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Financing Energy Efficiency Building Retrofits

White Paper Presentation:

International Policy and Business Model Review With Regulatory Alternatives for Spain.

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Climate Strategy es una consultora de primera clase en Energía Limpia y Cambio Climático

Peter Sweatman

- 9 years at JPMorgan
- 5 years as Social Entrepreneur
- 5 years as MD for Iberia for Climate Change Capital
- Founder and CEO of Climate Strategy & Partners

Katrina Managan

- Fulbright Scholar International MBA Candidate IE Business School
- 5 years Climate Change policy work in Washington DC

Climate Strategy clients Include:

Climate Change Capital
Bloomberg NEW ENERGY FINANCE
TRUCOST
Tessera Solar
ferrovial
GRUPO BANCO POPULAR
GESTAMP

Empresa

Climate Strategy es una empresa dedicada a señalar y trabajar las oportunidades y los riesgos creados por el cambio climático. Tiene 3 áreas de trabajo:

1. ***Consultoría Estratégica:*** Trabajamos para ofrecerle información, ideas, análisis y servicios de consultoría estratégica a clientes cuyo futuro se está viendo cada vez más impactado por el Cambio Climático directamente o indirectamente a través de la dinámica política medioambiental y de sostenibilidad.

2. ***Colaboraciones Constructivas:*** Climate Strategy busca acelerar los enlaces transfronterizos de los recursos, ideas y conocimientos en Energía y Tecnología Limpia, trabajando en España y Portugal con empresas expertos internacionales de alto nivel y con líderes mundiales en soluciones medioambientales.

3. ***Eficiencia Energética - Estrategia y Ejecución de Proyectos*** : Climate Strategy trabaja íntegramente en la eficiencia energética como competencia principal tomando por hecho que es la principal fuente de valor, a corto plazo, capaz de aportar reducciones de emisiones significativos en los sectores de industria y vivienda. Climate Strategy está ya trabajando para el desarrollo de estrategias, política y en la actual ejecución de proyectos en éste área.

Climate Strategy busca diferenciar su oferta a través de su:

- **Experiencia relevante:** Nuestro equipo y colaboradores tienen un historial de excelencia en el sector y ámbitos relevantes.
- **Arquitectura abierta:** Nuestro modelo de negocio abarca asociaciones activas con los proveedores de soluciones globales e innovadoras, líderes en el mercado.
- **Red de contactos activa:** Climate Strategy y los miembros de su equipo son contribuyentes asiduos a los foros de la energía, tecnologías limpias y el clima.
- **Plataforma colaborativa tecnológica:** La plataforma tecnológica que emplea Climate Strategy está diseñado para dar una mayor flexibilidad y disponibilidad de recursos de servicio al cliente.
- **Ejecución de Primera Clase.**

La sede de Climate Strategy está situada en Madrid, España.

Climate Strategy es una firma de consultoría no regulada que ofrece consultoría estratégica, analítica y empresarial en áreas relacionadas a la Energía Limpia, Tecnología Limpia, Eficiencia Energética, Sostenibilidad y Cambio Climático. Climate Strategy no es un asesor financiero y no promueve inversiones financieras, ni recaudación de fondos, ni servicios de asesoría financiera.

