GTR 2014 REPORT

STRATEGY FOR BUILDINGS RENOVATION

Keys to Transform Spain's Buildings Sector

Co-authors

Albert Cuchí

Peter Sweatman

An initiative of

GTR (Rehabilitation Working Group)

Coordinated by:

GBCe green building council españa

FUNDACIÓN CONAMA

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Co-authors
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December 2013

Sponsored by:

European Climate Foundation

FUNDACIÓN la casa que ahorra

URSA uralita

Foreword

2014 is a critical year for Spain, and Europe, for energy efficiency and buildings renovation. It is worth noting that Spain currently spends about € 60 billion a year on primary energy and a third of this is used in buildings. In 2014, the Energy Efficiency Directive (EED) mandates Member States to publish a Strategy for Buildings Renovation that encompasses well defined energy efficiency objectives. After three years of research and two published reports, the experts forming the Buildings Renovation Working Group (GTR) wish to support this process by providing their proposed "Renovation Strategy" and keys to transform Spain's Buildings Sector.

Energy efficiency is key to balance Spain's trade deficit

Paradoxically, energy efficiency is not currently a strategic priority for Spain, even though it could offer vast economic benefits to a country that is 76% dependent upon foreign sources of energy. Spain's current fiscal deficit is largely an energy problem and the energy efficient rehabilitation of Spanish buildings is part of the solution and can generate significant energy savings, jobs and other important economic, social and environmental benefits.

Energy Efficient Renovation of 10 million Spanish homes by 2050 can create 150,000+ jobs

In 2012, GTR published an Action Plan for the energy efficient renovation of 10 million Spanish principal dwellings built before 2001 and estimated that this residential buildings transformation would create 150,000+ new stable quality jobs. This third report offers key pointers to make the renovation of the sector viable with changes in the regulatory, financial and operational structures.

Creating a new job in buildings renovation costs less than maintaining a person unemployed

Buildings renovation is an excellent job creation opportunity for Spain. GTR's third work suggests that the amount of public investment required to create each new job in the buildings rehabilitation sector for home refurbishment is between €13,500 to €14,500 per year, which compares favourably to the €19,991 estimated annual cost of supporting an unemployed person.

In 10 years Spain can save up to 50 % of the energy used in office buildings

One of the relevant features of this report is the assessment of opportunities for rehabilitation in the tertiary sector. The types and energy consumption patterns in the Spanish non-residential sector (offices, shopping centres, hotels, sports centres etc.) have been studied. We believe that investments in non residential buildings can be repaid in just 10 years as a result of energy savings of 35- 50%, with the highest savings percentages in hospitals and offices.

Three key instruments: a Roadmap, a Rehabilitation Agency and a National Fund for Buildings Renovation

The report analyzes the current regulatory framework in conjunction with the new features of the Energy Efficiency Directive (EED). GTR recommends three new instruments to activate the new buildings renovation sector: a Roadmap to connect the different Sector stakeholders to deliver the transformation of Spanish buildings, A Rehabilitation Agency to manage and coordinate the state's Roadmap, and a National Fund for Buildings Renovation that includes different financing sources and enables and facilitates their availability.

The energy efficient renovation of Spain's buildings can create a market of €2 to €10 billion per annum

The energy rehabilitation of buildings can create a new market that generates between €2 to €10 billion per annum from 2014 to 2050. In this report the main financial barriers are analyzed and five new funding sources are identified that are required to work together to deliver the ambitious road map for the long-term transformation of buildings in Spain.

A new business model for the rehabilitation of multi-family homes can revalue them by up to 10%

A new business model could revolutionize the energy efficient renovation of Spanish multi-family homes. In this new model a key factor is the "Green Premium": defined as the increase in home value which occurs among those which have been renovated and are more energy efficient. GTR proposes a new simpler business model that shares costs and benefits, where investments would be covered by savings of heating -45%-, savings of domestic hot water -8%-, public support -25%- and the owner's contribution -22%-, which can be as little as € 6,000.

Index

Chapter 1

- The mission of Spain's Rehabilitation Working Group (GTR) is to facilitate the energy efficient transformation of Spain's Buildings.
- Once established, Spain's Buildings Renovation Sector can be economically viable and is capable of creating and sustaining employment also delivering against Spain's constitutional right of access to housing in full consideration of the environmental and social challenges inherent in this change.
- GTR is composed of 11 independent experts and stakeholders in the future of Spain's Buildings Renovation Sector. GTR's three annual publications have been co-authored by Albert Cuchí and Peter Sweatman each bringing highly complimentary skills and knowledge to the publications. GTR's reports have also been reviewed by a 25-person expert advisory panel.
- GTR's expert advisory panel contains some of Spain's and Europe's most knowledgeable individuals in the Buildings Sector and contains legislative, financial and operational experts, half from Spain and half from outside Spain.

Introduction
Spain's Rehabilitation Working Group (GTR)

GTR 2014
REPORT

What is the Rehabilitation Working Group (GTR)?

Founded in 2010, seeks to foster the opportunity for renovating Spanish dwellings

The Spanish Working Group for Buildings Rehabilitation ("GTR" – Grupo de Trabajo sobre Rehabilitación) is an expert group which came together independently following a series of key forums that took place in 2010. In 2010, expert members of the GTR agreed that there was a need for change in Spain's buildings sector and that this might also help to resolve some of the key challenges facing the Spanish economy and to meet its environmental goals.

The GTR's objective is to define a strategy that will allow for the transformation of the current built environment and the buildings sector in Spain. This transformation will launch a Buildings Renovation Sector (BRS) dedicated to the renovation, retrofit, efficient operation and maintenance of appropriate and habitable housing and efficient and affordable commercial space in Spain. The transformation will solidify citizens' rights to decent and adequate housing and deliver increased productivity and comfort in commercial, care and educational environments. Simultaneously the economic, social and environmental impacts of the transformation will deliver local jobs, improved fiscal balance and lower greenhouse gas emissions to Spain.

The buildings sector has been strongly impacted by the financial crisis; its transformation through the adoption of a more productive and sustainable model will help reactivate the Spanish economy. Having published reports in 2011 and 2012, the GTR aims to deepen the scope of its previous Road Map with this new publication and Long-term Plan to ensure that the transformation of Spain's built environment becomes an economic reality.

GTR´s work is reviewed by an advisory board of domestic and international experts and while GTR raises funds from foundations and corporations its work remains independent. GTR is coordinated by two institutions, CONAMA and GBC España, and the co-authors of its publications are Albert Cuchí and Peter Sweatman who work together to model and articulate the GTR members' vision. On behalf of Barcelona Tech University Anna Pagès has acted as co-author, while Sergi Aguacil has been a collaborator. On behalf of Climate Strategy & Partners Mauricio Yrivarren has been a collaborator. Joaquim Pareras of IPSOM has had a decisive participation in this report. Dolores Huerta of Green Building Council España has collaborated in the coordination and the edition of this report.

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GTR's Expert Advisory Panel

This report has been revised by 25 International and Domestic Experts

Expert Advisory Panel

Each year, GTR invites a few experts who represent different sector stakeholders and international specialists whose opinions GTR respects and can incorporate in its work.

The experts are drawn from three main areas: Representing Industry, representing society and representing the buildings sector both internationally and from Spain. Additionally GTR seeks to ensure that reviewers can analyze its work from a legislative standpoint, financial and operational.

In this report, the GTR is pleased to be working with some 24 experts who have reviewed the draft report and whose extensive comments and inputs have enabled the co-authors to refine the final version, and without whose input this report might not be as comprehensive as it is.

We note that reviewers act in a personal capacity and do not provide an institutional view and we greatly appreciate all the efforts of the members of the advisory council of 2013. Thank you.

Expert Advisory Panel: Members

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Chapter 2

- The Energy Efficient Renovation of Spanish Buildings leads to a “win-win” for the public and private sectors
- Spain’s expensive energy dependency can be partially addressed by cost effectively reducing energy inefficiency
- Hundreds of thousands of jobs can be created directly and indirectly through the stimulation of energy efficiency in buildings at no net public cost.
- Energy Efficient Renovation will make Spanish buildings more valuable, comfortable and productive
- A clear and ambitious Buildings Renovation Strategy written in line with the European Energy Efficiency Directive and articulated through a new agency, legislative and financial platform can deliver multiple benefits to Spain.

Executive Summary

GTR 2014
REPORT

The transformation of buildings stands as a major opportunity

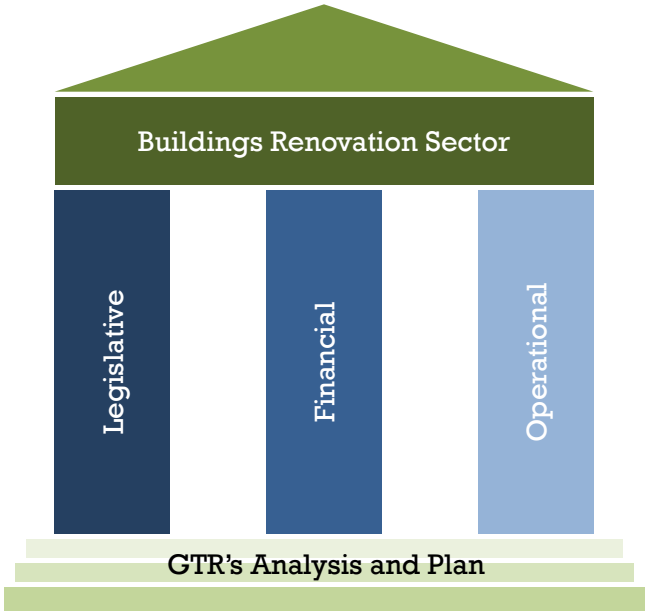
The ambitious transposition of Energy Efficiency Directive is a "Win-win" for Spain

Present		Future	
1	Spain's construction sector has lost 1.7 million jobs since its peak	1	150,000 new jobs can be created through the energy efficient renovation of Spanish homes. In addition other tens of thousands of jobs can be created through the renovation of non residential buildings
2	Spain is 76% dependent on foreign energy which severely impacts its commercial deficit	2	Demand reduction policies such as the deep renovation of buildings reduce energy dependency and improve the fiscal deficit
3	Spain's existing buildings use 1/3 of its energy and are very inefficient	3	Current technology can cost-efficiently reduce the energy needs of 10 million Spanish homes by 70-80% by 2050. Tertiary buildings can cost effectively save up to 50% of energy needs.
4	Spain's energy companies are not incentivized to offer customer energy savings	4	Through Energy Efficiency Obligations, Spain's energy companies are obliged to offer client energy demand reduction solutions and their model moves to "value added services"
5	2013 Spanish legislation begins to develop a Buildings Renovation Sector together with some public finance	5	New legislation facilitates data, financing, a central rehabilitation agency, "one-stop shop" for public support and technical assistance to strengthen the renovation activities of sector stakeholders
6	The "value proposition" for Spanish property owners of a deep renovation is virtually unknown	6	Spanish property owners see value increases, productivity gains, energy savings and increased comfort in renovated buildings.

NATIONAL RENOVATION STRATEGY

Three pillars of the Country Strategy for the Renovation of Buildings

The GTR has identified six key steps for a long term Roadmap in Spain



A National Buildings Renovation Strategy can deliver a vibrant new Buildings Sector which will employ 150,000 people in the deep renovation of Spanish homes and tens of thousands in an overhaul of tertiary buildings and public administration offices. This long-term national roadmap has three pillars and six key components:

1. **Political Leadership** and Clear Articulation of a Buildings Renovation Strategy with Targets and Milestones
2. **An Action Plan** that organizes resources, outlines market margins, and orients the actions of the different stakeholders
3. Clear and **supportive legislative framework** faithfully transposing all elements of the Energy Efficiency Directive which facilitates and supports the activity of the new Buildings Renovation Sector
4. **National Energy Efficiency Fund** to deliver renovation financing through a network of collaborating public and private sector channels that guarantees investing security
5. A **Renovation Agency** whose objective is to implement the renovation strategy, as well carrying out the much needed coordination among stakeholders
6. **Open source data and national reference projects** which deliver verified savings and energy efficient deep renovation in all segments of Spain's built environment.

Chapter 3

- Spain is highly (76%) dependent on external sources of Energy
- Energy Efficiency and Energy Conservation are ideal ways to create much needed local economic activity and jobs which can more than pay for themselves
- Spain's buildings are a key potential source of energy savings and these savings can help fund a transformation of Spanish residences and business with significant economic and productivity benefits to buildings owners and occupants
- Renovation investments in buildings can deliver energy savings, lower running costs, improved productivity, health and comfort, enhance utility and increase value.
- A long-term and efficient buildings transformation in Spain will require the reinvention of the traditional construction sector and a new mind-set and approach among buildings owners and occupants

Energy and Building Efficiency in Spain

GTR 2014
REPORT

Spain's Energy Conundrum

Energy Efficiency is key to balance the country's commercial trade

Spain is a large energy importer with a 76% external energy dependence – just behind Italy among large EU countries.

Europe is energy dependent with an average 52% dependency rate on external energy sources and Spain is among the most energy dependent of the large EU nations.

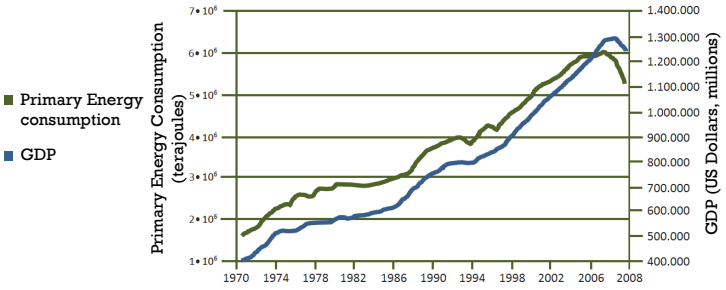
Spain's negative Trade Balance has an Energy problem

Spain's pre-crisis trade deficit was approximately 1/3 energy and 2/3 non-energy related. Spanish trade balance improvements since 2009 have come with a worsening energy deficit and no clear increases in energy productivity.

Spain should prioritize "value added per primary energy unit consumed" in its long-term energy strategy

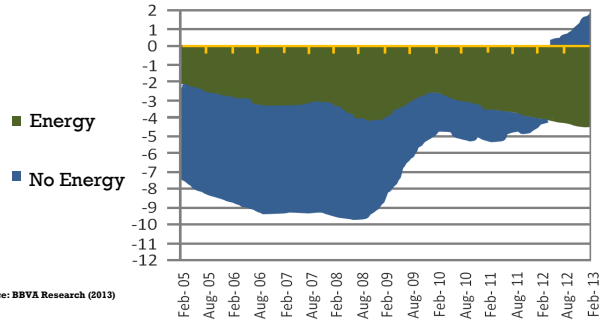
Aggregate primary energy consumption in Spain has grown with GDP yet energy efficiency improvements have allowed countries like the US, Denmark, UK, Germany and Japan to grow without materially increasing energy needs and emissions.

Correlation between Primary Energy Consumption and GDP



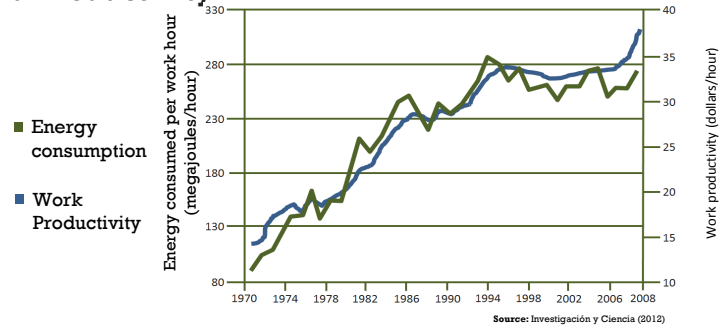
Source: Investigación y Ciencia (2012)

Commercial Cumulative Balance, 12 months (GDP Percentage)



Source: BBVA Research (2013)

Correlation between Energy Consumption and Productivity



Source: Investigación y Ciencia (2012)

Slide Constructed by GTR based on the work of: Ramos Martin (2013)

Energy Security and Economic Growth

Energy Efficient Buildings can deliver Long-term Prosperity

Spain's Primary Energy Consumption of 129 million toe costs Spaniards around 6% of GDP (€60 billion) per annum.

129 million tons of oil equivalent is the energy provided by approximately 1 billion barrels of oil. Depending upon feedstock the approximate cost to the Spanish economy of this energy is €60 billion (or 6% of Spain's GDP).

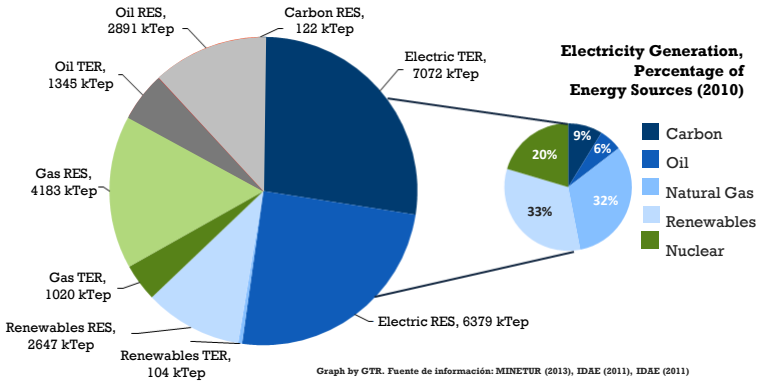
Energy Efficiency is a "win-win" for Spain, but it has not been a priority traditionally and Spain's level of ambition and performance are mediocre despite a strong opportunity set.

Energy conservation and efficiency investments save costs, reduce emissions and create employment. In its 2013 assessment of EU countries performance, Energy-Efficiency-Watch declared Spain's performance as average with most experts only able to identify a few sectors where policy was ambitious. With better performance in Industrial and Service sectors, one of Spain's greatest policy and finance gaps was identified in the buildings sector.

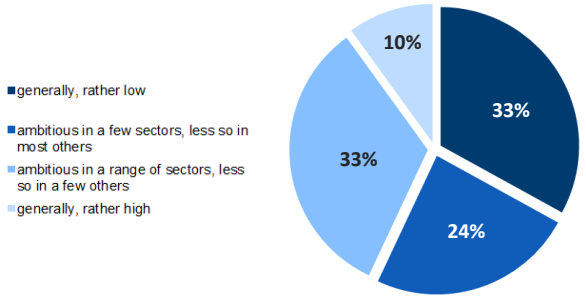
Around 1/3 of Spain's final energy consumption is used in its buildings and the cost effective energy savings from building refurbishment is a sizeable and attractive opportunity.

Since its formation in 2010, GTR has extensively documented the poor energy performance of current Spanish buildings and the cost effective opportunities to address this situation. GTR has identified 10 million Spanish primary residences built prior to the adoption of meaningful buildings codes which it believes can be cost effectively transformed into highly efficiency, low energy homes while creating up to 150,000 jobs in a Buildings Renovation Sector. In 2013, GTR has also extended its analysis to the tertiary buildings sector and is equally confident of the opportunity to cost effectively save energy among those more intensive energy users (eg. Hospitals, Hotels, Schools, Offices and Public Buildings).

Buildings Primary Energy Consumption (2011)



Energy-Efficiency-Watch Summary of Spanish Energy Policy Ambition-2013



Energy Efficiency Delivers Multiple Value Streams

Spain's Buildings Transformation can deliver much more than Energy Savings

The IEA's "Multiple Benefits" studies reveal 12 value sources delivered by Energy Efficiency in four areas: Energy Security, Economic Development and Competitiveness, Environment and Social benefits.

