

## Report on the level and causes of congestion on Romanian interconnection lines, in 2009

A congestion on a border appears when the access cannot be guaranteed on the ATC market for all the market players who have asked for it.

2009	Hungary		Bulgaria		Serbia		West Ukraine	
	export	import	export	import	export	import	export	import
Day Number with congestion	365	353	365	287	359	359	350	122
Day Number with interconnection OHLs maintenance (on borders with one interconnection OHL)	—	—	—	—	6	6	15	15
Annual Frequency of Congestion Occurrence (%)	100	97	100	79	98	98	96	33
Severity index	5	4	5	4	4	4	4	2

Severity index	0	1	2	3	4	5
Annual Frequency of Congestion Occurrence	0%	1-25%	26-50%	51-75%	76%-99%	100%

For the Annual Frequency of Congestion Occurrence (aFCO) the following formula has been used

$$\text{aFCO (\%)} = \text{NdC} * 100 / (366 - \text{NdM})$$

Where - NdC is the number of days with congestion

- NdM is the number of days with zero NTC value corresponding to the maintenance days on borders with a single interconnection line (Serbia, West Ukraine).

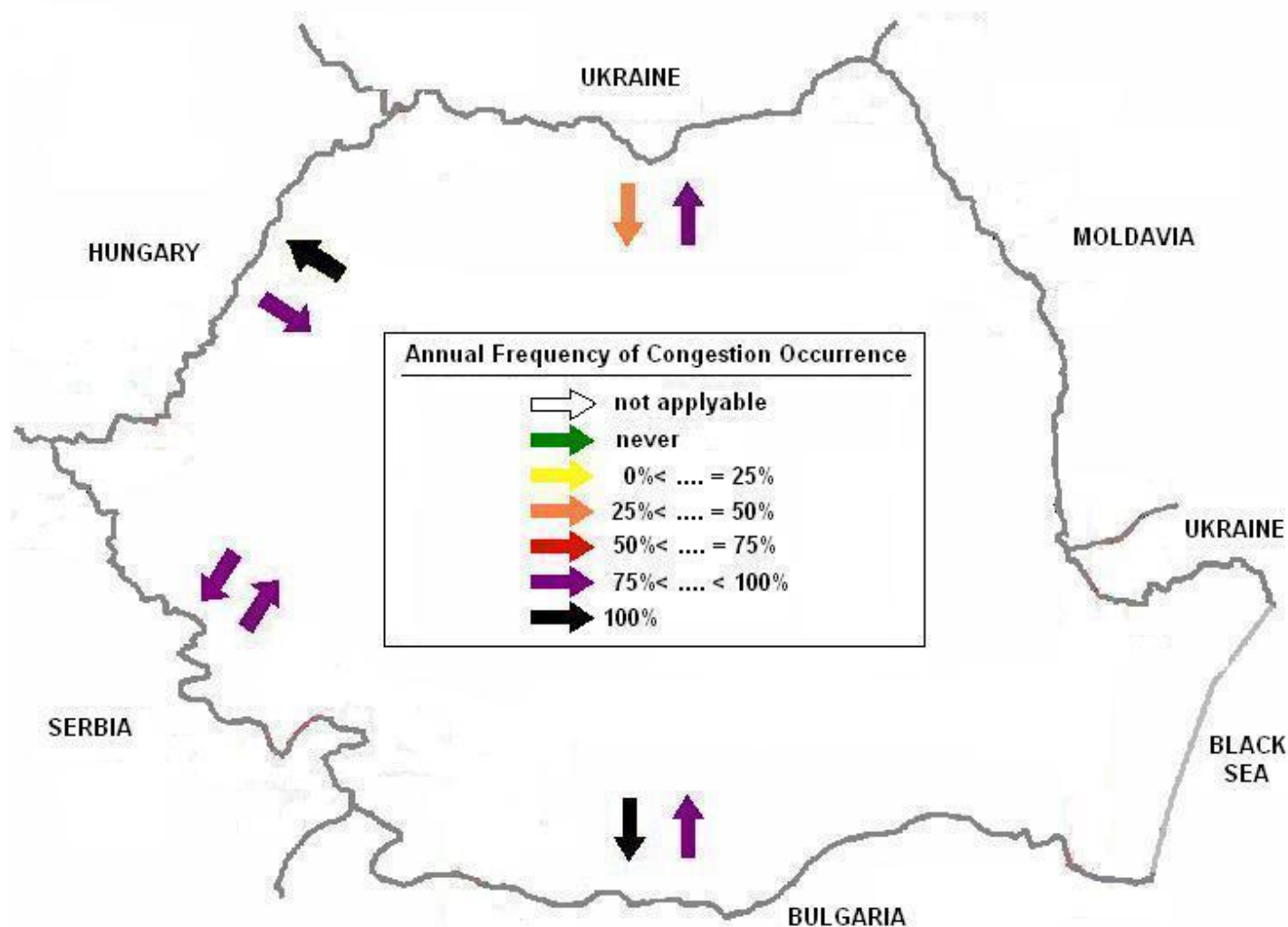
The Annual Frequency of Congestion Occurrence on the borders with Hungary, Serbia and Bulgaria was calculated relatively to the half of the NTC value agreed with the neighbour TSOs, which is the quota allocated by Transelectrica on its centralized ATC market. Transelectrica has signed mutual agreements with its neighbour TSOs (excepting Western Power of Ukraine-WPS Ukraine) for the calculation and harmonization of NTC values on borders, providing that each TSO offers on the market a quota of 50% from the agreed NTC value.

