



II Congreso EECN
Edificios Energía Casi Nula
Madrid, 6-7 Mayo 2014

PROYECTO ENTRANZE

POLÍTICAS PARA REFORZAR LA TRANSICIÓN A EDIFICIOS DE ENERGÍA CASI NULA EN EUROPA

María Fernández Boneta

CENER – Centro Nacional de Energías Renovables

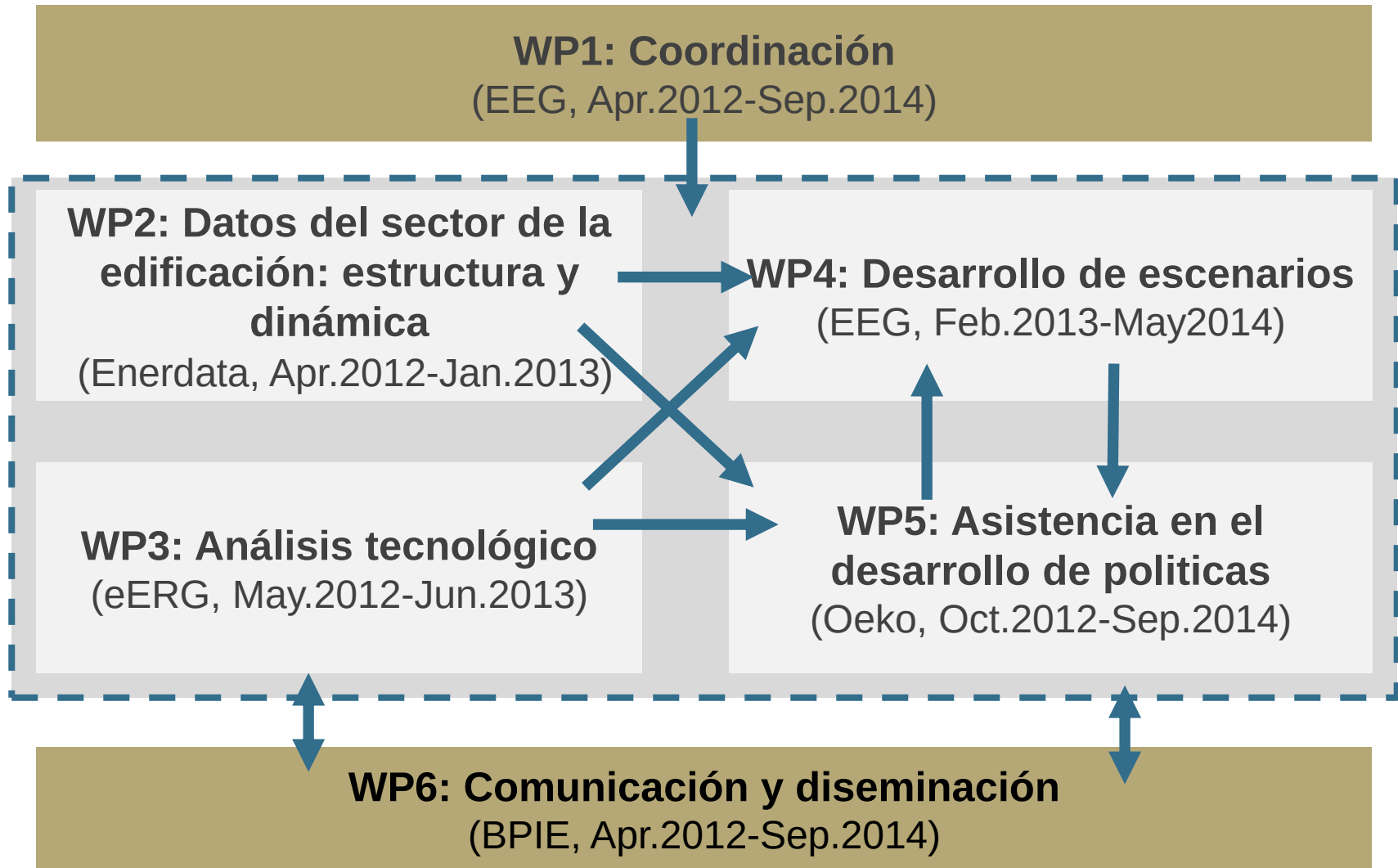


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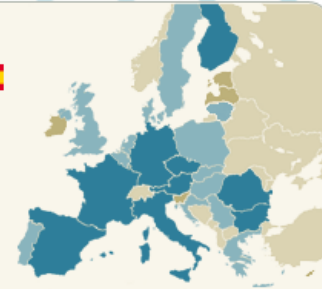


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ESTRUCTURA DEL PROYECTO







Policies to **EN**force the **TR**ansition to Nearly Zero Energy buildings in the EU-27

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Presentation of the Project

The objective of the ENTRANZE project is to actively support policy making by providing the required data, analysis and guidelines to achieve a fast and strong penetration of nZEB and RES-H/C within the existing national building stocks. The project intends to connect building experts from European research and academia to national decision makers and key stakeholders with a view to build ambitious, but reality proof, policies and roadmaps.

