

“Eficiência Energética nos Edifícios no contexto de NZEB e Smart Cities”

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Tópicos a abordar...

Contexto actual

Eficiência Energética

(vs Consumos e vs Suficiência Energética)

Edifício no Futuro

(próximo/reabilitação/novos)

“Edifício Interactivos”



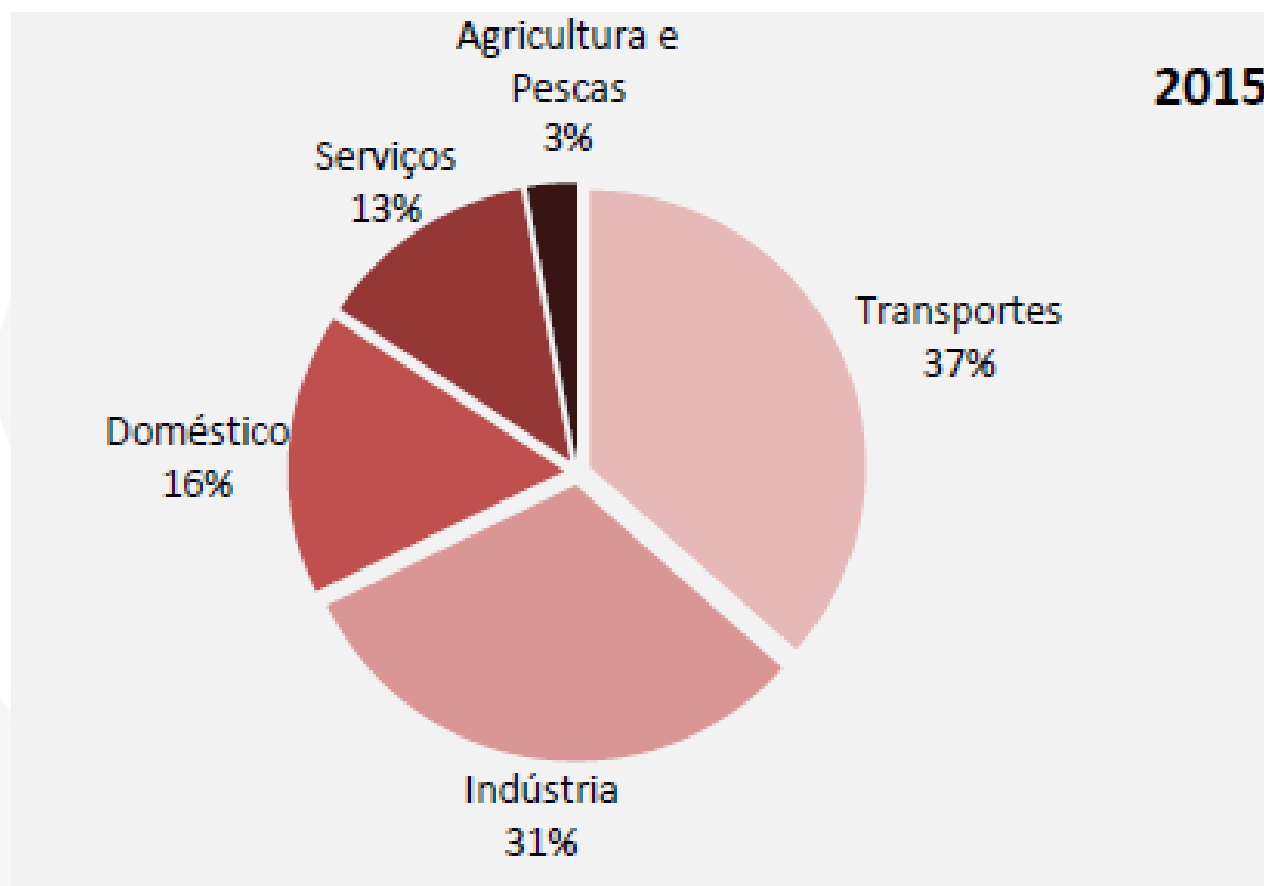
A scenic view of a city, likely Lisbon, Portugal, featuring a suspension bridge and a tall tower in the background. The foreground shows a dense urban area with red-tiled roofs and a church dome.

Os Edifícios em Portugal representam:

30 % dos consumos energéticos

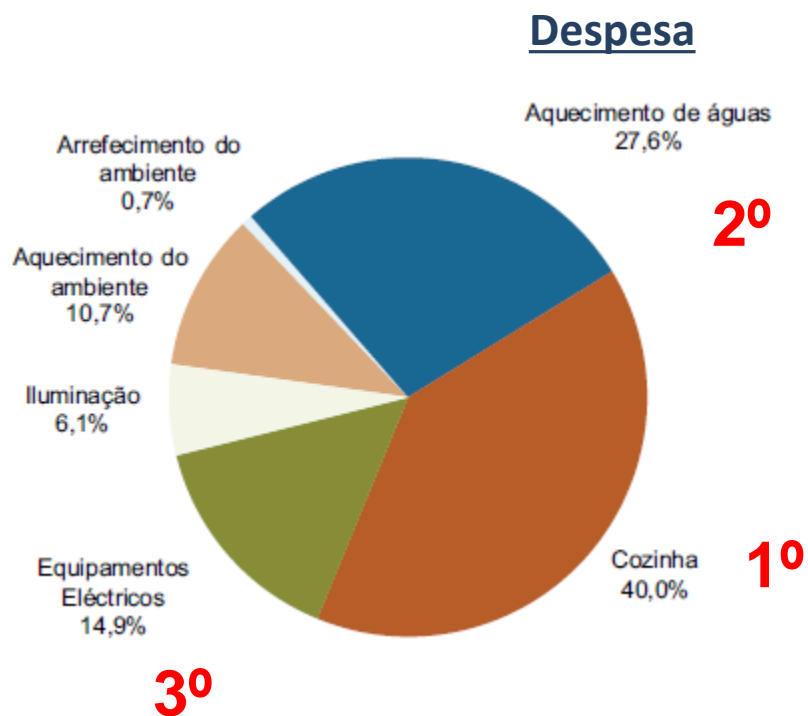
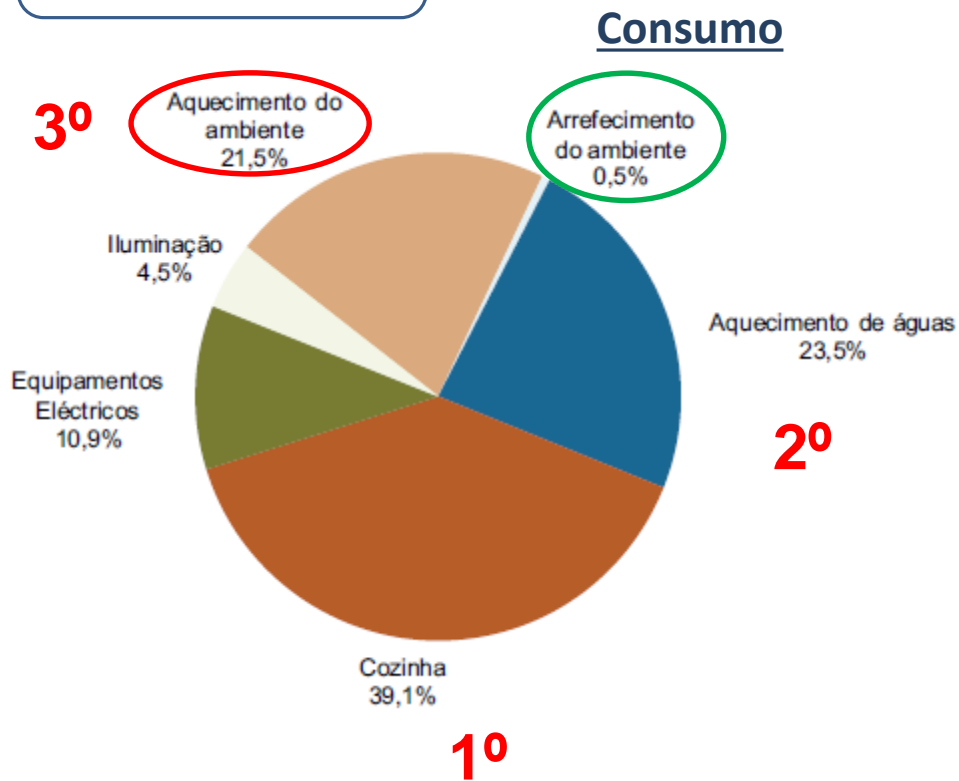
60 % do consumo eléctrico

2º sector em termos de emissões de CO₂



Inquérito ao Consumo de Energia no Sector Doméstico (2009-2010)

ALOJAMENTO (Utilização)

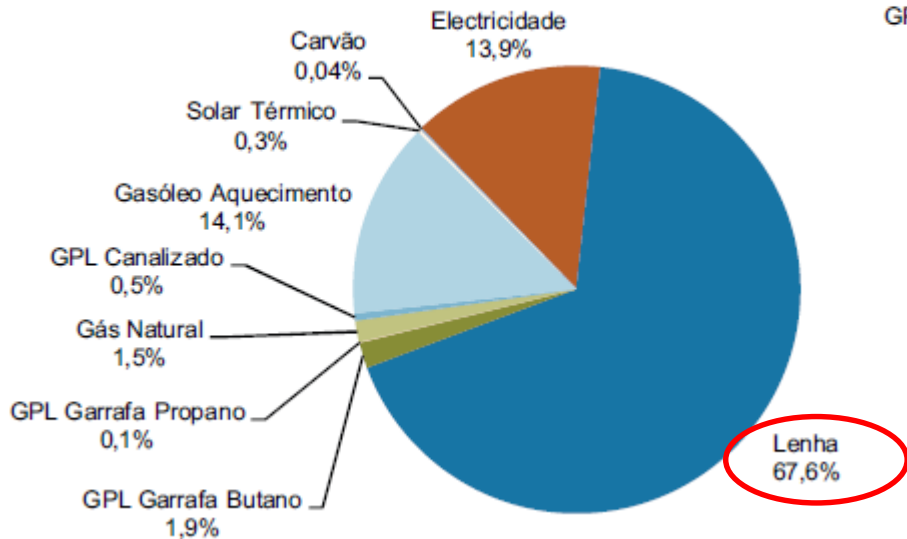


Cozinha inclui Fogão com forno, Placa, Forno independente, Fogareiro, Lareira, Microondas, Exaustor/extractor, Frigorífico (com e sem congelador), Combinado, Arca congeladora, Máquina de lavar loiça, Máquina de lavar e secar roupa, Máquina de secar roupa e Máquina de lavar roupa.

