Public data underlying the figures of Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2015

Electricity Wholesale Market Volume

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Legal notice

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If you have any queries relating to this report, please contact:

ACER
Mr David Merino
Telephone: +386 (0)8 2053 417
E-mail: david.merino@acer.europa.eu

CEER
Mr Andrew Ebrill
Telephone: +32 (0)2 788 73 35
E-mail: andrew.ebrill@ceer.eu

Figure 1, Page 7: Evolution of European wholesale electricity prices at different European electricity exchanges – 2008 to 2014 (euros/MWh)

Source: EMOS, Platts, PXs and data provided by NRAs through the ERI (2015) and ACER calculations.

Area	2008	2009	2010	2011	2012	2013	2014
Germany (EPEX)	66	39	44	51	43	38	33
Nordic+Baltic Region (Nord Pool Spot)	48	36	54	46	33	40	34
Iberian Market (OMIE)	67	37	37	50	48	44	42
France (EPEX)	69	43	47	49	47	43	35
Italy (GME)	91	67	66	74	77	64	54

Figure 3, Panel A, Page 8: Frequency of zero or negative wholesale prices in a selection of European countries and the quantity of electricity produced from intermittent generation (wind and solar, in combination with run-of-river in the case of the Iberian market) – 2010–2015 (number of hours and GWh).

Source: EMOS, Platts, power exchanges, European Network of Transmission System Operators for Electricity (ENTSO-E) and ACER calculations (2016).

Panel A

Year	BE	CH	CZ	DE	DK	SK	GB	Wind+Solar Production
2010	-	-	-	12	18	-	-	60,160
2011	-	4		16	37	-	-	84,228
2012	8	31	43	58	68	43	-	100,408
2013	16	31	54	65	72	54	-	114,723
2014	2	16	45	64	65	45	-	128,594
2015	1	34	81	129	103	81	73	138,077

Figure 3, Panel B, Page 8: Frequency of zero or negative wholesale prices in a selection of European countries and the quantity of electricity produced from intermittent generation (wind and solar, in combination with run-of-river in the case of the Iberian market) – 2010–2015 (number of hours and GWh).

Source: EMOS, Platts, power exchanges, European Network of Transmission System Operators for Electricity (ENTSO-E) and ACER calculations (2016).

Panel B

Year	ES	PT	Wind+Solar+Run-of-river Hydro Production
2010	331	319	80,816
2011	31	12	76,072
2012	44	8	81,470
2013	478	475	97,942
2014	177	195	95,879
2015	-	49	86,894

Figure 5, Page 10: Evolution of the frequency of price spikes (number of hours per year, left axis), the aggregated installed conventional generation capacity and aggregated electricity demand (indexed to 2005 = 100, right axis) in France, Germany, the Netherlands and Spain – 2005–2015

Source: Eurostat, ENTSO-E (2016).

Year	Demand	Conventional generation capacity	Price Spikes DE	Price Spikes ES	Price Spikes FR
2005	100.00	100.00	81	26	78
2006	100.49	100.78	56	16	59
2007	101.05	102.59	110	0	84
2008	102.60	103.61	27	0	17
2009	98.50	105.01	56	1	79
2010	102.25	108.04	0	0	21
2011	99.22	109.46	0	0	0
2012	100.47	107.98	3	0	17
2013	99.37	107.43	0	0	1
2014	95.24	109.57	0	0	0
2015	97.06	105.30	0	0	1

Figure 8, Page 12: Unit costs associated with capacity payments, redispatching actions and system operation in Spain – 2008–2015 (euros per MWh of demand)
Source: CNMC (2016).

Year	Redispatching	System operation	Capacity mechanisms + interrumptibility
2008	1.52	0.85	1.80
2009	1.71	0.73	3.76
2010	2.36	1.03	4.73
2011	1.93	0.94	7.58
2012	2.32	1.73	7.33
2013	2.93	1.97	8.11
2014	3.36	1.69	7.59
2015	2.71	1.14	6.53

Figure 9, Page 14: NTC averages of both directions on cross-zonal borders, aggregated per region – 2010–2015 (MW)
Source: Vulcanus, ENTSO-E, Joint Allocation Office (JAO) and Nord Pool Spot (2016).

Region	2010	2011	2012	2013	2014	2015
BALTIC	2,502	2,259	1,989	1,746	2,314	2,344
CEE	7,440	8,354	8,520	8,406	7,851	7,491
CSE	10,265	9,977	9,974	9,927	10,276	10,954
CWE	8,438	8,178	8,084	7,793	7,509	7,336
F-UK-I		2,359	2,732	3,091	3,375	3,545
NORDIC		11,422	10,928	10,221	10,690	10,905
SEE	800	2,978	2,887	3,668	3,339	3,855
SWE	1,969	2,521	2,804	2,684	2,978	3,687

Figure 10, Page 14: Change in tradable capacities in Europe – 2014–2015 (MW, %)

Source: Vulcanus, ENTSO-E, JAO and Nord Pool Spot (2016).