The core part of the project is the dialogue with policy makers and experts and will focus on nine countries, covering >60% of the EU-27 building stock. Data, scenarios and recommendations will also be provided for EU-27 (+ Croatia and Serbia). [Read more ...](#)

Data Tool

Interactive online Data Tool is accessible [on this website](#)



An in-depth analysis of the structure related energy systems in EU-27 (+Croatia and Serbia).

nZEB Community - BUILD UP

Nearly zero-energy buildings Community of BUILD UP - The European portal for energy efficiency in buildings

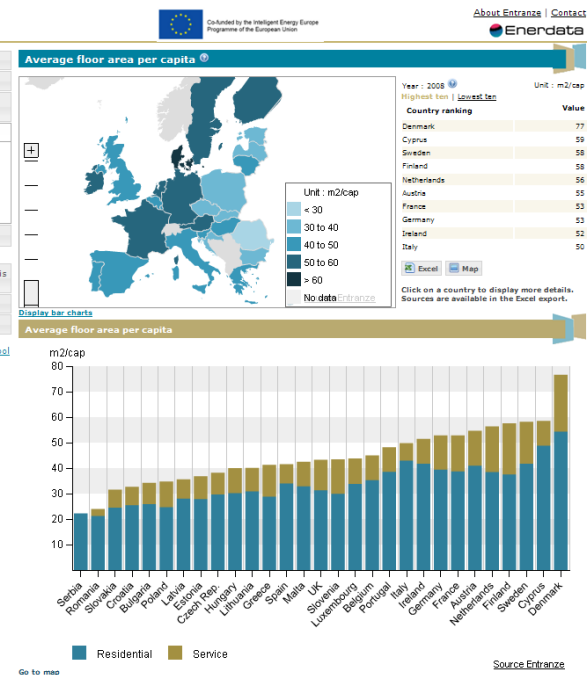


News

- 10. 02. 2014 [Press Releases on fast](#)
- 19. 12. 2013 [ENTRANZE Project in w](#)
- 12. 11. 2013 [ENTRANZE Project on C](#)

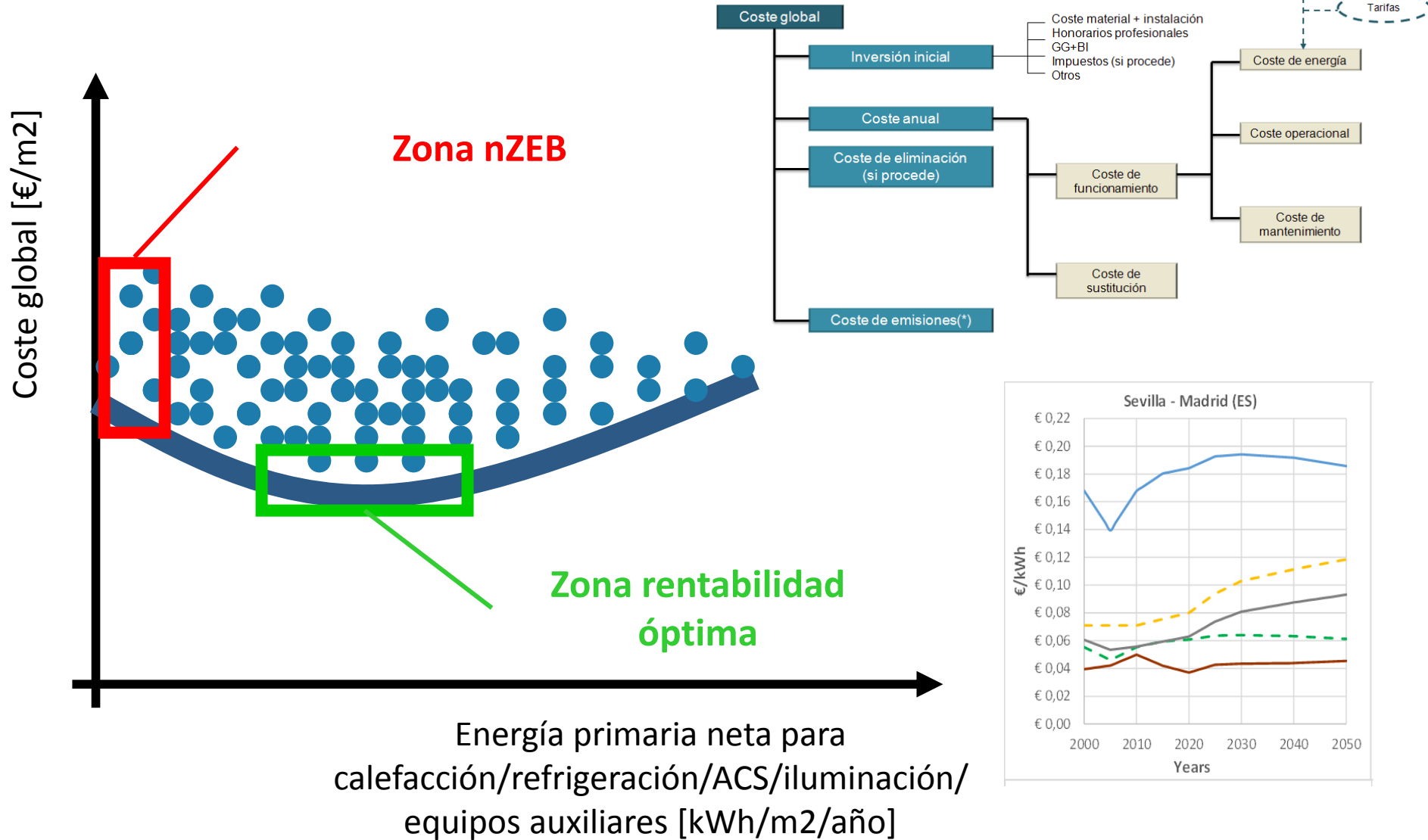
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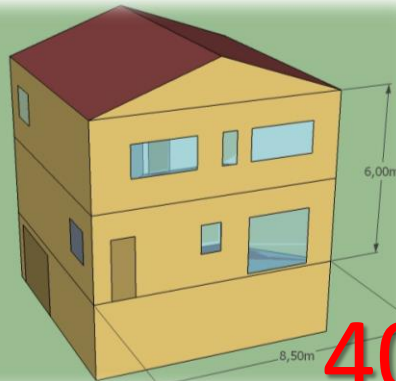
CÁLCULO COSTE-ÓPTIMO



