entsoe

ITC Transit Losses Data Report 2015

Published following the requirements of Articles 4.2 and 4.3 of the Annex of Regulation (EU) No 838/2010, Part A

1 September 2016

Contents

1. Background and purpose of this document

The Inter Transmission System Operator Compensation (ITC) mechanism is governed by Article 13 of Regulation (EC) No 714/2009. Commission Regulation (EU) No 838/2010 of 23 September 2010 on laying down guidelines relating to the inter-transmission system operator compensation mechanism and a common regulatory approach to transmission charging further specifies the ITC mechanism. According to Articles 4.2 and 4.3 of the Annex, Part A, of Commission Regulation (EU) No 838/2010, ENTSO-E is mandated to determine the amount of losses incurred on national transmission systems by calculating the difference between:

(1) the amount of losses actually incurred on the transmission system during the relevant period; and

(2) the estimated amount of losses on the transmission system which would have been incurred on the system during the relevant period if no transits of electricity had occurred.

ENTSO-E is also responsible for publishing this calculation and its method in an appropriate format. This document contains these publications.

2. Method

The losses caused by transits in each transmission system are determined by:

- recording the load flow situation for each party to the ITC mechanism (ITC Party) for 6 monthly snapshots T (3rd Wednesdays of a month and preceding Sundays at 03:30h, 11:30h and 19:30h CET/CEST):

  - with transit represented on interconnected system;

  - with transit represented on disconnected system;

- the losses caused by transit for the particular hour $\Delta Ploss_k(T)$ is then determined as the difference of losses observed in the two situations;

- based on a mapping that attributes every hour of the month to one of the six snapshots timestamps T, each snapshot timestamp is given a weight wT;

- the overall monthly amount of transit losses for each ITC party is derived by aggregating the weighted transits for the particular hours.

Annex 1 contains further illustrations of this method.

3. Calculation

Annex 2 contains the calculation results for the year 2015.

## 4. Annex 1: Illustration of the methodology

Monthly WWT Calculation: Introduction
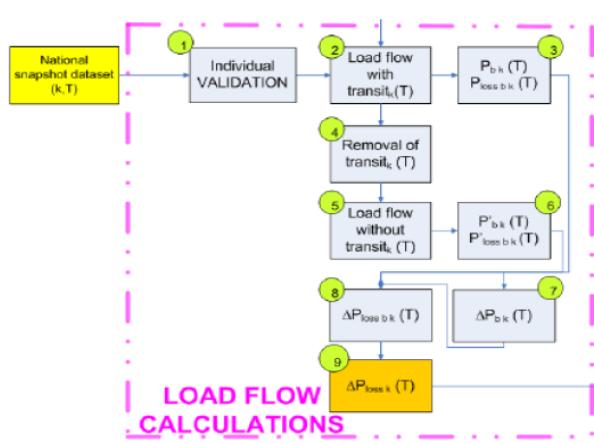
- The losses caused by transit $\Delta P_{loss\,k}$ (T) are determined for each ITC Party k for 6 monthly snapshots T (3rd Wednesdays and preceding Sundays at 03:30h, 11:30h and 19:30h CET/CEST)

- Based on a mapping that attributes every hour of the month to one of the six snapshots timestamps T, each snapshot timestamp is given a weight w_T

- The monthly WWT compensation is yielded by ITC Party k's losses costs C_{losses}(k) multiplied by the losses energy caused by transit.

ΔPloss k (T) – load flow calculation (Module 2-3)

Recorded Situation with transit represented on interconnected system (snapshots)
(measured load flow, result from State Estimation)
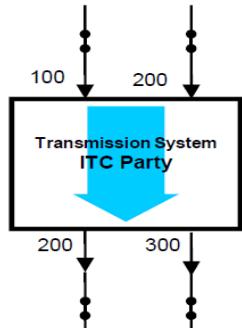
Recorded Situation with transit represented on disconnected system
(measured load flow, result from State Estimation)
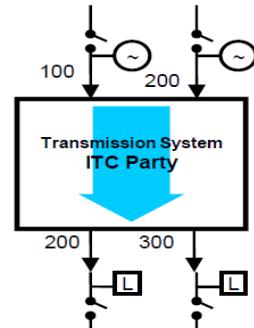
Transit = Minimum { Σ Export, Σ Import}
Example: Σ Export = 500 MW, Σ Import =300 MW
Transit = Minimum { 500 , 300 } = 300 MW

ΔPloss k (T) – load flow without transits (Module 4-5-6-7)