Region	Change in MW	Change in %
ES->FR	270.44	31%
FR->ES	268.58	26%
PT->ES	712.02	34%
AT->CH	165.98	27%
CH->IT	364.93	14%
DE->CH	304.24	28%
GR->IT-BRI	158.94	71%
IT-BRI->GR	158.69	71%
BG->GR	107.96	26%
BG->RO	146.97	125%
HU->RO	258.05	73%
RO->HU	290.14	83%
NL->UK	137.26	16%
UK->NL	140.12	16%
DE_TENNET->SE-4	-164.41	-51%
DK_E->SE-4	147.49	11%
DK_W->DE_TENNET	-273.46	-54%
DK_W->NO-2	554.50	65%
NO-1->SE-3	219.92	13%
NO-2->DK_W	525.60	65%
NO-4->SE-1	-219.14	-36%
SE-2->NO-3	-168.34	-19%
SE-3->NO-1	232.25	14%
SE-4->DE_TENNET	-172.40	-39%
FI->EE	138.78	17%
LV->EE	-188.72	-23%
DE_50HZT->CZ+PL	-227.93	-35%
DE_TENNET->CZ	-237.13	-36%
PL->CZ+DE+SK	-134.92	-17%

Figure 11, Page 15: Tradable capacities in the CWE region before and after implementing FBMC – 2014–2015 (MW and %)
Source: Vulcanus, ENTSO-E and JAO.

CWE	ATC imp 2014	FB imp 2015	ATC exp 2014	FB exp 2015		
Belguim	3,372.37	3,459.73	2,631.13	3,499.45	2.6%	33.0%
Netherlands	3,520.16	3,538.53	3,477.26	3,793.53	0.5%	9.1%
France	3,890.71	4,212.12	3,966.63	5,048.86	8.3%	27.3%
Germany	4,071.52	5,023.26	4,779.73	4,861.13	23.4%	1.7%

Figure 12, Page 17: Ratio between available NTC and aggregated thermal capacity of interconnectors – 2014 and 2015 (%, MW, MVA)

Source: Vulcanus, ENTSO-E YS&AR (2014), EW Template (2016), Nord Pool Spot, and ACER calculations.

AC/DC	Country borders	Indicated direction	Opposite direction	Import FBMC	Export FBMC
HVDC	IEEWIC->GB	98%	103%		
	UK->NL	100%	100%		
	NL->NO-2	99%	95%		
	DE_50hzt->DK_E	95%	91%		
	FI->EE	93%	89%		
	UK->FR	90%	90%		
	NO-2->DK_W	86%	91%		
	FI->SE-3	86%	85%		
	IT-BRI->GR	77%	77%		
	DK_W->SE-3	73%	72%		
	PL->SE-4	13%	64%		
	DE_tennet->SE-4	26%	46%		
HVAC	NO-1->SE-3	84%	84%		
	LV->EE	72%	85%		
	AT->IT	97%	41%		
	DK_E->SE-4	76%	58%		
	FI->SE-1	47%	61%		
	BE->FR	33%	48%		
	FR->IT	52%	22%		
	BG->GR	41%	29%		
	ES->FR	31%	36%		
	HR->SI	34%	34%		
	CH->IT	42%	24%		
	NO-4->SE-2	29%	36%		
	NO-3->SE-2	30%	36%		
	AT->SI	29%	35%		
	CZ->SK	38%	26%		
	ES->PT	27%	35%		
	IT->SI	33%	28%		
	HU->SK	26%	34%		
	DE->FR	34%	26%		
	CH->FR	16%	42%		
	DE->CZ	15%	43%		
	NO-4->SE-1	29%	28%		
	HU->RO	25%	27%		
	AT->CH	19%	29%		
	LT->LV	17%	31%		
	BE->NL	23%	23%		
	CH->DE	32%	11%		
	DE->NL	21%	22%		
	CZ->PL	20%	22%		
	PL->SK	21%	20%		

	HU->HR	22%	18%		
	DE_tennet->DK_W	29%	8%		
	AT->CZ	18%	16%		
	AT->HU	15%	18%		
	CZ+DE+SK->PL	0%	20%		
	RO->BG	3%	5%		
FBMC	FR			36%	43%
	BE			34%	34%
	DE			30%	29%
	NL			23%	25%

Figure 13, Page 21: Regional performance based on fulfilment of capacity calculations requirements – 2014-2015 (%)
Source: Data provided by NRAs through the EW template (2016) and ACER calculations.

REGION	Score	MAX	2015
BALTIC	22	36	61.1%
SWE	11	24	45.8%
CWE	28	64	43.8%
NORDIC	68.5	168	40.8%
F-UK-I	12	36	33.3%
CSE	39	124	31.5%
CEE	31	128	24.2%
SEE	12	80	20.0%

Figure 14, Page 29: Absolute aggregate sum of UFs for three regions – 2014–2015 (TWh)
Source: Vulcanus (2015) and ACER calculations.

	CEE		CSE		CWE	
	2014	**2015**	**2014**	**2015**	**2014**	**2015**
AT-CH			3.79	3.78		
AT-CZ	10.28	12.87				
AT-DE	11.73	14.89				
AT-HU	1.84	1.97				
AT-IT			0.55	0.75		
AT-SI	2.14	1.58				
BE-FR					7.33	8.24
BE-NL					7.25	8.10
CH-DE			9.31	9.83		
CH-FR			10.50	10.80		
CH-IT			3.88	3.87		
CZ-DE_50HZT	0.00	7.51				
CZ-DE_TENNET	0.00	3.93				
CZ-PL	6.69	8.67				
CZ-SK	1.91	2.08				
DE-FR					19.91	20.27
DE-NL					7.20	7.98
DE-PL	9.96	13.18				
FR-IT			4.46	4.68		
HU-SK	2.49	2.72				
IT-SI			2.30	2.48		
PL-SK	3.70	5.30				

Figure 17, Page 33: Estimated loss of social welfare due to UFs on selected borders in the CEE, CSE and CWE regions – 2011–2014 (million euros)

Source: Vulcanus, EMOS, ENTSO-E (2015), and ACER calculations.

