

# El mercado mayorista de la electricidad es un mercado europeo

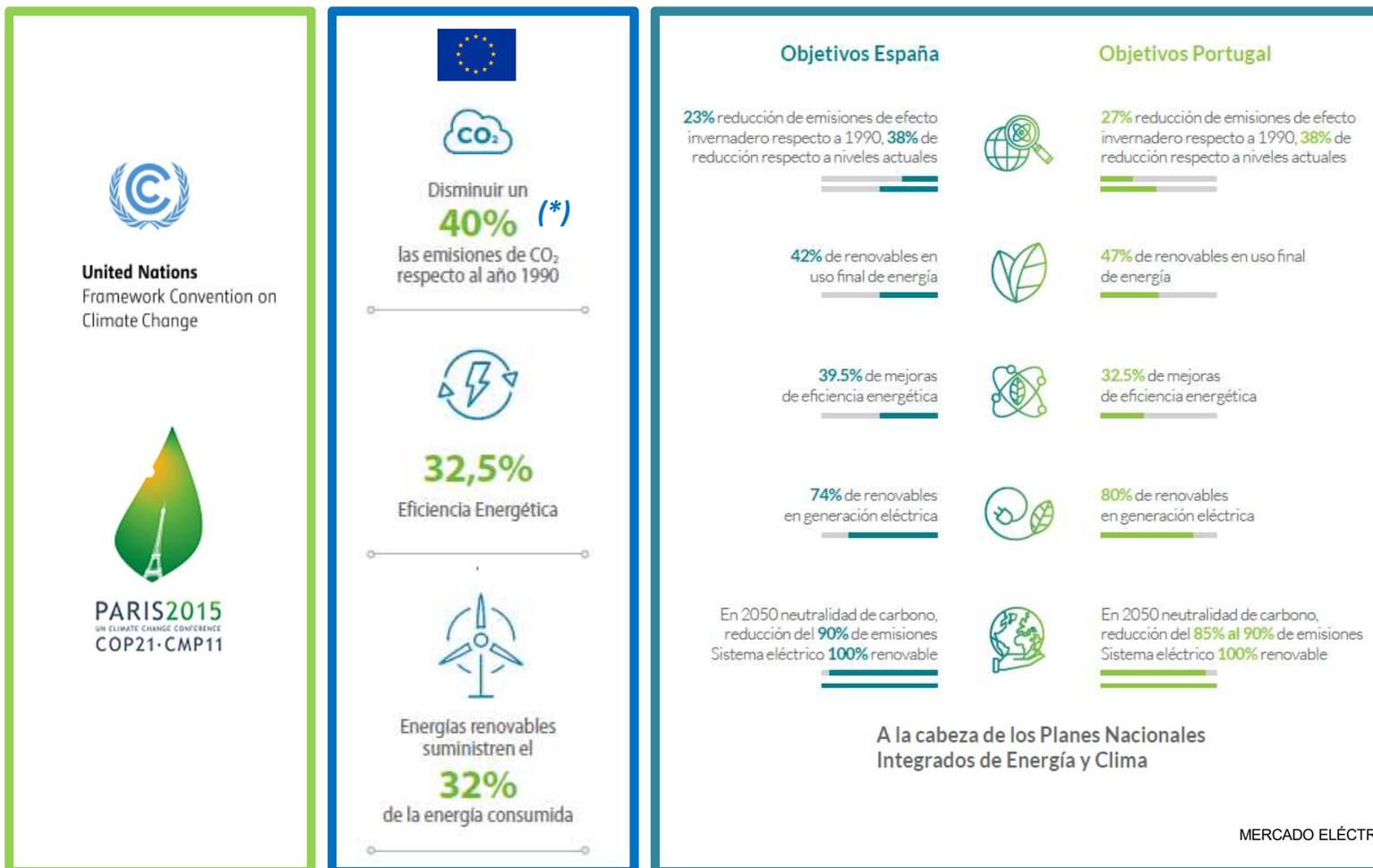
**Rafael Gómez-Elvira**

Director de Relaciones Institucionales y Marketing, OMI  
Presidente, EU NEMO Committee



