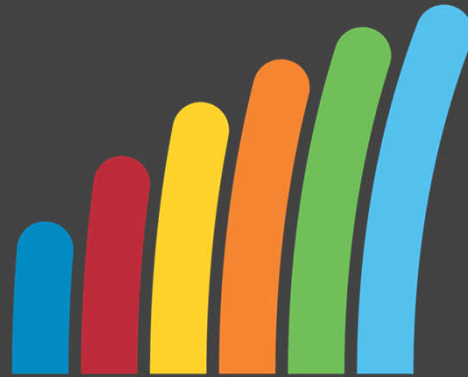




APREN



Solar Finance & Investment Europe

Pedro Amaral Jorge

CEO | APREN – Associação Portuguesa de Energias Renováveis

PORTUGAL

A MARKET UPDATE AND A LOOK TOWARDS
A GREEN HYDROGEN FUTURE
(POWERED BY SOLAR)





1) APREN - Portuguese Renewable Energy Association



APREN's share in 2019



Portugal

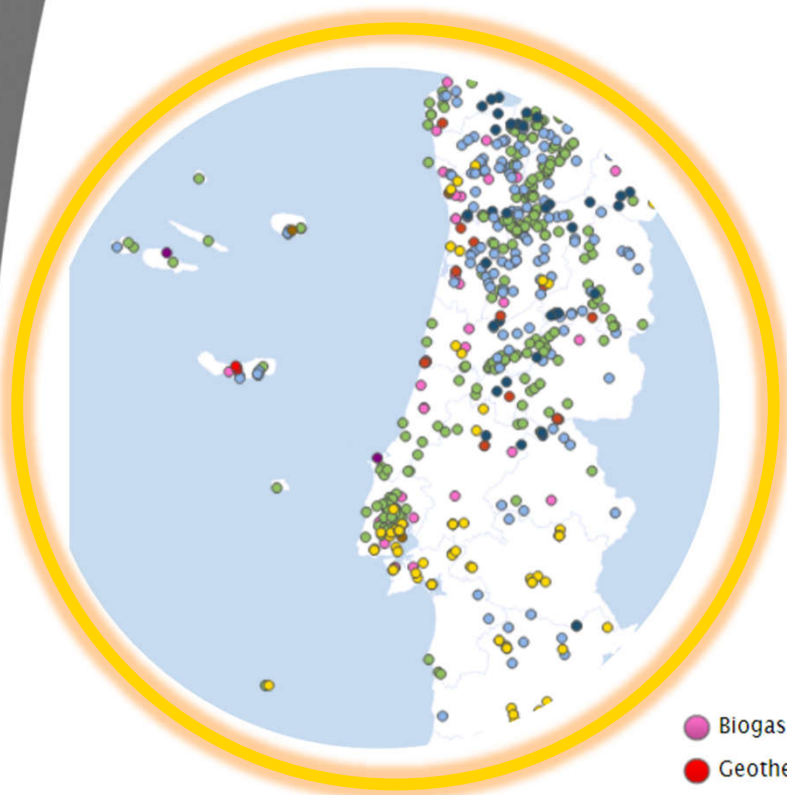
Renewable

Electricity

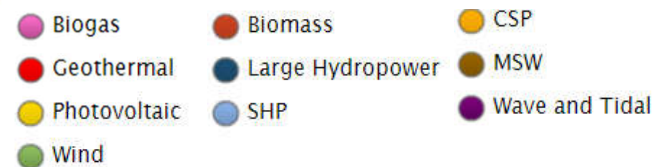
Market

2020

NECP 2030



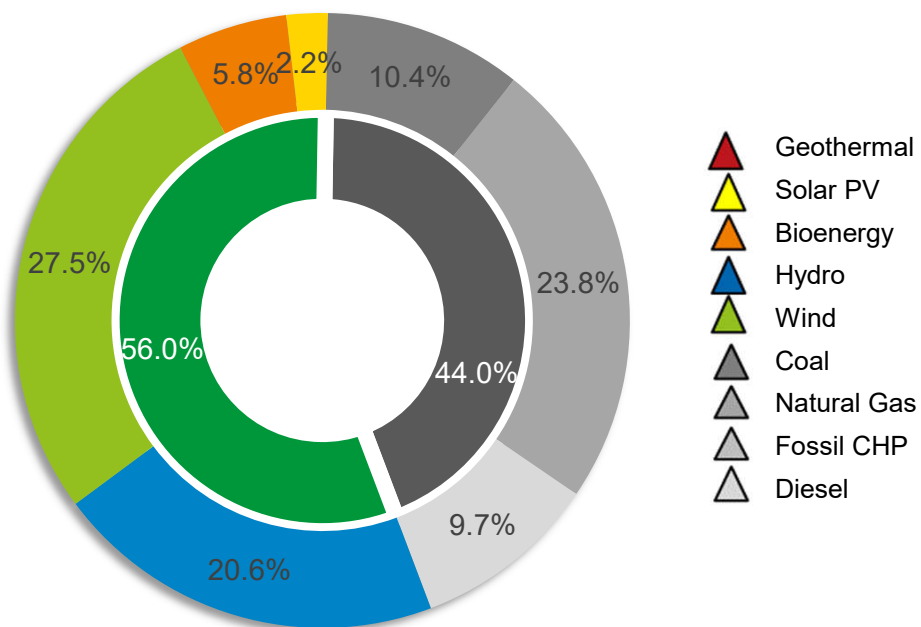
Technology	Share
Wind	97 %
Hydro	99 %
Solar PV	25 %
Biomass	28 %
Geothermal	100 %