	Welfare loss LF	Welfare gain LF	Welfare loss UAF	Welfare gain UAF	TOTAL Welfare loss UF
CH-IT	76.46	-12.78	151.83	-3.40	212.11
2014	44.16	-4.90	73.82	-2.41	110.67
2015	32.30	-7.88	78.02	-0.99	101.44
DE-NL	153.91	-0.18	121.44	-7.95	267.22
2014	81.56	-0.03	52.54	-6.91	127.17
2015	72.35	-0.15	68.90	-1.04	140.05
DE-PL	206.21	-0.27	107.46	-0.34	313.05
2014	120.97	-0.18	55.44	-0.33	175.89
2015	85.24	-0.09	52.02	-0.01	137.16
IT-SI	66.10	-10.15	63.92	-6.43	113.44
2014	26.19	-7.67	31.66	-2.23	47.96
2015	39.91	-2.48	32.26	-4.20	65.49
CH-DE	79.02	-3.40	220.78	-1.18	295.22
2014	21.20	-1.92	70.22	-0.76	88.73
2015	57.82	-1.48	150.56	-0.42	206.49
CH-AT	63.70	-1.94	62.53	-4.26	120.03
2014	32.40	-0.93	12.79	-3.26	40.99
2015	31.31	-1.01	49.74	-1.00	79.03
PL-CZ	19.06	-4.43	16.09	-0.06	30.66
2014	6.21	-3.20	7.51	-0.05	10.47
2015	12.85	-1.23	8.57	0.00	20.19
FR-IT	41.13	-27.69	85.92	-12.65	86.71
2014	18.82	-17.08	47.59	-5.67	43.65
2015	22.31	-10.61	38.33	-6.98	43.06
FR-DE	29.02	-3.36	30.47	-0.61	55.52
2014	23.92	-0.53	19.83	-0.20	43.02
2015	5.09	-2.83	10.64	-0.40	12.49
DE-CZ	13.29	-2.06	31.27	-2.66	39.84
2014	6.07	-0.59	13.29	-1.23	17.54
2015	7.21	-1.47	17.98	-1.43	22.30
CH-FR	16.97	-1.01	36.92	-1.63	51.25
2014	7.23	-0.58	18.50	-0.92	24.22
2015	9.74	-0.42	18.42	-0.71	27.03
BE-NL	69.87	-2.14	56.65	-0.80	123.58
2014	8.56	-1.46	9.84	-0.24	16.71
2015	61.32	-0.68	46.81	-0.57	106.88
SK-HU	67.60	-0.21	21.84	-5.32	83.90
2014	29.58	-0.20	13.47	-2.81	40.03
2015	38.03	-0.01	8.36	-2.51	43.87
AT-SI	22.84	-12.66	46.49	-2.83	53.84
2014	13.11	-2.04	10.53	-1.60	20.00
2015	9.73	-10.62	35.96	-1.24	33.84

IT-AT	17.73	-4.34	15.30	-4.37	24.31
2014	10.55	-2.13	7.39	-2.67	13.15
2015	7.18	-2.21	7.91	-1.70	11.17
AT-HU	15.39	-23.21	54.83	-1.68	45.33
2014	9.25	-4.16	18.20	-0.39	22.91
2015	6.14	-19.06	36.63	-1.29	22.42
PL-SK	14.77	-1.12	17.84	-1.08	30.41
2014	7.13	-0.36	5.32	-1.04	11.05
2015	7.64	-0.76	12.52	-0.04	19.36
AT-CZ	14.09	-0.08	31.11	-0.31	44.81
2014	7.76	-0.05	13.77	-0.04	21.45
2015	6.33	-0.03	17.33	-0.27	23.36
CZ-SK	7.78	0.00	0.70	-2.30	6.17
2014	2.51	0.00	0.34	-0.77	2.07
2015	5.27	0.00	0.36	-1.53	4.10

Figure 19, Page 42: DA price convergence in Europe by region (ranked) – 2008–2015 (% of hours)
Source:EMOS, Platts, power exchanges and ACER calculations.

