

# El mercado mayorista de la electricidad es un mercado europeo

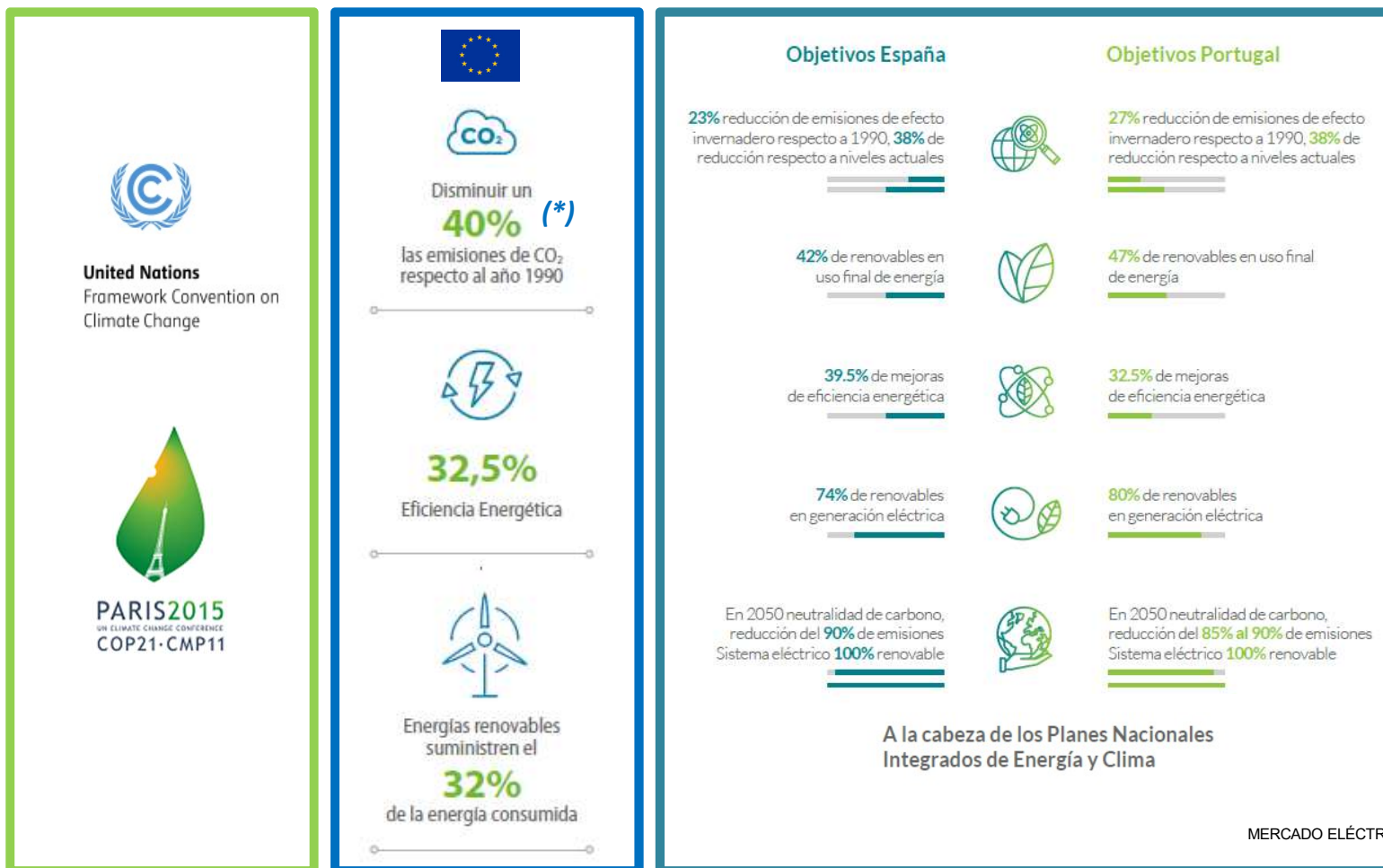
**Rafael Gómez-Elvira**

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



# Acción por el Clima

## Una gran oportunidad para todos



(\*) 55% Negociación

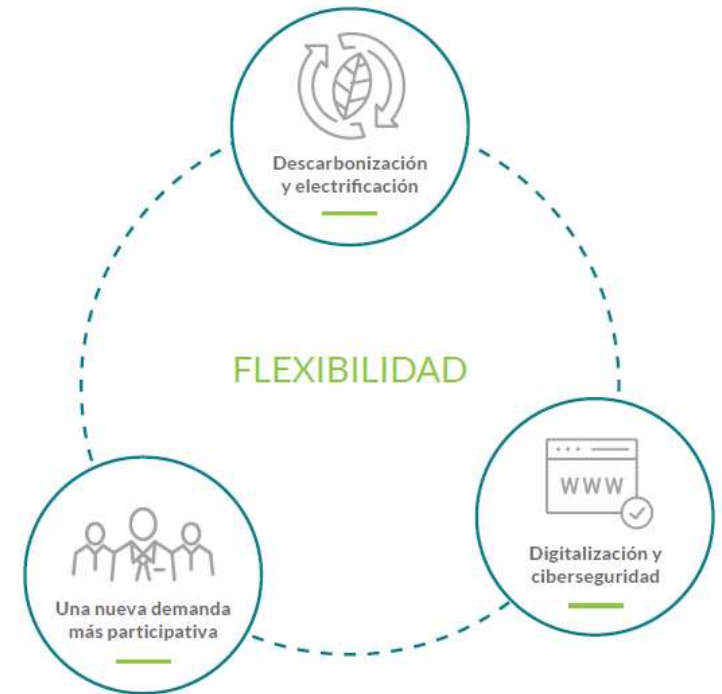




