A2PBEER – Affordable and Adaptable Public Buildings through Energy Efficient Retrofitting

Webinar

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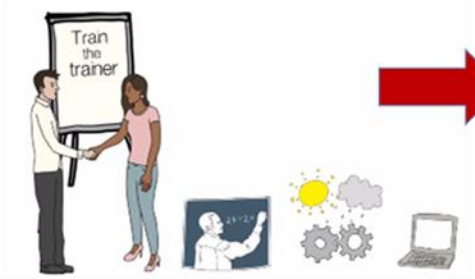
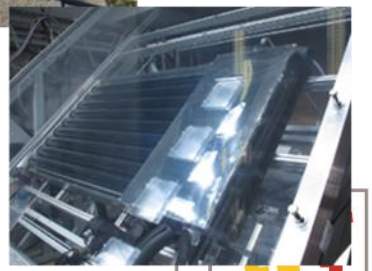
Tecnologías

A2PBEER– Affordable and Adaptable Public Buildings through Energy Efficient Retrofitting





Retrofitting Public Buildings

A2PBEER
AFFORDABLE AND ADAPTABLE PUBLIC BUILDINGS THROUGH ENERGY EFFICIENT RETROFITTING

SEVENTH FRAMEWORK PROGRAMME

Tipos de Tecnologías

4 Tipos de Tecnologías:

1 Tecnologías avanzadas

2 Soluciones de construcción innovadoras ya disponibles en el mercado a pequeña escala que requieren validación en edificios demostradores

3 *"Tecnologías que ya han sido probadas a pequeña escala y necesitan una demostración a gran escala."* (Necesita actividades de I+D para evolucionar de prototipo de laboratorio a solución constructiva)

4 Nuevas tecnologías para el mundo

Location / Domain	Technologies/ Retrofitting Strategies	Cost effectiveness	Compatible with continued operation	Replicability in Public District	Advantages and Disadvantages	Needs of innovation for specific use in Public district retrofitting	A²PBEER approach
FAÇADE	Replace all facade	**Low**	Very Low	Low	It is very intrusive and unsustainable.	None	Considered suitable for limited cases
	Ventilated façade	**High**	**Very high**	High	Easy to install. Require large thicknesses of insulation. Good for buildings aesthetics	Reducing the thickness in any environment.	**Development and demonstration of a ventilated facade based on VIPs (1)**
	ETHICs façade	**High**	**Very High**	High	Easy to install and lightweight. Depends on building type.	None	Recommendations and guidelines through the methodology
	Projected Insulation	**Low**	**High**	Medium	Easy to install but the projected products are unsustainable.	None	Considered suitable only for limited applications.
	Internal insulation	**High**	**High**	High	It is compatible with protected facades. Large thicknesses requirement and the system can be intrusive.	Reducing the thickness in any environment. Industrialised solution is required to reduce the impact in the building users.	**Development of internal insulation system based on VIPs (1)**
	Core Insulation	Medium	Medium	High	Very intrusive and the homogeneity of insulation is not been guaranteed	New expansive materials	Considered suitable only for limited cases
	Solar Wall	Medium	Low	Low	It is a singular system that requires specific conditions	Industrialization of the system	Considered suitable only for limited cases

OPENINGS	Duplication	Low	Very High	Medium	Not suitable for "Deep retrofitting"	None	Considered suitable only for cases with low budget
	Existing window improvement	Medium/ Low	High	Medium	Improvement of the tightness but not the thermal conductivity.	None	Considered suitable only for limited application but not for deep retrofitting
	Multi-layer glazing	**High**	High	High	It is a good solution for improving the energy efficiency of buildings.	None	Recommendations and guidelines through the methodology
	Low e-glass	**High**	**High**	**Very High**	It is not possible to separately optimize solar gains for heating and cooling seasons	Adaption of its filtering capability to the climatic conditions of environments and to the thermal loads	**Development of a reversible window system (1)**
	X-chromic windows (Photo, electro,..)	Low	High	Low	High price and for very specific situations	None	Considered suitable only for limited cases
	Static shading elements	High	Very High	High	Regulations hampers the implementation	Innovation is not demanded	The methodology will include it
	Dynamic shading elements	Medium	Very High	High	Regulations hampers the implementation	Innovation is not demanded	The methodology will include it
ROOF	Roof insulation	High	Very High	Very High	There are a lot of demonstrated technologies	None	The methodology will include it
	Roof covering	Medium	Very High	Very High	There are a lot of demonstrated technologies	None	The methodology will include it
INTERIOR	**Optimizing natural lighting sources**	**Very high**	**High**	**Very High**	There are several natural lighting systems but they are quite expensive and very intrusive.	Development of a solution kit that combines natural lighting systems, efficient artificial lighting and management.	**Set Solution that combines natural light systems, efficient artificial lighting and management control system. (2)**
	Efficient artificial lighting sources	**Very high**	**Very High**	**Very High**	There are a lot of technologies in the market	Innovation is not demanded	
	Lighting systems control	**Very high**	**Very High**	**Very High**	Regulation of artificial lighting without taking into account the specific needs of each end user	Design a lighting system control improving the energy efficiency of the lighting system.	