EDIFICIOS DE REFERENCIA

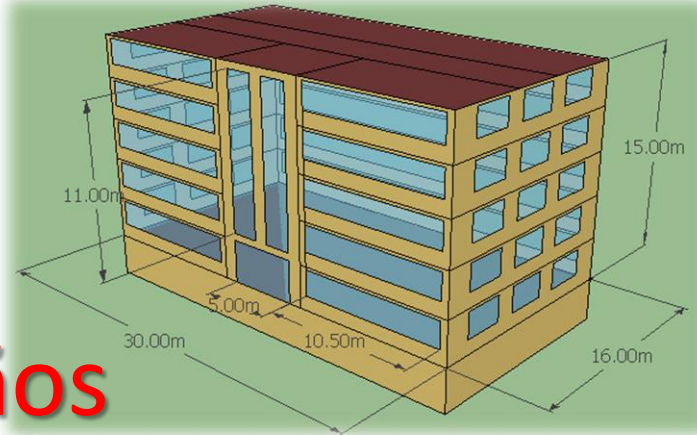


**Vivienda
unifamiliar
140m²**

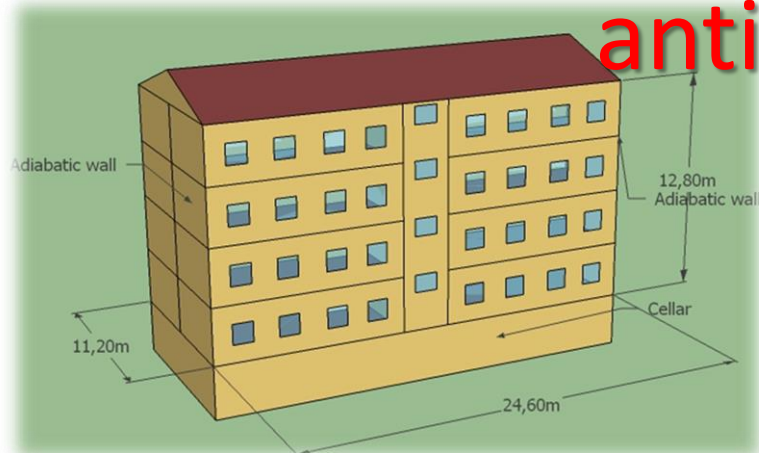


40 años

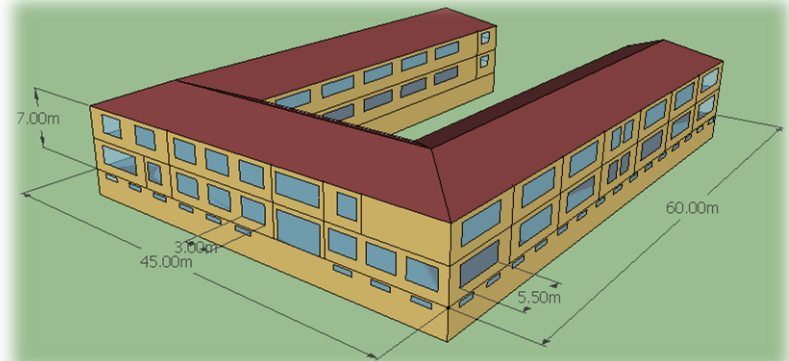
antigüedad



**Edificio de oficinas
2.400m²**



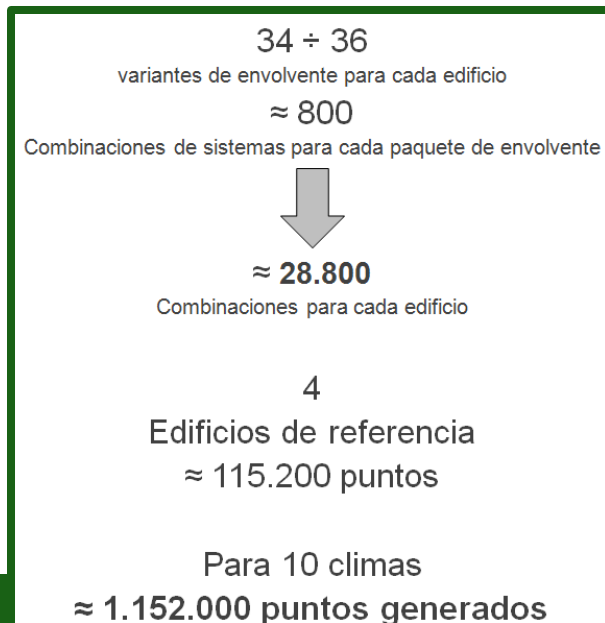
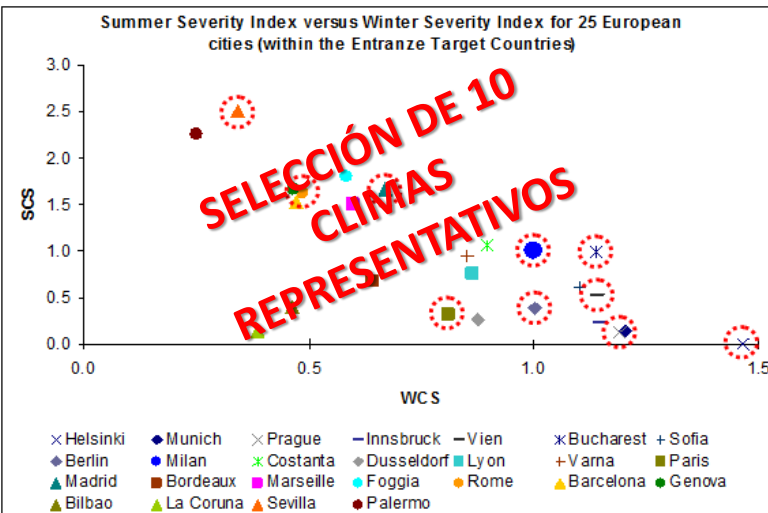
**Bloque de viviendas
990m²**



**Colegio
3.150m²**



CÁLCULO ENERGÉTICO



Envelope Variants	1. Opaque elements parameters				2. Window parameters			3. Heat Recovery for ventilation system	4. Cooling parameters	
	Roof additional Insulation [cm]	Wall additional Insulation [cm]	Basement additional Insulation [cm]	Thermal bridges [% increase U-value]	Glass U-value [W/m²K]	Frame U-value [W/m²K]	Air permeability: m³/hm² at 100	Heat recovery Efficiency	Shading control device optimization	Extra natural ventilation in Summer
Variant 1	0	0	0	0	0	0	0	0	0	0
Variant 2	0	0	0	0	0	0	0	0	1	1
Variant 3	0	0	0	0	1	0	0	0	0	0