## Legislación EU derivada del CEP (Clean Energy Package)

|                                 | 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

 CROPIX

 epexspot

 EXAA

 GME

 HEnEx

 h u p x

 IBEX

 Nasdaq

 NORD POOL

 OKIE

 omie

 opcom

 OTE

 semoPX

 SOUTH POOL

 TGE

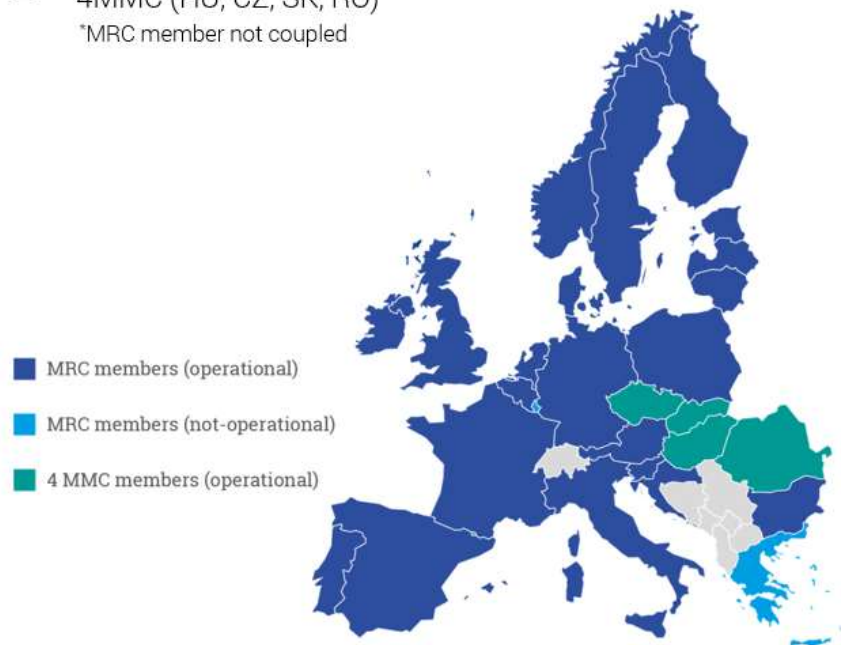
[www.nemo-committee.eu](http://www.nemo-committee.eu)