The energy efficient transformation of Spain's buildings is not just an energetic nor economic nor environmental challenge but it delivers multiple benefits across various areas of the Spanish economy.

Delivery of the Multiple Benefits of an Energy Efficient Transformation of Spanish Buildings will require a historic collaboration between policy makers and the New Buildings Sector.

At a global level, the IEA cannot overstate the importance of energy efficiency as a route to improved competitiveness and reduced energy intensity. With 60% of energy in Buildings used for heating or cooling and significant improvements in lighting and appliances, energy loads of many buildings can be cost effectively reduced by up to 80%. IEA presents energy intensity targets for new build between 15-30 kWh/m2/year and as 75% of buildings standing today will remain until 2050, it recommends large-scale refurbishment of existing buildings and a tightening of Buildings Codes and Standards.

Economy-wide outcome	Impact of energy efficiency investment	Value delivered
Energy Security	• Reduced imported energy • Reduced domestic demand to maximise imports • Reduced energy use	• Improved balance of trade (fewer spending on imports; greater revenue from exports) • Increased reliability of supply • Reduced investments in energy supply
Economic development and competitiveness	• Reduced imported energy • Reduced energy use • Reduced energy intensity	• Frees up resources that can be spent on additional economic activities • Reduced investments in energy supply liberates money to be spent elsewhere in economy by both public and private actors • Reduced government expenditure • Reduced production costs and improved industrial competitiveness
Climate and environmental benefits	• Reduced energy use	• Avoided GHG emissions • Avoided pollution related to extraction, transport and combustion of energy
Social benefits	• Reduced energy cost • Increased employment • Increased energy services • Reduced public health costs	• Avoided air pollution and related health issues • Improved comfort and associated economic impacts • More affordable energy consumer costs

A new focus for the buildings Sector

Skills & Innovation can be the basis of a new Building Sector

Spain has 5.9 million unemployed, equal to 26% of its labour force, double the EU average, and the highest unemployment rate in the country's history especially among young people.

Spain's unemployment, one of the highest in the developed world, is a critical strategic challenge and involves a full re-think of the Spanish economic model centered upon the creation of long-term, sustainable jobs and the integration of youth into the workforce.

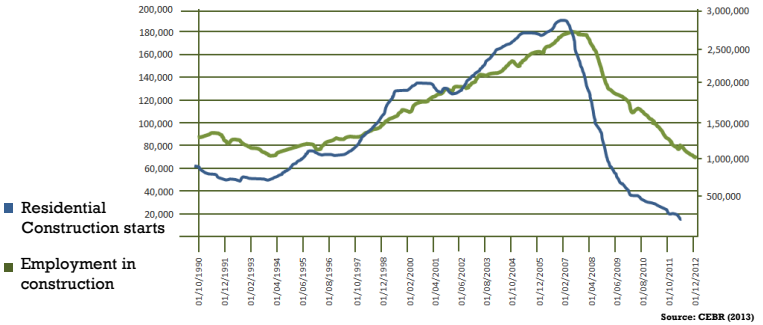
Spain's construction sector has shed 1.6 million jobs since its peak – 40% of the total 3.7 million jobs lost in Spain since 2007.

Spain's economic model relied heavily on an unsustainable construction boom representing 16% of GDP at its peak. Since 2007, 1.6 million direct jobs and probably up to 2-3 times as many induced jobs have been lost as a result of the fall in building activity. It is clear that a large proportion of Spain's unemployment problem is derived from an unsustainable construction model and that jobless figures will not recover until this model is recast. The unemployed from the construction sector also require minimal re-training for the Buildings Renovation Sector.

A Buildings Renovation Sector built-up with a core of Spanish local contractors dedicated to transforming Spain's buildings from 2014-2050 can mine the value in energy efficiency and develop new markets, methods and innovation for the future.

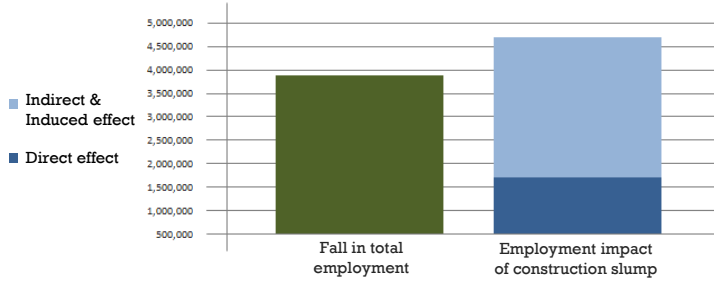
The European construction sector is characterized by a large number of small, local firms (77% of employment in Spanish construction in 2012 was in firms with under 50 employees). The long-term opportunity to save energy costs and modernize Spanish buildings is an attractive value proposition and potential source of some 150,000 local jobs. In addition, the new energy efficiency driven buildings transformation model is in its infancy and there is significant scope for innovation and improvements as the market grows. R&D investment and apprenticeship approaches will be beneficial to catalyze the change.

Employment in the construction sector (left) and one-year total of square meters of construction permits (right)



Source: CEBR (2013)

Change in Employment in Aggregate and in the Construction Sector between Q3 2007 and Q1 2013



Source: CEBR (2013)

The Energy Efficiency Directive, what does it entail?

An ambitious Transposition of the Energy Efficiency Directive is Key for Spain

The Energy Efficiency Directive creates the opportunity for energy dependent countries in Europe, like Spain, to initiate a new culture of efficiency through a new regulatory framework removing barriers and promoting savings.

The Energy Efficiency Directive establishes a common framework of measures for the promotion of energy efficiency to ensure the achievement of Europe's 2020 20% headline target on energy efficiency and lay the framework for the future. The EED lays down rules designed to remove barriers in the energy market and overcome market failures that impede efficiency in the supply and use of energy, and provides for the establishment of indicative national energy efficiency targets for 2020 and the platform for beyond.

The Directive's articles establish a set of binding measures which impact key sectors in the transition to a lower energy intensity and more efficient economy.

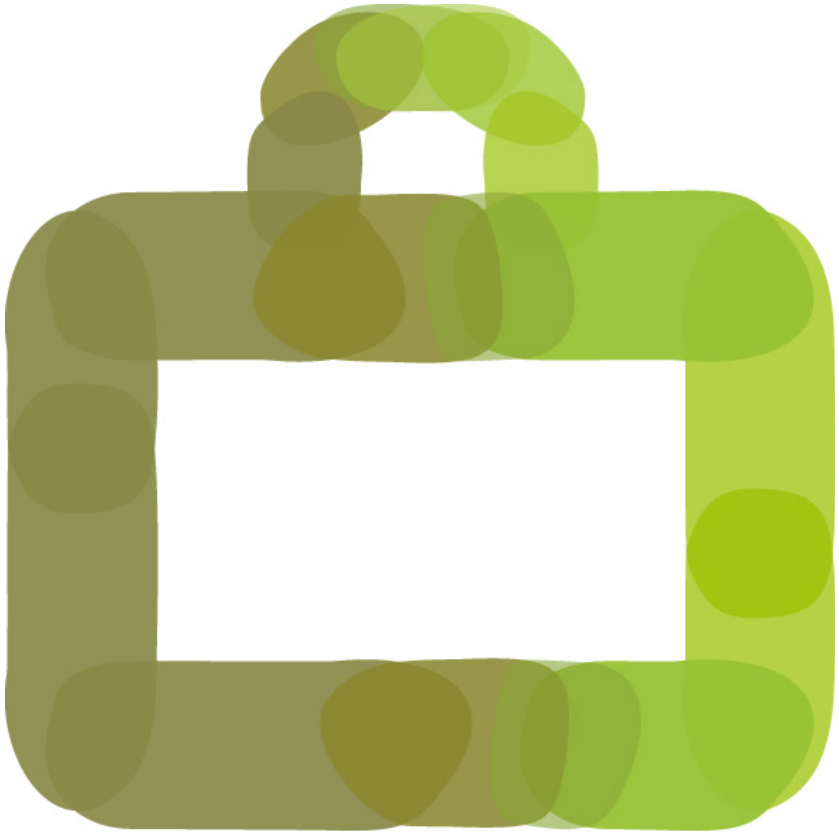
Critical in the design of the Energy Efficiency Directive is its cross-sectoral impacts. It establishes a series of incentives and targets for agents and sectors within each Member State to align interests and engage with the delivery of national targets, jobs, optimal renovation and a more efficient economy. These include obligatory -1.5% net customer reductions for energy companies, a 3% renovation rate among central Government buildings and the requirement for a long-term national renovation strategy with appropriate financial support.

Sector	Measures
Public sector: Buildings, appliances, equipment	• Requirement to renovate 3% of buildings owned and occupied by the central government; Requirement for public purchasing to drive market transformation and promote innovative financing
Utilities	• Energy efficiency obligation schemes: energy distributors or retailers to achieve annual energy savings equivalent to 1.5% of their energy sales volume in the previous year, in a flexible manner.
Utilities	• Metering and billing to provide consumers with basic rights to information about their energy consumption
Utilities	• Obligation to assess potential for cogeneration of heat and power, cost-benefit analyses, and policies that take these assessments into account
Utilities	• Improving efficiency of energy transmission, aims at increased efficiency from the management of energy infrastructure
Utilities	• Energy audits, providing information and triggering action mainly in large companies; requiring assessment of CHP potentials
Buildings Renovation Sector	• National Buildings Renovation Strategy to guide the overall transformation of the buildings sector of each Member State

Source: IEA 2013

Chapter 4

- GTR is an expert and independent working group which has dedicated resources over three years to mapping the energy efficient transformation of Spain's existing building stock
- GTR's core recommendations are based upon a "Three Pillar Strategy" involving complementary activity in the legislative, operational and financial areas
- GTR's analysis is based upon a "bottom-up" segmentation and modelling of 10 million individual building transformations until 2050
- The GTR Action Plan delivers against 2020 and 2050 energy and emissions savings targets and fully pays back public and private finance sources
- There are five key pre-conditions to the delivery of the energy efficient transformation of Spanish Buildings
- A successful result delivers a vibrant new Buildings Sector employing 130-170,000 people and worth up to €10 billion per annum from 2014-2050



The Opportunity and GTR's Response

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Diagnosis of Spain's Building Challenge

Designing an Approach to Understand and Resolve Issues

Over 3 years, we have dedicated expert resources to build an accurate understanding of the potential size of Spain's Buildings Opportunity and the resources and legislative framework required to deliver it.

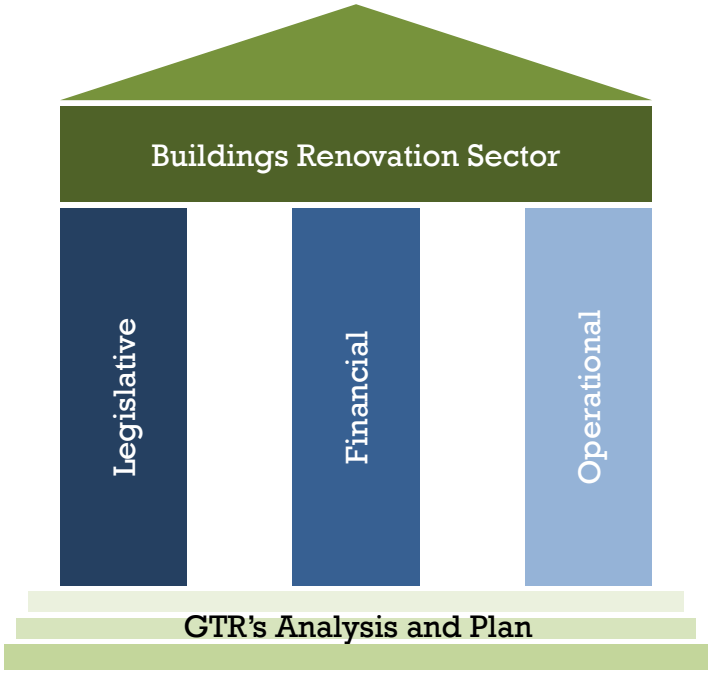
Since 2011, the GTR team has invested in a bottom-up approach to its understanding of Spain's built environment and in a detailed technical study of the appropriate interventions required to transform this physical reality into renewed, low energy and more valuable property.

GTR has developed integrated recommendations to deliver Spain's Buildings Transformation in a "Three Pillar Strategy" with Legislative, Financial and Operational recommendations.

GTR's work provides the background, structure, methodology and analysis to establish an action plan to deliver 2020 and 2050 objectives and to be a key component in the transformation of Spanish buildings and the economic agents who serve them. Such transformation is supported by a coherent three pillar approach consisting of a strong legislative platform, adequate and appropriately structured finance supported by GTR's research, analysis, expert opinion and modelling.

GTR's assessment is that while the Spanish Building Refurbishment opportunity is significant, the legislative, financial and operational frameworks are not yet sufficient to deliver the transformation and its full economic, social and environmental advantages.

We have identified 10 million primary homes and various "sector strategies" within Spain's non-residential buildings which can transform the energy and environmental footprint of Spain's Buildings, spur the buildings value chain and deliver in excess of 150,000 sustainable long-term jobs in a New Buildings Sector. However, the legislative, financial and operational pre-conditions for such activity to commence are still not present in Spain and a coherent strategy at all levels and between all sector stakeholders is required.



A proposal supported at Conama 2012

It is necessary to overcome barriers that currently prevent the development of the rehabilitation sector

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Eduardo de Santiago Rodríguez. Technnical Advisor. Ministerio de Fomento
Eduardo Perero Van Hove. Vicepresident. Asociación de Ciencias Ambientales (ACA)
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Assessment

- **Energy Retrofit of Buildings in Spain** currently exists as a subsector of the Construction Sector.
- **Yet, the Energy Retrofit of Buildings** is set to become the Construction Sector's main activity.
  — A series of barriers prevent its development
- **What needs to be done to unlock its great potential?**

Proposal

1. **Barriers need to be broken through reforms in the following arenas:**

Legislative
Financial
Operational

2. **Without barriers:**

The Energy Renovation of the Spanish Building Stock

Can Ignite

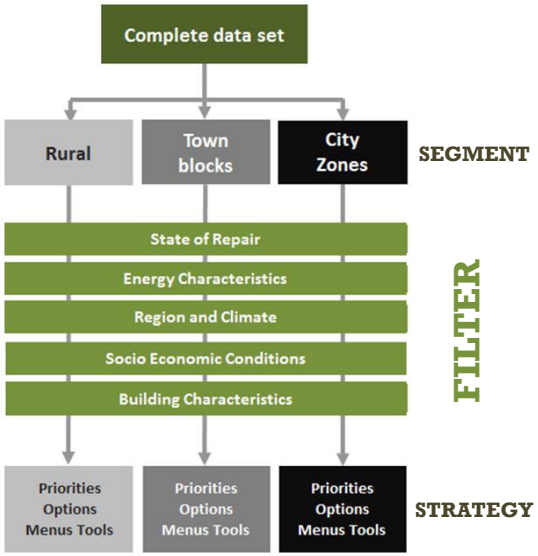
A New Buildings Renovation Sector

Chart by GTR, Data Source: Conama (2012)

GTR's Methodology: Step by step, "Bottom-up"

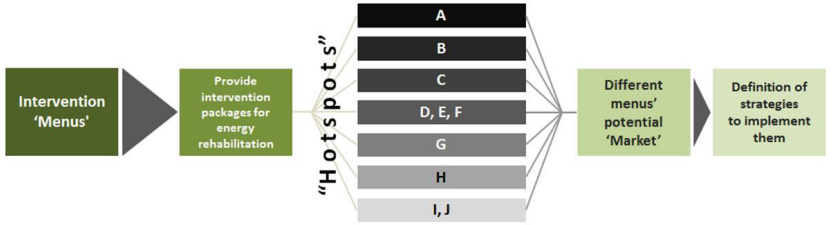
The economic model used has over 80 parameters

1. Residential Building Segmentation



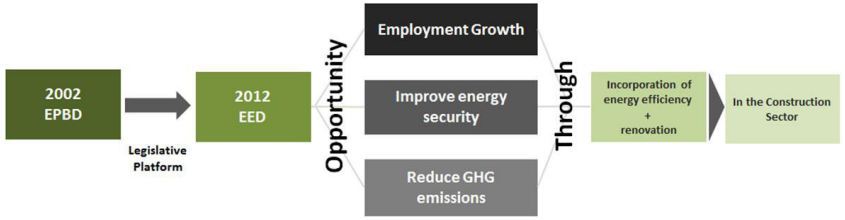
GTR's Methodology segments the physical reality and applies an "Intervention Menu" approach to determine the cost and impact of the transformation.

2. GTR's economic model has over eighty parameters and is supported by a detailed technical and cost analysis for its ten identified hotspot intervention menus. Low level modelling is then complimented by a high-level scenario analysis which allows for the modification of external factors which influence timing and outcomes (eg. Energy prices, finance costs etc.);



GTR has developed its approach to Spain by using the EU Legislative platform for Energy Efficiency as a basis, following the recommended methods and targets.

3. GTR has focused on the direct incorporation of the new legislative guidelines in the European Union's Energy Efficiency Directive 2012, as well as national and international best-practice processes and developments.



GTR's Action Plan Delivers EU Targets

The renovation of 10 million homes until 2050 can create over 150,000 jobs

2020-2050 Results of GTR Action Plan

	2020	2030	2050
Number of homes reformed (2012-year)	2.200.000	5.700.000	10.000.000
(% of 2001 Primary Residential Homes)	14%	35%	62%
Aggregate Investment in Housing (€ mm)	64.000 €	160.000 €	260.000 €
Cumulative Investment only in Energy Efficiency	42.667 €	106.667 €	173.333 €
Energy Saved in Year (GWhr)	21.000	47.000	68.000
Cumulative Energy Savings since 2012 (GWh)	77.000	440.000	1.6700.000
CO_2 Saved in Year (KTm)	4.600	8.300	8.600
(% Reduc. vs 2001 Residential Homes (inc. other measures)	24%	40%	82%
Cumulative CO_2 savings from 2012 (KTm)	19.000	89.000	26.000
Accumulated Savings Energy and CO_2 from 2012 (€ mm)	11.000 €	81.000 €	390.000 €
Jobs Sustained (period average)	130.000	170.000	120.000
Subsidy cost per Job (average over period)	13,694 €	14.144 €	n/a

10 million primary residences built in Spain before 2001 could be transformed into high efficiency, more comfortable, low carbon and more valuable residences by 2050.

GTR's 2011 Roadmap and 2012 Action Plan describe the creation of a New Buildings Sector and forecast its generation of 150,000 high quality, stable direct and indirect jobs between 2012 and 2050 through the investment of up to 10 billion euros a year in the deep rehabilitation of between 250,000 and 450,000 of Spain's primary residences annually. The renovation rates forecast by GTR are consistent with an aggregate 2-3% deep renovation rate target.

GTR's approach assumes a single, highly energy efficient transformation for each home optimized for a 20 year investment horizon.

The transformation of Spanish homes is a strategic and long-term undertaking and as such requires owners and occupants to make decisions based upon savings horizons of 20 years. Costs of interventions vary depending upon home size, type and climatic region, but for a typical 80m2 residence these may lie between Euro 14-24,000 per home to achieve 70-80% heating, cooling and water heating energy requirements.

€390 billion of aggregate savings by 2050 outweighs the €260 billion investment required to get there and the needed public subsidies are recovered through the fiscal gains created by increased economic activity and the decrease in unemployment.

