

The Spanish Electricity System

Ancillary services and
International exchanges 2021



Glossary of terms

<https://www.ree.es/en/glossary>

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Components of the average final price of energy in the peninsular system

Reference supply and free contracting

€/MWh

Precio (€/MWh) ⁽¹⁾	J	F	M	A	M	J	J
Day-ahead market	63.60	29.86	46.39	66.20	67.94	83.94	92.81
Intraday market	0.03	-0.02	-0.02	-0.03	-0.03	-0.03	-0.03
Ancillary Services	3.72	4.00	3.26	3.02	3.93	3.00	3.09
Technical constraints PDBF ⁽²⁾	1.80	2.14	1.99	1.70	2.50	1.96	1.21
Secondary control band	0.71	1.16	0.66	0.58	0.97	0.73	0.72
Real-time technical constraints	0.95	0.67	0.53	0.67	0.42	0.30	1.08
Non-compliance of balancing energy	-0.05	-0.02	-0.02	-0.04	-0.04	-0.04	-0.04
Deviation cost	0.49	0.25	0.25	0.25	0.18	0.25	0.15
Deviation balance	-0.20	-0.14	-0.10	-0.13	-0.05	-0.12	0.01
Control of the power capacity factor	0.00	-0.07	-0.06	-0.06	-0.07	-0.07	-0.07
Operating Procedure 14.6 balance	0.02	0.01	0.01	0.05	0.02	-0.01	0.03
Average final price 2021		2.98	2.38	2.31	2.25	0.30	0.54
Average final price 2020	70.37	36.82	52.01	71.50	74.09	87.21	96.41
Final energy ⁽³⁾ (GWh)	46.96	41.40	33.24	25.30	27.35	36.02	40.02
Energía final ⁽³⁾ (GWh)	22,764	19,226	20,723	18,861	19,171	19,528	21,503

	A	S	O	N	D	Total	% 20/21
Day-ahead market	106.45	156.53	202.59	197.46	245.70	113.10	221.2
Intraday market	-0.04	0.00	-0.02	0.03	-0.06	-0.02	0.0
Ancillary Services	4.61	3.92	6.73	5.98	5.95	4.28	68.5
Technical constraints PDBF ⁽²⁾	2.07	1.02	2.44	1.49	1.80	1.84	2.8
Secondary control band	1.17	1.23	1.97	1.60	1.50	1.08	170.0
Real-time technical constraints	1.19	1.43	1.87	2.45	2.28	1.16	251.5
Non-compliance of balancing energy	-0.04	-0.09	-0.13	-0.13	-0.27	-0.07	250.0
Deviation cost	0.32	0.36	0.50	0.42	0.86	0.36	111.8
Deviation balance	-0.05	0.01	0.16	0.19	-0.19	-0.05	-28.6
Control of the power capacity factor	-0.06	-0.06	-0.07	-0.08	-0.08	-0.06	-14.3
Operating Procedure 14.6 balance	0.01	0.02	-0.01	0.04	0.05	0.02	100.0
Average final price 2021		0.31	0.26	0.38	0.54	1.30	-50.6
Average final price 2020	111.33	160.76	209.56	203.85	252.13	118.66	193.9
Final energy ⁽³⁾ (GWh)	41.06	47.45	42.64	48.11	49.09	40.38	
Energía final ⁽³⁾ (GWh)	20,620	19,589	18,915	20,241	20,757	241,899	2.3

(1) Prices are calculated using the latest settlements available from the System Operator.

(2) PDBF: Daily base operating schedule.

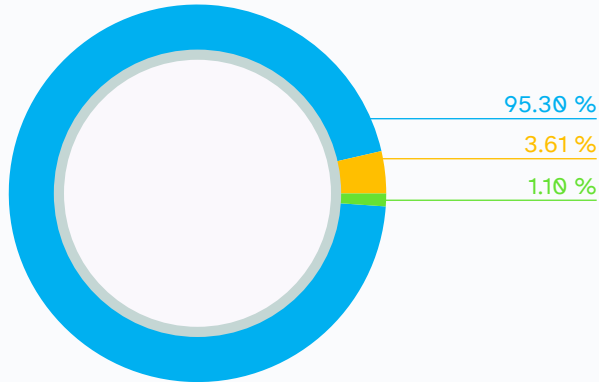
(3) Includes closing of the energy market and own consumption of power generation ancillary services.

