (507)	1352	0	1361	0
		Vierraden - Krajnik (508)	1352	0	1361	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	
380	Massenhoven	Busbar		111%	150	Lillo	Zandvliet	150.117	

## 50HzT DC loopflows sensitivity

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

## South analyses results

Security analyses have been performed for these 2 timestamps:

- Off-peak period (23:00 – 07:00): **03:30**
- Peak period (07:00 – 23:00): **19:30**

Adaptations made on merged DACFs:

### Off-peak:

- SI → IT physical flow adapted to **1200 MW** (not possible to reach the target flow of 800 MW)
- Mendrisio-Cagno flow adapted to the schedule : **78 MW**
- PST of Lienz adapted to **160 MW**
- PST of Camporosso adapted to **200 MW**
- PST of La Praz on **tap 1**

### Peak:

- SI → IT physical flow adapted to **1280 MW** (not possible to reach the target flow of 800 MW)
- Mendrisio-Cagno flow adapted to the schedule : **178 MW**
- PST of Lienz adapted to **180 MW**
- PST of Camporosso adapted to **200 MW**
- PST of La Praz on **tap 1**

## Special topologies

Nodes in South area				
			Off Peak	Peak
380 kV	Swissgrid	Sils	2	2
		Robbia	2	2
	Rte	Génissiat	1	1
		Albertville	2	2
		Grande Ile	1	1
	Terna	Turbigo	1	1
		Baggio	1	1
		Bovisio	2	2
		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	22	2370	24
		Albertville - Rondissone 2	2370	18	2370	41
		Bulciago - Soazza	2300	26	2300	41
		Cagno - Mendrisio	855	14	855	31
		Musignano - Lavorgo	2270	46	2270	61
		Redipuglia - Divaca	2700	44	2700	50
		Robbia - San Fiorano	2530	34	2530	49
		Robbia - Gorlago	2530	63	2530	75
		Venaus - Villarodin	2715	13	2715	37
	220 kV	Airolo - Ponte	900	19	900	17
		Lienz - Soverzene	750	52	750	58
		Menton - Campo Rosso	1165	41	1165	44
		Padriciano - Divaca	960	95	960	96
		Riddes - Avise	1010	10	1010	21
		Riddes - Valpelline	1010	10	1010	24
		Serra - Pallanzeno	900	24	900	41

For Terna:

<div></div>	X < 50 % of I <sub>max</sub>	<div></div>	50 ≤ X < 75 % of I <sub>max</sub>	<div></div>	X ≥ 75% of I <sub>max</sub>
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### 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	1092	3208	158	1196
	Compensation ratio (calculated from NTC)	40%	49%	4%	8%
	Pentalateral impact on physical flows	-27%	-56%	-4%	-14%
Peak	Initial physical flows on adapted base case	1954	4366	174	1284
	Compensation ratio (calculated from NTC)	37%	50%	4%	9%
	Pentalateral impact on physical flows	-27%	-55%	-4%	-14%

## 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	SWG / Terna / Eles	380	Sils - Filisur	Robbia - Pradella - Sils	N-2	145%	380/220	Redipuglia	Tfo	
						125%	220	Redipuglia	Monfalcone	
						116%	220	Padriciano	PST	
						112%	220	Padriciano	Divaca	
		<b>Preventive action:</b> Increase 5 taps on Divaca PST (from -32 to -27) => 98% remaining on Padriciano-Divaca, 101% on Padriciano PST, 117% on Monfalcone-Redipuglia, 132% on Redipuglia Tfo, 100% on Divaca PST  Then: <b>Pentalateral reduction of 200 MW</b> => 95% remaining on Padriciano-Divaca, 98% on Padriciano PST, 116% on Monfalcone-Redipuglia, 129% on Redipuglia Tfo, 97% on Divaca PST OR <b>Bilateral reduction IT-SI of 100 MW</b> => 95% remaining on Padriciano-Divaca, 98% on Padriciano PST, 116% on Monfalcone-Redipuglia, 129% on Redipuglia Tfo, 97% on Divaca PST								
	Terna / Eles / APG	380 / 220	Divaca	Redipuglia / Padriciano	N-2	125%	220	Lienz	Soverzene	
		<b>Curative action:</b> 2 nodes in Soverzene => 99% remaining								
	Eles / HOPS	380	Divaca	Melina		126%	220	Divaca	Pehlin	
		<b>Observability area:</b> No cascading effect after tripping the line Divaca-Pehlin								
	RTE	380	Albertville	Busbar	2A	105% (1')	220	Albertville	Longefan	
		<b>Preventive action:</b> Increase 5 taps on La Praz PST (from 1 to 6) => 99% (1') remaining <b>Curative action:</b> Change tap position to tap 23 on La Praz PST => 99% (20') remaining								
	RTE	380	Chaffard	Busbar	2B	103%	380	Chaffard	St Vulbas 1	
		Observability area								
After the preventive actions mentioned above, no more additional constraints detected.										



## 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 / Eles	380	Sils - Filisur	Robbia - Pradella - Sils	N-2	127%	380/220	Redipuglia	Tfo		
						118%	220	Redipuglia	Monfalcone		
						122%	220	Padriciano	PST		
						102%	380	Divaca	PST		
						112%	220	Lienz	Soverzene		
	<b>Pentalateral reduction of 1000 MW</b> => 105% remaining on Padriciano-Divaca, 109% on Padriciano PST, 112% on Monfalcone-Redipuglia, 118% on Redipuglia Tfo, 100% on Divaca PST, 92% on Lienz-Soverzene OR <b>Bilateral reduction IT-SI of 400 MW</b> => 96% remaining on Padriciano-Divaca, 99% on Padriciano PST, 106% on Monfalcone-Redipuglia, 107% on Redipuglia Tfo, 95% on Divaca PST  Then: <b>Preventive action:</b> Increase 3 taps on Divaca PST (from -29 to -26) => 97% remaining on Padriciano-Divaca, 99% on Padriciano PST, 107% on Monfalcone-Redipuglia, 110% on Redipuglia Tfo, 97% on Divaca PST, 88% on Lienz-Soverzene										
	Terna / Eles / APG	380 / 220	Divaca	Redipuglia / Padriciano	N-2	141%	220	Lienz	Soverzene		
										<b>With preventive actions above:</b> 116% remaining <b>Curative action:</b> 2 nodes in Soverzene => 96% remaining	
	<b>After the preventive actions mentioned above, no more additional constraints detected.</b>										

### 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)	6	110
Rondissone 1 (1/33)	16	304
Rondissone 2 (1/33)	17	362
Camporosso (-32/32)	-12	193
Lienz (-32/32)	-17	138
Padriciano (1/33)	33	304
Divaca (-32/32 each)	-27	963

PST	Peak	
	Tap position	Physical flow to Italy (MW)
La Praz (1/33)	1	383
Rondissone 1 (1/33)	31	574
Rondissone 2 (1/33)	15	321
Camporosso (-32/32)	-12	158
Lienz (-32/32)	-32	126
Padriciano (1/33)	33	293
Divaca (-32/32 each)	-26	899

## Conclusion

**CWE: No constraint detected.**

**CEE: No constraint detected.**

**CSE: Critical constraints detected on SI-IT border which requires pentilateral reduction of 200 MW for the off-peak and 1000 MW for the peak.**