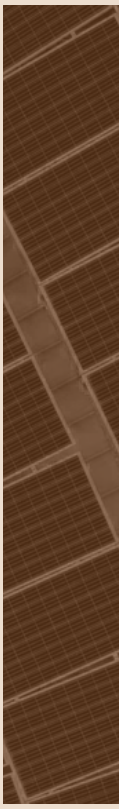
Renewable energy research

Aurea Capital Partners

The challenge of European energy market integration: **Spain, a unique leadership opportunity.**



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With the complete decarbonisation of the European energy system as the EU's grand objective for 2050, a promising horizon opens up for Spain in the renewable energies sector.

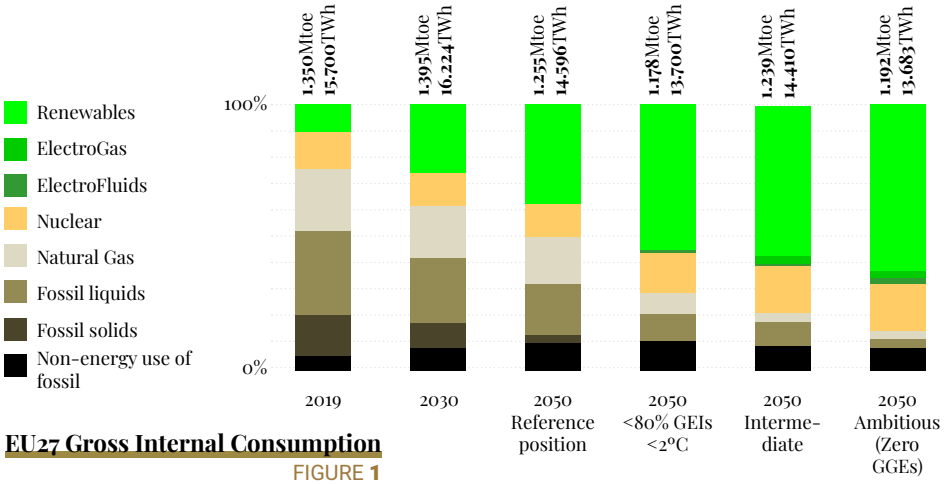
Spain, which enjoys 35% more solar irradiance than all the other countries in Southern Europe, starts from a privileged position in this new "field of play", particularly when it comes to photovoltaic solar energy.

01 Clear regulatory framework for integration of the energy market

Lines	Targets for 2030	Targets for 2050
Decarbonisation	Reduction GGEs > **55%**	**Complete decarbonisation of the European energy system**
Penetration of renewables in the European mix, to replace generation sources using fossil and nuclear fuels	Penetration of renewables **> 40**% of total energy consumed	
Increasing Energy Efficiency	Efficiency > **32,5%**	
Increasing electricity interconnection in the single European space	Interconnection **>15%**	
Stabilising energy prices in Europe	Unifying energy markets in Europe	**Complete integration of the European energy market**
Developing the market in spot energy and futures prices to facilitate price coverage and reduce volatility		
Integration of the single European energy market		

02 Current situation

According to the Communication from the Commission in 2018(1), and the statistics from EUROSTAT for 2019, the structure of gross internal energy consumption in 2019, the last year for which figures are available, and the scenarios forecast for 2030 and 2050, breakdown like this:



EU27 Gross Internal Consumption
FIGURE 1

(1) COM(2018) 773 Final of 28/11/2018: "Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank: "A clean planet for all. A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy."

	2019	2030	2050 Refe-rence position	2050 <80% GEIs <2ºC	2050 Interme-diate	2050 Ambitious (Zero GEIs net)
Non energy use of fossil	5%	8%	11%	11%	10%	8%
Fossil solids	17%	10%	2%	0,5%	0,5%	0%
Fossil liquids	30%	24%	20%	10%	8%	4%
Natural gas	24%	20%	18%	8%	4%	3%
Nuclear	14%	12%	12%	15%	17%	17%
Electro fluids	0%	0%	0%	0,5%	1,5%	2,5%
Electrogas	0%	0%	0%	1%	2,5%	3,5%
Renewables	10%	26%	37%	54%	56,5%	62%
Total Mtoe	1.350	1.395	1.255	1.178	1.239	1.192
Total TWh	15.700	16.224	14.596	13.700	14.410	13.683

EU27 Gross Internal Consumption
TABLE 1

75% of primary energy demand in Europe and Spain is covered using energy from fossil sources.

Nuclear will continue to be one of the base energies on the supply side, together with renewables, accumulators, electrofluids and electrogases.

Transition to the 2030 target will require an increase of **16%** in renewables and gradual reductions in energy from fossil sources, in order to reach **62%**.

The scenarios for 2050 compared with 2019 would vary between increases in renewables of **27%**, in the reference scenario, to **52%**, in the most ambitious. Example of the Intermediate scenario:

1 · Of a total of 14,410 TWh of primary energy consumption forecast for 2050, the EU estimates that internal consumption would be covered **56%** with renewables and **17%** with nuclear.

2 · This would mean renewables providing a further 6,000 TWh, in addition to the 1,750 TWh that they were already providing in renewable production in 2019.

To meet the targets for 2050, the CAPEX requirements for renewables, assuming a 35%/65% split between wind and solar energy, would be as shown in TABLE **2**.

1 · For the Intermediate scenario for 2050, Europe needs to replace 6,700 TWh of production that currently uses fossil fuels with renewables.