# 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

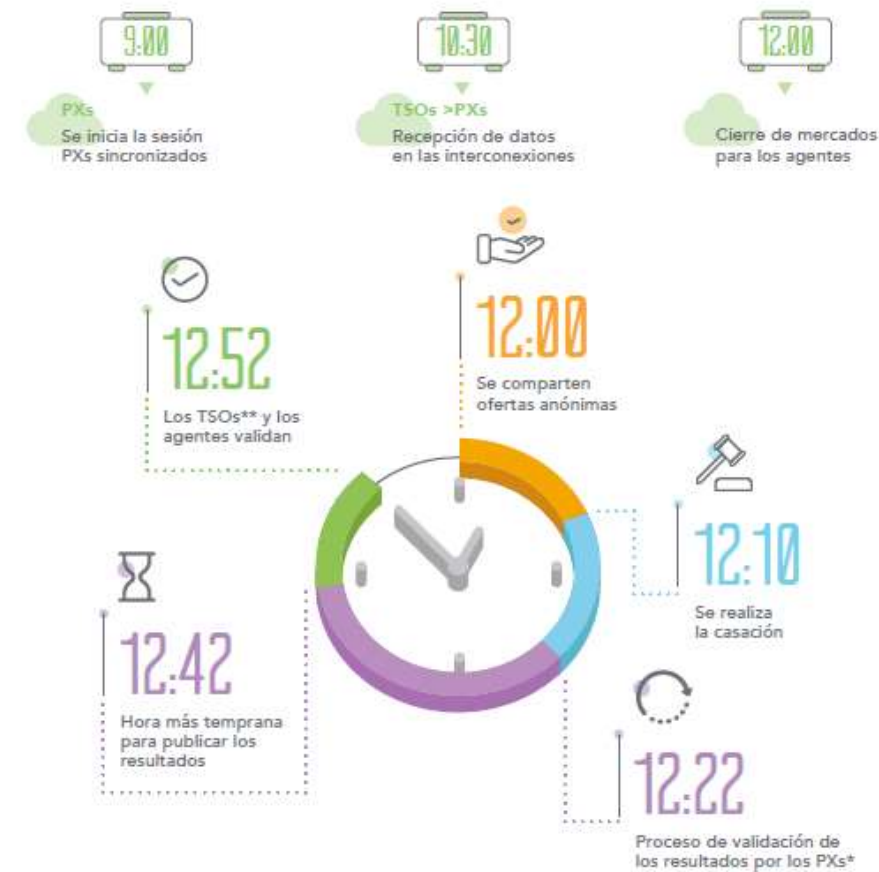


MERCADO ELÉCTRICO EUROPEO 2030



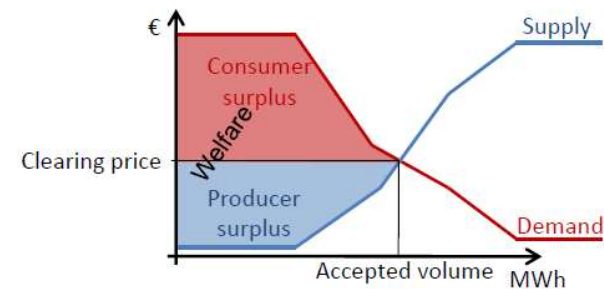


# Mercado **Diario**: Un Mercado **Europeo**



## EUPHEMIA

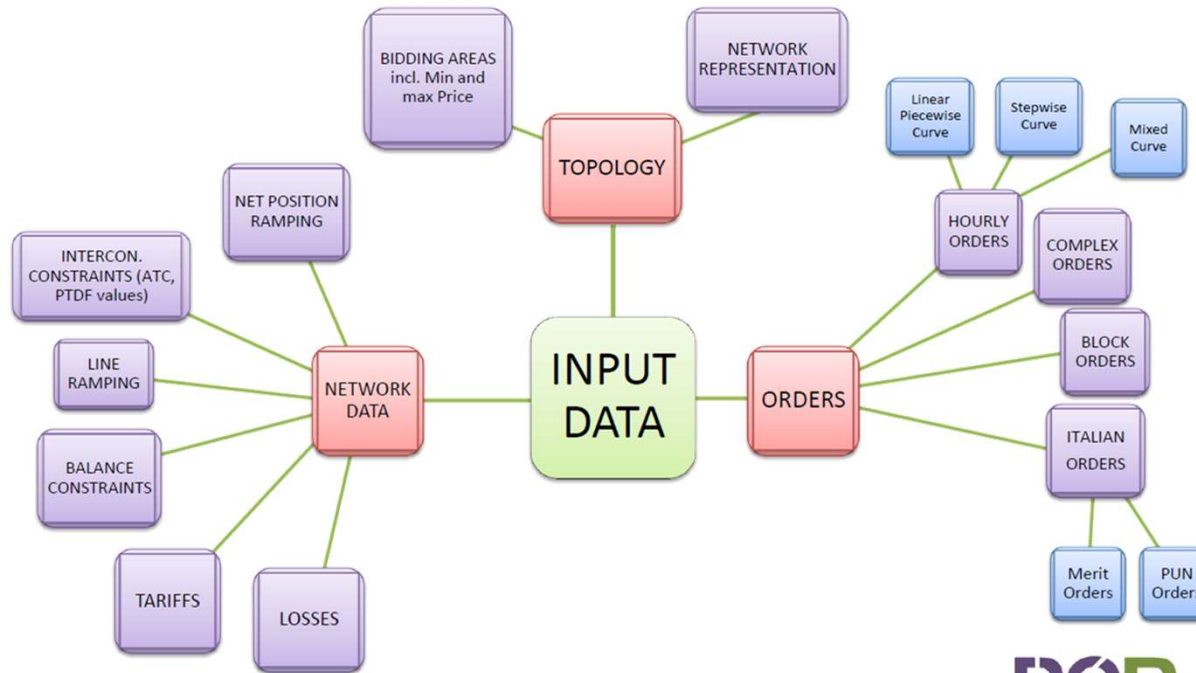
### EU Pan-European Hybrid Electricity Market Integration Algorithm