Variant 4	0	0	0	0	1	0	0	0	1	1
Variant 5	0	0	0	0	1	1	1	1	0	0
Variant 6	0	0	0	0	1	1	1	1	1	1
Variant 7	1	0	0	0	0	0	0	0	0	0
Variant 8	1	1	0	0	0	0	0	0	1	1
Variant 9	1	1	0	0	1	0	0	0	0	0
Variant 10	1	1	0	0	1	0	0	0	0	0
Variant 11	1	1	0	0	1	0	0	0	0	0
Variant 12	1	1	0	0	1	0	0	0	0	0
Variant 13	1	1	0	0	1	0	0	0	0	0
Variant 14	1	1	0	0	2	0	0	0	0	0
Variant 15	1	1	0	0	2	1	1	1	0	0
Variant 16	1	1	0	0	2	2	2	2	1	1
Variant 17	2	0	0	0	0	0	0	0	0	0
Variant 18	2	0	0	0	0	0	0	0	1	1
Variant 19	2	1	0	0	1	0	0	0	0	0
Variant 20	2	1	0	0	1	0	0	0	1	1
Variant 21	2	1	0	0	1	1	1	1	0	0
Variant 22	2	1	0	0	1	1	1	1	1	1
Variant 23	2	2	0	0	2	2	2	2	0	0
Variant 24	2	2	0	0	2	2	2	2	1	1
Variant 25	2	2	0	0	2	2	2	2	0	0
Variant 26	2	2	0	0	2	2	2	2	1	1
Variant 27	3	1	0	0	1	0	0	0	0	0
Variant 28	3	1	0	0	1	0	0	0	1	1
Variant 29	3	1	0	0	1	1	1	1	0	0
Variant 30	3	1	0	0	1	1	1	1	1	1
Variant 31	3	2	0	0	2	0	0	0	0	0
Variant 32	3	2	0	0	2	0	0	0	1	1
Variant 33	3	2	1	1	2	1	1	1	0	0
Variant 34	3	2	1	1	2	1	1	1	1	1



