crossCert

Next-generation of Energy Performance Assessment and Certification

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No 101033778

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Next-generation of Energy Performance Assessment and Certification

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Stakeholder workshop

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¿En qué son mejorables los certificados en Europa?

- Robustez
- Valor añadido
- Centrados en el usuario
- Uniformidad (convergencia) en Europa

Proyectos trabajando en certificados ("sister projects")

crossCert

Next Generation Energy Performance Certificates H2020 cluster

Qual DeEPC

U-CERT
User-Centred Energy Performance Assessment and Certification

X-tendo

D2EPC

EDYCE

ePANACEA
Smart European Energy Performance Assessment & Certification

EPC RECAST
ENERGY PERFORMANCE CERTIFICATE RECAST

crossCert
Next-generation of Energy Performance Assessment and Certification

EUB SuperHub

iBRoad2EPC

TIMEPAC
The new EPC for Europe

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¿En qué son mejorables los certificados en Europa?

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- ¿Qué hace crossCert en estos ámbitos?

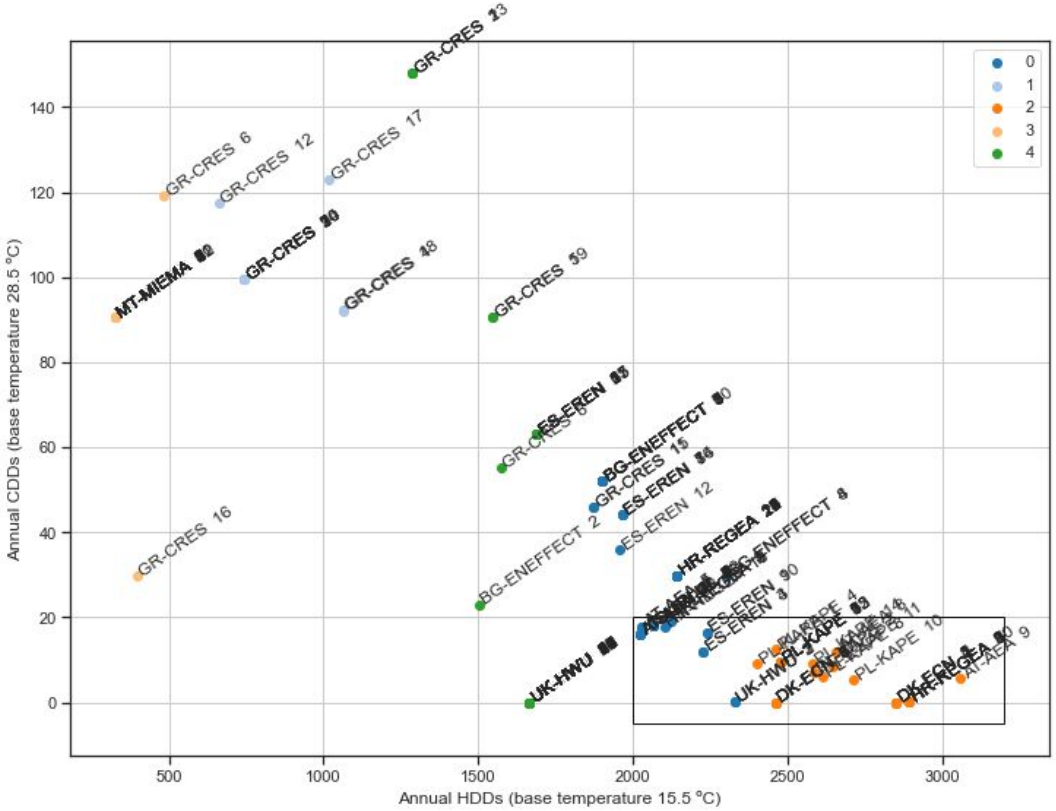
Qué es cross-testing [WP2]

- Un país testea algunos de sus edificios con los certificados de otros países
- 149 edificios en total, en muchas categorías de uso

