

# INVESTMENT OPPORTUNITY OF ENERGY SECTOR



# ENERGY SECTOR OF UKRAINE

## Energy sector macroeconomics



**7.6%**

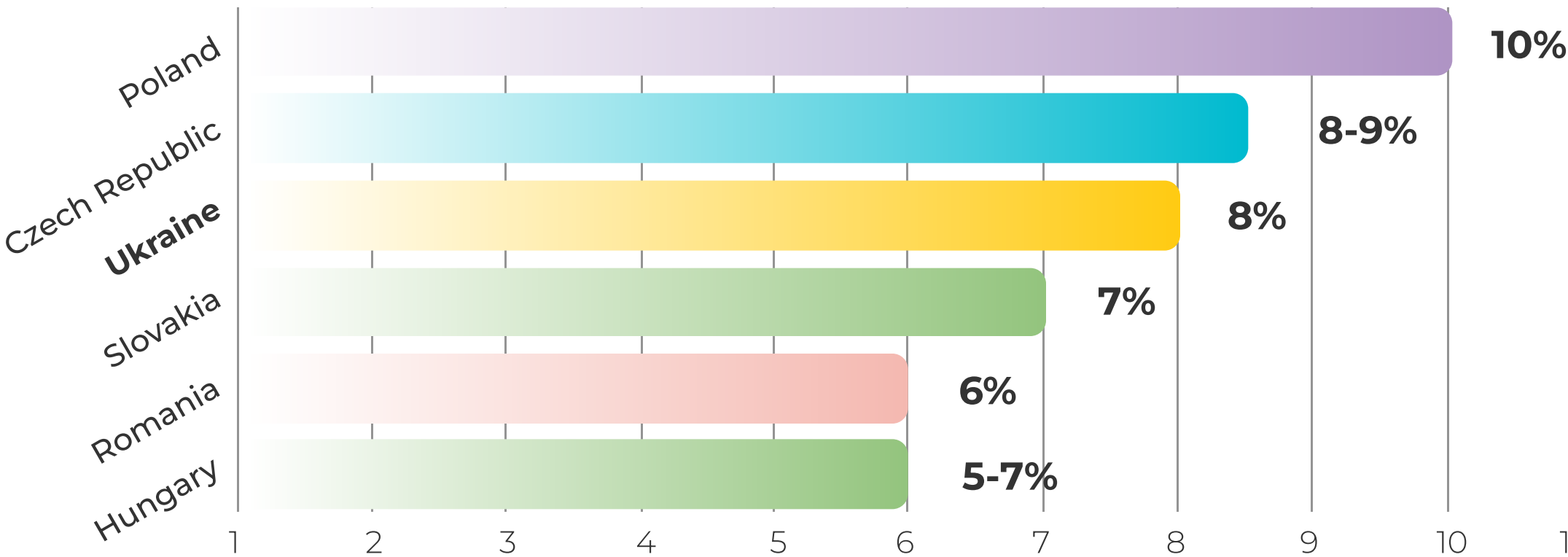
of Ukraine's budget was provided by the energy sector in 2023



**Top-30**

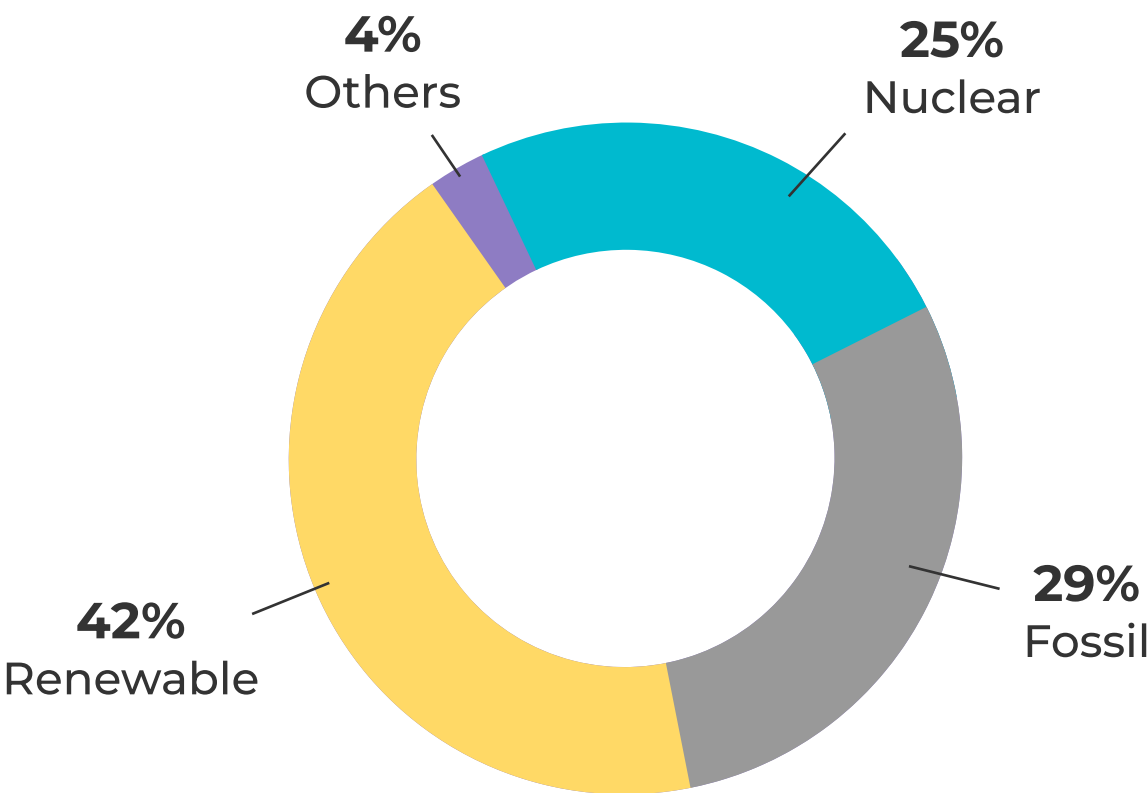
electricity consumption in the world

## Energy share in the country's GDP, 2023

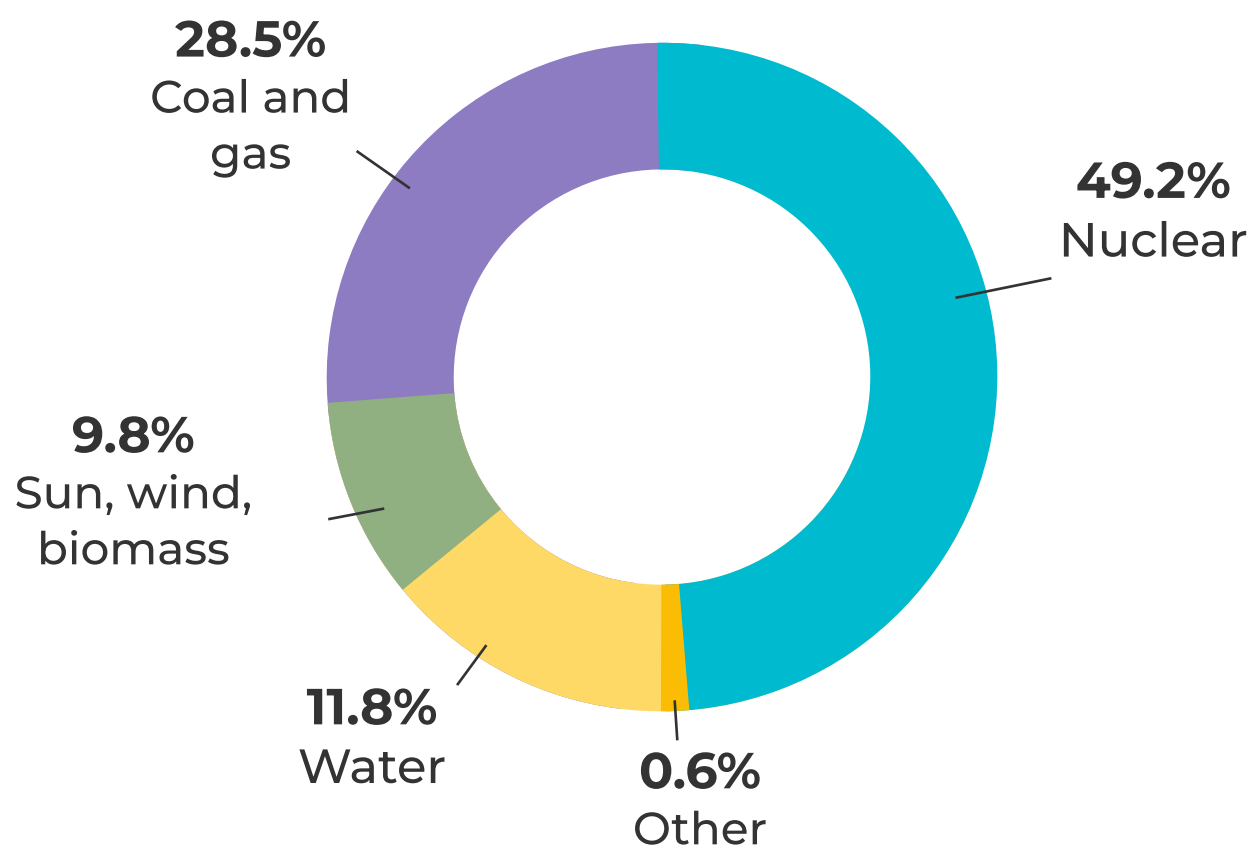


Approximately **450 000** individuals are employed in the Ukrainian energy sector, accounting for **1,2% of the population**

