

Subject: Congestion management on the Belgian transmission grid
 Date: 1 September 2016

Contact: Steven Harlem
 Phone: 0032 2 500 85 89
 Mail: steven.harlem@febeg.be

Introduction

To guarantee the security, effectiveness and reliability of the grid, Elia has to be able to coordinate the injection of electricity in the Belgian transmission grid and to use the capacities that are not used by the Belgian generators. To this end the CIPU-contract – the contract for the Coordination of the Injection of Production Units – establishes a framework that obliges generators to inform Elia about the availabilities of the units and that allows Elia to activate the capacities that are not used by the generator.

FEPEG calls Elia to evaluate and modify the rules in the CIPU-contract with regard to congestion management: FEPEG urges for (1) a level playing field between all grid users when applying the current mechanism of ‘red zones’, (2) the implementation of some ‘quick wins’ at short notice to improve the current mechanism and (3) a proper remuneration when restrictions are imposed to the grid users.

Tool of ‘red zones’

The CIPU-contract allows Elia – once the nominations are submitted according to the day-ahead procedure in CIPU-contract – to limit re-nominations in certain zones, i.e. the so called ‘red zones’. Indeed, in function of the expected congestions Elia can decide to cap – without any compensation – the nominations as they were submitted to Elia. Market operators with units in a red zone can thus no longer re-nominate their units to benefit from optimization opportunities in intraday or adapt their production plan in case of a forced outage of a generation unit.

Each day, at the end of the day-ahead procedure and based on the results of the load flow calculations, Elia will publish, if any, restrictions by electrical zone. Within the day, based on real-time events, Elia can at any moment modify or cancel these restrictions or add new ones.

Peak (9h - 20h)				
Zone	Increment	MW Cap (Inc)	Decrement	MW Cap (Dec)
Hainaut		-		-
Langerbrugge	↑	0		-
Off Peak				
Zone	Increment	MW Cap (Inc)	Decrement	MW Cap (Dec)
Langerbrugge	↑	0		-

These restrictions, also called ‘Network Constraints’, are characterized by:

- a direction: upwards/increment or downwards/decrement;
- a period: peak or off peak;
- a limit: volume above/below which Elia will not accept any additional MW.

As a consequence these ‘Network Constraints’ are technology neutral, operator neutral and applicable to all CIPU units in the red zones, independently of the precise location of the unit in the zone.

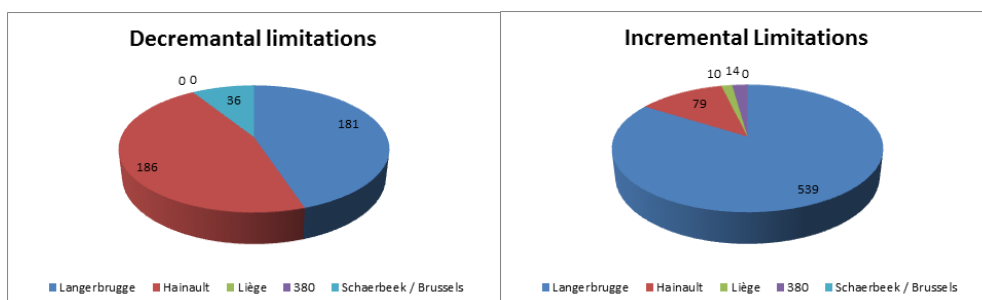
Evolution of the occurrence of red zones

The red zones can be linked to different root causes, e.g. a local network within the zone, the structural weakness of the interconnections between the zones, a connection problem with the 380 kV grid, ...

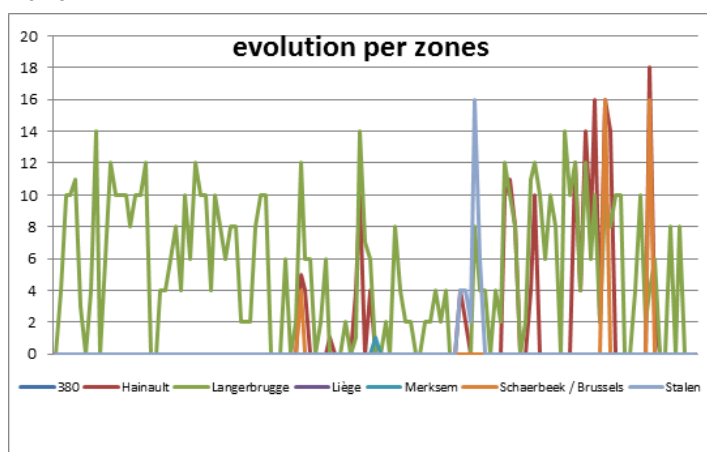
In the last years the occurrence of red zones – and the related ‘Network Constraints’ – has significantly increased (see annex 1):