Building typologies, actual count		CRES	REGEA	KAPE	ENEFFECT	MIEMA	EREN	ECN	AEA	HWU	IRI UL	Total in category
	Number of buildings in country	20	22	15	10	12	16	10	10	24	10	149
	Colour indicates climate	Greece	Croatia	Poland	Bulgaria	Malta	Spain	Denmark	Austria	UK	Slovenia	
Residential	Single family house	5		7	1	2		3	3	20		41
	Terraced house			1		2		2				5
	Multi-apartment Building	5		1	3			3	3			15
Tertiary sector	Educational	5	13	4	2	2	2		1	3	9	41
	Office	2		1	3	4	7	2	1			20
	Sports hall	1	3	1							1	6
	Healthcare buildings		3				2			1		6
	Public entertainment buildings				1							1
	Community/Public assemby buildings		3			2						5
	Social housing						2					2
	Retail buildings	2							1			3
	Buildings for religious activities											0
	Public security buildings											0
	Others						3		1			4
Industrial secto	Industrial buildings and warehouses											0

La dificultad del clima [WP2]

- Gráfica
  Cooling Degree Days
  vs
  Heating Degree Days



Cross-testing: dificultades [WP2]

- Idioma! Clima!
- Solución: tres grupos ('ensembles') de edificios

1. Project-wide ensemble (P-buildings) [7 buildings] – Todos testean; modelo 'de referencia'

2. Climate clusters (C-buildings) [7 buildings x 10 partners] – Testeado 'en parejas'

3. Partner local building ensemble (L-buildings) [Remaining buildings] – Testeado local

Robustez [WP3]

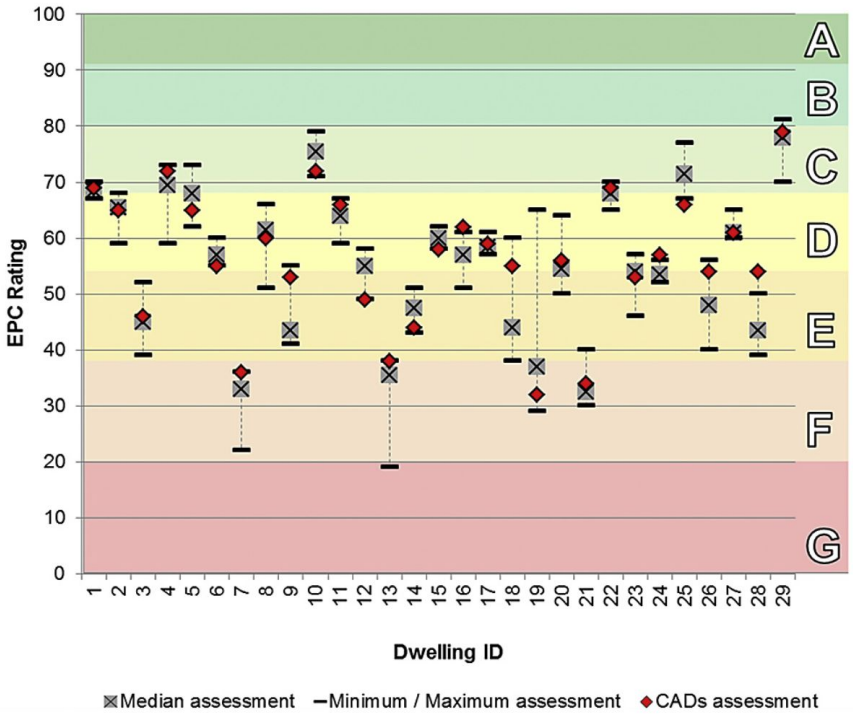
- Performance gap

  Cómo de preciso es el EPC al predecir el consumo energético anual del edificio, supuesto que los inputs son correctos

- Repetibilidad, o consistencia
  Mismo edificio, distinto evaluador = mismos resultados?

Robustez en el Reino Unido [WP3]

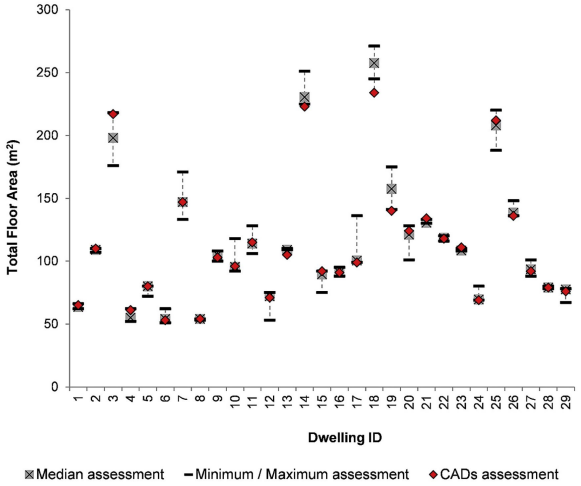
- 29 viviendas, 5 evaluaciones por vivienda
- Una de las evaluaciones de referencia' (rombo en el gráfico)
- Nótese dispersión de valores!