2 · Replacing this energy with renewables requires CAPEX of €2.7 billion (x10^12).

3 · Of this 2050 target, by 2030 Europe needs to replace 2,596 TWh (a little over 35%) of the total planned for 2050 (6,700 TWh), for which Europe needs a CAPEX investment of €1.1 billion (x10^12).

4 · The penetration of renewables in the mix would save the European economy €254,376M over the period from 2019 to 2050, i.e. 2.12% of Eurozone GDP in 2020 (€11,982,723M).

5 · If a fiscal incentive mechanism were introduced in Europe for the reinvestment of these amounts in renewables, the introduction of renewables would be exponentially accelerated, and the target would be reached early.

6 · Each €1M per year invested in renewables releases €0.09M per year in consumption of fossil fuels in the Intermediate scenario, thus preventing the diversion of revenues to OPEC countries. This is without taking account of the savings in CO2-eq emissions, currently quoted at 55€/tCO2eq. *(2)*

7 · Each €1M invested in renewables is recouped in 9 years with the savings in fossil fuels that result, and this saving is multiplied by 4.4 times if one bears in mind that the useful life of a photovoltaic plant is 40 years.

FIGURE **2** shows the way that energy demand broke down by sector in 2019.

To reach these targets, the economy must be transformed:

1 · **By electrifying the sectors that are most dependent on oil** (transport, industry and residential).

2 · **By substantially increasing** electricity **interconnections** between EMs

3 · By speeding up the deployment of renewables.

4 · By speeding up the deployment of mobility infrastructure.

5 · By speeding up the deployment of investment in **circular economy**.

6 · By speeding up the internationalisation of the environmental and social costs of dirty vs. clean technologies.

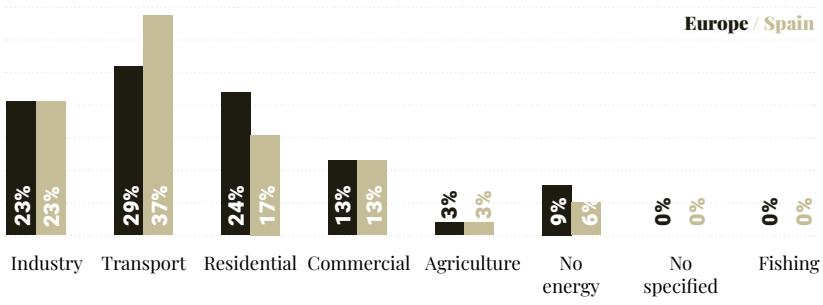
7 · Northern Europe (Scandinavian countries and Northern Germany) will produce wind energy.

8 · **Southern Europe** (mainly Spain, and to a lesser extent, Italy and Greece) **will produce Photovoltaic Solar energy**.

9 · By speeding up the digitalisation of energy.

GROSS INLAND CONSUMPTION TO BE COVERED BY RENEWABLES		2019 - 2030	2019 - 2050 Reference Situation	2019 - 2050 <80% GGEs < 2 ºC	2019 - 2050 Intermediate	2019 - 2050 Ambitious	2019 - 2050 Promedio
TOTAL NEW RENEWABLES CAPACITY	Increase on 2019	**16,0%**	**27,0%**	**44,0%**	**46,5%**	**52,0%**	**42,4%**
	TWh	**2.596**	**3.941**	**6.028**	**6.700**	**7.209**	**5.993**
	GWp	**1.267**	**1.923**	**2.942**	**3.270**	**3.519**	**2.925**
	TOTAL CAPEX	**1.074.173 M€**	**1.630.751 M€**	**2.494.469 M€**	**2.772.710 M€**	**2.983.045 M€**	**2.479.839 M€**
	CAPEX per year	**97.652 M€/year**	**52.605 M€/year**	**80.467 M€/year**	**89.442 M€/year**	**96.227 M€/year**	**79.995 M€/year**
SAVINGS IN FOSSIL FUEL COSTS	Mtoe	223 Mtoe	339 Mtoe	518 Mtoe	576 Mtoe	620 Mtoe	**515 Mtoe**
	M€/1Mtoe	441,5 M€/1Mtoe	441,5 M€/1Mtoe	441,5 M€/1Mtoe	441,5 M€/1Mtoe	441,5 M€/1Mtoe	**441,5 M€/1Mtoe**
	€M/year	8.959 M€/year	4.826 M€/year	7.382 M€/year	8.206 M€/year	8.828 M€/year	**7.339 M€/year**
	€M/scenario	98.548 M€	149.610 M€	228.850 M€	254.376 M€	273.673 M€	**227.507 M€**
WIND	% RES	35%	35%	35%	35%	35%	35%
	eqh/year	3.000	3.000	3.000	3.000	3.000	3.000
	€M/MWp	1,00	1,00	1,00	1,00	1,00	1,00
	GWp	303	460	703	782	841	699
	TOTAL CAPEX	302.845 M€	459.763 M€	703.274 M€	781.719 M€	841.020 M€	699.149 M€
	CAPEX per year	27.531 M€/year	14.831 M€/year	22.686 M€/year	25.217 M€/year	27.130 M€/year	22.553 M€/year
SOLAR PHOTOVOLTAIC	% RES	65%	65%	65%	65%	65%	65%
	eqh/year	1.750	1.750	1.750	1.750	1.750	1.750
	€M/MWp	0,80	0,80	0,80	0,80	0,80	0,80
	GWp	964	1.464	2.239	2.489	2.678	2.226
	TOTAL CAPEX	771.328 M€	1.170.988 M€	1.791.195 M€	1.990.991 M€	2.142.025 M€	1.780.690 M€
	CAPEX per year	70.121 M€/year	37.774 M€/year	57.780 M€/year	64.226 M€/year	69.098 M€/year	57.442 M€/year

Gross internal consumption to be covered by renewables
TABLE **2**



Final energy consumption (FEC) **2019**
FIGURE **2**

03 Effects of energy transition

1 · **The cost of producing energy never includes the real but hidden cost of the environmental impact** caused by its production.