On the border with West Ukraine, Transelectrica allocated 100% NTC to the ATC market participants agreed by WPS of Ukraine. The aFCO was calculated accordingly.

The severity index of congestion is determined by fitting the annual frequency of congestion occurrence within a range of severity.

Border		Severity index	Remarks
From	To		
HU	RO	4	Transelectrica: yearly and monthly allocation of 50% NTC by explicit auction
RO	HU	5	Transelectrica: yearly and monthly allocation of 50% NTC by explicit auction
BG	RO	4	Transelectrica: yearly and monthly allocation of 50% NTC by explicit auction
RO	BG	5	Transelectrica: yearly and monthly allocation of 50% NTC by explicit auction
SR	RO	4	Transelectrica: yearly and monthly allocation of 50% NTC by explicit auction
RO	SR	4	Transelectrica: yearly and monthly allocation of 50% NTC by explicit auction
UA	RO	2	Matching between results of Transelectrica 100%NTC explicit auction and W Ukraine priority list
RO	UA	4	Matching between results of Transelectrica 100%NTC explicit auction and W Ukraine priority list

Representation of severity index on each Romanian border with ENTSO-E and exchange direction for 2009



Remarks for export:

- The most congestated borders were those with Hungary and Bulgaria (100 %);
- Raported to the whole 2009 year the Serbia and Ukraina borders had about equal values (96-98%);