David Jenkins, Sophie Simpson, Andrew Peacock, Investigating the consistency and quality of EPC ratings and assessments, Energy, Volume 138, 2017,

¿Por qué la falta de robustez? [WP3]

David Jenkins, Sophie Simpson, Andrew Peacock,
Investigating the consistency and quality of EPC ratings and assessments,
Energy, Volume 138, 2017,



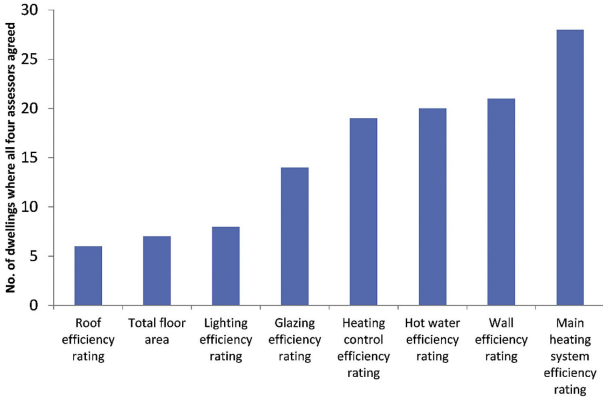


Fig. 6. Number of dwellings where all four assessors agreed on parameters used in the EPC calculation process.

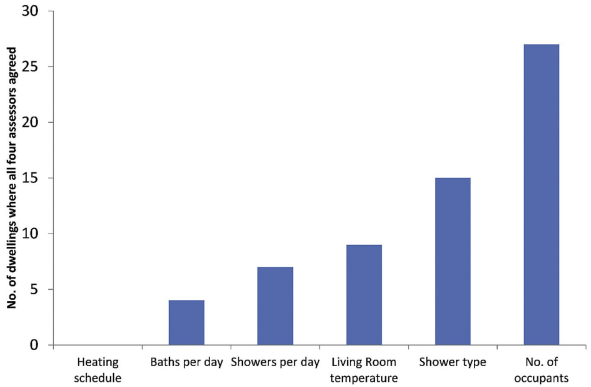
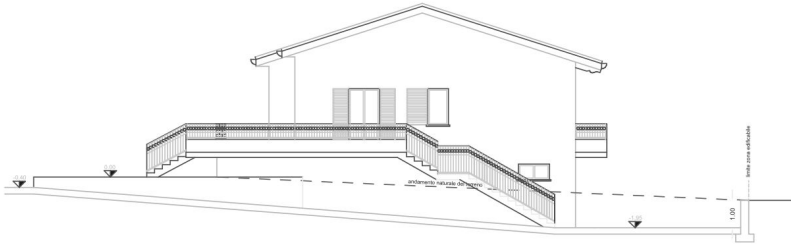


Fig. 9. Number of dwellings where all four assessors agreed on parameters used in the Green Deal OA calculation.

- Incertidumbre en los datos de entrada (áreas, U-values, puentes térmicos)
- Entrenamiento insuficiente (orientado a aprender a utilizar un software, pero no a entender la física detrás del consumo energético de los edificios)
- Descripción de la metodología insuficiente

Robustez en Italia [WP3]

- 162 expertos evalúan el mismo edificio (casa individual)



