	EASI ZERo **GA n°101091531**
Deliverable	**ENVELOPE MATERIAL SYSTEM WITH LOW IMPACT FOR ZERO ENERGY RENOVATION AND CONSTRUCTION**

Deliverable ID	**D2.4**
Deliverable name	**Product requirement tool**
Deliverable description	The Product Requirements Tool will be delivered to assess products' performance at building level. It will incorporate description of relevant reference buildings or building stock segments to analyse how specific insulation products will perform when applied to these. The tool will be developed in task 2.3 as an Excel or other solution and will be based on different calculation engines (such as E-Plus) or approaches used for building performance assessment (e.g., ISO 52000 standards).

WP	2	Specification and validation of products requirements
Task	2.3	Product design baseline and Product Requirements Tool

Dissemination level[1]	PU	**Due delivery date**	31/10/2023 → 30/11/2023
Nature[2]	DEC	**Actual delivery date**	5/12/2023

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Proprietary document reference	NA
Contributing beneficiaries	All

[1] Dissemination level: **PU** = Public, fully open, **SEN** = Sensitive, limited under the conditions of the Grant Agreement
[2] Nature of the Deliverable: **R** = Report

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Disclaimer	Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Health and Digital Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

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[3] Creation, Modifications, Final version for evaluation, Revised version following evaluation, Final.

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Glossary

DMP: Data Management Plan

1. Executive summary

1.1 *Description of the Deliverable content and objectives*

The product requirements tool facilitates assessment of products' performance at building level. The tool allows assessment of product performance for different building typologies in specified geographic regions by showing the performance of specific insulation products for targeted KPIs when applied to reference buildings in selected geographies. The tool is developed as part of task 2.3 in the form of an excel sheet and is based on energy performance assessment aligned with the ISO 52016-1:2017 standard. D2.3 provides a detailed analysis of the methodology and describes product requirements to achieve KPIs for relevant products.

1.2 *Impact of the results*

Because the product requirement tool is not published yet, no results have been achieved yet. During several meetings facilitated by BPIE, the tool content and method has been validated with internal project partners and external experts. Internal feedback shows that the tool might prove useful insights for work done in WP4 (construction product development and assembly). The tool is also foreseen to help validate the product design as part of T2.5 (validation of the design results) which has links with WP5 (performance evaluation in test environment) and WP6 (validation of real use cases). This work is foreseen to start late 2024 (M24)

Feedback of EZ0 partners has been integrated into the tool where realistic and feasible. Other points of criticism have been included in the D2.3 report describing the limitations of the tool.

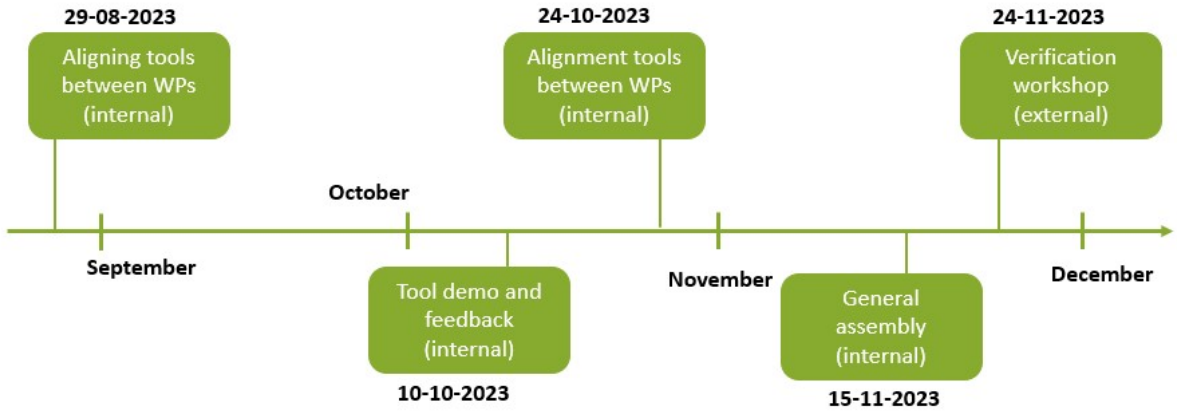
1.3 *Feedback and validation of the product requirement tool*

