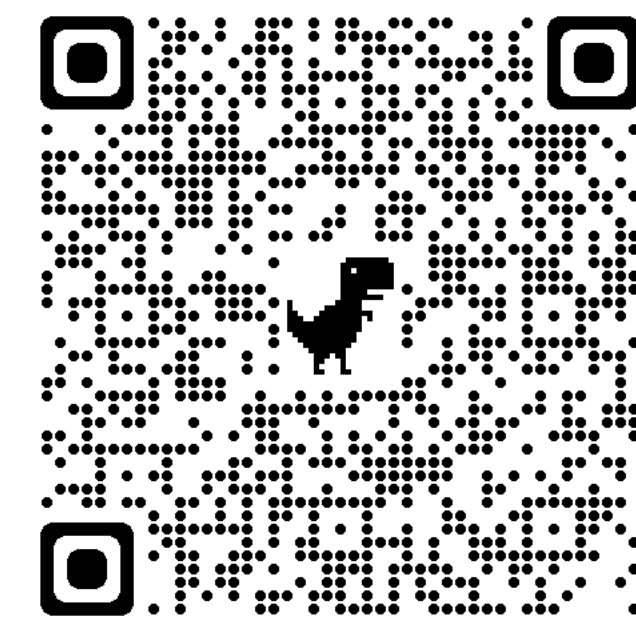


ENCONTRO EFS 22

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Multiple benefits of energy efficiency policies: Exploring new assessment tools

Supervisors: PhD Álvaro Gomes (DEEC; INESC); PhD Carla Henriques (ISCAC; INESC; CEBER); PhD Patrícia Silva (FEUC; CEBER).



Marcos Tenente

Second Year PhD Student

Email: marcos.tenente@inescc.pt

Received the Master's degree in Energy for Sustainability in 2019 at the University of Coimbra.

Main research interests: Energy efficiency; multiple benefits; Optimization;

Objective

Develop a holistic approach

- ❖ Combination of HIO-LCA with portfolio optimization theory models;

To...

- ❖ Promote a more adequate assessment of EE measures, thus increasing their attractiveness;
- ❖ Contributing to the development of more adequate EE policies;
- ❖ Help public DMs in the selection of EE measures for residential sector.

By...

- ❖ Assessing economic, energy, environmental and social impacts and benefits;
- ❖ Addressing all life cycle phases – from cradle-to-grave;

Methodology

❖ Review of the EE technologies and policies in place in the residential sector to:

- Identify the main responsible problems related with the low energy performance levels;
- Assess the current panorama of the EE governance framework;
- Identify technologies and its main features;

❖ Review of the multiple benefits related to energy efficiency

- Identification of the indicators to assess the economic, energy, environmental and social impacts and benefits;

❖ Application of the HIO-LCA model

- To the technologies selected;
- Combining Supply and Use tables with technical data;
- Computing the multiplier effects - direct, indirect and induced – for the indicators selected;
- Assess the impacts of each BAU / BAT;

❖ Multi-objective optimization portfolio

- Survey to several representative DMs to define different strategies of investment considering the impacts / benefits assessed and the objectives of the EE policies.

❖ Identification of the best EE portfolios to be funded



Expected Outcomes

- ❖ Assess a wide spectrum of energy, environmental, economic and social impacts and benefits generated throughout the life cycle phases of EE technologies.

- ❖ Address all types of retrofitting measures: lighting, insulation, space heating and cooling, domestic hot water and renewable electricity production systems;

- ❖ Analyze the extent of the benefits and impacts generated if the technology production supply chain undergoes any change;

- ❖ Present the best EE portfolios considering the DMs preferences regarding the different types of indicators;

- ❖ Adapt and adjust the methodology to be employed in the appraisal of other technologies in different regions;

Illustrative results (work in progress)

Table 1 - Domestic impacts of life cycle phases of lighting and insulation technologies (ecee 2021 Summer Study).

2021 Summer Study:

TECHNOLOGIES		MANUFACTURING, PACKAGING, INSTALLATION AND MAINTENANCE						
		Economy	Employment	Embodied emissions		Embodied energy	Waste generation	
Lighting and Insulation		GVA	FTE	ACG	GHG	O3PR	Net domestic energy use	Total Waste
		10^6 €	Jobs	Tons of SO2 eq.	Tons of CO2 eq.	Tons of NMVOC eq.	MWh	Tons
	CFL 18W	0.14	3.72	0.80	265.41	1.36	682.05	25.47
	LED 14.5W	0.02	0.59	0.08	26.19	0.13	106.23	4.10
Façade insulation	EPS 140mm	6.00	195.16	6.35	1,870.05	12.82	8,609.16	176.02
	ICB 140mm	54.05	1,018.46	21.38	6,692.98	36.17	33,701.42	1,173.20
Roof	EPS 140mm	6.44	209.18	6.80	2,004.34	13.74	9,227.39	188.66
insulation	ICB 140mm	57.93	1,091.60	22.92	7,173.61	38.77	36,121.57	1,257.45

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