As renovation investments happen up-front and the savings then go on for decades, it is only at the later stages of the plan that the value of the aggregate energy and emissions savings overtakes the investment cost. The public support (initially 25%) required in GTR's Action Plan amounts to around €14,000 p.a. per job created. Studies show that these public investments are more than compensated through increased tax receipts, lower social security payments and the VAT charged on the renovation itself.

Home renovation can deliver 45% of Spain's article 3 targets by 2020.

Finally, GTR projects a saving of 1,800 kTOE in 2020 resulting from the successful execution of its Action Plan which represents a full 45% of the overall national energy efficiency target for 2020 submitted under article 3 of the Energy Efficiency Directive.

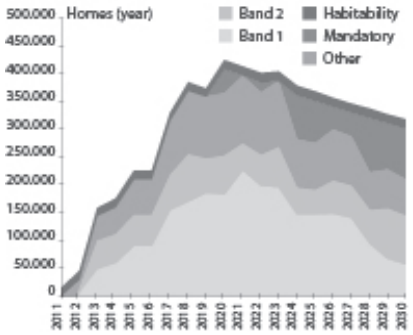
Five Key Factors for the Transformation of Buildings

Pre-conditions to Ensure the Success of the New Buildings Renovation Sector

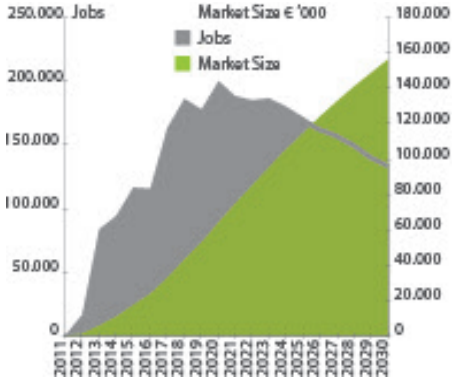
GTR's Sensitivity Analysis has identified five pre-conditions to Spain's residential buildings transformation:

1	**Adherence to Buildings Codes and Energy Performance Standards must be properly enforced.** Spain's Buildings Transformation will be achieved through a combination of "carrot and stick" policies. Much of the recently implemented reforms from EPBD must be tracked and well enforced to be effective.
2	**White Certificates or similar energy efficiency obligations.** Article 7 of the Energy Efficiency Directive requires that energy suppliers reduce their customer net energy demands by 1.5% per annum from 2014-2020. This can be implemented through an obligation programme (white certs.) which will better align the energy sector with buildings renovation and provide much needed additional funding or through a national energy efficiency fund.
3	**25% public support and/or public finance for deep renovation.** Before the new Buildings Renovation Sector reaches scale there will be a cost-gap between the present value of 20 years of 70-80% energy savings and the rehabilitation cost of up to 25%. This can be addressed in many ways, such as through direct public support, finance guarantees, white certificates and others.
4	**20 year financing at low rates (MAX. 5%).** Low rate, long-term finance better matches the renovation asset lifetime and allows buildings to value the energy savings over the long-term.
5	**"One Stop Shop" for all public-private finance streams and operators to deliver housing transformation.** Home renovation requires a mix of public-private finance which must be mutually compatible and aligned to be easy to access, in one place and simple for sector operators to deliver as a package.

Expected profile of the home renovation activity in the New Housing Sector delivered through the GTR Residential Buildings Action Plan



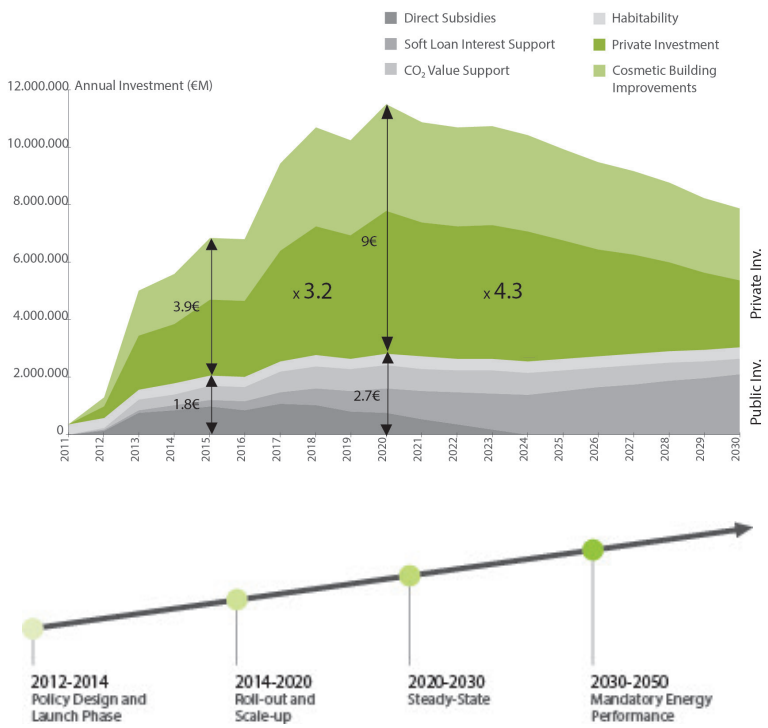
The GTR Action Plan creates a home renovation market with an aggregate value of up to Euro 160 billion by 2030 and is capable of creating and sustaining **130-170,000 new jobs** for individuals within the **New Housing Sector**



Investing in Housing for Spain's Future

Creating a new job in renovation costs less than the annual subsidies of an unemployed worker

Annual evolution of the public and private finance sources, Investment Magnitude.



- The GTR Action Plan anticipates a total investment of € 260 billion (of which € 170 billion are invested to produce energy and CO2 savings, and Euro € 87 billion into non-energy related renovations) over 37 years until 2050.
- As studies have found in Germany and other EU Member States, GTR believes that when the costs and benefits of the public support for an new Buildings Sector are assessed and compared alongside other decisions of similar magnitude, buildings refurbishment will stand-out for its public and private returns and positive social and environmental results.
- At its peak, the 2012 GTR Action Plan envisages the investment of over € 10 billion per year (€9 billion average over the 2012-2030 period) in Spanish homes through the smart combination of private, public and European finance sources potentially supported by on-bill finance and white certificates.
- To deliver GTR's 2012 Action Plan the NHS would create 130,000 new jobs on average in its first period until 2020, and would then grow to sustain around 170.000 jobs for its second period from 2020 to 2030; and GTR anticipates that the long-term trend would be above 120,000 jobs sustained from 2030 onwards.
- The projected public investment of the Action Plan has immediate results due to an increase in activity and tax revenues, and also because of savings: GTR estimates that the total public support required to provide these renovation jobs is in the order of €13,500 to 14,500 as opposed to €19,991 which is the average annual subsidy cost of each unemployed worker.

GTR's Approach to Non-Residential Buildings

The non residential sector needs its own strategies

A wide range

Previous GTR reports have primarily focused on Spain's residential buildings. Yet, it is necessary to take into account the non residential sector, which represents over a third of energy consumption among existing buildings.

The main difficulty in the non-residential sector is the wide range of building types which, along with their geographical distribution makes it hard to conduct an ample aggregate segmentation to put forward a reduced number of intervention menus which cover all sector buildings. Therefore, it is necessary to develop "sector strategies".

Additionally, the data availability for the tertiary sector in Spain is worse than the residential sector, like in many countries. There is no database with transparent centralized information on typologies and consumption patterns that could serve as the basis for a detailed analysis of prospect specific rehabilitation works. In fact, good data can be a key private asset for ESCOs and other companies engaged in energy efficiency in different sectors and hence it is often only published in aggregate form.

A markedly Different Sector from Residential

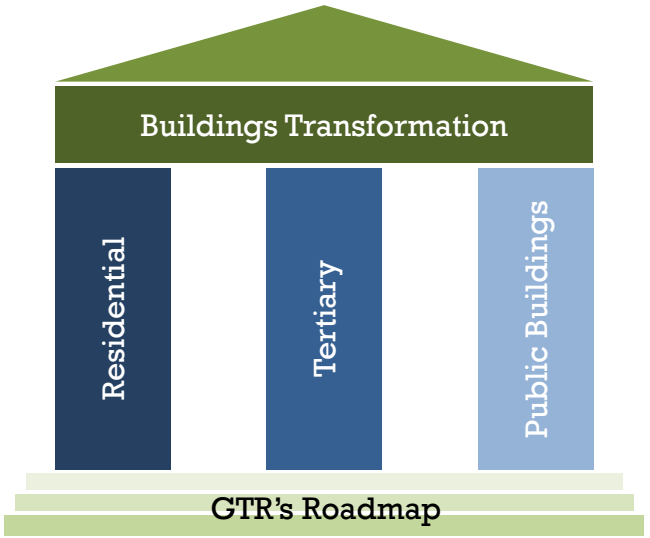
Clearly, the same rehabilitation strategies proposed for the residential sector cannot be applied in the tertiary sector. Tertiary buildings differ from residential buildings not just in their physical character and purpose but also in their management, payback requirements and their use as a financial asset.

These differences have tended to make commercial buildings managers seek shorter payback periods. In addition, the relationship between management and use, the buildings' envelopes and the machinery used to maintain internal environments are radically different from those in the residential sector.

A sector with Opportunities

Notwithstanding the aforementioned difficulties, there are important signals and prospects for significant energy savings from tertiary buildings through the implementation of GTR's "sector strategies".

Basing its work on publicly available data, as well as specific intervention menus –designed to improve energy efficiency- supplied by an experienced Spanish ESCO, we have accomplished a mapping of the sector using the best available tertiary data available to estimate its capacity for cost effective energy savings.



Opportunities to renovate tertiary sector buildings

They represent 35% of spain's buildings energy consumption and their potential savings are significant

Spain's Non-Residential Buildings have a good savings potential but require a different approach from Housing. Despite there being less buildings with a smaller surface area than the Residential Sector, the Tertiary Sector represents 35% of the energy consumption of Spain's Building's Sector.

Administrators of Tertiary Sector non-residential buildings are often receptive to energy efficiency interventions -due to interesting investment returns- yet the execution of energy rehabilitation projects is not widespread. This is because energy efficiency often competes with and undermines the returns on other investments (eg. New equipment).

However, ESCOs have begun assessing the sector, as many are buildings operators or maintainers and so their energy efficiency services can be combined with other services in long-term management contracts. Energy Performance Contracting would become part of Energy Supply Contracting creating an interesting conflict of interests upon occasion.

Unlike in residential, the Tertiary Sector is more familiar with Energy Efficiency measures and large commercial property managers are implementing them outside Spain and importing that knowledge. The individual measures or renovation packages tend to focus more on short-term payback measures (as a "risk limitation approach") and many of the barriers which are presently preventing an optimum approach in Spain's residential buildings are also seen in the non-residential sector.

"Menus" of Measures for the Rehabilitation of Tertiary Buildings

Insulation and Energy Management	Space and water heating	Appliances	Cooling	Lighting	Cooking
Wall & roof insulation	Fossil fuel-based (coal/oil/gas)	Varying level of efficiency	Air conditioner	Incandescent	Fossil fuel-based (LPG/gas/coal)
Improved glazing of windows	Electric boiler		Heat pump	Fluorescent	Payback expectations
Floor insulation	Heat Radiator			Fluorescent rapid start	Investing Horizon
Loft insulation	Heat pump			LED	
Automation	Renewables				

Source: IEA (2012)

Intervention menus, outcomes of their application

Spain's Tertiary Sector Buildings can Save between 35-50% of their Energy Consumption

Today's Sector is Characterized by "Quick Returns"

Energy Efficiency investments in the non-residential sector to date in Spain seek almost immediate return on investment, which accounts for their shallow nature. Due to overall business climate volatility and the desire to maximize return on investment, the majority of tertiary efficiency investments have focused on the replacement of old equipment and lighting measures. The Tertiary sector requires a different methodological approach than the residential sector in order to determine long term efficiency parameters as well as to how to implement passive measures with slower returns.

In addition, the non residential building sector has multiple types of buildings with different uses and different energy consumption patterns. Sector strategies need to take into account these characteristics.

On the next slides we discuss improvement menus that comprise sector strategies which address buildings and their different uses. The non residential sector has the potential to save energy in an economically viable manner with quick returns (under 8 years).

The menus focus on:

- HVAC
- Lighting
- Equipment
- Hot Water (where meaningful)

Also the Sector strategy menus consider the use and management of the installations, equipment and the building itself. We highlight that the data availability has been scarce. Furthermore, due to the sector's different uses and typologies the data utilized for this report has been assessed as an approximation

Potential Energy Savings of over 20% in just a few years

Applying the GTR Sector Strategies on different types of non residential buildings reveals that it is feasible to obtain savings of 35-50% of the total consumption of the non-residential sector (see chart on next slide).

These savings could be obtained immediately if the barriers that prevent the widespread implementation of intervention menus that rely on field experience are overcome. These barriers stem out of the lack of information on the sector's basic data such as the number of buildings, surface occupied per use type, overall consumption per use typology, etc.

The table on the next slide shows –based on data from IDAE when possible- consumption information for different sub-sectors of tertiary buildings with the distribution of energy consumption for each type. Savings estimations take into account the whole built park, as well as per use typology and general savings that could be obtained. The aforementioned estimation is based on intervention menus supplied by an experienced Spanish ESCO (IPSOM) and other published references.

GTR Approach to Buildings Envelope and Long-term Measures

Clearly, passive measures are critical to enable tertiary buildings to achieve the substantial energy reductions contemplated in Europe's roadmap 2050. In certain segments, like offices, hospitals and hotels, where heating and cooling represent high proportions of total energy demand, passive measures are critical to the achievement of cost optimal renovations – and yet in Spain they are rarely contemplated by buildings owners.

Interestingly, non-residential buildings often undergo more frequent "over-hauls" to their exterior and interiors. The façade and roof could be simply improved to reduce energy consumption when the building is upgraded, according to new and tighter buildings codes, as the incremental cost of insulation may be small compared to a new commercial finish.

Non residential sector strategies, summary

Different uses, consumption and potential savings

	n° Buildings	Thousand m2	kTOE total	Energy Distribution %				Savings %
				Heating & Cooling (just cooling)	Lighting	Hot Water	Equipment & Others	
Private Offices	900,000	90,000	2,000	55 (25)	20	5	20	45-55%
Small Businesses	780,000	95,000	3,000	60 (20)	20	5	15	30-50%
Shopping Centers (1)	10,000	20,000	1,000	40	45		15	30-35%
Hotels (2)	15,000	22,000	1,000	45	15	25	15	30-35%
Sports Centers	19,000-30,000		*100-200*	35 (10)	20	5	40	30-50%
Hospitals (3)	800	25,000	500	40	35	20	5	45-55%
Public Administration			*2,000*	*55 (25)*	*20*	*5*	*20*	*45-55%*
Public Schools	14,000	45,000	200	75	20		5	10-30%
Public High schools	4,000	30,000	50	*70*	*20*		*10*	15-30%
Universities	75	16,000	150	40 (10)	30		30	20-30%
TOTAL Commerce, Services and Public Admin.			10,000					35-50%

1. Refers to the retail area
2. Includes all residences used in the Tourism Industry
3. ¿? Surface: 48.274 m2 information and very approximate.

NB: *Italic and Blue* numbers are those which GTR has least

Graph by the GTR, data sources: Evaluación del potencial de climatización con energía solar térmica en edificios, IDAE (2011)

E4, IDAE (2004)
Seguimientos energéticos sectoriales. web IDAE (estudios, informes y estadísticas)
Balances energéticos anuales. web IDAE (estudios, informes y estadísticas)
PAEE 2011-2020

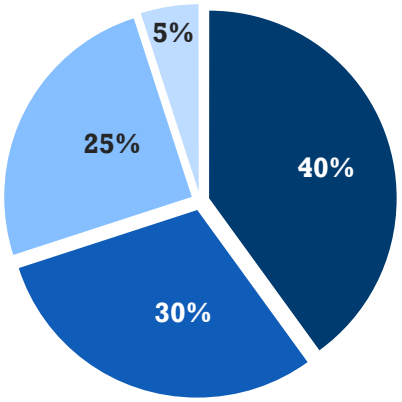
Sector Strategy for Offices

Offices can reduce 50% of its energy consumption with quick returns on investment

Total Consumption of Energy, Distribution

Total Consumption 2010 (kTep): 2,156

Consumption with Measures (kTep): 987



	Initial Consumption kTep	Potential Savings	Repayment Period (years)
Lightning and Equipment	862	76%	4-5
Heating	647	40%	4-5
Cooling	539	46%	3-4
Domestic Hot Water	108	6%	3-4

Specific GTR Intervention Measures

Lightning and Equipment	Estimated Savings (%)
• Use and purchase of efficient energy saving lighting systems	50
• Better use of natural light and rational use of lighting	35
• Installation of a centralized control system, zoning, luminaire regulation, time-delay, switches, motion detectors	25

HVAC	Estimated Savings (%)
• The use of large boilers has results in a lower energy consumption per unit of produced heat	20
	22
• Replacement of water chillers for others of higher performance	8
• Incorporation of no exterior air into HVAC devises	10
• Adequate regulation of the temperature of HVAC	15
• Use of free-cooling	10
• Proper maintenance of the HVAC system	

Hot Water	Estimated Savings (%)
• Review of insulation of installation and regularization of temperature of Domestic Hot Water	6
	2
• Lowering the temperature of stored and distributed Domestic Hot Water	

Insulation	Estimated Savings (%)
• Improved insulation of walls, floors and building façade	40
• Improvements in the glazing of the building, reducing air infiltration …	45

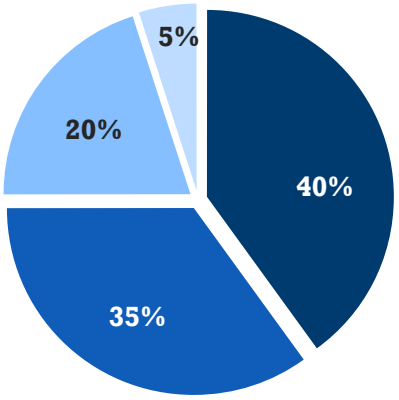
Sector Strategy for Hospitals

Hospitals can reduce 50% of its energy consumption with quick returns on investment

Total Consumption of Energy, Distribution

Total Consumption 2011 (kTep): 553

Consumption with Measures (kTep): 245



	Initial Consumption kTep	Potential Savings	Repayment Period (years)
HVAC	221	46%	<3
Lightning	194	70%	<3
Domestic Hot Water	111	38%	4-5
Others	28	15%	<3

Specific GTR Intervention Measures

HVAC	Estimated Savings (%)
• Improvement of boiler's combustion and utilization of residual heat through an analysis of fumes	30
• Improvement of distribution network, insulating and discarding pipes	Poor Building 30 / Average Building 15
• Installation of a centralized control system, zoning, regulation of temperature	10

Lighting	Estimated Savings (%)
• Replacement of conventional lamps for those of lower energy consumption	40
• Installation of a centralized control system, zoning, luminaire regulation, time-delay switches, motion detectors	15

Others	Estimated Savings (%)
• Replacement of obsolete items	7
Burner (over 8 years old)	20
Boiler (over 12 years old)	10
• Installation of thermostatic valves to limit and regulate the temperature of Hot Domestic Water	5
• Properly isolate pipeline network and storage reservoirs	10
• Installing solar thermal energy for the generation of Hot Domestic Water	

Hot Water	Estimated Savings (%)
• Improvement in end-use hot water storage and humidifiers	15