Components of the average final price

2021

%

Average final price
118.66
€/MWh

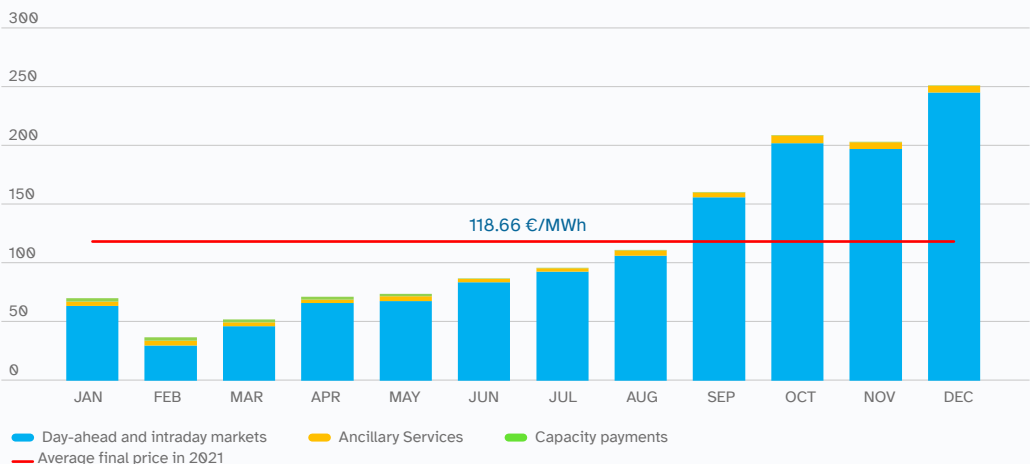


Day-ahead and intraday markets Ancillary Services Capacity payments

Evolution of the components of the average final price

Reference supply and free contracting

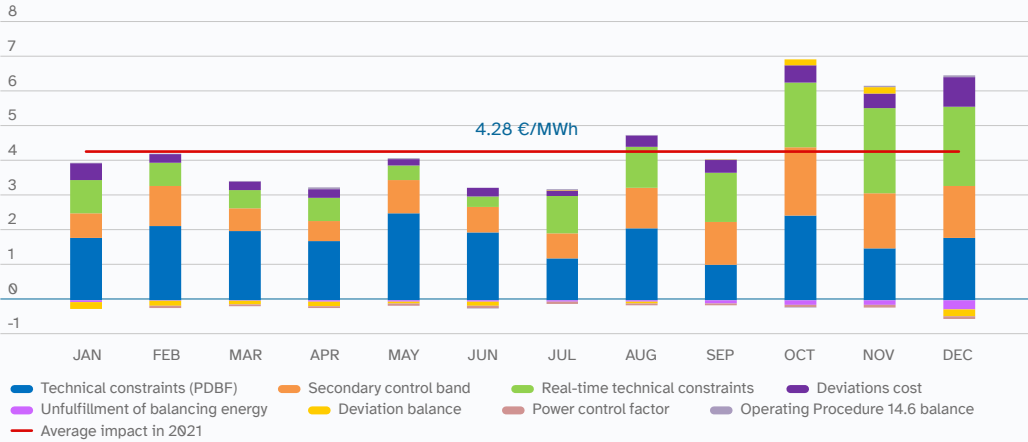
€/MWh



Day-ahead and intraday markets Ancillary Services Capacity payments
Average final price in 2021

Impact of ancillary services on the average final price

€/ MWh



Energy requirements covered through ancillary services

GWh

	2020		2021		% 21/20	
	Upward	Downward	Upward	Downward	Upward	Downward
Scheduled Energy to ensure security	10,159	914	9,475	912	-6.7	-0.3
Technical constraints (PDBF) ⁽¹⁾	9,431	548	7,789	253	-17.4	-53.8
Real-time technical constraints	728	366	1,686	659	131.5	80.0
Energy used to perform balancing	4,890	3,599	5,824	4,480	19.1	24.5
Replacement reserves (RR) ⁽²⁾	2,107	872	2,168	852	2.9	-2.2
Secondary control	1,212	1,631	1,300	1,541	7.2	-5.5
Tertiary control	1,543	1,061	2,160	1,322	40.0	24.7
IGCC ⁽³⁾		36	197	765	598.7	2,022.6
Total energy managed		19,563		20,691		5.8

Does not include energy managed through cross-border balancing services.