Region	Year	Full price convergence	Moderate price convergence	Low price convergence	Full price convergence
SWE (2)	2008	41%	35%	23%	41%
	2009	80%	18%	2%	80%
	2010	82%	14%	4%	82%
	2011	93%	5%	2%	93%
	2012	91%	6%	3%	91%
	2013	90%	6%	4%	90%
	2014	95%	3%	1%	95%
	2015	14%	22%	64%	14%
CWE (4)	2008	8%	55%	37%	8%
	2009	12%	67%	20%	12%
	2010	22%	59%	19%	22%
	2011	68%	15%	16%	68%
	2012	50%	23%	27%	50%
	2013	18%	19%	63%	18%
	2014	23%	29%	47%	23%
	2015	22%	24%	54%	22%
Nordic (11)	2008	14%	25%	61%	14%
	2009	36%	39%	25%	36%
	2010	27%	35%	38%	27%
	2011	31%	27%	42%	31%
	2012	30%	25%	46%	30%
	2013	31%	41%	29%	31%
	2014	17%	38%	46%	17%
	2015	29%	24%	48%	29%
Baltic (3)	2011	13%	70%	17%	13%
	2012	10%	57%	33%	10%
	2013	40%	36%	24%	40%
	2014	34%	20%	46%	34%
	2015	37%	21%	42%	37%
CEE (4)	2010	3%	62%	35%	3%
	2011	3%	59%	38%	3%
	2012	6%	50%	44%	6%
	2013	10%	48%	42%	10%
	2014	5%	44%	51%	5%
	2015	6%	43%	51%	6%
F-UK-I (2)	2008	5%	36%	59%	5%
	2009	7%	49%	44%	7%
	2010	11%	48%	42%	11%
	2011	9%	46%	45%	9%
	2012	10%	38%	52%	10%
	2013	4%	37%	59%	4%
	2014	4%	41%	64%	4%
	2015	4%	37%	59%	4%

CSE (8)	2010	0%	9%	91%	0%
	2011	0%	12%	88%	0%
	2012	0%	5%	94%	0%
	2013	0%	4%	96%	0%
	2014	0%	4%	96%	0%
	2015	0%	22%	78%	0%

Figure 20, Page 42: Evolution of DA price convergence in the SWE region – 2013–2015 (% of hours)

Source: EMOS, Platts and ACER calculations (2016).

	Full price convergence
2013	
Jan	5.65%
Feb	5.80%
Mar	1.48%
Apr	3.75%
May	5.51%
Jun	2.64%
Jul	1.88%
Aug	6.18%
Sep	10.00%
Oct	8.32%
Nov	5.83%
Dec	3.76%
2014	
Jan	6.05%
Feb	1.79%
Mar	7.66%
Apr	8.06%
May	11.02%
Jun	1.11%
Jul	0.00%
Aug	0.27%
Sep	1.11%
Oct	13.42%
Nov	22.92%
Dec	27.28%
2015	
Jan	13.44%
Feb	25.89%
Mar	37.23%
Apr	19.31%
May	4.44%
Jun	0.00%
Jul	1.88%
Aug	0.54%

Sep	7.36%
Oct	31.85%
Nov	24.17%
Dec	8.60%

Figure 21, Page 43: Weekly DA price convergence in the CWE region – 2015 (% of hours)

Source: EMOS, Platts and ACER calculations (2016).

Date	Full price convergence
29/12/2014 - 04/01/2015	5.95%
05/01/2015 - 11/01/2015	7.74%
12/01/2015 - 18/01/2015	8.93%
19/01/2015 - 25/01/2015	25.60%
26/01/2015 - 01/02/2015	7.74%
02/02/2015 - 08/02/2015	10.71%
09/02/2015 - 15/02/2015	13.69%
16/02/2015 - 22/02/2015	8.93%
23/02/2015 - 01/03/2015	11.90%
02/03/2015 - 08/03/2015	8.33%
09/03/2015 - 15/03/2015	14.88%
16/03/2015 - 22/03/2015	17.86%
23/03/2015 - 29/03/2015	19.76%
30/03/2015 - 05/04/2015	16.07%
06/04/2015 - 12/04/2015	4.76%
13/04/2015 - 19/04/2015	7.74%
20/04/2015 - 26/04/2015	3.57%
27/04/2015 - 03/05/2015	7.14%
04/05/2015 - 10/05/2015	6.55%
11/05/2015 - 17/05/2015	0.60%
18/05/2015 - 24/05/2015	45.24%
25/05/2015 - 31/05/2015	47.02%
01/06/2015 - 07/06/2015	14.88%
08/06/2015 - 14/06/2015	51.19%
15/06/2015 - 21/06/2015	23.21%
22/06/2015 - 28/06/2015	25.60%
29/06/2015 - 05/07/2015	31.55%
06/07/2015 - 12/07/2015	43.45%
13/07/2015 - 19/07/2015	56.55%
20/07/2015 - 26/07/2015	55.95%
27/07/2015 - 02/08/2015	26.19%
03/08/2015 - 09/08/2015	46.43%
10/08/2015 - 16/08/2015	14.88%
17/08/2015 - 23/08/2015	20.83%
24/08/2015 - 30/08/2015	5.95%
31/08/2015 - 06/09/2015	7.14%

07/09/2015 - 13/09/2015	5.36%
14/09/2015 - 20/09/2015	17.86%
21/09/2015 - 27/09/2015	5.95%
28/09/2015 - 04/10/2015	20.24%
05/10/2015 - 11/10/2015	42.86%
12/10/2015 - 18/10/2015	19.64%
19/10/2015 - 25/10/2015	21.43%
26/10/2015 - 01/11/2015	48.81%
02/11/2015 - 08/11/2015	48.21%
09/11/2015 - 15/11/2015	15.48%
16/11/2015 - 22/11/2015	23.81%
23/11/2015 - 29/11/2015	10.12%
30/11/2015 - 06/12/2015	15.48%
07/12/2015 - 13/12/2015	27.38%
14/12/2015 - 20/12/2015	52.38%
21/12/2015 - 27/12/2015	16.67%
28/12/2015 - 01/01/2016	61.46%