To ensure that the product requirement tool provides reliable output it is based on the ISO 52016 standard. Additional efforts have been made to align the tool development with work implemented in other work packages feedback has been collected. Besides smaller meetings and surveys for partners, a series of feedback and verification workshops has been organized from August to November 2023. This included four internal feedback opportunities that have been provided for EZ0 partners, and one validation workshop with EZ0 partners and external experts. The objectives of these meetings included:

- Clarifying the products, the product requirements and KPIs covered by the product requirement tool, as not all products, requirements and KPIs are relevant for building-level performance of products.
- Assess what information other EZ0 partners required to start working on their deliverables and tasks.
- Demonstrating the functions of the tool and the types of results it could generate, while obtaining feedback from partners on what type of output would be relevant and how the results could be displayed.

- Verifying assumptions underlying the calculations made in the tool (e.g., final energy and emission factors).

Figure 1 Internal and external workshops to collect feedback for developing the tool



Based on these feedback rounds several changes have been made, among others including Denmark in the analysis, but also agreeing on how to define the product requirements (thermal resistance, R, m^2K/W). Moreover, based on feedback in the verification workshop, a reassessment of assumptions for final energy and emission factors on national level has been initiated to ensure reliable and high-quality output of the tool. Other topics addressed during the meetings allowed to verify where products could be applied in buildings and highlighted limitations of the tool (e.g., only applying one product to the reference buildings).

Hereby EZ0 partners have been able to contribute to the tool design and have been informed about its contents, besides providing a platform for different partners to align between their respective work packages – e.g., assessments in WP4, WP5, WP6 and WP7.

2. Content of the tool

Format: Excel

Description of the data:

- Key assumptions (standard input, physical properties, building stock input) and related calculation standards.
- KPIs (grant agreement), product requirements (from T2.2 product requirement input database – e.g. thermal resistance of products), and manufacturer input on product application in buildings (e.g., roofs, walls, floors, windows).
- Building stock data and reference buildings based on the Hotmaps project for selected geographies.
- Weather data for selected geographies.
- ISO 52016-1:2017 calculation rules for energy performance of buildings
- Results and graphs

1	What kind of research output?	Product requirement tool produces product requirements for individual products in different geographies to achieve single or combined KPIs relevant for building level
2	Is it physical or digital?	Digital
3	Are you generating or re-using it?	The reference building data is re-used, coming from the Hotmaps project, the product thermal properties are obtained from the product manufacturers, and the calculation rules are obtained from the ISO 52016-1:2017
4	What is the type of the described dataset?	.xls
5	What is its format?	Excel table with sheets dedicated to assumptions, KPIs, building stock data, weather data, calculation standard, results
6	What is its expected size?	10-15 MB
7	Why are you collecting/generating or re-using it?	Hotmaps reference building data is useful for the product design baseline operational energy calculations over a buildings life-cycle in the product requirements tool (T2.3) and potentially work in other WPs (WP3 product development, WP4 (development & assembly), WP5 (performance evaluation in test environment) , WP6 (in-use cases), WP 7 (sustainability assessment).
8	What is its origin / provenance?	https://wiki.hotmaps.eu/en/Hotmaps-open-data-repositories#building-stock_eu-building-stock
9	To whom might it be useful ('data utility')?	WP leads of WP2 (BPIE) – and WPs (WP4: DTI WP5: SINTEF, WP6: ELITHIS, WP7: LEITAT)

Table 1: Description of research outputs

Illustration (screenshot of first sheet of Excel file) are provided in section 4.

Metadata : examples, to be amended, completed… metadata are defined to make the table searchable and easily re-usable

- Title:
- Project name, funding
- Origin date of generation of the data
- Publication date
- Format (details on the file format)
- Authors, reviewers, contributors
- Access rights to the information
- Parameters reference buildings (e.g., country, construction period, building type, nr of buildings, useful living area, ect.)
- Weather data for selected geographies (e.g., solar radiation, wind, temperature)
- Parameters results (KPI data per building typology per country / output R-value range per product per typology).

1	How is the dataset / output shared?	See DMP
2	What is the reason of limiting access to the dataset / output?	NA
3	Are there any methods or tools required to access the dataset?	Microsoft Office, other tools working with .xls files
4	Is the described dataset supported by a data access committee?	No, to be confirmed
5	How the dataset will be accessed during and after the project?	Accessible for all partners through the CEA sharepoint or externals upon request or through Zenodo after validation by the EC and the General Assembly
6	How long after the project has ended the dataset will be made accessible?	Depends on utility and data updates.