(1) Upward or Downward Energy in phase 1 of the resolution of technical constraints of the PDBF (Operating Procedure 3.2).

(2) Energy requirements of the Spanish System allocated via Deviation management until 2 March, and as of that date, allocated through the European platform for the exchange of balancing energy from replacement reserves (RR).

(3) The IGCC Product (European Platform for the netting the demand for secondary control power) came into service on 21 October 2020.

Average weighted energy prices in the peninsular system's ancillary services

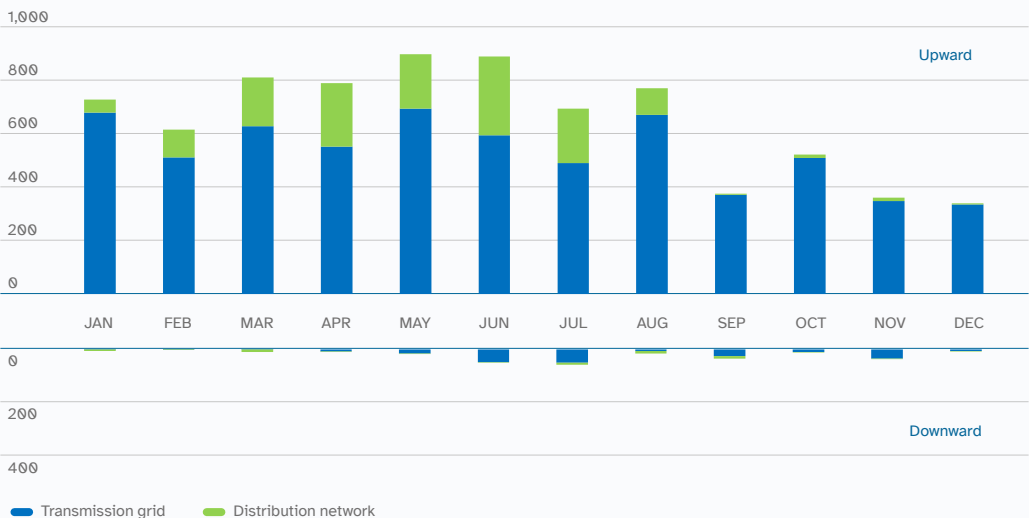
€/ MWh

	2020		2021		% 21/20	
	Upward	Downward	Upward	Downward	Upward	Downward
Technical constraints (PDBF)	75.3	30.7	145.9	89.0	93.8	189.5
Real-time technical constraints	146.1	7.4	268.4	37.6	83.6	405.8
Secondary control	35.8	29.0	112.1	100.5	213.1	246.8
Tertiary control		19.3	137.4	59.1	222.6	206.4
Replacement reserves ⁽¹⁾	43.1	22.0	144.3	70.2	235.0	218.4

(1) Balancing energy from replacement reserves (RR) has a single price. The value represented in the table corresponds to the weighted average price according to the activated upward or downward balancing energy needed to cover the need of the Spanish Electricity System. Up to and including February 2020, the figures correspond to the weighted average price of the upward energy managed through the generation-consumption deviation management service.