# Acción por el Clima

## Una gran oportunidad para todos



(\*) 55% Negociación

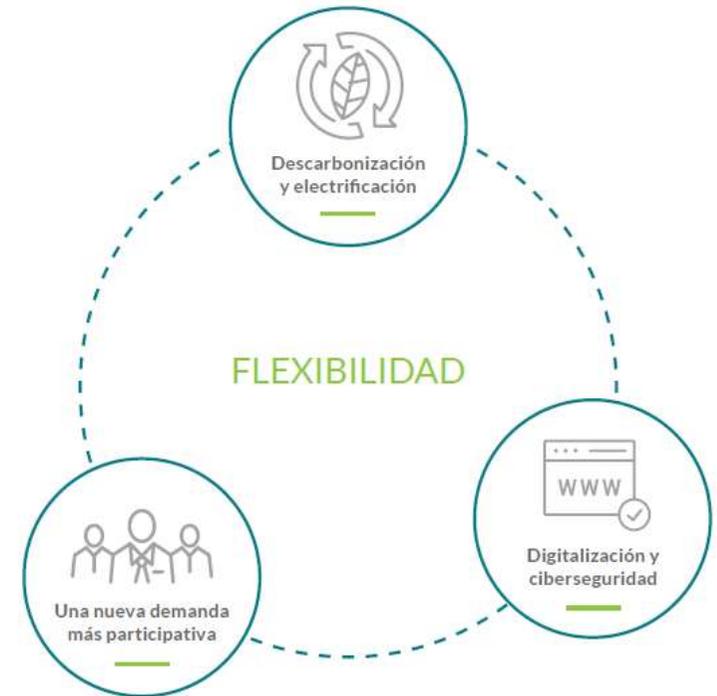




## Legislación EU derivada del CEP (Clean Energy Package)

	Official Journal Publication
Energy Performance in Buildings	19/06/2018 - Directive (EU) 2018/844
Renewable Energy	21/12/2018 - Directive (EU) 2018/2001
Energy Efficiency	21/12/2018 - Directive (EU) 2018/2002
Governance of the Energy Union	21/12/2018 - Regulation (EU) 2018/1999
Electricity Regulation	14/06/2019 - Regulation (EU) 2019/943
Electricity Directive	14/06/2019 - Directive (EU) 2019/944
Risk Preparedness	14/06/2019 - Regulation (EU) 2019/941
ACER	14/06/2019 - Regulation (EU) 2019/942

“... This regulation is one of the legislative proposals of the clean energy package and is the **cornerstone of the redesign of the electricity market**. (...) In so doing, it will help the EU transition **towards a low-carbon economy** and meet the objectives of the Energy Union, **in particular the 2030 climate and energy framework...**” **Council, 2018**



# **Nominated** Electricity Market Operator (NEMO)



“...Operador designado para el mercado eléctrico o NEMO, por sus siglas en inglés: operador del mercado **designado** por la autoridad competente **para realizar funciones relacionadas con el acoplamiento único** diario o intradiario...”

Art. 2. Reglamento (UE) 2019/943

































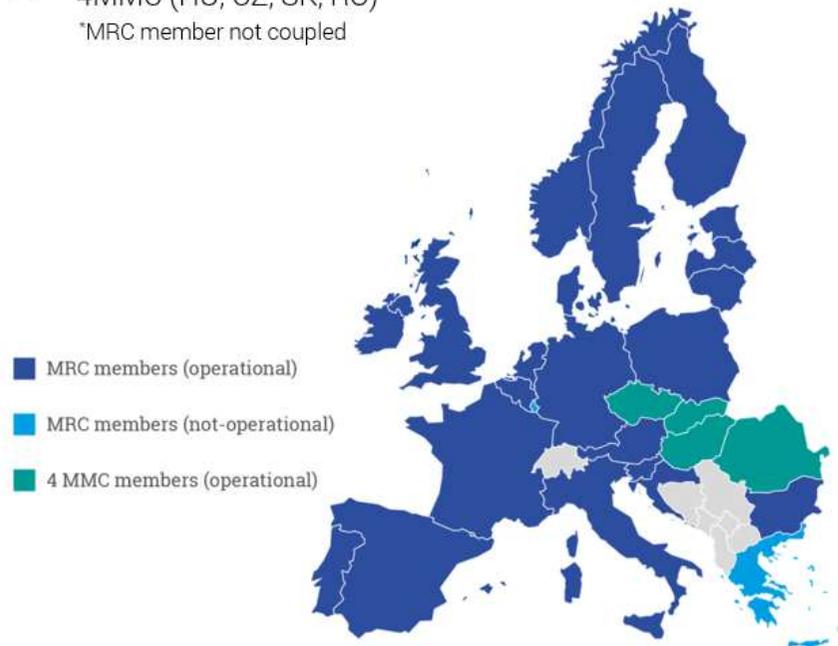
[www.nemo-committee.eu](http://www.nemo-committee.eu)



# Mercado **Diario**: Un Mercado **Europeo**

## Geographical scope

- MRC (PT, ES, FR, IT, DE, BE, NL, LU, UK, IE, AT, SI, HR, BG, GR\*, PL, LT, LV, EE, FI, SE, DK, NO)
- 4MMC (HU, CZ, SK, RO)  
\*MRC member not coupled



- 1** **Algorithm** calculating prices and cross border flows
- 95** **% of EU** is coupled
- 1500** **TWh/year in** in one market solution
- 8,8** **B€** average daily welfare gain
- 12** **minutes** to solve a large and complex optimization problem