2 · We have therefore spent many years living with figures for energy costs that did not include the real value of the environmental cost that society, and therefore the economy, has had to bear.

3 · The Emissions Trading System (ETS) is a fundamental tool for revealing this cost and for forcing those who contaminate to pay for their emissions, thus generating incentives to persuade them to transition towards a sustainable energy production model.

4 · This is inevitably going to result in a "transference of revenues" between different operators in Europe: businesses, cities, regions and countries.

5 · If we analyse specific cases, such as that of the Netherlands, according to the International Energy Agency it produces **90%** of the energy that it consumes from burning natural gas at combined cycle plants.

Therefore, market operators in the Netherlands will have to buy Emission Rights Certificates on the European ETS market, in order to be able to offset their emissions with other market operators that produce renewable forms of energy and that will sell them these certificates in the ETS.

6 · **The European energy sector will become concentrated with fewer energy companies. This will include the oil companies, which will merge with electricity producers to increase efficiency**.

7 · The way of speeding up this concentration is through the opportunity costs of paying to contaminate, or by investing to advance transition through the sale of certificates in the ETS.

8 · **The incorporation of technologies that until now have been purely theoretical due to their elevated cost, (geothermal, offshore wind, etc.) is now a real and viable alternative.**

9 · This transformation will mean that the unit cost of energy will fall, while the European market as a whole grows, due to the **increase in domestic energy demand as a result of the electrification of the different European industrial sectors** (road transport, homes, industry, etc.). The majority of this energy will be produced internally.

10 · This will mean that companies in the sector will achieve higher volumes but with lower margins. Hence the need to create **mergers and become more efficients**.

> New technologies, such as offshore wind and geothermal energy, will no longer be merely theoretical but will instead become a profitable and real alternative over this decade

([2]) Bearing in mind that 1Mtoe = 6,840,000 Barrels OPEC x €64.6/Barrel (2020) = €441.5M/1Mtoe, which is saved by installing renewables. If in the intermediate scenario 46.5% of gross internal European fossil fuel consumption is going to be replaced, and if 1Mtoe = 11.6 TWh, this represents 576 Mtoe x €441.5M/1Mtoe = €254,376M savings over the period from 2019 to 2050 (31 years), i.e. €254,376M/31 = €8,205M/year / €89,442M/year = €0.09M/year savings in fossil fuels for every €1M/year invested in renewables.

04

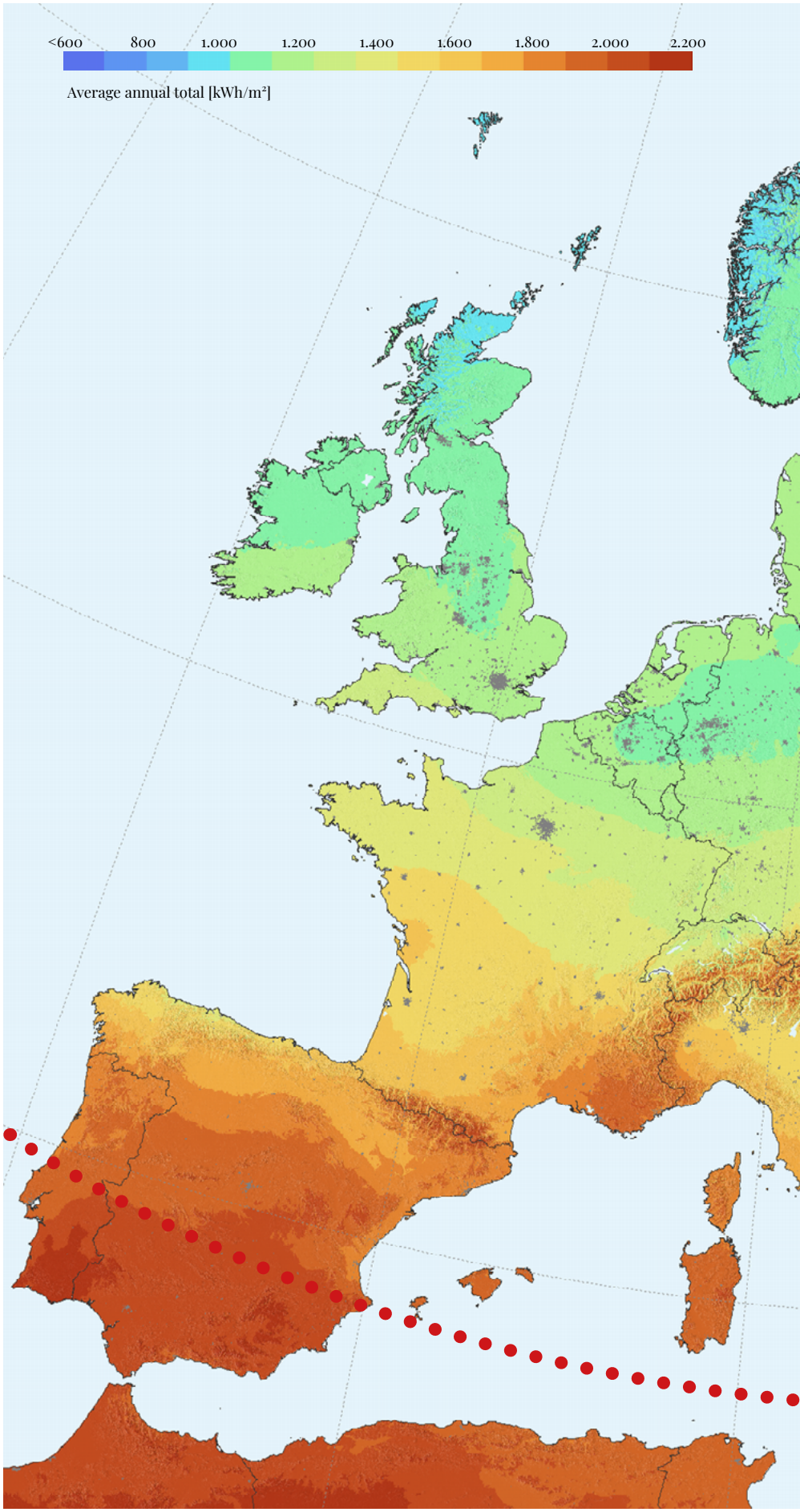
How is Spain positioned?