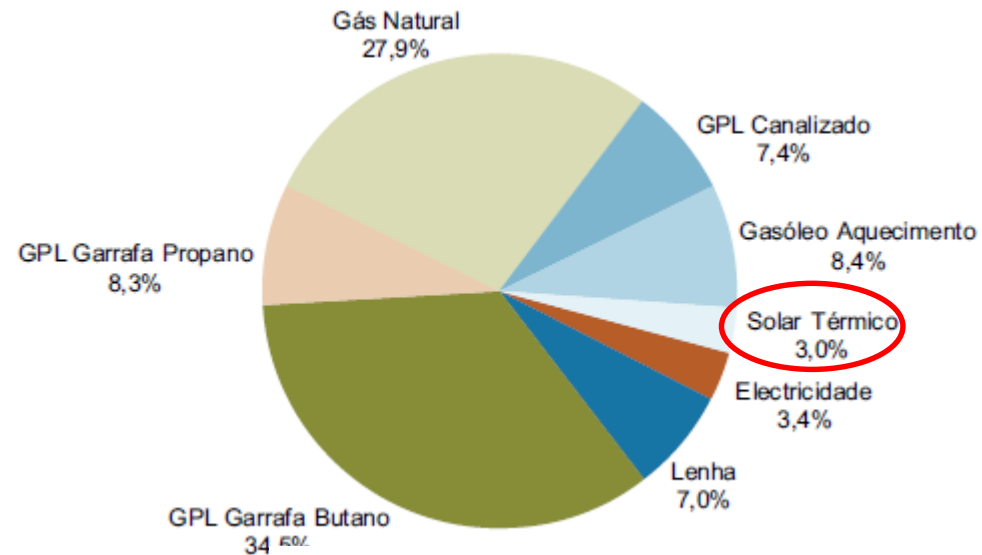
Os Equipamentos Eléctricos incluem Aspirador, Aspiração central, Ferro de engomar, Máquina de engomar, Desumidificador, Televisão, Rádio, Aparelhagem, Leitor de DVD, Computador, Impressora e Impressora/Fax.

Inquérito ao Consumo de Energia no Sector Doméstico (2009-2010)

Aquecimento ambiente



AQS



Tipo de Equipamento	N.º de alojamentos que utilizaram	
	N.º de alojamentos	% (1)

Esquentador	2 995 810	78,6
Termoacumulador	426 751	11,2
Caldeira	455 406	11,9
Sistema solar térmico	68 824	1,8

- **Aquecimento**

- Electricidade
- Lenha
- Solar inexistente



1. Equipamentos (Classe)
2. Solar Térmico (AQS)
3. Reabilitação de Envolvente

- **AQS**

- Esquentadores
- Solar fraca penetração

- **Envolvente**

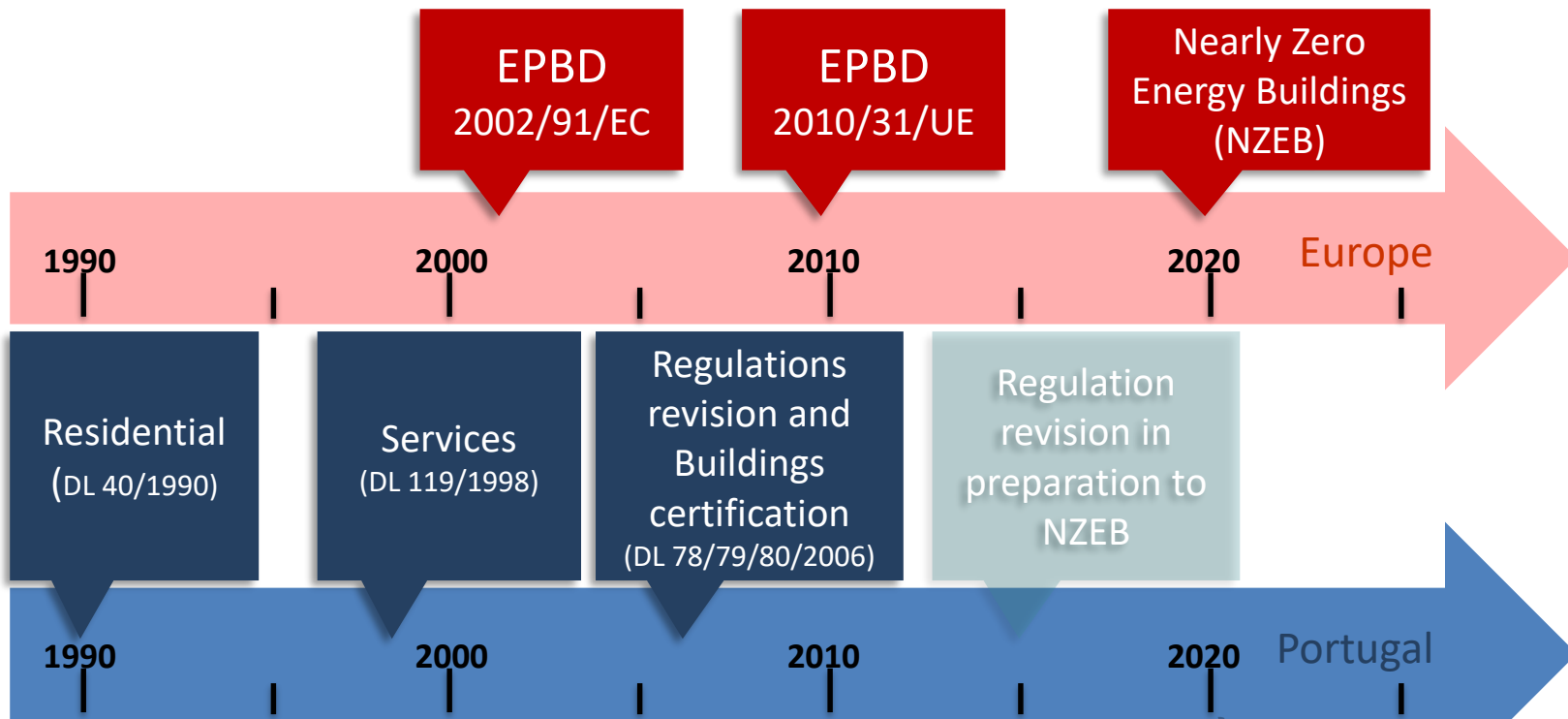
- **Vidros**; 75,4% simples; 18,8 % duplos, 7% VDcct
- **Isolamentos**; Paredes: 21,1% ; Coberturas: 14,1%

