MINISTRY OF DEVELOPMENT OF COMMUNITIES AND TERRITORIES OF UKRAINE

STATE ENTERPRISE
“STATE RESEARCH INSTITUTE OF BUILDING CONSTRUCTIONS”
(NIISK)

THE SCALE OF DESTRUCTION AND DAMAGE IN THE CONSTRUCTION INDUSTRY OF UKRAINE AND THE REGULATORY AND TECHNICAL BASE FOR RECOVERY

The European Economic Congress (EEC)
Katowice
25.04. 2023

Prof. Gennadiy FARENYUK
Director of Institute

STATE RESEARCH INSTITUTE OF BUILDING CONSTRUCTIONS (NIISK)

State Enterprise «The State Research Institute of Building Constructions» (NIISK) is one of the oldest research centers of the Ukrainian construction sector. It was established in November 1943. Its purpose was to contribute to the reconstruction of buildings and facilities destroyed in World War II in the short term and find the most efficient design methods and optimal use of building materials. Since then we proved that we are a leading science and technology center in surveying, testing and reconstruction. This valuable experience we use when take part in recovery and reconstruction projects which have already started in Ukraine.

NOWADAYS

- Nowadays Research Institute of Building Construction is large research center of Ukraine. It is well-known in Ukraine and abroad as well. Institute experts are awarded with international prizes.

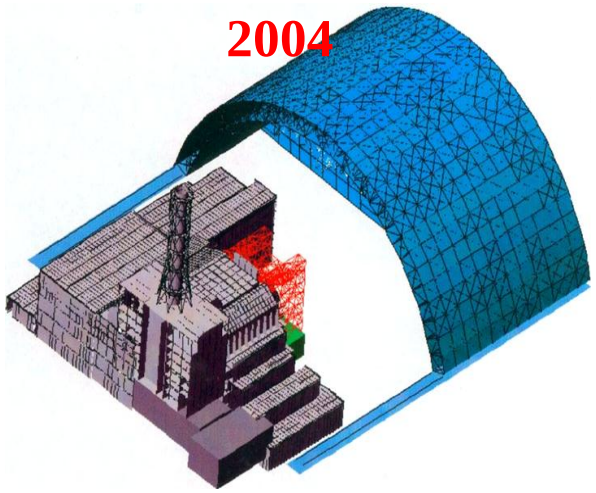
- Institute presents the Ukrainian construction sector in some international organizations:
  fib (International Federation of Concrete) – since 1998;
  UEAtc (the European Union of Agreement) - since 2008.

- Also, Institute has a membership in different public organizations.

- More then 200 specialists, including 8 Dr, 45 PhD and 155 specialists with university education, work for the Institute today.

- Institute has branches and laboratories in some regions of Ukraine: Zaporizhia, Poltava and Rivne. In addition to the 9 **Scientific departments** there are **Design department** and **Experimental base** which can develop the projects and technologies for the new structural decisions and to develop the structures for experimental construction.

Acting as a Client Engineer in the design and construction of the New Safe Confinement

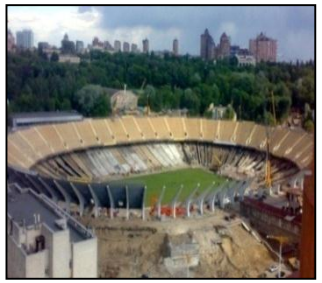


Span	257m
Length	150m
Height	110m
Weight	25,000t
Cranes	4 at 50t
Life	100yrs

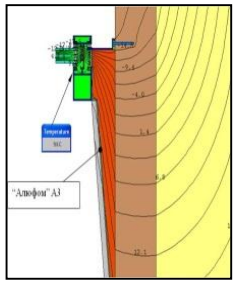
DIRECTIONS FOR INTERNATIONAL COOPERATION

- Development of regulatory framework and standardization
- Research and testing of civil structures
- Earthquake engineering and vibration protection
- Energy performance of buildings and facilities
- Geotechnical aspects of construction
- Reliability, safety and protection of civil structures
- Acoustical engineering and noise protection
- Economics of civil engineering and pricing of scientific and technological activities in construction