## Energy sources in Europe, 2023



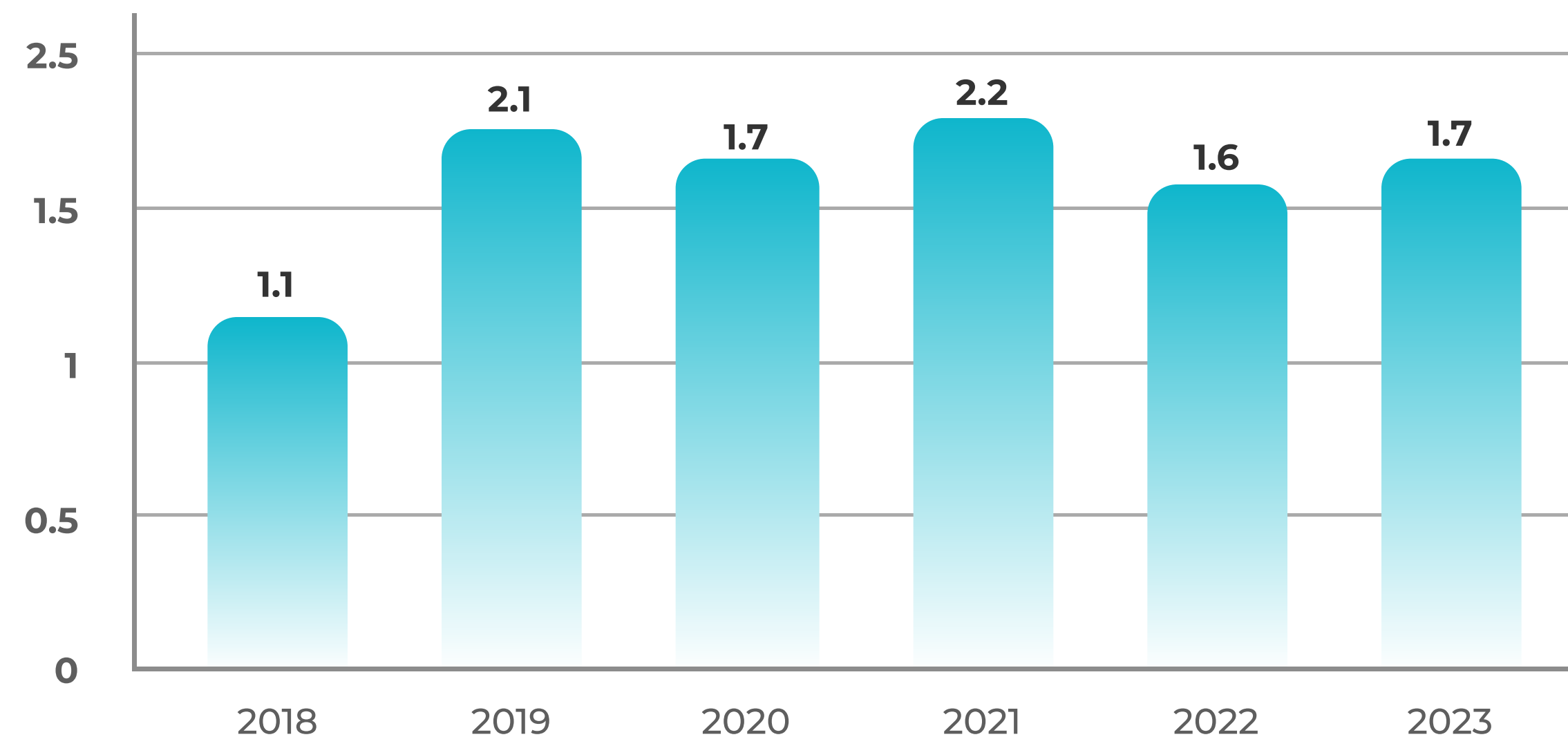
## Energy sources in Ukraine, 2023



# ENERGY SECTOR OF UKRAINE

## FDI snapshot

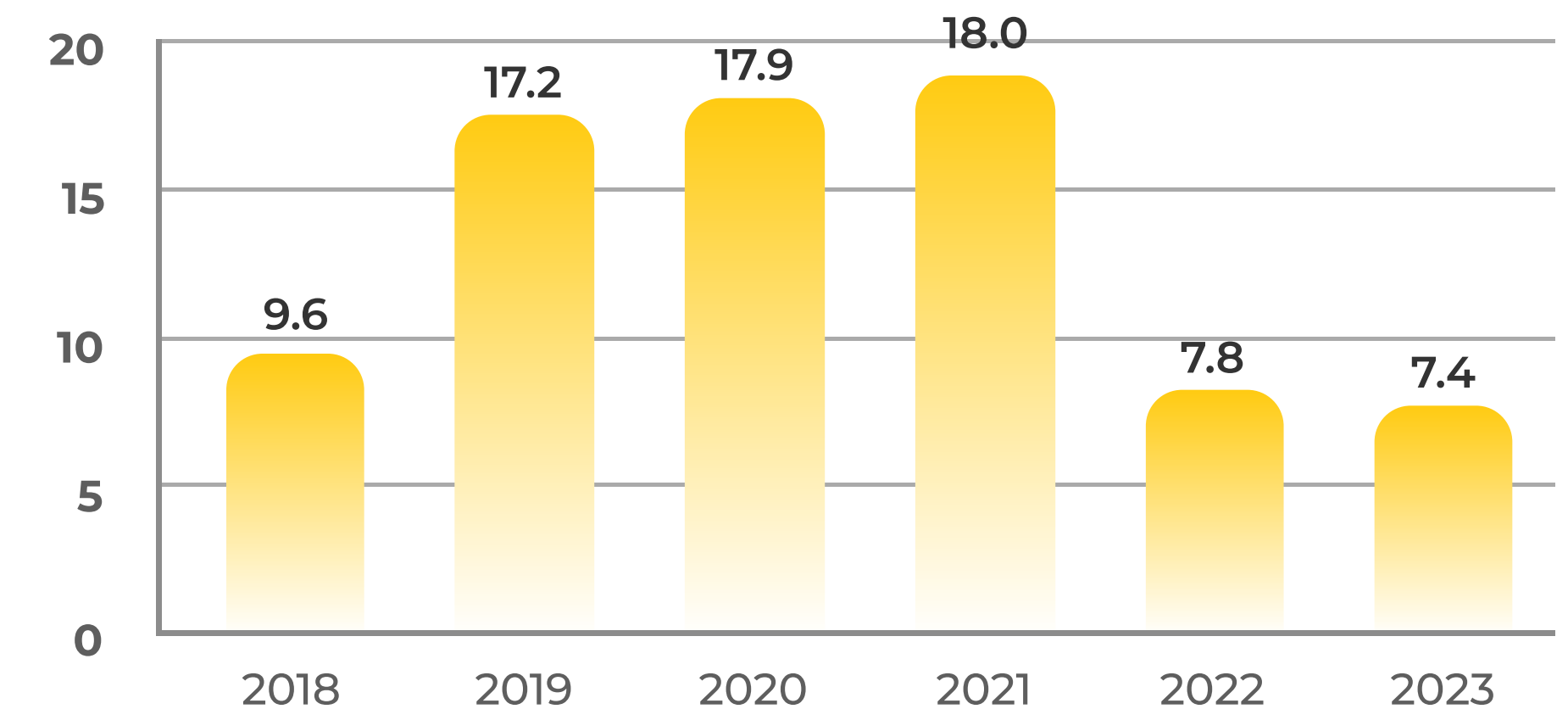
Total FDI in electricity generation, transmission and distribution, bln USD