Overall Renewables	92 %



2) Current situation and 2020 targets



Electricity Generation in Portugal 2019



In 2019, **Renewable Electricity** represented **56,0% (27 315 GWh)** of the total Electricity generated in Portugal (48 759 GWh).

15 Mt CO₂
Emissions
Avoided



Portugal

Renewable

Electricity

Market

2020

NECP 2030



Electricity Generation in Portugal April 2020



Portugal

Renewable

Electricity

Market

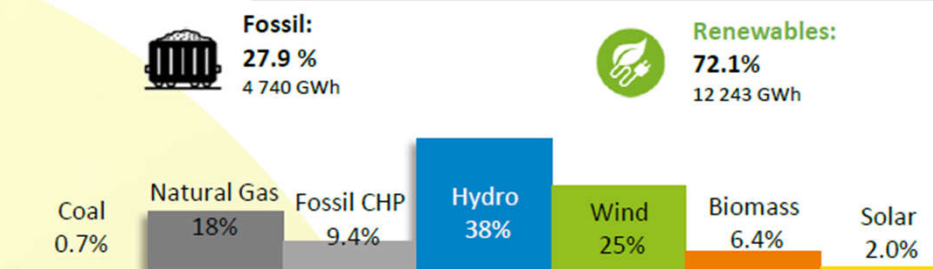
2020

NECP 2030

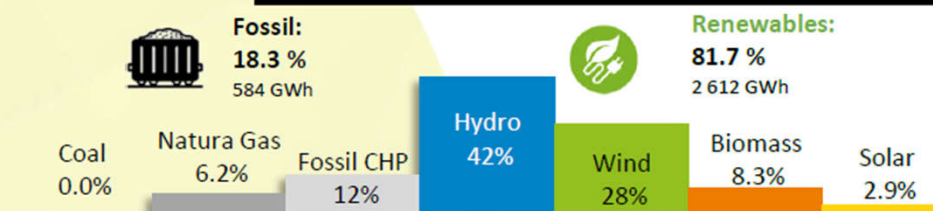
72.1 %

Renewable electricity
generation
(January to April 2020)

CUMULATIVE ON APRIL 2020 (JAN-APR)