South-East View

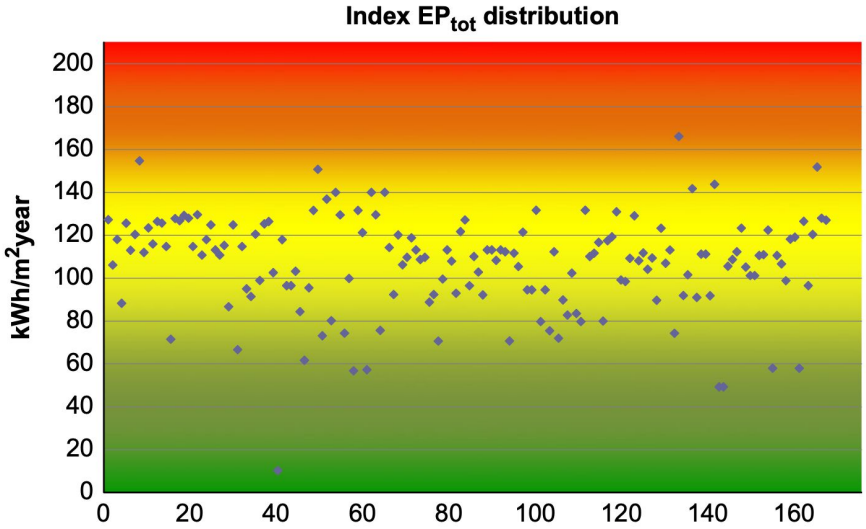


Fig. 3. EP$_{tot}$ index—result dispersion.

Lamberto Tronchin, Kristian Fabbri

Energy Performance Certificate of building and confidence interval in assessment: An Italian case study

Energy Policy, 2012

Actividades de crossCert [WP3]

- Testeo cruzado de metodologías existentes y nuevas metodologías:

Deriving technical Guidelines for EPCs (WP3)

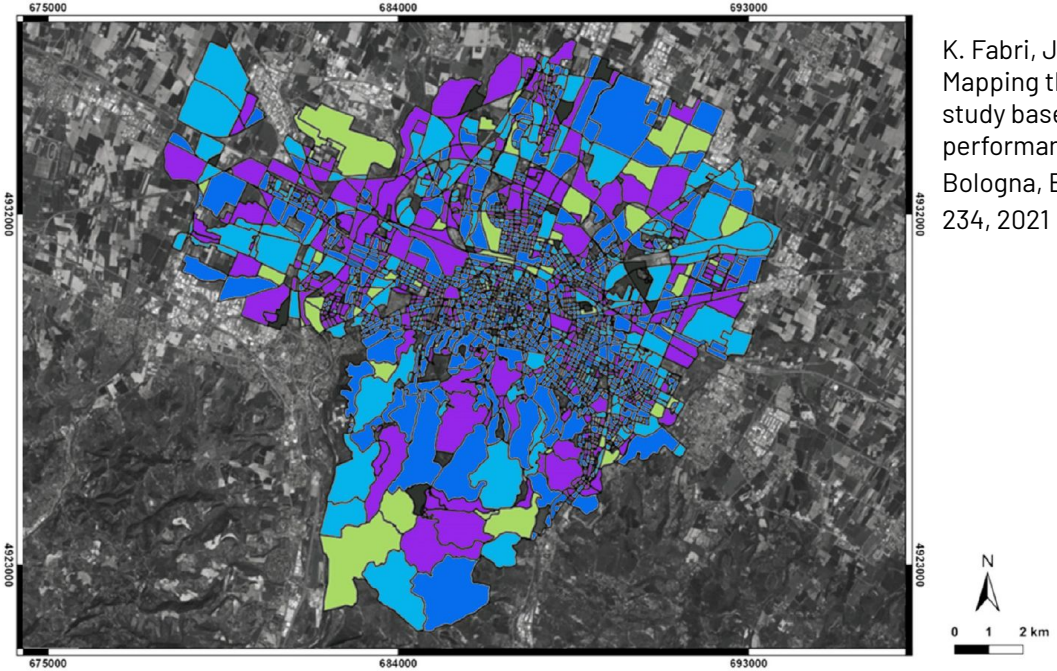
- Performance gap assessment
- Analysis of new scales and KPIs (comfort, SRI)
- Evaluation of the renovation measures recommended by EPCs
- Are new EPC paradigms a significant improvement?