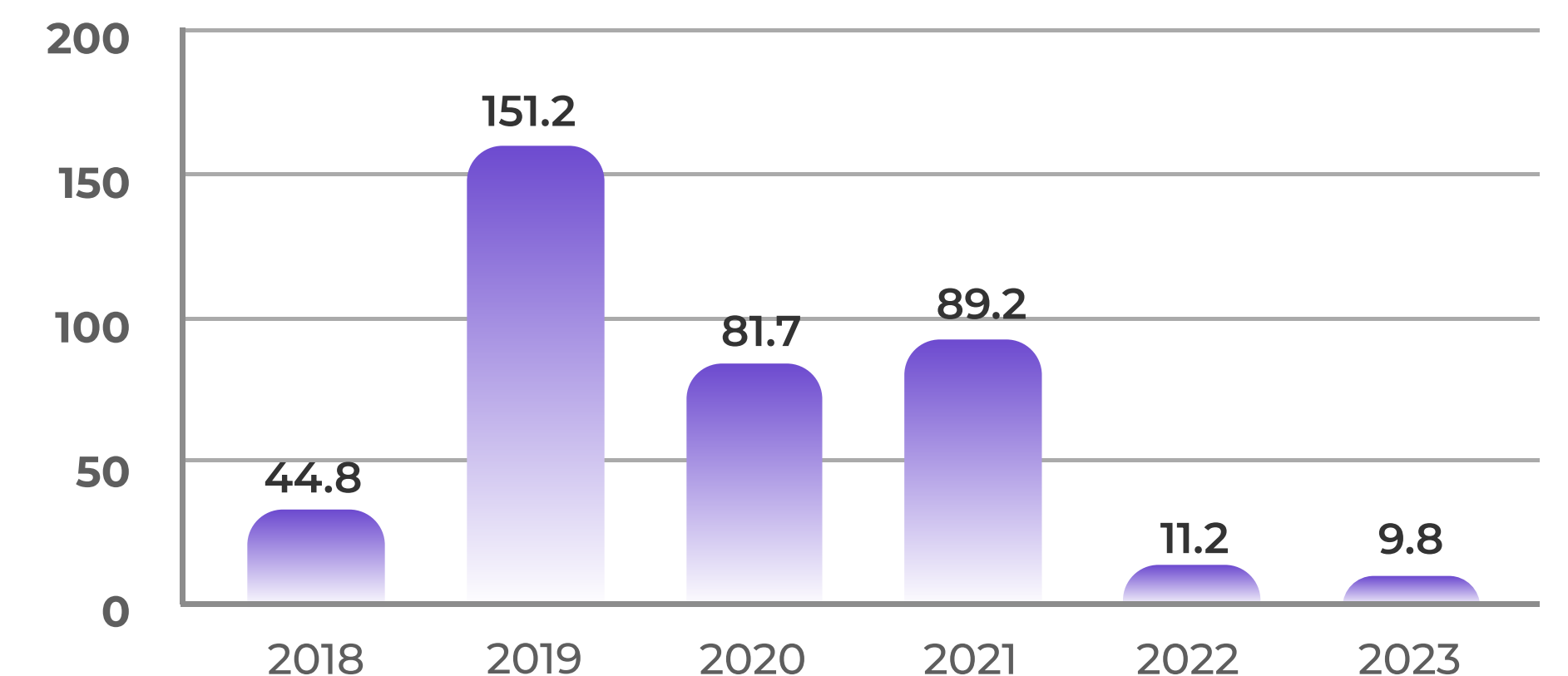
~7%

of FDI in electricity supply in Ukraine in relation to investments in other economic activities

Total FDI in manufacture of electric motors, generators, transformers, electrical distribution and control equipment, mln USD



Total FDI in gas production, mln USD



# ENERGY SECTOR OF UKRAINE

## Losses due to full-scale invasion



Over **50%** of the energy infrastructure has been damaged, causing **23 GW** of generation losses.\* From March to July 2024, Ukraine lost **9 GW** of generation



**USD 56 bln**

Damage to Ukraine's energy infrastructure caused by Russian attacks since the beginning of the full-scale invasion as of spring 2024