Fuente: NEMO Committee, 2020

The largest market integration worldwide

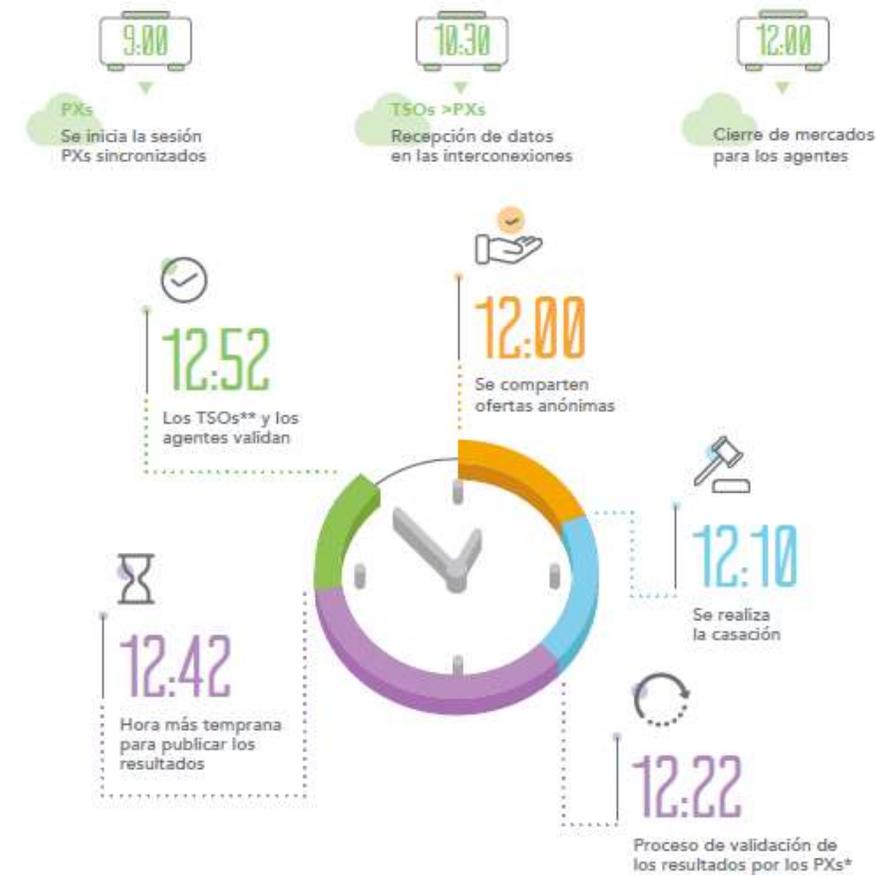


MERCADO ELÉCTRICO EUROPEO 2030





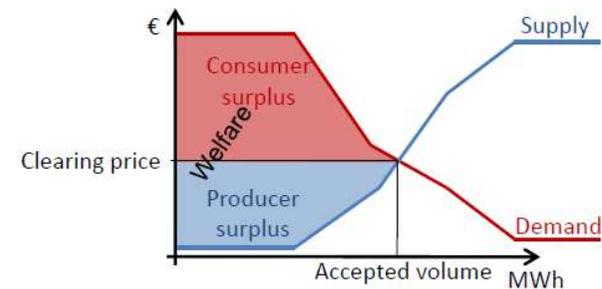
# Mercado **Diario**: Un Mercado **Europeo**



\*PXs: Operadores de mercado \*\* TSOs: Operadores de sistema

## EUPHEMIA

EU Pan-European Hybrid  
Electricity Market Integration Algorithm



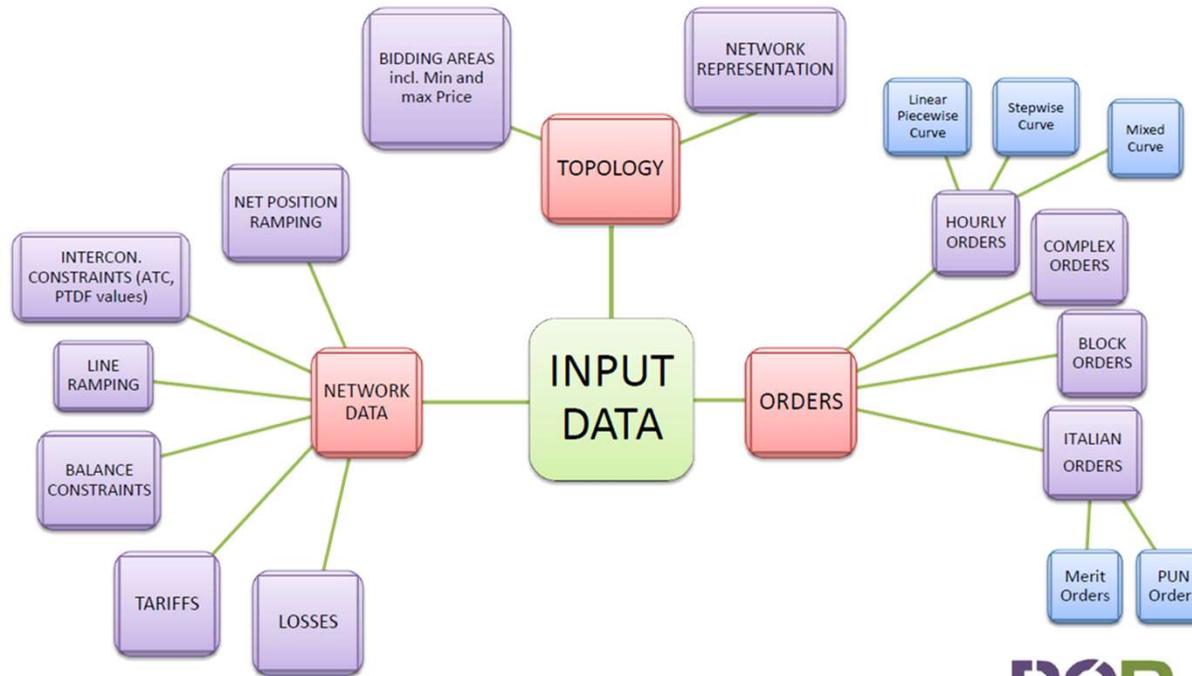
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# Mercado **Diario**: Un Mercado **Europeo**