HVAC	Mechanic ventilation	Low	Medium	High	Improved indoor air quality and economizer operation	Minimize installation process impact on building operation	Considered suitable only for limited cases
	Mechanic ventilation with Heat recovery	High/ medium	Medium	High	Improved indoor air quality and reduction of energy consumption linked to ventilation	Minimize installation process impact on building operation	Recommendations and guidelines through the methodology.
	Heating/cooling generation systems	High	High	High	Improvement of performance. Operation cost reduction	Minimize installation process impact on building operation	**Development of a flexible and modular system (at building and district scale) that optimises thermal network taking into account the building systems, district systems, RES and the management systems. (2)**
	CHP	Very High	High	High	Energy cost and environm. impact reduction through distributed electricity generation.	Improved integration with district thermal network. Bidirectional building node	
	Absorption	Very High	High	High	Energy cost and environm. impact reduction through solar cooling and integration with smart thermal network.	Improvement in the integration with solar installations and district thermal network.	
	Short term Thermal Energy storage	Very High	High	Medium	Optimization of the integration and performance of the solar cooling system and the thermal network	Minimize installation process impact on building operation. Improvement the integration with solar cooling system and with thermal network	
	Heating /cooling distribution/emission subsystem	High	Medium	High	Improved energy performance. Comfort and performance improvement through low T° systems and optimization of thermal zoning	Minimize installation process impact on building operation.	
	Biomass boiler	Medium	High	Medium	Environmental impact reduction through renewable fuel use	Minimize installation process impact on building operation.	
RES	Photovoltaic	Medium	High	High	Energy cost and environmental impact reduction through renewable used for electricity, heating and cooling.	Improved building integration	
	Solar thermal	High	High	High		Improved integration with building heating and cooling systems	
	Solar concentrator	Medium	High	Low		Verification of applicability and improved integration with building CHP and heating and cooling systems	
MGT	BEMS	High	High	Very High	Improved comfort and energy performance. Operation cost reduction	Integration of building scale control and Thermal network control	

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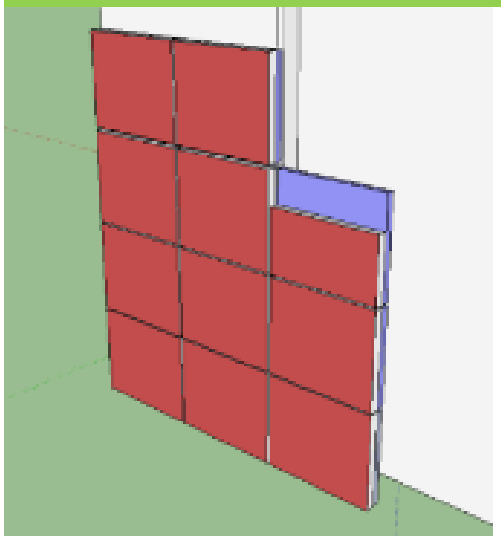
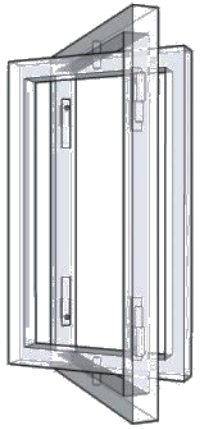
kit 1. SOLUCIONES DE ALTAS PRESTACIONES PARA LA ENVOLVENTE

1. 1 DESARROLLAR UN SISTEMA DE ALTAS PRESTACIONES PARA LA **ENVOLVENTE** (Externa e interna)



El proyecto desarrolla y evalúa un kit de soluciones basado en un sistema de rehabilitación de fachadas industrializadas super aislantes. KIT adaptable y asequible para cada tipo de edificio público y clima, teniendo en cuenta las diferentes limitaciones de construcción.

