

# Zestaw wskaźników w cyfrowych świadectwach charakterystyki energetycznej budynków



## U-CERT

User-Centred Energy Performance  
Assessment and Certification

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**Joanna Rucińska**



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## W jaki sposób wyznaczono nowe wskaźniki?

W każdym z krajów biorących udział w projekcie przeprowadzono badania

- potrzeb i oczekiwań użytkowników należących do grupy ekspertów i nie będących ekspertami w zakresie świadectw charakterystyki energetycznej budynków

Zbadanie rynku i określenie stosowanych w różnych systemach wskaźników

- określenie drogi przejścia od wskaźników standardowych do całościowych

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## Uzyskane wnioski

- Wskaźniki energetyczne powinny być bardziej intuicyjne i wpływać na zachowania użytkowników
- Wskaźniki dotyczące zdrowia, bezpieczeństwa, wygody, dobrego samopoczucia i komfortu są cenne dla użytkowników końcowych
- Należy zapewnić szeroki zakres stosowania
- Trzeba zapewnić kilka poziomów szczegółowości przeznaczonych dla różnego typu odbiorców
- Należy opracować odpowiednie moduły i zapewnić ich cyfryzację dla różnych użytkowników
- Konieczność uwzględnienia różnych standardów budowlanych



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## Struktura EPC U-CERT

Charakterystyka energetyczna opracowana w projekcie U-CERT zbudowana jest w sposób modułowy w zależności od typu użytkownika dostępny jest podstawowy lub bardziej szczegółowy zestaw informacji.



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# Wskaźniki opisane w normach

## Analiza norm:

- EN ISO 52003-1 Energetyczne właściwości użytkowe budynków -- Wskaźniki, wymagania, ocena i certyfikacja - Część 1: Ogólne aspekty i zastosowanie do całkowitych energetycznych właściwości użytkowych
- EN ISO 52018 Energetyczne właściwości użytkowe budynków -- Wskaźniki do częściowych wymagań EPB związanych z bilansem energii cieplnej i funkcją budowli -- Część 1: Przegląd opcji

Dokumenty te ograniczają się głównie do wskaźników energetycznych



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# Wskaźniki

Analiza innych projektów badawczych:

- **Smart Readiness Indicator**
- **Projekt ALDREN**
- **Projekt CEN-CE**
- **Projekt Triple-A reno**

Projekty te zostały przeanalizowane w celu określenia wskaźników uzupełniających w zakresie energii.



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## Typ oceny

W U-CERT wykorzystano rodzaje ocen wyszczególnione w

- EN ISO 52001-1 - Energetyczne właściwości użytkowe budynków - Nadrzędna ocena EPB - Część 1: Ogólne ramy i procedury

Charakterystyka energetyczna budynku wykonana zgodnie z U-CERT może być sporządzona metodą obliczeniową oraz zużyciową.



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## Wskaźniki

System Certyfikacji U-CERT uwzględnia wskaźniki w czterech obszarach:

- Zapotrzebowanie na energię
- Jakość środowiska wewnętrznego
- Gotowości budynku do obsługi inteligentnych sieci
- Koszty



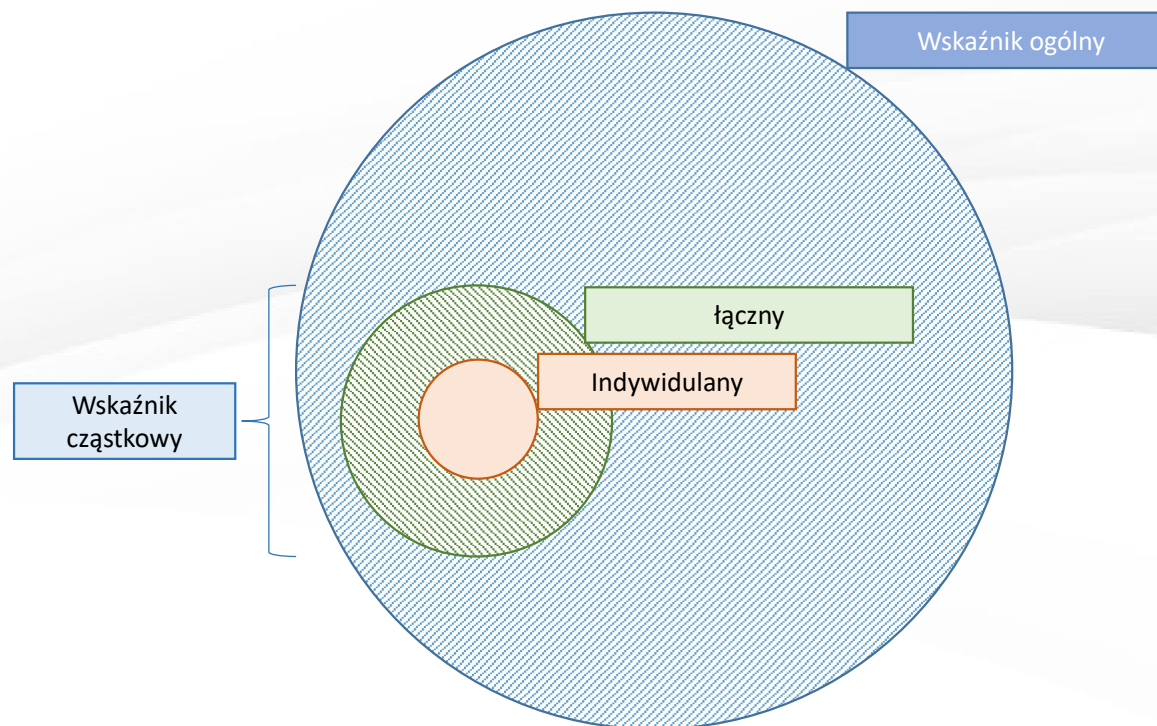
# Wskaźniki

Ich uwzględnienie zależy od zastosowanej metody oceny:

| Kategoria  | Wskaźniki                         | Zawarte w EPC U-CERT |                  |
|--|-----------------------------------|----------------------|------------------|
|  |                                   | Metoda obliczeniowa  | Metoda zużyciowa |
| Zapotrzebowanie na energię                       | Ogólne wskaźniki EP               | X                    | X                |
|  | Cząstkowe wskaźniki EP            | X                    | -                |
| Gotowość budynku do obsługi inteligentnych sieci | SRI                               | X                    | -                |
| Jakość środowiska wewnętrznego                   | ALDREN Skala środowiska cieplnego | X                    | -                |
| Koszty   | Koszt                             | -                    | X                |

# Wskaźniki

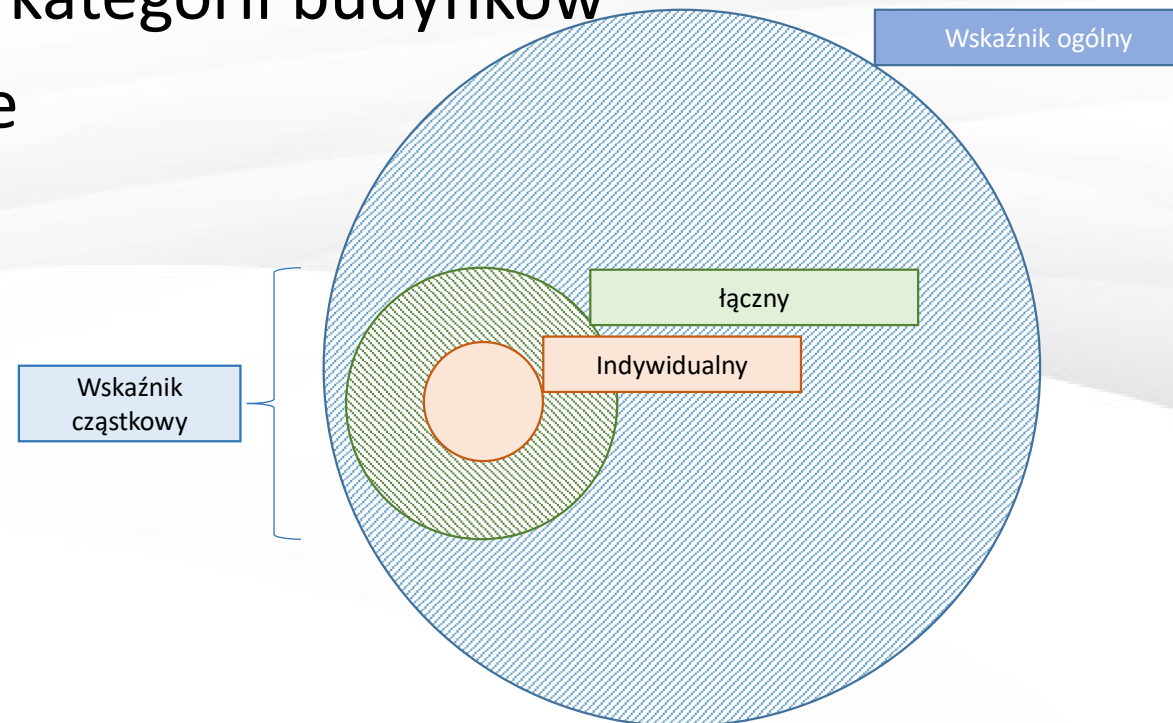
Wskaźniki energetyczne podzielono na ogólne i cząstkowe.



# Wskaźniki

Wymagania dotyczące wskaźników energetycznych powinny być określone dla poszczególnych kategorii budynków

- Renowacje płytkie i średnie
- Głębokie modernizacje
- Nowe budynki
- Budynki istniejące



# Wskaźniki - energia

## Ogólne wskaźniki EP

- Zapotrzebowanie na nieodnawialną energię pierwotną [kWh/(m<sup>2</sup>rok)]
- Całkowite zapotrzebowanie na energię pierwotną [kWh/(m<sup>2</sup>rok)]
- Komfort cieplny latem [K·h]
- Komfort cieplny zimą [K·h]
- Ciepła woda użytkowa – komfort cieplny [K·h]



# Wskaźniki - Energia

## Ogólne wskaźniki EP

- Całkowita produkcja odnawialnej energii pierwotnej [kWh/(m<sup>2</sup>rok)]
- Zapotrzebowanie na odnawialną energię pierwotną [kWh/ (m<sup>2</sup>rok)]
- Ekwiwalentna emisja CO<sub>2</sub> [kg/ (m<sup>2</sup>rok)]
- Wytwarzanie energii elektrycznej ze źródeł odnawialnych [kWh/(m<sup>2</sup>rok)]
  - zużywana na miejscu
  - eksportowana nie uwzględniana w EPB
  - eksportowana do sieci