Table 2: Description of tool dissemination policy

For data re-use, do you agree with these statement:

1	What internationally recognized license will you use for your dataset / output?	Creative Commons Attribution 4.0 (CC BY) • Share, copy and redistribute the material in any medium or format • Adapt, remix, transform, and build upon the material for any purpose, even commercially
2	What reusability and / or reproducibility methods are followed?	NA
3	Will you provide the described dataset / output in the public domain?	Yes,

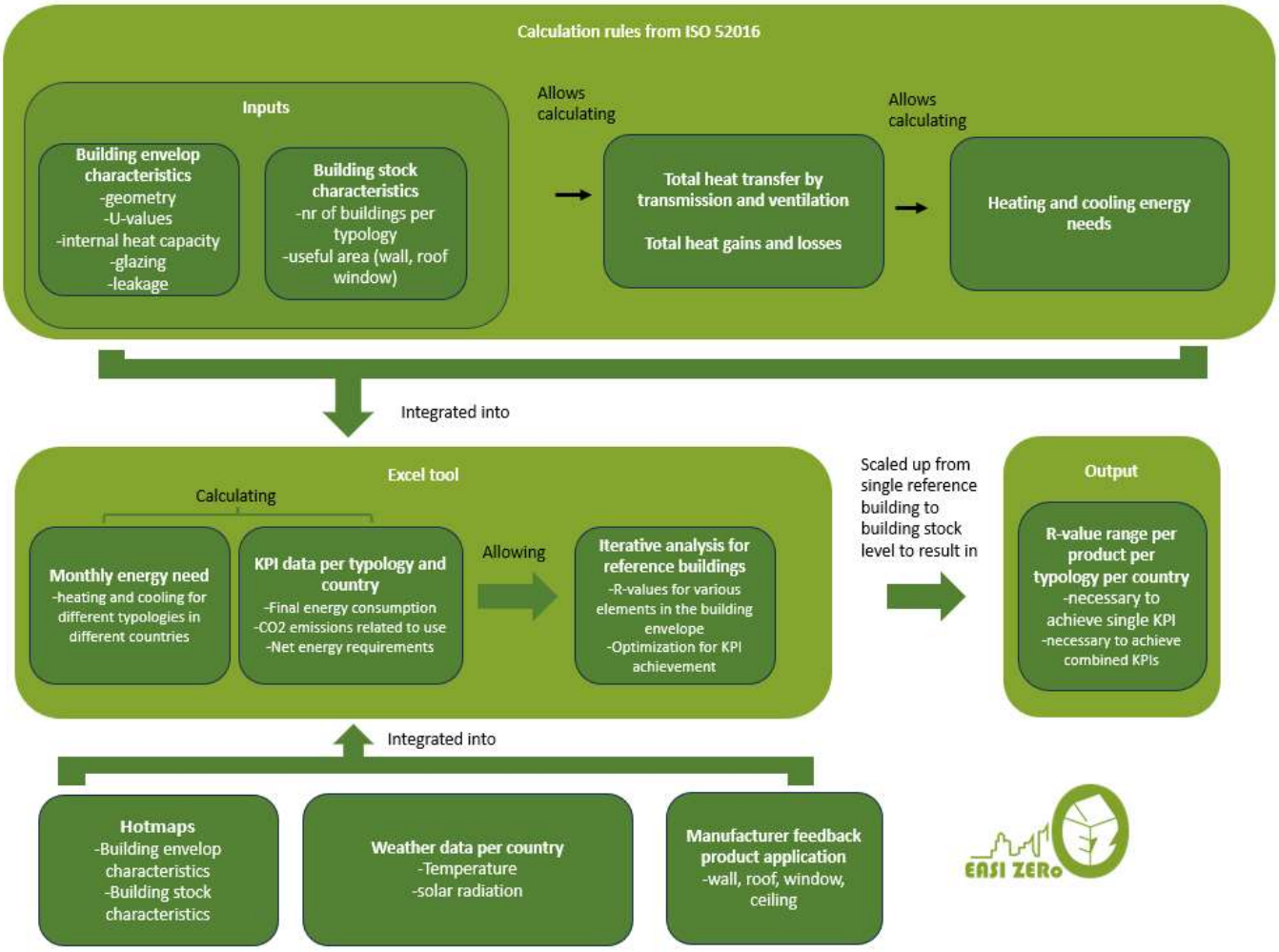
		this means that we will NOT control or limit the access with a specific license
4	Do you intend to ensure (re)use by third parties after your project finishes?	Yes
5	Is provenance well documented?	No
6	What documented procedures for quality assurance do you have in place?	Other *Several rounds of verification with project partners.*