- Units in the zone ‘Langerbrugge’ are most faced with ‘Network Constraints’ although the commissioning of the high voltage station ‘Stevin’¹ is expected to considerably improve the situation. The important growth of off shore wind generation capacities risks nevertheless to intensify the occurrence of ‘Network Constraints’ before 2018 and to continue to cause – notwithstanding the commissioning of ‘Stevin’ – ‘Network Constraints’ after 2018.
- Next to the increasing number of ‘Network Constraints’ in the zone ‘Langerbrugge’ the phenomenon of red zones is also further spreading: lately more ‘Network Constraints’ are occurring in zones that were normally not suffering from congestions at all, like for example the zone ‘Henegouwen’ or the zone ‘380 kV’.

The following two graphs show the number of ‘Network Constraints’ peak and off peak since January 2016:



The graph below presents the evolution of the ‘Network Constraints’ by zone since January 2016:



¹ The ‘Stevin’-project allows to reinforce the Belgian high voltage grid with a double high voltage connection of 380 kV over a distance of 47 kilometers between Zeebrugge and Zomergem. On top of that Elia is also constructing a new high voltage station at Zeebrugge and two new conversion stations at Brugge and Damme. This project is an important missing link for the electricity supply in Belgium, and especially at the seaside. ‘Stevin’ will facilitate the connection of the future off shore wind farms, the development of decentralized generation units at the seaside and the high voltage interconnection with the United Kingdom (NEMO).

- It is also important to point out that more often the zones ‘Langerbrugge’, ‘Henegouwen’ and ‘380 kV’ are congested at the same time, implying that multiple flexibility means situated in these zones (Coo, Plate-taille, Herdersbrug, ...) are simultaneously not available for the market.

Impact of the red zones on the generators

Due to the increasing share of renewables in the system, the short-term markets and especially the intraday market are becoming more volatile. Units in a red zone and having to respect the imposed restrictions will not be able to capture the price spikes in the market (opportunity cost). The mechanism of the red zones is therefore contradictory to the model of the ‘energy only market’ that assumes a remuneration of the generation units during price spikes.

While the mechanism of red zones generates no costs whatsoever for Elia, limiting the flexibility of the involved units creates an opportunity cost for the generator who can no longer valorize the flexibility of the unit in the market or compensate the loss of a generation unit (also when providing ancillary services to Elia). In other words: Elia shifts the impact of the weaknesses in its grid to the ARP’s. At the same time the mechanism impacts the balancing market and hampers the development and the growth of the intraday market. In fact, the mechanism of the ‘red zones’ risks to create 7 virtual pricing zones within the Belgian control area while it is off course the objective to strive for convergence of prices by integrating markets.

As the occurrence of ‘Network Constraints’ rises and is expected to grow further, the related opportunity cost for the generators is increasing significantly as well. Therefore, FEBEG insists on a level playing between all grid users as regards the application of ‘Network Constraints’ and calls for an evaluation and update of the mechanism of the red zones in order to properly remunerate the grid users that are impacted by these constraints.

FEBEG proposals

Level playing field between all grid users when applying the current mechanism of ‘red zones’

FEBEG is aware that the CIPU contract initially aimed at coordinating the injection of larger production units. Nevertheless, FEBEG supports the initiatives of Elia to gradually open the reserves market so that all grid users can make bids for balancing purposes. This means that CIPU units as well as non-CIPU units will be able to participate in the reserves market.

With regard to the bids of non-CIPU units, the following congestion management rule is proposed:

‘To ensure (1) a secure operation of the grid and (2) a level playing field with CIPU free bids, the delivery points with a $R_{ref} \geq 25$ MW that are located in a red zone, will not be considered when activating reserve’.

FEBEG doesn’t agree that this rule creates a level playing field between CIPU and non-CIPU bids, because in a certain red zone a bid of 1 MW of a non-CIPU unit ($R_{ref} \leq 25$ MW) will be accepted while a bid of 1 MW of a CIPU unit in the same zone would be refused.