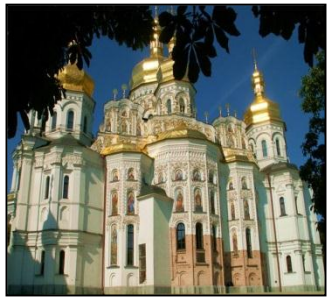
Construction projects



The NSC «Olympic», Kyiv



Energy effective retrofitting of the residential buildings



The Uspenskiy cathedral of the Kievan-Pechersk Lavra

The Kahovskaya hydroplant

The residential complex with multi-store parking in Kyiv

The Guy bridge across the Dnieper river

DAMAGES TO INFRASTRUCTURE AND ECONOMIC IMPACT OF RUSSIAN INVASION

ECONOMIC LOSSES DUE TO DESTRUCTION AND COLLAPSE OF ENGINEERING STRUCTURES*

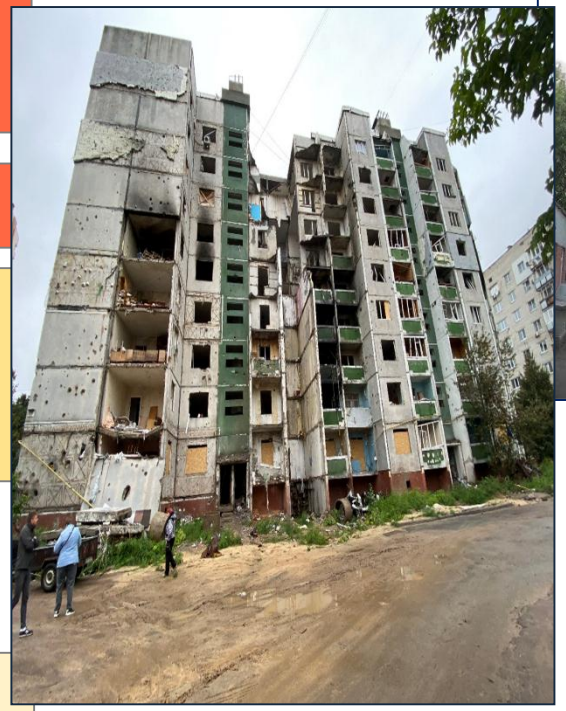
Total sum of losses is 138 bln USD

54 bln USD to residential buildings (total amount of destroyed residential buildings is about 150 thousand)

Of them:

- **131 thousand one family dwellings**
- **19 thousand multi-family dwellings**

Infrastructure 35.6 bln USD



View of the building before February 24, 2022

View after attacks of Russian troops in April 2022

DAMAGED RESIDENTIAL BUILDING IN CHERNIGIV, CHORNOVOLA STR 15

DAMAGES TO INFRASTRUCTURE AND ECONOMIC IMPACT OF RUSSIAN INVASION AS OF DECEMBER, 2022
based on the data taken from damaged.in.ua

DAMAGES TO INFRASTRUCTURE AND ECONOMIC IMPACT OF RUSSIAN INVASION

ECONOMIC LOSSES DUE TO MILITARY ACTIVITIES*

Enterprise and industrial assets, 13.0 bln USD

Education institutions, 8.4 bln USD (more than 3000 institutions are damaged)

Buildings of social and cultural significance, 2.2 bln USD (1430 facilities are damaged)

Administrative buildings, 0.8 bln USD (595 buildings are damaged)

Residential building attacked by rocket in the Irpin town, Kyiv region, Happy str. 24

DAMAGES TO INFRASTRUCTURE AND ECONOMIC IMPACT OF RUSSIAN INVASION AS OF DECEMBER, 2022
based on the data taken from damaged.in.ua

DAMAGES TO INFRASTRUCTURE AND ECONOMIC IMPACT OF RUSSIAN INVASION

DAMAGES AND COLLAPSE OF HEAT SUPPLY FACILITIES *

592 facilities are damaged such as:

444 Boiler plants

7 Thermal power plants

128 Central heat supply units

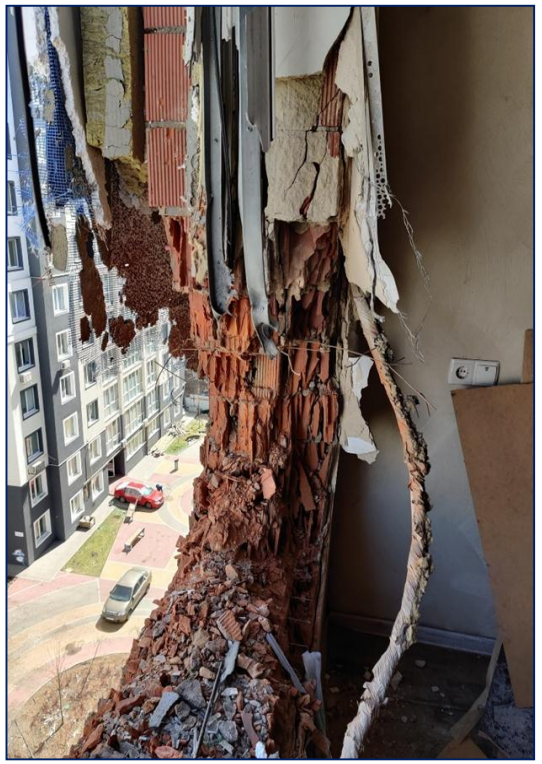
Of these, 300 heat supply facilities are reconstructed

DAMAGES TO INFRASTRUCTURE AND ECONOMIC IMPACT OF RUSSIAN INVASION AS NOVEMBER, 2022
based on the data taken from damaged.in.ua

RESIDENTIAL BUILDING IN BUCHA, OLEKSY TYKCHOGO STR 4

View after attacks
of Russian troops
in April 2022

All buildings on the photos above are surveyed by NIISK professionals to assess damages and to provide engineering solutions for reconstruction



RESIDENTIAL BUILDING IN BUCHA , BOGDAN KHMELNYTSKY AVE, 11

View of the building in 2015

View after attacks of Russian troops in April 2022

DAMAGED RESIDENTIAL BUILDING IN CHERNIGIV, CHORNOVOLA STR 15A

View of the building before February 24, 2022

View after attacks of Russian troops in April 2022

Object of the study is a residential building on Lobanovsky Prospekt, 6-A, in Kiev

LARGE-SCALE DESTRUCTION AS A RESULT OF RUSSIAN SHELLING AND BOMBING OF BUILDINGS IN SOLEDAR, DONETSK REGION

LARGE-SCALE DESTRUCTION AS A RESULT OF RUSSIAN SHELLING AND BOMBING OF BUILDINGS IN MARIUPOL, DONETSK REGION

CHANGES IN THE UKRAINIAN CONSTRUCTION MARKET IN 2022

From January through September of 2022, the commissioning of housing in Ukraine decreased by 44.9% compared to January-September 2021 - up to 4 million 825 thousand 286 square meters

In Kyiv, in 9 months of 2022, from January through September, the total area of new housing construction decreased by 77% compared to data from January through September 2021 up to 654 thousand square meters

From January through September 2022 it was commissioned
1.6 million square meters m of non-residential buildings

By November 2022, 185 sites out of 221 active at the beginning of the year (83.7%) have recovered in Kyiv (83,7%), 77.5% of construction sites (204 out of 263) have recovered in Kyiv region. 75% of sites started before the war (135 out of 180) are active in Odesa.
212 out of 218 construction sites work in Lviv

IMPLEMENTATION OF REGULATION (EU) No 305/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL IN UKRAINE

TECHNICAL REGULATION OF CONSTRUCTION PRODUCTS ⟷ **LAW OF UKRAINE "ON MARKETING OF CONSTRUCTION PRODUCTS"**

Provide mechanism Of marketing of construction products

APPROVED by Decision No. 1764 of the Cabinet of Ministers of Ukraine of December 20, 2006

implements PROVISIONS of Directive 89/106/EEC

MODIFICATIONS of Technical Regulation adopted on March 22, 2022 provide:

- **APPROXIMATION of provisions of valid Technical Regulation to Regulation (EU) No 305/2011;**
- **During martial law and within the next 90 days IT IS ALLOWED** to place to market and market construction products delivered to the territory of Ukraine from EU countries on the base of **DECLARATION OF PERFORMANCE** drawn up by a foreign manufacturer with a copy of the declaration in Ukrainian what demonstrates the conformity of construction products to the requirements of Regulation (EU) No 305/2011

ADOPTED by the Ukrainian Parliament on September 2, 2020 and BECAME EFFECTIVE on January 1, 2023