In this context, Spain's position is **envidiable**:

1 · **Spain is the 'Texas of Europe** in terms of renewables: it enjoys **35% more solar irradiance** than all the other countries in Southern Europe.

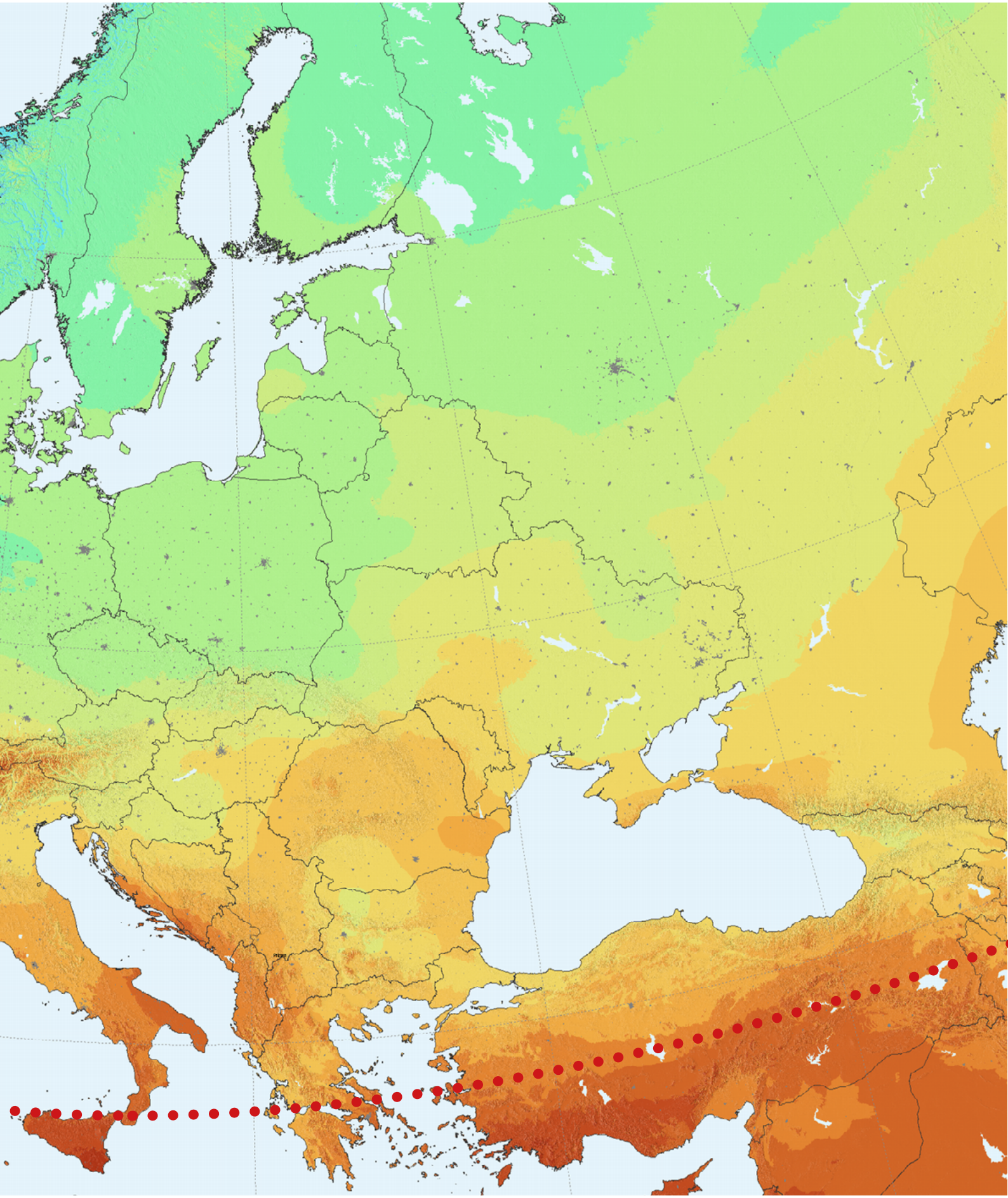
2 · Every euro invested in solar production in Spain brings **a return that is 35% higher** than any other country in the European Union. In addition, in order to mass produce green hydrogen one needs cheap solar energy, and this can only be found in Spain.