APRIL 2020





Electricity Generation in Portugal April 2020 || 2020 vs. 2019



Portugal

Renewable

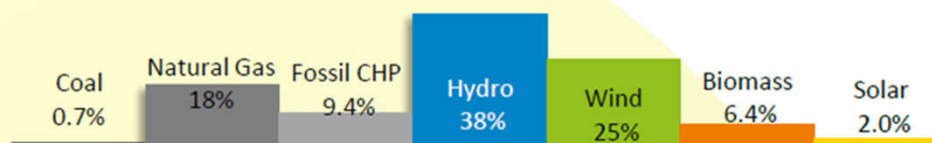
Electricity

Market

2020

NECP 2030

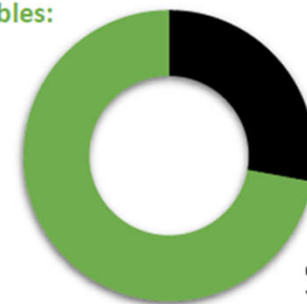
CUMULATIVE ON APRIL 2020 (JAN-APR)



Source: REN, APREN Analysis

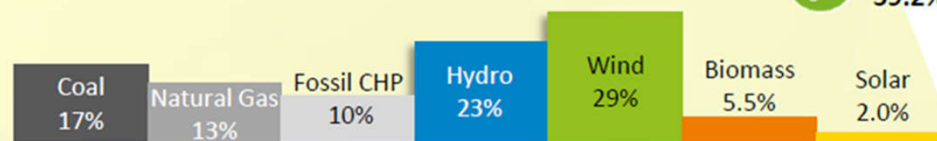


Renewables:
72.1 %



Fossil:
27.9 %

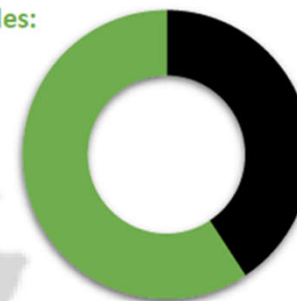
CUMULATIVE ON APRIL 2019 (JAN-APR)