Resolution of technical constraints (PDBF). Scheduled energy broken down by type of constraint

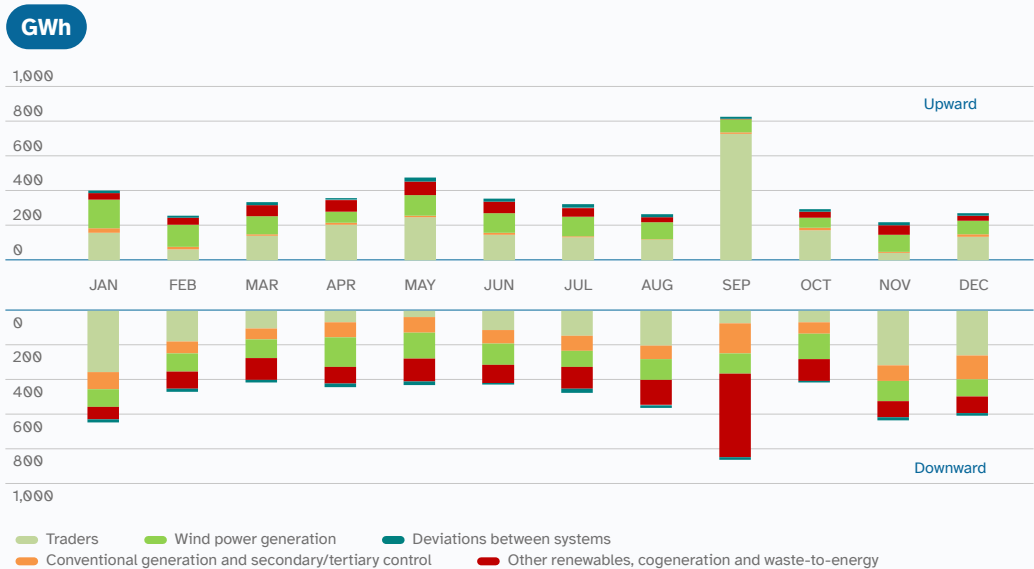
GWh



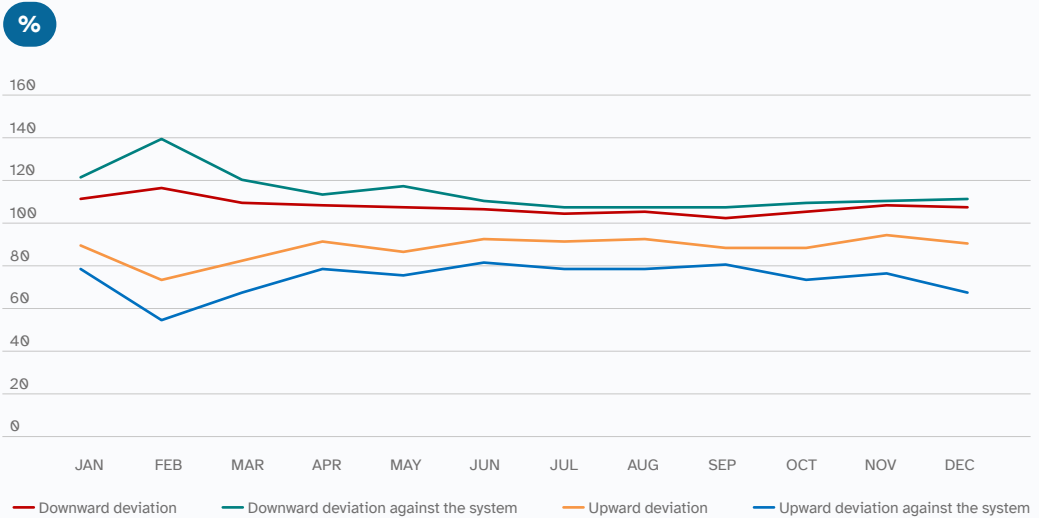
Other ancillary services markets. Energy requirements covered



