

# Era of 100% Renewables

REvision 2019: Renewable Revolution

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*Tokyo | 6 March 2019*

# NATIONAL INTEGRATED PLAN ENERGY AND CLIMA: OBJETIVES 2030

	2016	2030	2050
Emission reduction from 1990	+13%	-20%	-100%
Renewable share in final energy	16%	42%	100%
Electricity from renewables	41%	74%	100%

## NATIONAL INTEGRATED PLAN ENERGY AND CLIMA: OBJETIVES 2030

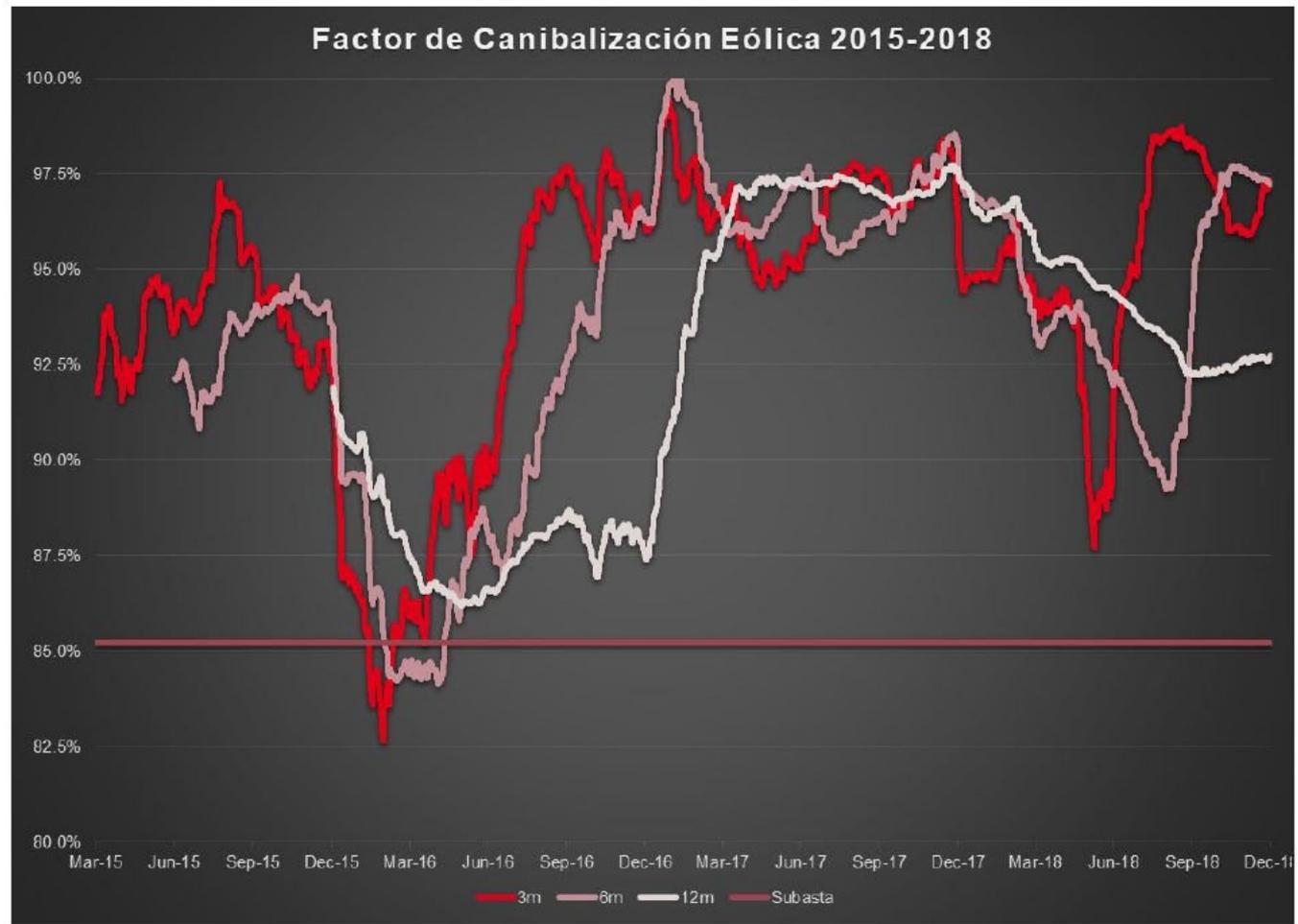
Parque de generación del Escenario Objetivo (MW)					
Año	2015	2020*	2025*	2030*	
Wind	Eólica	22.925	27.968	40.258	50.258
FV	Solar fotovoltaica	4.854	8.409	23.404	36.882
CSP	Solar termoeléctrica	2.300	2.303	4.803	7.303
	Hidráulica	14.104	14.109	14.359	14.609
	Bombeo Mixto	2.687	2.687	2.687	2.687
	Bombeo Puro	3.337	3.337	4.212	6.837
	Biogás	223	235	235	235
	Geotérmica	0	0	15	30
	Energías del mar	0	0	25	50
	Biomasa	677	877	1.077	1.677
Coal	Carbón	11.311	10.524	4.532	0-1.300
CCGT	Ciclo combinado	27.531	27.146	27.146	27.146
	Cogeneración carbón	44	44	0	0
	Cogeneración gas	4.055	4.001	3.373	3.000
	Cogeneración productos petrolíferos	585	570	400	230
	Fuel/Gas	2.790	2.790	2.441	2.093
	Cogeneración renovable	535	491	491	491
	Cogeneración con residuos	30	28	28	24
	Residuos sólidos urbanos	234	234	234	234
	Nuclear	7.399	7.399	7.399	3.181
	<b>Total</b>	<b>105.621</b>	<b>113.151</b>	<b>137.117</b>	<b>156.965</b>