1. 2 **VENTANA** INTELIGENTE



Se desarrolla una nueva solución de ventanas basado en un nuevo sistema de ajuste.

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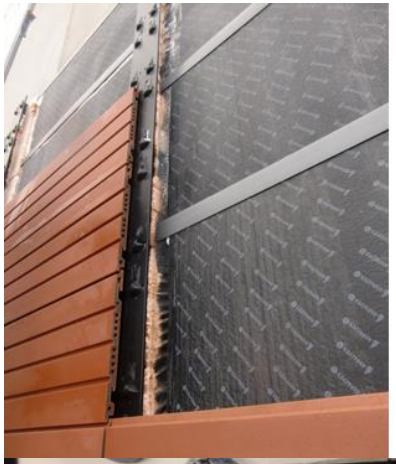

Fachada ventilada con VIPs.

VIP: paneles al vacío de muy baja conductividad térmica.
1 cm de VIP ≅7 cm lana de roca

Con **3cm** de **VIP** integrados en la **FV K-20** de **Buchtal** conseguimos
U_{FV}= 0.276 W/m²K

RECRECIMIENTO exterior**: 10cm**

Video aislamiento por el exterior

https://www.youtube.com/watch?v=QS2aY_IreW0

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Trasdosado interior con VIPs.

Con **3cm** de **VIP** integrados en un sistema Placo

RECRECIMIENTO interior **: 10cm**

Videos trasdosado interior

https://www.youtube.com/watch?v=MEQDvB_Urxs

https://www.youtube.com/watch?v=q_TEPslxZNI

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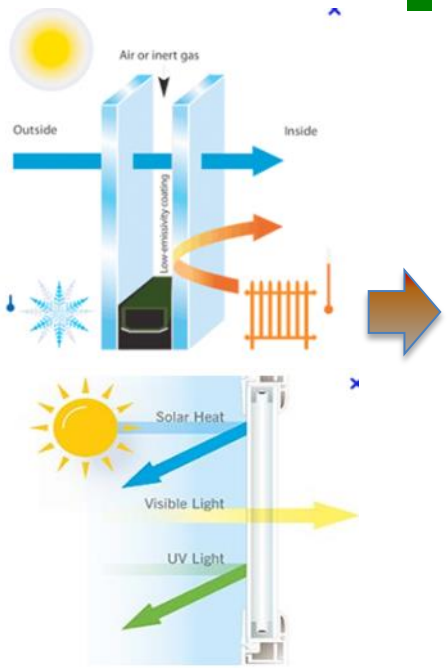
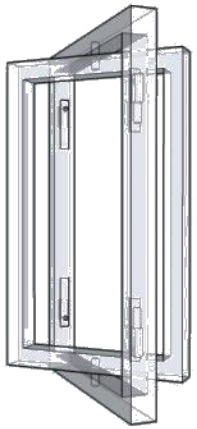
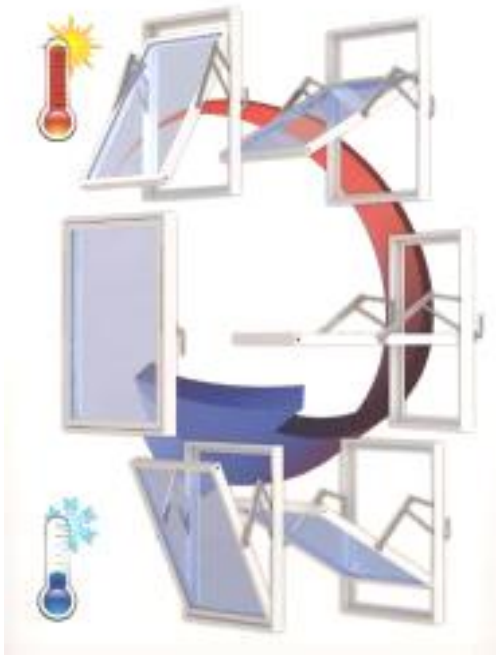




Ventana reversible.