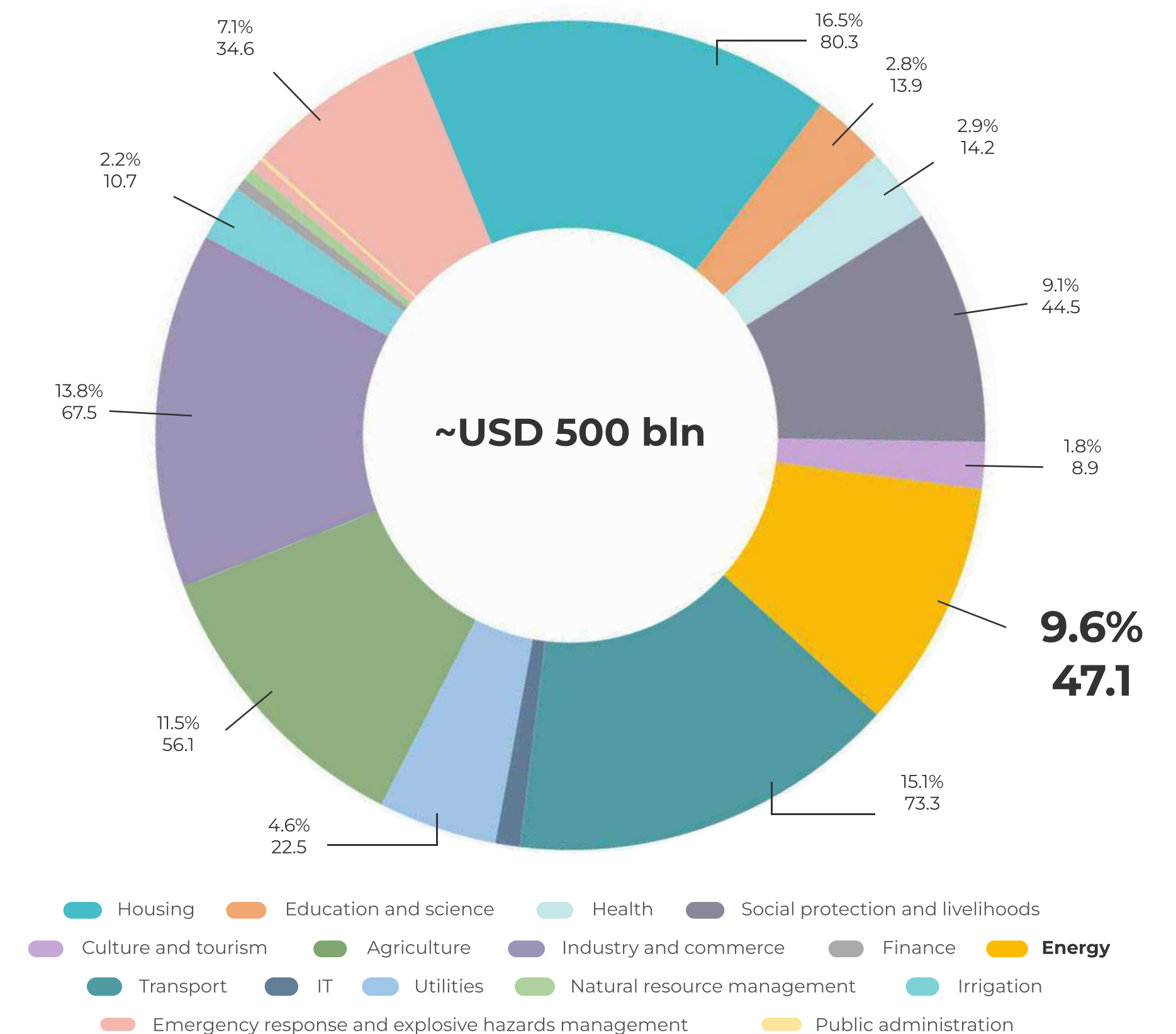
**5%**

Average electricity deficit forecast in **2024-2025**

**0.6%**

of GDP will be electricity deficit in **2024**

## Recovery and reconstruction needs, USD bln\*

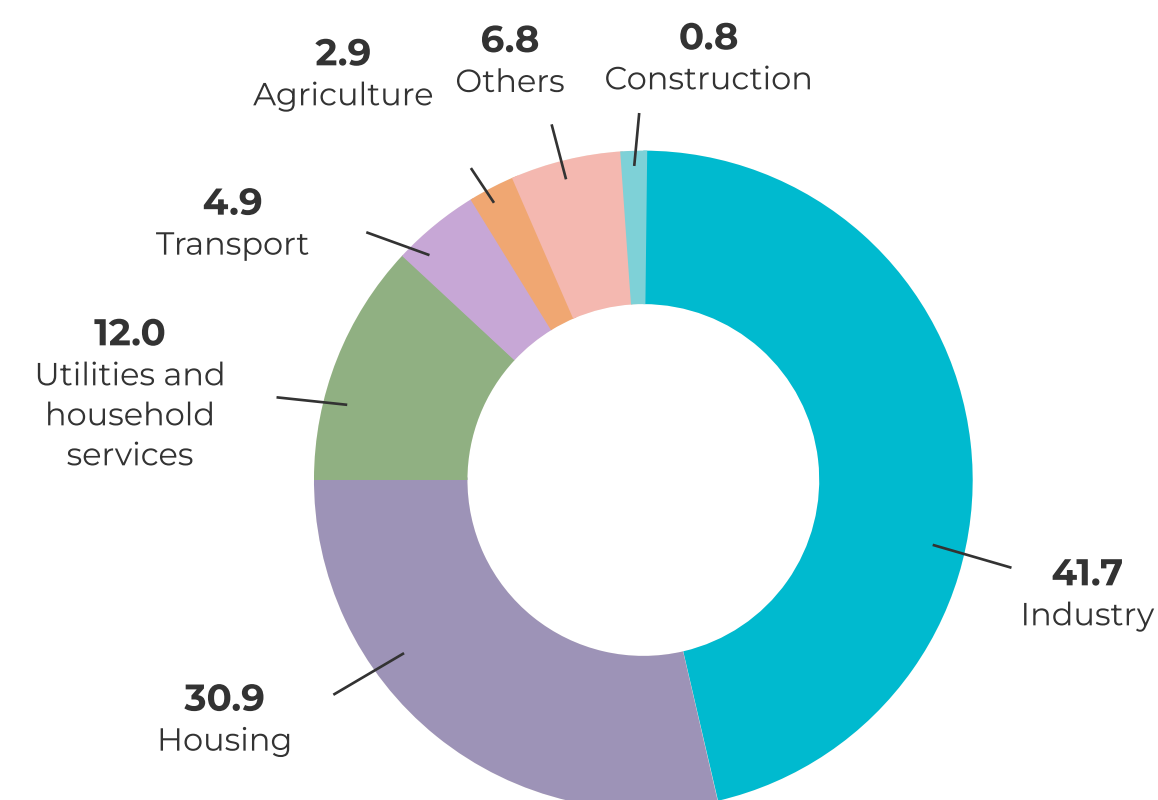




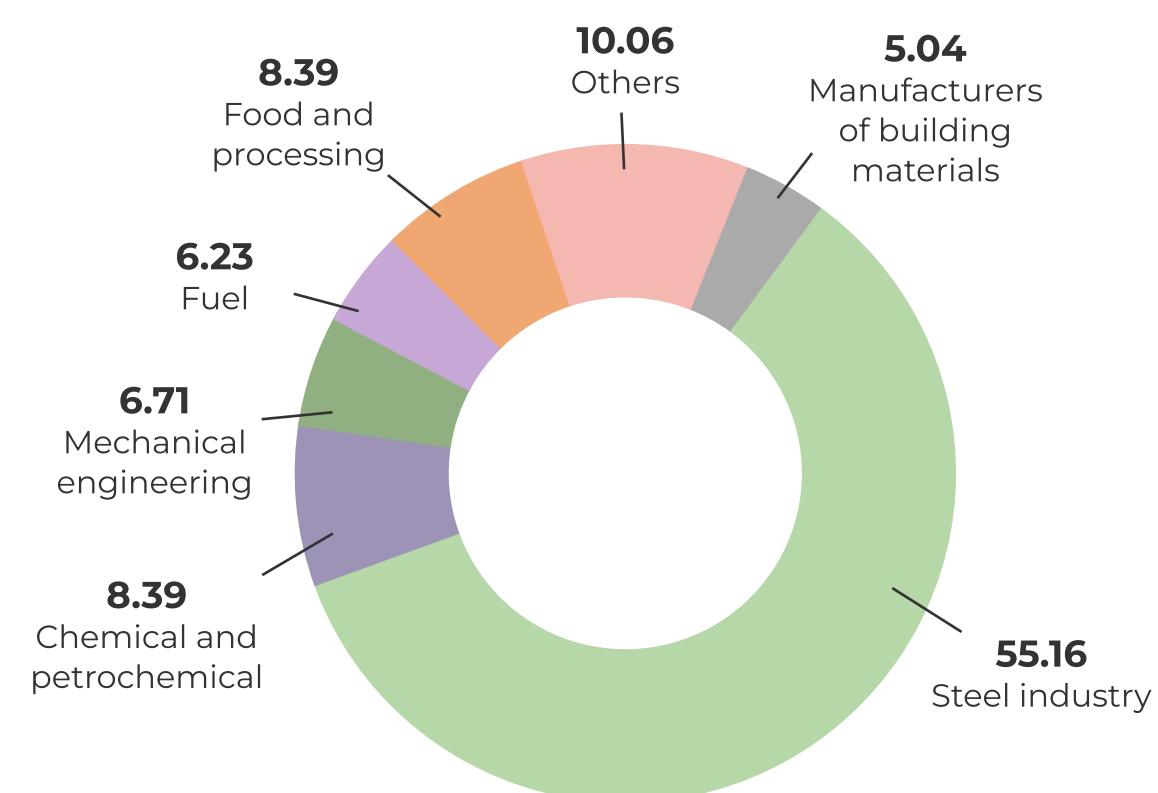
# ENERGY SECTOR OF UKRAINE

## Current state of electricity consumption

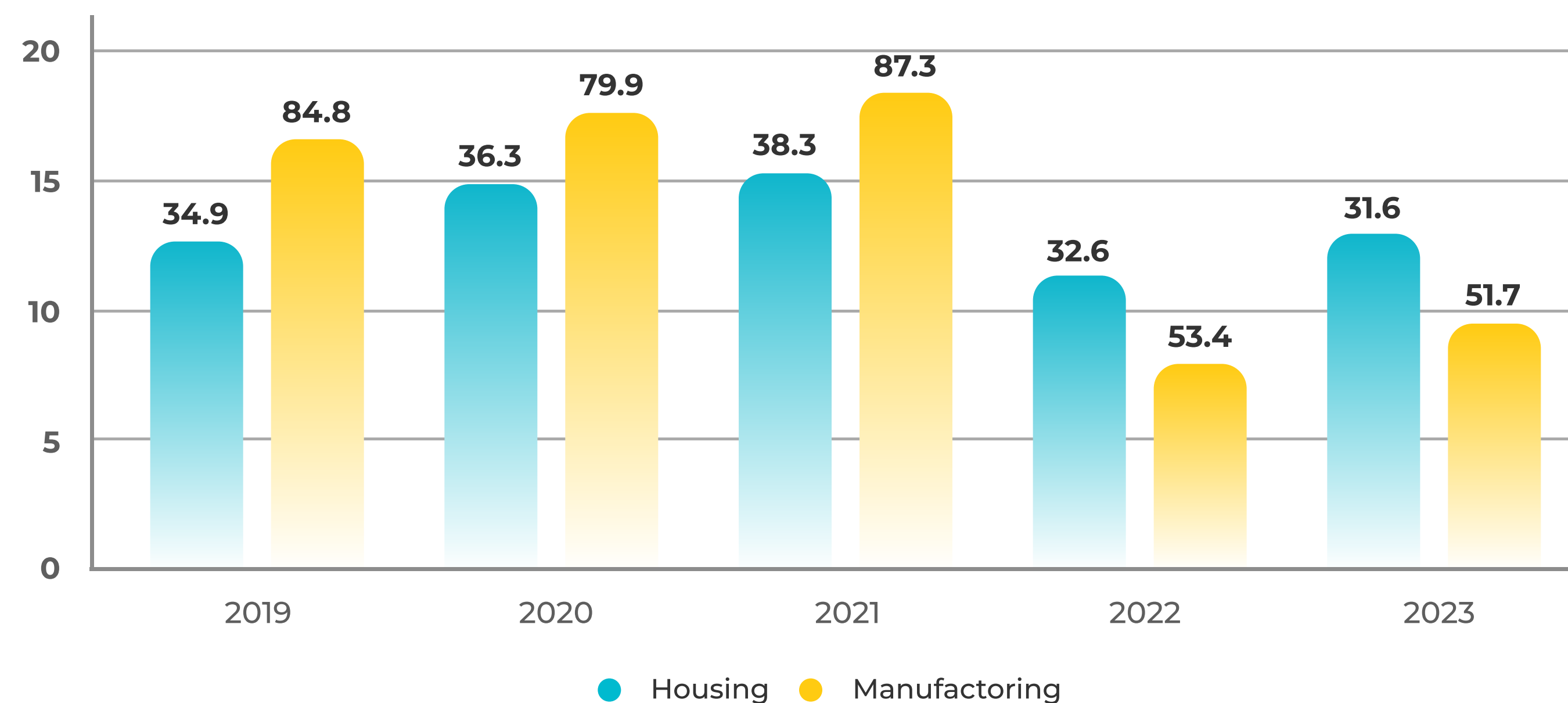
Electricity consumption in Ukraine, %, 2021