Figure 22, Page 43: Percentage of available capacity (NTC) used in the “right direction” in the presence of a significant price differential in all EU electricity interconnectors – 2010 (4Q)–2015 (%)

Source: ENTSO-E, NRAs,

Year	% of capacity used in the right direction	% of capacity unused in the right direction
2010	61%	39%
2011	67%	33%
2012	75%	25%
2013	77%	23%
2014	85%	15%
2015	84%	16%

Figure 23, Page 44: Estimated “loss in social welfare” due to the absence of market coupling, per border – 2014–2015 (million euros)

Source: ENTSO-E, data provided by NRAs through the EW template, Vulcanus (2015) and ACER calculations.

	2014	2015
CH-FR	39.6	42.3
CH-DE	29.7	35.7
CH-IT	5.7	17.4
CZ-DE_TENNET	19.1	15.8
FR-GB	1.9	14.8
AT-SI	8.4	13.6
AT-CZ	12.1	11.9
AT-CH	10.7	10.6
NL-GB	1.3	7.1
AT-HU	7.4	5.6
DK_E-SE-4	0.2	5.0
FR-IT	5.4	4.0
DE_TENNET-SE-4	0.0	2.2
DK_W-NO-2	0.5	0.8
DK_W-SE-3	0.3	0.3
DE-NL	0.4	0.2
DE_50HZT-DK_E	0.1	0.2
CZ-SK	0.3	0.2
PL-SE-4	0.3	0.2
IT-SI	0.6	0.1
DE-DK	0.0	0.1
EE-FI	0.0	0.1
NL-NO-2	0.2	0.0
AT-IT	0.3	0.0
FI-SE-3	0.1	0.0
NO-4-SE-1	0.0	0.0
NO-3-SE-2	0.0	0.0
FI-SE-1	0.0	0.0
NO-4-SE-2	0.0	0.0
ES-FR	6.8	0.0
HU-SK	6.8	0.0
NO-1-SE-3	0.0	0.0
BE-NL	0.1	0.0
BE-FR	0.1	0.0
ES-PT	0.2	0.0

Figure 24, Page 46: Simulation results: gross welfare benefits from incremental gain per border – 2011-2015 (million euros)

Source: PCR Project (2015).

Interconnector	Welfare Difference (€ mln)TS - RS				
	2011	2012	2013	2014	2015
ITɔ-FR	18.76	25.50	17.72	12.88	12.39
NL-NO2	11.76	15.60	13.03	12.48	17.23
FR-GB	5.31	9.33	11.90	13.92	14.47
FR-ES	7.53	5.96	10.50	12.79	11.47
DE-SE4	6.29	9.50	6.47	5.33	9.21
NL-DE	0.81	4.33	13.60	6.72	7.87
NL-GB	1.94	4.57	4.74	8.29	12.69
DE-DK1	4.42	6.29	4.95	4.07	8.45
SE4-PL	2.64	6.73	4.10	1.90	11.85
DE-DK2	4.21	5.25	4.94	4.29	8.06
DE-FR	4.07	3.20	6.10	4.70	6.57
NO2-DK1	6.08	3.79	4.22	4.39	2.53
BE-NL	3.63	2.16	5.26	2.00	5.08
FR-BE	0.24	1.74	4.45	5.83	5.55
SE1-FI	2.29	3.47	1.20	3.47	6.64
NO1-SE3	3.68	2.01	2.74	4.62	1.84
SE3-FI	0.60	3.00	1.76	3.17	5.97
EE-FI	4.17	2.66	2.39	1.28	0.90
SE4-DK2	0.34	3.73	1.72	1.90	1.69
DK1-SE3	0.37	1.18	2.17	1.41	1.38
NO3-SE2	2.55	-0.49	0.83	0.85	0.49
NO4-SE1	1.03	0.24	0.46	0.99	1.10
NO4-SE2	1.09	-0.40	0.84	1.03	1.12
ES-PT	2.06	-0.67	0.32	0.52	0.31
LV-LT	-	-	-	0.10	0.11

Figure 24, Page 46: Simulation results: gross welfare benefits from incremental gain per border – 2011-2015 (million euros)
Source: PCR Project (2015).

Interconnector	Welfare Difference (€ mln)TS - RS		
	2013	2014	2015
NL-NO2	13.03	12.48	17.23
FR-GB	11.90	13.92	14.47
NL-GB	4.74	8.29	12.69
ITɔ-FR	17.72	12.88	12.39
SE4-PL	4.10	1.90	11.85
FR-ES	10.50	12.79	11.47
DE-SE4	6.47	5.33	9.21
DE-DK1	4.95	4.07	8.45
DE-DK2	4.94	4.29	8.06
EE-LV	-	10.27	8.00
NL-DE	13.60	6.72	7.87
SE1-FI	1.20	3.47	6.64
DE-FR	6.10	4.70	6.57
SE3-FI	1.76	3.17	5.97
FR-BE	4.45	5.83	5.55
BE-NL	5.26	2.00	5.08
NO2-DK1	4.22	4.39	2.53
NO1-SE3	2.74	4.62	1.84
SE4-DK2	1.72	1.90	1.69
DK1-SE3	2.17	1.41	1.38
NO4-SE2	0.84	1.03	1.12
NO4-SE1	0.46	0.99	1.10
EE-FI	2.39	1.28	0.90
NO3-SE2	0.83	0.85	0.49
ES-PT	0.32	0.52	0.31
LV-LT	-	0.10	0.11

Figure 25, Page 47: ID traded volumes as a percentage of electricity demand in a selection of EU markets – 2011–2015 (%)

Source: Power exchanges and the CEER National Indicators Database (2016).