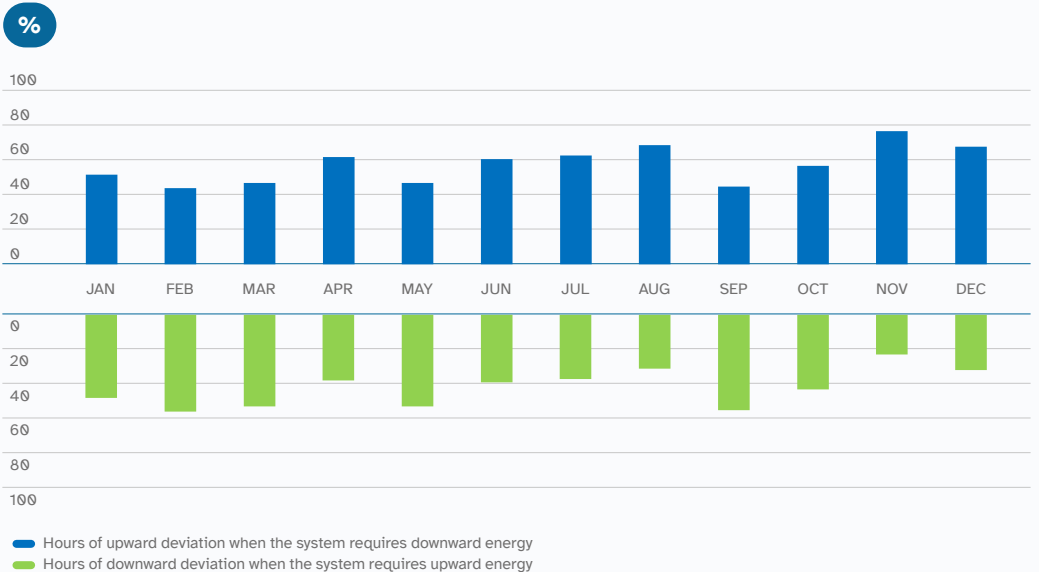
Measured net deviations



Price deviation in relation to the day-ahead market

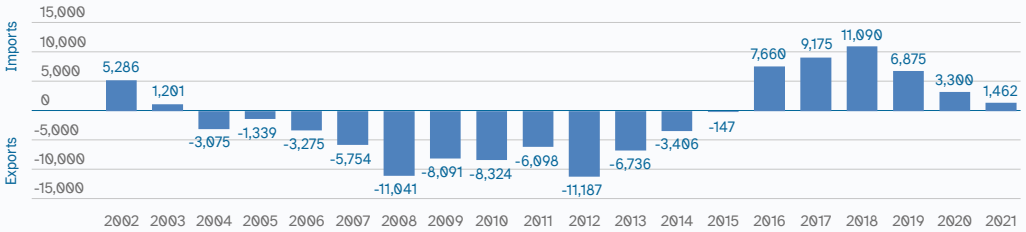


Hours with deviations contrary to system requirements



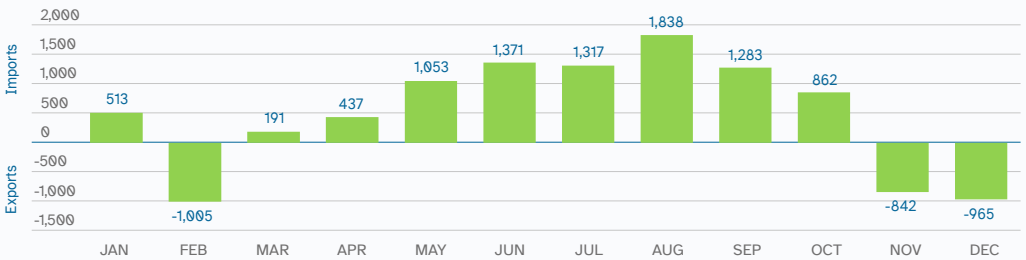
Annual net balance of scheduled energy exchanges via Spain's cross-border connections

GWh



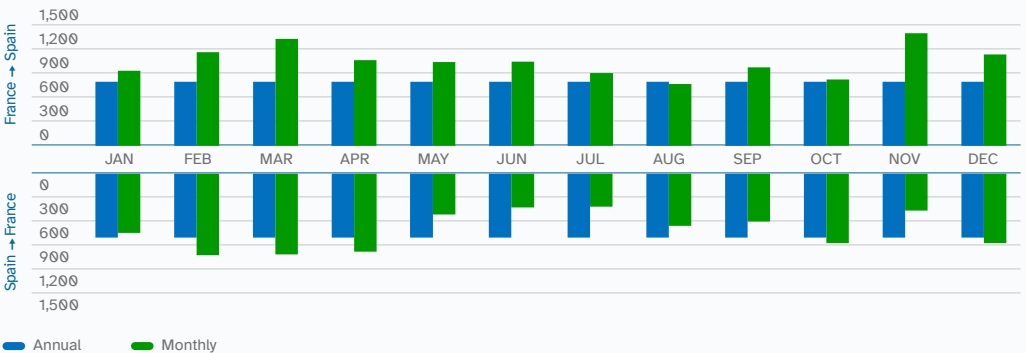
Monthly net balance of scheduled energy exchanges in 2021 via the cross-border connection with France (IFE)