el clima cambia todo

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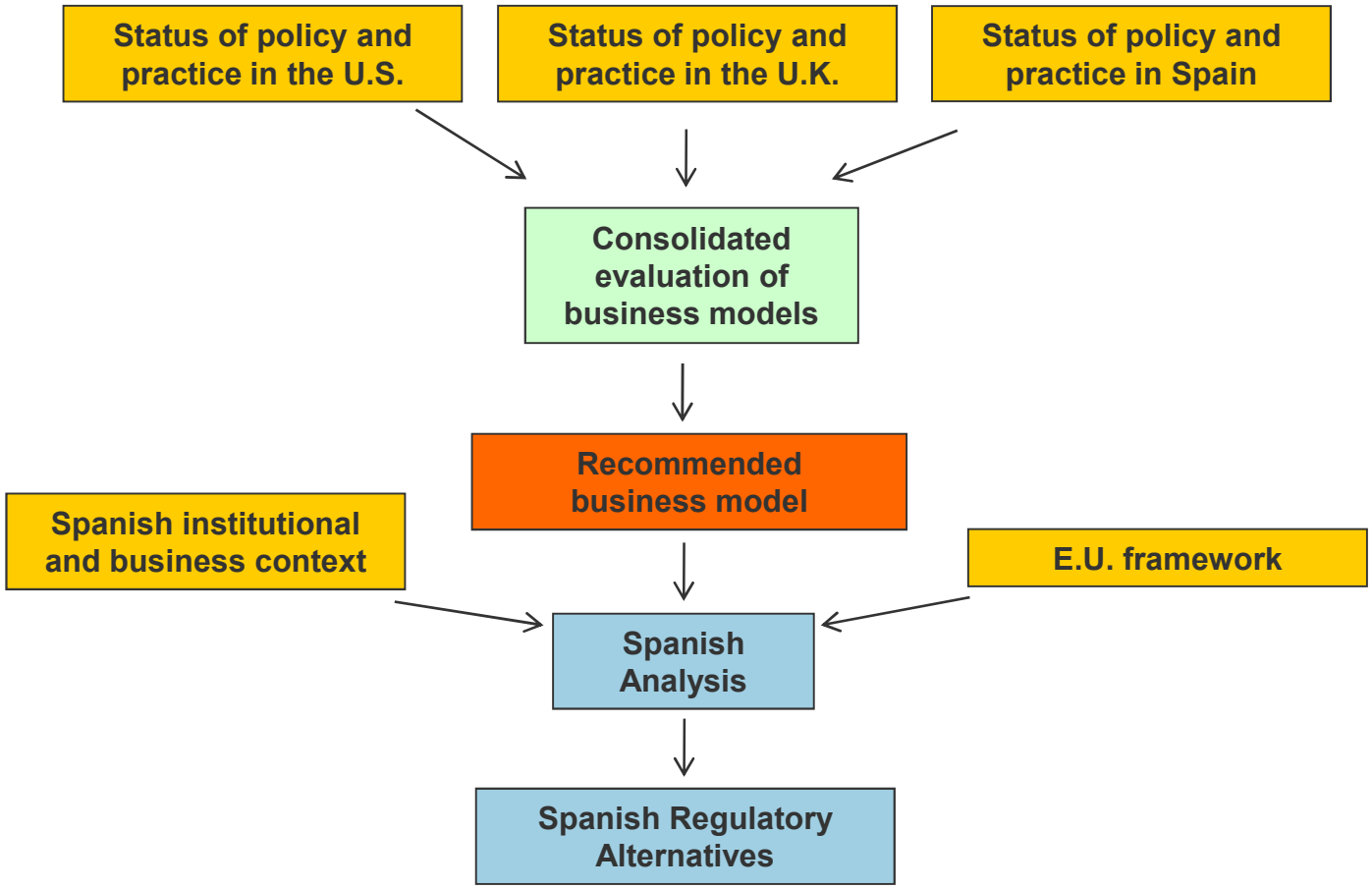
Workflow during 5 month Process



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Key Stages in Our Research

The following are notable stages in the research and interview process

- **Extensive literary Review**
  - Built a database of around 120 relevant white papers, articles and pieces of legislation
- **Business Model and Financing Focus**
  - Policies analysed from the perspectives of stakeholders and impacts on business models
- **New Business Model Development**
  - By combining the best features of existing business models and policies we create the hybrid business model:
    - Aggregated Investments Model
- **35 International Expert Reviewers**
  - Split equally across USA, UK and Spain
  - Selected from areas of finance, policy, academia, energy and ESCO/retrofit
  - 2 rounds of comments included in the final text
- **Assumptions, exclusions and scope limitations**

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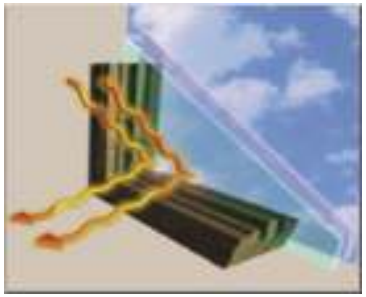
The Energy Efficiency Opportunity is Substantial