Industrial sector electricity consumption, %, 2021



Electricity consumption by housing and manufacturing, bln kWh, 2019-2023

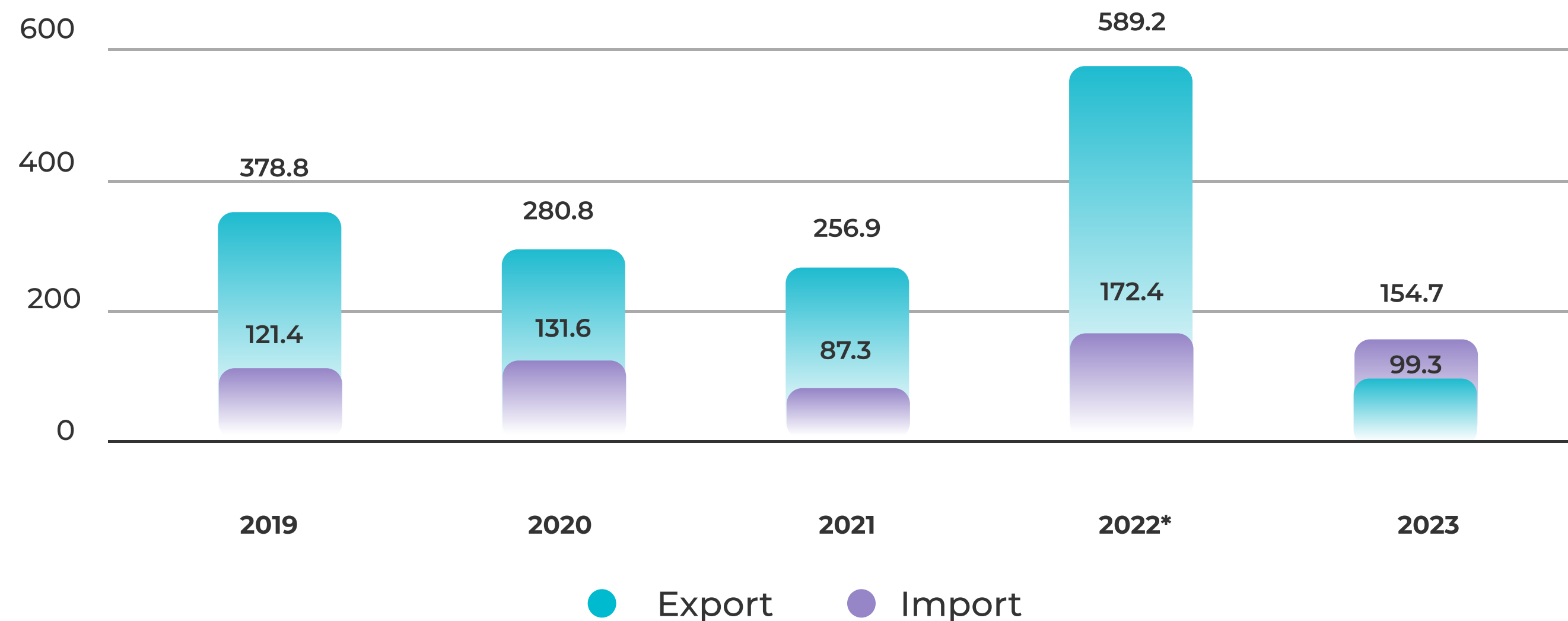


Electricity consumption structure shows that the majority of electricity is used by industry and covers the needs of the residential sector

# ENERGY SECTOR OF UKRAINE

## Electricity turnover

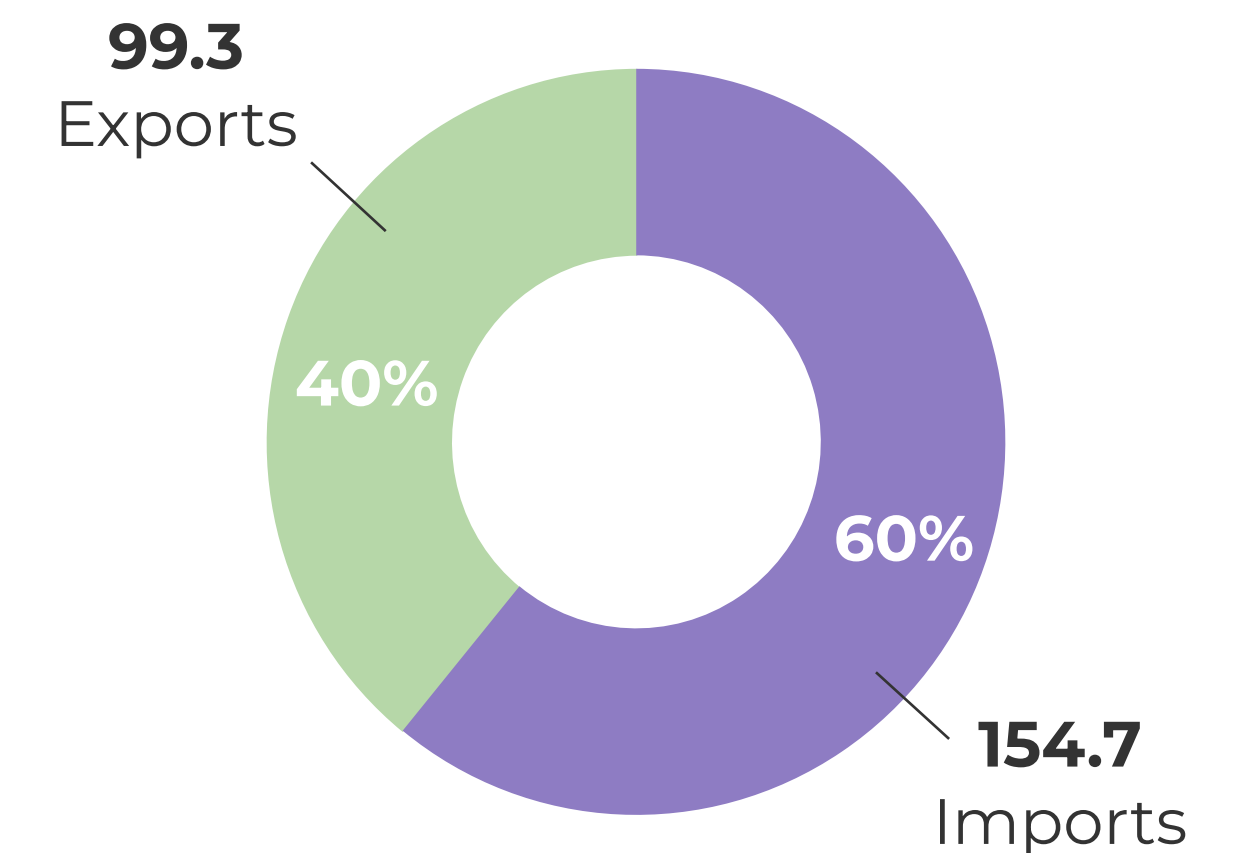
Dynamics of electricity turnover in Ukraine in 2019-2023, USD mln\*



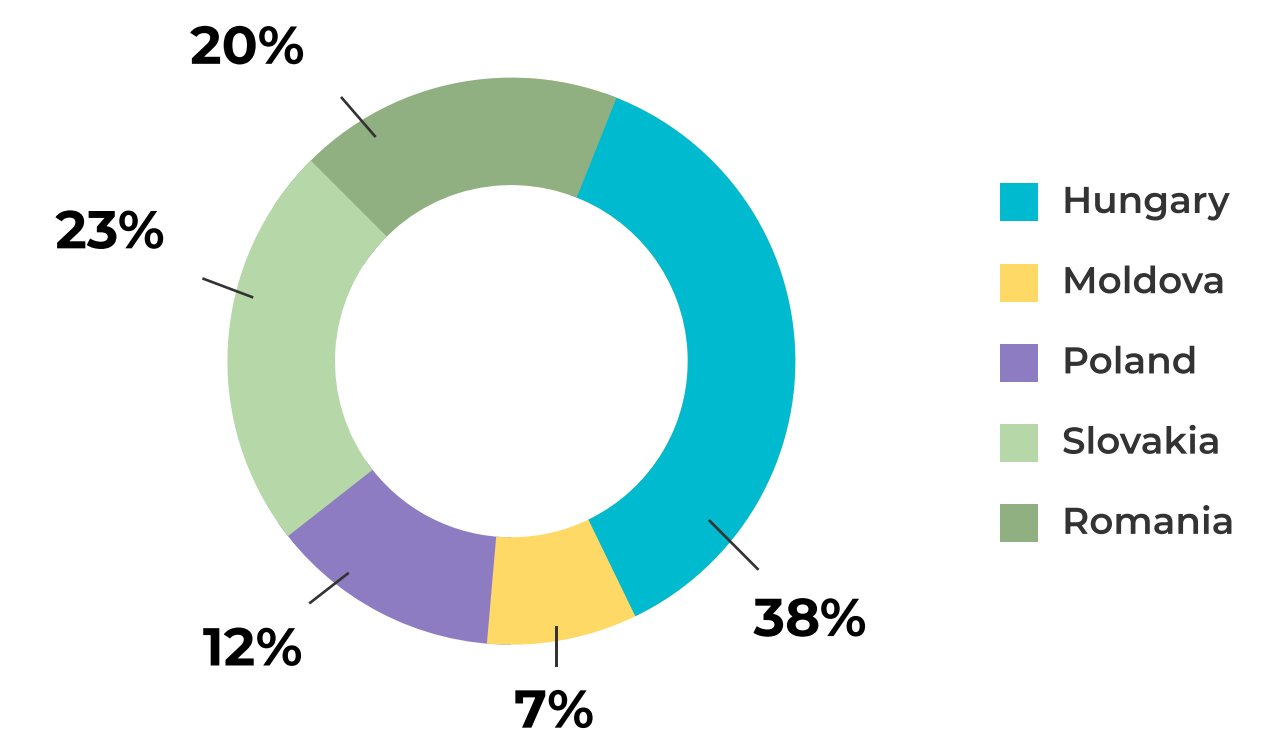
In 2023, electricity imports to Ukraine exceeded exports as a result of insufficient production capacity due to russia's terrorist attacks on energy infrastructure