Source: REN, APREN Analysis



Renewables:
59.2%



Fossil:
40.8%



APREN



Renewable Electricity Generation in Portugal for 2020



Portugal

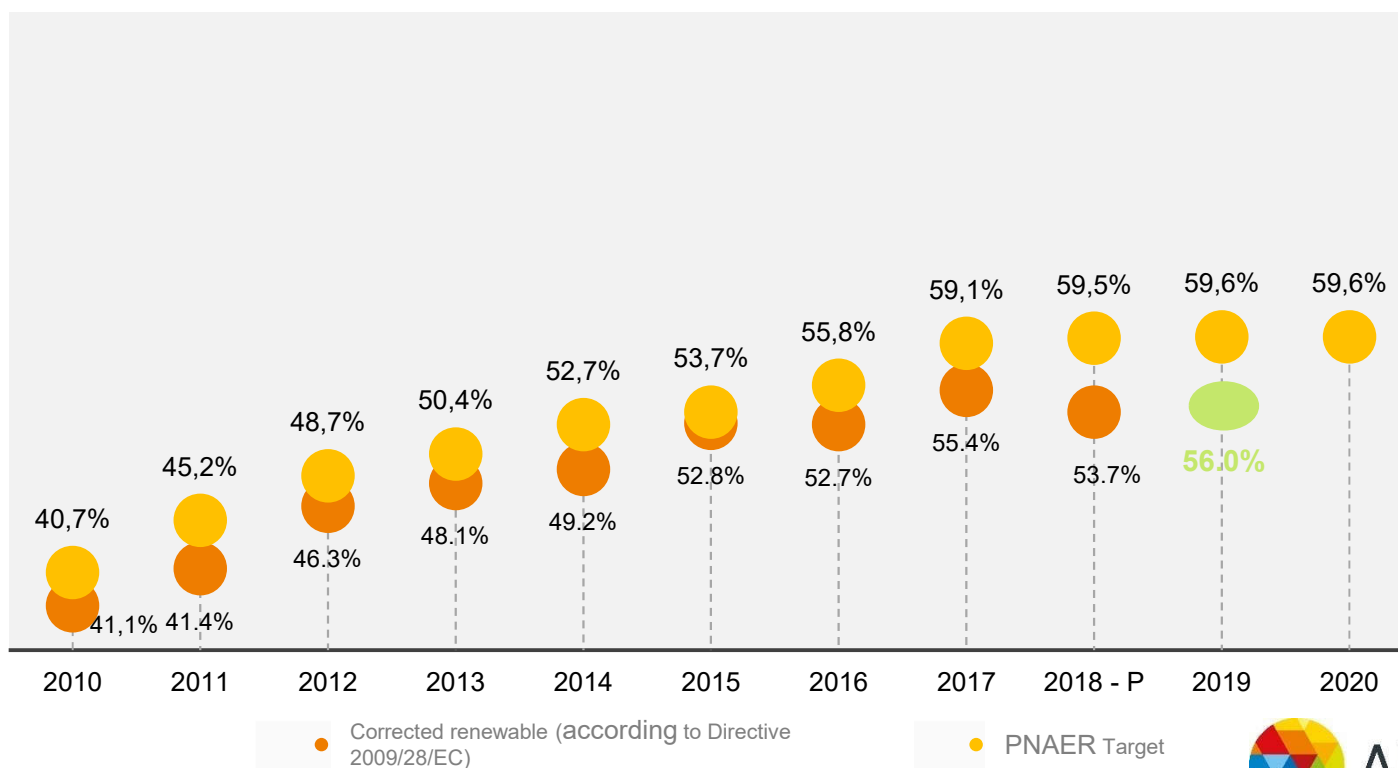
Renewable

Electricity

Market

2020

NECP 2030



Source: PNAER; DGEG, 2019





Renewable Electricity Generation in Portugal for 2020



2020 Targets

- Undertake 1 Auction for 700 MW grid capacity including Storage
- Award 250 MW of establishment licences for hibrid projects
 - Wind + FPV+ Hydro+PV
- New 700 MW PV in Operation by the end of 2020 in order to achieve 1.5 GW of PV

Portugal

Renewable

Electricity

Market

2020

NECP 2030

Source: PNAER; DGEG, 2019





3) National Energy and Climate Plan 2030



Portuguese National Energy and Climate Plan

Portugal

Renewable

Electricity

Market

2020

NECP 2030

2030 Targets

	2020 TARGET	2030 TARGET
GHG Emissions	- 18% to -23%	-45% to -55%
Energy Efficiency	25%	35%
Renewables	31%	47%
Electricity	59,6%	80%
Heating & Cooling	34%	38%
Transports	10%	20%
Electricity Interconnections	10%	15%

Source: PNEC 2030





Renewable Electricity until 2030

Portugal

Renewable

Electricity

Market

2020

NECP 2030

Capacity Targets

	2018	2030
Demand	56 TWh	~65 TWh
Renewables	54 %*	80 %
RES Installed Capacity	14,0 GW	26,2 – 28,3 GW
Hydro	6,7 GW	8,7 GW
Wind	5,4 GW	8,8 – 9,2 GW
Solar	0,7 GW	7,8 – 9,3 GW
Centralized	0,3 GW	6,6 - 8,0 GW
Distributed	0,4 GW	1,2 – 1,6 GW
Other RES	0,8 GW	0,9 – 1,1 GW