# 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:

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

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

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

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

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

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

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

MERCADO ELÉCTRICO EUROPEO 2030

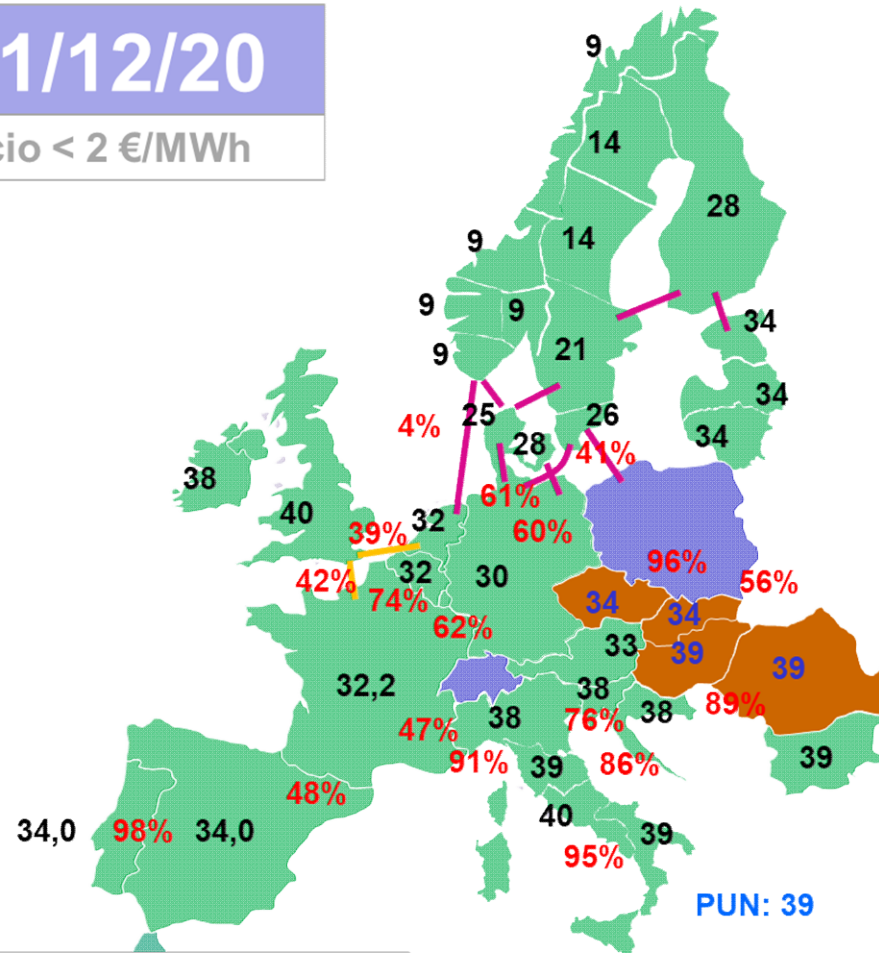




# Mercado **Diario**: Un Mercado **Europeo**

**1/1/20 – 31/12/20**

Diferencia de precio < 2 €/MWh



**Precios medios**

% de horas con diferencia de precio < 2 €/MWh

Fuente: Web públicos de los PXs, procesado por OMIE

MERCADO ELÉCTRICO EUROPEO 2030