# Wskaźniki - Energia

## Ogólne wskaźniki EP

### Zapotrzebowanie na energię użytkową do:

- ogrzewania [kWh/(m<sup>2</sup>rok)]
- chłodzenia [kWh/(m<sup>2</sup>rok)]
- przygotowania ciepłej wody użytkowej [kWh/(m<sup>2</sup>rok)]
- nawilżania i osuszania [kWh/(m<sup>2</sup>rok)]
- wentylacji mechanicznej [kWh/(m<sup>2</sup>rok)]
- oświetlenia - autonomia światła dziennego [%]

# Wskaźniki - Energia

## Ogólne wskaźniki EP

Zapotrzebowanie na energię dostarczoną z podziałem na systemy oraz z podziałem na nośniki:

- ogrzewania [kWh/(m<sup>2</sup>rok)]
- chłodzenia [kWh/(m<sup>2</sup>rok)]
- przygotowania ciepłej wody użytkowej [kWh/(m<sup>2</sup>rok)]
- nawilżania i osuszania [kWh/(m<sup>2</sup>rok)]
- wentylacji mechanicznej [kWh/(m<sup>2</sup>rok)]
- oświetlenia [kWh/(m<sup>2</sup>rok)]



# Wskaźniki - Energia

## Cząstkowe wskaźniki

## Przegrody zewnętrzne

Przegrody zewnętrzne nieprzezroczyste:

- Współczynniki przenikania ciepła [W/(m<sup>2</sup>·K)]

Materiały:

- Nazwa [Text]
- Grubość [cm]
- Przewodność cieplna [W/(m·K)]
- Ciepło właściwe [J/(kg·K)]
- Kolor, tylko dla warstwy zewnętrznej [Text]



# Wskaźniki - Energia

## Cząstkowe wskaźniki

## Przegrody zewnętrzne

Przegrody przezroczyste:

- Współczynnik przenikania ciepła [W/(m<sup>2</sup>·K)]
  - elementy przezierne
  - rama
- Współczynnik przepuszczalności promieniowania słonecznego [-]
- Typ sterowania otwieraniem [Text]
- System zacielenia [Text]
  - Zastosowano/nie zastosowano [Text]
  - Technologia [Text]
  - Sterowanie [Text]
- Potencjał zacielenia wg ISO 18292 [%]
- Przepuszczalność powietrza wg EN 12207 [Text]

# Wskaźniki - Energia

## Cząstkowe wskaźniki

## Przegrody zewnętrzne

### Mostki ciepła:

- Liniowy współczynnik przenikania ciepła [W/K]
- Długość [m]

### Szczelność powietrzna:

- $n_{50}$  [1/h]

*Wskaźnik ten należy w miarę możliwości mierzyć za pomocą testu Blower Door zgodnie z normą EN 13829, a jego wartość uwzględnić w obliczeniach.*



# Wskaźniki - Energia

## Częstkowe wskaźniki

## Systemy techniczne

Systemy ogrzewania, chłodzenia, CWU, nawilżania i osuszania oraz wentylacji mechanicznej

Sprawności składowe systemu:

- Charakterystyka
- Całkowita sprawność systemu

[Text]

[%]

# Wskaźniki - Energia

## Częstkowe wskaźniki

## Systemy techniczne

### Produkcja:

- Rodzaj źródła [Text]
- Nośnik energii [Text]
- Znamionowy pobór mocy [kW]
- Efektywna moc znamionowa [kW]
- Wydajność znamionowa [%]
- Udział energii odnawialnej [%]
- Rodzaj opomiarowania [Text]
- Rodzaj sterowania [Text]

# Wskaźniki - Energia

## Częstkowe wskaźniki

## Systemy techniczne

### Magazynowanie:

- Pojemność [m<sup>3</sup>]
- Rodzaj sterowania [Text]

### Przesył:

- Rodzaj układu/systemu [Text]
- Izolacja rur [Text]
- Urządzenie cyrkulacyjne [Text]
- Rodzaj sterowania [Text]

# Wskaźniki - Energia

## Częstkowe wskaźniki

## Systemy techniczne

### Emisja:

- Rodzaj źródła
- Sposób sterowania

[Text]

[Text]

### Sposób raportowania

[Text]

# Wskaźniki - Energia

## Częstkowe wskaźniki

## Systemy techniczne

### System oświetlenia

- Rodzaj systemu
- Całkowita moc znamionowa
- Rodzaj sterowania

[Text]

[W]

[Text]

# Wskaźniki - Energia

## Częstkowe wskaźniki

Dla każdej technologii:

- Rodzaj systemu [Text]
- Zainstalowana moc szczytowa [kWp]
- Wydajność znamionowa [%]
- Orientacja [°]
- Nachylenie [°]
- Typ inwertera [Text]
- Sposób sprawdzania wydajności [Text]

## Produkcja energii elektrycznej ze źródeł odnawialnych



# Wskaźniki - Energia

## Częstkowe wskaźniki

## Produkcja energii elektrycznej ze źródeł odnawialnych

Dla każdej technologii magazynowania:

- Rodzaj systemu [Text]
- Zainstalowana moc szczytowa [kW]
- Rodzaj sterowania [Text]
- Sposób sprawdzania wydajności [Text]

# Wskaźniki – Gotowość budynku do obsługi inteligentnych sieci

- Ocena ogólna



- Ocena wpływu:

- Oszczędność energii na miejscu;
- Elastyczność dla sieci i magazynowania;
- Komfort;
- Udogodnienia;
- Dobre samopoczucie i zdrowie;
- Konserwacja i przewidywanie awarii;
- Informacja dla użytkowników;
- Podsumowanie

# Wskaźniki– Gotowość budynku do obsługi inteligentnych sieci

- Ocena w zakresie:

- ogrzewanie;
- c.w.u;
- chłodzenie;
- wentylacja;
- oświetlenie;
- Dynamiczne otoczenie;
- Odnawialne źródła energii i magazynowanie;
- Ładowanie samochodów;
- Monitorowanie i kontrola;
- Podsumowanie

Ocenę gotowości można zintegrować z ocenami EPB

# Wskaźniki – Jakość środowiska wewnętrznego

- **Skala opracowana w projekcie ALDREN**
- Wyniki dla okresu zimowego
- Wyniki dla okresu letniego
- Wyniki dla okresu przejściowego
- Wartość dla całego roku

| Season        | Occupied (h) | Score      |
|---------------|--------------|------------|
| ❄ Winter      | [Value]      | <b>1.9</b> |
| ☀ Summer      | [Value]      | <b>2.8</b> |
| 🌿 Aut./Spring | [Value]      | <b>2.7</b> |
| <b>Total:</b> | [Value]      | <b>2.5</b> |

---

## Wskaźniki – Koszt

- Całkowity koszt energii z uwzględnieniem różnych nośników

Issue Date: [insert text here]  
 Building Reference: [insert text here]  
 Software used: [insert text here]



EPB Assessor name: [insert text here]  
 EPC Reference: [insert text here]  
[\[link to EPC database\]](#)

# Report U-CERT's EPC

## Calculated EPB Assessment

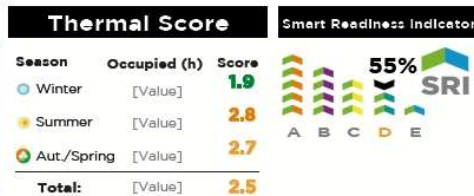
### Building Information

Name: [insert text here]  
 Address: [insert text here]  
 Municipality: [insert text here]  
 Postal Code: [insert text here]  
 Region: [insert text here]  
 Country: [insert text here]  
 Cadastral Ref.: [insert text here]



Professional's report

Building Situation: [insert text here]  
 Year of Construction: [insert text here]  
 Previous Interventions: [insert text here]  
 Object Type: [insert text here]  
 Building Category: [insert text here]  
 Building Ref. Area: [insert text here]



### Assessor Information

Name: [insert text here] Address: [insert text here]  
 ID: [insert text here] Municipality: [insert text here]  
 Company name: [insert text here] Postal Code: [insert text here]  
 Company ID: [insert text here] Region: [insert text here]  
 Email: [insert text here] Country: [insert text here]  
 Phone: [insert text here]



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Issue Date: [insert text here]  
Building Reference: [insert text here]  
Software used: [insert text here]



EPB Assessor name: [insert text here]  
EPC Reference: [insert text here]  
[\[link to EPC database\]](#)

## Calculated EPB Assessment

### On-site visit

#### Date of Visit 1

[DateofVisit]

Description of tests, checks and inspections performed

[Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation]

#### Date of Visit 2

[DateofVisit]

Description of tests, checks and inspections performed

[Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation]



Professional's report

# Report U-CERT's EPC



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 Building Reference: [insert text here]  
 Software used: [insert text here]



EPB Assessor name: [insert text here]  
 EPC Reference: [insert text here]  
[\[link to EPC database\]](#)

## Calculated EPB Assessment

### Renovation Scenario

#### Deep Renovation

[Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud exerci tation]

### Cost

[X €]

Professional's report

### Renovation Actions



[Insulating the Building]



[Ensuring Natural Ventilation]



[Installing Heat Pumps]

### Energy Performance



### Thermal Score

| Season        | Occupied (h) | Score      |
|---------------|--------------|------------|
| Winter        | [Value]      | 1.9        |
| Summer        | [Value]      | 2.8        |
| Aut./Spring   | [Value]      | 2.7        |
| <b>Total:</b> | [Value]      | <b>2.5</b> |

### Smart Readiness Indicator



### Renovation Performance



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Issue Date: [insert text here]  
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Software used: [insert text here]



EPB Assessor name: [insert text here]  
EPC Reference: [insert text here]  
[\[link to EPC database\]](#)

# Report U-CERT's EPC

## Calculated EPB Assessment

### Overall EP indicators

**Overall non-renewable primary energy use<sup>1</sup>** [Value] kWh/m<sup>2</sup>

<sup>1</sup>Calculated according to H5 in Annex H in ISO 52000-1; thus, considering compensation between different energy carriers and the effect of exported energy

|                                    |         |                    |
|------------------------------------|---------|--------------------|
| Overall total primary energy use   | [Value] | kWh/m <sup>2</sup> |
| Summer thermal comfort             | [Value] | K.h                |
| Winter thermal comfort             | [Value] | K.h                |
| Domestic Hot Water thermal comfort | [Value] | K.h                |

