

AN FTI CONSULTING REPORT – PUBLISHED MAY 2021

Measuring, mitigating and monitoring risks in Energy Efficiency projects



The Spanish Recovery, Transformation and Resilience Plan, which will invest 70 billion euros of public sources over three years (2021-2023), will allocate 6.8 billion euros to the Housing Renovation and Urban Regeneration Programme.

The implementation of energy projects in buildings brings singular challenges. Proper identification, measurement and mitigation of risks is essential for making decisions on investment and project financing.

FTI has collaborated with Greenward Partners to develop a pioneering tool for the management of operational, real estate, commodity, regulatory, counterparty and reputational risks in building renovation projects.

The tool allows working with four contractual structures, provides an individual score for each risk (Tier 1) and an overall project score (Tier 2), enabling well-informed investment decisions, risk-adjusted financing pricing and recurrent monitoring of the risk profile of the project portfolio.

The definitive boost to energy efficiency in buildings in Spain will come from public-private collaboration mechanisms such as PACE loan models promoted by Greenward Partners or the public certification of energy savings through white certificate system, as is already the case in the large energy markets around us.

Energy efficiency of buildings and EU’s Green Deal

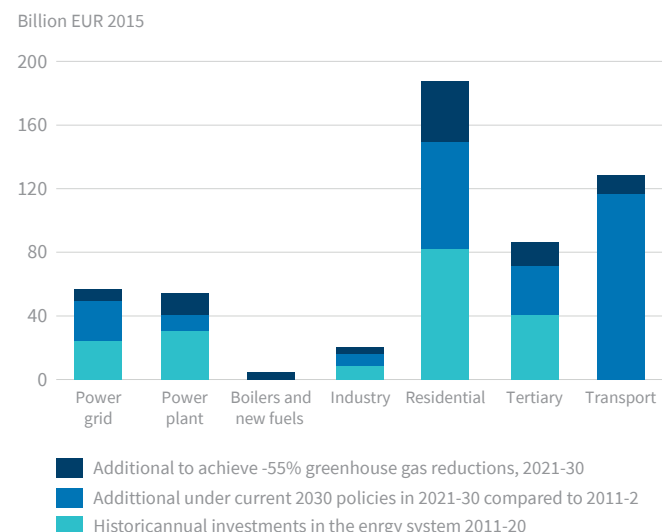
The EU Green Deal commits member countries to reduce their net emissions by at least 55% and increase efficiency by 32.5% by 2030 compared to 1990 levels.¹

Given that buildings account for 40% of energy consumption and that 75% of buildings are energy inefficient, the Energy Efficiency Directive 2012/27/EU is an essential element of ecological transition.

The Energy Efficiency Directive calls on each Member State to draw up a roadmap with milestones in 2030, 2040 and 2050 for the renovation of its national stock of residential and non-residential buildings, with the aim of transforming them into energy-efficient and decarbonised by 2050.²

In its latest monitoring report on efficiency targets published last year, the European Commission³ warned that primary and final energy consumption remains above the targeted trajectory to reach 2020 goals and pointed out that national goals are still not in line with the EU’s. As a result, all countries are adapting and updating their National Energy and Climate Plans (NECPs) to achieve 2030 goals.

FIGURE 1 – ANNUAL INVESTMENTS (2021-30) NEEDED TO REACH EMISSION REDUCTION TARGETS⁴



Status of the housing stock in Spain

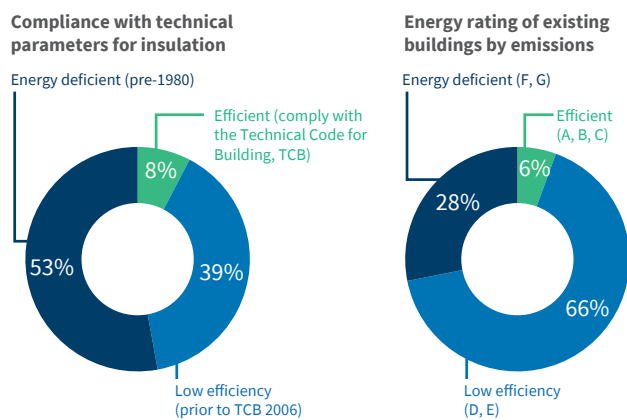
In Spain, there are 13.6 million dwellings built before 1980,⁵ when the first mandatory thermal insulation measures in buildings were approved.⁶ In addition, 90% of the dwellings were built before the first Spanish Technical Building Code

(CTE by its acronym in Spanish) of 2006, which set minimum building qualities, including those related to energy saving - which adds up to approximately 10.2 million post-1980 buildings with insufficient thermal insulation.⁷

Hence, over 23 million dwellings in Spain are estimated to need renovation in order to improve their quality and reduce GHG emissions into the atmosphere.