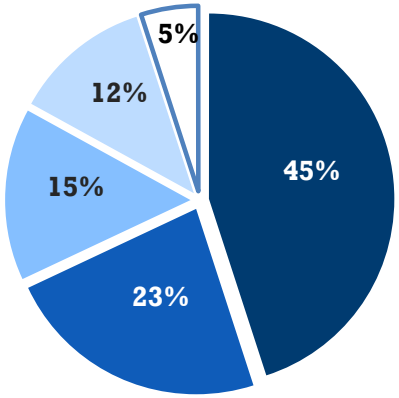
Sector Strategy for Hotels

Hotels can reduce 35% of its energy consumption with quick returns on investment

Total Consumption of Energy, Distribution

Total Consumption 2011 (kTep): 985

Consumption with Measures (kTep): 649



	Initial Consumption kTep	Potential Savings	Repayment Period (years)
HVAC	443	36%	<3
Domestic Hot Water	227	28%	<3
Lightning	148	49%	3-5
Laundry and Kitchens	118	30%	<3
Other	49	10%	<3

Specific GTR Intervention Measures

HVAC	Estimated Savings (%)

HVAC	Ahorro Estimado (%)
• Use of variable speed drives in the recirculation pumps of thermal distribution networks	15
• Regulate the speed of fan convectors as well as installing thermostatic mixers in the radiators	12
• Establish a policy of maximum and minimum temperatures	10
• Reuse of heat for air conditioning	5

Hot Domestic Water	Estimated Savings (%)
• Control system for the recirculation of hot water	10
• Minimize the consumption of Hot Domestic Water in final points of consumption	20
• Reuse of heat for Hot Domestic Water	10

Lighting	Estimated Savings (%)
• Replacement of Auxiliary Electromagnetic Equipment for Electric ones	15
• Limitation and Improvement of Ignition timing	20
• Installation of a centralized control system, zoning, luminaire regulation, time-delay, switches, motion detectors	25

Laundry and Kitchen	Estimated Savings (%)
• Use washers and driers at the rated load, never at a half load	10
• Adjust the size of the pots and pans to the size of the stove used	5
• Monitoring the opening and closing of freezers	15

Others	Estimated Savings (%)
• Avoiding the heating of water in the dishwasher, using a heat recovery system	10

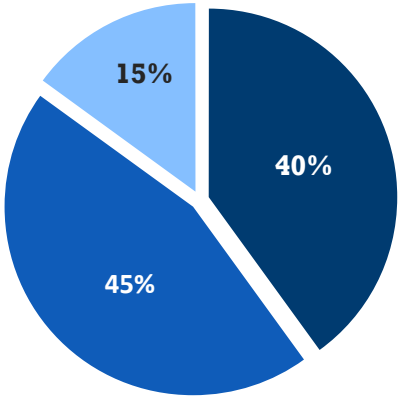
Sector Strategy for Shopping Centers

Shopping Centers can reduce over 30% of their energy consumption with quick returns on investment

Distribución del consumo total de energía

Consumo total 2011 (kTep): 1,010

Consumo con medidas (kTep): 684



	Consumo Inicial en kTep	Potencial de ahorro	Plazo de Amortización (años)
Climatización	404	35%	10-12
Iluminación	455	41%	3-5
Otros	152	n/a	

Specific GTR Intervention Measures

HVAC	Estimated Savings (%)
• Correctly estimate the demand for HVAC	10
• Improve combined insulation with an adequate ventilation	20
• Install Renewable Energy based support systems for HVAC	10

Lighting	Estimated Savings (%)
• Better use of natural light	30
• Installation of a centralized control system, zoning, luminaire regulation, time-delay switches	15

Summary and Conclusions from GTR's Work on the Tertiary Sector

Passive measures need to be supported to allow for deep renovations

Key Differences from Residential Sector

The tertiary sector is significantly different from the residential sector:

- Tertiary buildings have very specific and different patterns of energy use according to their purpose and even within a sector
- Tertiary buildings should be "easier" to renovate as their management is institutionalized and should be more attuned to the economic rationale of investments in energy efficiency
- Buildings managers tend to be more professional in regards to their energy management procedures
- Buildings are often considered a pure financial asset
- Shorter horizon periods result in a significant focus on active rather than passive measures
- Data availability is worse in the tertiary sector than in the residential sector especially as concerns energy consumption linked to the physical buildings creating barriers to practical intervention menus
- ESCOs are operating in the tertiary sector in Spain and frequently pitching large buildings owners and managers. These companies are rapidly accumulating experience and will expand within the sector and will actively promote greater energy efficiency.

A sector where many opportunities lie

The tertiary sector has a very significant capacity for short term savings –under ten years- of between 30 and 55%. The specific intervention menus depend upon a sector strategy and will require a tailored "per building" approach, but the scale of these transactions is larger and will enable ESCOs to operate in a favorable framework.

Unlike the residential sector, Offices, Hotels and Shopping Centers have a high renewal rate of equipment and even passive construction elements (such as facades because of their quality-image value) and therefore this represents a key opportunity to improve long-term energy efficiency also.

A Sector with its own Natural Barriers

European long-term 2050 objectives mandate reductions of over 80% for buildings. In order to achieve these objectives, longer repayment periods and passive measures must be considered for Tertiary buildings which also must not be blocked out through the "lock-in" effect of just doing active elements or shallow renovations only.

ESCOs, and their financiers, lack sufficient internal knowledge about cost optimal energy efficiency and as a result there is a generalized high risk perception and aversion towards greater investments in energy efficiency especially when "easier" and shorter payback periods are available from doing other energy, and non-energy, related things.

The uncertainty around the regulatory and tariff frameworks for energy has significantly impacted efficiency investments in Spain. Instability and the absence of guarantees and of stable market rules in the short, medium and long term creates uncertainty and prevents investment – especially those with long-term paybacks.

A long term Action Plan, coordinated by a Renovation Agency, with specific strategies for each of the segments of the tertiary sector can focus resources on breaking these barriers, can lead to a stabilization of the market framework and possibly change businesses culture on energy efficiency. In addition, specific funds can help finance investments with longer return periods (such as most passive measures) that will enable increased ambition and the eventual delivery of the longer-term EU energy savings targets and emissions reductions. Clearly, significant renovations should include passive elements as a matter of course.

Chapter 5

- Summary of the current regulatory framework for Buildings Renovation in Spain
- Outline of the regulatory opportunity offered to Spain by the European Energy Efficiency Directive
- Review of the key articles of the Energy Efficiency Directive and their potential application in the Spanish context
- Summary of the key components and timeframes for an appropriate long-term buildings roadmap for Spain
- Importance of a Roadmap for the new Buildings Renovation Sector
- Cost Optimal approach and how it can be applied
- Stakeholder engagement

Regulatory Framework in Spain

GTR 2014
REPORT

The need for a change in the regulatory framework

An Appropriate Framework for the Renovation Sector will Stimulate Activity

The current regulatory framework of the Spanish Buildings Sector was conceived solely to regulate the construction of new buildings

The Buildings Management Law (Ley de Ordenación de la Edificación (LOE)) –enacted in 1999 - organizes the sector's actors, their responsibilities and competencies in order to ensure the quality of newly constructed buildings – but virtually ignores buildings rehabilitation in the law's objective.

The 2006 Technical Buildings Code (Código Técnico de la Edificación (CTE)) defines the technical qualities for buildings, yet these qualities are only applicable to new buildings or buildings undergoing a substantial renovation. In September 2013 the "base document" for energy savings of the CTE was published (Documento Básico DB HE «Ahorro de energía» del Código Técnico de la Edificación (12/09/2013)). This is a solid step forward adapting technical standards to the needs inherent to renovation works.

A specific regulatory framework for Rehabilitation activity is needed

The current state of the regulatory framework of the buildings sector continues to be a barrier to the renovation of existing buildings. Its lack of practical application prevents the renovation of the housing stock and makes it harder to develop projects; and so it needs to be revised to allow for the development of a viable sector and to deliver the substantial economic, social and environmental benefits that buildings rehabilitation offers.

Spain's new law 8/2013 for Urban Rehabilitation, Regeneration and Renovation (3R) is a clear step forward

Within the traditional regulatory framework of the construction sector, construction activity stands as secondary to urbanism. However, the large-scale renovation of buildings offers both economic and environmental opportunities. The new 3R law fosters large-scale renovation and removes some of the barriers that have previously prevented the development of the Spanish buildings renovation sector. But, it is only a necessary first step.

A proactive strategy and new agency is required to allow for the development of a new regulatory framework

The public should to have access information pertaining to the characteristics and possibilities of improvement of their homes. Due to the diverse nature of the housing stock, an adequate approach is needed to better assess value, condition and possibilities for improvement in each case. Existing regulations are mute on giving the public access to this information and the organization of a rehabilitation sector. For these reasons, a new and flexible regulatory framework is required designed to accommodate future renovation models. GTR believes that the transformation of Spain's buildings sector and the built environment itself requires a proactive approach to deliver optimal retrofits and renovation rates and this can be coordinated by a new Renovation Agency.

Needs more than Just a Regulatory Framework

The renovation of Spain's housing stock is important for the Spanish economy and can deliver environmental sustainability and an improvement in the quality of life of its residents. The new regulatory framework should be defined coherently in conjunction with appropriate objectives, resources, timeframes and actions to launch the new buildings sector. The sector's legislation should be developed in conjunction with a coherent organizational and financial plan of how the buildings transformation will be delivered.

State of the Regulatory Framework for the Renovation of Buildings

Spanish Legislators are taking steps, but More Leadership and Coordination is Required

Assessment of Intersection and Impact of Laws with Sector Needs	Facilitation	Economics	Standards and Policing	On-site Production	Engagement and Alignment of Resources
Relevant Spanish Legislation	• of Administrative Procedures • Procurement and Budgeting • Access to Data • On-Bill Repayment • EPCs	• Saving Energy Saves Money for Investor – alignment of interests with energy sector • Monetizing Green Value	• Establish cost optimal standards and ensure compliance through verification and fines • ESCO definition and standard contracts	• Clear unambiguous signals • Move toward "net positive" buildings	• Engagement of various actors • Energy Supply Obligations and National Energy Efficiency Fund, and Fiscal Policy
Sustainable Economy Law *(Ley 2/2011 de Economía Sostenible) (Capítulo IV del Título 111)*	+				
Technical Code for Construction *(Código Técnico de la Edificación (CTE)* **found in RD 314/2006)**	+			+	+
Commonhold Property Law *(Ley de Propiedad Horizontal) (Law 49/1960)*	+				
Land Act *(Ley de Suelo) (RDL 2/2008, June 20th)*	+	+	+		+
Law 8/2013 of Rehabiliation and Regeneration *(Regeneración y Rehabilitación)* **And 2013-2016 Housing Plan**	+	+	+		+
2013 Energy Reform and proposed legislative approach to on-site production		-		-	
Building Management Act (L 38/1999 of 5th November) *Ley 38/1999, de 5 de noviembre, de Ordenación de la Edificación*	+	+			
Fiscal Policies		+		+	

The Energy Efficiency Directive Mandates Renovation

Member states have to publish a renovation strategy by the end of April 2014

The European Energy Efficiency Directive (EED) mandates the planned Energy Efficient renovation of the building stock

The European Energy Efficiency Directive (enacted in 2012), stresses the need to intervene in the existing building stock as a prerequisite to achieving the environmental and energy objectives that the European Union has set for 2020 and 2050. Notwithstanding the near zero energy buildings envisioned for new construction in the next decade, the energy efficient retrofit of the current building stock is essential to achieve cost optimal and long-term transformation for EU energy policy.

The Directive's article 4 requires the development of a long-term strategy which addresses the energy efficient renovation of the entire building stock

Article 4 of the Directive indicates that before April 30th 2014; each member state must have published its national strategy to mobilize investments for the renovation of national (private and public) residential and commercial building stock. The strategy must consider and include the following:

- A description of the building stock;
- A definition of cost-effective approaches for renovation, which consider building type and climate zone;
- Policies and measures to encourage deep and cost-effective renovations of buildings conducted in phases;
- A vision for the future intended to serve as a guide for investment decisions of individuals, the construction industry and financial institutions;
- A calculation based on real data of energy savings and broader benefits that are expected;
- A submission of the strategy to the European Commission which will conduct a full review every three years.

Article 4: National Renovation Roadmaps

"Member States shall establish a long-term strategy for mobilizing investment in the renovation of the national stock of residential and commercial buildings, both public and private"

Long-term strategy that brings actors together

Involvement of all stakeholders (including cities)

- **Ensure local initiatives supported into coherent framework**
- **Ownership from stakeholders in the long-term**

Inventory of Full Building Stock: typology

Policies specific to national conditions

- **Useful to cities: know their potential**
- **Potential to group buildings – access to Structural Funds**

Source: Renovate Europe (2013)

Directive's Key Articles, Structured Approach

Central Government Buildings offer a template to launch the ESCO sector

The government can lead through example offering 3% of its central buildings as a pipeline to showcase the transformation process

Article 5 of the Directive sets out obligations for the effective implementation of energy efficiency measures for central government buildings; ensuring from 2014 onwards a minimum renovation of 3% of the surface area (m2) of its heated or cooled building stock.

The Directive requires the mobilization of additional resources.

In addition to energy savings returns, the saved cost of emissions and other benefits (see chapter 7 of this report), article 7 of the directive proposes that member states to establish a system of annual energy efficiency obligations for distribution and/or retail energy companies that will enable them to confidently achieve savings of 1.5% of their net energy sales from 2014 through 2020. This mechanism allows energy companies to engage directly in the provision of energy services to their clients and as energy efficiency investors through 'white certificates' or other similar measures which are already in place in other EU countries.

"White Certificates" while among the most direct of the art. 7 mechanisms is not the only one and the Directive offers the possibility to deliver savings through alternative measures such as carbon or emissions taxes, incentives for energy efficient technologies, energy efficiency funds and more strict energy efficiency standards among others.

Using "exceptions" for article 7 will dilute its impact and reduce benefits to Member States.

Articles 4, 5 and 7 of the Directive provide mutually reinforcing frameworks.

Key Articles from the Energy Efficiency Directive

Chart by GTR, Data Source: Renovate Europe (2013)

Article 5: Renovation of Public Buildings

"3% of the total floor area of heated and/or cooled buildings owned and occupied its central government is renovated each year"

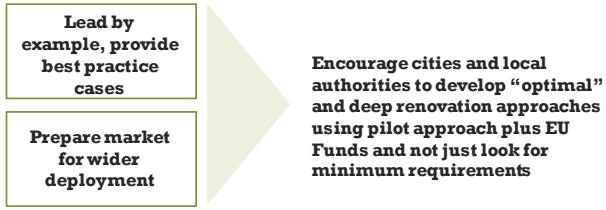


Chart by GTR, Data Source: Renovate Europe (2013)

Transposition of the Energy Efficiency Directive in 2014

Timescales for its Transposition and Implementation before Summer 2014

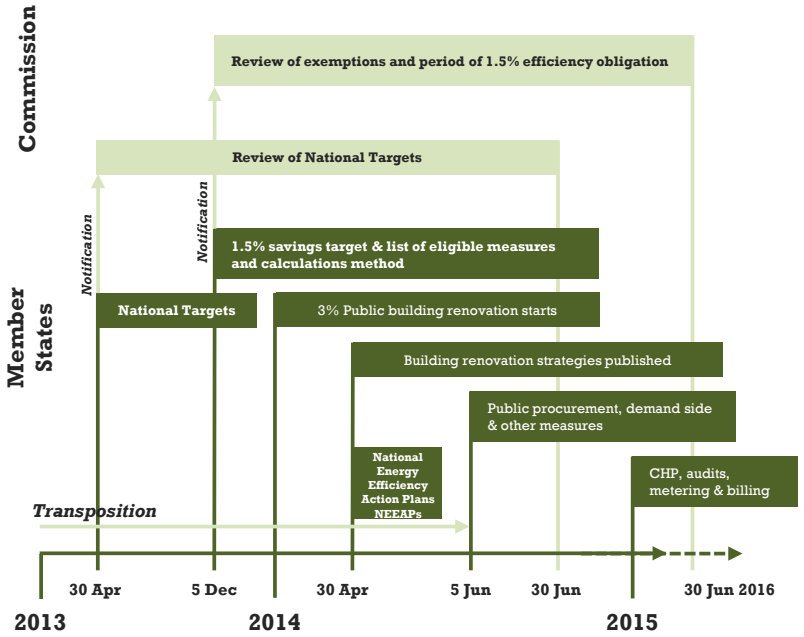
The Directive sets out specific deadlines

The directive establishes a time frame for national savings targets as well as specific intermediate deadlines for the implementation of individual articles. The timeframe is appropriate for an engaged development plan for the built environment.

Necessary Steps towards Full Transposition

The fulfillment of the implementation of the Directive requires a step-by-step approach led by indicative targets, followed by a long-term buildings roadmap -Article 4- together with resourcing plans (such as articles 7 and 10) as is required to be defined by summer 2014.

EED's Relevant Deadlines and Targets



Source: The Coalition for Energy Savings (2013)

Transposition & Implementation - the key to success

30 April 2013	Indicative national energy efficiency targets (and report every year onwards on progress/main measures)
5 December 2013	Key decisions on the design of energy efficiency obligations (or alternative)
30 April 2014	Long-term strategies for optimal renovation of national building stock
5 June 2014	Transposition deadline !!! (for most of the measures)
30 April 2015	National Energy Efficiency Action Plans (and every three years onwards, including reports on Article 7 with report on use of Article 7 exemptions
30 June 2015	Assessment of potential for improving energy efficiency in gas and electricity infrastructure
31 December 2015	Assessment of potential for district heating and cogeneration

Source: European Commission, Directorate General–Energy (2013)

EED's article 4, a key instrument

A solid buildings renovation strategy is key to launch the sector

A clear and appropriate Article 4 Long-term Roadmap provides an opportunity to align the sector to deliver an optimal transformation.

An ambitious and strict compliance with the Directive provides the opportunity to implement a national action plan aimed at improving the energy efficiency of Spain's building stock. This requires the drafting of a roadmap which is agreed by the key sector stakeholders to jumpstart a viable market backed by an efficient government regulatory framework and resources together with tailored financial instruments.

As well as energy efficiency, other vectors such as security, accessibility, health and suitability for use can positively contribute to the long-term buildings roadmap strategy mandated by the directive's article 4. In sum, a buildings renovation strategy for the built park will help define and develop activities for a new Buildings Renovation Sector.

A strategy for a New Buildings Renovation Sector

An all-encompassing roadmap stands as the best instrument to comply with the Directive. This roadmap will lead to a new Building Management Law (Ley de Ordenación de la Edificación (LOE)) to be subsequently complemented with a new Technical Code for Construction (Código Técnico de la Edificación (CTE), thus creating a new sector.

In addition, these legislative instruments need to have adequate resources attached in the form of strict buildings codes enforcement, obligations on energy suppliers and additional national, regional and European funds.

Instrument Required

A Regulatory Framework suited for renovation

Needs and objectives to be considered by regulatory change

Needs and objectives to be achieved

The restructuring of the buildings sector towards the rehabilitation of existing buildings driven by the need for energy efficiency, needs an Action Plan to direct and guide its actions in an appropriate manner. This plan will progressively determine the necessary changes in the regulatory framework many of which, today, can not be defined because the objectives and intervention models must be fully defined and tested at scale.