- Invierno: evita el escape de calor
- Verano: evita ganancias solares



https://www.youtube.com/watch?v=PLo_KaqoZKo&feature=youtu.be

Videos ventana reversible

https://www.youtube.com/watch?v=sclAcngswYc

https://www.youtube.com/watch?v=vrRm7F1X1rA

SEVENTH FRAMEWORK PROGRAMME

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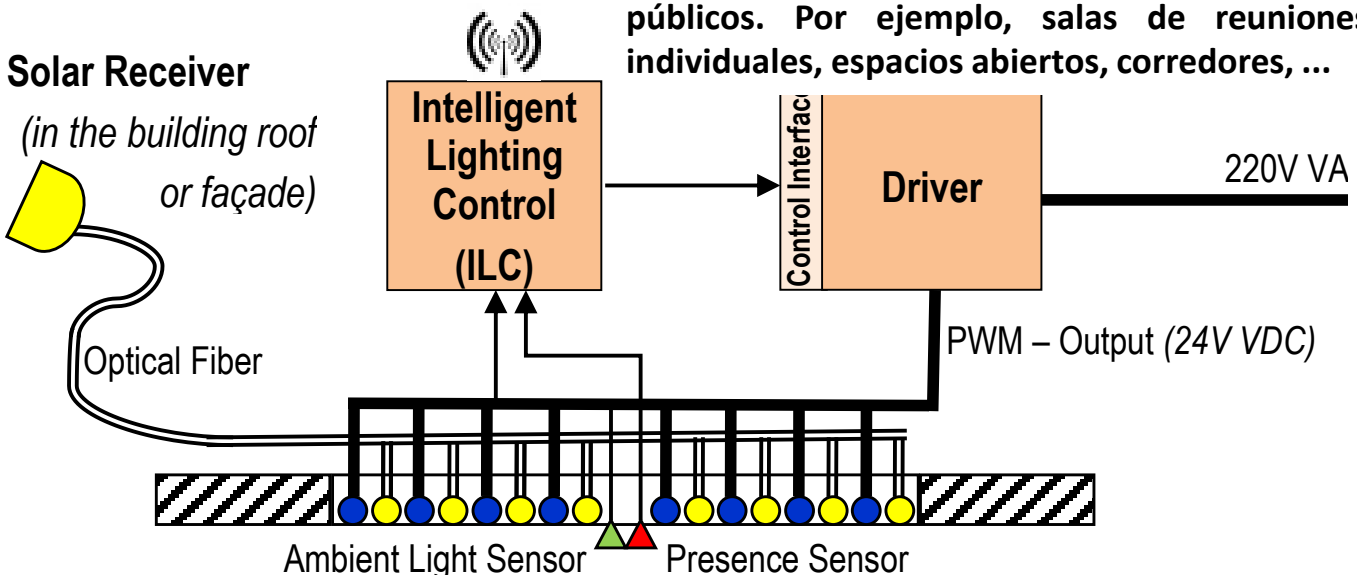
kit 2. SISTEMA INTELIGENTE DE ILUMINACION

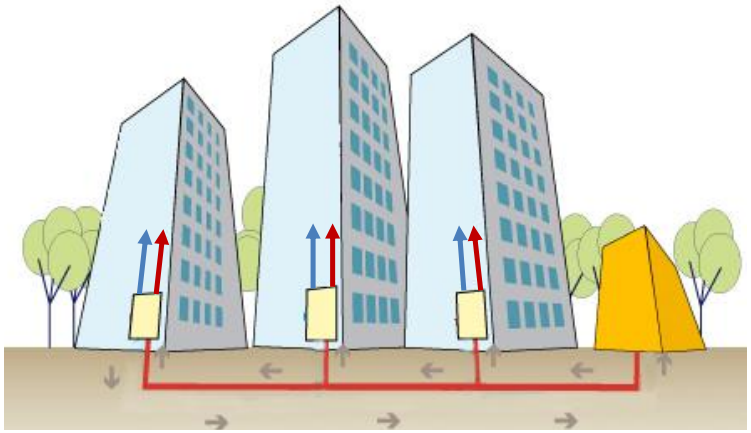
Los Kits desarrollados consisten en un conjunto de soluciones que permiten cubrir diferentes necesidades de iluminación en edificios públicos. Por ejemplo, salas de reuniones interiores, oficinas individuales, espacios abiertos, corredores, ...