The following are notable stages in the research and interview process

- **Energy is of strategic importance to more than 40% of the global economy**
- **Buildings are responsible for 40-45% of all energy used in the US, UK and Spain**
- **Studies show that energy usage in existing buildings can be cost effectively reduced by 20-50% in the US, UK and Spain**
  - These retrofits are expected to pay back in 2-15 years through energy cost savings.
- **Improved acoustics and liveability**
- **Retrofit penetration is low**
  - $60-300 billion per year could be invested globally to fully capture the cost effective energy efficiency opportunities in buildings

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Photos from US DOE

Component Approach to "Whole of Building" Upgrade

	Type of Retrofit	Practical Difficulty	Capital Cost	Pay Back (years)	IRR	Overall Difficulty
Energy Efficiency	Efficient Lighting	Low	Low	1-2	High	
	New Boiler/Air-conditioner	Low	Medium	2-7	Medium	
	Usage/Energy Management (ex. Smart Thermostat)	High	Low	0-1	High	
	New Efficient Appliances (ex. Refrigerator)	Medium	Medium	3-10	Medium	
	Insulation	Medium	Medium	3-15	Medium	
	Fittings/Windows	Medium	Medium	8-15	Low	
Micro-gen	Solar Thermal/Geothermal	Medium	Medium	5-10	Medium	
	Co-generation	High	High	5-9	Medium	
	Micro-generation	Medium	High	10-25	Low	

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Key Characteristics of Residential Buildings in target Geographies

Summary characteristics of the Residential buildings stock in the target countries

	US	UK	Spain
Multi-unit residences	25%	12%	**71%**
Residence owner occupied	67%	66%	**89%**
Average Residence Ownership Period	18 years	18 years	**29 years**
Residences constructed before 1980	59%	79%	**58%**
Number of Residences (millions)	111	22	**25**

Sources:

- *2005 US Census of Housing Characteristics by Year of Construction*
- *England Housing Survey of 2008*
- *Instituto Nacional de Estadísticas through 2001 and Ministerio de Viviendas 2002-2008*

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Key Characteristics of Commercial Buildings in the UK and Spain

Summary characteristics of the Commercial building stock in Spain and the UK

	constructed before 1975	constructed 1976-2004	small buildings	large buildings
Spain – commercial buildings	**61%**	**39%**	**53%**	**47%**
UK – commercial buildings	60%	40%	55%	45%

Source:

- *Fraunhaufer, Study on the Energy Savings Potentials in EU Member States, Candidate Countries and EEA Countries, 2009.*