GWh



Hourly capacity rights allocated via explicit long-term auctions in the cross-border connection with France (IFE)

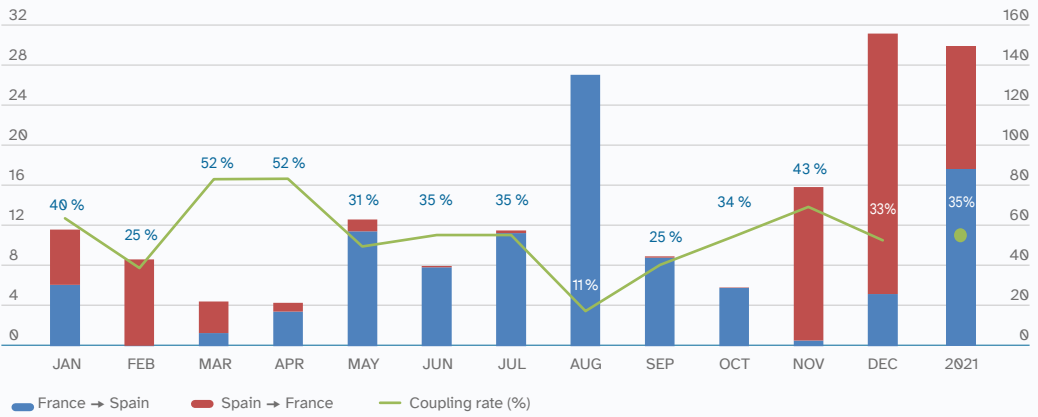
MW



Maintenance periods that limit the capacity rights allocated have not been considered in the graphical representation.

Congestion rents and coupling rates in the interconnection with France derived from the coupling of the MRC day-ahead markets (MRC - Multi-Regional Coupling)

€ Million



Does not include counter-trading costs nor other costs.

Coupling Rate: % of hours without congestion in the day-ahead horizon.

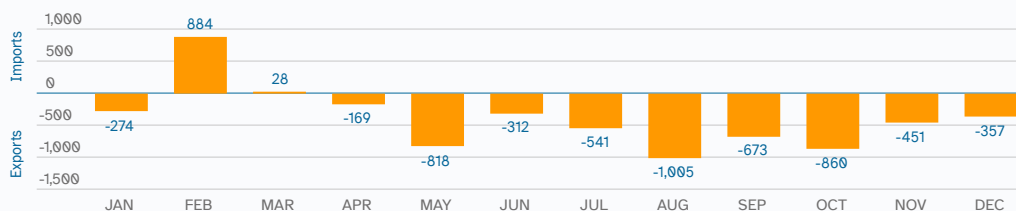
Congestion rents in the interconnection with France derived from the mechanisms for the management of cross-border connections

€ Thousand and %

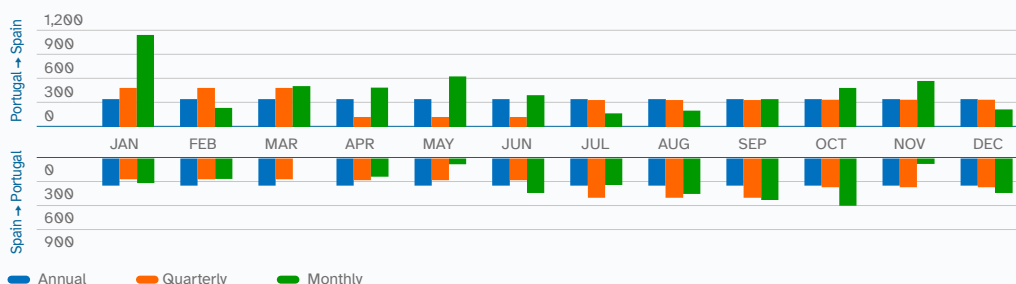
	France → Spain		Spain → France		Total	
	€ Thousand	%	€ Thousand	%	€ Thousand	%
Annual Auction	30,554.9	9.6	35,250.2	11.1	65,805.1	20.7
Monthly Auction	56,699.9	17.8	39,832.0	12.5	96,531.9	30.3
Day-ahead Horizon	89,339.8	28.1	61,374.4	19.3	150,714.2	47.3
Replacement Reserves	3,754.8	1.2	1,564.7	0.5	5,319.4	1.7
Total	180,349.3	56.6	138,021.2	43.4	318,370.6	100.0