Implements PROVISIONS of Regulation (EU) No 305/2011 of the European Parliament and of the Council of March 9, 2011

is the legal and organizational basis for the **PLACING TO MARKET or MARKETING** of construction products by laying down rules for expressing **PERFORMANCE FOR ESSENTIAL CHARACTERISTICS** of construction products and use of **UKRAINIAN** conformity sign of Technical Regulation

EUROPEAN TECHNICAL APPROVAL GUIDELINES ADOPTED AS NATIONAL STANDARDS OF UKRAINE

For the purposes of

TECHNICAL REGULATION OF CONSTRUCTION PRODUCTS

AND

LAW OF UKRAINE "ON MARKETING OF CONSTRUCTION PRODUCTS"

Prepared by NIISK for the implementation into Ukrainian legislation

DSTU ETAG 004:2021 (ETAG 004:2013, IDT)
Guideline for European technical approval. External Thermal Insulation Composite Systems (ETICS) with rendering

DSTU N B ETAG 007:2013
Guideline for European technical approval. Timber frame building kits **(ETAG 007:2001, IDT)**

DSTU N B ETAG 017:2013
Guideline for European technical approval of VETURE kits - Prefabricated units for external wall insulation. **(ETAG 017:2005, IDT)**

DSTU N B ETAG 023:2013
Guideline for European technical approval of prefabricated building units. **(ETAG 023:2006, IDT)**

DSTU N B ETAG 024:2013
Guideline for European technical approval of concrete frame building kits **(ETAG 024:2006, IDT)**

DSTU N B ETAG 025:2013
Guideline for European technical approval of metal frame building kits **(ETAG 025:2006, IDT)**

SYSTEM OF EUROPEAN CODES IMPLEMENTED IN UKRAINIAN REGULATORY FRAMEWORK

Today there are 58 European Codes (category A standards) and their publication is completed in 2007

EN Bases of structural design 1

EN 1991 Loads and actions 10

- EN 1992 Reinforced concrete structures — 4
- EN 1994 Steel-reinforced concrete structures — 3
- EN 1996 Masonry structures — 4
- EN 1993 Metal structures — 20
- EN 1995 Timber structures — 3
- EN 1999 Aluminum structures — 5
- EN 1997 Geotechnical design — 2
- EN 1998 Design of aseismic structures — 6