# CHALLENGE: ELECTRCITY MARKET DESIGN CANNIBALISATION

In 2017: 8 GW were auctioned at zero support incomes will be exclusively the market price

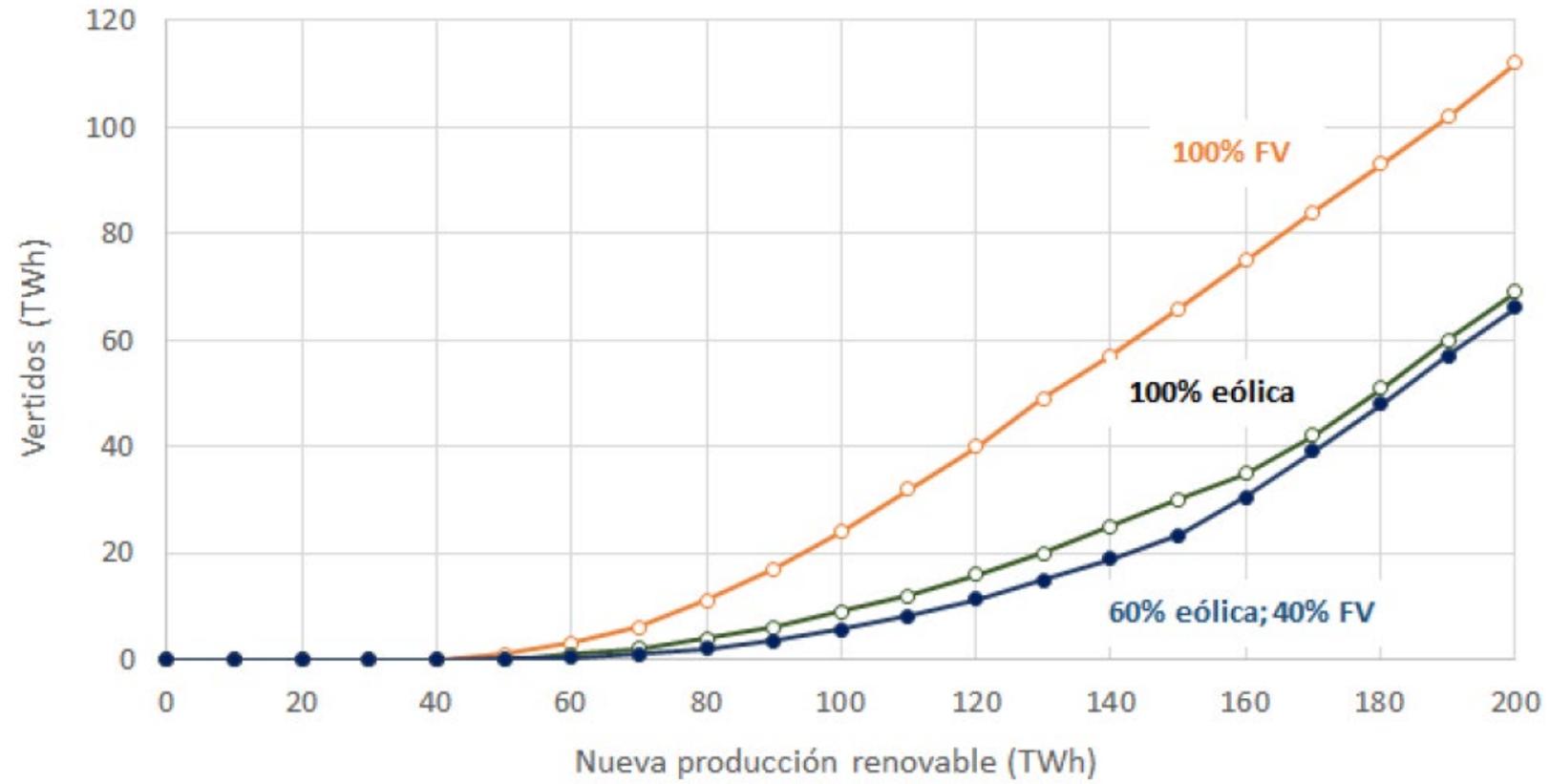
Tecnología	Código de identificación de la instalación tipo de referencia	Código de identificación de la instalación tipo	Año de autorización de explotación definitiva	Valor estándar de la inversión inicial – €/MW	Retribución a la inversión rinv 2017-2019 – €/MW
Eólica	ITR-0103	IT-04022	2017	155.040	0
		IT-04023	2018	155.040	0
		IT-04024	2019	155.040	0
Fotovoltaica	ITR-0104	IT-04025	2017	361.440	0
		IT-04026	2018	361.440	0
		IT-04027	2019	361.440	0