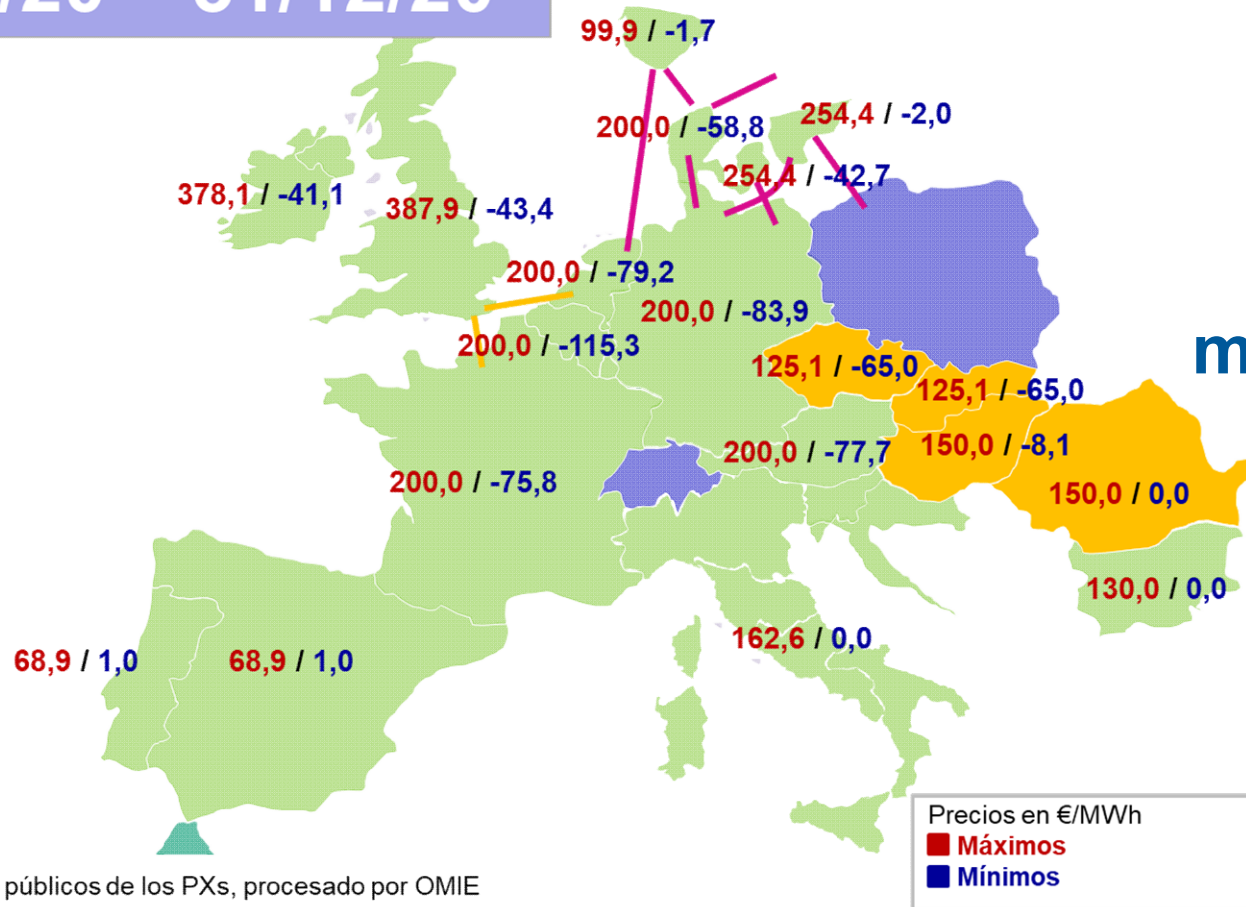






# Mercado **Diario**: Un Mercado **Europeo**

1/1/20 – 31/12/20



## Precios horarios máximos y mínimos

Fuente: Web públicos de los PXs, procesado por OMIE

MERCADO ELÉCTRICO EUROPEO 2030





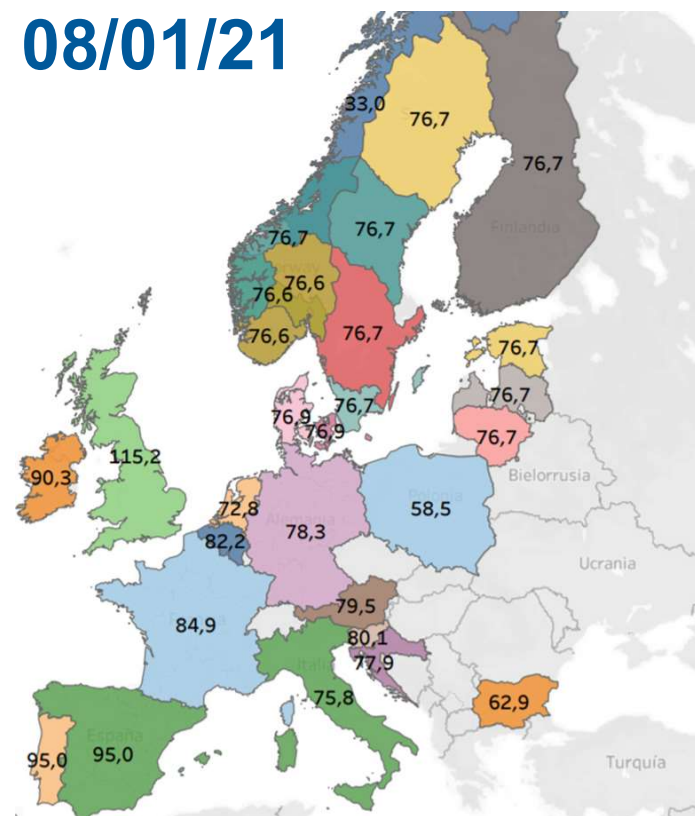
# Mercado Diario: Un Mercado Europeo

## 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 ■

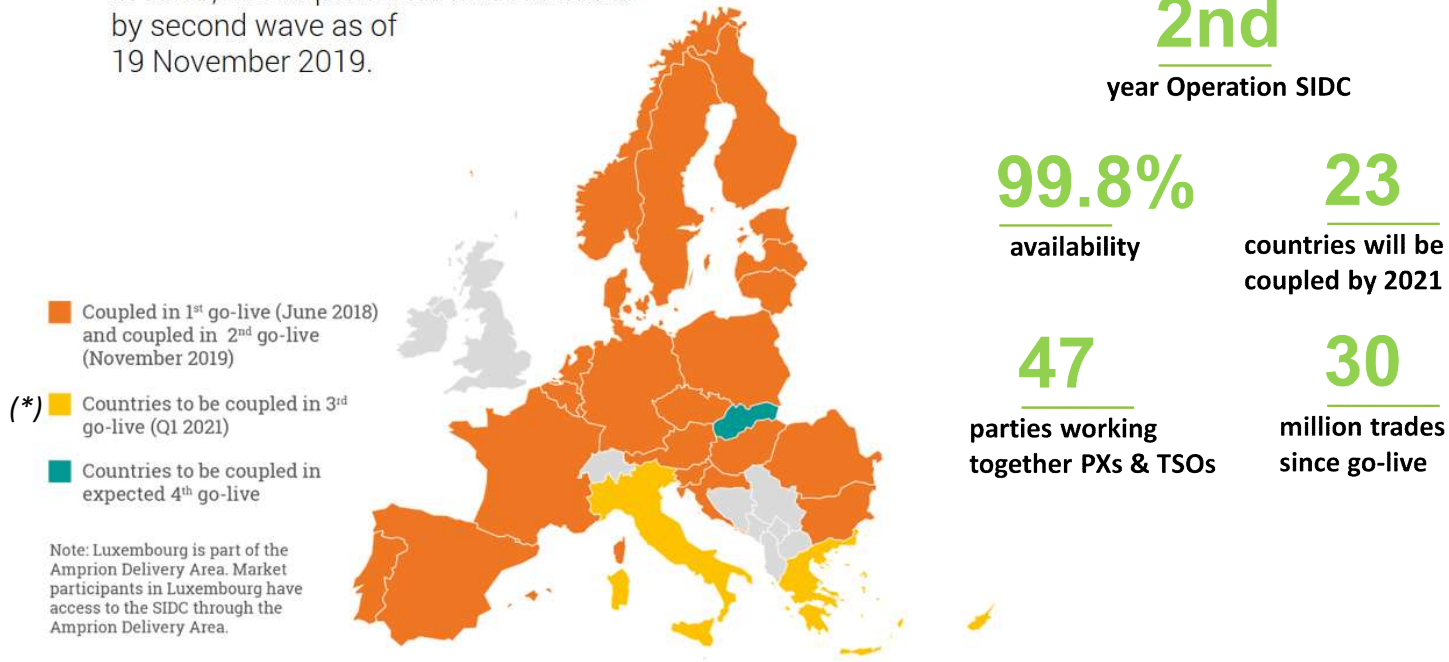