Source: PNEC 2030





Renewable Electricity until 2050

Portugal

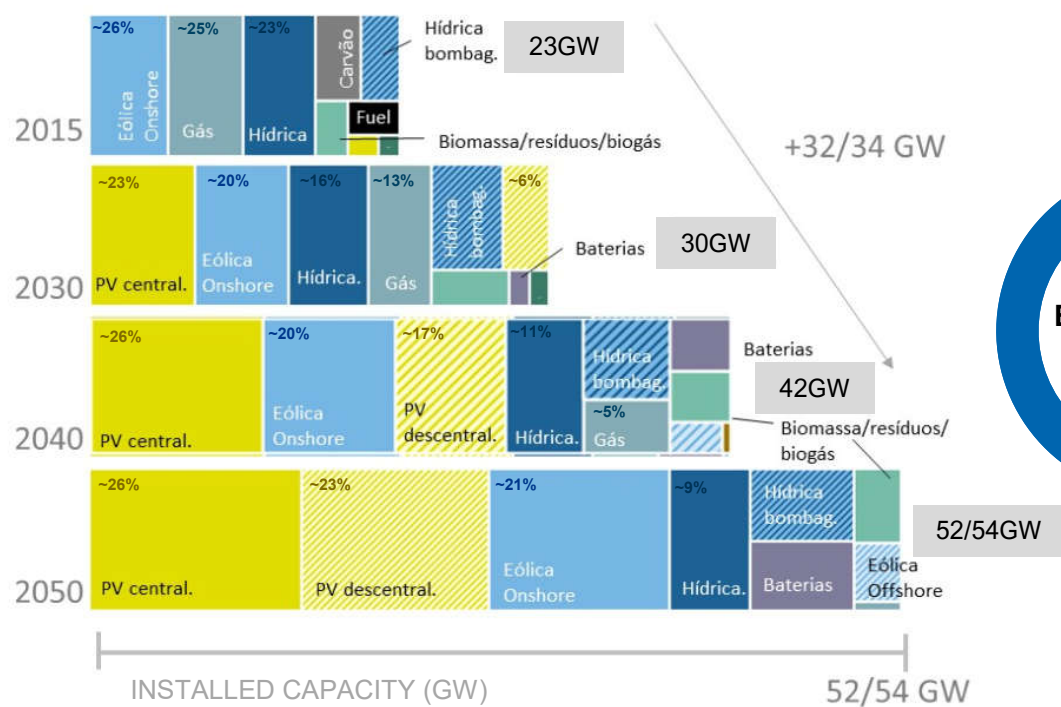
Renewable

Electricity

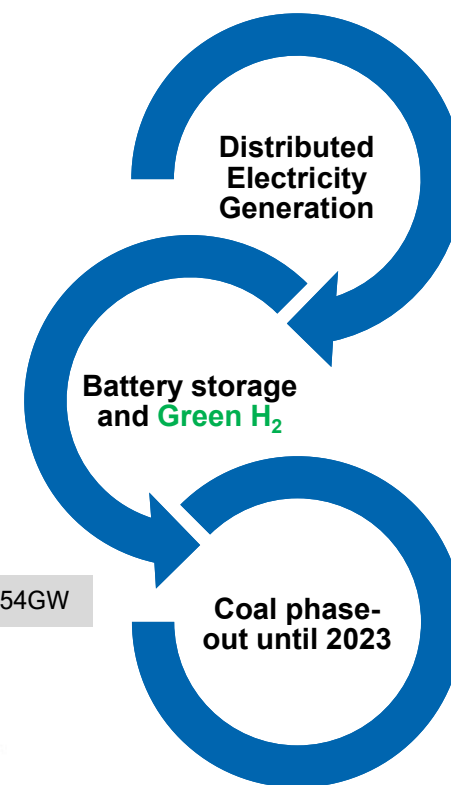
Market

2020

NECP 2030



Source: RNC 2050, Cenário Pelotão e Camisola Amarela, 2018



4) Portugal **Green H2**



NATIONAL HYDROGEN STRATEGY: A BRIEF OVERVIEW



THE PORTUGUESE GOVERNMENT IS ALREADY WORKING TO
CREATE THE NECESSARY CONDITIONS AND MECHANISMS
THAT RECOGNIZE AND VALUE HYDROGEN IN THE NATIONAL
MARKET