## Welfare maximization problem



The purpose of the Master Problem is to find a good selection of blocks and complex orders (i.e. all binary variables) satisfying all of their respective requirements. The objective function of this problem is to maximize the global welfare:

$$- \sum_{\substack{m,h,s,o: \\ \text{Step Orders}}} ACCEPT_{m,h,s,o} q_{m,h,s,o} p_{m,h,s,o}^0 \quad (1)$$

$$- \sum_{m,h,s,o: \text{Interpolated Orders}} ACCEPT_{m,h,s,o} q_{m,h,s,o} \left( p_{m,h,s,o}^0 + ACCEPT_{m,h,s,o} \frac{p_{m,h,s,o}^1 - p_{m,h,s,o}^0}{2} \right) \quad (2)$$

$$- \sum_{bo,h} ACCEPT_{bo} q_{bo,h} p_{bo} \quad (3)$$

$$- \sum_{m,co,h} ACCEPT_{m,co,h,o} q_{m,co,h,o} p_{m,co,h,o} \quad (4)$$

$$- \sum_{mo} ACCEPT_{mo} q_{mo} p_{mo} \quad (5)$$

$$- \sum_{l,u,h} Tariff_{l,h} FLOW_{l,u,h} \quad (6)$$

$$- M \sum_{m,h,o: \text{Price Taking Hourly Demand orders}} MAX\_CURTAILMENT\_RATIO \quad (7)$$

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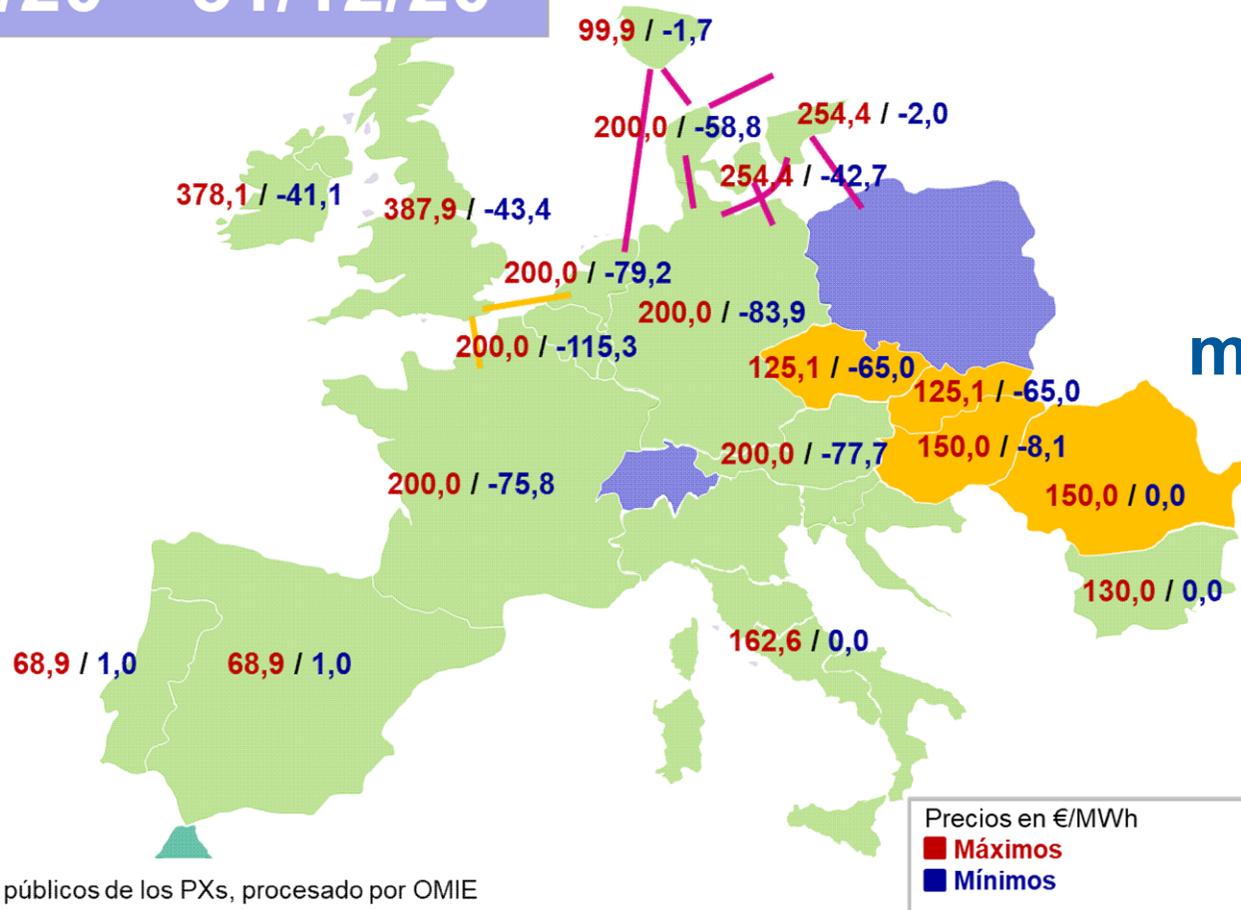