**Overall non-renewable primary energy use<sup>2</sup>** [Value] kWh/m<sup>2</sup>

<sup>2</sup>Calculated according to H4 in Annex H in ISO 52000-1; thus, not considering compensation between different energy carriers nor the effect of exported energy

|  |         |                    |
|--|---------|--------------------|
| Overall renewable primary energy production  | [Value] | kWh/m <sup>2</sup> |
| Overall renewable primary energy use         | [Value] | kWh/m <sup>2</sup> |
| Overall equivalent CO <sub>2</sub> emissions | [Value] | kg/m <sup>2</sup>  |

### Renewable energy indicators



|   |         |                    |
|---|---------|--------------------|
| Electricity generation by onsite PV               | [Value] | kWh/m <sup>2</sup> |
| Electricity from onsite PV self-used              | [Value] | kWh/m <sup>2</sup> |
| Electricity exported to non-EPB uses by onsite PV | [Value] | kWh/m <sup>2</sup> |
| Electricity exported to the grid by onsite PV     | [Value] | kWh/m <sup>2</sup> |

Professional's report



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Software used: [insert text here]



EPB Assessor name: [insert text here]  
EPC Reference: [insert text here]  
[\[link to EPC database\]](#)

# Report U-CERT's EPC

## Calculated EPB Assessment

### Wind Turbines

|   |         |                    |
|---|---------|--------------------|
| Electricity generation by onsite wind               | [Value] | kWh/m <sup>2</sup> |
| Electricity from onsite wind self-used              | [Value] | kWh/m <sup>2</sup> |
| Electricity exported to non-EPB uses by onsite wind | [Value] | kWh/m <sup>2</sup> |
| Electricity exported to the grid by onsite wind     | [Value] | kWh/m <sup>2</sup> |

Professional's report

### CHP

|  |         |                    |
|--|---------|--------------------|
| Electricity generation by onsite CHP               | [Value] | kWh/m <sup>2</sup> |
| Electricity from onsite CHP self-used              | [Value] | kWh/m <sup>2</sup> |
| Electricity exported to non-EPB uses by onsite CHP | [Value] | kWh/m <sup>2</sup> |
| Electricity exported to the grid by onsite CHP     | [Value] | kWh/m <sup>2</sup> |



Issue Date: [insert text here]  
Building Reference: [insert text here]  
Software used: [insert text here]

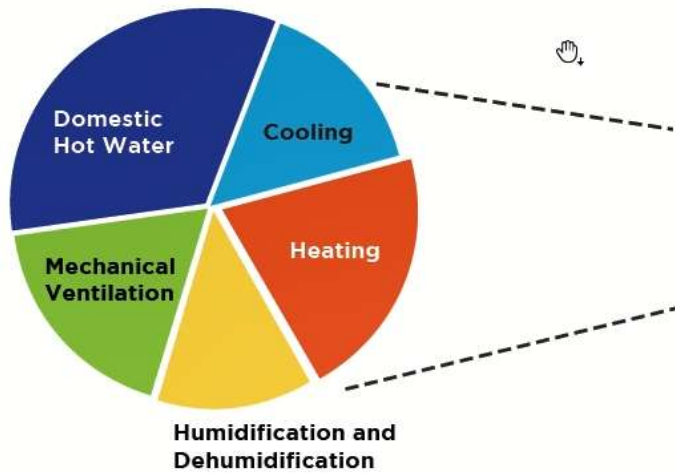


EPB Assessor name: [insert text here]  
EPC Reference: [insert text here]  
[\[link to EPC database\]](#)

## Calculated EPB Assessment

### Energy needs

|   |                            |
|---|----------------------------|
| Heating   | [Value] kWh/m <sup>2</sup> |
| Cooling   | [Value] kWh/m <sup>2</sup> |
| Domestic Hot Water  | [Value] kWh/m <sup>2</sup> |
| Humidification and Dehumidification                                   | [Value] kWh/m <sup>2</sup> |
| Mechanical Ventilation  | [Value] kWh/m <sup>2</sup> |
| Lighting <sup>3</sup><br><small><sup>3</sup>Daylight Autonomy</small> | [Value] %                  |



Professional's report

# Report U-CERT's EPC



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 Software used: [insert text here]



**U-CERT**  
 User-Centred Energy Performance  
 Assessments and Certification

EPB Assessor name: [insert text here]  
 EPC Reference: [insert text here]  
[\[link to EPC database\]](#)