As a start, the environmental, technical and functional quality of Spain's existing buildings should be defined. These definitions ought to have intended quality standards and be presented in proper formats to be applied to current buildings and their transformation.

Likewise, there ought to be a defined "value framework" capable of assessing energy and emissions savings and their evolution, calculation and recognition as well as appropriate vesting among stakeholders (he/she who invests should obtain the returns on investment). Moreover, the timeframe for buildings transformation is by definition, long-term, and this requires a trusted and stable long-term framework. Public funding support, tax breaks and tariffs play a key role and should be made in the form of long-term and trusted commitments for the sector to internalize and react to. Sadly Spain's behavior has not been exemplary In this regard.

Third, it is imperative to organize and align stakeholders in order to deliver the new energy efficiency objectives. For example, current and new stakeholders as well as ESCOs ought to align their actions. Concrete regulatory changes are needed to determine roles, objectives and responsibilities.

Last but not least, information also plays a vital role. The changes mentioned above need the availability of reliable public information to allow for the planning and verification of objectives. Correspondingly, proper information is required through transparency and public engagement. The sector's stakeholders have to have the same access to the data to better design their interventions and monitor their results transparently.

GTR's Assessment of Existing Regulatory Framework

The current framework begins to support the sector's transformation towards rehabilitation however, there is some way to go. The current framework takes into account regulatory and specific sector's laws –such as the Technical Code for Construction (Código Técnico) or the Building Management Law (Ley de Ordenación de la Edificación)- as well as other policy areas –such as fiscal or energy policies- that intersect with them on issues of energy efficiency and rehabilitation.

The table on the following page shows GTR's assessment of the degree of impact that these regulations have -and may have in the immediate future- on needs and objectives to meet and by implication the areas which require further work.

Laws and Policies to address the needs of the sector

Legislation and Objectives, degree of Impact

GTR Assessment of the potential impact of each Law on the four key Development needs of the sector

○ Nothing

◔ Little

◕ Plenty

● Decisive

	Quality Objectives	Economic Needs	Organizational Needs	Information and Participation Needs
	• Technical quality • Functional quality • Environmental quality	• Valuation and transferability on energy savings • Security and stability for long-term conditions	• Role of Stakeholders • Establishment of responsibilities • Definition of ESE and standards	• Quality information available • Transparency
Ley 38/1999, November 5th, Building Management Law *(Ley de Ordenación de la Edificación (LOE))*	◕	◔	●	◕
Technical Code for Construction *(Código Técnico de la Edificación (CTE)* found in RD 314/2006)	●	◕	◔	○
Commonhold Property Law (Ley de Propiedad Horizontal) (Law 49/1960)	◔	○	◕	●
Land Act (Ley de Suelo) (RDL 2/2008, June 20th)	◔	○	◔	◕
Law 8/2013 of Rehabiliation and Regeneration (Regeneración y Rehabilitación) And 2013-2016Housing Plan	◕	◕	◕	◔
2013 Energy Reform and proposed legislative approach to on-site production	○	◔	◔	◔
Regional and municipal regulation	◕	◕	◔	◕
Fiscal Policy	○	●	◔	◕

Input from the GTR-EuroACE Workshop with Stakeholders

Broad Consensus about the need for an ambitious Buildings Roadmap

Participants

Moderator

Julie Kjestrup, Danfoss (Chair of the EuroACE WG on Implementation)

Panelists

Jose Antonio Tenorio, DG of Instituto Eduardo Torroja
Javier Serra, Directorate General for Architecture, Housing and Planning Ministry of Development - Government of Spain
Clemens Haury, European Commission Official Responsible for Spain, DG Energy
Peter Sweatman, CEO Climate Strategy & Partners
Adrian Joyce, Secretary General of EuroACE
Emilio Miguel Mitre, GBCe
Begoña Leyva, CNC, Confederación Nacional de la Construcción
Alberto Coloma Campal, Fundación La Casa que Ahorra
Rafael Herrero, President of ANESE
Manuel Gamez, Banco Santander
Emilio Miguel Mitre, GBCe
Maria Sicilia Salvadores, Ministerio de Industria, Energía y Turismo
José Luis De Esteban, Danfoss
Antonio Burgueno Munoz, SEOPAN

Challenges of Implementation in Spain

Financing

- Spanish Ministries emphasized the need to find private customer models, given the lack of availability for public subsidies
- Spanish ESCO actors currently assert that there is a growing gap about the benefits of energy efficiency with the consumers

Lack of Visibility

- The lack of enforcement of EPCs both in the market when renting/ selling a property but also by displaying them in public buildings
- Commission confirmed that a Court Case against Spain because of poor implementation in EPCs had been launched

Regionalization

- Enforcement lies with the 17 regions
- Differences amongst regional standards for energy certificates

Subjects Discussed

Investing in Energy Efficiency as a Way out of the Crisis

- Boosting economic growth given the huge local job creation potential of the buildings renovation sector
- The unemployment rate for the construction sector is at record levels

Implementation of European Directives in Spain

- Spain has not been particularly receptive to both European Directives
- In September 2012 the European Commission started infringement procedures against 24 Member States –including Spain- that had not notified to the Commission the national measures transposing the Directive into national law

Opportunities from EPBD and EED

- The EPBD remains relevant for Spain, requirements for new buildings will ultimately be applied for the renovation of existing buildings
- The EED offers a real opportunity for bringing all actors together and ensure that all stakeholders are 'working in the same direction' in the building sector

Conclusions

1. The Spanish Ministries are implementing the European Directives as evidenced by the relevant degrees issued recently
2. The ESCO market is poorly developed in Spain and the actors remain highly critical of government policy
3. The Roadmap produced by the GTR was recognized by the Ministries as a valuable contribution to the debate
4. The Ministries invited all stakeholders for further consultation
5. The Workshop highlighted the huge potential for the buildings sector in Spain, particularly given its local job creation potential

Charts by GTR, Data Source: Euroace (2013) & GTR (2013)

Renovation, to be defined by the Regulatory Framework

Spanish legislation must Facilitate a New business Model and Deliver Resources

A viable Rehabilitation Sector requires changes in the regulatory framework so that it mirrors the current state of the built park, the demands of society and its future transformation. These requirements are:

An Action Plan with clearly defined objectives

The Sector needs a long term action plan with energy efficiency related quality objectives, as well as other quality objectives inherent to buildings such as accessibility , security, etc .- defined for the refurbishment of the existing physical built environment. These objectives should be feasible and tailored to the different characteristics of the buildings themselves and their efficient use. Moreover, these objectives should identify and facilitate the financial and operational resources required to deliver the outcomes. This Plan of Action, if adhering to the guidelines in Article 4 of the Energy Efficiency Directive represents a key opportunity, and must be an instrument that dictates the standards for changes and investments in Spain's buildings, thus proposing a reasonable and coherent plan for each city, region, owner and community.

A defined intervention within the regulatory framework

The objectives of the Regulatory Framework have to tailored for and coherent with the objectives of the Action Plan. Obviously, the current regulatory framework is not structured to address the needs of the rehabilitation sector, and even less so to address the portion of Spain's energy efficiency targets which can be delivered from buildings. A policy framework for technical, operative and financial aspects cannot be implemented instantly because the model for intervention and the role of the stakeholders will partly be defined during the process, but the Plan is a first positive step.

Coordination among all regulatory areas, with a clear leadership

Having a regulatory framework with oversight over all factors and stakeholders is a pre-requisite to ensure its efficient evolution. Also, it should encompass every normative and regulatory area that relates to the Rehabilitation Sector, from the obvious Buildings Technical Code to the less visible areas such as ESCO regulation or energy tariffs and obligations.

Today's regulatory framework is fragmented and managed by different levels and sectors of government. It needs to operate simultaneously and smoothly at many different management levels to articulate a coherent and efficient regulatory outcome. Coordination and leadership are essential to deliver this transformation and the benefits which it will bring to Spain.

A strategy to adjust regulatory standards based on experience

As mentioned, there is no immediate "perfect" solution in the form of a simple set of regulatory changes that could be fully applied today to the current regulatory framework to adapt it to the immature buildings rehabilitation sector. It is therefore necessary for the Action Plan to include a dynamic methodology to design, coordinate and implement these changes based on the increasing and relevant future practical experiences. The Action Plan has to include measures that define the objectives, resources and strategy which can adjust regulatory standards and incorporate the opinions of the stakeholders on an on-going basis.

Government Agency and National Energy Efficiency Fund to concentrate resources, expertise and focus

The key instruments needed to develop the strategy are: a buildings renovation agency to coordinate the Action Plan between the different stakeholders and administrators, as well as a National Energy Efficiency Fund to best manage public and private resources to finance the Action Plan.

Chapter 6

- The Energy Renovation of Spanish Buildings requires Euro 2-10 billion per annum over the coming years
- The barriers to the provision of Energy Efficiency Investments in buildings are well known and can be resolved through a concerted approach from policymakers, sector stakeholders, banks and energy companies
- GTR identifies five "innovative" new sources of finance which together can deliver an ambitious long-term buildings roadmap for Spain
- Energy Supply Obligations and a well aligned white certificate programme could generate the equivalent of up to Euro 1 billion of finance and resources per annum
- ESCOs can play an important role in the tertiary sector and industrial projects whose size, complication and returns match their expertise and funding cost
- GTR believes that a National Energy Efficiency Fund for Spain could provide buildings owners and occupants with low-cost, long term funding which is presently unavailable for renovations.

Financing the Energy Efficient Renovation of Spanish Buildings

GTR 2014
REPORT

Renovation, Financing Sources

New and Innovative Finance mechanisms for the renovation of Buildings

Identifying New and Innovative Energy Efficiency Finance in Spain for Buildings Transformation is a significant challenge.

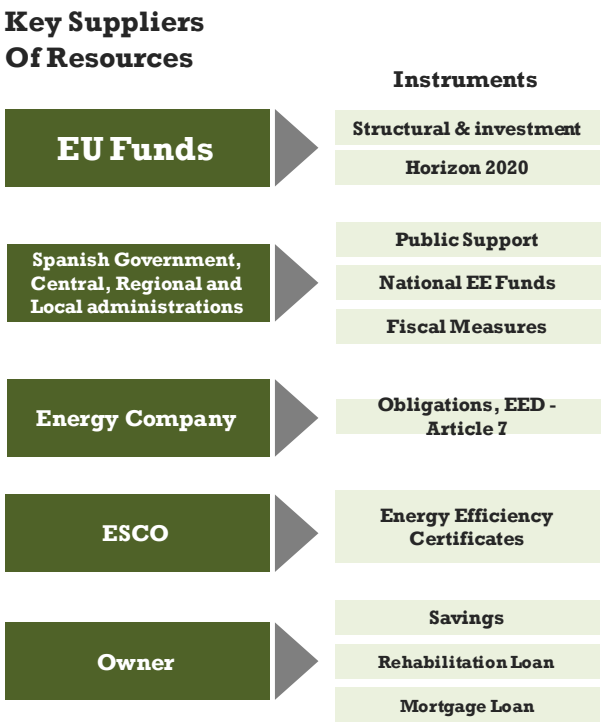
By April 2014, Member States are required to establish a long-term strategy for mobilizing investment in the renovation of their national building stock. In 2013, Spain announced a new Housing Plan 2013-2017 endowed with over €2 billion of finance with much to be channeled into regional buildings renovation as directed by each regional government – although very little has materialized to date. In addition, ICO and IDAE have both launched different facilities dedicated to Energy Efficiency – sadly incompatible with Housing Plan. At the time of writing, the expediency and through-put rate for these facilities is low and private sector banks and financial intermediaries remain on the sidelines.

Buildings Renovation Finance cost and maturity need to better match the asset life and be attached to the underlying building.

While many industrial and commercial energy efficiency projects may have short payback periods (eg. 3-8 years), significant buildings renovations containing passive energy conservation measures are designed to last for decades. GTR's models suggest that 20+ year finance at a cost of less than 5% to the consumer is the minimum required in Spain to encourage the deep renovation of residential property. The provision of security to the lender will reduce rates of default and energy savings, property value collateral and "on-bill" finance are all forms of reducing expected renovation loan default rates.

New Lenders and Sources of Finance will only enter the building renovation market when execution is standardized and lenders' claims are clear and quick to exercise.

GTR has repeatedly called for a Roadmap or Action Plan in Spain which identifies the 4 million homes in the most energy inefficient buildings whose renovation can be considered both priority and highly cost efficient for occupants and the country's fiscal balance over the next 10 years. If and when considered a "project" these buildings could be renovated at a rate of 400,000 homes per year and best market practice will drive standards and solid understanding of the asset class.



Reasons why Energy Efficiency Finance is not "Easy"

Financing Energy Efficiency is an Emerging Market with a Series of Hurdles

Financing "a saving" /reduced cash out flows	Energy efficiency measures result in a reduction of the cash outflow related to energy in a household or building. This has a financial return but it is derived from the underlying ability of the household to pay or company to continue operating. The challenge is to structure a business case in energy efficiency in such a way that the potential increase in free cash flow is secured and therefore used for interest and repayment requirements instead of discretionary spending by households or businesses.
Split incentives	The entity investing in energy efficiency is often not the same one that is benefiting from the investment. Without aligned or common interests, this makes it hard to develop a business case for renovation. This is apparent when the occupant of a building is different from its owner and also impacts the way the construction sector sees innovation to improve energy efficiency of its end-product: Unless homeowners and purchasers are more aware of the running costs of efficient versus inefficient buildings the "free market" mechanisms will require regulatory support.
Aggregation Challenge	Saving energy in buildings requires the upgrade of a series of complimentary measures (such as better insulation, energy measurement systems, changing behaviour, LED-lighting, replacing old appliances, etc) which can deliver impressive savings. This can then be repeated in many similar buildings and produce an interesting scale project for wholesale finance. Keeping the costs of aggregation down is critical.
Perceived Higher Risk	Due to the lack of an investment track record and many investors' unfamiliarity with energy efficiency project structures and economics there is a perception among many funders with low levels of specialist technical capacity that the risk of energy efficiency projects is high.
Multiple Sources of Finance	The multiple benefits of energy efficiency upgrades accrue to different stakeholders and hence a mixed multi-stream package of public and private source financing is appropriate, yet more complex to arrange and coordinate.
Concentration of Banking Risk In Real Estate	The built environment provides one of the most attractive and cost effective opportunities in Spain to save energy. But Spanish banks have large exposures to domestic real estate and the mortgage market. As commercial and residential property values continue to decline the built environment poses an increasing risk to banks balance sheets. Banks are reluctant to increase their exposure to real estate finance in a weak price environment even though there is strong international evidence that property values of energy efficient buildings hold up relatively well in comparison to less energy efficient buildings. Banks may prefer exposure to "on-bill" repayment channels than additional mortgage debt.
Lack of Knowledge and capacity	Energy efficiency requires specialised knowledge which is not widespread across the finance market. While many banks have this knowledge in specialist teams, like structured finance, this potentially restricts the deal size and appetite for energy efficiency through the retail channels and among generalist client managers to offer their institutional clients.

Source: Adapted from ING (2013) supplemented with GTR interviews in Spain

Public-Private Financing is Apt

Yet, the amount and availability of private financing depends on the regulatory framework

Policy Choices drive Private Finance towards the Energy Efficiency Market

Finance Sources are not policy independent, in fact Governments have a number of policy tools which can deliver third party finance including: Fiscal, direct regulation, financial incentives, energy savings trust (IDAE) and white certificates.

These can also be augmented with EU Structural and Investment Funds and EIB resources.

Policy path

1	A combination of regulation and financial incentives based on state budgets
2	A combination of regulation, financial and fiscal incentives
3	A combination of regulation, financial and fiscal incentives and saving obligation schemes
4	A combination of regulation, fiscal incentives and an energy saving trust
5	A combination of regulation, fiscal incentives, energy saving trust and saving obligation schemes
6	A combination of regulation, financial and fiscal incentives, energy saving trust and saving obligation schemes

New Sources of Finance

	Potential Amounts (annual)
Energy Supplier Obligations/ White Certificates	€ 1 billion
Banks via On Bill Finance	€ 1-2 billion
ESCOs	€ 200 million
European Funds/ Policy Banks	€ 500 million
National Energy Efficiency Fund	€ 0.5-1 billion

Source: Odyssee (2013)

Efficiency, Energy Companies are key Stakeholders

Obligation Schemes for Energy Suppliers have a substantial impact on savings

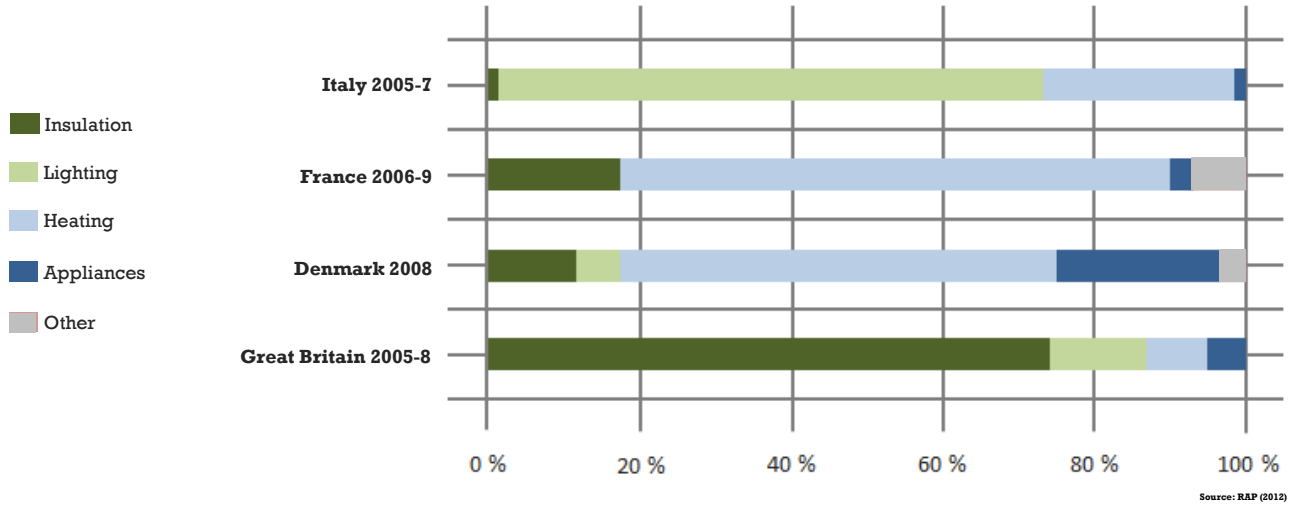
Utilities/ Energy Suppliers are key parties to engage and align with National Energy Efficiency outcomes.

Utilities/ Energy Suppliers are highly advantaged parties in the delivery of customer energy efficiency as they have: Low cost capital; Public Interest Responsibility; Direct Customer Relationships; Access to the Energy Data; Expertise in Energy Pricing; On-bill Collection Potential; Opportunities for Scale and Sector Knowledge. Energy Efficiency Obligations and White Certificate Programmes are positive means to achieve this alignment and engagement.

The Detailed Design of a Energy Supplier Obligation Scheme has profound impacts on the amount of energy saved, the type and quality of these savings and the amount of resources invested by the Energy Suppliers.

In Italy, large amounts of initial savings from its white certificate scheme came from lighting, whereas in the UK nearly 80% came from insulation measures. By comparison, where UK utilities were investing almost Euro 1 billion per annum in Energy Efficiency measures, schemes in Italy and France in the same period each levered less than Euro 200 million.