# Mercado **Diario**: Un Mercado **Europeo**

1/1/20 – 31/12/20



## Precios horarios máximos y mínimos

Fuente: Web públicos de los PXs, procesado por OMIE

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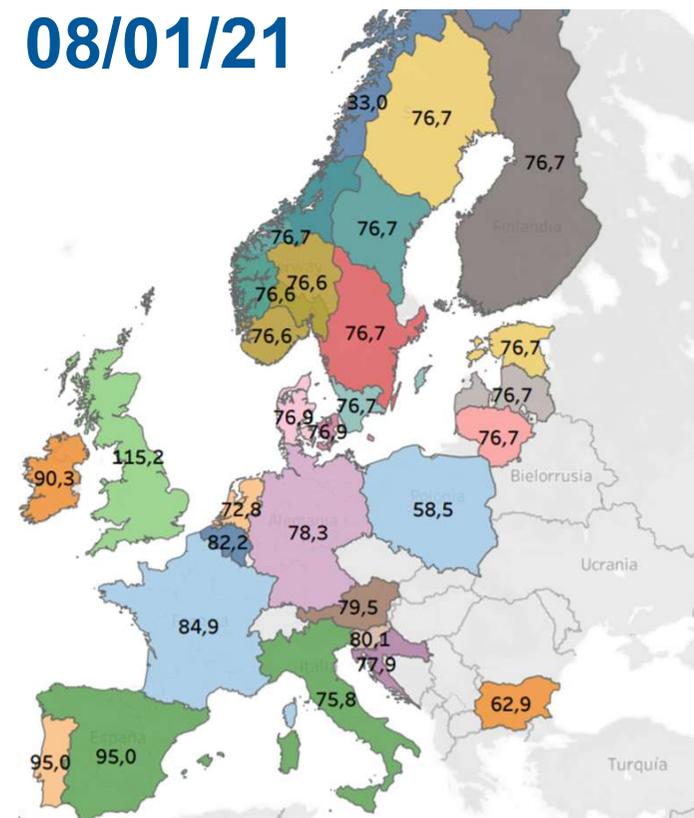
# Mercado Diario: Un Mercado Europeo

## Precios medios 08/01/21

Precios máximo/medio/mínimo en el mercado diario (€/MWh)

	04/01/21	05/01/21	06/01/21	07/01/21	08/01/21	09/01/21	10/01/21	11/01/21	12/01/21
España - Máximo	72,60	80,00	90,00	108,97	114,89	121,24	110,29	121,14	114,02
España - Medio	59,85	67,55	70,60	88,93	94,99	80,66	66,27	82,45	84,25
España - Mínimo	41,62	50,56	53,51	58,00	60,00	50,25	48,45	46,36	55,18
Portugal - Máximo	72,60	80,00	90,00	108,97	114,89	121,24	110,29	121,14	114,02
Portugal - Medio	59,85	67,55	70,60	88,93	94,99	83,80	70,60	82,45	85,54
Portugal - Mínimo	41,62	50,56	53,51	58,00	60,00	51,39	48,45	46,36	55,18
Francia - Máximo	72,60	80,00	101,07	108,97	114,89	71,99	73,91	89,06	78,93
Francia - Medio	59,27	63,85	70,16	82,10	84,85	60,60	56,85	67,69	63,54
Francia - Mínimo	41,62	44,58	47,20	49,35	50,86	50,25	48,45	46,36	46,57
Alemania - Máximo	66,82	67,14	61,92	100,00	110,45	71,99	63,41	70,59	64,60
Alemania - Medio	48,02	55,34	52,68	70,93	78,34	59,32	52,16	48,15	46,10
Alemania - Mínimo	24,65	37,54	42,15	46,72	45,61	49,10	37,24	27,39	15,82
Bélgica - Máximo	76,05	83,57	139,48	100,00	118,80	71,99	87,18	114,43	92,21
Bélgica - Medio	46,74	63,39	81,45	67,23	82,17	61,00	60,64	59,09	61,51
Bélgica - Mínimo	19,42	37,92	46,23	42,70	40,00	50,47	49,24	24,80	37,73
Italia PUN - Máximo	71,97	68,32	69,47	94,76	101,01	72,92	69,96	83,39	85,33
Italia PUN - Medio	59,10	59,29	58,23	71,96	75,81	60,81	57,34	66,83	68,12
Italia PUN - Mínimo	41,62	44,58	47,20	49,35	50,86	50,25	48,45	46,36	49,50
Países Bajos - Máximo	67,37	64,35	68,83	100,00	110,45	71,99	63,41	59,19	87,19
Países Bajos - Medio	49,72	50,39	50,59	63,84	72,77	57,99	49,96	45,58	51,07
Países Bajos - Mínimo	35,79	36,97	42,16	40,54	42,07	45,00	45,02	27,39	19,51
Gran Bretaña (N2EX) - Máximo	112,3	115,0	1.108,7	540,7	741,3	140,9	168,2	109,6	813,6
Gran Bretaña (N2EX) - Medio	67,9	67,5	160,8	101,4	115,1	74,2	76,5	71,7	125,2
Gran Bretaña (N2EX) - Mínimo	42,6	54,2	46,1	54,1	51,9	59,9	51,2	48,1	49,3