- **Equipamentos e Iluminação**

- Melhoria de Classe Energética







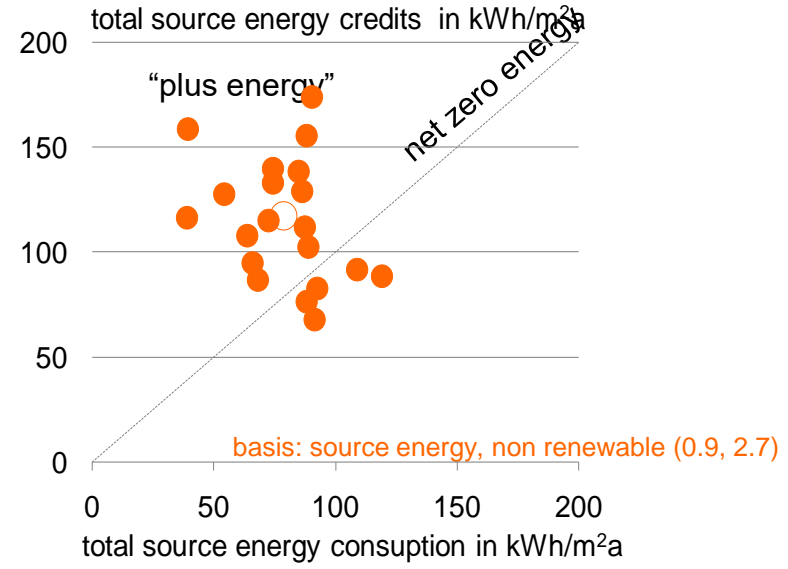
NZEB

Residential buildings

Solar Settlement, Freiburg
Architecture and concept: Rolf Disch



Plus Energy Settlement



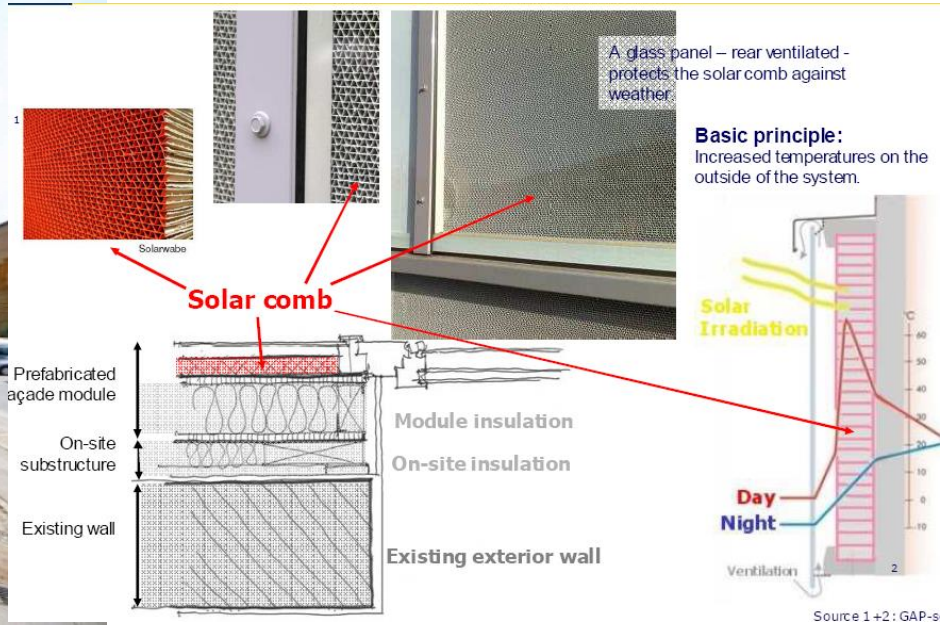
note: 100 kWh/m²y = 32 kBtu/ft² y



Kleehäuser Freiburg



Kraftwerk B



Sistemas pre fabricados de fachada (colector térmico)