Recorded Situation without transit represented on disconnected system
(measured load flow, result from State Estimation)
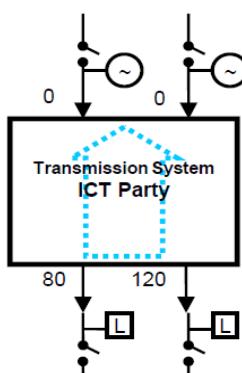
Removal of transit by modifying the flows on tie-lines

$$\text{If } (\sum_i Pex_i \geq \sum_j Pim_j \;) \quad \text{then } Pex'_k = Pex_k \cdot \left(1 - \frac{\sum_i Pim_i}{\sum_j Pex_j}\right)$$

$$Pim'_m = 0$$

$$\text{If } (\; \sum_i Pex_i < \sum_j Pim_j \;) \quad \text{then } Pim'_k = Pim_k \cdot \left(1 - \frac{\sum_j Pex_j}{\sum_i Pim_i}\right)$$

Distribution of the overall modification in losses observed on the slack node to all generators nodes

$$P_i' = P_i \cdot (1 + \frac{\Delta P_{Loss}}{\sum_n P_n})$$

ΔPloss b k (T) – for each branch (Module 8)

In case the relative share of losses caused by transits exceeds the relative share of power flow caused by transits, it shall be delimited to this proportion. (Interpretation of ERGEG Guideline)

ΔPloss b k (T) = Ploss b k (T) – P'loss b k (T)
Δ ploss b k (T) = Δ Ploss b k (T)/Ploss b k (T)
Δ p b k (T) = Δ P b k (T)/ P b k (T)
If {sign (Δ ploss b k (T)) = sign (Δ p b k (T)) and | Δ ploss b k (T)| > | Δ p b k (T)| }
then

$$\Delta \text{ Ploss b k (T) = } \Delta \text{ p b k (T) * Ploss b k (T)}$$

else

$$\Delta \text{ Ploss b k (T) = Ploss b k (T) – P'loss b k (T)}$$

K	country
B	branch
T	snapshot timestamt
Ploss	relative increase in losses
Δp	relative increase in flows

entsoe

ΔPloss b k (T) – sum for ITC party (Module 9-10)

Sum of all branches within a country

$$\Delta P_{Loss\_k}(T) = \sum_b \Delta P_{Loss\_b\_k}(T)$$
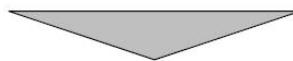
The losses energy caused by transit is the scalar product of the ΔPloss k (T) vector times the wT vector that attributes each hour of the month to a snapshot

$$Compensati \quad on \_ WWT \ (k,m) = Closses \quad (k) \sum_{T=1}^{6} \left[\Delta P_{loss\_k}(T) w_T \right]$$