In **June 2024**, Ukraine imported **6%** more electricity than in the whole of 2023 - **858.4 thousand MWh**, which is also the **largest monthly volume since 2014**

Electricity turnover, mln USD, 2023



Electricity imports to Ukraine, for the first six months of 2024



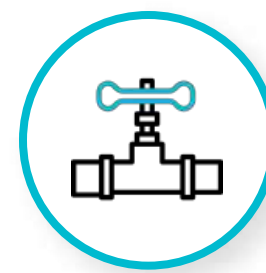


# ENERGY SECTOR OF UKRAINE

## Gas sector



**12**  
underground gas  
storage facilities



**~31 bln m<sup>3</sup>**  
total storage  
capacity

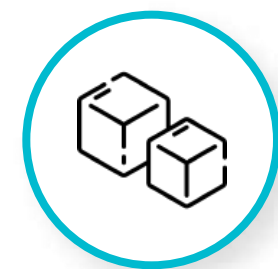
**№1**

in Europe

by the capacity of underground gas storage facilities

**№3**

In the world



**more than 8.1 bln m<sup>3</sup>**  
of gas available in gas storage  
facilities in Ukraine as of 2024

In 2023

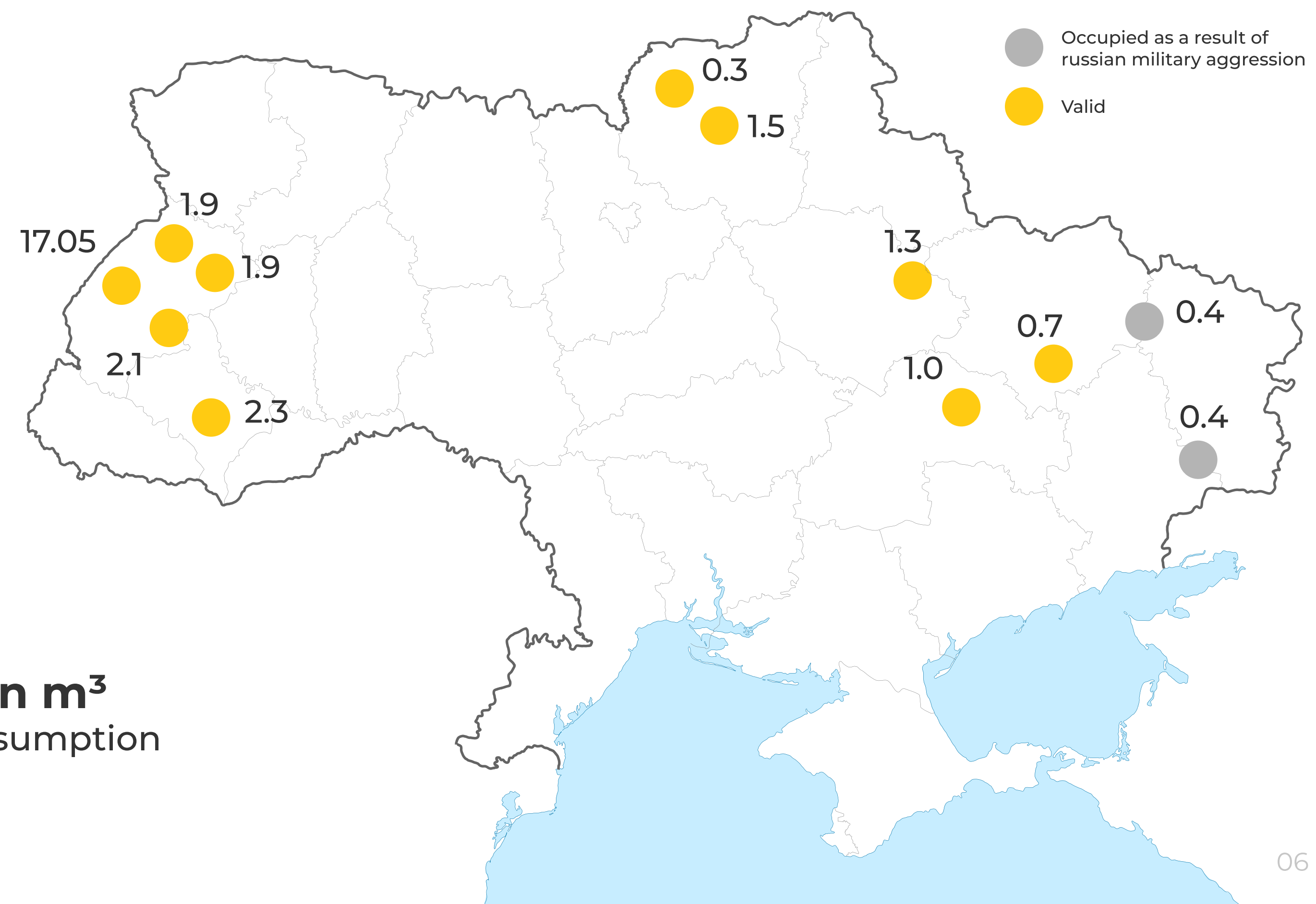


**18.7 bln m<sup>3</sup>**  
gas production



**19.6 bln m<sup>3</sup>**  
gas consumption

## Underground gas storage facilities in Ukraine, bln m<sup>3</sup>



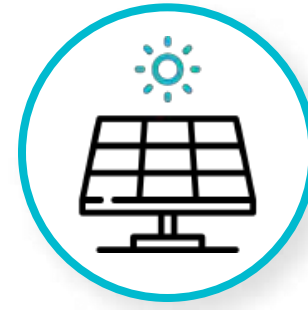


# RENEWABLE ENERGY

## Solar energy



about  
**13% of industrial SPPs**  
destroyed or damaged since  
the beginning of the full-scale  
invasion