This ageing condition of the Spanish building stock has led to 94% of the 4.1 million Energy Efficiency Certificates issued to date for existing buildings corresponding to low energy ratings - D, E, F or G - suggesting that there is a high potential for improvement.

FIGURE 2 – STATUS OF THE HOUSING STOCK IN SPAIN



The great boost to renovation with 6.82 billion euros

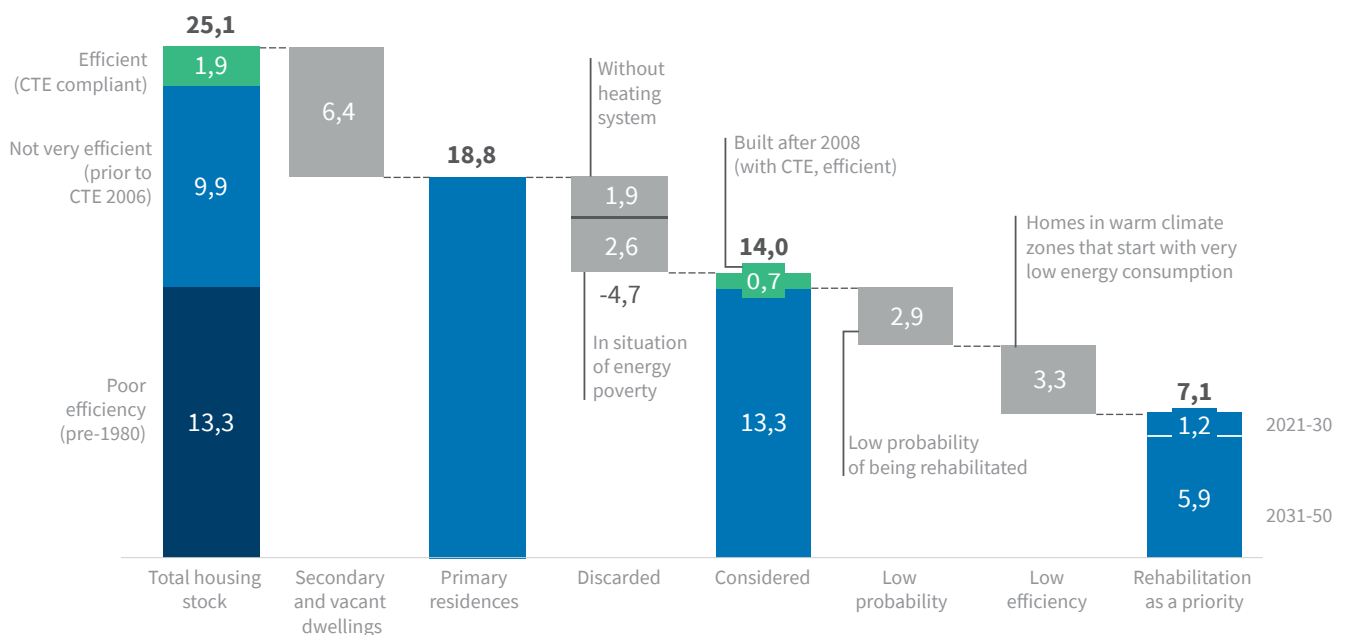
Spain’s roadmap is defined in the long-term Strategy for Energy Renovation in the Spanish Building Sector (ERESEE 2020). For the energy renovation of the residential stock, the ERESEE sets the following housing renovation goals:

- Renovate the envelope of 7.2 million dwellings considered as “priority renovation” until 2050, with 1.2 million being renovated in the period 2021-30 with an estimated investment of 13,167 million euros.
- Renovate or replace heating systems in 8.9 million dwellings by 2030, with an estimated investment of 20.616 million euros.
- Renovate DHW systems in 8.5 million dwellings by 2030, with an estimated investment of 7,688 million euros.

