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for Reconstruction and Development

# Energy Performance Certificate for Buildings in Ukraine

## conceptual approach

# Energy Efficiency through European Directive

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**KYOTO Protocol**

**EU 20-20-20 Goals**

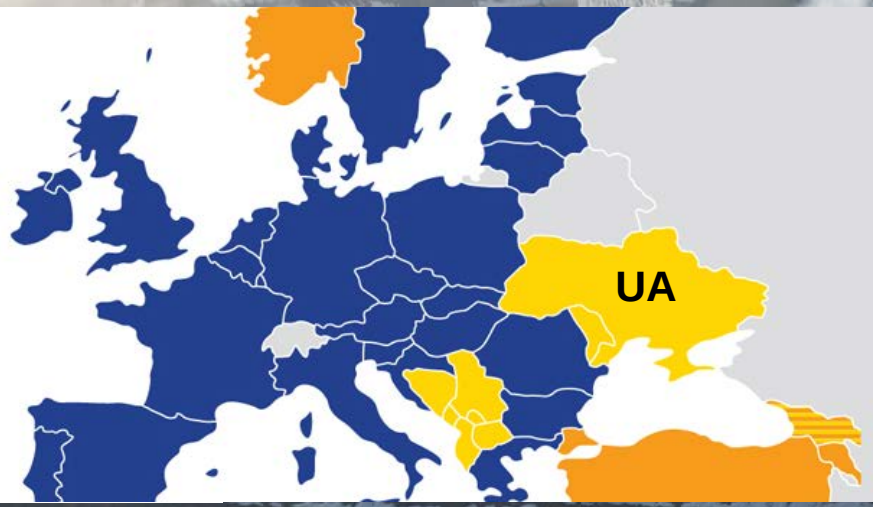
**COP Paris Agreement**

DIRECTIVE 2010/31/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 19 May 2010
on the energy performance of buildings

European Union

Contracting Parties

**UA** Ukraine signed in 2011 the Energy Community Treaty




Source: www.energy-community.org

# Energy Efficiency through thermal modernisation

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# Instruments for Energy Efficiency in Buildings

**CALC**

## Common calculation methodology

Calculation of the overall energy performance of buildings, based on national standard

**MEPS**

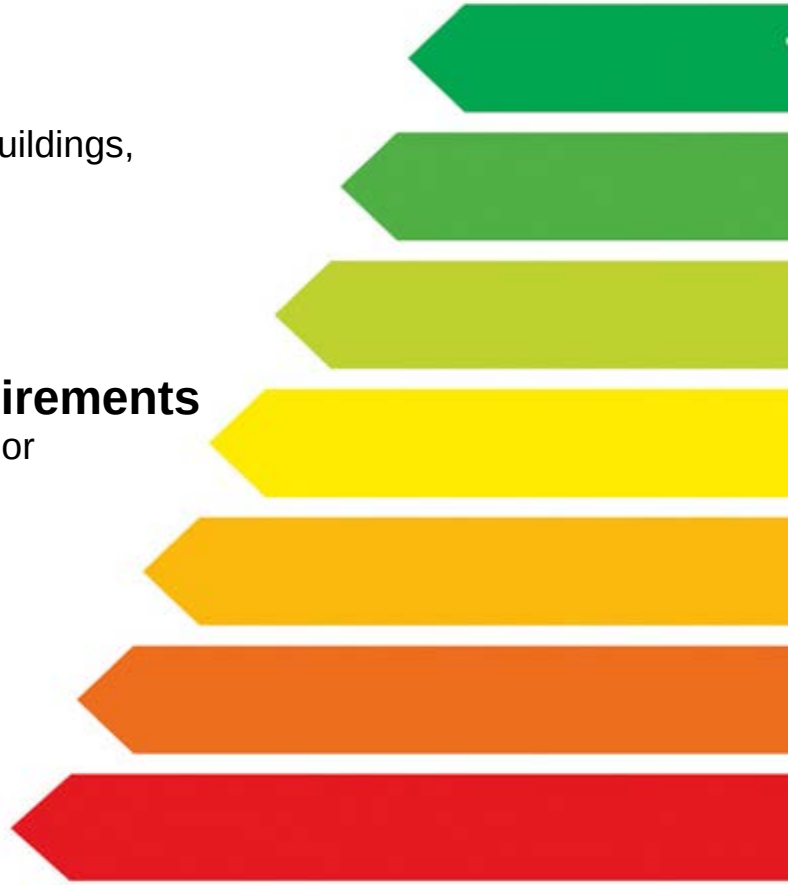
## Minimum Energy Performance Requirements