# Mercado **Intradiario**: Un Mercado **Europeo**

## 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

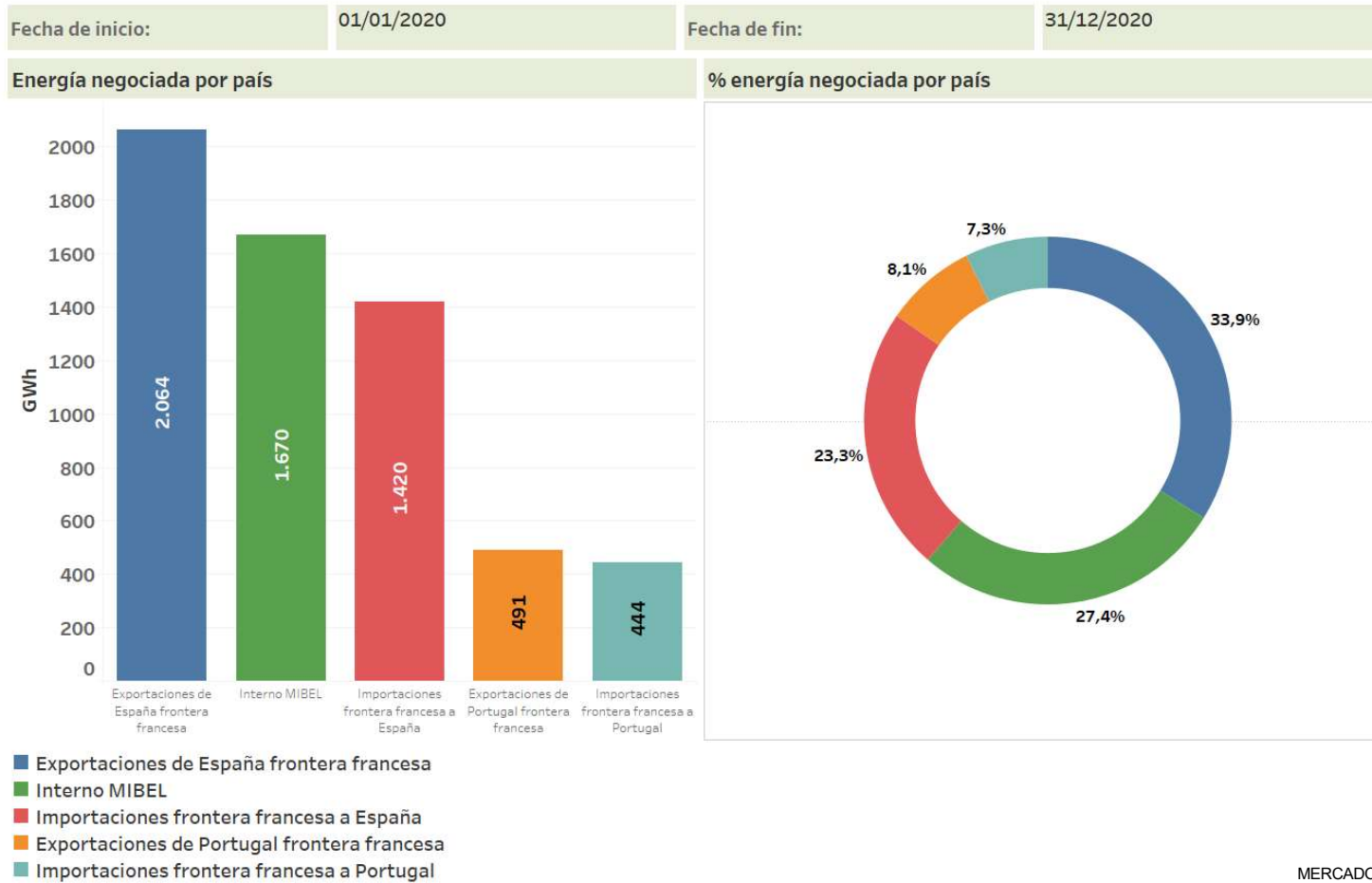


MERCADO ELÉCTRICO EUROPEO 2030





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



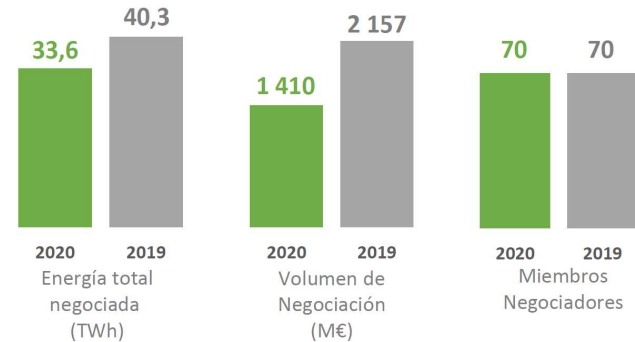
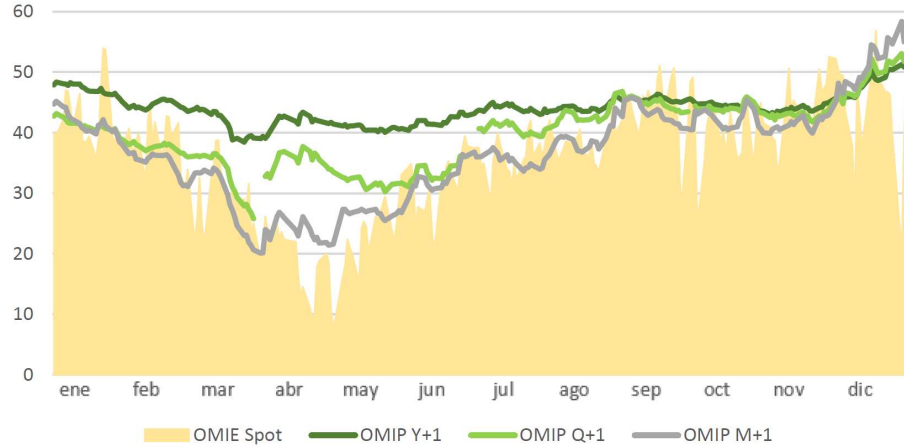