Residential Energy Savings by End-use



Source: RAP (2012)

The Design of an Obligation Scheme is Key

The Results and Amount of Resources invested by Energy Companies depend on the Regulatory Framework

We can learn two lessons from the European experience with obligations for energy companies. First, energy supplier obligations ought to be aligned with national energy efficiency targets and a long-term buildings roadmap. Second, incentivize measures not to be expected from a "Business as Usual" scenario.

The UK's Energy Supplier Obligation schemes have both secured significant amounts of utility funding and engagement and have enabled solid progress towards contributing to national energy and CO2 targets.

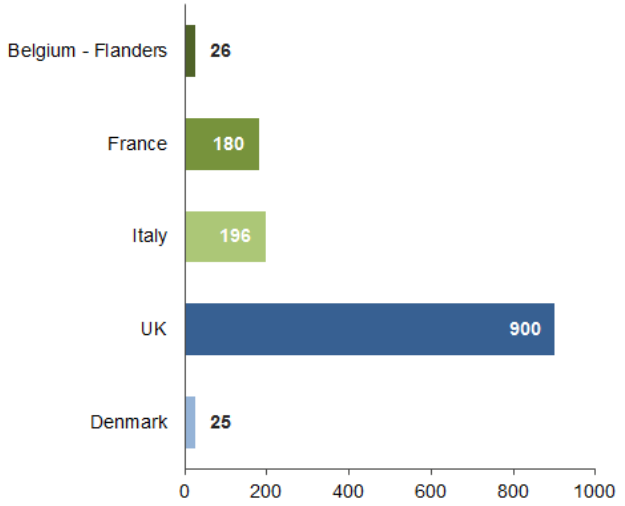
In Italy and France, programmes have delivered lower funding and energy savings and are presently under revision in the context of the new Energy Efficiency Directive. A Spanish Energy Efficiency Obligation/ White Certificate programme, if well designed, could proactively involve Spain's energy suppliers in the development of a new customer energy savings model and deliver the necessary data, customer access, funding and resources needed to kick-start buildings renovation.

Retail Energy Suppliers or Distribution Utilities are the "Obligated Entities"

Country	Obligated Company	Eligible Customers	Target set by	Administrator
Belgium - Flanders	Electricity distributors	Residential and non energy intensive industry and service	Flemish government	Flemish government
France	All suppliers of energy	All (including transport except EU ETS)	government	government
Italy	Electricity & gas distributors	All including transport	government	Regulator (AEEG)
UK	Electricity & gas distributors	Residential only	government	Regulator (Ofgem)
Denmark	Electricity, gas & heat distributors	All except transport or covered by EU ETS	government	Danish Energy Authority

Source: RAP (2012)

Amount of Resources Invested in EE by the Energy Sector by Country, 2008 – 2009 Est. (€M)



Graph by GTR. Data Source: RAP (2012)

An "On-bill" Repayment Channel can Attract Banks

Assuring repayments can be achieved through an on bill channel

Paying for Energy Savings through Energy Bills makes sense and ties the renovation debt to the building and not its occupant.

The advantages of offering renovation finance repayments through energy bills are numerous: Customer can easily compare loan repayments with energy savings, multiple finance providers can be used (not just utilities), quality controls can be imbedded in the loan processing cycle, if building occupant moves then repayments pass to new energy account holder automatically and standardization is necessary driving economies of scale.

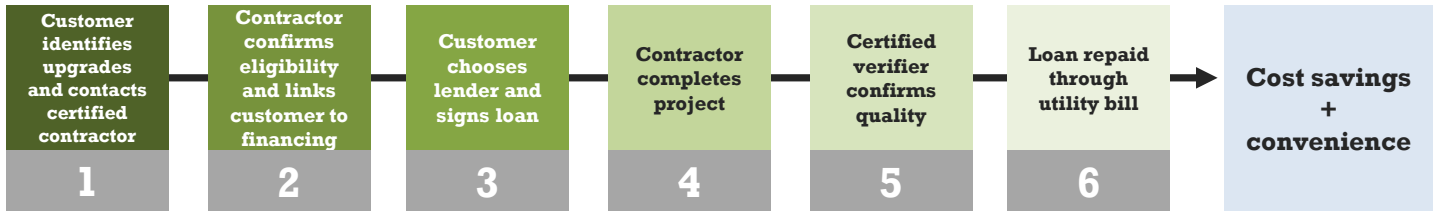
On-Bill Repayment offers banks a way to differentiate Buildings Renovation Investments from regular mortgages or consumer lending.

Spanish banks have considerable existing exposure to and risk concentrations in home mortgages and Spanish consumer lending. Opening an "on-bill" repayment channel for Energy Efficient Buildings Renovation investments would allow bank credit departments to view these investments differently and the benefits would become evident through lower risk pricing and longer-term facilities.

The Use of "On-Bill" Repayments for Energy Efficient Buildings Renovation in Spain would greatly accelerate the uptake of Buildings Renovation Measures and engage more third party finance.

On-Bill Repayment mechanisms are being championed by the UK (through the Green Deal) and the USA (in selected States eg. California). It has been assessed in France and petitioned by banks in Holland and other countries. Spain has a liberalized energy supplier market and regional distribution company model which is apt for the low-cost development of on-bill repayment mechanisms. Spanish Banks have the expertise and interest to work with the energy companies to develop this new channel and this way stimulate the demand for energy efficient buildings renovation and the inclusion of new and formidable players in the market.

On-Bill Repayment Program, 6 Steps



Graph by GTR; Source: EDF (2013)

The Role of Finance with ESCOs in the Buildings Renovation Sector

ESCOs Play an Important Role in the Tertiary Sector

The ESCO sector is Diverse and can significantly scale-up to provide solutions for the tertiary sector and industrial energy efficiency.

ESCOs are diverse and often fall into one or several of the following categories of business: Equipment supplier; Public authority contractor; Buildings maintenance; Energy supplier or Technical Project Management firm. The economics of ESCOs vary as often there are cross-subsidies from parallel businesses and/or additional margins aside from pure Energy Savings. The sector is not homogenous and to be understood should be sub-segmented and approached as "solution providers" to various of the pieces of the overall energy efficiency challenge.

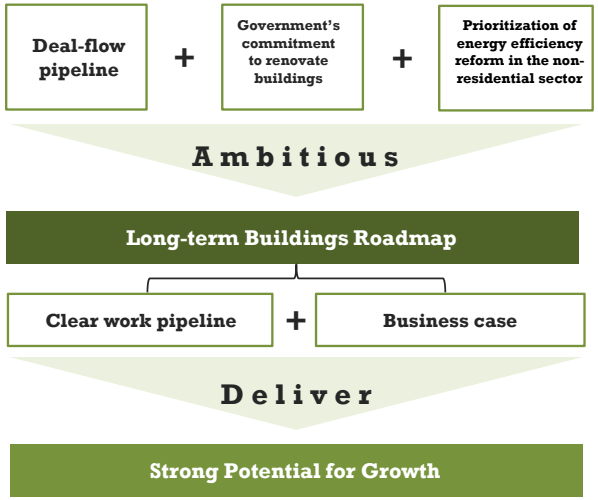
ESCO Finance is not a "silver bullet", as its cost depends upon the ESCO's size and any cross-subsidies, but this isn't a major hurdle for large Tertiary Sector Buildings and Industrial Efficiency projects.

The ESCO sector is diverse but also nimble and adaptive. While it may not be the cheapest source of finance (as it is more like structured project finance than plain vanilla retail finance), a large number of Industrial and Tertiary Sector Energy Efficiency projects place a higher premium on technical aptitude and high quality execution than funding costs as their payback periods are shorter and savings greater in any case.

In Spain, ESCOs need the certainty of a deal-flow pipeline to be delivered by a clear and committed Government undertaking to renovate its buildings together with the prioritization of energy efficiency reform in the non-residential sector delivered by an ambitious long-term buildings roadmap.

The uncertain policy environment and low priority for energy savings in tertiary buildings in Spain has meant that the Spanish ESCO sector is still small and immature. There is a strong potential for growth which the certainty of a clear pipeline of work and business case would deliver to the many sub-sectors of the non-residential building sector where project returns are higher and the hurdles are non-financial.

Appropriate Roadmap for ESCOs



Possibilities of an Energy Efficiency Fund

How an Energy Efficiency Fund can Stimulate Renovation

Article 20 of the Energy Efficiency Directive mandates Member States to use multiple streams of finance to facilitate Energy Efficiency Measures and proposes a National Energy Efficiency Fund.

Due to the multiple benefits of Energy Efficiency, there are many streams of finance which can come together to fund a renovation project – often public and private. A critical challenge is striking the right balance between each funding source and correct allocation of risks to those entities best placed to manage them and to whom the benefits flow. The EU Commission and European Financial Institutions are clearly engaged in aligning central EU funding streams together with best practice examples to support Member States' activity.

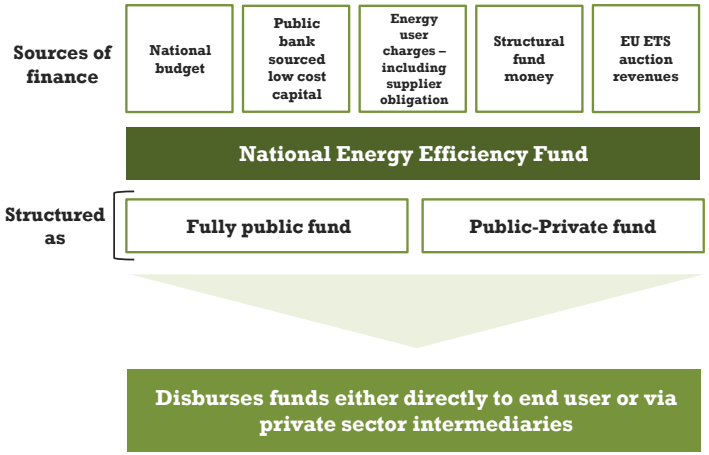
National Energy Efficiency Funds can collect funding from diverse public and private sources and work together with retail distribution agents, sector specialists, buildings owners and banks to tailor funding offers to best fit the national opportunity set.

Clearly, a National Energy Efficiency Fund should provide a stream of finance which is tailored to fund the National Energy Efficiency opportunity set. In Spain, GTR has identified the need for low cost, long-term finance to address the cost effective opportunity to renovate Spanish buildings and kick-start a renovation industry creating up to 150,000 jobs. Long-term, low cost finance for energy efficiency would certainly be "additional" to existing finance offers and would not "crowd out" any existing funding sources.

A National Energy Efficiency Fund for Spain can be a core complement to deliver an ambitious article 4 Long-term Spanish Buildings Roadmap.

A scaled source of long-term, low cost finance is critical to Spain's buildings transformation. Private sector finance alone will not deliver the optimal buildings transformation and will not deliver the full public benefits through employment and tax revenue increases. A National Energy Efficiency Fund can fill an important gap as the sector builds experience and economies of scale and can engage key stakeholders in its design and management.

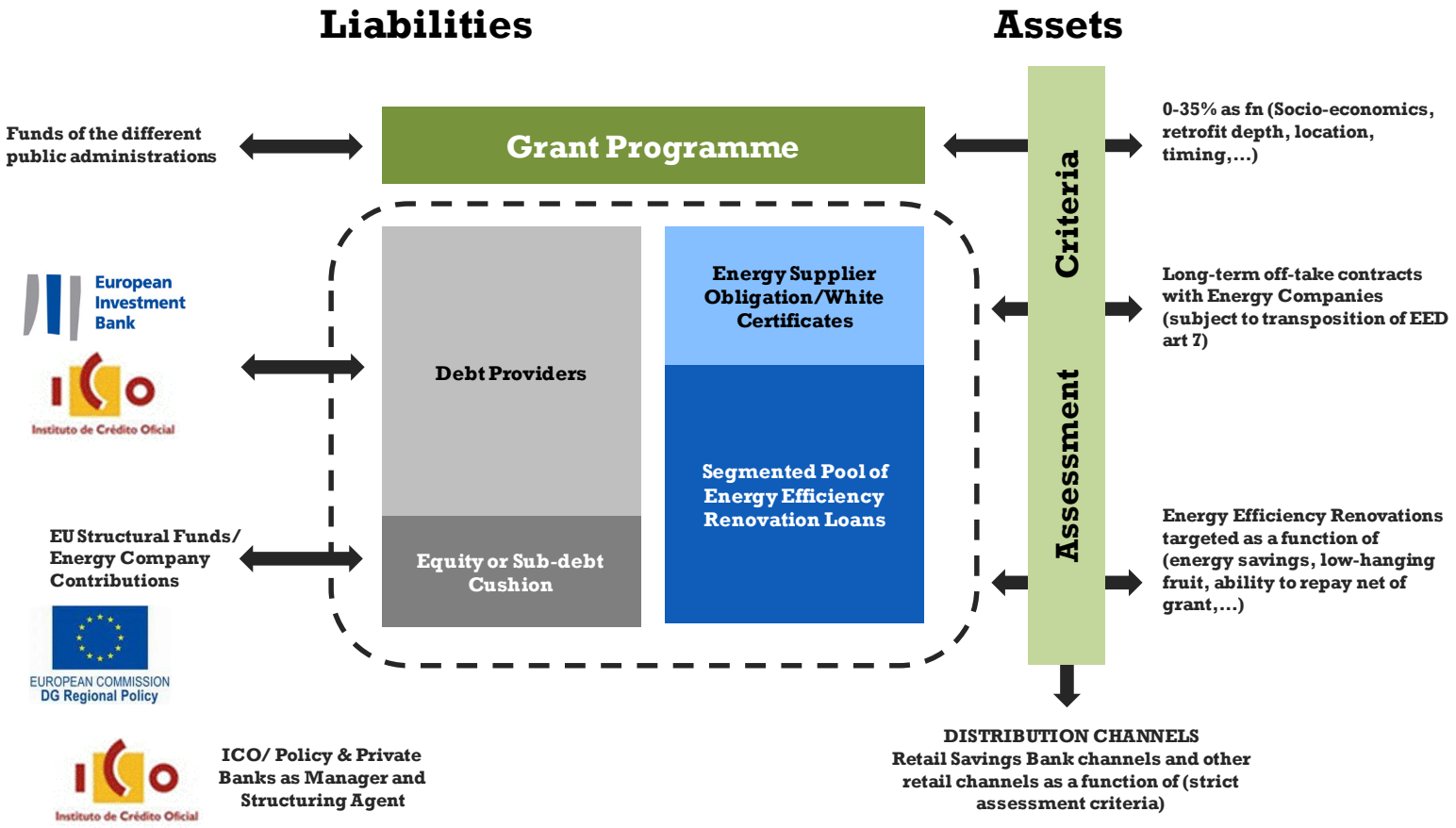
Design Criteria for a National Energy Efficiency Fund



Source: The Coalition for Energy Savings (2013)

Fund for Energy Renovation

Designed to Provide Long-term Low Cost Transformation of Multi-Family dwellings



Key Design Elements of an Energy Efficiency Fund

A Series of Critical Elements will allow a National Fund to Deliver Results

1	National Energy Efficiency Fund must be additional and fill the market gap for Long-term (20+ years) and low cost Buildings Renovation Finance.	• To stimulate the optimal transformation of Span's buildings and fill a finance gap in the market, the Spanish Energy Efficiency Fund must offer long-term finance (minimum 20 years) at a low cost (all-in cost target 5%).
2	Application Procedures Aligned to Deliver "One-Stop" Shop via various (and many) Retail Distribution Agents.	• Potential projects can provide information to a variety of retail agents (banks, energy companies, installers, ESCOs etc) that allow the fund to quickly determine the amount of the loan, eligibility for grants and project viability.
3	Ability to monetize White Certificates (or equivalent) directly with the Obligated Parties (eg. Long-term off-take agreement).	• National Energy Efficiency Fund will be a major source of white certificates as it funds numerous energy efficient renovations of Spanish buildings. This value stream appears as an asset in the Fund's accounts and can be monetized through a long-term purchase contract.
4	Accessed and Processed through the Retail Distribution Networks of various Sector Stakeholders (eg. Banks, Energy Companies and other Accredited Parties).	• Project eligibility criteria for funding are determined and then specific projects are identified and described by accredited agents who then present back to the fund for assessment and processing.
5	Opens and Accesses "On-Bill" Repayment Channel.	• National Energy Efficiency Fund leads to the development and use of "on bill" repayment channels.
6	Designed to be use in combination of Structural and Investment Funds (2014-2020) with other public and private finance sources.	• The buildings renovation loans given by the National Energy Efficiency Fund will develop the first significant renovation asset performance track record in Spain and at its launch the fund will require capitalization with levels of "cushion" injected in the form of soft, subordinated loans or equity to absorb the potential performance losses and defaults; as a result this new asset will get positive exposure, and will result in more senior debt being injected into financing the investment pipeline of Spanish Energy Rehabilitation assets.

Financing is not the solution, but it is an essential Step

Challenges in the financial field to launch the Buildings Renovation Sector

Present		Future	
1	There is not enough money to renovate Spanish buildings and obtain the positive benefits this offers	1	The optimal transformation of Spanish buildings creates a market with investment growing from 2-10 billion Euro per annum to 2050
2	The energy efficient renovation of Spanish homes needs low cost 20+ year finance	2	Structural Funds, Government instruments (EIB and ICO) and a National Fund for Energy Efficiency are created to support sector
3	Any financing needs to be compatible with direct financial public support and fiscal measures through "One Stop" distribution	3	Centralized structures with large distribution networks (branches, invoices, installer network) as well as simple and accessible "One Stop Shop" costumer packaged products and services
4	The economic interests of the energy companies need to be aligned with the delivery of optimal energy refurbishment	4	An ambitious implementation of art 7 obligations on Spanish energy suppliers creates demand for optimal renovation
5	Spanish legislation needs to support optimal investment in the energy efficient refurbishment of multi-family dwellings	5	Legislative amendments support transparent energy data, incorporate "on-bill" payments and expedite decision-making
6	Instruments inherent to: National, regional, private sector, ESCOs, fiscal and funds must be coordinated to function and operate properly	6	An unprecedented level of coordination between public administration and the private sector to produce a user friendly service which is easy to understand and operate for consumers

TRANSFORMATION

Chapter 7

- There are opportunities in three sectors: residential, tertiary and public buildings
- The buildings renovation sector should be organized to deliver an optimal long-term transformation in line with owner's needs
- A clear business model could lead to a revolution in the energy efficient renovation of Spain's multi-family dwellings
- "Green value" is already recognized in several European countries and it will be a feature of Spain as it applies more of the EPBD and transposes the EED articles
- "Market access" is a factor that is almost more important than price itself in the current state of the Spanish housing market; furthermore energy rehabilitation can improve access to the market
- GTR has developed various strategies to intervene in every segment of the tertiary buildings, which would generate energy savings of 35-50%

Operational Framework for the Buildings Renovation Sector in Spain

GTR 2014
REPORT

The organization of the sector can produce the required results

How to refurbish 2 million residences and 20% of Tertiary Buildings before 2020

The immediate 2020 opportunity for Spain involves the identification and transformation of the country's most energy inefficient buildings.