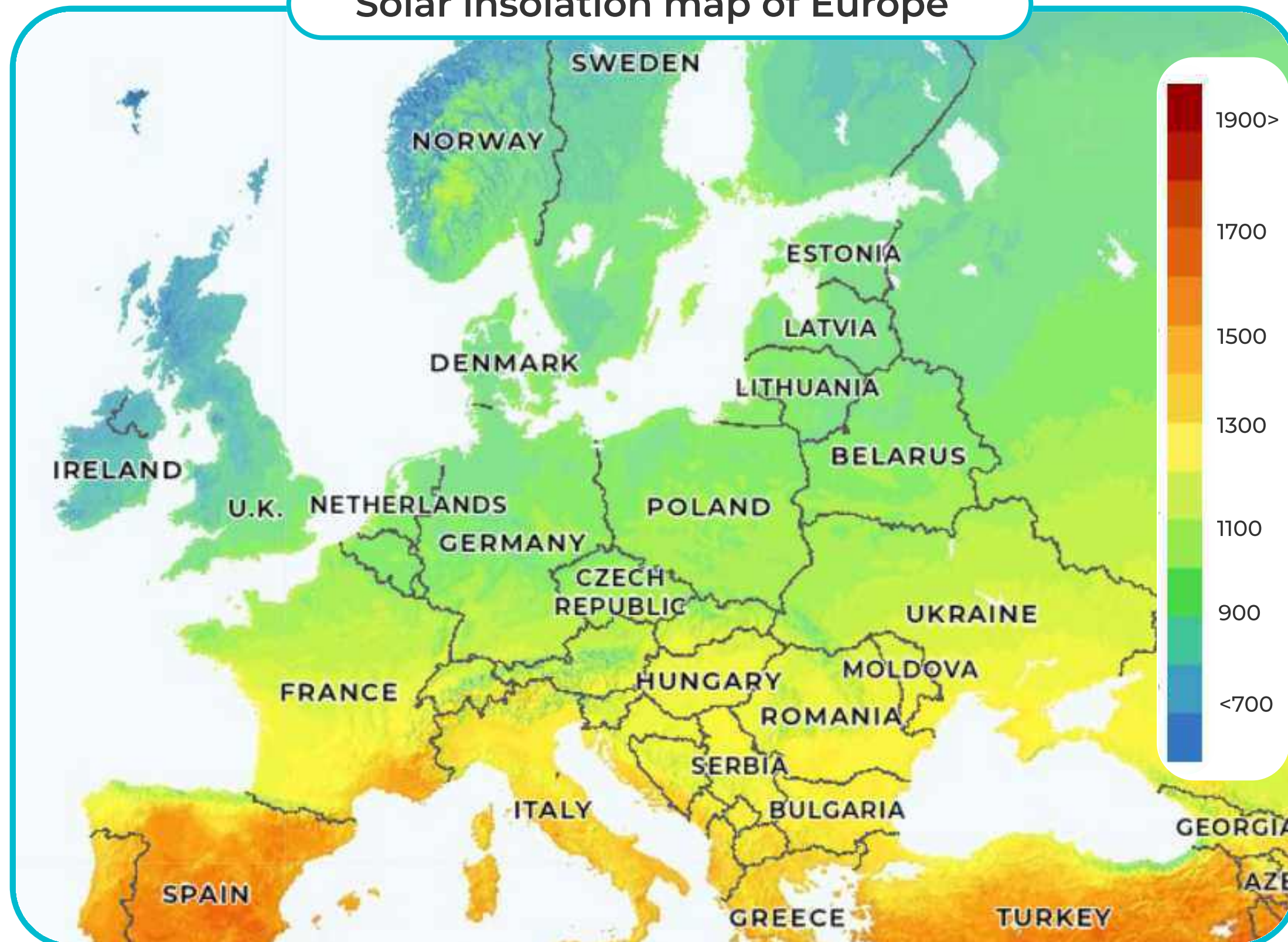


about  
**1400 facilities**  
solar power plants



about  
**USD 150 mln**  
invested by Ukrainian  
businesses in solar energy  
in 2023

### Solar insolation map of Europe



The entire territory of Ukraine is suitable  
for the installation of solar power plants



The southern regions of the country are considered  
optimal for the operation of these facilities

### Insolation indicators

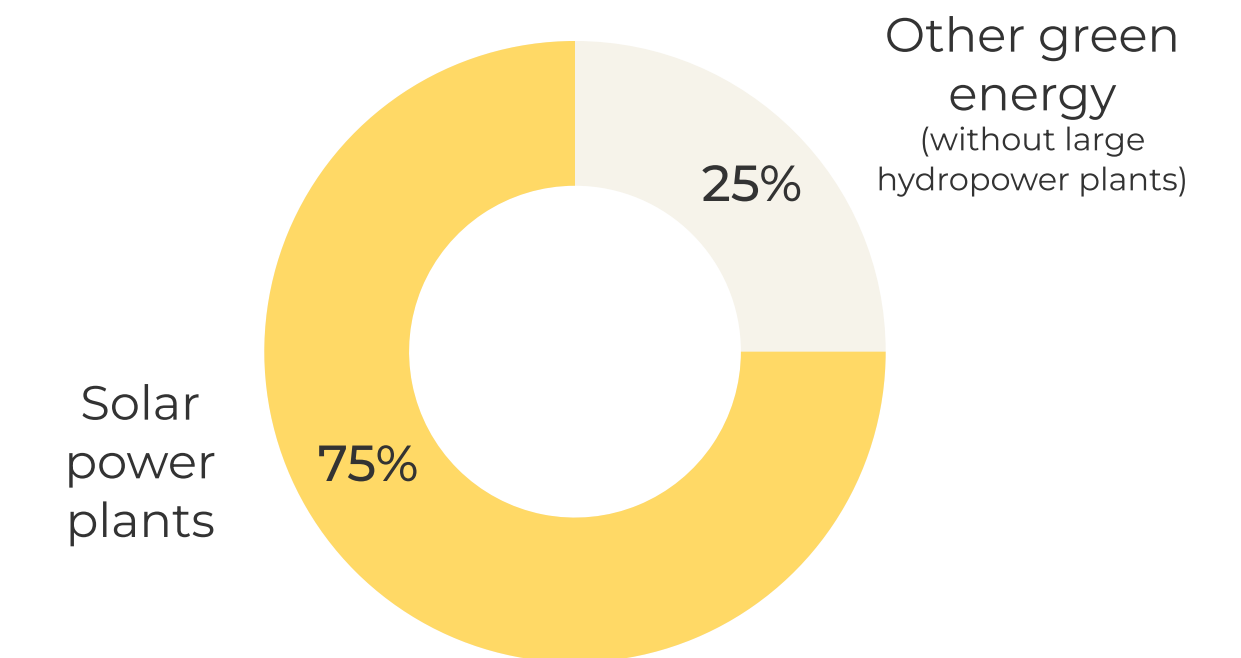
#### Ukraine

From **1100** to  
**1500 kWh/m²**

#### Europe

From **600** in the  
north to **2200 kWh/**  
**m²** in the south

### Share of solar energy production, 2024



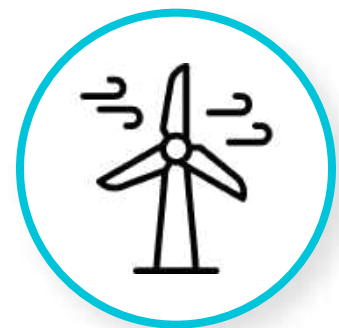


# RENEWABLE ENERGY

## Wind energy

- The greatest potential for wind power plant installations is found in the northeastern regions of Ukraine, where the average **wind speed** exceeds **7 m/s**

### Before the full-scale in Ukraine were:



**34**  
wind power plants  
(699 wind turbines)



**3.5 MW**  
average capacity  
of one turbine



about  
**80%**  
of wind power energy  
was occupied or damaged

## Bioenergy



**34 mln tons**  
Biomass potential in Ukraine  
(37% of agricultural waste per year)

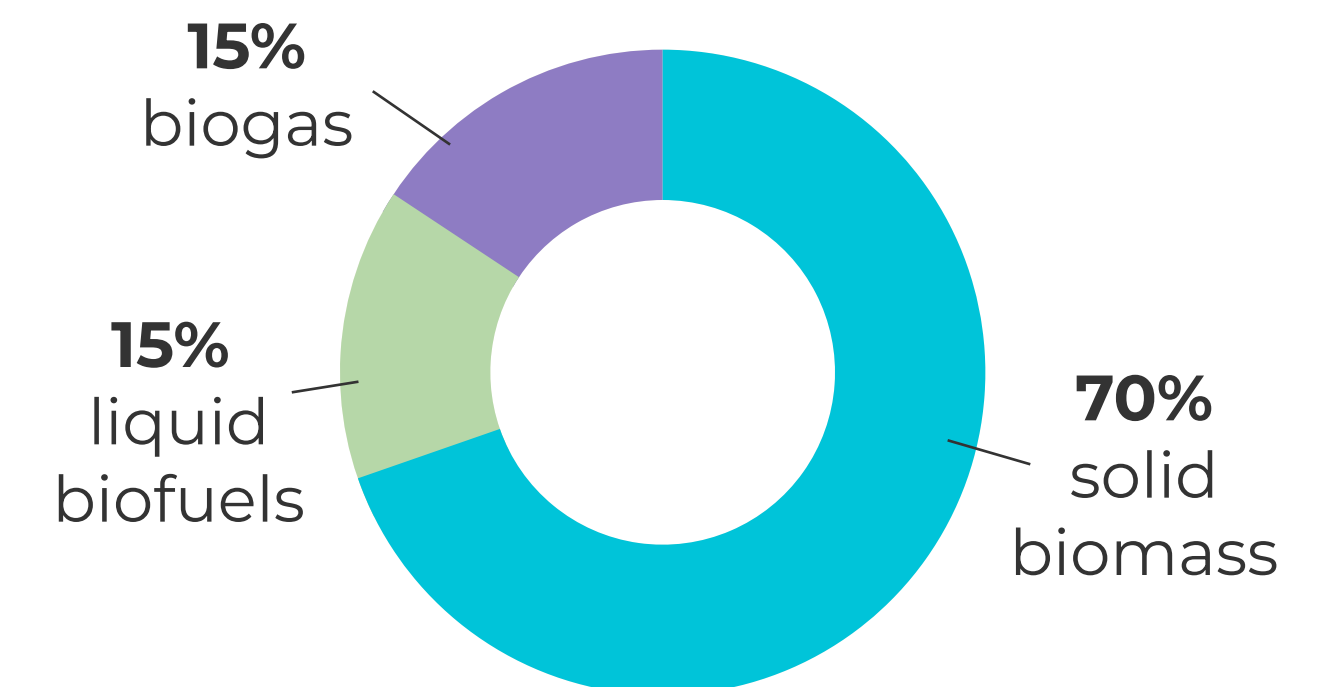
**94 mln tons**  
solid waste  
per year