Solar thermal collectors were integrated instead of solar comb

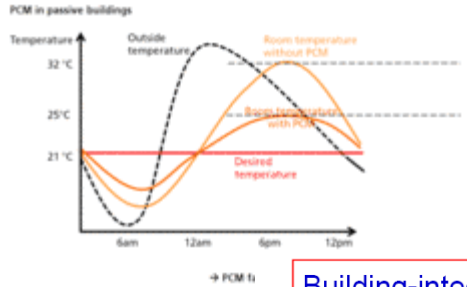
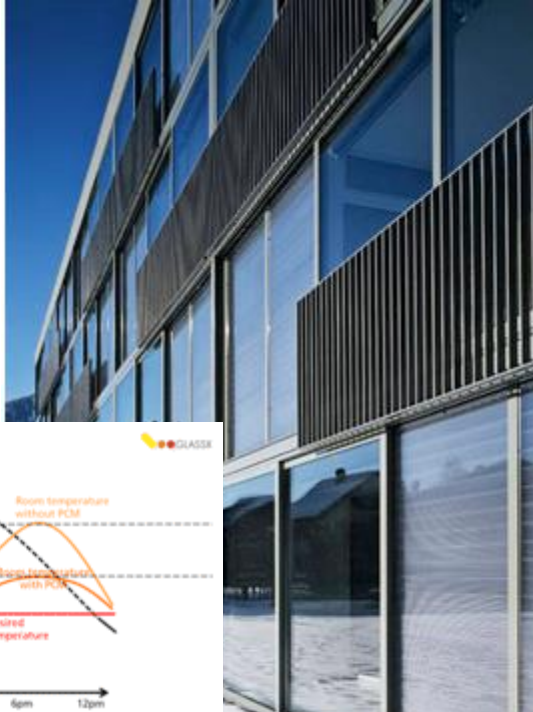


South oriented facade of the long building row



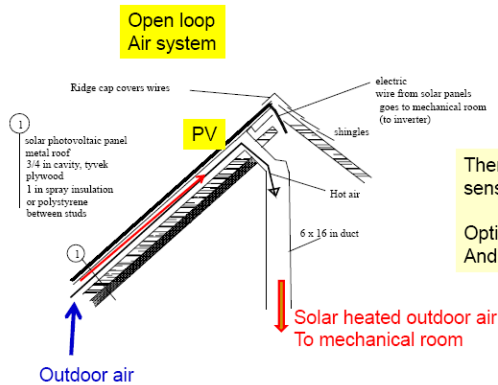
Towards Innovation - Towards NZEB

PCM



www.glassx.ch

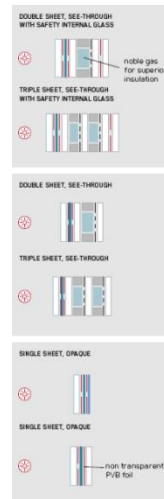
Building-integrated photovoltaic/thermal system principle and design (Theme 1 of SBRN)



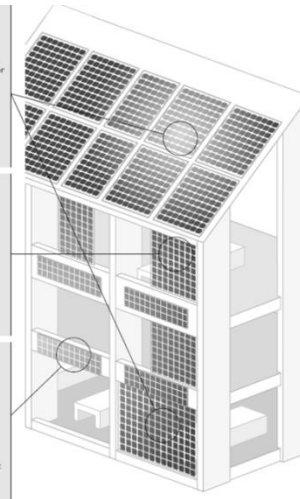
Thermal performance sensitive to slope

Optimal slope for thermal
And to get rid of snow 45deg

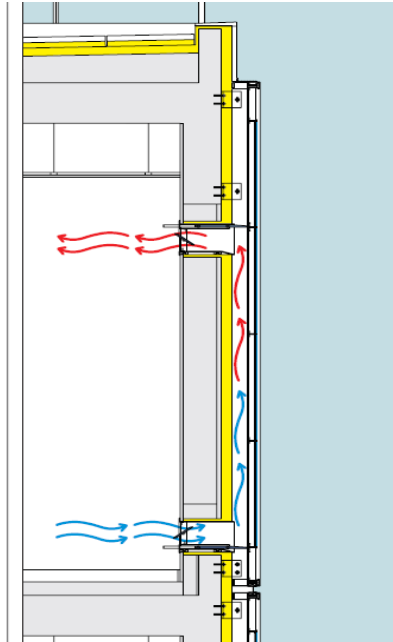
Heat recovery from PV roof raises combined solar efficiency by a factor of ≥ 3