Table 3: Description of data-reuse policy

3. Development process

The methodology that was implemented to develop the product requirement tool and complete the tool description hereafter. Several inputs have been included in the product requirement tool.

Figure 2: Visualization of the product requirement tool methodology



The methodology is based on the ISO 52016 standard, in which calculation methods are described for the evaluation and impact of heating, cooling and domestic hot water, ventilation and moisture in the building, and finally indoor temperature (determining comfort). Time-step as low as one hour can be used, which provide significant results.

Country	Number of reference buildings/archetypes
Denmark	21
France	15
Germany	19
Italy	21
Spain	21
Poland	21
Norway	21

Table 4: Reference building statistics

4. Product requirement tool extract

Here we show screenshots of the product requirement tool. Several aspects are illustrated.

Input data

building stock input
user defined input
meteo data

Building ID:	SE-11-APT
Country:	SE
Option:	5838

Building stock characteristics	number of buildings (-)	number of appartments (-)	useful living area (m2)	useful living area / building	roof area to living area	wall area to living area	windows area to living area	floor area to living area	roof area (m2)	wall area (m2)	windows area (m2)	floor area (m2)
	3,000	0	1,184,650	395	0.44	0.74	0.22	0.37	521,246	876,641	260,623	438,321

Building geometry	roof area per building (m2)	wall area per building (m2)	windows area per building (m2)	basement area per building (m2)	base side (m)	building height (m)	building volume (m3)	number of windows per building	window to wall	windows area per building per orientation (m2)	appartments per building (-)	useful living area / appartment (m2)
	174	292.21	86.87	146.11	12.09	7.84	1,145.55	58	0.23	14	0	#DIV/0!

Building envelope characteristics	roof u value	wall u value	windows u value	floor u value	leakage level	Q4Pa (m3/h)	Building class	internal heat capacity of the building. Cm (J/K)	glazing type	solar energy transmittance, gn
Existing U values	0.13	0.18	1.30	0.15	Average	379.1	Medium	65,155,756	Triple glazing	0.70
Existing U value factor	1	1	n/a	1						
Additional R value (mK/W)	1	10	n/a	10						
Improved U-values	0.12	0.06	1.30	0.06						

Weather

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	
Internal temperature – heating	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	°C
Internal temperature – cooling	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	26.0	°C
Heating													
Hours per day with normal heating setpoint weekend	12	12	12	12	12	12			12	12	12	12	hr/day
Hours per day with normal heating setpoint working day	4	4	4	4	4	4	0	0	4	4	4	4	hr/day
Fraction of the week with normal heating setpoint	26%	26%	26%	26%	26%	26%	0%	0%	26%	26%	26%	26%	-
Cooling season													
Days per week with normal cooling set point	0.0	0.0	0.0	0.0	0.0	1.0	1.5	2.0	1.0	0.0	0.0	0.0	days/week
Fraction of the week with normal cooling setpoint	0%	0%	0%	0%	0%	14%	21%	29%	14%	0%	0%	0%	-
Average monthly external air temperatures	-1.7	-1.9	0.8	4.9	10.9	15.3	17.7	16.7	11.9	7.3	2.8	-0.4	°C
Average monthly ground temperatures	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	°C
Average monthly wind speed	3.4	3.4	3.4	3.4	4.2	4.2	3.4	3.4	3.4	4.2	3.4	3.4	m/s
Temp difference heating	21.7	21.9	19.2	15.1	9.1	4.7	2.3	3.3	8.1	12.7	17.2	20.4	°C