FEBEG is of the opinion that the congestion management rules should be applied to all grid users in a transparent and non-discriminatory manner. Pending a more thorough review of the principle of the red zones, FEBEG sees four approaches to avoid discrimination between grid users:

- downstream approach:
 - o bids are offered as foreseen: delivery points grouped by product type, price, technology, ...;
 - o when selecting potential bids, Elia applies a 'red zone' filter for all bids without distinguishing between CIPU or non CIPU units:
 - Elia continuously checks all bids for compliancy with the red zones, i.e. Elia analyzes which delivery points of the bid are situated in a red zone and which ones not;
 - Elia restricts the activation of some bids – partially or totally depending on the list of delivery points – excluding all delivery points in a red zone;
 - o the FSP activates the bid partially according to the instructions of Elia;
- upstream approach:
 - o bids are offered by electrical zone: during the pre-qualification process the delivery point is linked to an electrical zone of which the FSP is informed;
 - o when selecting potential bids, Elia applies a 'red zone' filter for all bids without distinguishing between CIPU or non CIPU units: Elia only selects the bid that is not linked to a red zone (all or nothing approach like for CIPU);
 - o the FSP activates the offered bid.
- allow CIPU units to also increase or decrease their production with maximum 25 MW;
- group all flexibility – for balancing as well as for congestion management – by electrical zone.

Evaluation and modification of the mechanism of red zones

Introduction

The growing occurrence of red zones and related 'Network Constraints' increases the opportunity costs for generators having signed a CIPU contract. As the reserves market is gradually being opened to non-CIPU units, other market participants will be impacted as well.

Therefore, FEBEG urges for an evaluation and update of the mechanism of the red zones.

Weaknesses and some quick wins

FEBEG has identified some weaknesses in the current mechanism and therefore proposes some quick wins:

- Granularity:
The mechanism of the red zones is designed rather roughly in that sense that the restrictions are generally set for the whole selected time horizon (peak or off peak). A congestion in specific hour will thus lead to a restriction to all the generations in the zone for the whole period. A restriction will thus exclude any flexibility of any generation in that zone. FEBEG is of the opinion that the granularity of the restrictions – for the moment limited to peak and off-peak – is excessive and doesn't reflect the reality of the congestions. A smaller granularity, e.g. by quarter-hour, would allow generators to benefit more from opportunities in the intraday and balancing market.

23/06/2016 [dropdown] [dropdown] [dropdown] [dropdown] CST_22-06-2016-174429 [dropdown]

PEAK (9h - 20h)					
Zone	Increment	MW Cap	Decrement	MW Cap	
380					
Hainault			●	0	
Langerbrugge					
Liège					
Merksem					
Ruilen					
Schaerbeek / Brussels			●	0	
Stalen					

OFF-PEAK					
Zone	Increment	MW Cap	Decrement	MW Cap	
380					
Hainault			●	0	
Langerbrugge					
Liège					
Merksem					

- Static mechanism:
 FEBEG also proposes to make the mechanism more dynamic. For the moment, the constraints are not automatically recalculated if the situation changes: the dispatchers of the generators have to contact Elia to verify if a constraint has been removed or modified (manual operation). To allow grid users to adjust their positions in intraday as much as possible, it would be welcomed if Elia would be able to make its mechanism more dynamic and if Elia would automatically inform grid users when a 'Network Constraints' has been removed or modified.
- No level playing field between all grid users:
 Although the CIPU contract only focusses on larger generation units, FEBEG is of the opinion that the congestion management rules should be applied to all grid users – CIPU as well as non CIPU – in a transparent and non-discriminatory manner.
- Ancillary services:
 In case of forced outage of a generation unit providing ancillary services to Elia (R1, R2, ...), no penalty should be applied when another unit could make the lost R1 or R2 available from an asset that is not situated in a red zone.
- Lack of harmonization with neighboring markets:
 FEBEG also wants to emphasize that the French and German systems remunerate the generators for similar restrictions. FEBEG is convinced that TSO's should work towards a more harmonized mechanism for congestion management with the CWE: this would increase functioning of the integrated energy markets, create a level playing field between the grid users and be compatible with CACM that foresees the development of market-based mechanisms for congestion management.
- Not in line with CREG's principle:
 Last but not least, FEBEG also wants to point out that de CREG makes the following consideration in its study demand flexibility²: *'from the perspective of a well-functioning market, it is desirable that each activation blocked by the TSO is compensated'*. Following the same logic and from the perspective of a level playing field, FEBEG considers that producers should receive a compensation when they are limited in their production for congestion management reasons.