3 · Spain can cover its own renewable energy requirements, along with those of a large part of Europe, in an environmentally sustainable (and territorially and socially inclusive) way using solar and photovoltaic energy and accumulators. It must **aspire to become the principal supplier of renewable energy in the whole of Europe**, displacing imports of gas and oil.



Global horizontal irradiance
FIGURE 3

Solar electricity [kWh/kWp]



4 · For Spain to be able to cover 15% of the new renewable potential to be installed in the EU by 2030, and the same percentage of all the new renewable potential to be installed by 2050, the European coverage by renewables installed in Spain would be as shown in TABLE **3**.

5 · Taking the Intermediate scenario for 2050, and calculating Spain's contribution to European transition towards renewables, bearing in mind the target of 15% for both periods, along with Spain's National Integrated Energy and Climate Plan ("PNIEC") targets, the result would be (see TABLE **4).**

- An increase in the target for total potential from renewables for 2030 in the PNIEC, currently 120 GWp, raising it to 249 GWp by including the additional 129 GWp contributed to Europe, on top of the additional 61 GWp of new potential planned for Spain, which would mean a total of 190 GWp in new renewables capacity in Spain.

- Coverage of 12% of total EU consumption (including Spain) by 2030 and 14% by 2050.

- Of the 2.7 billion euros in CAPEX required for new renewables in Europe, 0.4 billion euros would be invested in Spain (15% of the total) over the period from 2019 to 2050.

6 · If this European renewables coverage were to be undertaken in Spain, the impact on the territory would be as shown in TABLE **5**.

7 · To be able to meet these targets, the following scenarios would have to be in place by 2030:

- Increase in interconnections between France, United Kingdom, the Netherlands, etc. in order to broadly exceed the community target of 15%;

- Increase in the PNIEC targets by 129 GWp in the review of 2023, as opposed to the 120 GWp planned at present;

- The speeding up of administrative processing: Establishment of a "single service desk" for the processing of the permits and licences required to obtain Unified Administrative Authorisation for Construction and Production at plants producing Electrical Energy from Renewable sources.

- Facilitation of the bankability of PPAs signed by renewables producers with SMEs and large consumers, through guarantees from either the system or the State, in order to improve competitiveness with lower costs and less volatility.

- Territorial planning and organisation: preparation of a map for the strategic implementation of renewables in the regions/autonomous communities, in which self-sufficient nodes (counties, municipalities, etc.) are connected, with the identification and inclusion of strategic target areas for the installation of large plants and with inclusive territorial energy planning that benefits and replicates the PNIEC at a regional/autonomous community level, adapting and improving it, with structured measures aimed at:

  » i. Providing maximum encouragement for self-consumption and the establishment of energy communities for the different territories in a balanced way;

  » ii. Ensuring a high degree of implementation of self-consumption plants that feed into the network, for both domestic and industrial consumers;

  » iii. Promoting the balanced growth of large plants connected to the network.

- Evaluation and mitigation of the impact on natural capital: Spain's contribution to energy stability in Europe in terms of both production and prices must include a mechanism for the mitigation of impact on natural capital from the installation of large renewable energy production plants. To this end, the definition of territorial planning must be accompanied by conservation, restoration and recovery plans that will mitigate the negative impacts of the development and implementation of renewables, in order to ensure an increase in environmental assets and biodiversity, in accordance with the principles of robust "sustainability" and sustainable investments under EU Regulation 852/2020;

- Joint European responsibility:

  » i. Incorporating Natural Capital Valuation Certificates as way of extending the framework of the carbon emissions market, since these certificates include carbon emissions as part of their valuation;

  » ii. Boosting Spain's central role in providing solar energy to the single European energy market, given its unrivalled competitive geographical advantage and its institutional stability;

  » iii. Facilitating the establishment of a Common Energy Policy, including the passing on of the savings in fossil fuels achieved every year, in order to build a European Fund to activate resources for co-investment and the co-financing of Energy Transition in Europe;

8 · **Spain's capacity to produce solar energy will have an increasing effect on European geopolitical independence against fluctuations in the price of gas, coal and oil**.

9 · Never before has Spain enjoyed such a clear and unique competitive advantage in one of the consumables that is most important for any economy and in one of the richest regions on the planet.