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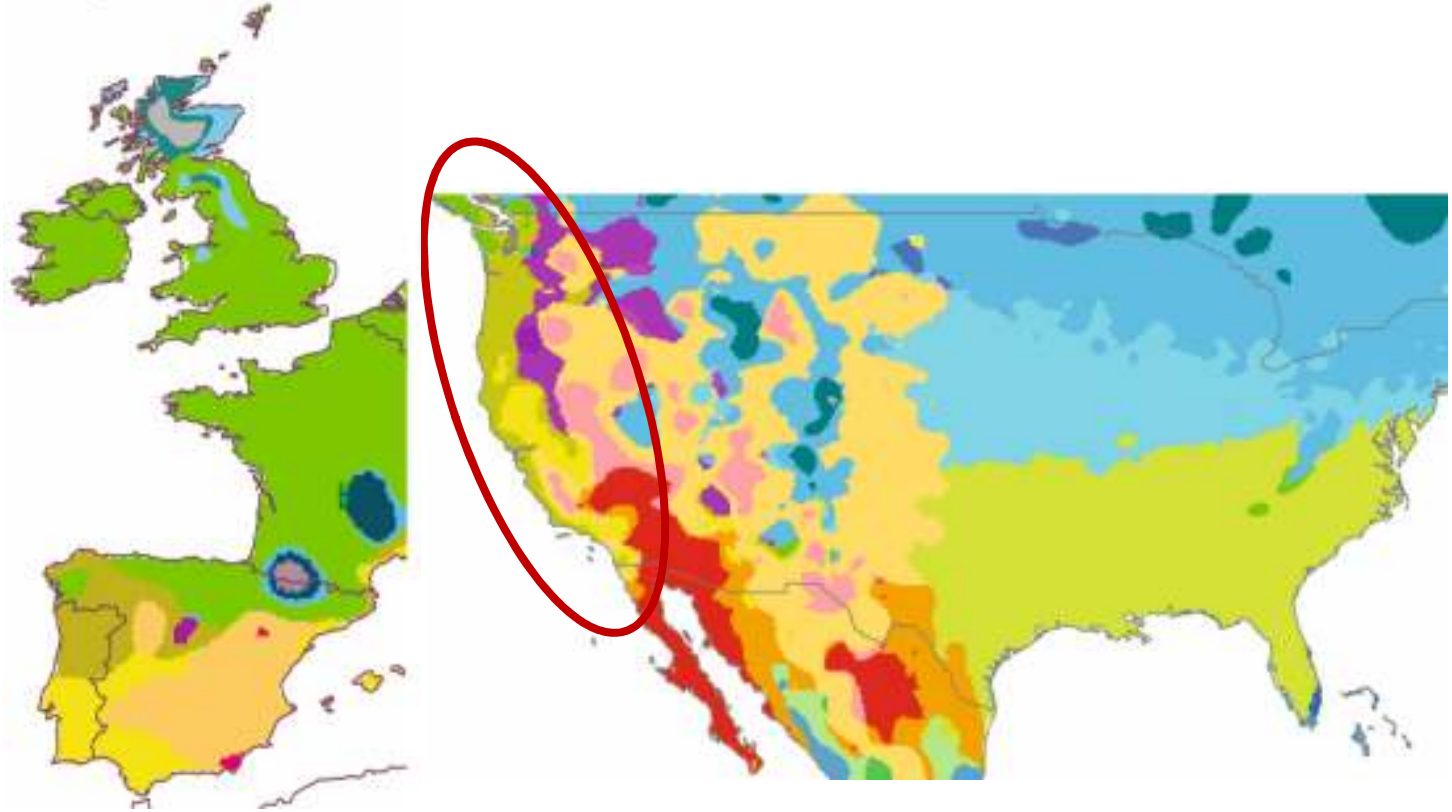
Similar total Heating and Cooling needs

Summary Climate Characteristics of target countries

Heating Days:
Spain: 1,829
California: 2,574
UK: 3,043

Spain has significantly more "cooling days" during summer, particularly in the hot southern regions of the country.



Köppen classification system

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Policies that Support Energy Efficiency

Standards
Strong Building Codes
Labeling or Retrofit requirements at Time of Sale/Rental
Retrofit Provider Accreditation
City-wide Opt-out Policy
Utility Minimum Spending Requirement
Utility Energy Efficiency Priority Resource Requirement
Appliance Standards

Direct Financial Assistance
Direct Government Subsidy - unlimited
Government Risk Insurance
Property Tax Financing (PACE)

Market Based
Certificate Programs [CERT/EERS]
Fiscal Incentives, e.g. stamp tax

Removing Hurdles
Building Energy Label Requirement
Education
Enable On-bill Repayment
Utility Decoupling
Direct Technical Assistance

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Policies that Undermine Energy Efficiency

Standards

Electric Rates that Decline as Use Rises

Direct Financial Assistance

Subsidized Energy Consumption

Direct Government Subsidy - limited

Market Based

Tax Write-off's of Energy Costs

Removing Hurdles

Utility Profit Driven Mainly by Amount of Energy Sold

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US: Many Fragmented State and Local Solutions

Increase in activity in the last 5 years

- **National government**
  - Appliances
  - Government buildings – 30% by 2015
  - Weatherization Assistance Program – 6 million low-income homes 1973-2008
  - Energy Efficient Mortgage support
  - Some financial assistance for State programs
- **State government**
  - Energy Efficient Resource Standard (EERS) – market-based mandatory efficiency improvements, 24 states
  - Energy Efficiency rebates, grants or loans
  - Energy efficiency priority resource requirement
  - Utility rate decoupling programs
- **Municipalities**
  - Residential Energy Conservation Ordinances
  - PACE