sapa-solar



BIPV

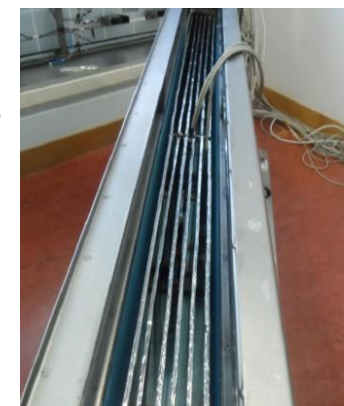
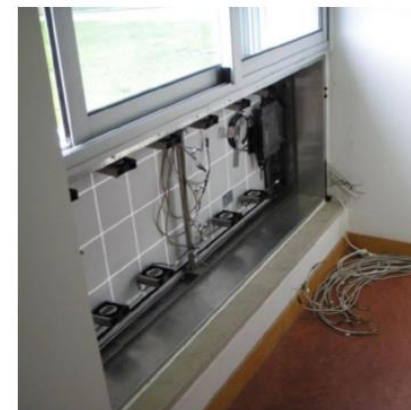
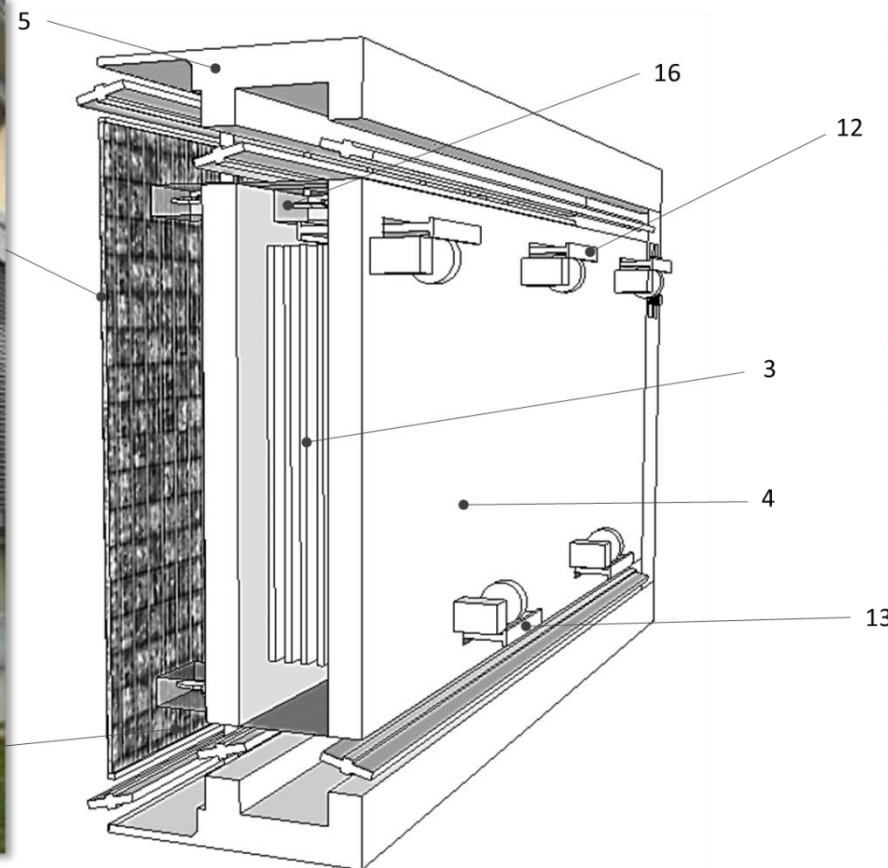


BIPV-T



FRAME – Prefabricated systems for low energy buildings: design, modulation, prototyping and testing