TABLE **3**

EU RENEWABLE INSTALLED IN SPAIN		2019 - 2030	SCENARIOS 2019 - 2050 Reference Situation	2019 - 2050 <80% GGEs < 2 ºC	2019 - 2050 Intermediate	2019 - 2050 Ambitious
TOTAL NEW RENEWABLES CAPACITY	% Target	15%	15%	15%	15%	15%
	TWh	389	591	904	1.005	1.081
	GWp	190	289	441	491	528
	TOTAL CAPEX	161.126 M€	244.613 M€	374.170 M€	415.907 M€	447.457 M€
	CAPEX per yr.	14.648 M€/yr	7.891 M€/yr	12.070 M€/yr	13.416 M€/yr	14.434 M€/yr
FOSSIL FUELS AVOIDED	Mtoe	33 Mtoe	51 Mtoe	78 Mtoe	86 Mtoe	93 Mtoe
	€M/1Mtoe	441,5 €M/1Mtoe	441,5 €M/1Mtoe	441,5 €M/1Mtoe	441,5 €M/1Mtoe	441,5 €M/1Mtoe
	€M/yr	1.344 M€/yr	724 M€/yr	1.107 M€/yr	1.231 M€/yr	1.324 M€/yr
	€M/scenario	14.782 M€	22.441 M€	34.327 M€	38.156 M€	41.051 M€
WIND	%	35%	35%	35%	35%	35%
	eqh/year	3.000	3.000	3.000	3.000	3.000
	€M/MWp	1,00	1,00	1,00	1,00	1,00
	GWp	45	69	105	117	126
	TOTAL CAPEX	45.427 M€	68.964 M€	105.491 M€	117.258 M€	126.153 M€
	CAPEX per year	4.130 M€/yr	2.225 M€/yr	3.403 M€/yr	3.783 M€/yr	4.069 M€/yr
SOLAR PHOTOVOLTAIC	%	65%	65%	65%	65%	65%
	eqh/year	1.750	1.750	1.750	1.750	1.750
	€M/MWp	0,80	0,80	0,80	0,80	0,80
	GWp	145	220	336	373	402
	TOTAL CAPEX	115.699 M€	175.648 M€	268.679 M€	298.649 M€	321.304 M€
	CAPEX per year	10.518 M€/yr	5.666 M€/yr	8.667 M€/yr	9.634 M€/yr	10.365 M€/yr

TABLE **4**

TRANSITION		2019 - 2030		2030 - 2050 Intermediate Ambition		2019 - 2050 Intermediate Ambition	
EU	Existing RES	1.570 TWh	766 GWp	4.166 TWh	2.033 GWp	1.570 TWh	766 GWp
	New RES	2.596 TWh	1.267 GWp	4.105 TWh	2.003 GWp	6.700 TWh	3.270 GWp
	Total RES	4.166 TWh	2.033 GWp	8.270 TWh	4.037 GWp	8.270 TWh	4.037 GWp
	Total CAPEX	1.074.173 M€ 97.652 M€/año		1.698.537 M€ 84.927 M€/año		2.772.710 M€ 89.442 M€/año	
SPAIN	Existing RES	120 TWh	59 GWp	510 TWh	249 GWp	120 TWh	59 GWp
	PNIEC Target	124 TWh	61 GWp	226 TWh	110 GWp	350 TWh	171 GWp
	European Coverage installed in SPAIN	265 TWh	129 GWp	390 TWh	190 GWp	655 TWh	320 GWp
	New RES	389 TWh	190 GWp	616 TWh	301 GWp	1.005 TWh	491 GWp
	Total RES	510 TWh	249 GWp	1.125 TWh	549 GWp	1.125 TWh	549 GWp
	Total CAPEX	161.126 M€ 14.648 M€/año		254.780 M€ 12.739 M€/año		415.907 M€ 13.416 M€/año	
Spain / EU	New RES	10,2%		9,5%		9,8%	
	Total RES	12,2%		13,6%		13,6%	
	Total CAPEX	15,0%		15,0%		15,0%	

TABLE **5**

IMPACT ON THE LAND		2019 - 2030	SCENARIOS 2019 - 2050 Reference Situation	2019 - 2050 <80% GGEs < 2 ºC	2019 - 2050 Intermediate	2019 - 2050 Ambitious
Wind	Power	45.427 MWp	68.964 MWp	105.491 MWp	117.258 MWp	126.153 MWp
	Usable surface area	6,5 ha./MWp	6,5 ha./MWp	6,5 ha./MWp	6,5 ha./MWp	6,5 ha./MWp
	Total Surface Area	295.274 ha.	448.269 ha.	685.692 ha.	762.176 ha.	819.994 ha.
Solar PV	Power	144.624 MWp	219.560 MWp	335.849 MWp	373.311 MWp	401.630 MWp
	Usable surface area	2,5 ha./MWp	2,5 ha./MWp	2,5 ha./MWp	2,5 ha./MWp	2,5 ha./MWp
	Total Surface Area	361.560 ha.	548.901 ha.	839.623 ha.	933.277 ha.	1.004.074 ha.
TOTAL IMPACT European Renewables Coverage Installed in Spain	Capacity	190.051 MWp	288.525 MWp	441.340 MWp	490.569 MWp	527.783 MWp
	Total Surface Area	656.834 ha.	997.170 ha.	1.525.315 ha.	1.695.453 ha.	1.824.068 ha.
Total Surface Area in Spain Impact by category	50.537.000 ha.	1,30%	1,97%	3,02%	3,35%	3,61%
1. Water-covered areas	639.000 ha.	102,79%	156,05%	238,70%	265,33%	285,46%
2. Land	49.898.000 ha.	1,32%	2,00%	3,06%	3,40%	3,66%
2.1 Forestry land	18.506.600 ha.	3,55%	5,39%	8,24%	9,16%	9,86%
2.2 Other land	2.731.400 ha.	24,05%	36,51%	55,84%	62,07%	66,78%
2.3 Agricultural land	28.660.000 ha.	2,29%	3,48%	5,32%	5,92%	6,36%
2.3.1 Arable land	12.700.000 ha.	5,17%	7,85%	12,01%	13,35%	14,36%
2.3.2 Permanent crops	4.860.000 ha.	13,52%	20,52%	31,39%	34,89%	37,53%
2.3.3. Meadows and pastures	11.100.000 ha.	5,92%	8,98%	13,74%	15,27%	16,43%

05 Which model should we apply in Spain?

Spain is now in the same situation that Norway found itself in when it discovered its oil reserves in the 1960s and created the largest Sovereign Wealth Fund in the world.