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UK: Europe's Policy Innovator and Leader

- **Historic Focus: Direct Financial Assistance and Removing Hurdles**
  - Warm Front - 2 million low-income homes since 2000
  - Energy Savings Trust – Removing Hurdles/Education
- **New Innovations: Commitment to upgrade 7 million homes by 2020**
  - Carbon Emissions Reduction Target (CERT) – requires utilities to improve their customer's efficiency
  - Energy Performance Certificates (EPC's) – requires an energy efficiency label in order to rent or sell a property.
  - Community Energy Savings Programme (CESP) – whole-home low-income housing direct financial assistance
  - CRC Energy Efficiency Scheme – mandatory emission reductions for all not covered by EU ETS, cap and trade system, 4000 firms, £1 billion in energy cost savings

Spain: Strong in Education and Large Retrofits through ESCO's

- **IDAE** *Instituto para la Diversificación y Ahorro de la Energía*
  - Principal architect and agent of Spain's energy efficiency policy framework
  - Consumer education
  - Technical advice
- **Strategy for Energy Savings and Efficiency 2004-2012**
- **Action Plan 2008-2012**
  - 11% energy savings by 2012
- **Plan to Activate Energy Savings 2008-2011**
  - Consumer awareness campaign – 10% reduction in oil imports
- **Plan to improve efficiency in 2000 government buildings (Plan 2000ESE)**
- **ESCO's – a growing sector doing extensive large commercial and industrial retrofits.**

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Three Principal Business Models Exist Today

Business Model	Definition	Initial Investment Paid By	Limiting Factor	Investment Performance Responsibility	Regulatory Support		
					U.S.	U.K.	Spain
Owner Financed Model	Energy efficiency building retrofits financed with the building's equity and managed by the building owner.	Building Owner	Owner's Funds	Owner	◔	◔	○
Utility Fixed Repayment Model	Energy efficiency building retrofit financed by a utility and paid for through fixed monthly payments.	Utility or Gvmt.	Regs.	No One	◑	◑	○
Energy Performance Model	Energy Service Company (ESCO) finances the energy efficiency retrofit and is paid back from energy bill savings.	Energy Service Provider	Energy Service Provider Balance Sheet	Energy Service Provider	◑	◔	◔

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Stakeholders:
Primary Economic Interests Must be Aligned

	Stakeholder
Client	Building owner
	Building occupant
Finance	Equity funder
	Debt providing bank
Utility	Power Generator
	Power Distributor
	Electricity Retailer
	Gas Provider
	Energy retrofit provider
	Government

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Challenges: Must be Overcome

	Challenge	Can a Good Business Model Fix This?	Can Good Policy Fix This?
Structural	Fragmented Market/ Aggregation Challenge	Yes	No
	Change in Ownership or Tenancy	Yes	Yes
	Agent Problems	Partially	Partially
	Regulatory Distortions	No	Yes
Financial	Cherry Picking	Partially	Yes
	Changes in Energy Needs	Partially	Partially
	High Hurdle Rate Return requirements	Yes	Yes
Behavioral	Information and Awareness	Yes	Yes
	Non-economic Decisions	Yes	Yes
	The Rebound Effect	No	Partially

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Existing Business Models: Meet just 1/3 of Stakeholder's Interests

	Stakeholder	Owner Financed Model	Utility Fixed Repayment Model	Energy Performance Model
Client	Building owner	◔	◑	◕
	Building occupant	◔	◔	◑
Finance	Equity funder	○	○	◔
	Debt providing bank	◔	◔	◔
Utility	Power Generator	○	○	○
	Power Distributor	○	◔	○
	Electricity Retailer	○	◑	◑
	Gas provider	○	◔	○
	Energy retrofit provider	◔	◕	◕
	Government	○	◑	◔
	Average Success	**10%**	**33%**	**33%**

○ No Interests Met

◔ Most Interests not met

◑ Interests partially met, or depends on circumstance

◕ Interests mostly met

● Interests all met

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Existing Business Models: Address just 1/3 of Challenges