Building stock

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
	country	construction period	building type	Building ID	number of buildings (-)	number of appartments (-)	useful living area (m2)	roof area to living area (m2/m2)	wall area to living area (m2/m2)	windows area to living area (m2/m2)	floor area to living area (m2/m2)	roof u value	wall u value	windows u value	floor u value	Leakage level	Building class	Glazing type	Space heating [kWh/m² year] - Useful	Space heating [kWh/m² year] - Final	Final energy/energy need
191	FR	Before 1945	SFH	FR-45-SFH	2110000		300,208,930	0.83	1.04	0.22	0.68	1.36	1.62	4.80	1.81	Average	Medium	Single glazing	243.8906	325.0818	1.33
192	FR	1945 - 1969	SFH	FR-69-SFH	1010000		107,885,166	0.83	1.04	0.22	0.68	1.21	2.20	2.60	1.96	Average	Medium	Double glazing	197.9101	263.7943	1.33
193	FR	1970 - 1979	SFH	FR-79-SFH	1190000		145,616,343	0.83	1.04	0.22	0.68	1.31	1.93	2.77	0.72	Average	Medium	Double glazing	225.3141	300.3212	1.33
194	FR	1980 - 1989	SFH	FR-89-SFH	1080000		128,607,908	0.75	0.94	0.23	0.64	0.29	0.45	2.95	0.78	Average	Medium	Double glazing	194.5007	259.2499	1.33
195	FR	1990 - 1999	SFH	FR-99-SFH	100000		10,330,419	0.75	0.94	0.23	0.64	0.22	0.36	2.20	0.42	Average	Medium	Double glazing	153.3669	204.4228	1.33
196	FR	2000 - 2010	SFH	FR-10-SFH	1050000		122,231,680	0.70	0.97	0.22	0.58	0.18	0.32	1.60	0.28	Average	Medium	Double glazing	106.9072	142.4966	1.33
197	FR	Post 2010	SFH	FR-11-SFH	300000		63,290,258	0.70	0.97	0.22	0.58	0.14	0.23	1.40	0.20	Average	Medium	Double glazing	66.91604	89.19239	1.33
198	FR	Before 1945	MFH	FR-45-MFH	500000		159,908,690	0.43	0.76	0.19	0.37	1.35	1.55	2.67	2.10	Average	Medium	Single glazing	166.0277	221.2883	1.33
199	FR	1945 - 1969	MFH	FR-69-MFH	880000		205,192,293	0.43	0.76	0.19	0.37	2.42	3.00	4.80	1.55	Average	Medium	Single glazing	130.478	173.9141	1.33
200	FR	1970 - 1979	MFH	FR-79-MFH	910000		209,100,054	0.43	0.76	0.19	0.37	0.59	0.70	4.20	1.34	Average	Medium	Double glazing	135.2511	180.2762	1.33
201	FR	1980 - 1989	MFH	FR-89-MFH	950000		216,938,791	0.48	0.72	0.22	0.45	0.62	0.36	2.80	0.62	Average	Medium	Double glazing	89.01253	118.6448	1.33
202	FR	1990 - 1999	MFH	FR-99-MFH	1100000		225,675,153	0.48	0.72	0.22	0.45	0.38	0.33	2.60	0.38	Average	Medium	Double glazing	81.64089	108.8191	1.33
203	FR	2000 - 2010	MFH	FR-10-MFH	970000		218,045,346	0.44	0.74	0.22	0.37	0.23	0.32	1.60	0.32	Average	Medium	Double glazing	64.52026	85.99906	1.33
204	FR	Post 2010	MFH	FR-11-MFH	1140000		248,463,979	0.44	0.74	0.22	0.37	0.14	0.18	1.40	0.20	Average	Medium	Double glazing	51.3066	68.38657	1.33
205	FR	Before 1945	APT	FR-45-APT	80000		18,362,609	0.43	0.76	0.19	0.37	2.30	2.10	3.80	1.97	Average	Medium	Single glazing	166.0277	221.2983	1.33
206	FR	1945 - 1969	APT	FR-69-APT	200000		57,711,058	0.43	0.76	0.19	0.37	3.20	3.00	2.60	1.43	Average	Medium	Double glazing	130.478	173.9141	1.33
207	FR	1970 - 1979	APT	FR-79-APT	170000		53,803,296	0.43	0.76	0.19	0.37	1.98	0.79	2.70	1.45	Average	Medium	Double glazing	135.2511	180.2762	1.33
208	FR	1980 - 1989	APT	FR-89-APT	150000		45,964,559	0.48	0.72	0.22	0.45	0.52	0.78	2.60	0.37	Average	Medium	Double glazing	89.01253	118.6448	1.33
209	FR	1990 - 1999	APT	FR-99-APT	80000		22,409,657	0.48	0.72	0.22	0.45	0.43	0.36	3.30	0.37	Average	Medium	Double glazing	81.64089	108.8191	1.33