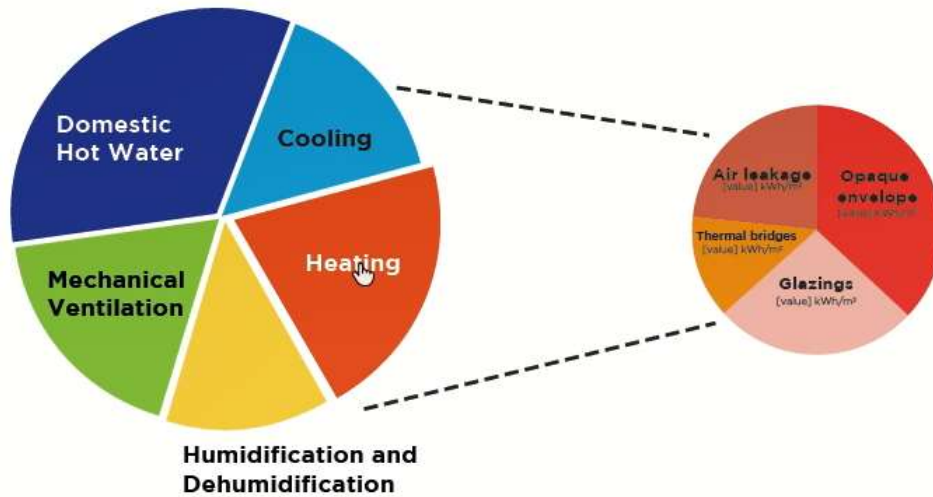
# Support U-CERT's EPC

## Calculated EPB Assessment

### Energy needs

|   |         |                    |
|---|---------|--------------------|
| Heating   | [Value] | kWh/m <sup>2</sup> |
| Cooling   | [Value] | kWh/m <sup>2</sup> |
| Domestic Hot Water  | [Value] | kWh/m <sup>2</sup> |
| Humidification and Dehumidification                                   | [Value] | kWh/m <sup>2</sup> |
| Mechanical Ventilation  | [Value] | kWh/m <sup>2</sup> |
| Lighting <sup>3</sup><br><small><sup>3</sup>Daylight Autonomy</small> | [Value] | %                  |

Professional's report



Issue Date: [insert text here]  
Building Reference: [insert text here]  
Software used: [insert text here]



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User-Centred Energy Performance  
Assessment and Certification

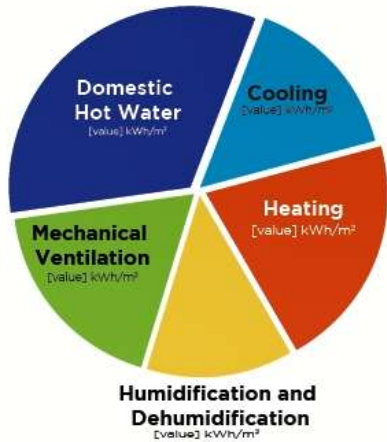
EPB Assessor name: [insert text here]  
EPC Reference: [insert text here]  
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# Report U-CERT's EPC

## Calculated EPB Assessment

### Energy needs

#### Energy needs per energy vector



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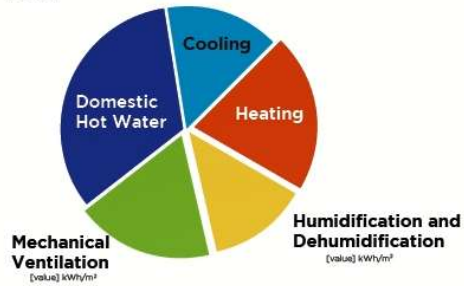


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# Calculated EPB Assessment

## Energy use

Energy use per energy vector



Professional's report

### Energy use per energy vector i

|                                     |         |        |
|-------------------------------------|---------|--------|
| Heating                             | [Value] | kWh/m² |
| Cooling                             | [Value] | kWh/m² |
| Domestic Hot Water                  | [Value] | kWh/m² |
| Humidification and Dehumidification | [Value] | kWh/m² |
| Mechanical Ventilation              | [Value] | kWh/m² |
| Lighting                            | [Value] | kWh/m² |

### Energy use per energy vector i+1

|                                     |         |        |
|-------------------------------------|---------|--------|
| Heating                             | [Value] | kWh/m² |
| Cooling                             | [Value] | kWh/m² |
| Domestic Hot Water                  | [Value] | kWh/m² |
| Humidification and Dehumidification | [Value] | kWh/m² |
| Mechanical Ventilation              | [Value] | kWh/m² |
| Lighting                            | [Value] | kWh/m² |

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EPB Assessor name: [insert text here]  
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# Calculated EPB Assessment

## Partial EP Indicators

### Envelope

#### Opaque envelope

##### [Opaque envelope construction i]

Thermal Transmittance [Value]  $W/(m^2K)$

##### Layered Materials\*

*\*From outer to inner element*

| Name   | Thickness (cm) | Conductivity (W/mK) | Density (kg/m <sup>3</sup> ) | Specific Heat [J/(kg K)] | Colour  |
|--------|----------------|---------------------|------------------------------|--------------------------|---------|
| [Name] | [Value]        | [Value]             | [Value]                      | [Value]                  | [Value] |
| [Name] | [Value]        | [Value]             | [Value]                      | [Value]                  |         |
| [Name] | [Value]        | [Value]             | [Value]                      | [Value]                  |         |
| [Name] | [Value]        | [Value]             | [Value]                      | [Value]                  |         |

##### [Opaque envelope construction i+1]

Thermal Transmittance [Value]  $W/(m^2K)$

##### Layered Materials\*

*\*From outer to inner element*

| Name   | Thickness (cm) | Conductivity (W/mK) | Density (kg/m <sup>3</sup> ) | Specific Heat [J/(kg K)] | Colour  |
|--------|----------------|---------------------|------------------------------|--------------------------|---------|
| [Name] | [Value]        | [Value]             | [Value]                      | [Value]                  | [Value] |
| [Name] | [Value]        | [Value]             | [Value]                      | [Value]                  |         |
| [Name] | [Value]        | [Value]             | [Value]                      | [Value]                  |         |
| [Name] | [Value]        | [Value]             | [Value]                      | [Value]                  |         |