The Spanish government intends to accelerate this roadmap by taking advantage of the resources provided by the Recovery and Resilience Plan, suggesting the refurbishment of around 500,000 homes between 2021 and 2023. To this end, it has announced that it will allocate 6.82 billion euros in its Housing Renovation and Urban Regeneration programme⁸.

These ambitious objectives and the great existing potential mean that the renovation of the housing stock and energy efficiency will be a sector of great growth and value creation for the Spanish economy in the coming years.

FIGURE 3 – STATUS OF THE HOUSING STOCK IN SPAIN ACCORDING TO ERESEE



Energy service companies, ready to meet the challenge

Energy service companies (ESCOs) are key to unlocking the potential for energy savings and are ready to respond to the challenges of decarbonisation.

Largely born to provide energy services in industrial facilities with a high concentration of demand, ESCOs are now moving decisively into the residential, commercial and transport sectors, which are more atomised and with less obvious returns.

In this process, ESCOs are transforming themselves to respond to this demand by offering integrated solutions (end-to-end) to optimise all energy uses - electrical, thermal and transport demand - and by moving into the field of demand aggregation and flexibility.

In short, the barriers between solutions and sectors are beginning to blur and problems are being addressed holistically. To address these challenges, the industry is consolidating and implementing the knowledge of companies with digital capabilities or oriented to specific sectors.

ESCOs have a portfolio of solutions that include (i) supply side measures, optimising energy supply with thermal and/or electrical self-consumption with renewables or high efficiency, storage or replacing fossil fuels with cleaner ones; (ii) demand side, reducing final demand by using more efficient equipment (lighting, motors, boilers, pumps, heating and air conditioning) and passive measures, such as actions on the building envelope (including roofs, walls, windows), insulation of pipes

and shading elements; and (iii) flexibility/aggregation of electricity demand, by pooling the demand of different consumers to put it in value within the system, participating in the balancing services.

The energy services market in Spain is still under development and has grown steadily in recent years, reaching a volume of more than 1.2 billion euros in 2019⁹.

However, in order to give it a final boost, it is necessary to revitalise the financing market, so that ESCOs can grow and develop their business without the constraint of saturating their balance sheets with long-term investments on behalf of customers.

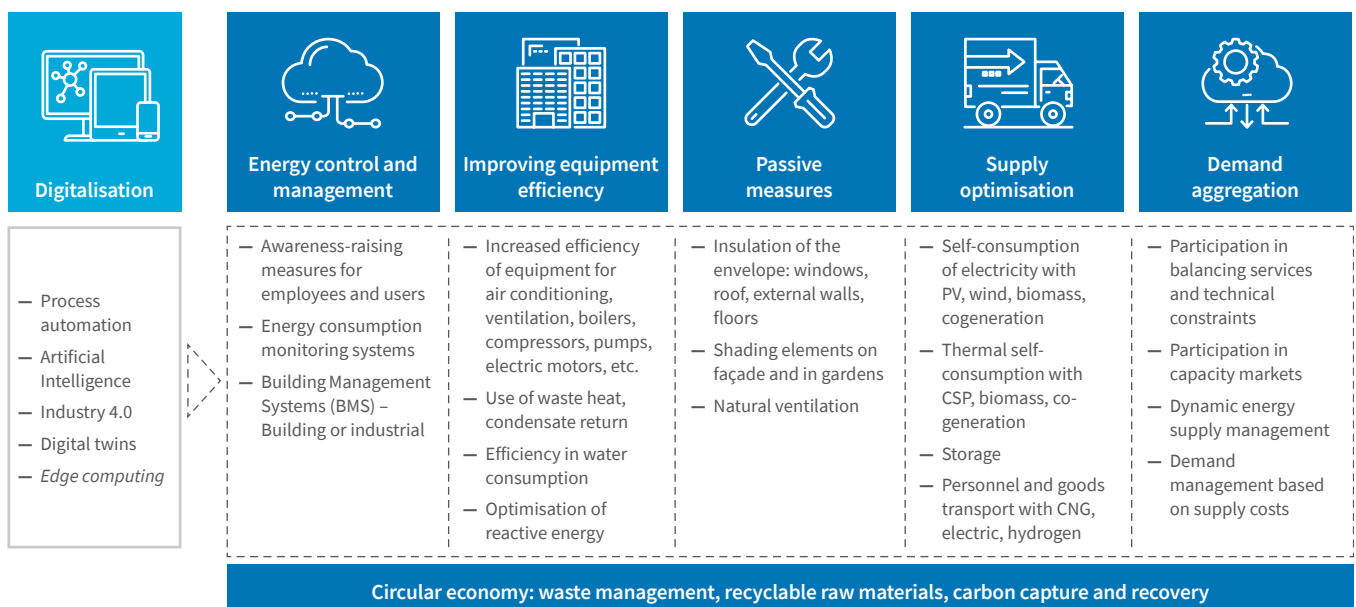
GreenWatch: Grenward Partners' experience with FTI Consulting