entsoe

5. Annex 2: Calculation results

Country	2015											
	WWT weighted MWh	WWT weighted MWh	WWT weighted MWh	WWT weighted MWh	WWT weighted MWh	WWT weighted MWh	WWT weighted MWh	WWT weighted MWh	WWT weighted MWh	WWT weighted MWh	WWT weighted MWh	WWT weighted MWh
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Albania / AL	97,31	-1.171,59	-1.047,11	-254,11	-88,09	10,91	-237,15	-200,67	-149,93	88,41	2,21	33,29
Austria / AT	20.622,52	15.779,22	23.201,51	20.271,78	7.548,76	11.883,74	6.538,94	3.788,39	4.113,57	8.089,26	21.500,37	23.040,46
Belgium / BE	5.512,57	1.523,68	166,62	452,45	1.341,62	4.145,48	2.483,59	2.604,82	81,54	8.510,76	620,31	1.020,69
Bosnia / BA	1.357,62	1.682,60	4.156,11	4.244,37	3.534,93	3.265,56	6.053,14	4.548,11	3.091,01	2.975,65	3.750,38	6.822,29
Bulgaria / BG	4.389,00	5.269,01	7.928,90	1.933,52	1.305,26	2.698,69	1.140,20	7.899,71	2.448,15	3.344,40	6.054,07	3.388,19
Croatia / HR	5.145,51	6.175,98	10.066,66	14.474,20	6.371,65	3.887,32	4.389,79	2.013,11	1.811,29	-1.910,74	5.041,37	5.204,26
Czech Rep. / CZ	4.778,47	12.974,33	12.096,77	1.561,51	1.600,31	6.175,81	34.243,74	20.406,56	17.571,53	8.756,47	37.114,09	61.567,99
Denmark / DK	34.486,36	7.726,92	19.010,75	19.864,65	20.780,82	26.468,76	36.549,45	15.564,14	21.590,36	25.781,06	39.331,96	29.158,42
Finland / FI	16.454,34	9.853,55	15.464,32	19.107,64	23.061,52	38.315,87	30.378,14	19.867,88	20.213,71	28.990,40	14.823,21	11.924,96
France / FR	13.636,46	19.080,58	8.311,62	7.038,80	26.910,03	6.252,39	2.109,54	2.457,27	10.127,93	23.755,20	5.473,92	11.521,07
Germany / DE	87.107,96	53.084,20	47.941,84	20.125,07	21.092,55	22.982,68	37.080,04	11.421,04	-8.948,07	34.501,81	521,84	43.771,33
Great Britain / GB	-8.547,56	-7.608,07	-6.608,40	2.902,07	-4.419,31	-3.085,74	6.066,37	508,02	40,04	-4.881,93	-7.051,57	-814,96
Greece / GR	997,57	212,54	245,85	869,40	0,00	275,62	8.386,61	3.601,82	1.592,59	879,91	1.215,62	1.479,73
Hungary / HU	837,14	478,73	2.080,21	2.313,40	1.449,90	1.200,20	3.479,20	2.247,64	-712,29	369,90	3.975,56	9.528,79
Ireland / IE	449,80	942,76	87,98	-11,49	3,84	-0,39	-18,84	-8,04	12,52	-29,47	-18,52
Italy / IT	0,00	-5.698,76	-8.598,08	-2.595,22	-5.881,36	864,31	-2.887,67	-3.012,29	-4.139,21	-30,64	0,00	-214,15
Estonia / EE	10.850,15	8.328,44	6.734,51	14.427,27	12.902,74	16.513,15	14.377,67	9.495,18	9.347,70	22.578,06	8.808,20	10.565,17
Latvia / LV	1.864,88	1.960,56	467,12	8.892,09	4.750,85	2.531,52	1.639,56	4.409,87	7.042,79	12.279,60	5.346,42	2.431,75
Lithuania / LT	-20,37	3,27	909,09	1.395,77	475,60	52,70	165,20	1.107,49	452,46	528,60	295,83	44,33
Luxembourg/LU	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
FYROM / MK	1.486,06	1.105,83	2.506,65	1.460,87	1.208,80	2.619,68	1.896,68	2.142,41	755,91	372,46	750,85	751,55
Montenegro / ME	797,61	-157,76	891,95	597,42	-35,45	1.210,78	75,00	937,77	-203,17	832,06	145,80	-316,99
Netherlands / NL	16.548,92	32.572,93	25.119,19	15.833,51	4.700,94	19.358,19	18.379,63	-1.220,66	15.247,60	15.022,90	20.239,44	15.617,56
Northern Ireland / NI	26,68	10,22	6,00	12,26	0,00	37,07	58,79	298,11	103,53	6,58	46,72	170,57
Norway / NO	21.173,36	23.806,33	29.473,46	15.499,06	5.197,55	9.953,56	1.790,86	2.661,96	5.588,07	4.784,73	3.526,61	-908,10
Poland / PL	8.595,80	24.227,53	21.083,76	12.424,60	8.089,87	15.286,69	28.317,01	19.252,61	26.646,96	10.077,39	74.454,21	57.442,47
Portugal / PT	8.655,83	2.944,29	9.309,29	5.323,88	-140,58	871,05	4.165,06	1.664,29	1.744,91	2.635,48	8.739,02	13.798,17
Romania / RO	-2.492,52	-1.783,22	-1.077,29	-660,73	602,74	-1.919,93	-1.054,87	-1.341,63	-658,14	-408,61	-1.207,23	-5.145,85
Serbia / RS	11.375,01	3.672,16	9.141,97	11.743,47	2.272,35	4.177,08	7.066,80	3.800,03	3.888,92	2.408,67	8.920,79	6.920,13
Slovakia / SK	5.122,05	7.641,16	6.547,43	6.331,78	-522,90	2.847,66	8.326,50	7.509,30	8.996,81	3.288,29	6.168,21	16.449,78
Slovenia / SI	4.025,74	4.220,78	5.368,33	6.160,33	6.327,07	3.405,34	5.094,34	4.603,85	4.538,45	2.193,55	7.627,70	7.222,81
Spain / ES	-7.629,48	8.736,76	-2.131,83	18.726,67	10.572,45	10.589,21	7.223,59	8.956,79	5.826,50	10.926,95	23.500,29	1.008,70
Sweden / SE	53.840,80	12.715,50	29.978,48	8.244,99	25.892,16	10.024,62	10.543,19	11.140,17	46.694,32	33.367,57	35.079,01	44.147,53
Switzerland / CH	72.723,22	42.425,15	56.426,90	46.530,98	5.053,42	8.590,58	21.587,71	11.513,96	17.417,68	26.189,89	72.165,41	67.898,03
TOTAL	394.268,801	292.735,596	335.260,554	285.242,272	191.960,014	231.490,158	305.431,502	180.628,183	222.155,431	286.316,598	406.951,138	445.511,382