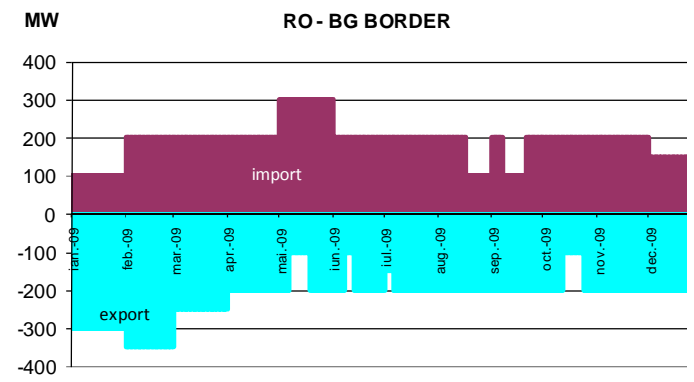
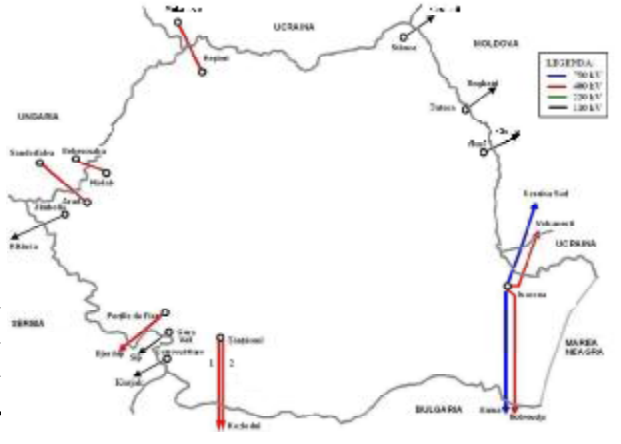
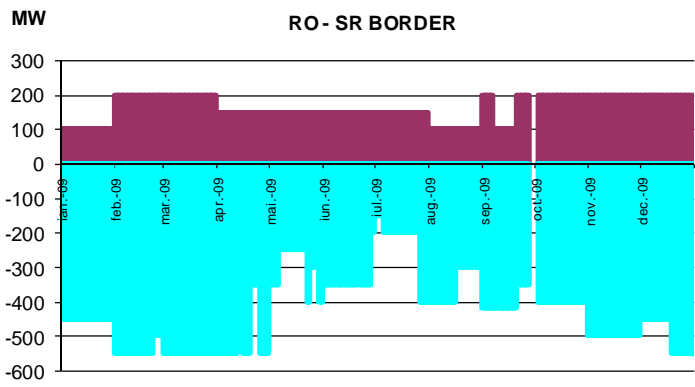
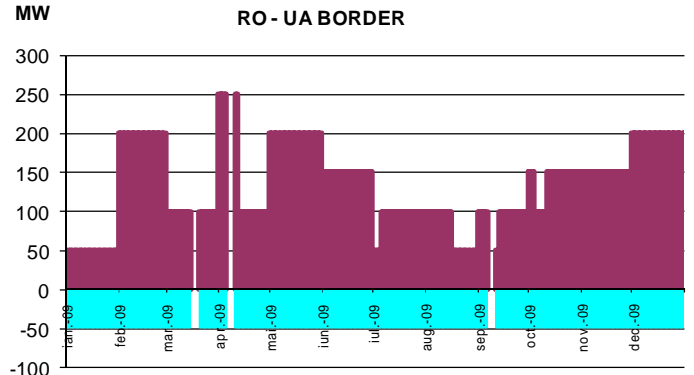
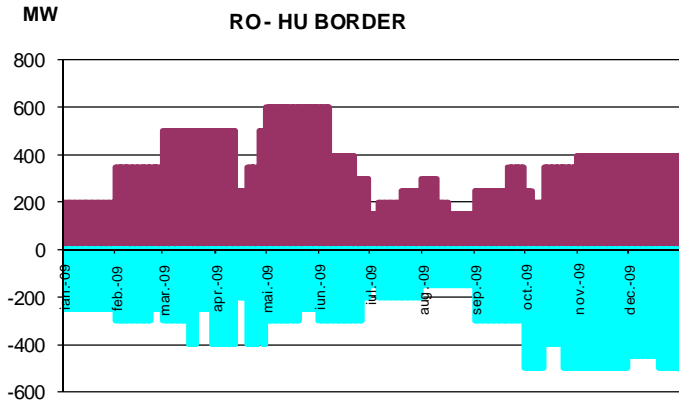
Remarks for import :

- The most congestated border was the border with Serbia (98 %);
- The less congestated border was the border with Ucraina (33 %)

The highest value for the Annual Frequency of Congestion Occurrence in 2009 was reached on the export direction to Bulgaria and Serbia.