	Ratio ID/Demand				
	2011	**2012**	**2013**	**2014**	**2015**
ES	17.93%	17.53%	12.73%	12.07%	10.76%
PT	5.73%	10.69%	10.93%	7.56%	7.27%
IT	6.59%	7.76%	7.39%	7.39%	
GB	6.34%	6.23%	6.55%	6.84%	7.17%
DE/AT/LU	2.55%	2.31%	3.28%	4.59%	6.42%
CH	-	-	0.73%	1.73%	2.33%
BE	0.00%	0.60%	0.75%	0.96%	0.89%
Nordic+Baltic	0.00%	0.63%	0.74%	0.95%	1.05%
NL	0.25%	0.43%	0.63%	0.92%	0.84%
FR	0.35%	0.44%	0.59%	0.71%	0.80%

Figure 29, Page 50: Level of utilisation of cross-border capacity in the ID timeframe when it has a value, for a selection of borders – 2015
Source: ENTSO-E, data provided by NRAs through the EW template, Vulcanus (2015) and ACER calculations.

border	Direction	% of hours when valuable ID capacity is utilised	Number of hours when intraday capacity is available (at least 100 MW) and has a value (> 1 euro/MWh ID price differential)	Number of hours when valuable intraday capacity is utilised (>50 MW nominated in the intraday timeframe)
ES-PT	ES->PT	100%	77	77
ES-PT	PT->ES	100%	7	7
FR-DE	DE->FR	55%	878	481
FR-DE	FR->DE	73%	888	651
ES-FR	FR->ES	56%	627	352
ES-FR	ES->FR	59%	837	498
FR-IT	IT->FR	32%	1,343	427
FR-IT	FR->IT	40%	827	334
FR-BE	BE->FR	30%	1,777	525
FR-BE	FR->BE	41%	1,741	706
FR-GB	FR->GB	23%	427	97
FR-GB	GB->FR	35%	1,379	482

Figure 30, Page 52: Overall costs of balancing (capacity and energy) and imbalance prices over national electricity demand in a selection of European markets – 2015 (euros/MWh)

Source: Data provided by NRAs through the EW template (2016) and ACER calculations.

	Energy	FCR procurement costs	(Capacity procurement costs-FCR)	Imbalance charges
SK	0.38	0.49	4.62	1.23
RO	1.91	0.00	2.56	1.68
SI	0.83	0.00	2.92	0.90
HU	1.27	0.45	1.98	1.43
CZ	0.52	0.27	2.82	0.74
CH	0.34	0.21	1.54	0.60
AT	1.50	0.18	0.36	0.81
PT	1.01	0.00	0.93	1.02
ES	0.54	0.00	0.97	0.49
GB	0.54	0.52	0.39	0.45
DE	0.42	0.21	0.40	0.33
(DK-NO-SE-FI)	0.24	0.54	0.20	NA
NL	0.40	0.16	0.38	0.56
PL	0.16	0.01	0.51	0.16
FR	0.14	0.19	0.33	0.17

Figure 33, Page 58: EU balancing energy activated abroad as a percentage of the amount of total balancing energy activated (upward) from mFRR in national BMs – 2015 (%)

Source: Data provided by NRAs through the EW template (2016) and ACER calculations.

	Average of mFRR+-% imported energy
SI	0.20%
ES	0.50%
CZ	1.00%
PT	2.80%
FR	14.40%

Figure 34, Page 58: EU balancing capacity contracted abroad as a percentage of the system requirements of reserve capacity (upward FCR) – 2015 (%)
Source: Data provided by NRAs through the EW template (2016) and ACER calculations.

	Sum of FCR+-% imported reserves
AT	1.49%
DE	3.46%
CH	6.76%
SE	9.69%
SK	20.68%
NL	31.96%
FI	55.04%

Figure 35, Page 58: Imbalance netting as a percentage of the total needs of balancing energy (activated plus avoided activation due to netting) from all types of reserves in national Balancing Markets – 2015 (%)
Source: Data provided by NRAs through the EW template "2016) and ACER calculations.

	Sum of Total imbalance netting
HU	10.46%
SI	16.38%
SK	21.03%
CH	26.00%
DE	33.06%
CZ	34.85%
AT	35.38%
NL	46.43%

Figure 43, Page 65: Evolution of the frequency of price spikes (number of hours per year, left axis), the aggregated installed conventional generation capacity and aggregated electricity demand (indexed to 2005 = 100, right axis) in Belgium – 2007–2015

Source: Eurostat, ENTSO-E (2016).