# Mercado a plazo

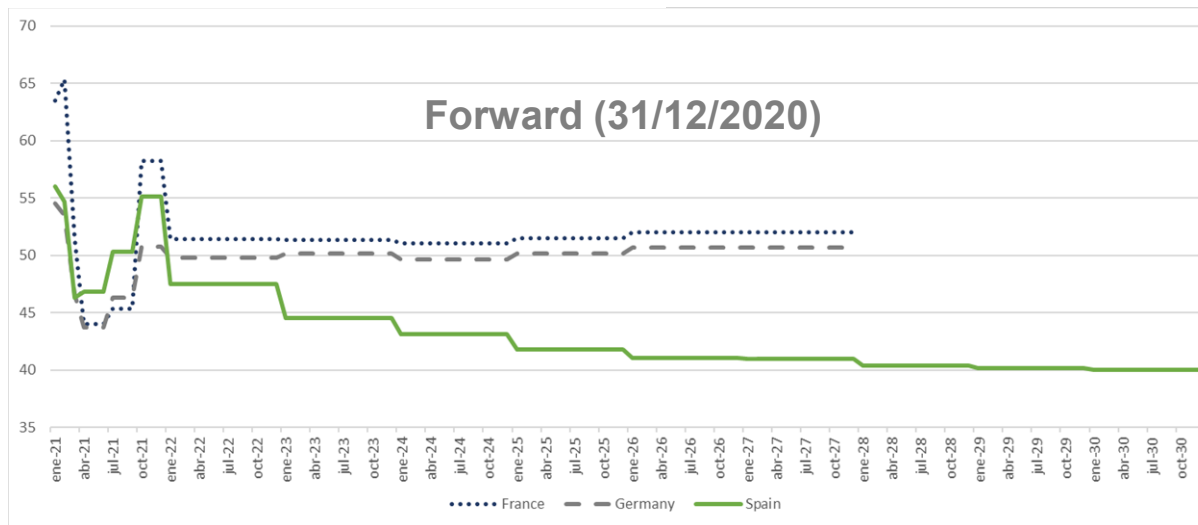


€/MWh

## Futures vs Spot 2020



## Forward (31/12/2020)



MERCADO ELÉCTRICO EUROPEO 2030





## Mercados 2030-2050

# Europeización

Innovación



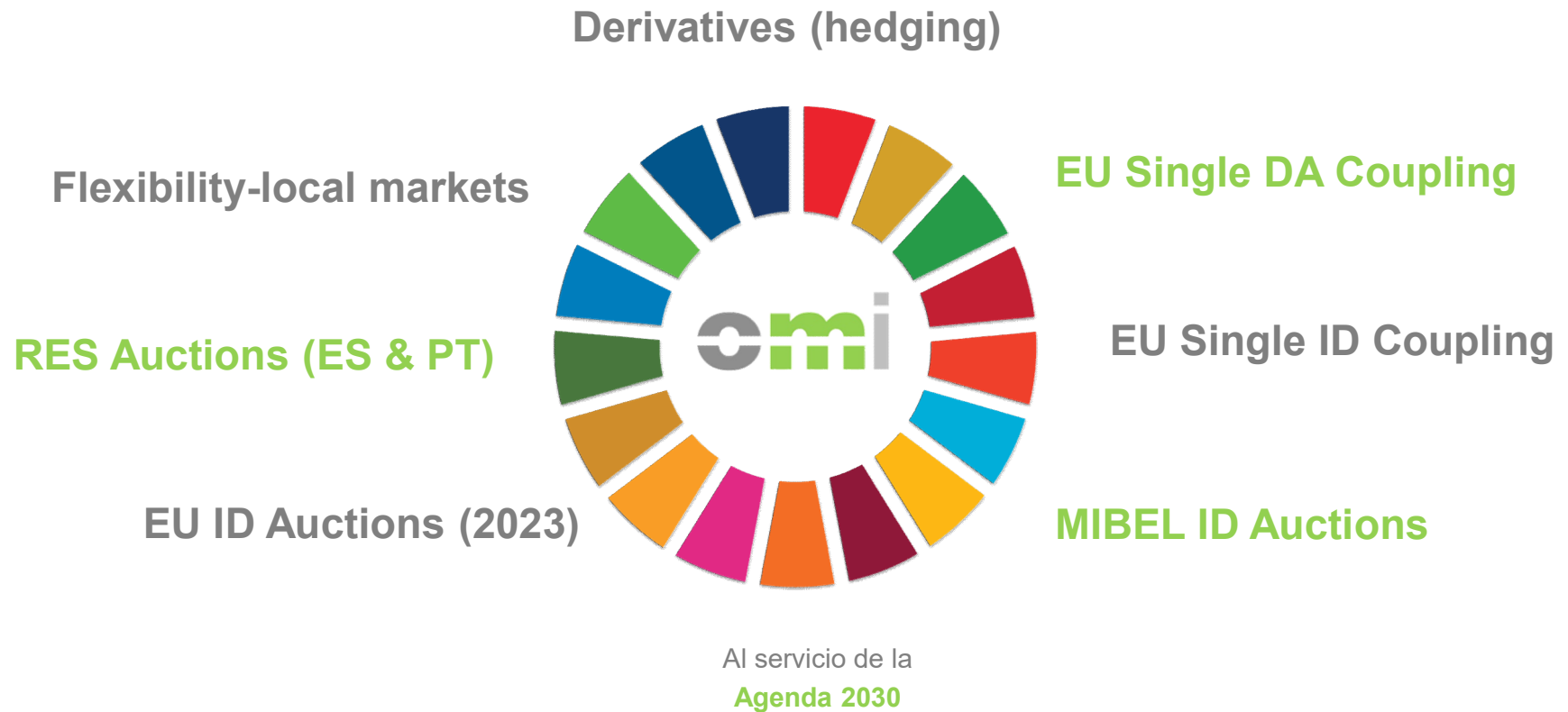
Nuevos  
recursos y  
“actores”

# 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

**emie omip emiclear**