Valores máximos ■ Valores mínimos ■

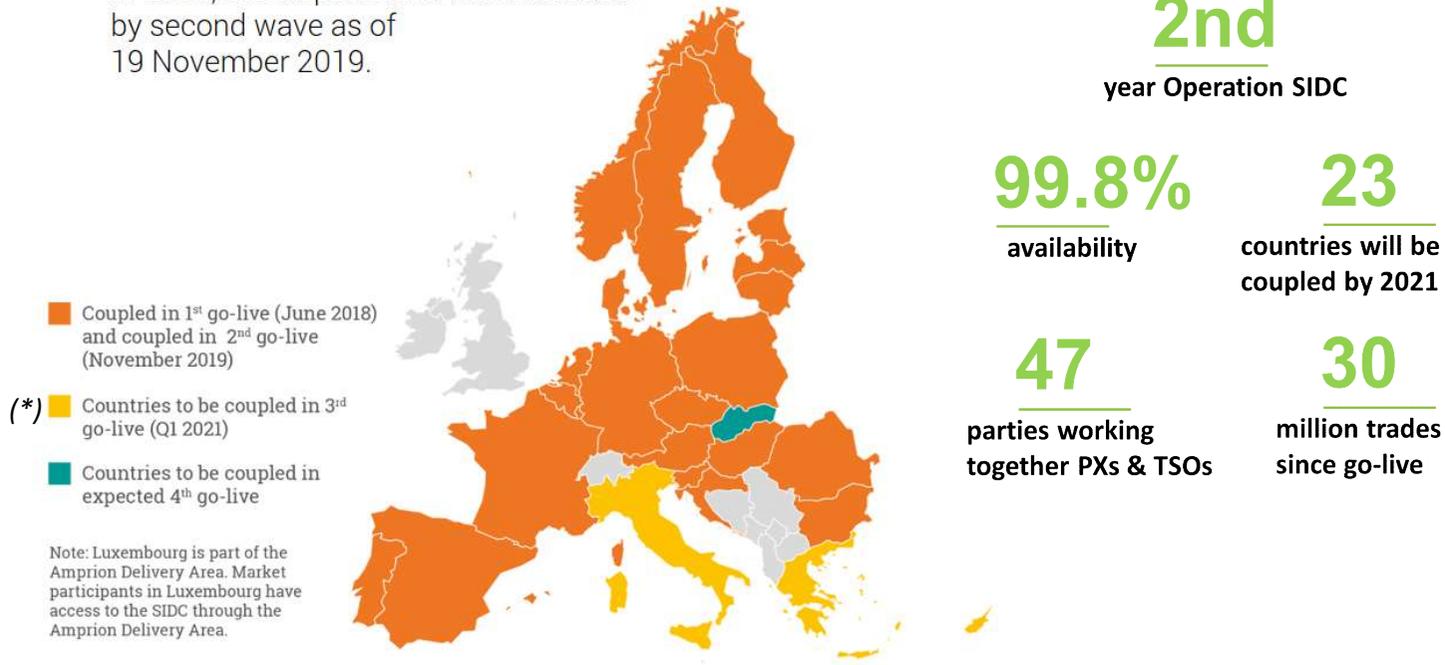




# Mercado **Intradiario**: Un Mercado **Europeo**

## Geographical scope

- First wave (PT, ES, FR, DE, BE, NL, AT, LT, LV, EE, FI, SE, DK, NO) and second wave (BG, HR, CZ, HU, PL, RO, SI)
- In 2019, SIDC operations was extended by second wave as of 19 November 2019.