	Challenge	Owner Financed Model	Utility Fixed Repayment Model	Energy Performance Model
Structural	Fragmented Market/Aggregation Challenge	○	◑	◔
	Change in Ownership or Tenancy	◔	◕	◔
	Agent Problems	○	◔	◑
	Regulatory Distortions	○	○	○
Financial	Cherry Picking	◑	○	◔
	Changes in Energy Needs	○	○	◕
	High Hurdle Rate Return requirements	◔	◕	◑
Behavioral	Information and Awareness	◔	◑	◑
	Non-economic Decisions	○	◑	◔
	The Rebound Effect	○	○	◑
	Average Success	**13%**	**33%**	**37.5%**

○ Not addressed

◔ Mostly not addressed

◑ Partially addressed

◕ Mostly addressed

● Completely addressed

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Key Building Blocks for New Hybrid Model

The following are the key building blocks for our Aggregated Investments Model

- **Creation of Standardized Energy Efficiency Asset**
  - Standards and guidelines created to streamline retrofit origination to create standardized assets with measurable and benchmarked performance
- **Standard Documentation**
  - Termsheet
  - Detailed Legal Terms and Conditions
- **Multi-channel Origination**
  - Open source model allowing free competition between retail channels:
    - Bank, Energyco, Retrofit provider, ESCO
- **"On-bill" collection and repayment**
  - Green Mortgage
  - Energy Supplier
  - Municipality/ Property Taxes
- **Government Credit Enhancement and Policy Support**
  - More effective channels than Direct Financial Support on project basis
  - Policy framework critical for AIM components to work
  - First loss, credit wrap and other means open
  - Transfer price can control risk

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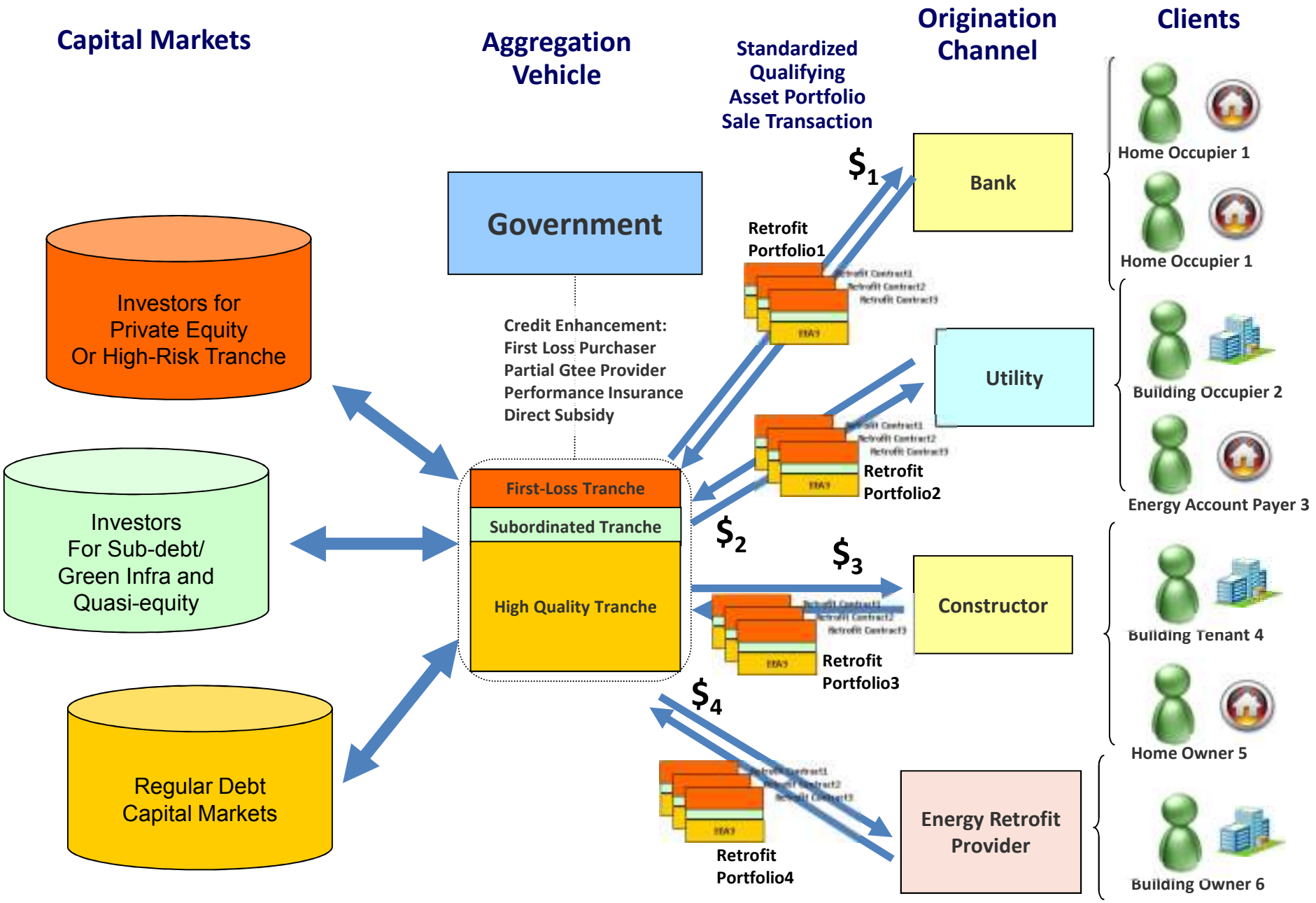
Aggregated Investments Model