Total: 58 standards of European Codes

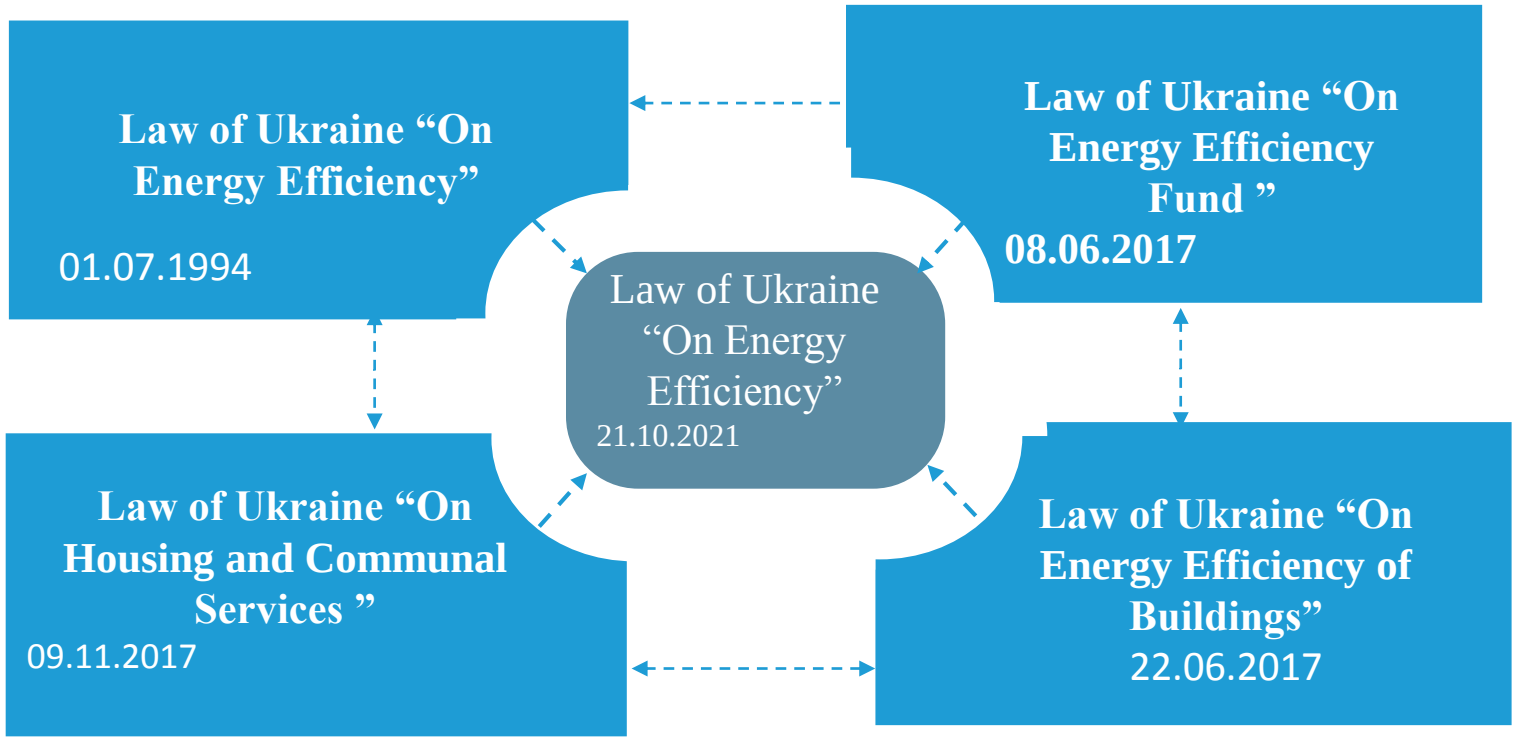
2 - number of separate standards

STATE CONSTRUCTION NORMS (DBN) FOR THE PURPOSES OF ESTABLISHING BASIC REQUIREMENTS FOR CONSTRUCTION WORKS IN UKRAINE

BASIC REQUIREMENTS FOR CONSTRUCTION WORKS

Mechanical resistance and stability	**DBN V.1.2-6:2021** Basic requirements for construction works. Mechanical resistance and stability – **developed by NIISK**
Safety in case of fire	**DBN V.1.2-7:2021** Basic requirements for construction works. Fire safety – **developed by NIISK**
Hygiene, health and the environment	**DBN V.1.2-8:2021** Basic requirements for construction works. Hygiene, health and environmental protection – **developed by NIISK**
Safety and accessibility in use	**DBN V.1.2-9:2021** Basic requirements for construction works. Safety and accessibility in use – **developed by NIISK**
Protection against noise	**DBN V.1.2-10:2021** Basic requirements for construction works. Protection against noise – **developed by NIISK**
Energy economy and heat retention	**DBN V.1.2-11:2021** Basic requirements for construction works. Energy saving and energy efficiency – **developed by NIISK**
Sustainable use of natural resources	

LEGISLATIVE BASE OF UKRAINE ON ENERGY EFFICIENCY



RELATIONSHIP OF THE SET OF EPB STANDARDS WITH THE NATIONAL REGULATORY FRAMEWORK

Directive 2021/31/ЄС on the energy performance of building EPBD

The Law of Ukraine “On energy efficiency of buildings”

Set of EPB standards

DBN V.2.6-11:2021
BASIC REQUIREMENTS FOR BUILDINGS AND STRUCTURES
ENERGY SAVING AND ENERGY EFFICIENCY

DBN V .2.6-31:2021
THERMAL INSULATION AND ENERGY EFFICIENCY OF BUILDINGS

DSTU 9190:2022
ENERGY PERFORMANCE OF BUILDINGS.
METHOD FOR CALCULATION OF ENERGY USE

DSTU 9191:2022
METHODS FOR CHOOSING OF INSULATION MATERIAL FOR INSULATION OF BUILDINGS

The EE fund’s activities

Fund's programs:

- Beginning September 2019, the Fund implements the Program for support of energy modernization of multi-apartment buildings ‘**ENERGODIM’**.