# CHALLENGE: ELECTRCITY MARKET DESIGN CANNIBALISATION



Source: Axpo

# CHALLENGE: CURTAILMENT



## CHALLENGE: DIVERSITY OF ACTORS



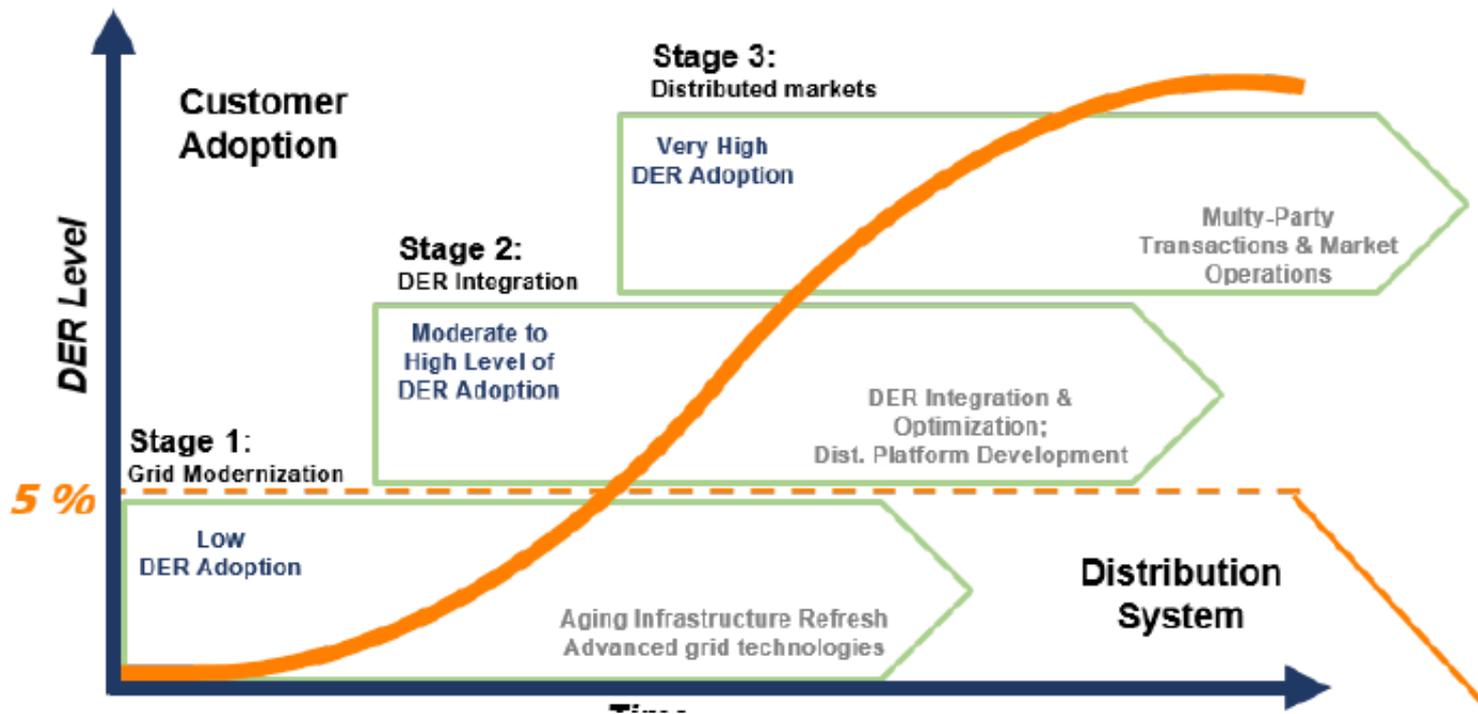
### Diversity of actors:

- Increases sources of funding
- Increases social acceptance
- Maximise socioeconomic impact
- Diversify technologies and territories