Limitation of energy use for new buildings and major renovations

**EPC**

## Energy Performance Certificate

Transparent communication of the energy performance of buildings to stakeholders/citizens



# Process elements to implement instruments


**Standards**
Definition of national standard for the calculation of the energy performance of buildings

**Software**
Development of a 'state-of-the-art' calculation software, incorporating the national standards for EP calculation

**Minimum Energy Performance Requirements**
Development of national legislation to define Minimum Energy Performance Requirements for buildings

**Energy Performance Certificate**
Define layout and content of the Energy Performance Certificate

**Quality Assurance**
Reviewing the results of the calculation in the Energy Performance Certification

**Repository**
Database for the final Energy Performance Certificates, including a 'public' view

**Energy Auditors**
Requirements/Qualifications, Registration and training for Energy Auditors who are certifying Energy Performance Certificates

**Organisation**
Responsible for qualified Energy Auditors, Quality Assurance and Repository for Energy Performance Certificates and managing a country auditors' database

# One software for the whole EPC process

| | | | | |
|---|---|---|---|---|
| **EPC** SOFTWARE | Administration of Calculators | Administration of Auditors | | |
| **EP** Calculation | Input of building data | Calculation of building's energy performance | Payment of request for certificate | **Request for certification** |
| **EP** Certification | Selection of independent Auditor | Automatic plausibility check of calculations | Payment of certification | **Approval of Certificate** |
| **EP** Verification | Classification of plausibility check | Random selection of Certificates | Second assessment of calculation | **Verified Certificate** |
| **EPC** Database | PDF report stored | All input and (intermediate) results stored | Selected data of EPC for public display | **Certificate stored in database** |