RESULTADOS VARIANTES

Heating	Cooling	Air chance for IAQ				Generation Power		Operation Time				Other Energy Demand		air to water heat pump EN		water to water ground heat	
q_he	q_co	infiltration		MAX Flow rate IAQ	Max Flow Rate HVAC	Qh [kW]	Qc [kW]	OT_he	OT_co	OT_IAQ	OT_Hvac	Lighting (electric demand)	Appliances (electric demand)	SCOP	SEER	SCOP	SEER
kWh/(m ² y)	kWh/(m ² y)	(m ³ /s)	ach	m ³ /s	m ³ /s	[kW]	[kW]	h	h	h	h	kWh/(m ² y)	kWh/(m ² y)	adim	adim	adim	adim
103.86	47.70	0.03	0.28	0.05	1.10	17.86	12.97	814	515	7937	1071	11.35		2.62	2.67	3.60	4.27
103.86	29.36	0.03	0.28	0.05	0.86	17.86	11.07	814.00	371.00	7937.00	1145.00	11.35		2.62	2.55	3.60	4.17
85.97	45.12	0.01	0.10	0.05	0.94	16.07	11.57	749.00	546.00	7937.00	1140.00	11.35		2.61	2.69	3.59	4.26
85.97	27.49	0.01	0.10	0.05	0.78	16.07	10.20	749.00	378.00	7937.00	1153.00	11.35		2.61	2.54	3.58	4.13
74.10	43.49	0.01	0.10	0.05	0.94	14.93	10.80	695.00	564.00	7937.00	1139.00	11.35		2.60	2.70	3.56	4.26
74.10	26.05	0.01	0.10	0.05	0.78	14.93	9.51	695.00	384.00	7937.00	1151.00	11.35		2.60	2.55	3.56	4.12
45.38	34.24	0.03	0.28	0.05	0.70	11.48	9.24	553.00	519.00	7937.00	1183.00	11.35		2.53	2.73	3.48	4.28
45.38	14.09	0.03	0.28	0.05	0.50	11.48	6.59	553.00	299.00	7937.00	1276.00	11.35		2.53	2.48	3.48	4.02
29.70	32.15	0.01	0.10	0.05	0.57	9.77	7.87	426.00	572.00	7937.00	1334.00	11.35		2.48	2.77	3.39	4.27
29.70	12.33	0.01	0.10	0.05	0.44	9.77	5.50	426.00	314.00	7937.00	1310.00	11.35		2.48	2.47	3.39	3.95
22.51	30.69	0.01	0.10	0.05	0.57	8.88	7.16	355.00	600.00	7937.00	1331.00	11.35		2.43	2.80	3.31	4.28
22.51	11.13	0.01	0.10	0.05	0.42	8.88	4.79	355.00	325.00	7937.00	1364.00	11.35		2.43	2.47	3.31	3.91
21.76	34.77	0.01	0.08	0.05	0.57	9.05	7.69	337.00	633.00	7937.00	1345.00	11.35		2.42	2.83	3.31	4.30
21.77	11.92	0.01	0.08	0.05	0.41	9.05	5.02	337.00	332.00	7937.00	1332.00	11.35		2.42	2.48	3.30	3.94
15.97	33.29	0.01	0.08	0.05	0.57	8.16	7.11	274.00	656.00	7937.00	1343.00	11.35		2.37	2.85	3.21	4.30
15.98	10.72	0.01	0.08	0.05	0.39	8.16	4.32	274.00	348.00	7937.00	1394.00	11.35		2.36	2.49	3.20	3.89
40.24	34.18	0.03	0.28	0.05	0.69	10.93	9.10	515.00	526.00	7937.00	1186.00	11.35		2.51	2.74	3.45	4.28
40.24	13.56	0.03	0.28	0.05	0.48	10.93	6.44	515.00	295.00	7937.00	1281.00	11.35		2.51	2.47	3.45	4.00
24.95	32.20	0.01	0.10	0.05	0.56	9.08	7.73	385.00	583.00	7937.00	1345.00	11.35		2.45	2.78	3.35	4.27
24.96	11.82	0.01	0.10	0.05	0.42	9.08	5.34	385.00	310.00	7937.00	1325.00	11.35		2.45	2.46	3.35	3.93
18.62	30.74	0.01	0.10	0.05	0.56	8.28	7.07	315.00	609.00	7937.00	1342.00	11.35		2.39	2.81	3.25	4.28
18.62	10.63	0.01	0.10	0.05	0.40	8.28	4.64	315.00	321.00	7937.00	1384.00	11.35		2.39	2.46	3.25	3.88
17.46	35.00	0.01	0.08	0.05	0.56	8.33	7.61	294.00	644.00	7937.00	1359.00	11.35		2.39	2.84	3.25	4.30
17.46	11.41	0.01	0.08	0.05	0.38	8.33	4.87	294.00	328.00	7937.00	1386.00	11.35		2.38	2.47	3.24	3.91
12.59	33.53	0.01	0.08	0.05	0.56	7.52	7.02	234.00	669.00	7937.00	1357.00	11.35		2.31	2.87	3.12	4.30
12.59	10.23	0.01	0.08	0.05	0.36	7.52	4.17	234.00	344.00	7937.00	1458.00	11.35		2.31	2.47	3.11	3.86
21.98	32.05	0.01	0.10	0.05	0.55	8.73	7.63	352.00	588.00	7937.00	1350.00	11.35		2.42	2.79	3.31	4.27
21.98	11.36	0.01	0.10	0.05	0.41	8.73	5.23	352.00	304.00	7937.00	1342.00	11.35		2.42	2.45	3.31	3.91
16.18	30.60	0.01	0.10	0.05	0.55	7.91	7.01	287.00	611.00	7937.00	1348.00	11.35		2.36	2.81	3.20	4.28
16.19	10.20	0.01	0.10	0.05	0.38	7.91	4.52	287.00	316.00	7937.00	1418.00	11.35		2.35	2.45	3.19	3.86
14.83	34.96	0.01	0.08	0.05	0.55	7.94	7.54	262.00	649.00	7937.00	1369.00	11.35		2.35	2.84	3.19	4.30
14.83	10.97	0.01	0.08	0.05	0.38	7.94	4.75	262.00	323.00	7937.00	1385.00	11.35		2.34	2.46	3.17	3.89
10.53	33.50	0.01	0.08	0.05	0.55	7.12	6.96	207.00	674.00	7937.00	1367.00	11.35		2.27	2.87	3.04	4.30