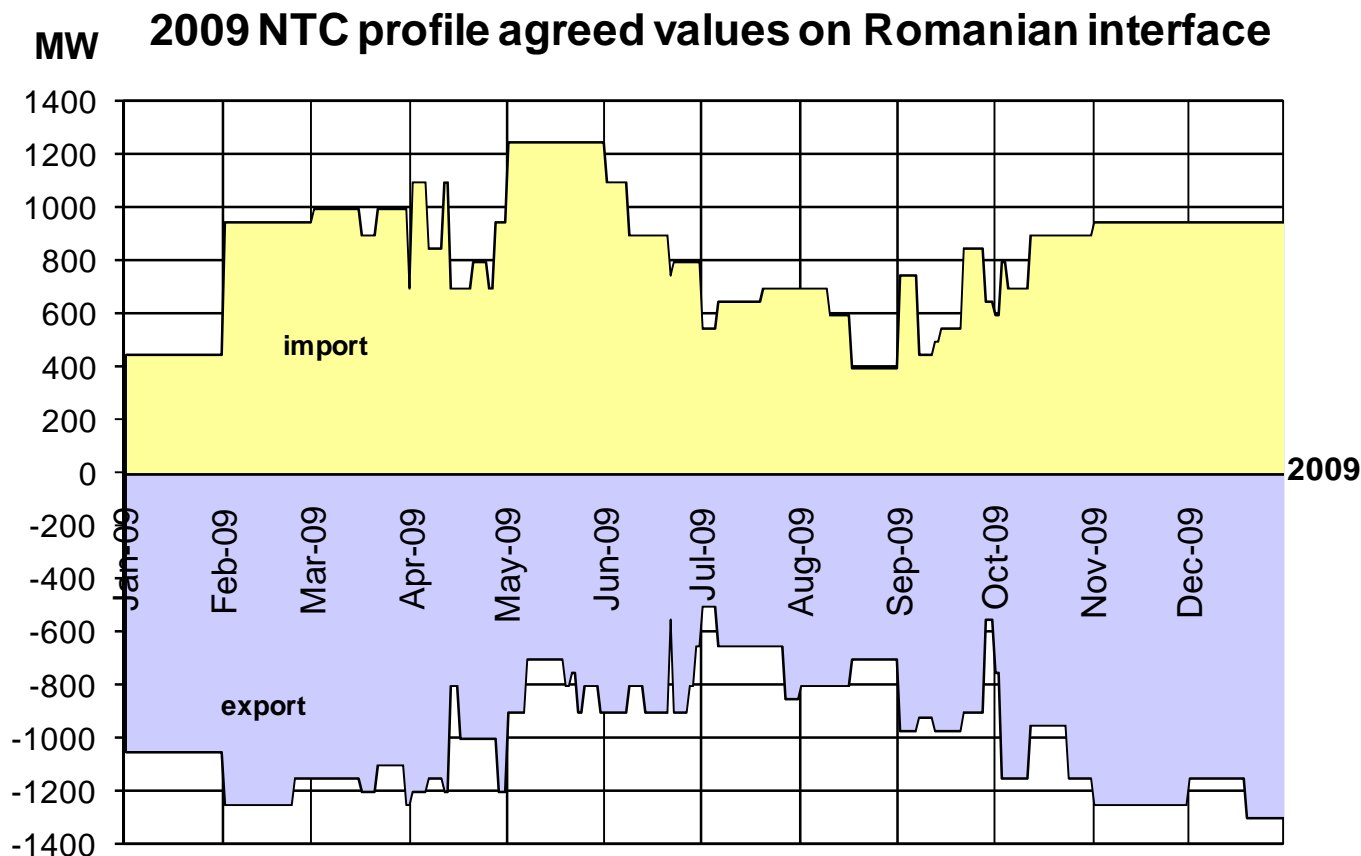
During 2009 the following reliable monthly NTC values on Romanian border for both exchange directions were calculated and agreed with the neighbour TSOs:

## 2009 NTC PROFILE VALUES ON ROMANIAN BORDERS



export  
 import

The reliable NTC values calculated and agreed on each border are aggregable in the Romanian interconnection interface. For the entire Romanian interconnection interface the following reliable NTC values on both exchange directions were obtained:



**In 2009 the NTC values were influenced by:**

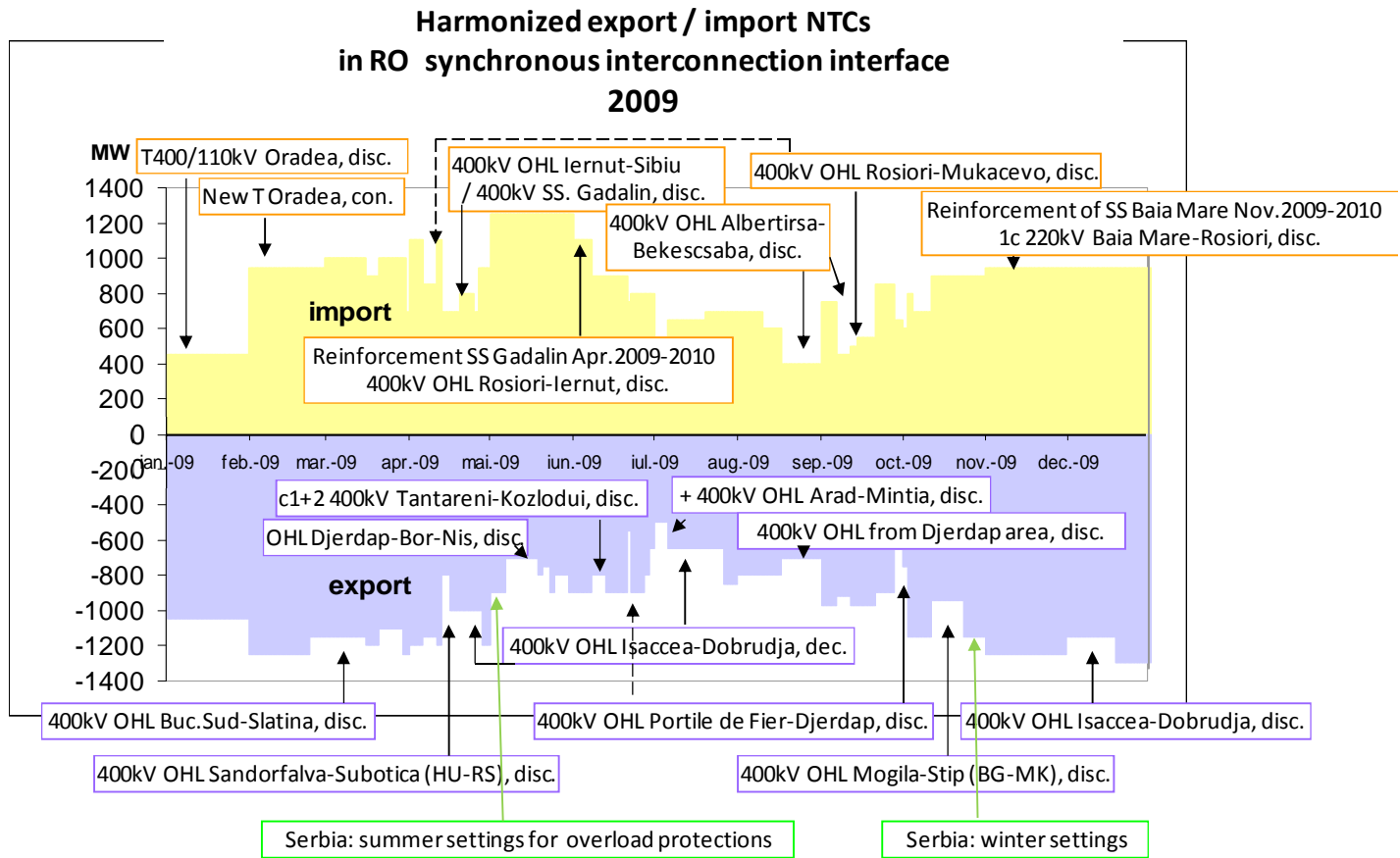
a) Current factors :

- Maintenance of interconnection lines and of internal lines that influence the NTC values.
- Seasonal temperature differences, leading to:
  - Change to summer settings, about 25% lower than the winter ones, for line overload protections during the period from May to October, in certain Power Systems within the region;
  - Allowable thermal current limits for 20°C on Romanian internal lines that influence NTC values in January-February and November-December;
- Generation in HPPs Portile de Fier and Djerdap, especially during summer;
- Deficit of the North region of the Romanian Power System.

b) Specific factors in 2009:

- Gadalin substation reinforcement and disconnection of temporary 400kV OHL Iernut-Rosiori to keep the voltage within the normal ranges in accordance with Romanian Transmission Grid Code.
- The commissioning of one 400/110kV transformer in Oradea Sud substation has determined the increasing of import capacity in 2009.

In the below diagram it can be observed the monthly export and import NTC values for 2009, the reduction of export and import values during the summer period and the determining factors.



Analyzing the NTC values variations for 2009 on each border in accordance with the above presentation we may consider that:

- The border that registered the highest decreasing of the summer export NTC values was the Serbia-Romanian border – with 63% from winter export NTC values.
- The export to Hungary reached the less values in August – about 37.5% from the April export NTC values.
- On the Bulgarian border during the second, third and fourth quarters the export NTC value was with about 43% less than the February export NTC value.

Starting with the 1st of December 2009 there are carrying on common bilateral daily auctions for interconnection capacity allocation on Hungary-Romanian border organized by MAVIR.

For the Frequency of Congestion Occurrence for daily allocation (FdC) the following formula has been used

$$FdC (\%) = N_{hC} * 100 / 24$$

where -  $N_{hC}$  is the number of hours with congestion during the analyzed day.

In the following figure it is presented the Frequency of Congestion Occurrence for daily allocation on Hungary-Romanian border in December 2009.