FCT Fundação para a Ciência e a Tecnologia
MINISTÉRIO DA EDUCAÇÃO E CIÊNCIA



Solaire – Battery Park City, NY: 33 kWp

USGBC LEED – Gold

Architect: Cesar Pelli

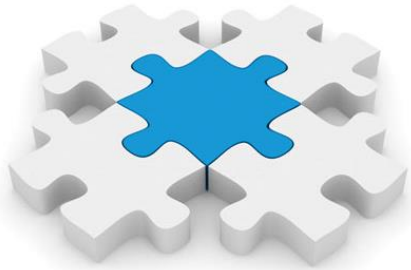


Cortesy

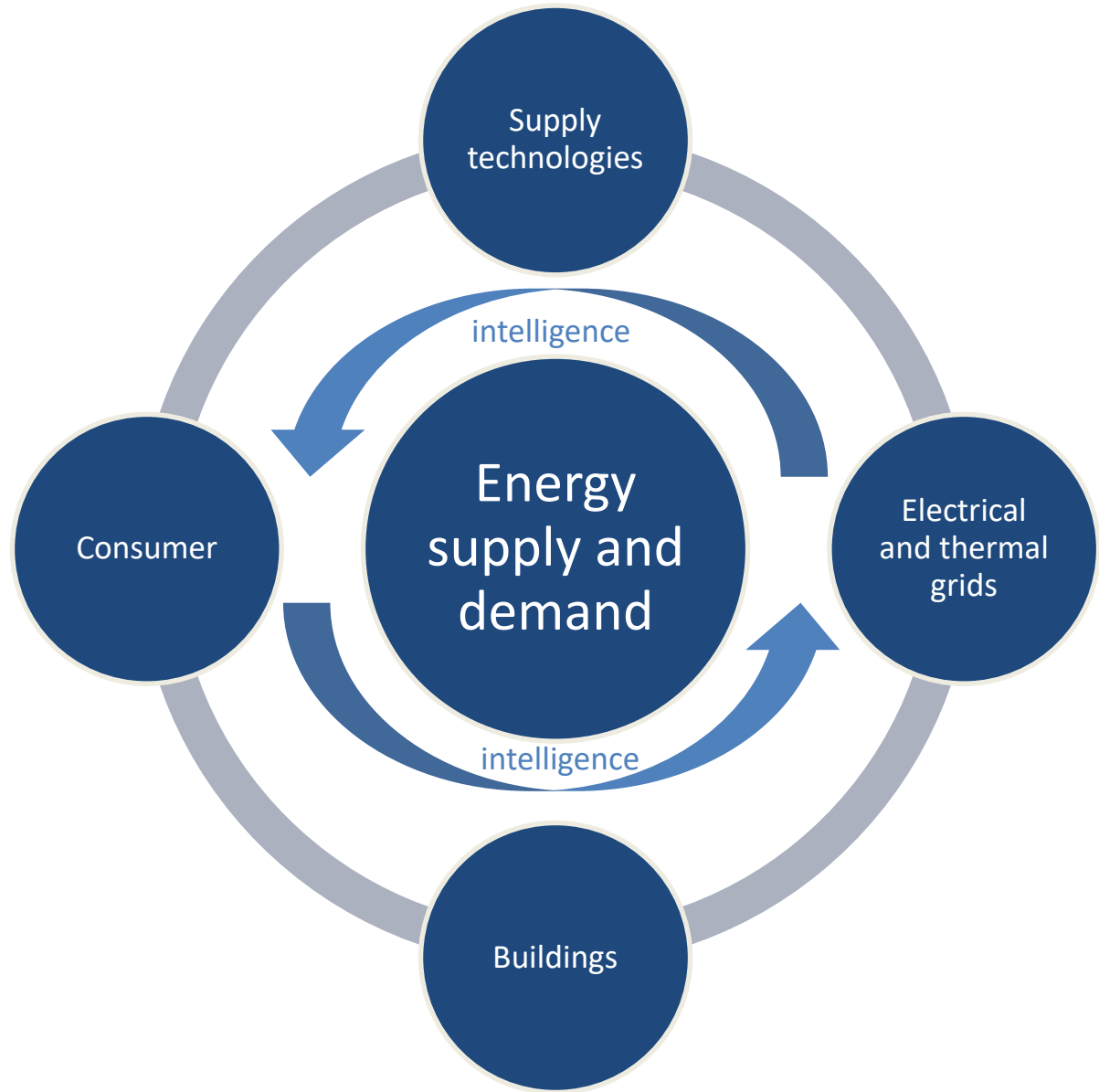


RELAB
RENEWABLE ENERGY LABORATORY

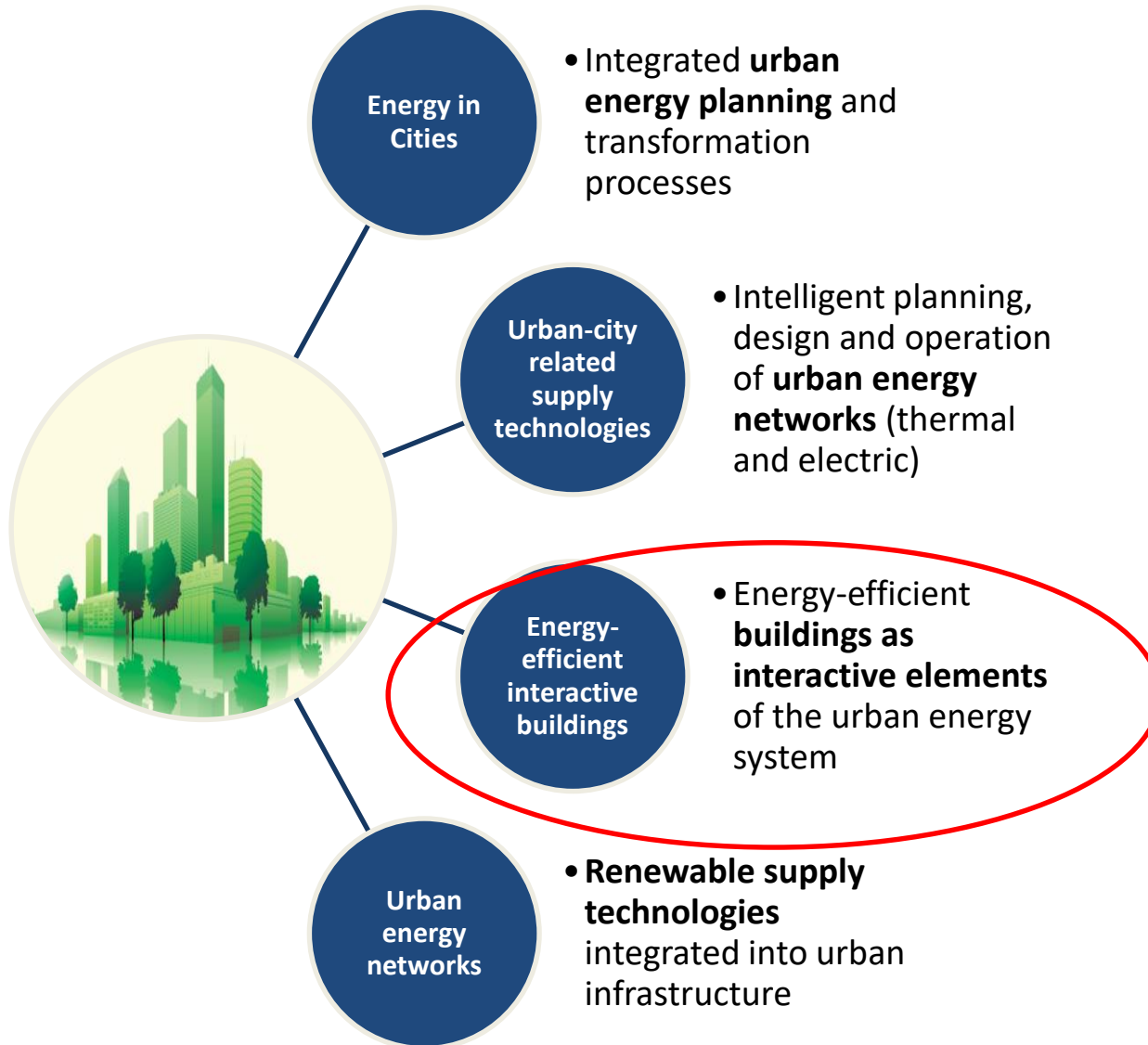
“SMART CITIES” PLAYS AN IMPORTANT ROLE



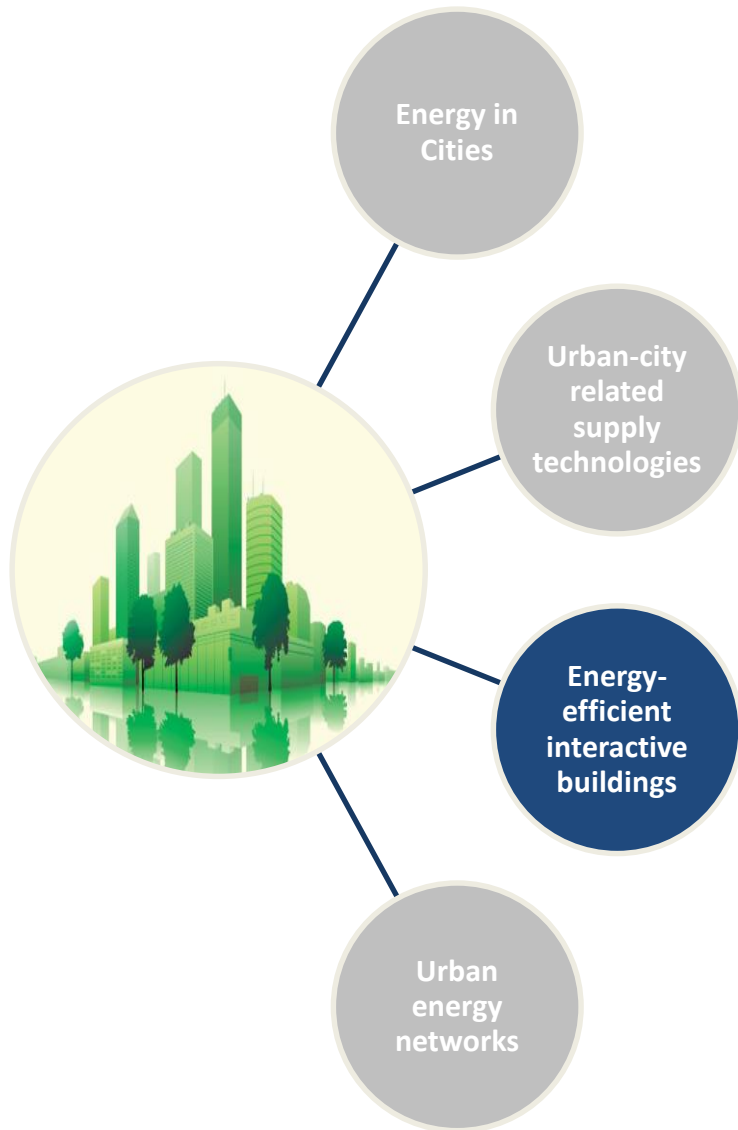
Current research programmes and projects focus merely on the further **development of single energy technologies**, lacking the **HOLISTIC APPROACH** necessary for a complete understanding of the **extensive energy system of an entire city**.



JP SMART-CITIES



JP SMART-CITIES



Current research focuses on the further development of **building automation control systems** that enable the increase in energy efficiency by including **new predictive control strategies**, as well as on the overall energy performance of buildings with respect to **new innovative building design concepts**.

In the context of a smart energy grid **BUILDINGS** have to be fully **INTEGRATED INTO THE OVERALL NETWORK**. Once integrated, they provide energy storage capacities supporting the smart management of the entire energy system.

Buildings will soon provide energy generation services supporting the overall energy supply of the entire system. This **interaction between building and the smart grid** is one key aspect for future research where ICT plays a major role.

Contribuição para medidas de EEE

Reabilitação
Evitar
consumos energéticos

Suficiência energética



NZEB

Programa	Sub-programas		
Edifícios Existentes	Residenciais	Envolvente	Isolamentos Janelas
		Equipamentos	Iluminação Electrodomésticos
		Aquecimento	Sistemas mais Eficientes
		AQS	Solar Térmico
Edifícios Novos	NZEB	Envolvente/Renováveis	Aquecimento e Arrefecimento
Renováveis nos Edifícios	Solar	Electricidade/ Térmico	
	Geoterminia	Aquecimento/AQS	



Tópicos no futuro...

Microgeração
(interacção com a rede)

Armazenamento
(eléctrico e térmico)

Carro Eléctrico

Modelos de negócio
(gestão da oferta e procura,
novos comercializadores, novos
modelos... "Blockchain")





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