- Starting November 2022, the Fund launched a new grant program called ‘**VidnovyDIM**’, which aims to finance construction works to restore residential buildings damaged as a result of the military aggression of the russian federation.

- Since February 2023, the Fund has been developing the new project – **the Renewable Energy Program**.

The programs are a real opportunity for Homeowner associations (HOAs) to receive funding for the repair of residential buildings, destroyed as a result of the hostilities of the russian federation, to increase the energy efficiency of houses and to reduce dependence on fossil energy resources.

About the Energy Efficiency Fund

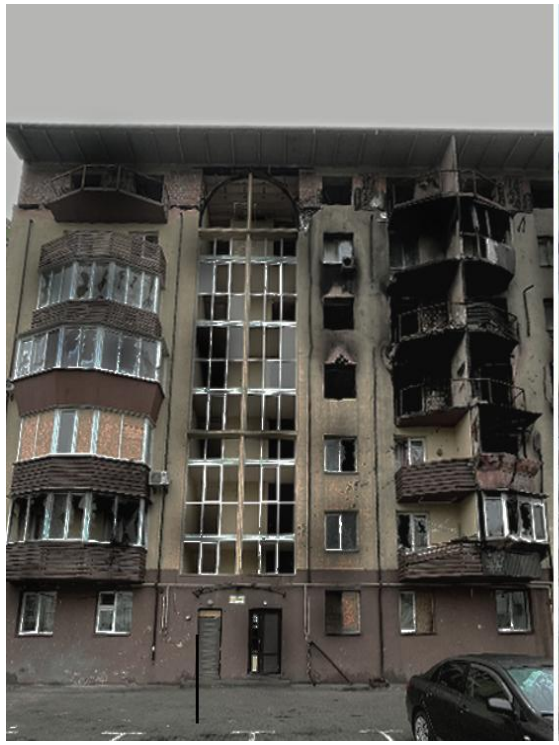
The Energy Efficiency Fund was established in 2018. The design of the fund draws on the success of similar programs in Poland, Lithuania, Croatia and elsewhere in the EU.

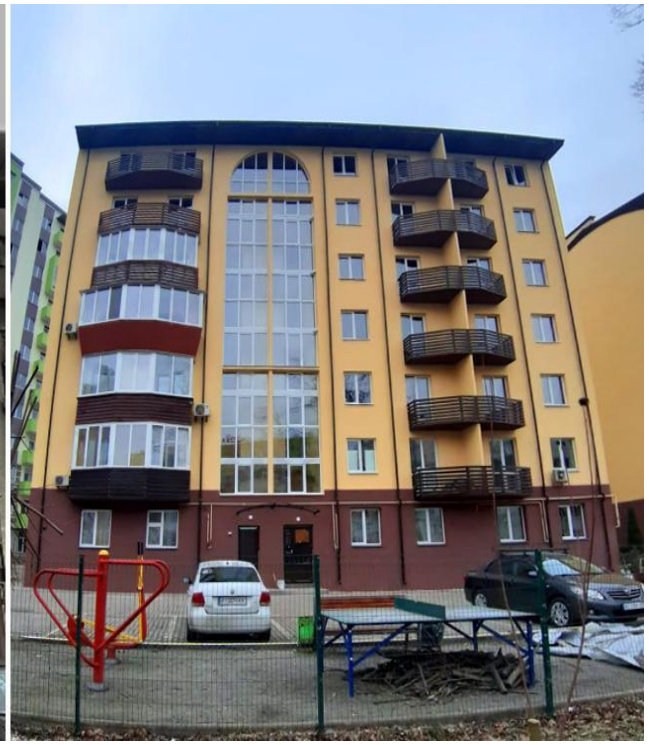
The EE Fund provides grants that HOAs can use to improve the energy efficiency of their apartment buildings and to implement other programs in the residential sector (in particular for the restoration of buildings destroyed or damaged due to **the armed aggression of the russian federation against Ukraine)**.

The EE Fund is an effective tool for **reducing the carbon footprint** of Ukrainian communities.

The **European Union** and the **German government support the EE Fund's activities**.