Fuente: NEMO Committee, 2020

(\*) Delayed recently

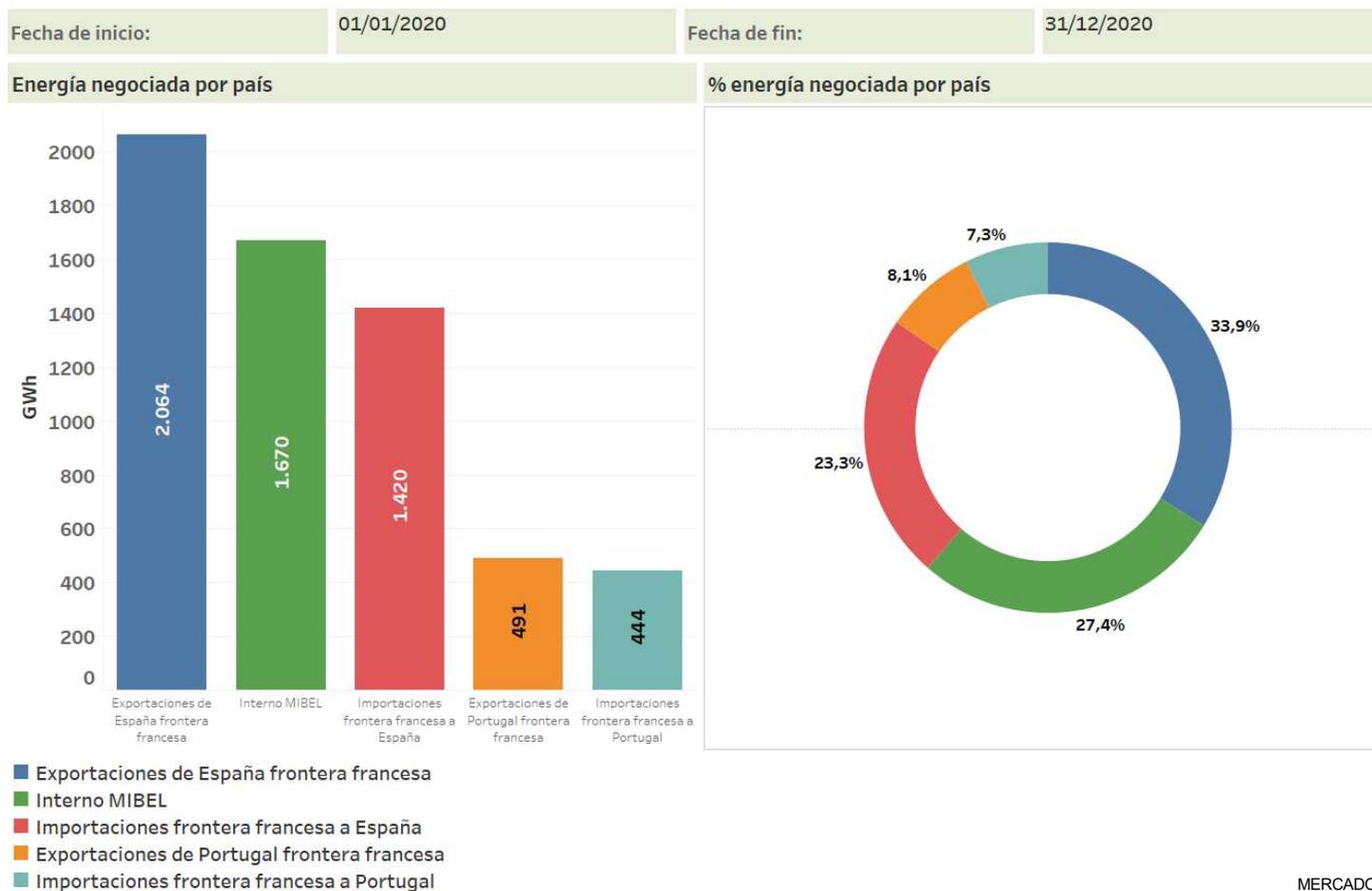


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# Mercado **Intradiario**: Un Mercado **Europeo**