210	FR	2000 - 2010	APT	FR-10-APT	130000		44,858,005	0.44	0.74	0.22	0.37	0.25	0.31	1.60	0.25	Average	Medium	Double glazing	64.52026	85.99906	1.33
211	FR	Post 2010	APT	FR-11-APT	50000		14,399,372	0.44	0.74	0.22	0.37	0.12	0.24	1.40	0.27	Average	Medium	Double glazing	51.3066	68.38657	1.33
212	DE	Before 1945	SFH	DE-45-SFH	2430000		487,081,204	0.83	1.04	0.22	0.68	1.55	1.76	2.78	1.23	Average	Medium	Double glazing	261.9174	275.118	1.05
213	DE	1945 - 1969	SFH	DE-69-SFH	3240000		569,278,819	0.83	1.04	0.22	0.68	0.84	1.25	2.80	1.06	Average	Medium	Double glazing	232.3981	244.111	1.05
214	DE	1970 - 1979	SFH	DE-79-SFH	1970000		286,551,202	0.83	1.04	0.22	0.68	0.51	1.00	2.80	0.77	Average	Medium	Double glazing	210.916	221.5461	1.05
215	DE	1980 - 1989	SFH	DE-89-SFH	1490000		228,922,960	0.75	0.94	0.23	0.64	0.40	0.55	3.00	0.51	Average	Medium	Double glazing	163.5951	171.8403	1.05
216	DE	1990 - 1999	SFH	DE-99-SFH	1550000		237,885,671	0.75	0.94	0.23	0.64	0.35	0.45	1.75	0.43	Average	Medium	Double glazing	109.8708	115.4083	1.05
217	DE	2000 - 2010	SFH	DE-10-SFH	1130000		193,109,975	0.70	0.97	0.22	0.58	0.23	0.30	1.35	0.28	Average	Medium	Double glazing	101.8526	106.9859	1.05
218	DE	Post 2010	SFH	DE-11-SFH	640000		91,645,328	0.70	0.97	0.22	0.58	0.17	0.22	1.20	0.26	Average	Medium	Triple glazing	68.18339	71.61983	1.05
219	DE	Before 1945	MFH	DE-45-MFH	1160000		223,925,800	0.43	0.76	0.19	0.37	1.49	1.97	2.83	0.95	Average	Medium	Double glazing	209.2447	219.7906	1.05
220	DE	1945 - 1969	MFH	DE-69-MFH	1160000		333,503,691	0.43	0.76	0.19	0.37	0.80	1.20	3.00	1.21	Average	Medium	Double glazing	198.6163	208.6265	1.05
221	DE	1970 - 1979	MFH	DE-79-MFH	440000		125,875,450	0.43	0.76	0.19	0.37	0.51	1.00	2.45	0.77	Average	Medium	Double glazing	144.7794	152.0763	1.05
222	DE	1980 - 1989	MFH	DE-89-MFH	350000		99,602,499	0.48	0.72	0.22	0.45	0.36	0.60	1.28	0.51	Average	Medium	Double glazing	131.8788	138.5255	1.05
223	DE	1990 - 1999	MFH	DE-99-MFH	340000		81,601,363	0.48	0.72	0.22	0.45	0.32	0.40	1.90	0.40	Average	Medium	Double glazing	84.50158	88.76046	1.05
224	DE	2000 - 2010	MFH	DE-10-MFH	160000		47,066,061	0.44	0.74	0.22	0.37	0.20	0.25	1.40	0.32	Average	Medium	Double glazing	81.4783	85.58481	1.05
225	DE	Post 2010	MFH	DE-11-MFH	160000		44,406,587	0.44	0.74	0.22	0.37	0.23	0.29	1.20	0.32	Average	Medium	Triple glazing	50.64462	53.1971	1.05
226	DE	Before 1945	APT	DE-45-APT	50000		15,417,376	0.43	0.76	0.19	0.37	0.98	1.55	2.90	0.83	Average	Medium	Double glazing	155.2012	163.0234	1.05
227	DE	1945 - 1969	APT	DE-69-APT	550000		123,357,941	0.43	0.76	0.19	0.37	0.81	1.20	3.00	1.19	Average	Medium	Double glazing	141.3054	148.4272	1.05
228	DE	1970 - 1979	APT	DE-79-APT	400000		104,476,623	0.43	0.76	0.19	0.37	0.51	1.10	2.45	0.77	Average	Medium	Double glazing	104.7256	110.0038	1.05
229	DE	1980 - 1989	APT	DE-89-APT	150000		36,021,200	0.48	0.72	0.22	0.45	0.36	0.60	1.28	0.51	Average	Medium	Double glazing	100.9888	106.0786	1.05
230	DE	1990 - 1999	APT	DE-99-APT	200000		38,415,673	0.48	0.72	0.22	0.45	0.52	0.40	1.90	0.40	Average	Medium	Double glazing	76.91522	80.79175	1.05
231	DE	2000 - 2010	APT	DE-10-APT	60000		18,313,458	0.44	0.74	0.22	0.37	0.20	0.25	1.40	0.32	Average	Medium	Double glazing	59.33889	62.32957	1.05
232	DE	Post 2010	APT	DE-11-APT	30000		9,151,987	0.44	0.74	0.22	0.37	0.23	0.29	1.20	0.32	Average	Medium	Triple glazing	46.0252	48.34487	1.05