Demanda

Ventilación

Operación de los sistemas

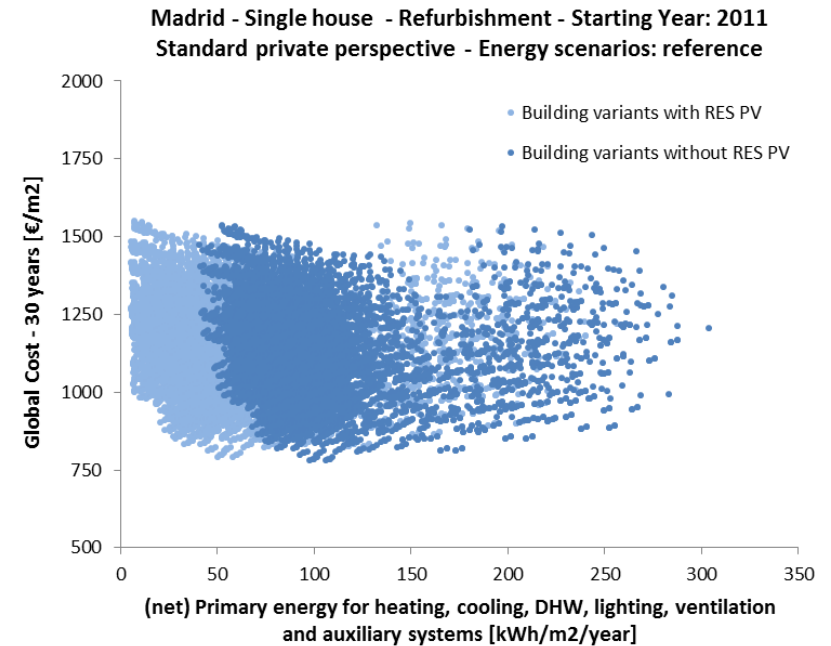
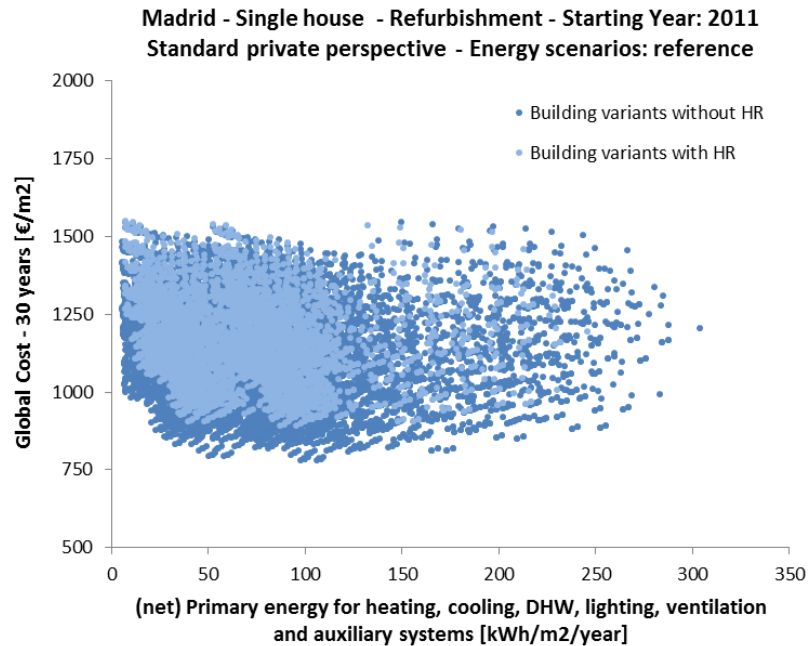
Iluminación