## PART OF THE SOLUTION: AUCTION DESIGN

- At least one auction per year
- At least the equivalent of 3,000 MW
- Bidding energy
- Pay as bid
- Auctions for dispatchable energy
- Auctions for diversity of location (also coal mining)
- Accession process for community driven projects

# CHALLENGE: VERY LARGE SCALE DISTRIBUTED GENERATION



## CHALLENGE: VERY LARGE SCALE DISTRIBUTED GENERATION



Aggregators: prosumers, demand side management, e-mobility

1. Access to markets, definition of services:

- Existing
- Requested by the DSO
- Provided ad-hoc by the aggregator



2. Access to data:

- Producers from 10 kW
- Data hub

# CHALLENGE: ENVIRONMENTAL IMPACT

L 197/30

FR

Journal officiel des Communautés européennes

21.7.2001

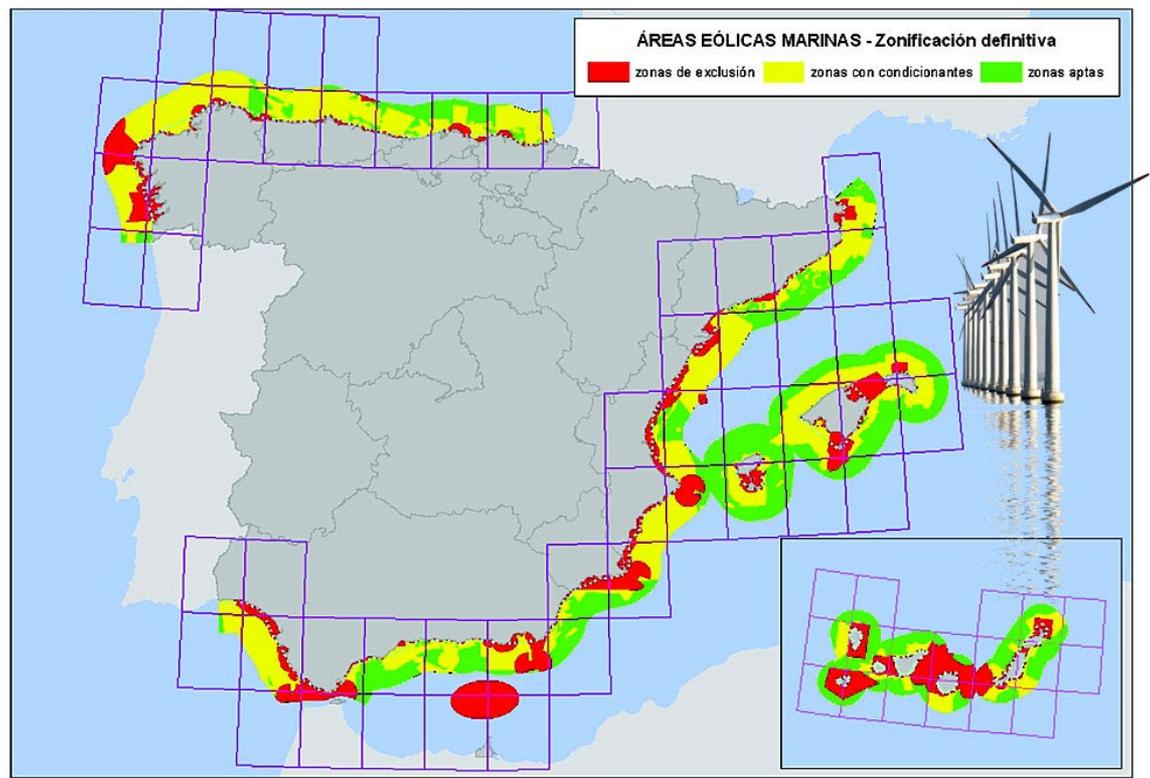
**DIRECTIVE 2001/42/CE DU PARLEMENT E**  
**du 27 juin 2001**  
**relative à l'évaluation des incidences de certains plan**

LE PARLEMENT EUROPÉEN ET LE CONSEIL DE L'UNION EUROPÉENNE, (4)

vu le traité instituant la Communauté européenne, et notamment son article 175, paragraphe 1,

vu la proposition de la Commission (1),

vu l'avis du Comité économique et social (2),



## 100 % in 2050: OTHER CONSIDERATION

Maximising the electrification of the economy

Increasing role of natural gas as a bridge fuel for providing flexibility

Key role of Hydrogen as enabler for sector coupling (using existing natural gas infrastructures)

Possible role of Hydrogen to provide flexibility being used in industrial processes

Carbon capture and storage maybe needed for emissions from processes

## CONCLUSIONS

Very large share of renewables are feasible and it is not a technical challenge

There is the need to coupling energy uses through electrification of the economy

There is a need to re-design markets

Increasingly will be a social and environmental challenge

Frist pillar is energy efficiency and saving

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