Does not include counter-trading costs nor other costs.

Monthly net balance of scheduled energy exchanges in 2021 via the cross-border connection with Portugal (IPE)

GWh


Hourly capacity rights allocated via explicit long-term auctions in the cross-border connection with Portugal (IPE)

GW


Annual Quarterly Monthly

Maintenance periods that limit the capacity rights allocated have not been considered in the graphical representation.

Congestion rents in the interconnection with Portugal derived from the mechanisms for the management of cross-border connections

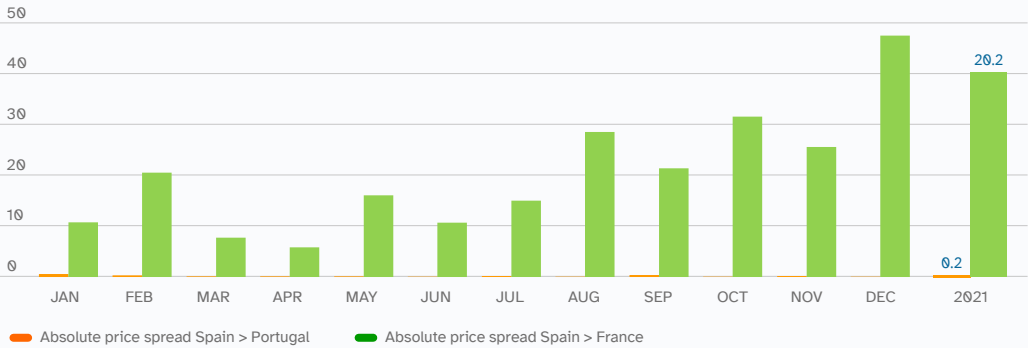
€ Thousand and %

	Portugal → Spain		Spain → Portugal		Total	
	€ Thousand	%	€ Thousand	%	€ Thousand	%
Annual Auction	245.3	6.1	297.8	7.4	543.1	13.6
Monthly Auction	120.9	3.0	179.9	4.5	300.8	7.5
Quarterly Auction	402.1	10.1	280.7	7.0	682.9	17.1
Day-ahead coupling	604.5	15.1	1,672.5	41.8	2,277.0	56.9
Intraday Market	74.3	1.9	45.0	1.1	119.3	3.0
Replacement Reserves	9.5	0.2	67.8	1.7	77.3	1.9
Total	1,456.6	36.4	2,543.8	63.6	4,000.4	100.0

Does not include counter-trading costs nor other costs.

Absolute price spread of the coupling rates of the day-ahead markets in the cross-border connections with France and Portugal

€/ MWh



Average arithmetic value of the absolute values of the hourly price differentials resulting from the coupling of day-ahead markets.

Replacement reserve (RR) energy allocated through the Spanish cross-border connections

GWh

	Imports		Exports	
	France	Portugal	France	Portugal
January	0.0	36.4	0.0	55.9
February	16.7	32.5	3.8	32.5
March	55.2	23.8	14.7	70.5
April	48.9	41.8	23.4	41.8
May	17.2	66.6	29.9	36.6
June	24.4	48.1	22.1	46.8
July	32.4	52.6	13.8	40.6
August	10.4	35.9	10.9	27.9
September	16.2	27.6	22.9	60.4
October	22.3	57.3	31.8	49.9
November	43.8	42.9	24.4	51.0
December	53.5	61.1	14.5	58.1



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