Year	Demand BE	Installed conventional generation BE	Price Spikes BE
2007	1.00	1.00	111
2008	1.00	0.99	40
2009	0.93	1.01	54
2010	1.00	1.01	10
2011	0.96	1.06	1
2012	0.94	1.00	4
2013	0.96	0.96	1
2014	0.93	0.94	2
2015	0.94	0.91	54

Figure 44, Page 65: Charges to household end-consumers that finance the costs associated with CMs, redispatching actions and other system services in Italy - 2008-2015 (euros/MWh)
Source: AEEGSI (2016)

Year	Aggregated costs of redispatching, balancing, capacity payments charged to household consumers
2008	8.68
2009	7.70
2010	8.89
2011	9.49
2012	10.80
2013	13.64
2014	15.44
2015	11.68

Figure 45, Page 67: Average curtailed capacity and number of curtailed hours per border – 2014 and 2015 (MW and hours/year)

Source: Data provided by NRAs through the EW template (2016), EW template (2016) and ACER calculations

Border	year	Average MW curtailment	Number of hours
CH->AT	2014	0.26	6
	2015	184.17	21
IT->CH	2014	-	0
	2015	744.48	31
SI->IT	2014	86.64	166
	2015	64.00	52
FR->CH	2014	226.83	90
	2015	162.48	149
ES->FR	2014	178.53	240
	2015	191.80	78
IE->GB	2014	500.00	327
	2015	500.00	228
GB->IE	2014	530.00	327
	2015	530.00	228
IT->AT	2014	66.82	896
	2015	69.61	78
AT->IT	2014	131.97	961
	2015	54.19	54
CH->IT	2014	389.19	1,128
	2015	328.42	401
IT->GR	2014	496.48	341
	2015	268.04	1,421
GR->IT	2014	453.02	476
	2015	285.16	1,433
GB->FR	2014	273.62	1,553
	2015	298.65	2,272
FR->GB	2014	311.66	1,702
	2015	325.49	2,498

Figure 46, Page 67: Total curtailment costs per border – 2014 and 2015 (thousand euros)
Source: Data provided by NRAs through the EW template (2016), and ACER calculations

	2014	2015
IT->AT	1,941	364
IE->GB	2,059	7,944
IT->FR	11,062	1,650
DE->DK2	15,734	0
GB->NL	17,128	1,775
GB->FR	51,332	93,282
FR->CH	53,363	26,531
DK2->DE	57,008	0
ES->FR	102,454	54,631
IT->GR	111,359	1,191,230
FR->ES	118,950	186,198
SI->IT	241,341	26,624
GB->IE	1,026,575	538,461
FR->IT	1,197,653	341,915
NL->GB	1,198,157	3,433,793
GR->IT	2,418,188	230,392
AT->IT	2,730,571	45,104
CH->IT	3,909,650	997,778
FR->GB	9,085,220	14,379,939

revenues per country – 2015 (million euros)
ovided by ENTSO-E (2016).

	Guaranties for allocated capacity (1)	Interconnection investments (2)	Lowering transmission tariffs	Placed on a separate internal account until used for (1) or (2)	Congestion Revenues
LU	0.00	0.00	0.00	0.00	0.00
NI	0.00	0.00	0.00	0.00	0.00
LT	0.00	0.46	0.00	0.00	0.46
BA	0.00	0.00	0.82	0.00	0.82
PT	0.00	0.00	0.90	0.00	0.90
HR	0.00	4.51	0.00	0.33	4.84
ME	0.00	0.00	5.10	0.00	5.10
CZ	0.00	11.44	0.00	0.00	11.44
AL	0.00	0.00	16.01	0.00	16.01
MK	0.00	0.00	0.00	18.40	18.40
IE	18.67	0.00	0.00	0.00	18.67
RS	0.00	0.00	19.67	0.00	19.67
RO	0.00	0.00	3.96	19.13	23.09
LV	1.57	0.00	0.74	24.15	26.45
PL	0.00	0.00	2.76	23.97	26.73
EE	1.75	2.34	0.00	26.30	30.38
SK	0.00	26.99	8.21	0.00	35.21
SI	0.00	0.00	45.71	0.00	45.71
BG	0.00	0.00	18.94	29.63	48.57
GR	0.00	0.00	55.99	0.00	55.99
HU	0.00	0.00	60.89	0.00	60.89
DK	0.00	0.00	62.21	6.63	68.84
BE	0.00	0.00	69.11	0.00	69.11
ES	0.30	0.00	72.09	0.00	72.39
AT	25.96	55.42	0.00	0.00	81.38
FI	0.00	90.94	0.00	0.00	90.94
NO	0.00	0.00	98.91	0.00	98.91
CH	0.00	0.00	124.28	0.00	124.28
SE	1.45	84.33	0.00	59.61	145.40
NL	13.00	0.00	45.00	97.44	155.44
DE	13.04	48.44	100.60	24.22	186.29
GB	25.15	168.33	0.00	0.00	193.48
IT	234.74	0.00	0.00	0.00	234.74
FR	0.00	475.07	0.00	0.00	475.07
GB/NL	-	-	-	-	-

Figure 49, Page 72: Percentage of hours with net DA nominations against price differentials per border – 2014–2015 (%)

Source: ENTSO-E, NRAs, Vulcanus (2016) and ACER calculations.