Portugal

Renewable

Electricity

Market

2020

NECP 2030





NATIONAL HYDROGEN STRATEGY: A BRIEF OVERVIEW



Portugal

Renewable

Electricity

Market

2020

NECP 2030

PROMOTE THE PRODUCTION OF GREEN HYDROGEN

- Start the dialogue with investors and market players in order to find the cost-effective solution to implement in Portugal;
- Support in coordinating the companies interested in the installation of a green hydrogen industry project

ENSURE INTERNAL AND EXTERNAL DEMAND

- Create the conditions for the emergence of an internal and external market for H₂;
- IGH2P will have a market in Portugal
- Partner with the Governments and Companies in Europe to export green H₂

IMPLEMENT POLICIES AND MECHANISMS

- Regulate the injection of renewable gases into the network;
- Definition of a Strategy for Hydrogen in Portugal;
- Study and set targets for the incorporation of renewable gases;
- Implement a system of guarantees of origin for renewable gases.





NATIONAL HYDROGEN STRATEGY: A BRIEF OVERVIEW



Renewable Resource in Portugal | Capacity

Portugal

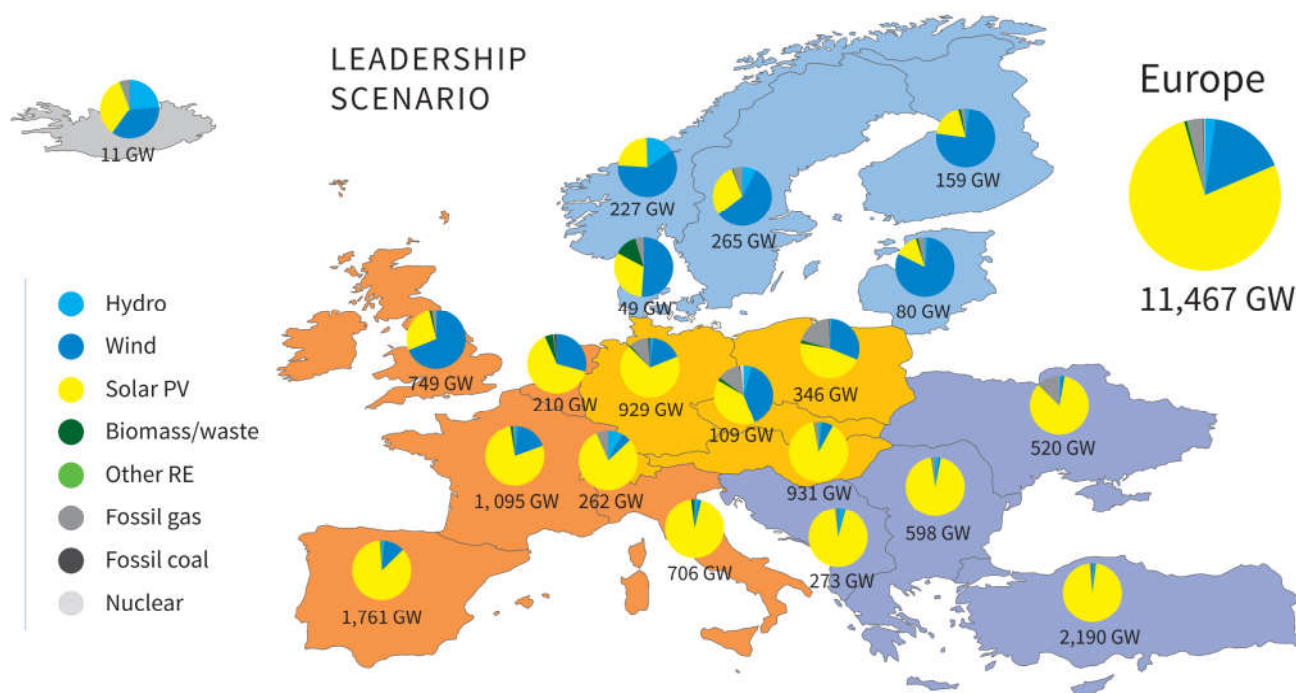
Renewable

Electricity

Market

2020

NECP 2030





NATIONAL HYDROGEN STRATEGY: A BRIEF OVERVIEW



Renewable Resource in Portugal | Generation

Portugal

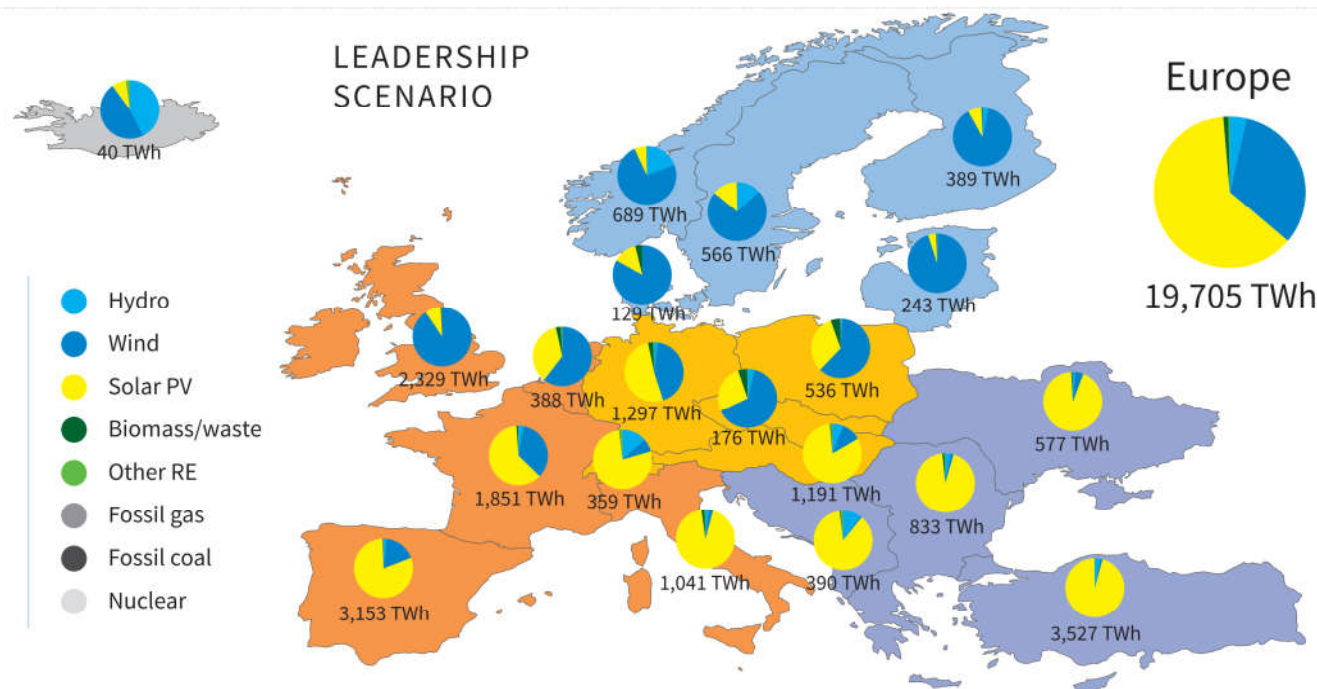
Renewable

Electricity

Market

2020

NECP 2030





Portugal

Renewable

Electricity

Market

2020

NECP 2030

Renewable Resource in Portugal



Key Findings from SPE and LUT Study

- A 100% renewable energy system enables the EU to become climate neutral in 2040, complying with an ambitious 1.5°C Paris Agreement target, and without resorting to carbon sinks
- A 100% renewable energy system is the most cost-effective way of becoming climate neutral by 2050
- A high rate of electrification is essential to achieving a 100% renewable and integrated energy system
- **Electrolysers for hydrogen production are a crucial technology for a 100% renewable energy system**
- A 100% renewable transport sector needs significant synthetic fuels for marine and aviation.