The first results of the Program





The HOA ‘NOVO-OSKOLSKII’
Building 1,
Irpin city, Kyiv region

General information:

Total cost of the Project
UAH 5,4 million

The Grant 1 amount
UAH 3,8 million

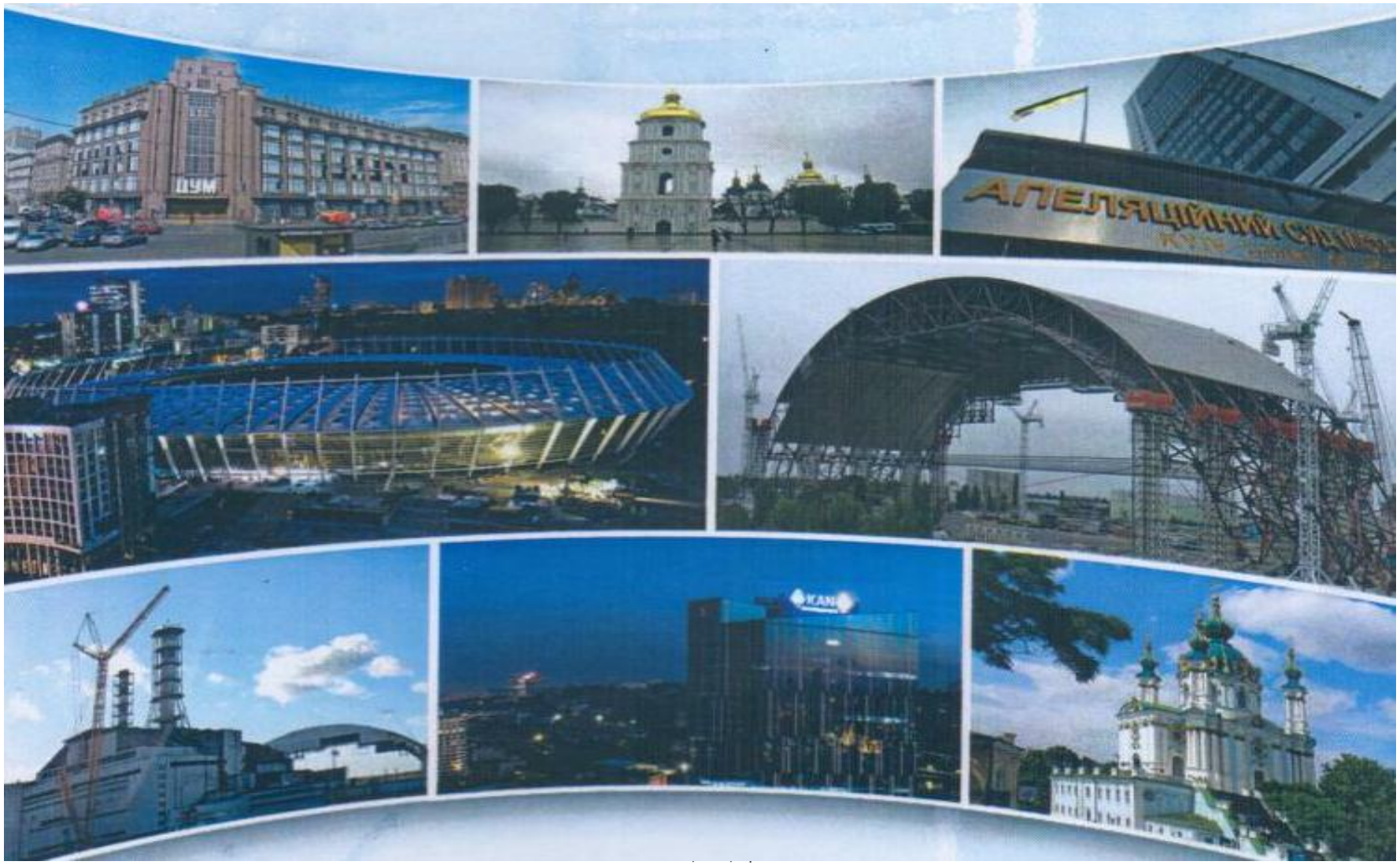
The Grant 2 amount
UAH 1,6 million

The number of households 42

The implemented measures:

- Replacement of the damaged transparent fencing structures (blocks of windows and blocks of balcony doors)
- Replacement of the damaged external and internal vestibule doors
- Repair of the damage to building facades.

THANK YOU FOR YOUR ATTENTION!



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