Se prevén cuatro tipos de sistemas:

- Luminaria con iluminación **LED** . El más barato y simple. Adecuado para edificios donde la iluminación solar no es suficiente y los usuarios controlan la iluminación.
- Luminaria con iluminación **LED + Sistema Inteligente**. Integra un control de presencia y de iluminación, ampliando el anterior controlando la presencia en el área de iluminación.
- Luminaria con **Fibra Óptica + LED**. El L2Hybrid actual. La mejora incorpora un control de iluminación con el fin de compensar automáticamente la falta de iluminación natural a través de la fibra con la iluminación artificial a través de LEDs.
- Luminaria con **Fibra Óptica + LED + Sistema Inteligente**. Este sistema integra un control de presencia y de iluminación, ampliando la anterior mediante el control de presencia en la zona de iluminación.

kit 3. RED INTELIGENTE DE DISTRITO DE CALOR Y DE FRÍO



El proyecto A²PBEER hará uso del sistema de generación y distribución de agua caliente ya disponible, para satisfacer las necesidades de enfriamiento del distrito. Para implementar este enfoque será necesario desplegar a escala de edificio tecnologías de absorción y sistemas solares térmicos con almacenamiento a corto plazo. La integración de almacenamiento a corto plazo permitirá maximizar el uso de la **energía solar** libre disponible.

Al mismo tiempo, y para aprovechar la posible complementariedad de los diferentes patrones de uso de los edificios del barrio, se realizará un **intercambio bidireccional de calor** entre los edificios y el sistema de district heating (calefacción urbana). La **bidireccionalidad** permitirá optimizar la producción solar y la capacidad de almacenamiento a escala de distrito, permitiendo la disposición de los sistemas individuales de colectores térmicos solares y sus almacenamientos asociados en una planta virtual centralizada. Las funcionalidades necesarias para implementar la doble transición desde las redes de calefacción unidireccionales existentes a las redes bidireccionales de calefacción y refrigeración (en las que el calentamiento y la refrigeración se pueden proporcionar al edificio desde una sola conexión a la red de distrito) y la dirección del flujo de energía se optimiza de acuerdo a equilibrio instantáneo entre el edificio y la red, prestados por el enfoque innovador y multifuncional de la **Subestación doble térmica inteligente** del edificio.

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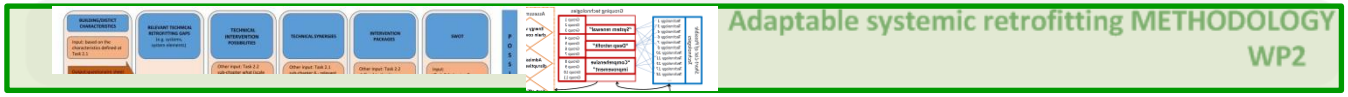

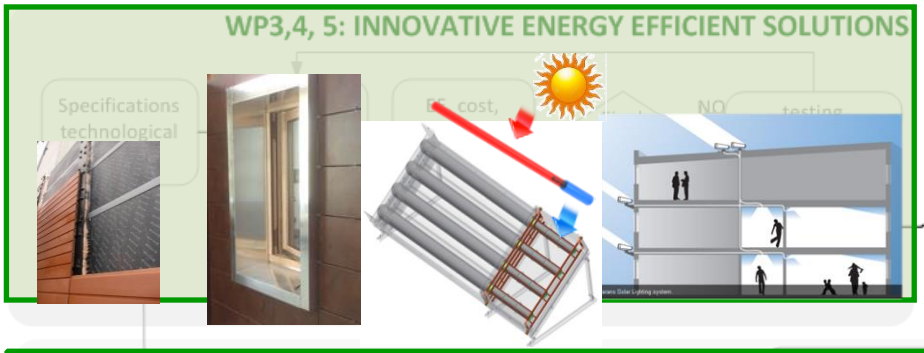

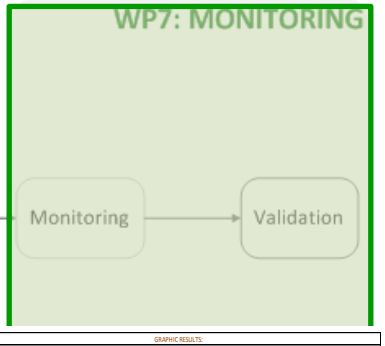

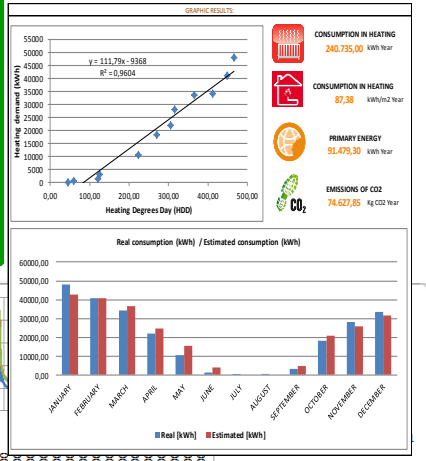

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Muchas gracias por su atención!