NATIONAL HYDROGEN STRATEGY: A BRIEF OVERVIEW



Portugal

Renewable

Electricity

Market

2020

NECP 2030

- Adding H2 generation to PV power plants as hedging mechanism
- Investors expectation of Solar PV with H2 generation business case
- Required support mechanisms and off-taker options





Hydrogen

LARGE
SCALE SOLAR
DIGITAL
SERIES

Portugal

Renewable

Electricity

Market

2020

NECP 2030



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5) Portugal 2020 PV Auctions



Renewable Resource in Portugal



Portugal

Renewable

Electricity

Market

2020

NECP 2030

- 700 MW of Grid Capacity Auction
- Technology Specific, Only PV
- South Part of Portugal, Algarve and Alentejo





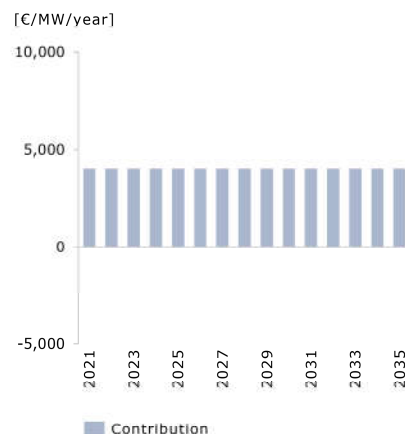
Portugal 2020 PV Auctions



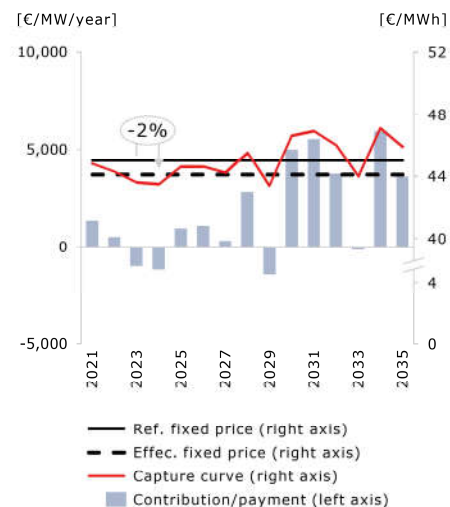
2020 AUCTION DESIGN

Changes vs 2019: (i) evaluation in €/MW; (ii) fixed compensation to SEN in €/MW; (iii) fixed tariff to fixed price; (iv) flexibility option bound to contract with TSO

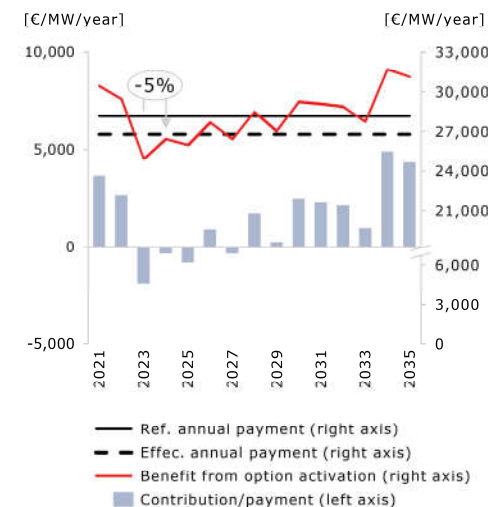
GENERAL REMUNERATION | FIXED COMPENSATION TO SEN



GENERAL REMUNERATION | FIXED PRICE



GENERAL REMUNERATION | FLEXIBILITY OPTION



Portugal

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Market

2020

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Thank You

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