Valor añadido [WP4]

- Explotación datos EPCs
  - Bases de datos de la Administración
  - Adaptación de los datos a sectores específicos (inversores)
  - Relación EPCs con otras herramientas:
    - Auditorías
    - Building Renovation Passports
    - Logbooks
  - Ventanillas únicas (one-stop-shops)

Valor añadido [WP4]

- Ejemplo: estudio sobre pobreza energética



K. Fabri, J. Gaspari
Mapping the energy poverty: A case study based on the energy performance certificates in the city of Bologna, Energy & Buildings, Volume 234, 2021

Fig. 2. Energy Poverty Map (EPM) of Bologna. The map reports the buildings potentially generating a risk of energy poverty, aggregated at cadastral parcel level. Legend: No energy poverty risk. Category A, B (table 6). Category C (table 6). Category D (table 6).

Actividades de crossCert [WP4]

- Análisis y evaluación

Increasing the value of EPCs (WP4)

- Integration of EPCs in the Administration databases
- Adapting EPCs to users and investor needs
- Linking next-generation EPCs to energy audits, logbooks and BRPs
- EPCs and one-stop-shops

User-centred [WP5]

- Instrumento de comunicación:
  - Estado energético del edificio
  - Motivar la renovación energética
- Actualmente, resultados de encuestas, estudios:
  - Alemania: "The EPC is not considered a reliable tool to motivate building renovation and is viewed as an administrative obligation"
  - UK: Only 18% of recipients are affected by the information and more than 80% think the influence is minor or negligible"
  - The Netherlands: "only 10% of the sample stated that the EPC had influence them in the process of property purchase"
  - Denmark: "EPC is regarded as a reliable and easy-to-understand energy efficiency information source by the respondents, but not have adequate information to encourage them to undertake home renovation work"

Y. Li, S. Kubicki, A. Guerriero, Y. Rezgui
Review of building energy performance certification schemes towards future improvement. Renewable and Sustainable Energy Reviews, Volume 113, 2019

User-centred [WP5]

- Uso de EPCs en transacciones

Figure 7 – Real use of EPCs in property sales or rent transactions.

Informe proyecto Zebra 2020:

ZEBRA 2020 - NEARLY ZERO-ENERGY BUILDING STRATEGY 2020. Strategies for a nearly Zero-Energy Building market transition in the European Union

User-centred [WP5]

- Influencia del EPC en el precio de un inmueble
- En España: 5-10% A,B, C, D respecto a E, F, G.

A. Ayala, I. Galarraga, J.V. Spadaro
The price of energy efficiency in the Spanish housing market. .Energy Policy, Volume 94, 2016

Table 1
Summary of literature review on EE ratings effect in the residential sector.

Reference	Country	Dependent variable	Main finding
Brounen and Kok (2011)	Netherlands	Trans. price $/m^2 (sales)	EPC price-premiums compared to D rated homes: A=10%; B=5.5%; C=2%; E=−0.5%; F=−2.5%; G=−5%
Bio Intelligence Service et al. (2013)	Some EU countries	Trans. price € (sales and rentals)	One-letter improvement in EPC carried a price-premium (except in Oxford): Austria=8% (sales), 4.4% (rentals) Belgium: Flanders=4.3% (sales), 3.2% (rentals); Wallonia=5.4% (sales), 1.5% (rentals); Brussels=2.9% (sales), 2.2% (rentals) France: Marseille=4.3% (sales); Lille=3.2% (sales) Ireland=2.8% (sales), 1.4% (rentals) Oxford (UK)=−4% (sales)
Caijas and Piazolo (2013)	Germany	Market value and €/m^2 (sales and rentals)	A 1% increase in energy saving increased market values by 0.45% and rent prices by 0.08%
Hyland et al. (2013)	Ireland	Listed price $ (sales and rentals)	EPC price-premiums compared to D rated homes: A=9.3% (sales), 1.8% (rentals); B=5.5% (sales), 3.9% (rentals); C=1.7% (sales), −0.6% (rentals); E=−0.4% (sales), −1.9% (rentals); F/G=−10.6% (sales), −3.2% (rentals)
Fuerst et al. (2015)	England	Trans. price £/m^2 (sales)	EPC price−premiums compared to D rated homes: A/B=5%; C=1.8%; E=−0.7%; F=−0.9%

Actividades de crossCert [WP5]

Towards People-Centred EPCs (WP5)