Border	2014	2015
IE-GB (EWIC)	43%	0.46
NI-GB (MOYLE)	43%	0.41
CH-FR	30%	0.34
CZ-DE	33%	0.32
AT-CZ	33%	0.32
GR-IT	12%	0.21
PL-SK	17%	0.19
AT-HU	18%	0.15
DE-PL	18%	0.15
AT-CH	21%	0.14
CH-DE	20%	0.14
CZ-PL	12%	0.11
CH-IT	2%	0.10
FR-GB	3%	0.06
NL-GB	5%	0.03
PL-SE	3%	0.03
FR-IT	4%	0.02
AT-SI	13%	0.02
AT-IT	2%	0.00
HU-RO	23%	0.00
ES-FR	4%	0.00

Figure 51, Page 72: Evolution of the average annual level of commercial use of interconnections (DA and ID) as a percentage of NTC values for all EU borders – October 2010–2015 (%)

Source: ENTSO-E, NRAs, Vulcanus (2016) and ACER calculations

Years	DA commercial schedules (LT included)	ID commercial schedules
2010	0.32	0.02
2011	0.35	0.02
2012	0.38	0.03
2013	0.38	0.03
2014	0.39	0.03
2015	0.37	0.04

Figure 52, Page 73: Level of ID cross-border trade: absolute sum of net ID nominations for a selection of EU borders – 2010–2015 (GWh)
Source: ENTSO-E, NRAs, vulcanus (2014) and ACER calculations.

Borders	2010	2011	2012	2013	2014	2015
CH-FR	1,012.08	907.68	3,619.59	4,496.12	4,694.67	4,453.70
DE-FR	2,076.69	2,829.14	2,762.11	2,524.09	3,057.38	2,237.76
ES-PT		1,675.36	2,044.43	2,426.15	2,274.22	2,456.33
CH-DE	1,676.30	1,716.83	1,382.80	1,400.41	1,506.50	1,831.59
AT-DE	1,019.57	1,412.89	1,354.42	1,999.90	2,124.28	4,304.27
ES-FR		823.08	1,069.64	1,023.47	837.61	744.40
BE-FR	685.15	1,088.86	1,035.08	1,065.20	658.12	661.76
CZ-DE	428.44	711.32	804.92	1,008.01	1,191.23	1,429.68
DE-NL	916.13	1,194.58	727.72	395.71	629.35	550.41
BE-NL	166.94	283.44	363.21	464.10	558.06	456.39
AT-SI	308.25	395.69	326.58	433.03	418.43	530.44
DE-PL	0.00	200.00	300.00	687.20	806.16	2,356.27
CZ-SK	31.32	137.42	177.93	217.75	193.56	245.64

Figure 53, Page 73: Weighted average prices of balancing energy activated from aFRR (upward and downward activation) in a selection of EU markets – 2014 (euros/MWh)
Source: Data provided by NRAs through the EW template (2016).

Row Labels	Downward	Upward
France	10.50	10.50
Poland	35.89	40.42
Sweden (SE1-SE2)	21.19	27.10
Norway (NO1-NO2-NO5)	20.34	26.93
Spain	38.48	53.73
Finland	30.47	50.35
Switzerland	31.41	53.65
Portugal	33.13	64.48
Denmark (DKW)	5.54	40.85
Slovenia	19.56	64.70
Romania	0.61	66.67
Slovakia	65.00	135.00
The Czech Republic	-0.04	86.13
Germany	-36.91	74.13
Hungary	-24.19	100.31
The Netherlands	-15.95	115.97
Austria	-177.50	140.13

Figure 54, Page 74: Average prices of balancing capacity aFRR (upward and downward reserve capacity) in a selection of EU markets – 2015 (euros/MW)
Source: Data provided by NRAs through the EW template (2016)

Countries	Upward	Downward
Germany	5.93	-2.65
Austria	4.20	-4.80
Sweden	5.00	-5.00
The Netherlands	6.84	-6.84
Denmark (DK_W)	7.20	-7.20
France	9.16	-9.16
Slovenia	10.53	-10.53
Norway	11.06	-11.50
Switzerland	11.42	-11.42
The Czech Repub	11.60	-11.60
Belgium	11.69	-11.69
Hungary	11.52	-14.40
Romania	13.01	-13.01
Croatia	13.84	-13.84
Slovakia	15.32	-15.32
Spain	19.58	-19.58
Portugal	20.20	-20.20
Finland	25.80	-20.00

Figure 59, Page 81: Ratio between available NTC and aggregated thermal capacity of interconnectors - 2015 (%)

Source: ACER

	Indicated direction	Opposite direction
meshed		
AT-CH	22%	34%
AT-CZ	22%	19%
AT-HU	17%	21%
AT-SI	33%	41%
BE-FR	39%	57%
BE-NL	27%	27%
CH-DE	37%	13%
CH-FR	19%	48%
CH-IT	48%	28%
CZ+DE+SK-PL	0%	23%
CZ-PL	23%	25%
CZ-SK	45%	31%
DE-CZ	17%	50%
DE-FR	40%	30%
DE-NL	23%	25%
FR-IT	59%	24%
HU-SK	32%	41%
IT-SI	41%	34%
PL-SK	26%	24%
non-meshed		
DE_tennet-DK_W	46%	12%
ES-FR	30%	35%
ES-PT	33%	42%