Greenward Partners is implementing a new model for the management and financing of integrated energy renovation projects for buildings, and has focused on standardising operational and risk management, in order to enable the massive channelling of long-term private investment into reliable projects.

In order to assess energy efficiency projects in buildings in a homogeneous way, FTI Consulting has collaborated with Greenward Partners in the design and implementation of GreenWatch, a risk assessment and monitoring tool adapted to the specifics of this segment.

GreenWatch assesses a selection of operational, real estate, credit risk, energy market, regulatory and reputational factors related to energy efficiency investments. This provides a risk profile of the project

FIGURE 4 – ENERGY EFFICIENCY SOLUTIONS



throughout its life cycle, enabling an Investment Committee to make well-informed decisions at the time of underwriting and to monitor the subsequent evolution of risk once the efficiency project is implemented, as energy savings are materialised.

Adaptation to four contractual models

The tool developed by FTI is flexible and allows the incorporation of four types of contractual models between the parties involved in projects of this type - i.e., the ESCO, the owners and users of the building, the financing party and the public administrations:

- **Energy efficiency loans** are a “traditional” way of financing a building renovation project. Greenward Partners finances the owner or users of the building, who take over the investment and hire an ESCO, engineering companies or installers for implementation and operation.
- In **ESCO financing**, the energy service company itself promotes the renovation project in a building and assumes the investment in its balance sheet. In this model, similar to “traditional” financing, Greenward Partners finances the ESCO directly.
- In **Energy Services Agreements** (ESA) Greenward Partners assumes the development, implementation and operation of the energy efficiency project by hiring an ESCO or engineering company. The owners or

users of the building where the renovation takes place commit to pay back the costs of the project through energy savings on their energy bills.

- Finally, there are the **PACE** (Property Assessed Clean Energy) **programmes**, promoted in Spain by Greenward Partners.¹⁰ This is an innovative financing mechanism, successfully implemented in the USA, which allows property owners to obtain long-term financing with loans that are repaid with the savings generated by the improvements and with exclusive recourse against the properties themselves. In these loans, the owner does not assume the debt and the municipality or local government acts as a collection agent.

In all of the above cases, repayment of funding can be linked to the achievement of savings - whether or not guaranteed by an ESCO - or be independent.

Individual project risk scoring

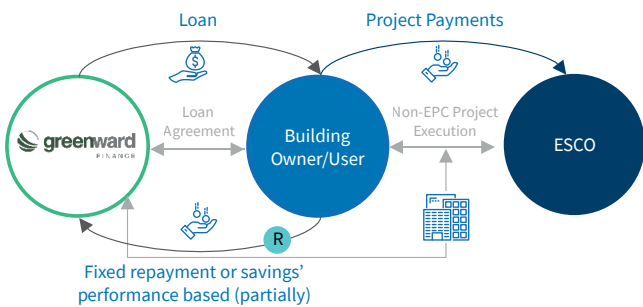
GreenWatch aims to assess and score individually all the risks identified in a building energy efficiency project (Tier 1) and to calculate an overall project score (Tier 2). This is done by taking into account multiple variables that define the risk profile of the project, depending on the contractual model and the parties involved.