Examplary results (subject to change)

													KPI 1	KPI 2	KPI 12		KPI 13 (ONLY SFH)		KPI 18			
													Energy consumption < 50 kWh/m²/year	Carbon emission < 4 kgCO2/m²/year	Net energy use reduction of -5% (Absolute minimum)		Net zero energy for single family with PV < 35 kWh/m²/year and <45 kWh/m²/year for nordic countries		Payback time of < 7 years			
Option	Country	Building ID	Existing U value factor – Roof	Existing U value factor – Wall	Existing U value factor – Ground floor	Existing U value factor – Windows	Additional R value (m2K/W)	Additional R value (m2K/W) – Roof2	Additional R value (m2K/W) – Wall	Additional R value (m2K/W) – Ground floor	Additional R value (m2K/W) – Windows	Product	ENERGY NEED FOR HEATING, PER BUILDING, QH,nd (kWh)	FE (kWh/m2/year)	CO2 from FE (kg/m2/year)	NE (KWh/m2/year)	Target R value required for this KPI (m2K/W)	NE (KWh/m2/year) 2	Additional R value required for this KPI (m2K/W)	Savings (kWh/m2/year)	Savings (kWh/year)	Savings (EUR/year)
1	Denmark	DK-45-SFH	1	1	1	1	0.00	0	0.00	0	0	P1,2,5,8	83.34	100.53	29.38	100.53	Target not reached	50.27	Target not reached	0.00	0.00	0.00
2	Denmark	DK-45-SFH	1	1	1	1	0.25	0	0.25	0	0	P1,2,5,8	81.96	98.87	28.89	98.87	Target not reached	49.43	Target not reached	1.38	16,723.23	3,083.97
3	Denmark	DK-45-SFH	1	1	1	1	0.75	0	0.75	0	0	P1,2,5,8	80.36	96.94	28.33	96.94	Target not reached	48.47	Target not reached	2.98	36,050.11	6,648.09
4	Denmark	DK-45-SFH	1	1	1	1	1.25	0	1.25	0	0	P1,2,5,8	79.46	95.86	28.01	95.86	Target not reached	47.93	Target not reached	3.88	46,887.47	8,646.63
5	Denmark	DK-45-SFH	1	1	1	1	1.75	0	1.75	0	0	P1,2,5,8	78.89	95.17	27.81	95.17	1.75	47.58	Target not reached	4.45	53,821.61	9,925.37
6	Denmark	DK-45-SFH	1	1	1	1	2.25	0	2.25	0	0	P1,2,5,8	78.49	94.69	27.67	94.69	2.25	47.34	Target not reached	4.85	58,639.42	10,813.84
7	Denmark	DK-45-SFH	1	1	1	1	2.75	0	2.75	0	0	P1,2,5,8	78.20	94.33	27.57	94.33	2.75	47.17	Target not reached	5.14	62,181.49	11,467.04
8	Denmark	DK-45-SFH	1	1	1	1	3.25	0	3.25	0	0	P1,2,5,8	77.98	94.06	27.49	94.06	3.25	47.03	Target not reached	5.37	64,895.29	11,967.50
9	Denmark	DK-45-SFH	1	1	1	1	3.75	0	3.75	0	0	P1,2,5,8	77.80	93.85	27.42	93.85	3.75	46.92	Target not reached	5.54	67,040.93	12,363.18
10	Denmark	DK-45-SFH	1	1	1	1	4.25	0	4.25	0	0	P1,2,5,8	77.65	93.67	27.37	93.67	4.25	46.84	Target not reached	5.69	68,773.93	12,683.87
11	Denmark	DK-45-SFH	1	1	1	1	4.75	0	4.75	0	0	P1,2,5,8	77.54	93.53	27.33	93.53	4.75	46.77	Target not reached	5.81	70,217.87	12,949.05
12	Denmark	DK-45-SFH	1	1	1	1	5.25	0	5.25	0	0	P1,2,5,8	77.44	93.41	27.30	93.41	5.25	46.71	Target not reached	5.91	71,426.72	13,171.97
13	Denmark	DK-45-SFH	1	1	1	1	5.75	0	5.75	0	0	P1,2,5,8	77.35	93.31	27.27	93.31	5.75	46.65	Target not reached	5.99	72,457.17	13,362.00