# EPC Application architecture

## Centralised Web based Service

### Calculation

State-of-the-art reusable code

Based on UA standards and norms

Unique calculation kernel county-wide

### Certification

EPC processing

Automatic plausibility check

Report generation

### Verification

Classification of plausibility check

Random selection of Certificates

Second assessment of calculation

User Data

EPC Data Input data

### Management

User Management

Software Maintenance

Release Management

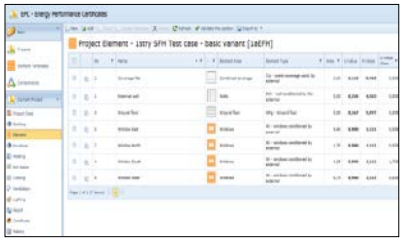
World Wide Web

### Local calculation by professionals

By use of web browser

Registration of user

User input data

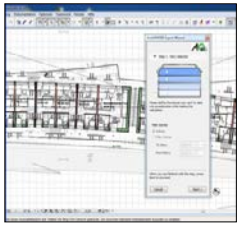


Local copy of project file, EPC PDF report

### Architectural SW/ Energy Calc SW

Structured interface

Calculation of Energy Performance via web- service integrated in Design SW



# One calculation kernel for the whole country

**Calculation**

State-of-the-art reusable code

Based on UA standards and norms

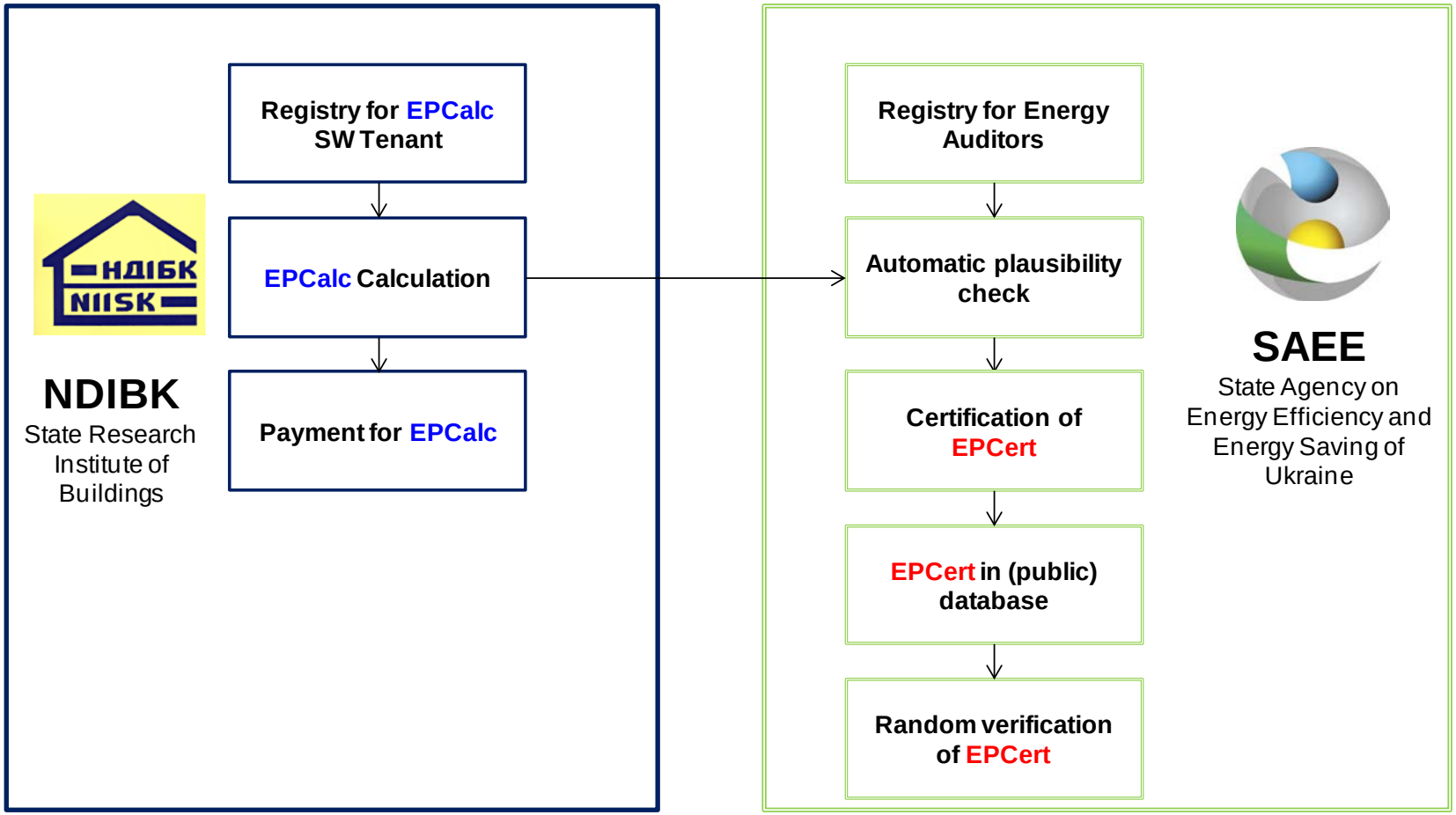
Unique calculation kernel county-wide

- **Only one kernel development** development of one calculation kernel saves resources (which is a part of software price and fee)
- **High quality/consistency in results** when using the same input data, the result for the calculation is the same (in contrast to countries with multiple tools for EPC)
- **No validation necessary:** no validation procedure for several software tools to calculate correctly, just for central kernel
- **One release management:** new releases for corrections and implementation of new calculation algorithms just once
- **No software download required:** just web browser and internet, most current calculation procedure at any time
- **Open to all software products** Individual software products can use calculation kernel via web service and by means of a structured interface for exchanging building data and EPC results

# Policy Dialogue in Ukraine

- **REEPD in Ukraine**
  **Residential Energy Efficiency Policy Dialogue**
- **Client: EBRD**
- **Duration: Feb 2014 – Feb 2017**
- **Technical Assistance to Support Investment in Energy Efficiency in Residential Buildings**
- **Implementation of EPC Software is one key project of REEPD programme**