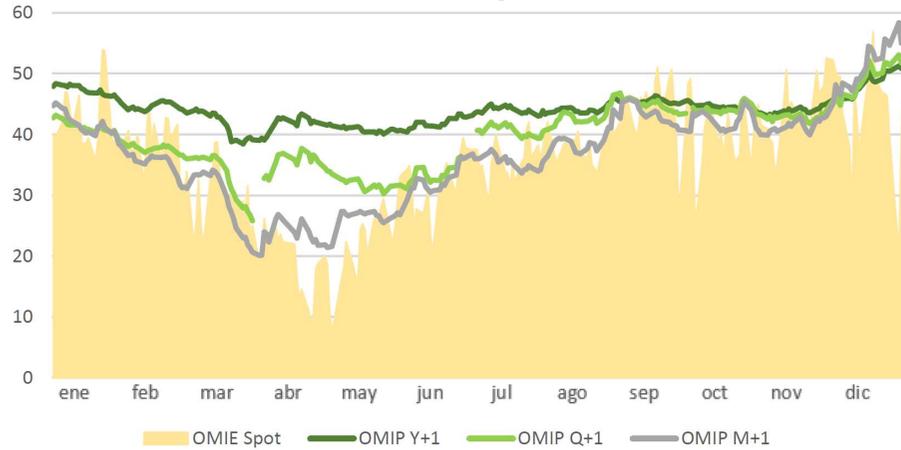


# Mercado a plazo

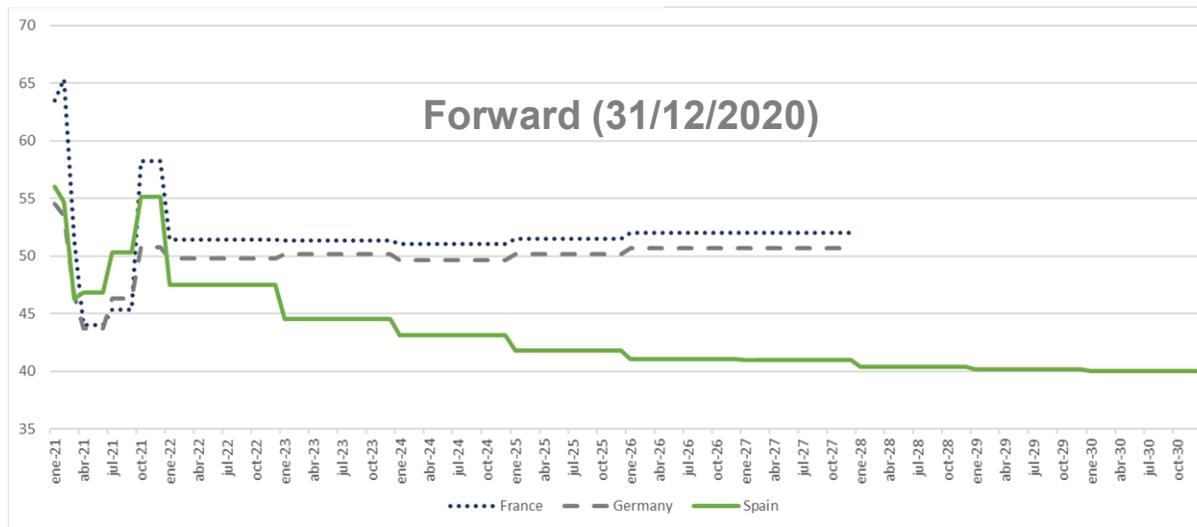


€/MWh

## Futures vs Spot 2020



## Forward (31/12/2020)



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## Mercados 2030-2050

# Europeización

Innovación



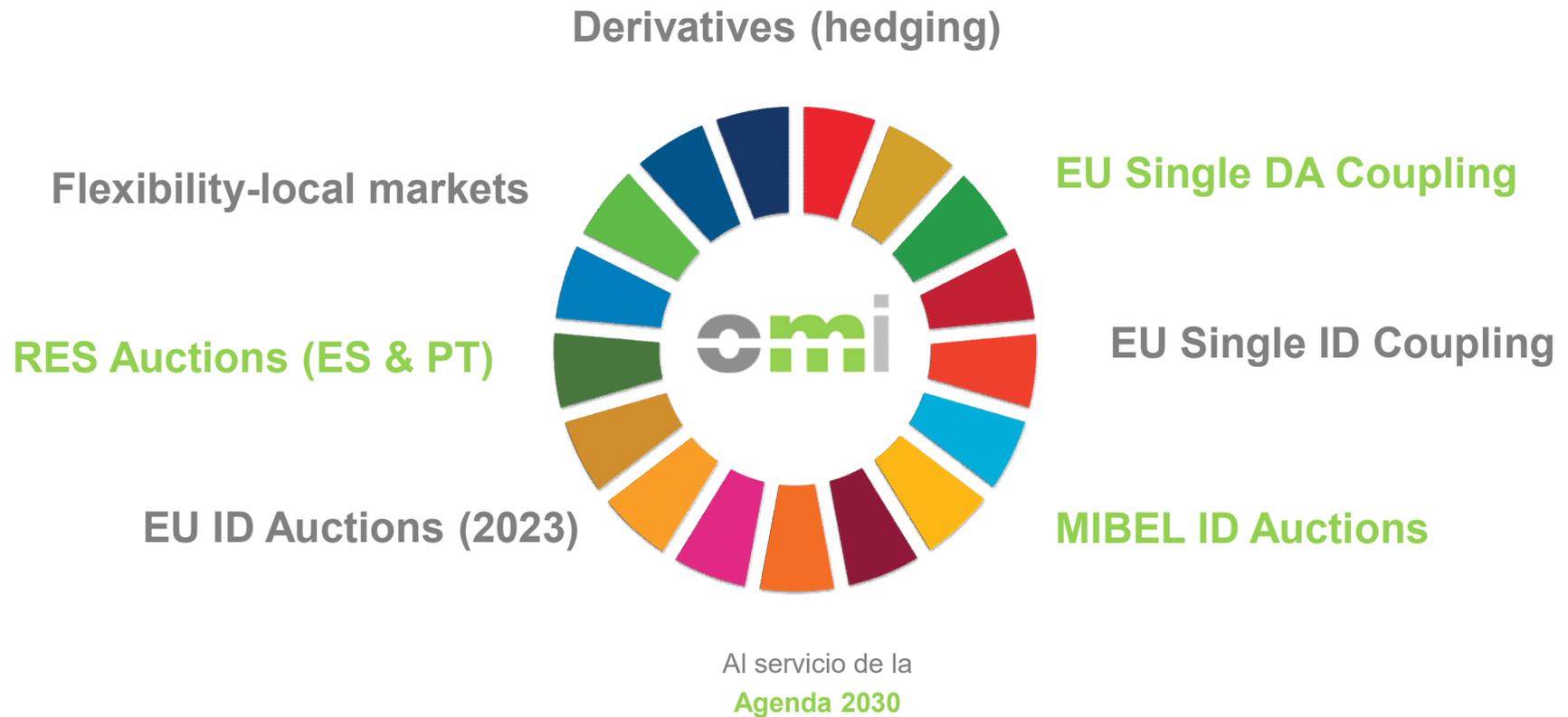
Nuevos  
recursos y  
“actores”

# Señales de precio





# Mercados al servicio de la **Agenda 2030**



# Muchas gracias Muito obrigado



Queremos acompañarte  
en la transición energética

**TRAINING FORWARD** NEMO MIBEL  
DAY AHEAD RES AUCTIONS  
INTRADAY OPTIONS **EMIR REPORTING**  
**SWAPS** FUTURES **POWER**  
SOLAR FUTURES  
AUCTION/OTC XBID REMIT REPORTING  
CLEARING **GAS** SCREEN TRADING

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