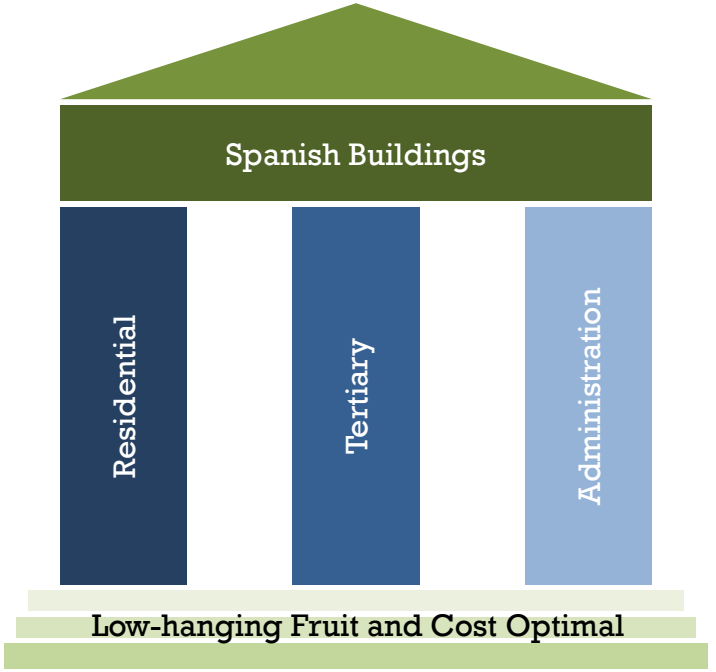
Spain has over 10 million homes built without thermal insulation. In any climatic zone this is inefficient and wasteful. The situation in the tertiary sector and for buildings occupied by central, regional and local administrations is not much better: GTR estimates that 35-50% energy savings (depending upon sub-sector and region) can be cost-effectively delivered from tertiary and administrative buildings with currently available technologies.

By 2020, 2 million of Spain's most wasteful and energy inefficient homes can be transformed into renewed, high comfort and energy efficient living spaces for the future.

Among the 10 million homes which GTR had identified through its "hot-spot" approach in 2011-2012, there are approximately 2 million which represent the "low-hanging fruit" to kick-start the transformation of Spain's residential buildings. These homes are characterized by having no insulation, high energy bills, discomfort caused to occupants, out-dated lighting and appliances and old and inefficient boilers (fuel-oil being among the least efficient). These are the targets for cost optimal home transformations and to launch the sector.

Working with leading experts from the Spanish ESCO sector, GTR has identified 35-50% energy savings across the existing tertiary building stock.

Based upon best available data for Spanish Tertiary buildings and a sectoral plus cost effective measure approach, GTR has been able to identify and estimate the potential for energy savings across Spain's tertiary and administrative buildings. While some sectors (eg. Hotels) demonstrate greater potential for energy savings than others (eg. Offices), there remains a sector strategy for each type of building and specific measures which can be used to quickly size potential energy savings from renovation and identify the low hanging fruit.



Sector Organization to Deliver the Transformation of Buildings

Different Stakeholders bring Different Elements of the Renovation Process

Intersection/ impact of "key capacities" for buildings renovation sector stakeholders

	Utilities	Buildings Owners	ESCOs	Contractor/ Installer	Public Administration
	• Energy Suppliers • Obligated Parties • Energy Retailers	• Buildings Owners • Buildings Tenants • Neighbour Communities • Public Administratetion	• Buildings Services • Equipment Manufacturer • Public Sector Contractor • Independent	• Construction • Local Installer • National Installer	• Central Govt • Regional Govt • City Town Hall
Access to Data	◕	◑	◔	◔	◔
Regulatory Targets	◕	◔	○	○	◑
Buildings Regulations	○	●	◔	◑	◑
Retail Distribution Channel	●	○	◔	◔	◑
Decision, Permission and Contracting	◑	◑	◑	◑	◔
Access to Finance	◕	◑	◔	◔	◕
Project Execution Resources	◔	○	◕	●	◔

○ None
◔ Slight Intersect
◑ Partial Intersect
◕ Strong Intersect
● Full Intersect

Rehabilitation from the Perspective of the Building's Owner

The operational process and the value proposition need to be simple and clear for the owners

Simple and Clear Value Proposition

Different stakeholders involved in the rehabilitation process have different degrees of access to different information, skills and resources. These need to be coordinated and made available to the building's owner and decision makers in simple form and with a clear value proposition and financial package to support it. When designing the rehabilitation sector's processes, thinking it through from the perspective of the owner is fundamental.

Firstly, building owners need to be able to determine the conditions they require for their building in terms of energy efficiency, accessibility, comfort and other issues in the long-term. These long-term characteristics should be regulated by a stable framework which supports the long-term economic sector which supports the delivery of these conditions.

A Building's Assessment Report can provide basic information, yet objectives for each particular building also need to fit within the framework of an action plan that ensures high quality execution, budgets and deadlines. In this regard, every building can define a action plan that takes into account time, costs and owner/ occupant's objectives. It is worth noting that the delivery of the owner's conditions should also deliver value and functionality to the building.

Conditions, such as energy efficiency, that deliver operational savings and hence investment returns, should have long-term and clear objectives and be supported by tailored finance facilities which are easy to find and work for the owner, in addition to an intervention plan to ensure maximum economic efficiency of the process itself and reasonable returns.

A Rehabilitation Agency to coordinate a National Action Plan

A National Action Plan can provide reference models for different climatic regions and buildings types to help owners and multi-family building associations tender for buildings refurbishment operations and manage them and any interests of external investors.

The Action Plan needs clear mechanisms and conditions to align stakeholder interests through a delivery mechanism with access to each kind of resource and finance to deliver the precise rehabilitation measures and benefits.

The complexity of the access to grants, tax breaks, public support, soft loans support, independent verification etc.., must be simplified into a "One Stop" service for buildings owners and other refurbishment costumers to simply understand and expedite the process throughout all of its phases.

A new Rehabilitation Agency could be the key element for the development of an Action Plan. Moreover, this agency could coordinate the inherent legislation along side the "One Stop" approach.

The Transformation of Buildings must be "Cost Optimal"

Application of the "Cost Optimal" concept: example of a rule

The new building sector should be driven by economic efficiency

The feasibility of the new sector depends on its competitiveness as an economic sector and the recognition of its value and service to society.

Prior policies and public support in Spain have artificially raised land values and sunk capital into wasteful assets. In the past, new building construction was incentivized through indiscriminate tax breaks with no thorough assessment of societal benefits.

The new buildings sector should be established on a solvent platform competing for public support and tax breaks in a fair and transparent basis with other non-speculative sectors. This certainly does not preclude the use of targeted fiscal policy (in fact GTR recommends it) but it requires the assessment of fiscal returns to justify it.

Using the 'cost optimal' methodology together with the tools from the Energy Efficiency Directive

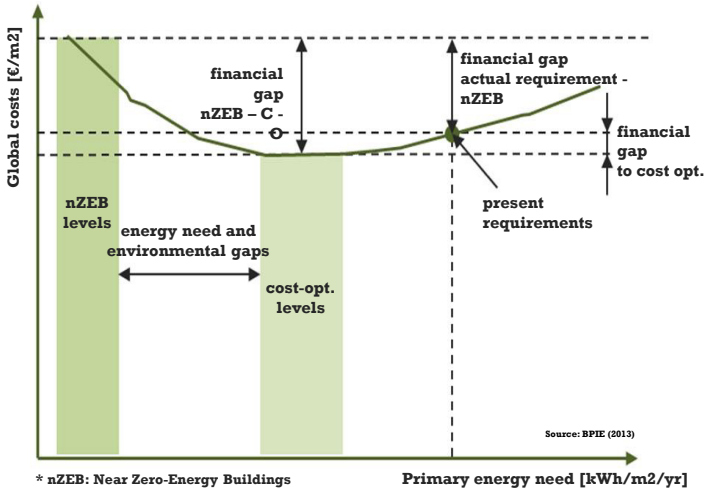
The Energy Efficiency Directive mandates the actions needed to improve a building's energy efficiency to be economically efficient. In essence, energy savings and other value sources should be able to finance the return of investment with a competitive interest rate within a reasonable timeframe.

In fact, interventions should be assessed according to the total costs and benefits of long term investments opportunities on a net present value (NPV) basis. An optimal intervention does not necessarily offer maximum energy savings, but rather offers the optimal NPV.

Costs to be considered:

- Investment costs and returns in energy savings
- Evolution of the energy costs
- Amortization period of investment

Cost Optimal Intervention Can Deliver Better Social and Environmental Results



La gráfica muestra cómo la intervención con un coste óptimo que solo considere el corto plazo no coincide, para el caso analizado, con la que obtiene los mejores resultados ambientales.

The graph above shows how a short term cost-effective intervention would not be in line with an intervention that leads to best environmental results.

Thus giving rise to discussions on the implementation of measures based on quick returns their influence on the implementation of subsequent measures. A clear example would be investing in replacing a boiler instead of conducting a deep renovation that also includes the thermal insulation of the building's envelope.

The Sector needs a Long-Term Horizon

Low cost savings policies ought to be avoided if they are not part of broader plans

It is essential to take into account a long term horizon to allow cost-efficiency measures to yield their best results

Conducting investments only assessing returns of investment choices while discarding the option 'menus' is often economically inefficient as energy consumption affects different non linear factors.

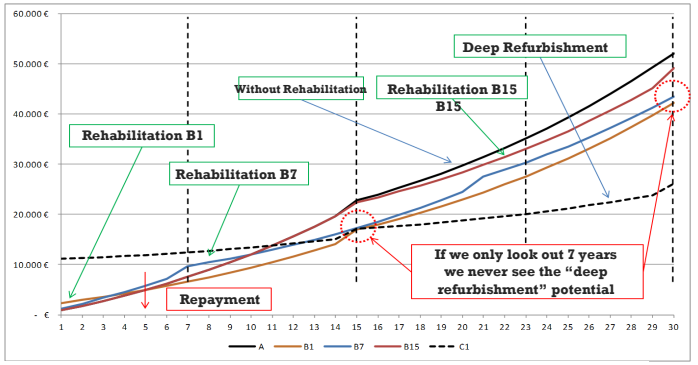
Consequently, policies that champion savings at low cost –such as installing more efficient boilers-should be avoided as they are "business as usual" unless they catalyze a cost optimal transformation included in broader strategies with long term objectives.

In fact, the evaluation of the return on investment should always be conducted on a long term basis -30 years for residential buildings- in order to assess its true economic efficiency. The diagrams on the right show the energy savings and the different maintenance costs of a variety of Refurbishment Strategies. To see economic benefits of deep renovation the user must be able to look out beyond 15 years and over 30 years the energy savings are double and costs potentially halved through deep renovation versus other strategies.

A long term vision is required. This vision has to define concrete savings objectives and the proper cost optimal criteria. In addition, the vision has to contemplate different situations and options to prevent buildings managers, users and owners from taking poor economic decisions in the long term.

The regulatory and operational framework requires a long term Action Plan that includes some compromises and simplifications to make practical the application of "cost optimal approach" but

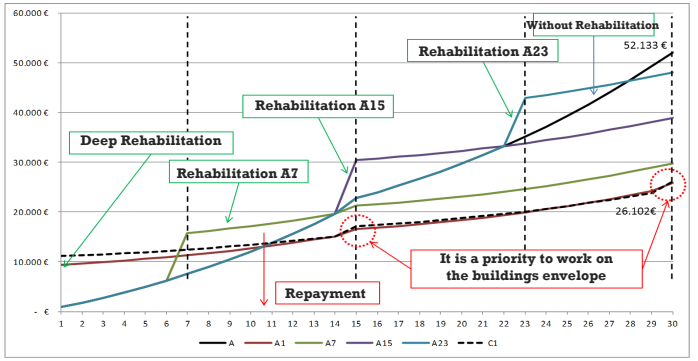
HOTSPOT D,E,F



"Bn": Change of boiler for a condensation boiler at n= year 1, 7 years, 15 years (afterwards, the new boiler always gets renewed at 20 years).

HOTSPOT D,E,F

Graph of Aggregate Cost during 30 years, with an annual energy increase of 4,5%



A: Intervention on the building's envelope in the years 7,15,23. Stands for a change in the boiler which takes place every 20 years and is renewed for a new one

"Green Value" needs to be identified and valued

Pertains to energy efficient properties and their increase in value

The environmental quality of new and existing homes has become a major issue for several countries

In most cases the improvement of the energy performance in housing is driven by the implementation of ambitious thermal regulation and energy performance labeling. Even though parties recognize that property value can be linked to environmental quality, this is taken into consideration by most buyers only after assessing other factors such as: living environment and work commute.

Benchmark analysis conducted in 10 countries: Germany, Austria, Canada, Denmark, Italy, Netherlands, United Kingdom, Sweden, Switzerland and the USA, suggests that procedures/methodologies to assess and determine green value need to be further developed.

Quantifying "green value" is not trivial particularly in the residential sector, and while more advanced, commercial real estate is not a perfect market.

- **The lack of comprehensive, reliable, recognized data by real estate professionals and buyers / sellers / renters / donors is a major obstacle to the widespread recognition of green value in the assessment of housing prices.**
- **Countries have expressed their need for databases that encompass: location, rent, equipment buildings, energy efficiency, costs, etc.**
- **All encompassing databases being introduced in France *(bases notariales)*.**

Assessment practices do not rely on a environmental performance approach. Only examples that took qualitative data into account were identified.

Meta Research undertaken by French Energy Agency ADEME Revealed the range of "green value" premia which could be identified in some countries:

There is green value for apartments and houses in certain countries:

- **Netherlands, around 2.5%**
- **Germany, 4 to 6%**
- **USA, 5%**
- **Switzerland, between 3.5% and 7%**

Factors that led to the emergence of the "green value", were linked to:

- **Markets**
- **Regulations**
- **Practices of real estate professionals**
- **Awareness of individuals and professionals**

Charts by GTR, Data Source: Ademe (2011)

"Green Value" will Become more Relevant with Time

Energy Renovation can raise property value up to 10%

Since their peak in 2008, Spanish home prices have fallen by around one third in value.

Not only did the property construction boom in Spain leave an overhang of 700,000 unsold new homes in the market, but house prices have continued to fall since 2008 and have lost a third of their value since then.

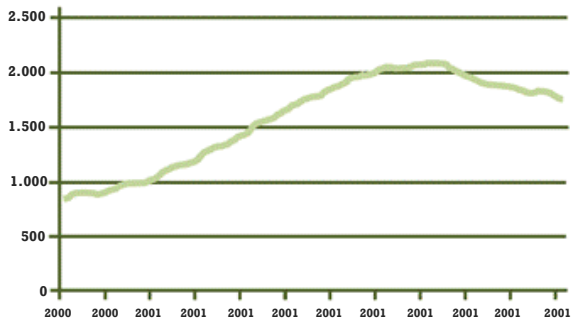
The "sticky" nature of residential real estate prices means that often the advertised prices of properties are significantly higher than the prices actually realized on sale.

In a downward and high discounting residential property market, like Spain's today, "market access" can often a more marketable feature of a recently renovated home (ie achieving asking price more quickly) rather than a "price premium". In reality, a "sale at asking price" may well represent a premium of 10-20% over the discount otherwise required to sell an non-renovated home.

Much international research has been undertaken to demonstrate a "green premium" for energy efficient homes of between 2-9%. GTR believes that if combined with simple cosmetic and non-energy related upgrades highly efficient Spanish homes could achieve a 10% market premium ("Green" and refurbishment).

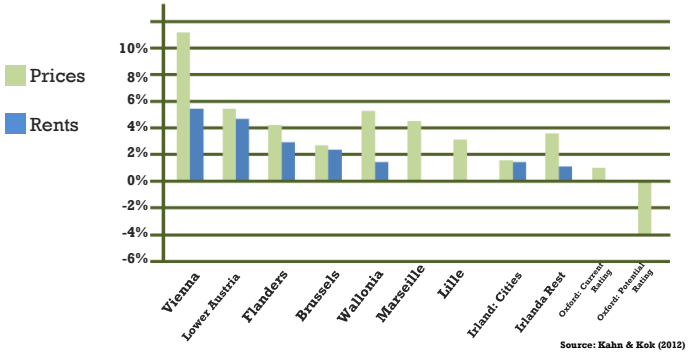
Spanish homeowners and home buyers value comfort and cosmetics over energy performance at present. Awareness of the cost of ownership of homes is increasing as energy costs rise and Energy Performance Certificates become mandatory. GTR believes that renovated homes will have both market access and price advantages over similar unrenovated equivalents. In interviews with homeowners, GTR believes that a "Value Premium" of 10% is a reasonable guide to the expectations of a traditional Spanish homeowner looking to undertake a highly energy efficient home upgrade combined with other non-energy improvements.

Evolution of Housing Prices in Spain (1995 base)



Source: Ministerio de Fomento (2013)

Effect of one-letter or equivalent improvement in EPC rating across a selection of European property markets



Source: Kahn & Kok (2012)

Analyzing energy renovation

Energy Poverty and Accessibility Issues should be resolved and fixed into a single package

Clear Consideration for the Energy Poor and Accessibility

'Energy Poverty' is directly linked to energy inefficiency. 'Energy Poverty' is a state defined when a substantial part of a household's income – twice the proportion spent by a median income household - is allocated to maintaining comfortable living conditions within a home. According to the Environmental Sciences Association (Asociación de Ciencias Ambientales) over 10% of Spanish households are now in a state of 'Energy Poverty'.

Households in a state of 'Energy Poverty' are unlikely to be able to invest in or repay the investments needed to conduct interventions designed to lower their energy bills. Spain needs a comprehensive policy which can lessen and ultimately end 'Energy Poverty'. This policy can also rely on energy efficiency and thereby foster the buildings renovation sector simultaneously.

Similarly, low accessibility conditions in dwellings –also at an urban scale- are a clear need for Spain's increasingly aging population (who in isolated cases can be confined to their flats dependent upon neighbours to help them) and is another key issue to fulfill the constitutional mandate for decent and adequate housing. The definition and articulation of programs which integrate energy efficiency and focus on solving consumer dissatisfaction with housing services are also needed to jumpstart the buildings renovation sector.

Spain's local context of Energy Poverty, Accessibility needs for the Aged and a gradual process of "gentrification" (that is the expulsion of lower income families from reformed dwellings in central city locations) are additional features of the physical buildings landscape which energy efficiency policy and plans need to negotiate.

Despite being possible barriers to "pure" energy efficiency renovations (ie those which focus only on energy specific upgrades) these features of the local market can also act as "touch-points" which can stimulate a deep renovation which delivers high energy efficiency (and hence low on-going costs) as well as the required non-energy related upgrades (provided as a social benefit and funded from the public purse or funded by owners in return for an increase in the property value).

New, Simplified Energy Efficient Renovation Model for Multi-family dwellings

During 2013, GTR has worked to amplify its prior approach to energy efficient renovation focusing in greater detail on the motivating factors for property owners, home-owners and neighbor communities to undertake a deep renovation. Aside from a fundamental lack of understanding of the potential for energy savings (and the trust in their delivery) from a large part of the Spanish home-owning population, the drivers for a "deep renovation" are not often to deliver economic goals nor lower energy bills. In many cases the energy efficiency components of a renovation may be added as a supplement to other works which the community or home-owner values more; such as installing a lift, cosmetic "make-over", new underground parking or extensions/ loft conversions or just pure façade renewal. Either way, with many of the sunk costs of undergoing the renovation (such as scaffolding, architect, project manager, finance facility and the interruptions and noise which go with civil works) the addition of energy efficiency measures is easy, adds little additional hassle and the marginal paybacks are much better than those calculated for a stand-alone project.

To illustrate this, GTR provides indication of a "new" and simplified business model for the funding of various components of an energy-centric and yet not 100% energy renovation based upon its practical engagement with the homeowners communities from over 2,000 Spanish homes on the following page.