The risks taken into consideration by GreenWatch are:

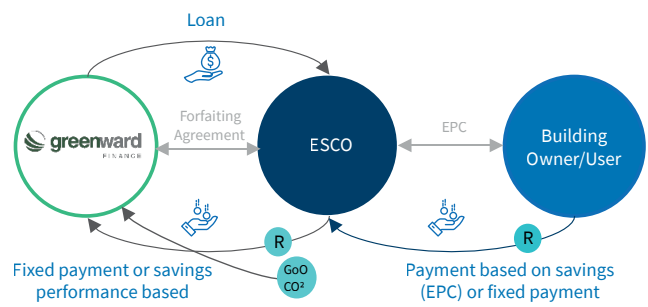
- **Counterparty** risk, which represents the which represents the risk of the counterparty failing on

FIGURE 5 – TYPES OF STRUCTURES SUPPORTED BY FTI-GREENWARD PARTNERS TOOL

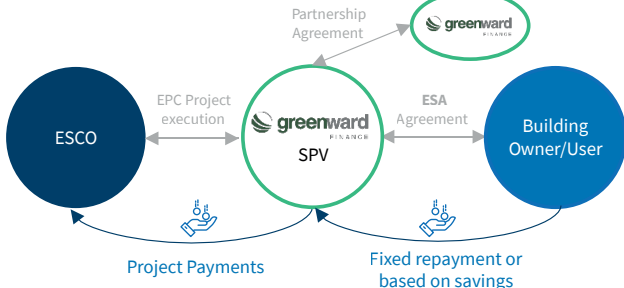
Energy Efficiency Loan



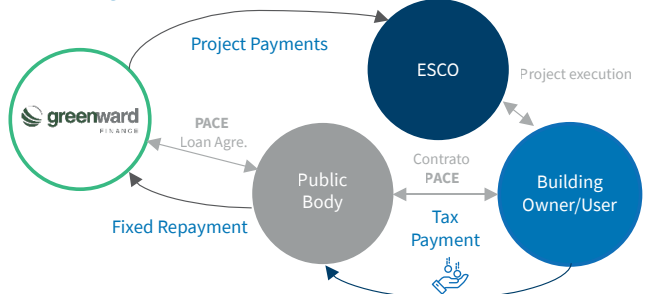
ESCO financing



ESA Agreement



PACE Program



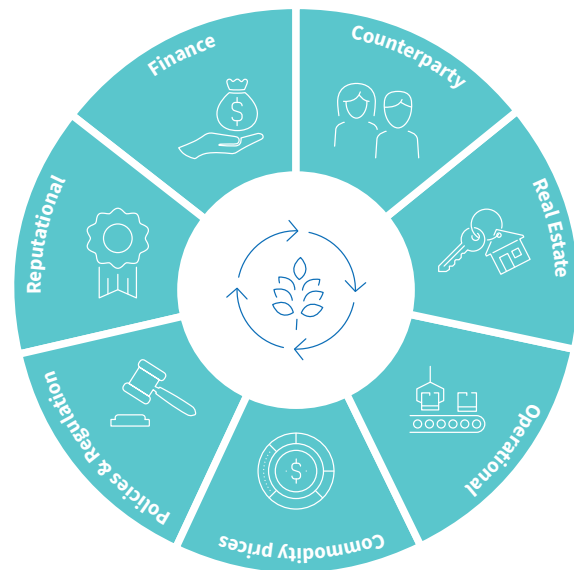
the payment of the interests or principal of the loan that finances the energy efficiency project. This counterparty is the owner, the user of the building, the ESCO, or a public entity - depending on the contractual model. The credit quality of the counterparty can be measured through (i) the status and evolution of its structural financial position (solvency, liquidity, debt and profitability ratios in the context of the economic sector in which it operates); and (ii) integrating the behavioural view, monitoring potential defaults, social security or tax obligations.

GreenWatch allows up to 3 counterparties to be considered, and applies a methodology and specific analysis parameters according to their characteristics and scope of activity: neighbourhood communities, public entities, non-profit organisations and private companies from different sectors (hotels, hospitals, REITs, educational centres, etc.)

- **Real estate** risk, which includes (i) the potential loss of the intrinsic value of the building, which may be caused by the deterioration of its activity or its conservation (potential incidents, actions regarding Technical Building Inspections); or (ii) the reduction of its market value as a consequence of the macroeconomic and local dynamics of the area where it is located and the quality of the asset.
- **Operational** risk, which arises when the project does not deliver the energy savings originally estimated according to certain levels of investment (CapEx) and maintenance (OpEx). This non-fulfilment can be due to many factors, including: (i) the type of measures adopted - for example, passive measures requiring building permits may entail delays in the implementation of solutions; (ii) sub-optimal/ inadequate design due to poor- or low-quality demand data; (iii) poor execution of works; or (iv) lower energy demand than expected.