² CREG, 'Study ((F)160503-CDC-1459) on the means that have to be applied to facilitate the participation of the demand flexibility in the electricity markets in Belgium', 5th of May 2016

Proper remuneration when restrictions are imposed to the grid users

FEBEG urges Elia to move as soon as possible towards a mechanism that ensures a proper remuneration for grid users when restrictions are imposed. FEBEG considers this as realistic at short term as FEBEG is of the opinion that Elia is able to manage the congestions in its grid by using the existing tool of 'congestion bids', i.e. mechanism that sends a signal to a specific unit to change its position. This solution would have multiple advantages:

- the mechanism of imposing - non remunerated - 'network constraints' can be removed at short notice and replaced by the tool of the 'congestion bid' that already exists;
- Elia can use the tool of congestions bids proactively (to counter an expected congestion) or reactively (to solve a congestion);
- the grid user, whose congestion bid is called by Elia, will be properly remunerated according the prices communicated to Elia in intraday.

The assessment to call a congestion bid can be based on the current evaluation process for the red zones, but also on an improved and more refined methodology to determine congestions.

Conclusion

FEBEG calls Elia to evaluate and modify the rules in the CIPU-contract with regard to congestion management that are focused on generation units (≥ 25 MW). FEBEG is of the opinion that congestion management rules should be transparent, ensure a level playing field between all grid users and include a proper remuneration for the grid user that is impacted by restrictions imposed by Elia.

Therefore, FEBEG urges for (1) a level playing field between all grid users when applying the current mechanism of 'red zones', (2) the implementation of some 'quick wins' at short notice to improve the current mechanism and (3) the introduction of a proper remuneration when restrictions are imposed to the grid users.

Annex 1: Evolution of the red zones since 2012

CIPU foresees since 2013 that Elia publishes at the beginning of each year a report on the occurrence of the red zones in the preceding year.

2012

Count of ElectricalZoneCode		ElectricalZoneCode							Grand Total
Years	date	HT	LA	LG	MK	RU	SC	ST	
2012	jan		7	2		2		1	12
	feb	11	1	3		5	6		26
	mrt	3	3	1	1	1	7	2	18
	apr	9	11	4		16		1	41
	mei							1	1
	jun	8	1	1			7		17
	jul	4					5		9
	aug	1				2			3
	sep		4			7			11
	okt		1		2	2			5
	nov		1						1
	dec					5			5
2013	jan					5			5
	feb			1					1
	mrt					2			2
Grand Total		36	29	12	3	47	25	5	157

2013:

Count of ConstraintDirection		ElectricalZoneCode TariffPeriodName												
		HT		LA		LG		MK		RU		ST		
Year	Month	OffPeak	Peak	OffPeak	Peak	OffPeak	Peak	OffPeak	Peak	OffPeak	Peak	OffPeak	Peak	
2013	1											4		
	3		1	1	1					1	2			
	4					3	5					1	1	
	6		1											
	7		4	1	6									
	8		1		1									
	9		1		1									
	10				1	1	4	4	1	1			4	5
	11			3		5		5	4	3				4
	12		5	6	5	8	1	1					1	1
	Grand Total			5 17	8 24		8 15		5 4		1 6		6 11	

2014:

Count of counter		ElectricalZoneCode TariffPeriodName											
		HT		LA		LG		RU		SC		ST	
Year	Month	OffPeak	Peak	OffPeak	Peak	OffPeak	Peak	OffPeak	Peak	OffPeak	Peak	OffPeak	Peak
2014	1		7 8	2 2		5 7				1 1			4
	2		1 1	2 2						1 1			1
	3		1 4	1 4				1 1					
	4		3 3	3 3									
	5		2 2	5 6	4 8								2 2
	6		4 4		3							1	
	7		3 3	17 17									
	8		2 2	16 16	11 11								4 4
	9		3 3	15 16									1 1
	10		2 2	18 19		1							1
	11		2 5	9 9	1								
	12		1 1	12 13	4 4		1 1						5 5
Grand Total			31 38	100 110		25 31		2 2		2 3		12 18	

2015:

Count of counter		ElectricalZoneCode TariffPeriodName											
		HT		LA		LG	MK		SC		ST		
Year	Month	OffPeak	Peak	OffPeak	Peak	Peak	OffPeak	Peak	OffPeak	Peak	OffPeak	Peak	
2015	1		1 1	14 14					1 1				
	2		1 4	10 11					1 1				
	3		1 1	5 5	1						2 2		
	4		2 2	2 2								1	
	5		1 1	5 5									
	6		7 7						1 1				
	7		8 10										
	8		2 2	10 10			4 4				5 5		