A new business model is necessary to conduct renovations

The deep renovation of dwellings requires a simple model that shares costs and benefitsto

In 2013, GTR and its partners have assessed over 2,000 home renovations – working with developers, builders and homeowners – to better understand the dynamics of deep rehabilitation projects.

GTR believes that there are up to 4 million Spanish homes in "typical" pre-1980 blocks in climatic regions which could benefit from a highly energy efficient and cost effective deep renovation in the next decade.

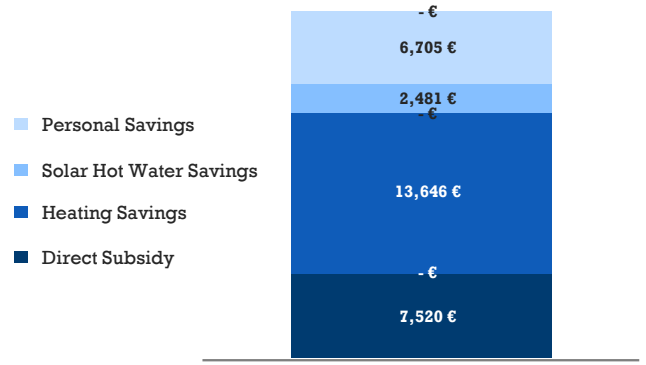
The keys to successful home renovation projects are: Economies of Scale (500+ units bundled in a single project); Clear budget partition between Energy-related works (eg. Insulation) and non-energy related (eg. Lift); and strong appreciation of "Value Increase" resulting from home renovation.

Economies of scale are key to the reduction of renovation costs. As long as there are no proved intervention models for the different segments of the built park, it is better to conduct renovation at a large scale. It is important to sub-divide the renovation budget into those upgrades designed to save energy (to be repaid through savings) and those designed to increase comfort (to be repaid through home "value increase"). Clear understanding and agreement among homeowners of the "value increase" derived from an energy efficient home upgrade.

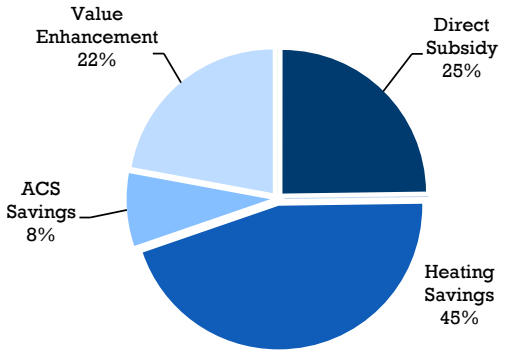
In many practical cases, energy-related upgrades form only part of the total renovation budget. From 2014, GTR anticipates that "typical" high efficiency home renovations may result when savings cover 50+% of the budget; up to 25% from public support and up to 25% invested against a "Value Increase".

In many practical cases, GTR observes that energy saving upgrades form a part of a larger upgrade of common parts, lifts and cosmetics of a building. Clearly, the non-energy related upgrades will add value to the property (as will the energy-related ones). In these cases, 20 years of energy savings discounted at 5% may cover half of the up-front cost and the remainder must be provided through other "value sources" such as public support or home value increase.

Example Composition of a Deep Rehabilitation Budget broken down by source of value



Financing Breakdown



Fiscal Support for Energy Refurbishment is critical

12% of all EU Member States support financing policies are of fiscal nature

There are certain Member States (e.g. France and Italy) favorable tax treatment and/or tax relief for the energy rehabilitation of homes contributes significantly in engaging different segments of the population.

12% of all financial policies to support the refurbishment of buildings in the EU Member States are of a fiscal nature. These include income tax deductions, tax credits and reduced VAT rates. The improved tax treatment seeks to stimulate greater activity in the residential sector. For middle class families these fiscal benefits are offered as way to achieve a tax-efficient savings product via tax benefits compared to say bank deposits.

Spain had a "Deduction for Improvement works in Housing" offered in the 29th provision of the Income Tax Act, amended by Article 1 of Royal Decree-Law 6/2010, of April 9 (2013 BOE).

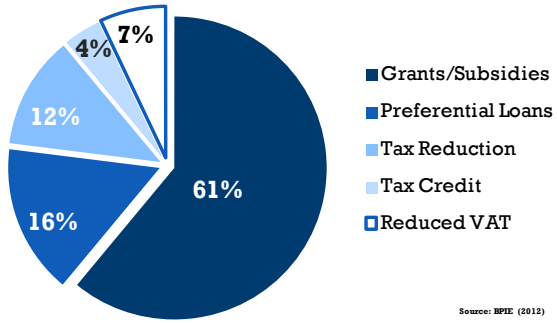
Deductions for main residences were 20% for total qualifying investments of up to € 20,000 for individuals with incomes of up to € 53,000. Deductions for second homes were 10% for total investment of up to € 12,000 for individuals with incomes of up to € 71,000. Works should have been conducted between 2010-2011 and tax deductions were valid until 31st Dec 2012.

Tax deductions to stimulate the demand for energy rehabilitation has to be part of a long-term and concerted policy.

To deliver energy efficient refurbishment investment deductions must be guaranteed for several years and easily understood within a framework of measures that stimulate demand for home refurbishment. In addition, the network of Spanish installers and Sector Stakeholders should communicate clearly any fiscal measures in an integral and comprehensive manner to customers.

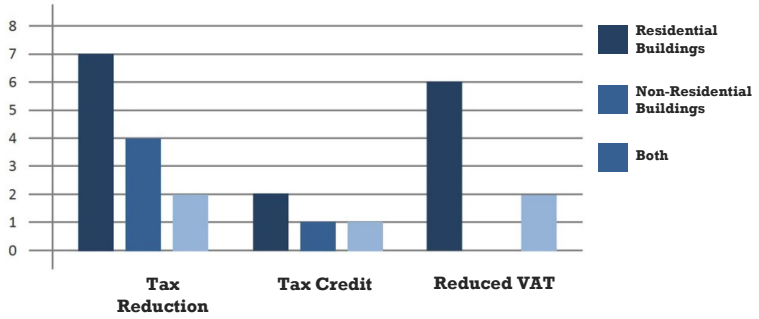
The Energy Efficiency Refurbishment Sector will grow over time and in order to stimulate the demand, tax deductions have to remain permanent over a fixed period of time (e.g. at least a decade). It is unclear whether reductions in VAT for sections of the rehabilitation work will have an effect greater than the income tax deductions (IRPF) in Spain. This measure has been used in France and is anticipated in the UK. Any long-term buildings roadmap for the Spanish residential sector should consider fiscal measures as a tool to unlock the demand for middle-class families and offer a tax-beneficial savings product in people's homes.

The Use Of Financial Instruments At Member State Level



Source: BPIE (2012)

Number of Fiscal Incentives by Type of Building (Residential / Non-Residential)



Source: BPIE (2012)

The renovation sector needs to transform itself

The Operational Framework has to deliver Optimal Refurbishments to its Clients

	Present		Future
1	There is confusion over models and operators, which generates distrust among final clients	TRANSFORMATION	Different operators will offer similar solutions (including financing) this will depend on the type of building and owner
2	Projects require multiple applications and have to comply with the criteria of different sources to be launched		There will be funds and financial solutions packages that approved operators could offer through a "One Stop" costumer service
3	The role of each entity (energy company, ESCO, bank, construction company) is not well defined, and they sell different products		There will be a legislative harmonization which will clarify the role of each entity and the products will tend to homogenize.
4	The pipeline of "ready" projects is small, therefore each project has a higher transaction costs and feels like a one-off		The proper implementation of Articles 4 and 7 of the Directive will result in the faster growth of the rehabilitation market
5	"Green Value" is not clearly evidenced in the market, but very clear from the physical pre- and post-refurbishment evidence		A clear "Green Premium" of 10% can be tracked and evidenced to help customers understand the value proposition of a deep refurbishment
6	Operators work independently, to different standards and with different interests		Sector Operators will come together through an ambitious transposition of the EED and identification of new shared business models and specific finance facilities

Chapter 8

- GTR proposes a "Three Pillar" strategy of mutually reinforcing legislation, tailored financial instruments and operational approaches
- The current legislative framework requires a focused update to deliver an optimal transformation of Spanish Buildings to deliver substantial economic, social and environmental benefits
- Tailored Finance facilities, like a National Energy Efficiency Fund, will help define new business models and shape the organizational reality in the sector
- Operational stakeholders need to come together around a long-term buildings roadmap articulated through a new Renovation Agency to determine their place within the optimal transformation of Spain's physical buildings reality
- 2014 will be the transitional year when the Spanish Buildings Renovation Sector begins to flourish

Recommendations and Conclusions

GTR 2014 REPORT

GTR proposes legislative, financial and operation changes

A "Three Pillar" Strategy should be implemented with the aid of a strong Political Leadership

Energy Efficiency and Buildings Transformation must have unambiguous political leadership and be clearly recognized as a core part of Spain's new post-crisis economy and business culture.

The political positioning in a post-crisis Spain begins with a "zero tolerance" for wasted energy and resources, and the singular re-focusing of Spain's buildings sector to deliver and transform its buildings into the appropriate living and working environments for a productive and affordable economic future. The transformation homes and workplace environments will impact not just the buildings sector but the energy sector whose interests must be strategically aligned in the national interest.

Spain's Buildings Transformation can be delivered through a "Three Pillar Strategy" with coherent and mutually reinforcing Legislative, Financial and Operational plans managed by a Renovation Agency.

Spain's buildings Transformation will be realized through the creation of a buildings renovation agency to create a self-reinforcing cycle of improvement as legislative changes supported by tailored finance lead to adaptation and re-structuring of the organizations and operational activities of entities involved in the value chain of buildings refurbishment. The three pillars must be coherently co-developed so that the feedback from pilots and project activity can be fed into the policy and financial processes providing on-going improvement and strengthening of the pillars themselves.

Today's legislative, financial and operational frameworks are not sufficient to deliver a buildings transformation and will not deliver the full economic, social and environmental opportunities presented. Immediate upgrades to all three pillars are required and are recommended by GTR.

Working with experts and key stakeholders in the buildings sector, the GTR and its advisors and collaborating institutions have assessed the current state of the Spanish sector and offer a set of recommendations to policy makers and the operational and financial sectors which if implemented can deliver the activity, jobs, value increase and multiple benefits of the long-term buildings transformation for Spain.

Regulatory framework needed to deliver the transformation of buildings

Regulatory measures aligned with the EED can benefit the renovation of buildings

1) An Action Plan with well defined objectives.

The Action Plan requires a long term horizon with renovation oriented objectives.

2) A Regulatory Framework with well defined intervention objectives

The Regulatory Framework's goals need to be coordinated with the objectives of the Action Plan in terms of what aspects need to be developed, in which policy area, and their relationship with the objectives of the Action Plan. Such coordination should entail the regulatory frameworks that influence the financial and organizational aspects of the sector.

3) Coordination among all policy areas, with clear leadership

Obviously, the current regulatory framework is not optimal to address the renovation sector and the energy efficiency targets. It is necessary to articulate a coherent and efficient regulatory framework, therefore coordination and leadership are essential.

4) A regulatory alignment strategy based on experiences.

There is a lack of a set of regulatory changes that can be fully applied to the current regulatory framework as a means to adapt it to renovation. Consequently, the Action Plan needs to include the necessary methodology to design, articulate and implement such changes.

The regulatory alignment strategy needs to detect and promote renovation initiatives, as well as to take into account examples carried out in Spain or other European countries

5) Support the identification of new business models and tailored finance streams through a Renovation Agency and with a National Energy Efficiency Fund.

A new Government Agency for Renovation to execute the National Strategy and help identify the optimal physical building refurbishment for certain highly inefficient buildings types together with tailored funding can drive the sector through replication and improvement. The role of a National Energy Efficiency Fund can also be more than just financial, it can also have a strong influence on the operational framework and help organize the intervention and set quality standards, activate distribution channels and build new models. Open on-bill repayment legislation possibilities.

6) Support ESCOs in the Tertiary Sector with clear models and approaches which define roles and responsibilities.

Work is required in the public procurement process to enable and facilitate the identification of renovation tenders of a significant and easily identifiable list of public buildings. This can, in turn, help define the standards for ESCO contracting which go further than the basic active measures and potentially include "top-up" finance to help ESCOs deliver an optimal refurbishment to non-residential buildings.

7) Coordinated package of facilitating legislation (ordinance, action plan, removal of barriers, state's public support, fiscal benefit) through a "one-stop" shop approach.

The state should engage with buildings owners and sector operators to develop a coordinated legislative package which establishes standards and responsibilities as well as delivering "easy to access" state support packaged together (public support, tax break and low cost finance). Barriers such as multi-family dwellings decision making processes and financing should be contemplated and resolved in practice and feedback can influence the future direction of legislation.

Financing Framework for the Renovation of Buildings

Clear and easy to access models for home owners with assured returns for the investor

"Buildings Renovation Finance" needs to be fit for purpose.
This means that it must be long-term and low cost funding for highly energy efficient buildings transformation. This requires:

1. **Legislative Support for an On-Bill Repayment Channel:** Renovation repayments secured via on-bill repayment or against the property itself will extend maturities, reduce costs and enable banks to enter.
2. **20+ year finance from National EE Fund (or similar):** Optimal Residential Renovation requires long-term finance to match energy savings returns and this can be delivered through a combination of ICO, EIB, a National EE Fund and private banks.
3. **Standard Renovation Loan Packages Developed:** The "terms and conditions" of Renovation Loans must be subject to stakeholder debate and then standardized like Mortgages or Auto-finance with "consensus" basic terms and conditions.
4. **Easy, "one-stop shop" access via multiple retail channels:** Standard Renovation Loan packages should be offered through multiple retail channels (eg. Energy Cos, ESCOs, Banks and Installers) and the packages should include grant disbursement mechanism and information on tax deductions.
5. **Energy Data Transparency:** Legislation should facilitate access to historic energy data for qualified installers and building owners and allow renovation loan provider to gather energy performance data during loan life.

Instrument

National Energy Efficiency Fund for Buildings Renovation

Can Provide

"One Stop" Focal Point for the New Sector

By developing appropriate

Mechanisms

- Renovation Finance
- \+
- Documentation
- \+
- Distribution

Recommendations for the operational framework

Clear Assignation of Responsibility and Alignment of Interests Required

1) Accredited Renovation Sector Stakeholders need access to the information.

To make the economic case for an Energy Efficiency Renovation Loan, the historic energy usage data is to be made available to the sector's stakeholders.

2) Energy Suppliers are a Key Source of Resources and Customer Access. Their interests should be fully aligned with the Renovation sector, and their role and responsibilities should be well defined.

European countries showing progress in Buildings Renovation have engaged energy companies and aligned their resources and activities with the transformation of their Building Stock. This requires a gradual modernization of the traditional energy supplier business model and improving customer service, as well as crafting a new provision of services model.

3) Buildings Codes and Standards can be used to gradually stimulate greater focus and interest in energy efficiency from buildings owners and occupants.

The gradual tightening of Buildings Regulations around Energy Efficiency is a powerful stimulus which is being used for new buildings. In a number of EU Member States, this stimulus is gradually attaining greater visibility in the existing buildings. The mandatory publication of EPCs upon property sale and rental is a positive start.

4) Retail networks should be engaged to offer renovation products to homeowners and businesses.

A "home renovation" or building upgrade should be a standardized and easily identified by consumers product. This product has to be part of an industry and can be offered through multiple retail networks e.g. banks, utilities, installers or ESCOs.

5) ESCOs and Installers can develop simple marketing tools to help buildings owners understand the value of renovation and finance packages delivered alongside their products.

Buildings renovation marketing requires easily understandable tools which offer a standardized approach to offer a value proposition to buildings owners together with a finance package if required.

6) Establishment of a Buildings Renovation Agency with responsibilities for the Sector, to deliver targets and to provide a clear operational model for the renovation of public buildings.

An Agency for the renovation of buildings, responsible for achieving the targets of the renovation strategy and its action plan, re-energizing the sector, jointly coordinating with other agencies the activities of the action plan, offering models, speeding up the development of regulation, managing an energy renovation fund, would have a key role the expediting the proper development of a regulatory framework. The agency would carry out the EED's requirements on the renovation of public buildings, thus fostering the development of ESCOs and the sector in general.

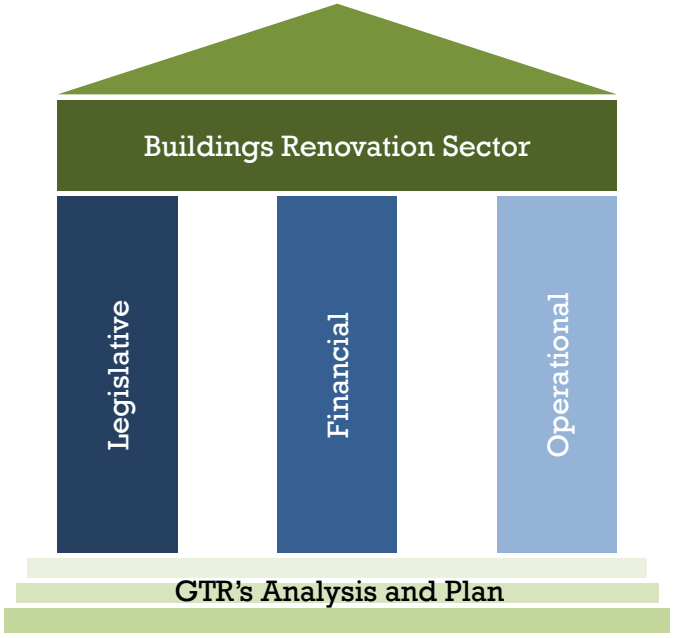
7) R&D should be co-invested alongside the different typologies of Spanish buildings in order to develop renovation

R&D investment alongside the industrial development of the renovation sector in Spain is critical to consolidate and improve the sector's "know-how" and constantly improve the approach, business models and tools which the sector employs to deliver the long-term transformation of Spain's built environment.

Three pillars of the Country Strategy for the Renovation of Buildings

The GTR has identified six key steps for a long term Roadmap in Spain

A National Buildings Renovation Strategy can deliver a vibrant new Buildings Sector which will employ 150,000 people in the deep renovation of Spanish homes and tens of thousands in an overhaul of tertiary buildings and public administration offices. This long-term national roadmap has three pillars and six key components:



1. **Political Leadership** and Clear Articulation of a Buildings Renovation Strategy with Targets and Milestones
2. **An Action Plan** that organizes resources, outlines market margins, and orients the actions of the different stakeholders
3. Clear and **supportive legislative framework** faithfully transposing all elements of the Energy Efficiency Directive which facilitates and supports the activity of the new Buildings Renovation Sector
4. **National Energy Efficiency Fund** to deliver renovation financing through a network of collaborating public and private sector channels that guarantees investing security
5. **A Renovation Agency** whose objective is to implement the renovation strategy, as well carrying out the much needed coordination among stakeholders
6. **An Open data source system** available to stakeholders that allows for a clear market and **examples** which supply intervention models to the stakeholders and serve as a reference for regulatory and operational changes

- The following list is a comprehensive bibliography of the research and literature reviewed and referenced in the GTR 2014 report
- Each year GTR attempts to review all of the relevant materials domestically and internationally to ensure that its report is "state of the art"
- It is possible that certain documents reviewed but not referred to directly may not appear in this list, but GTR makes every effort to include everything which has had a material impact upon its thinking and those provided as reference by reviewers

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