# Solution for Ukraine: 2 responsibilities



# Division of responsibilities in SW concept

| | | | | |
|---|---|---|---|---|
| **EPC** SOFTWARE | Administration of Calculators | Administration of Auditors | NDIBK SW | SAEE SW |
| **EP** Calculation | Input of building data | Calculation of building's energy performance | Payment of request for certificate | **Request for certification** |
| **EP** Certification | Selection of independent Auditor | Automatic plausibility check of Calculations | Payment of certification | **Approval of Certificate** |
| **EP** Verification | Classification of plausibility check | Random selection of Certificates | Second assessment of calculation | **Verified Certificate** |
| **EPC** Database | PDF report stored | All input and (intermediate) results stored | Selection of data stored for frequent analysis | **Certificate stored in database** |

# Quality Assurance in Ukraine

- **Best Practise of Quality Assurance in Europe**

| | |
|---|---|
| Qualified Experts Competence | ✓ |
| Control of Qualified Experts | ✓ |
| Energy Performance Certificate Issuing | ✓ |
| Energy Performance Certificate Quality Control | ✓ |
| Energy Performance Certificate Register | ✓ |


Source: BPIE, Energy Performance Certificate Across The EU, A Mapping of National Approaches, 2014

# Legal implementation

- **On the basis of Energy Efficiency Law**
- **Proposal for secondary legislation**

**CALC**

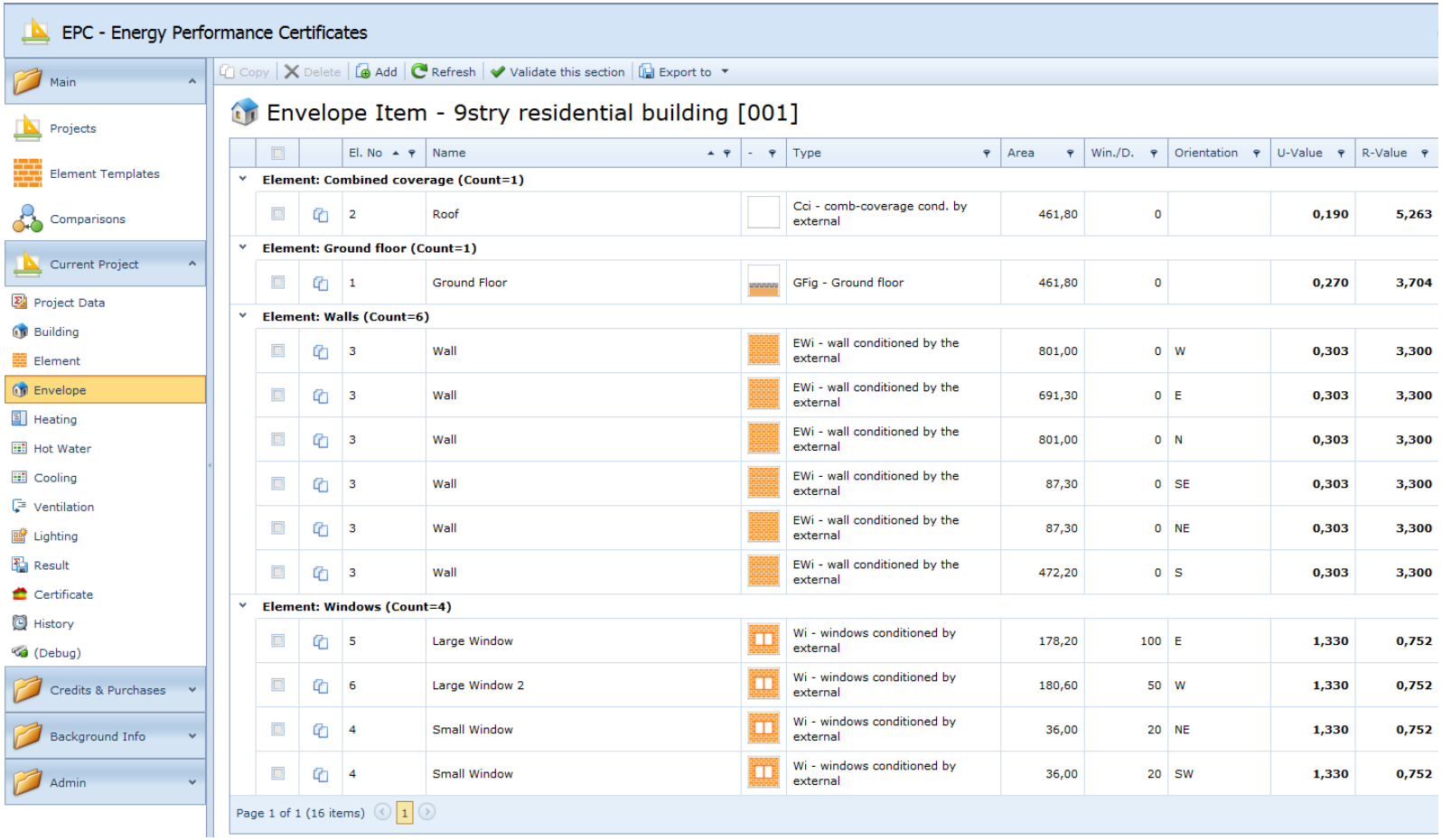
- Using a countrywide unique calculation kernel, central administration, operation and maintenance by **NDIBK**
- Controlled access to all professional Calculators via web browser (phase 1)
- Provision of access to all software products via web service (option)
- Revision of calculation kernel due to new algorithms and requirements in national calculation standards