- Research on design and experience of EPC products and services
  Expert users | General users (building users, owners, tenants) | EPC issuers
- Research on training and education of certified EPC issuers
  Weaknesses and strengths of training and education processes in our regions
- Research on EPC promotion and marketing
  A set of guidelines and recommendations for improving the promotion and marketing of EPCs
- Tool for development of people-centred EPC products and services
  A set of guidelines and recommendations for development of people-friendly EPC products and services

Actividades de crossCert [WP5]

Towards People-Centred EPCs (WP5)

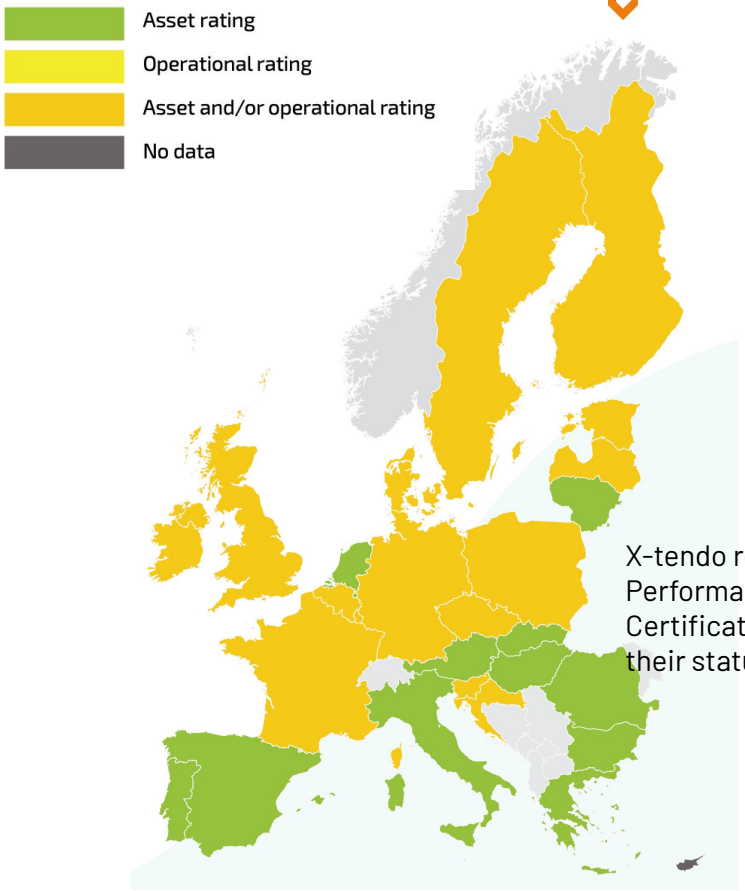
- Research on design and experience of EPC products and services
  Expert users | General users (building users, owners, tenants) | EPC issuers
- DLV5.1

Convergencia en Europa [WP6]

- Métodos de cálculo:
  (Directive 2010/31/EU on the energy performance of buildings):
  - "Modelado" (*Asset rating*)
  - "Medidas" (*Operational rating*)
- Disparidad en Europa

Table 17
Range of Default U-values for Exterior Walls.

	U-values [W/m^{2}K]		number of wall types	total number of options
	min	max		
Germany	0.40	1.70	2	16
Spain	0.57	3.12	15	120
France	0.32	3.90	14	116
Italy	0.55	3.59	6	20
Poland	0.71	3.87	9	17
United Kingdom	0.19	2.50	40	570



X-tendo report. Energy Performance Certificates assessing their status and potential

S. Semple, D. Jenkins. Variation of energy performance certificate assessments in the European Union. .Energy Policy, Volume 137, 2020

Actividades de crossCert [WP6]

Harmonising /converging EPCs in Europe (WP6)

- EPC Community
- EPCs Knowledge Exchange Centre
- Recommendations for EPCs harmonization

1. Regulations for energy performance assessment and certification
2. Input and output parameters of the EPC process
3. EPC databases
4. EPC checking and verification procedures
5. Training requirements and certification procedures for experts working on EPCs
6. Human friendliness of the EPC
7. Reduction of the performance gap

crossCert in cifras

- 12 socios participantes
- 140+ edificios
- 3 años (Sep 21-Ago24)
- 3 M€ de presupuesto