State intervention in the electricity market contravenes the laws governing the free market and the European energy market structure.

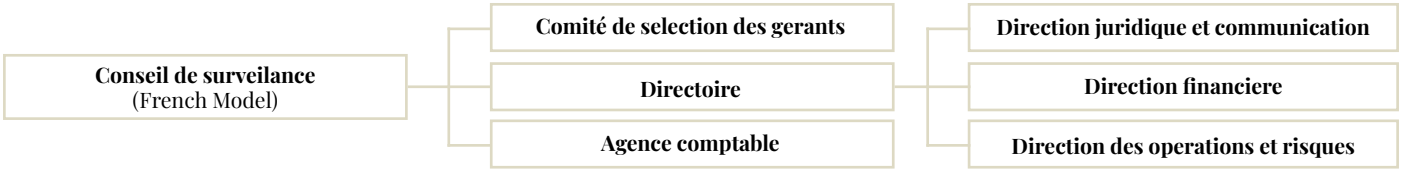
In this regard, the optimum way for the State to participate in the electricity market is by channelling investment towards the sector through the creation of "Independent Power Producers (IPP).

To this end, the creation of a **National Energy Transition Fund** could mobilise investments from pension funds and institutional investors in order to create IPPs in the energy sector. This fund could be financed:

1 · **Through the contribution of the savings obtained from the importation of fossil fuels**.

2 · **By the pensions pot, through an amendment to pensions legislation following the French or Norwegian model, as shown in the following table**:

Concept	Norway	France	Spain
Investor	Norwegian Pension Fund (National)	FRR - Fond de Reserve pour le Retraits	Public Employment Pension Fund
Established	1990 - 1996	2001	2023?
Manager	Norges Bank Investment Management (NBIM); specialist managers are selected by NBIM and given specific duties.	Public State Agency with 45 professional employees and independents (see the organisational chart at the foot of the page).	Tbd. Appointment of a Monitoring Committee from the Social Security Ministry with a right of veto. Combined mandate from the public sector and the private sector by tender, depending on investment policy.
Governance	Government Pension Fund Act approved in 1990. The Finance Ministry has responsibility for managing the Fund, delegated by mandate to the NBIM. ESG Investments form a core part of the mandate.	The FRR is a public state agency governed by a Supervisory Board and a Directorate. The aim of this structure is: i) To ensure its independence and work on its statute; ii) to ensure its transparency and public accountability; iii) association of social and parliamentary duties, through its Supervisory Board. The different investment strategies are managed on the basis of specific mandates given to professional managers, chosen by public competitive tender based on merits and competence.	The Spanish Public Pensions Fund Act, expected to be approved in June 2022.
Funds under Management	€1.16 billion ($10^{\wedge 12}$)	€0.033 billion ($10^{\wedge 12}$)	€0.30 billion ($10^{\wedge 12}$)



Concept	Norway	France	Spain
Investments	The international financial markets, diversifying risk to the Norwegian economy. Ethical and sustainable policy that is independent of the decision-making bodies.	Investment policy: Optimise return on investments made on the basis of prudent criteria, determined by the promotion of social and environmentally balanced economics. ESG policies and independence from governmental bodies. See Appendix 1.	Tbd. A special Mandate for Investment in Ecological Transition, which due to diversification criteria would be no greater than 10% of the Fund total (30,000 million euros), would cover 3.6% of the 830,000 million euros of investment in renewables required by 2050 in Spain. This would be a great help for channelling funds towards other institutional investors by giving specific mandates to specialist investors to channel investment into sustainable infrastructure and the circular economy, placing ownership of the Pensions Fund with key companies in the sector and influencing their strategies and decisions.
Mission	To work to safeguard and build financial wealth for future generations in Norway.	To invest and optimise return on the funds entrusted by the public authorities on behalf of the community, with the aim of financing the pensions system.	Tbd
Asset	Revenues from the sale of oil.	Revenues from the return earned from the Fund.	Solar Irradiance within the territory of Spain (basically 2/3 of Spain, from Burgos to Cadiz).
Funding	As of June 2021, the fund had received a total of €2,900 billion (10^9) in contributions from the government result from oil revenues, while the revaluation of accumulated investments amounted to €7,400 billion (10^9).	Initial in 2010, subsequent revaluation and obligation to make fixed distributions until 2024, then based on revaluations from 2024 onwards.	Social Security Pensions contributions.
Revaluation	19.9% in 2019 and 6.6% annualised since 1998.	9.6% in 2019	Tbd.
Conclusions	Norway is prepared for the possibility of decoupling its pensions from its country's production structure and from the annual oil revenue payments in 15 years.	The FFR will continue with its contributions to the French pensions system in a regular way using the return on its investments.	Spain has a pensions system that is linked to the performance of the Spanish economy, which results in high levels of vulnerability in terms of its sustainability, given the highly concentrated nature of its investments (100% Spanish government debt) and payments by its contributors.

The approach of **seeking to replicate the Norwegian State Fund**, substituting fossil fuel assets with renewable assets, particularly Spanish solar power, involves a challenge: while the Norwegian assets were in the sea, in Spain's case they are on land.