**EPC**

- Quality assurance of energy performance calculation, central administration, operation and maintenance by **SAEE**
- Registration of qualified Energy Auditors, responsible for issuing the Energy Performance Certificate
- Random verification of Certificates by second assessment
- Storage of EPC report and public access to main EP indicators

# Example Interface for Users

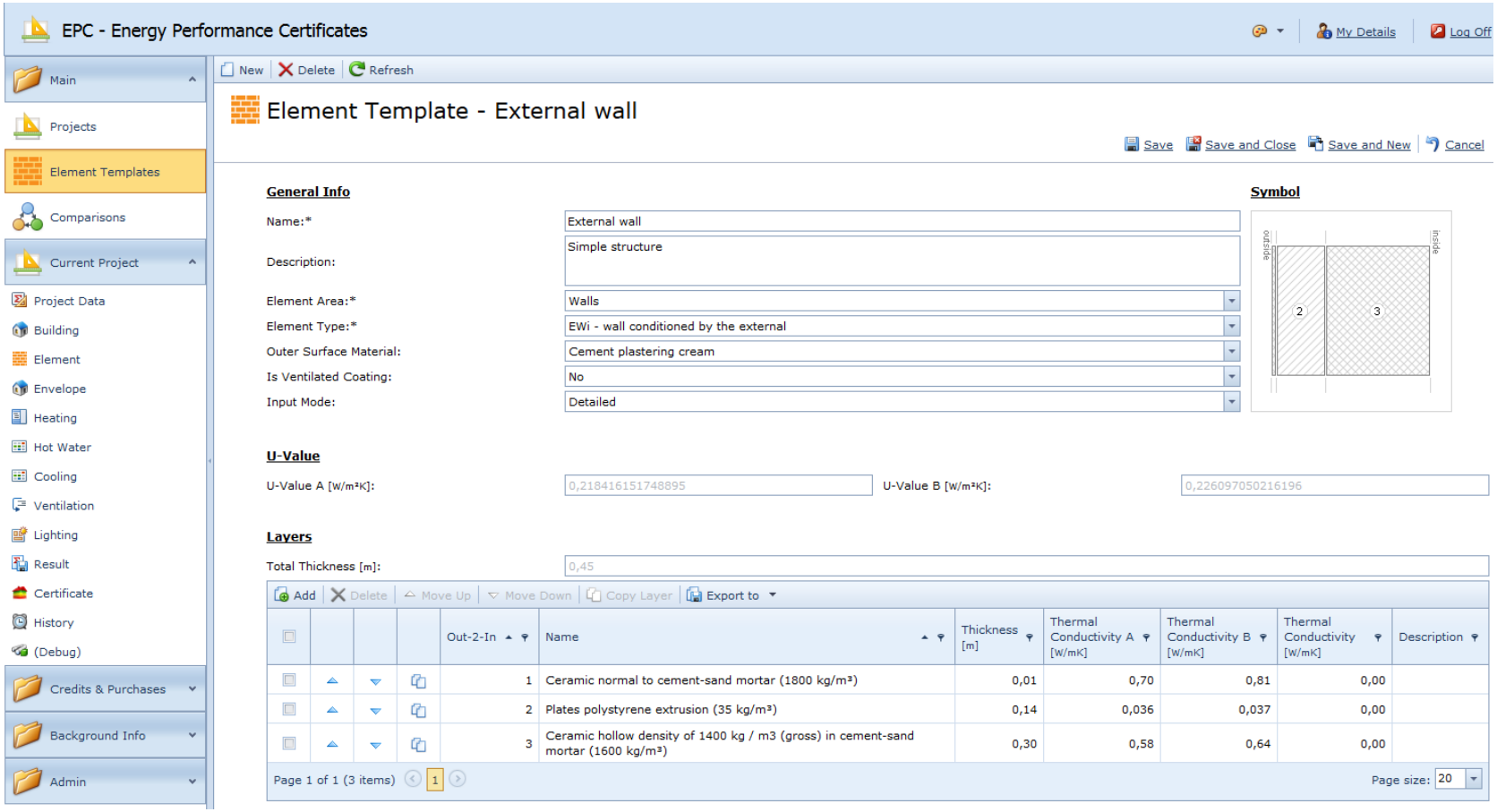
## Definition of building envelope




| El. No | Name | - | Type | Area | Win./D. | Orientation | U-Value | R-Value |
|---|---|---|---|---|---|---|---|---|
| **Element: Combined coverage (Count=1)** | | | | | | | | |
| 2 | Roof | | Cci - comb-coverage cond. by external | 461,80 | 0 | | **0,190** | **5,263** |
| **Element: Ground floor (Count=1)** | | | | | | | | |
| 1 | Ground Floor | | GFig - Ground floor | 461,80 | 0 | | **0,270** | **3,704** |
| **Element: Walls (Count=6)** | | | | | | | | |
| 3 | Wall | | EWi - wall conditioned by the external | 801,00 | 0 | W | **0,303** | **3,300** |
| 3 | Wall | | EWi - wall conditioned by the external | 691,30 | 0 | E | **0,303** | **3,300** |
| 3 | Wall | | EWi - wall conditioned by the external | 801,00 | 0 | N | **0,303** | **3,300** |
| 3 | Wall | | EWi - wall conditioned by the external | 87,30 | 0 | SE | **0,303** | **3,300** |
| 3 | Wall | | EWi - wall conditioned by the external | 87,30 | 0 | NE | **0,303** | **3,300** |
| 3 | Wall | | EWi - wall conditioned by the external | 472,20 | 0 | S | **0,303** | **3,300** |
| **Element: Windows (Count=4)** | | | | | | | | |
| 5 | Large Window | | Wi - windows conditioned by external | 178,20 | 100 | E | **1,330** | **0,752** |
| 6 | Large Window 2 | | Wi - windows conditioned by external | 180,60 | 50 | W | **1,330** | **0,752** |
| 4 | Small Window | | Wi - windows conditioned by external | 36,00 | 20 | NE | **1,330** | **0,752** |
| 4 | Small Window | | Wi - windows conditioned by external | 36,00 | 20 | SW | **1,330** | **0,752** |