A thorough assessment of the quality of the ESCO implementing the efficiency project is highly relevant, since a broad experience in project implementation allows to anticipate potential problems and to solve them in time.

FIGURE 6 – RISK MATRIX IN EE PROJECTS



- There is also a risk that **commodity prices** will vary in a way that reduces the economic appeal of the savings generated for the building. These commodities are electricity and hydrocarbons, CO2 emission allowances, Guarantees of Origin (GoO) or Energy Saving Certificates (ESC).
- Similarly, **energy policy and regulation** driving decarbonisation may change codes, standards, subsidies, incentives or taxation of the project. This risk will be particularly relevant for projects relying on incentives.
- Energy efficiency projects also have a **reputational** risk that would materialise if a project does not deliver the expected results and this could lead to a negative public perception of the actors that have financed or implemented the project. This can be particularly relevant if projects are carried out within the public sector or involve sensitive groups, such as for example elderly people's homes or the health sector.
- Finally, **financial risk** captures the risk that the return expected by the financing agent is lower because one of the above risks materialises.

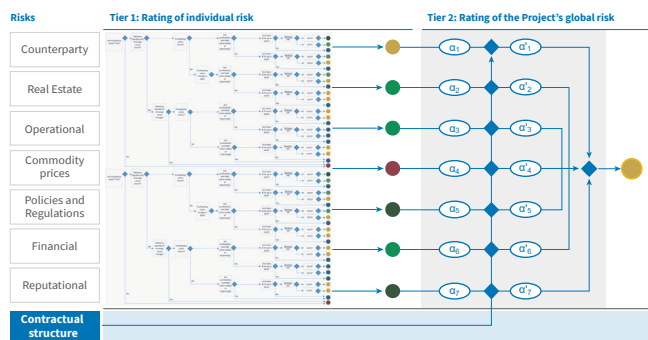
Overall project scoring

The intrinsic risk levels for each of these individual risks (Tier 1) are considered using an expert methodology to calculate an overall score (Tier 2) for the project.

This global score synthesises all the individual risks, incorporating (i) the contractual structure; (ii) the connection of payments to savings (or not) and the level of guarantee on them; and (iii) the risk hedging instruments that may have been established, such as insurance on energy savings or commodity price hedges, among others.

This way, GreenWatch allows the Investment Committee to make well-informed decisions and design risk-adjusted pricing for financing that takes into account multiple variables, the structure of the project and the mitigating elements contracted.

FIGURE 7 – INDIVIDUAL AND GLOBAL SCORING OUTLINE



GreenWatch goes a step further than the methodologies or solutions that we have identified in the market. These are, in general, limited to compiling in a more or less exhaustive manner the set of variables that affect the level of risk of each of the above elements, but do not calculate a score, either individually or globally.

Project risk profile monitoring and reporting

In addition, GreenWatch creates an individual scorecard for each project that gathers the most relevant information and automates the reporting of Greenward Partners portfolio.

This scorecard is regularly updated for each risk and for the overall score during the operation of the project, providing an overview of its evolution for the entire portfolio and generating alerts. Active monitoring enables Greenward to identify the factors that determine the success of each intervention in a building.

The scoring of energy efficiency projects in buildings allows professional risk assessment and management and its correct distribution among the professional agents involved. It also allows projects to be categorised and aggregated according to their credit quality. All this is essential to stimulate the financing market, to bring in new professional actors and to reduce the cost of financing investments, thus unlocking the existing energy efficiency potential.

FIGURE 8 – EXAMPLE OF A PROJECT SCORECARD

Operational model: EE Loan | Fixed Payment

Counterparty & Real Estate

Owner: Grupo Salud Madrid Number of owners: 1 Country: Spain Province: Madrid	Building Surface: 10.500 m Building Users: 1 Activity: - Commercial/Services: 10,000 m2 - Residential: 1,000 m2
Climate Zone: Continental Energy Certification: C Sustainability Certification: None Year Built: 2008 Last refurbishment: 2015	Asset Valuation: 790,000 eur Annual Expenses: 25,000 eur Leverage (Mortgages): 50,000 eur
Name: Hospital La Madriñeña Type: Legal Person- Private Entity Activity: Healthcare	Loan Holder: Yes Guarantor: Yes Guaranteed Amount: 200,000 eur
Name: Grupo Salud Madrid Type: Legal Person- Private Entity Activity: Healthcare	Loan Holder: No Guarantor: Yes Guaranteed Amount: 140,000 eur
Name: Type: Activity:	Loan Holder: Guarantor:

Risk Profile Evolution

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
OVERALL RISK	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Red		
GW Loan Financial	Green	Green	Green	Green	Green	Green	Green	Yellow		
Counterparty	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Red		
Real Estate	Green	Green	Green	Green	Green	Green	Green	Green		
Operational	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow		
Commodity Price	Green	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Green		
Policy & Regula.	Yellow	Yellow	Red	Red	Red	Red	Red	Red		
Reputational	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow		
Change in risk?	na	No	Yes	No	No	No	No	Yes		

Explanation of changes in risk

Period	Risk changed	Former value	New value	Reason for change
2023	Policy & Regula.	Yellow	Red	Explanation of change in risk profile
2023	Commodity Price	Green	Yellow	Explanation of change in risk profile
2028	Counterparty	Yellow	Red	Explanation of change in risk profile
2028	Commodity Price	Yellow	Green	Explanation of change in risk profile

Key Project Financials

GW Loan			ESA Agreement	
Loan Amount:	650,000 eur		Expected repayment:	240,000 eur
Outstanding Amount:	350,000 eur		Current repayment:	40,000 eur
	Expected	Actual		
GW IRR	6.50%	5.67%		
Project IRR	7.80%	6.40%		

Public-private partnership mechanisms: PACE and energy saving certificates

Within this context, the creation of public-private partnership mechanisms represents an additional instrument for project risk management.

In the United States, local governments can enable Property Assessed Clean Energy Programs (PACE) to finance energy efficiency improvements or renewable energy installations in buildings. These credits are linked to the building or dwelling - rather than the owner or user - and are repaid through property taxes. This risk allocation enhances the legal certainty of the operation and makes long-term financing with private capital possible.

The Public Administration can also contribute to the deployment of a system of certification of the energy savings achieved, based on an initial taxonomy of projects, and allowing their monetisation. The main neighbouring countries have wide experience in operating such systems, in the context of Energy Saving Certificates (or white certificates) mechanisms, which have proven to be a major driver of the efficiency sector in the UK, France and Italy.

Public recognition of the energy savings generated by energy efficiency projects makes the benefits of investments visible to the public and inspires trust. Ultimately, a well-designed Energy Saving Certificates scheme encourages the demand for projects and mobilises technical professionals responsible for analysing savings potential.

Endnotes

- 1 Agreement of the European Council held in December 2020.
- 2 Directive 2010/31/EU of 19 May 2010 on the energy performance of buildings, as amended by Directive 2018/844/EU.
- 3 2020 assessment of the progress made by Member States towards the implementation of the Energy Efficiency Directive 2012/27/EU and towards the deployment of nearly zero energy buildings and cost-optimal minimum energy performance requirements in the EU in accordance with the Energy Performance of Buildings Directive 2010/31/EU, Brussels, 14-10-2020.
- 4 EU-wide assessment of national energy and climate plans, European Commission, Brussels, 17-9-2020.
- 5 Population and Housing Census 2011. Dwellings, INE (Spanish Statistics Institute).
- 6 Spanish Royal Decree 2429/1979 of 6 July, approving the basic building standard NBE-CT-79, on thermal conditions in buildings.
- 7 "Report on Energy Renovation in Spain. An opportunity to improve the building stock", *CGATE* (General Council of Technical Architecture of Spain) and *Mutua de Propietarios* Group.
- 8 As announced by the President of the Spanish Government at the inauguration of the XI Edition of the International Economic Forum Spain Investors Day (SID) held in January 2021. The Plan for the Recovery, Transformation and Resilience of the Economy presented by the government in April 2021 considers aid to renovate housing for which owners will obtain between 35% and 100% of the cost of the works to improve buildings, allocating an investment of 6,820 million euros in housing renovation and urban regeneration over the next three years. 70% of the investment for real estate will be earmarked for housing renovation, with the focus on energy efficiency.
- 9 DBK Informa, energy services companies (Spanish classification of the Economic Activities Code, *CNAE* 7490).
- 10 Greenward Partners is one of the promoters of the legislative modifications that would allow its development in Spain, under the name of "*Programa de Activación de Capital Ecológico en Edificios*" (PACE, Green Capital Activation Programme for Buildings).

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