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EPB Assessor name: [insert text here]  
 EPC Reference: [insert text here]

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## Calculated EPB Assessment

### Partial EP Indicators

#### Envelope

#### Glazings

[Window/Skylight i]

#### Opening control

[Type]

#### Thermal transmittance

[Value]  $W/(m^2 \cdot K)$

Glass Thermal Transmittance

[Value]  $W/(m^2 \cdot K)$

Frame Thermal Transmittance

[Value]  $W/(m^2 \cdot K)$

#### Solar shading

Presence  
 Technology  
 Control

[Yes/No]

[Type]

[Type]

#### Solar shading potential<sup>5</sup>

[Value] %

<sup>5</sup>According to ISO 15292

Glass Solar Factor

[Value]

Frame colour

[Value]

Air permeability class<sup>6</sup>

[Value]

<sup>6</sup>According to EN 12207

[Window/Skylight i+1]

#### Opening control

[Type]

#### Thermal transmittance

[Value]  $W/(m^2 \cdot K)$

Glass Thermal Transmittance

[Value]  $W/(m^2 \cdot K)$

Frame Thermal Transmittance

[Value]  $W/(m^2 \cdot K)$

#### Solar shading

Presence  
 Technology  
 Control

[Yes/No]

[Type]

[Type]

#### Solar shading potential<sup>5</sup>

[Value] %

<sup>5</sup>According to ISO 15292

Glass Solar Factor

[Value]

Frame colour

[Value]

Air permeability class<sup>6</sup>

[Value]

<sup>6</sup>According to EN 12207

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EPB Assessor name: [insert text here]  
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[\[link to EPC database\]](#)

# Calculated EPB Assessment

## Partial EP Indicators

### Technical Building Systems

[Technical Building Systems ]

**Service(s)** [Value]

**Overall Rated Efficiency** [Value] %

#### Generation

Technology [Type]  
 Energy carrier [Type]  
 Rated power [Value] kW  
 Effective rated output [Value] kW  
 Rated efficiency [Value] %  
 Renewable contribution [Value] %  
 Metering [Type]  
 Control [Type]

#### Distribution

Typology of circuit [Type]  
 Insulation of pipes [Type]  
 Circulation device [Type]  
 Control [Type]

#### Emission

Technology [Value]  
 Control [Type]

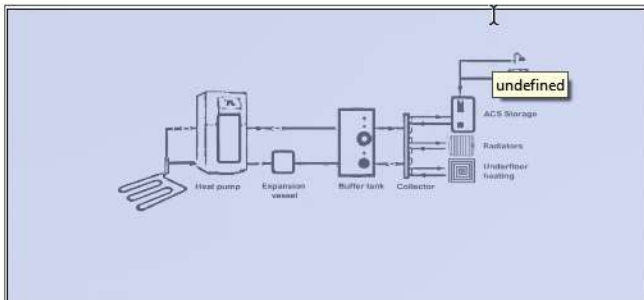
#### Storage

Capacity [Value] m<sup>3</sup>  
 Control [Type]

#### Reporting of performance

 [Type]

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*Technical scheme drawn by building assessor*

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EPB Assessor name: [insert text here]  
EPC Reference: [insert text here]  
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# Calculated EPB Assessment

## Partial EP Indicators

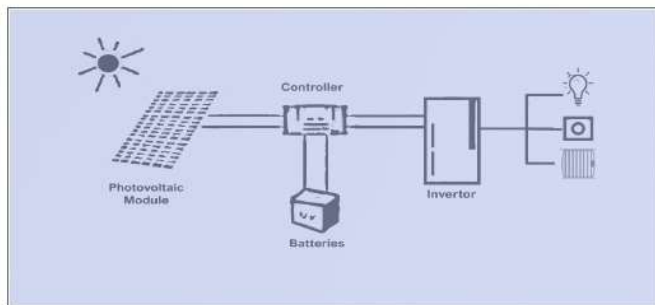
### Electricity Production

#### Photovoltaics

|   |             |
|---|-------------|
| Technology                                    | [Type]      |
| Installed Peak Power                          | [Value] kWp |
| Nominal efficiency                            | [Value] %   |
| Orientation                                   | [Value] °   |
| Inclination                                   | [Value] °   |
| Possibility to export electricity to the grid | [Type]      |
| Inverter type                                 | [Type]      |
| Reporting of performance                      | [Type]      |

#### Storage

|                         |             |
|-------------------------|-------------|
| Technology              | [Type]      |
| Installed Peak Capacity | [Value] kWh |
| Report of performance   | [Type]      |
| Control                 | [Type]      |