	Challenge	Aggregated Investment Model's Ability to Address Challenges
Structural	Fragmented Market/Aggregation Challenge	●
	Change in Ownership or Tenancy	◕
	Agent Problems	◕
	Regulatory Distortions	○
Financial	Cherry Picking	◑
	Changes in Energy Needs	◑
	High Hurdle Rate Return requirements	◕
Behavioral	Information and Awareness	◑
	Non-economic Decisions	◔
	The Rebound Effect	◑
	Average Success	**57.25%**

Aggregated Investments Model:

- Finds market momentum
- Passes the tipping point to success

Average Success 59%

	Stakeholder	Aggregated Investment Model's Ability to Meet Stakeholder's Interests
Client	Building owner	●
	Building occupant	◕
Finance	Equity funder	◕
	Debt providing bank	◕
Utility	Power Generator	○
	Power Distributor	◔
	Electricity Retailer	◑
	Gas provider	◑
	Energy retrofit provider	◑
	Government	◕
	Average Success	**60%**

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Spanish Regulatory Pathways and Alternatives

The following are the key recommendations from the White Paper

- **Balanced Consideration of Demand-side Policies**
  - Review of economic performance of demand side policies in context of Spin's energy needs, CO2 reduction targets and net energy balance
- **Stakeholder Engagement**
  - Utilities
  - Buildings Owners and Occupants
  - Financial Institutions
  - Retrofit Providers and ESCOs
  - Municipalities
- **Research and Pilot the Components of AIM**
  - Standardized Energy Efficiency Assets
  - Standard documentation
  - Multi-channel Origination
  - "On-bill" collection and repayment
  - Government Credit Enhancement and Policy Suport
- **Alignment of Existing Policies to Promote Demand-side Energy Efficiency**
  - Focus on policies which promote customer energy efficiency business models
  - Limit policies which discourage energy efficiency
- **Communides de Vecinos**
  - Unique segment of residential housing which gives rise to significant potential

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Potential Benefits to Spain in this Untapped Resource

Energy Efficiency in Buildings is an untapped and yet powerful resource

- **Potential for Energy Savings**
  - Saving of 30% of the energy used in Spanish homes and small commercial buildings
- **Inward investment in Buildings Upgrades**
  - 3 billion euros per year in saved costs to consumers
- **Contribution to National Emissions Reductions**
  - Reduce Spain's CO2 emissions by up to 5%
- **Job Creation**
  - 7 jobs for every one million Euros invested,
  - Tens of thousands of new jobs potentially
- **Impact on Net Energy Balance**
  - Improve Spain's energy balance by about 10%

These are only rough estimates, but they are based on the best economic studies and data available

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