This means that it is going to be vital to work in advance on a reasonable and sustainable response to the unavoidable territorial and social incursion involved in imposing a new layer of "land use": the use of energy from renewable sources, mainly photovoltaic solar energy, in an ambitious way.

At the same time that the new model is implemented there will inevitably have to be territorial planning that favours the dispersed nature of renewables, particularly photovoltaic solar energy, a territorial network with "**self-sufficient interconnected nodes**"

on a nationwide basis on which the response to European demand will have to be overlaid. Given that powers in terms of territorial planning lie with the Autonomous Communities, then replicating the PNIEC at an autonomous community level could facilitate the territorial integration process.

06 Final conclusions

In order for this strategy to bear fruit, it will be necessary:

1 · To speed up the processes for the inclusion of renewable generation sources among new territorial land uses: the installation of photovoltaic equipment on an industrial scale (for domestic consumption and export to Europe) and "self-sufficient interconnected nodes" (municipal, local and individual, promoting self-consumption and distributed energy).

2 · To work from a premise of "strong environmental sustainability" in the relationship between society and the land, accepting that environmental assets are not replaceable by any other asset type and that in matters relating to biodiversity, only incremental changes may be made. For this reason, assessments of impact on the land must be carried out from the perspective of an incremental increase in natural capital.

3 · To approve the regulations necessary to allow consumers with batteries to contribute to the stability and efficiency of the electricity system, in return for payment, thus allowing consumers to cease to be passive users of the system and to begin to participate in and benefit from their own contributions.

4 · To speed up the installation of renewables with the suitable hybridisation of the different technologies, including the maximisation of pumped storage hydroelectric plants managed, where possible, by REE, along with the connection and exploitation of the accumulated capacity of fleets of private, public and corporate electric vehicles, to cover 100% of energy demand in Spain and thus reduce or eliminate the inclusion of gas in the mix, allowing renewable technologies to set the price, which will see it fall to €40/MWh. At the same time, they can sell their emission rights to parties that contaminate,

though outside the electricity market, meaning that carbon costs are imposed on those who actually contaminate and not indiscriminately as currently happens.

5 · To speed up interconnection with France and the rest of Europe, in order to be able to sell Spain's renewable energy during the 15 or 20 years of transition. And to obtain a transfer of revenues to Spain similar to the one that occurred with oil in Norway, or perhaps even greater.

6 · To remove the base technologies that have been completely amortised (hydraulic, nuclear) from the Iberian Energy Market Operator (OMIE), so that they operate at a fixed price that covers costs plus a commercial margin (10% of the pool capped at €10/MWh – €20/MWh linked to the future performance of the pool), in order to reduce their impact on the wholesale and retail price and therefore on the aggregate CPI for the entire economy.

7 · To approve a specific mandate for the Spanish Public Pensions Fund to channel public pension funds to the Energy Transition Fund in the long term and thus stimulate the creation of IPPs, attracting other private pension funds and institutional investors at a low capital cost, revaluing the pensions of Spanish taxpayers and minimising the cost of transition for the Spanish economy.

8 · In Spain we are faced with a unique geopolitical advantage which should be seized and maximised as quickly as possible.

9 · At stake is the stability of the pensions system and the economic development of both Spain and the EU, making use of a resilient energy sector with a high degree of independence from fluctuations in the oil price.

Appendix

French Pensions Reserve Fund (FRR) – Strategy for Contributing to Energy Transition (Annual Report 2019)

Click on the image to read the document.

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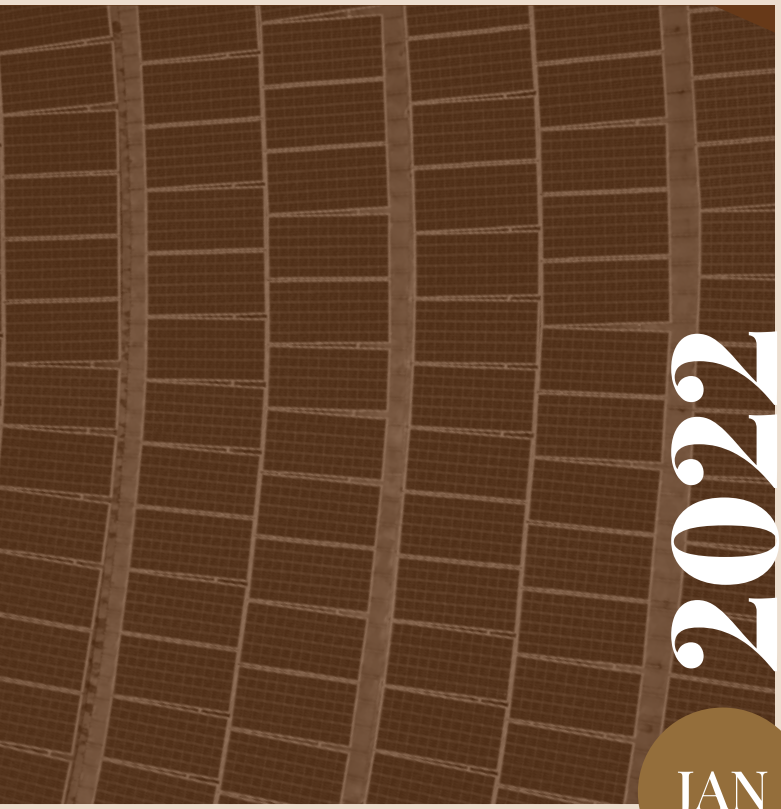

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