**Rendimiento
bombas de calor**

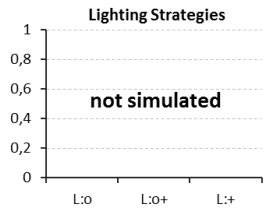
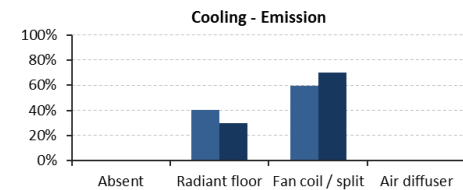
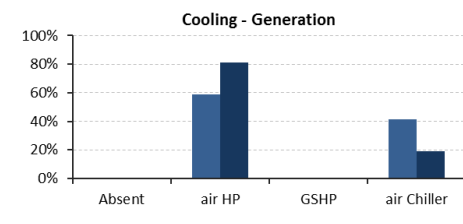
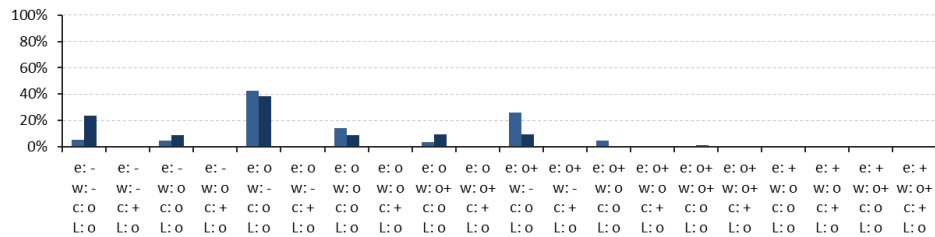


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EJEMPLO RESULTADOS COSTE-ÓPTIMO



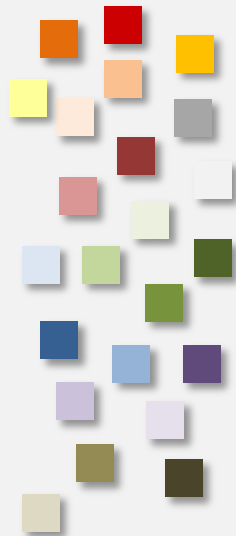
Madrid - Single house - min. Global Cost Area - Standard Private (Energy scenarios: reference)



	Mech. Ventilation	Heat Recovery	Photovoltaic		Solar Thermal	
100%						
80%	min. Global Cost Area		2011		2020	
60%			Min	Max	Min	Max
40%	Range of (net) Primary Energy [kWh/m ² /y]:					
20%						
0%	Range of Global Costs [€/m ²):		40	160	20	160
			780	858	827	898
	Number of Building Variants:		180		180	

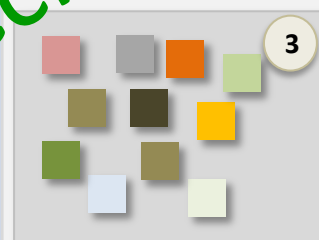
PAQUETES DE POLÍTICAS

Conjunto de instrumentos genéricos



Adaptación específica a cada país

Conjuntos de políticas seleccionados para cada país



Desarrollo de modelos matemáticos



Ratios de rehabilitación
Ahorro de energía
Coste de inversión
...