Example of initial analysis of targets achievements

We have used the tool to test the achievements of some of the pertinent EASI ZERo targets. Below an example trying to merge some KPIs for a potential global validation on reference buildings.

Product	Building ID	FE (kWh/m2/year) without the product	KPI 1: R min	KPI 2: R min	KPI 12: R min	KPI 13: R min	Number of buildings
P1, P2, P5, P8	DK-45-SFH	118.64	#N/A	#N/A	0.25	1.25	180,000
P1, P2, P5, P8	DK-69-SFH	93.05	#N/A	#N/A	0.25	0.25	140,000
P1, P2, P5, P8	DK-79-SFH	51.73	0.75	#N/A	1.25	0.00	160,000
P1, P2, P5, P8	DK-89-SFH	37.46	0	#N/A	0.75	0.00	30,000
P1, P2, P5, P8	DK-99-SFH	30.90	0	#N/A	0.75	0.00	30,000
P1, P2, P5, P8	DK-10-SFH	23.77	0	#N/A	1.25	0.00	50,000
P1, P2, P5, P8	DK-11-SFH	17.25	0	10.00	1.25	0.00	50,000
P1, P2, P5, P8	DK-45-MFH	60.68	0.75	#N/A	0.25		50,000
P1, P2, P5, P8	DK-69-MFH	50.57	0.25	#N/A	0.25		70,000
P1, P2, P5, P8	DK-79-MFH	39.40	0	#N/A	0.75		70,000
P1, P2, P5, P8	DK-89-MFH	33.92	0	#N/A	0.75		90,000
P1, P2, P5, P8	DK-99-MFH	28.16	0	#N/A	0.75		90,000
P1, P2, P5, P8	DK-10-MFH	22.49	0	#N/A	0.75		90,000
P1, P2, P5, P8	DK-11-MFH	17.51	0	#N/A	1.25		90,000
P1, P2, P5, P8	DK-45-APT	95.77	2.75	#N/A	0.25		20,000
P1, P2, P5, P8	DK-69-APT	79.30	3.75	#N/A	0.25		10,000
P1, P2, P5, P8	DK-79-APT	51.80	0.25	#N/A	0.25		10,000
P1, P2, P5, P8	DK-89-APT	38.44	0	#N/A	0.75		4,000
P1, P2, P5, P8	DK-99-APT	29.07	0	#N/A	1.25		4,000
P1, P2, P5, P8	DK-10-APT	20.24	0	#N/A	1.25		5,000
P1, P2, P5, P8	DK-11-APT	12.32	0	0	3.75		5,000