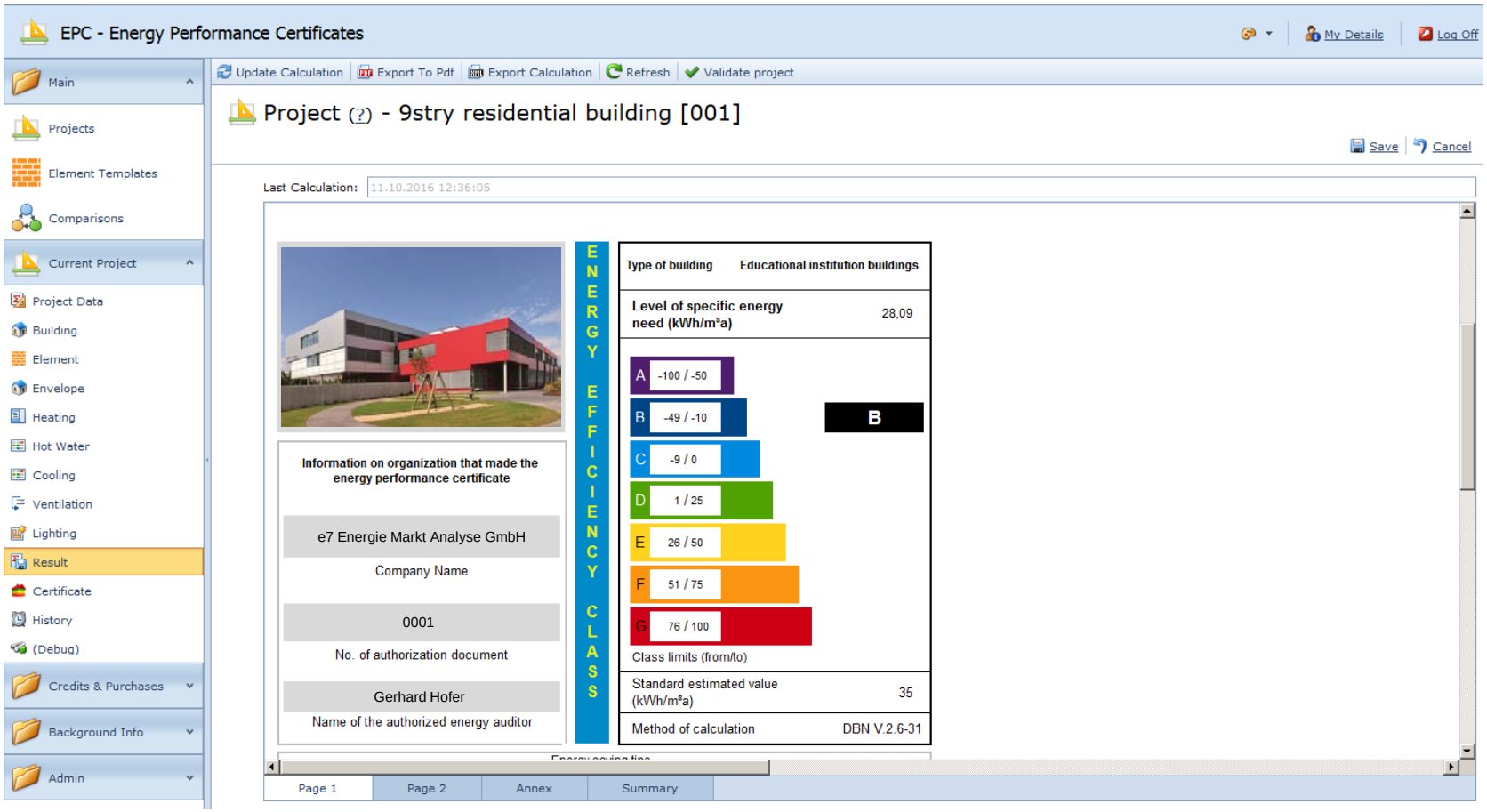
# Example Interface for Users

## Development of building element templates



# Example Interface for Users

## Display of results – draft version of the EP Certificate



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With the Government of Austria (the "Donor") providing funding for the consultancy assignment "Ukraine - Residential Energy Efficiency Policy Dialogue this presentation was prepared by e7 Energie Markt Analyse GmbH (the "Consultant") for the benefit of the Government of Ukraine and the European Bank for Reconstruction and Development (the "EBRD"). The views, opinions, assumptions, statements and recommendations expressed in this Report are those of the Consultant and do not necessarily reflect the official policy or position of the EBRD or the Donor.