Ratios de rehabilitación
Ahorro de energía
Coste de inversión
...



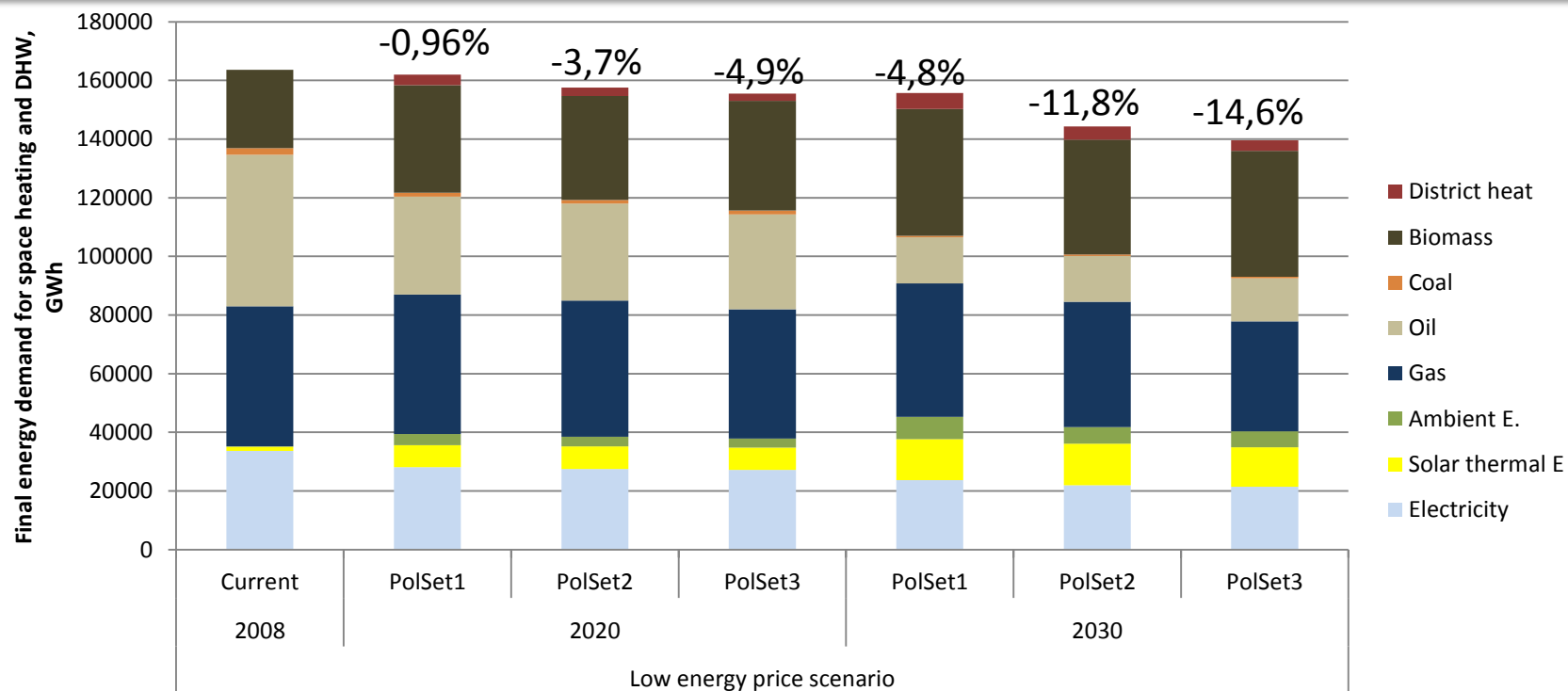
Ratios de rehabilitación
Ahorro de energía
Coste de inversión
...

Recomendaciones de políticas

Interacción con los desarrolladores



Conjunto de políticas 1 Escenario congelado	Conjunto de políticas 2 Escenario enfocado en los instrumentos regulatorios	Conjunto de políticas 3 Escenario ambicioso
Marco regulatorio CTE DB-HE 2013 Instrumentos financieros financiados de los fondos del estado – Plan Estatal IVA reducido (10%) para rehabilitación integral en sector residencial	Marco ambicioso para los instrumentos regulatorios (incremento paulatino de las exigencias hasta 2030) Instrumentos financieros financiados de los fondos del estado – Plan Estatal Eliminación del IVA reducido para rehabilitación en sector residencial	Marco ambicioso para los instrumentos regulatorios Aumento del presupuesto destinado a los instrumentos financieros IVA reducido (10%) para rehabilitación integral en sector residencial Implantación de obligaciones de ahorro





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MUCHAS GRACIAS

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Edificatoria



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