Technical scheme drawn by building assessor

Professional's report

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# Calculated EPB Assessment

## Partial EP Indicators

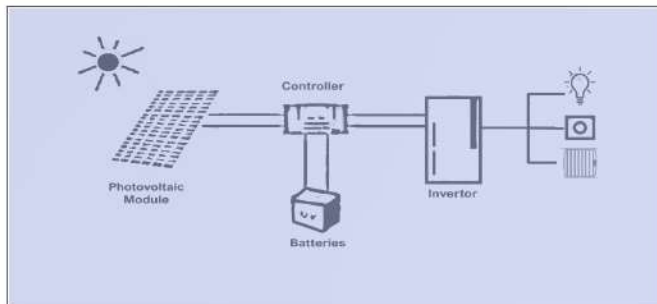
### Electricity Production

#### ☀️ Photovoltaics

|   |             |
|---|-------------|
| Technology                                    | [Type]      |
| Installed Peak Power                          | [Value] kWp |
| Nominal efficiency                            | [Value] %   |
| Orientation                                   | [Value] °   |
| Inclination                                   | [Value] °   |
| Possibility to export electricity to the grid | [Type]      |
| Inverter type                                 | [Type]      |
| Reporting of performance                      | [Type]      |

#### 🔋 Storage

|                         |             |
|-------------------------|-------------|
| Technology              | [Type]      |
| Installed Peak Capacity | [Value] kWh |
| Report of performance   | [Type]      |
| Control                 | [Type]      |



*Technical scheme drawn by building assessor*

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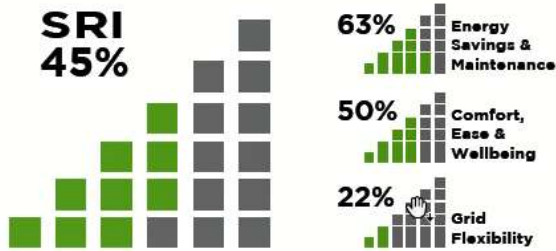


EPB Assessor name: [insert text here]  
 EPC Reference: [insert text here]  
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# Calculated EPB Assessment

# Raport U-CERT's EPC

## Smart Readiness Indicator



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### IMPACTS

| DOMAINS                   | IMPACTS           |                                  |            |             |                       |                          |                              | SRI        |
|---------------------------|-------------------|----------------------------------|------------|-------------|-----------------------|--------------------------|------------------------------|------------|
|                           | Energy efficiency | Maintenance and fault protection | Comfort    | Convenience | Health and well-being | Information to occupants | Energy flexibility & storage |            |
| <b>Total</b>              | <b>39%</b>        | <b>18%</b>                       | <b>60%</b> | <b>71%</b>  | <b>48%</b>            | <b>59%</b>               | <b>0%</b>                    | <b>42%</b> |
| Heating                   | 32%               | 18%                              | 62%        | 55%         | 24%                   | 74%                      | 0%                           |            |
| Sanitary hot water        | 17%               | 0%                               | 45%        | 70%         | 67%                   | 83%                      | 0%                           |            |
| Cooling                   | 65%               | 51%                              | 78%        | 72%         | 61%                   | 55%                      | 0%                           |            |
| Controlled ventilation    | 41%               | 0%                               | 55%        | 60%         | 34%                   | 44%                      | 0%                           |            |
| Lighting                  | 85%               | 14%                              | 90%        | 100%        | 83%                   | 15%                      | 0%                           |            |
| Dynamic building envelope | 10%               | 0%                               | 31%        | 56%         | 22%                   | 46%                      | 0%                           |            |
| Electricity               | 10%               | 0%                               | -          | -           | -                     | 68%                      | 0%                           |            |
| Electric vehicle charging | -                 | 38%                              | -          | 82%         | -                     | 84%                      | 0%                           |            |
| Monitoring and control    | 52%               | 43%                              | 62%        | 72%         | 45%                   | 64%                      | 0%                           |            |



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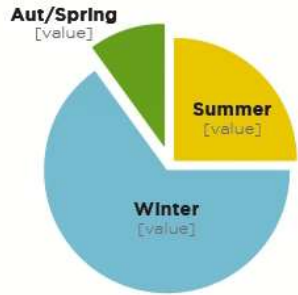
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[\[link to EPC database\]](#)

# Calculated EPB Assessment

## ALDREN Thermal Score

### Hours in the year

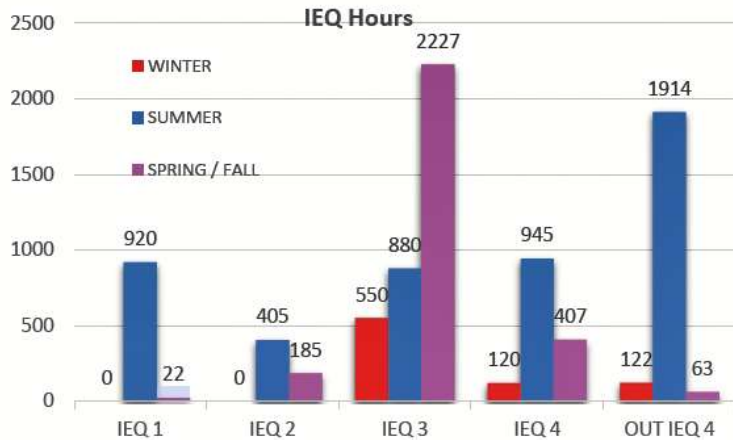


### Thermal Score

| Season        | Occupied (h) | Score      |
|---------------|--------------|------------|
| Winter        | [Value]      | 1.9        |
| Summer        | [Value]      | 2.8        |
| Aut./Spring   | [Value]      | 2.6        |
| <b>Total:</b> | [Value]      | <b>0.6</b> |

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