**12 mln tons**  
agricultural  
waste per year



**21.8 bln m<sup>3</sup>**  
Production potential of  
biogas/biomethane per year

### Structure of bioenergy in Ukraine



# RENEWABLE ENERGY

## Hydroelectricity

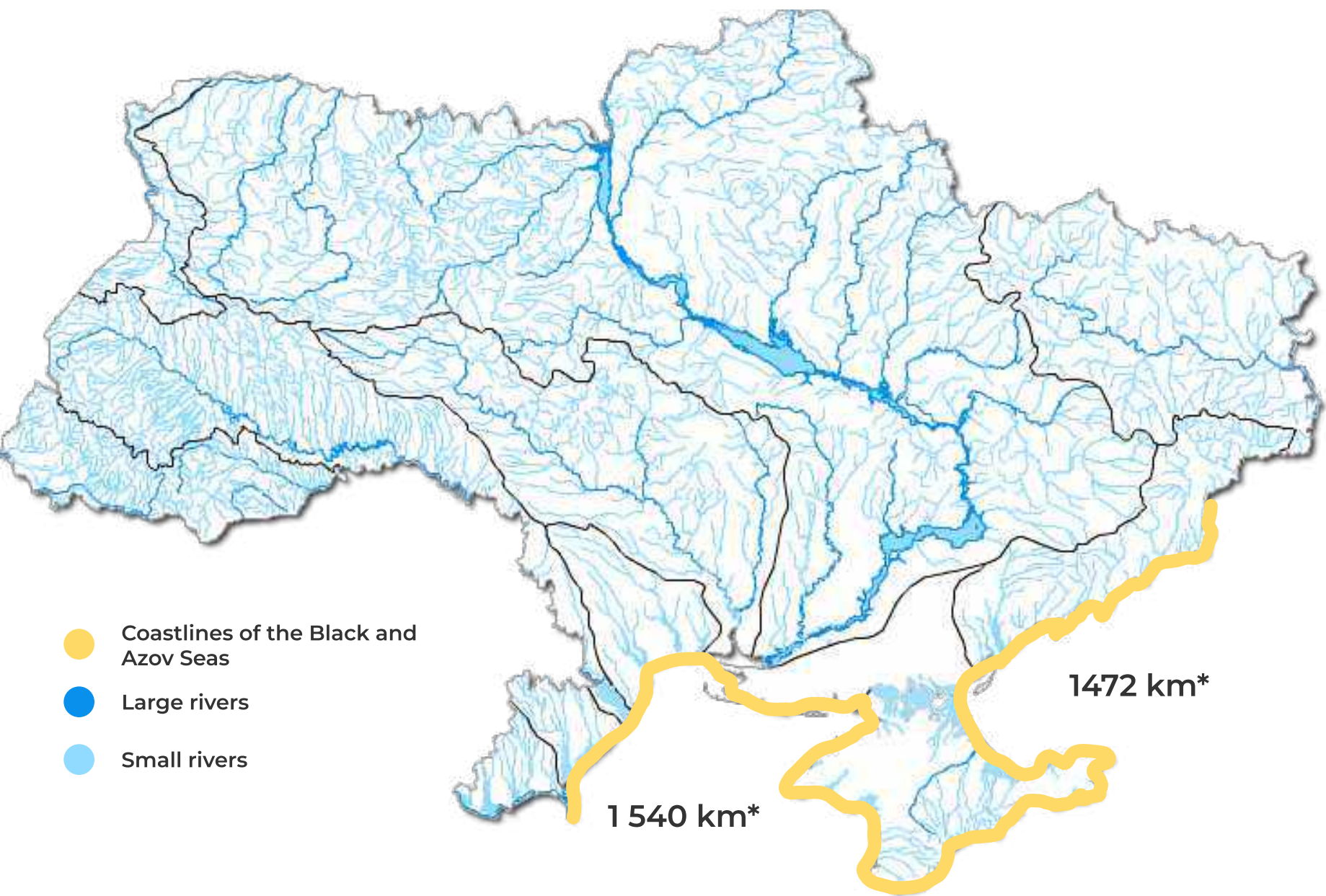


In 2023, the **Kakhovka HPP** was destroyed. **Kaniv HPP** and **Dnipro HPP** stations were damaged. Attacks on hydroelectric power plants resulted in the loss of about **2500 MW** of capacity.



**45%** of hydropower capacity was destroyed as a result of military aggression  
The preliminary amount of losses is about **USD 3 bln**

Map of the rivers of Ukraine



### Functioning in Ukraine:



**10 large HPP**  
of Ukrhydroenergo



**3 hydroelectric PP**  
Tashlyk, Dniester and Kyiv  
hydroelectric power stations



**~50 small HPP**  
publicly or privately owned  
average capacity — **200 mln kWh**

### Investment opportunity: hydropower plant construction potential



The total hydroelectric capacity is located on the **Dnipro** and **Dniester rivers**. However, there is potential for establishing new stations in any region with rivers, such as the Carpathian rivers, which could provide significant energy supply to the western regions.



# RENEWABLE ENERGY

## Green energy condition



**1400**  
new renewable energy sources  
connected to the  
system in 2023\*



**8,7 GW** of renewable energy  
capacity at the beginning of 2024\*\*

**1000+** companies,  
operating more than

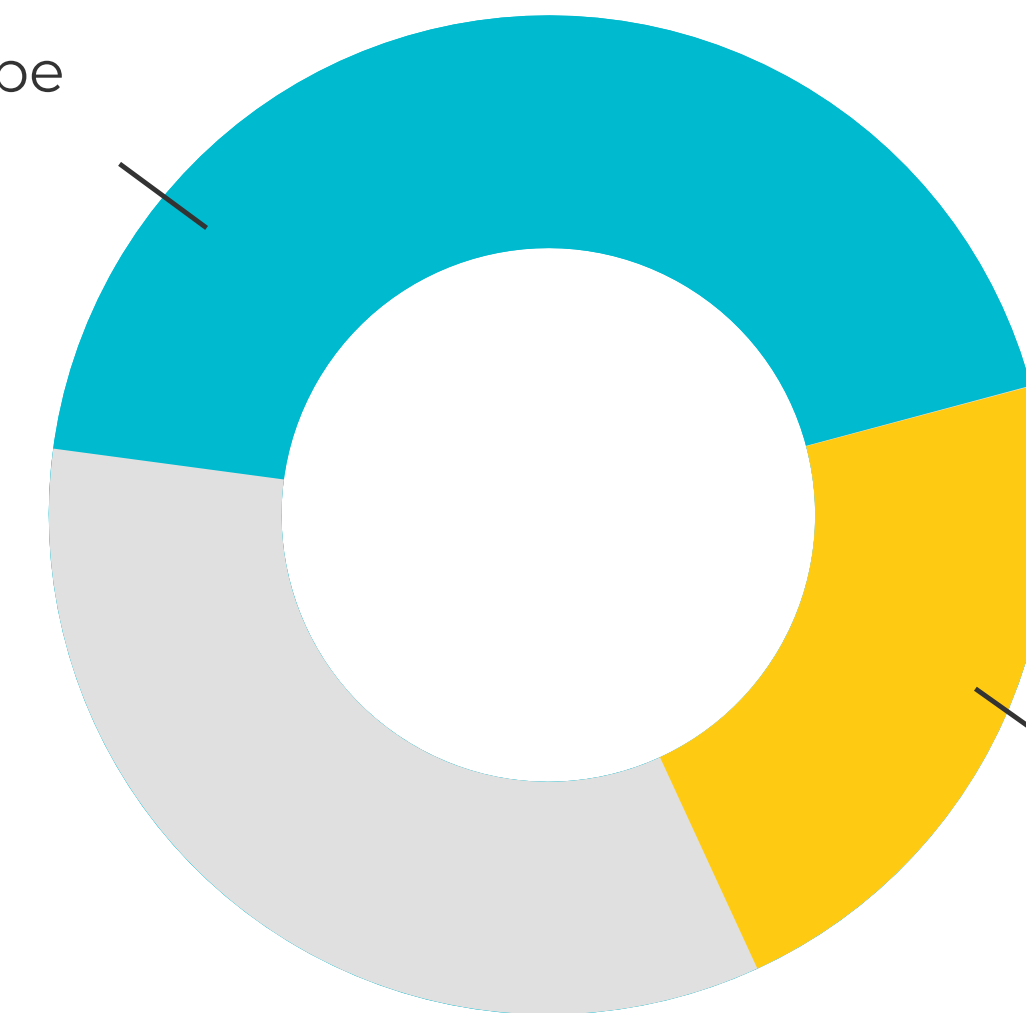
**1500+** facilities  
of renewable energy



up to **75%** of renewable energy  
infrastructure objects suffered  
varying degrees of damage  
due to the war

Share of RES in the structure of production  
(including large hydropower plants), 2023

**42%**  
In Europe



**21.6%**  
In Ukraine

# ENERGY EFFICIENCY IN UKRAINE

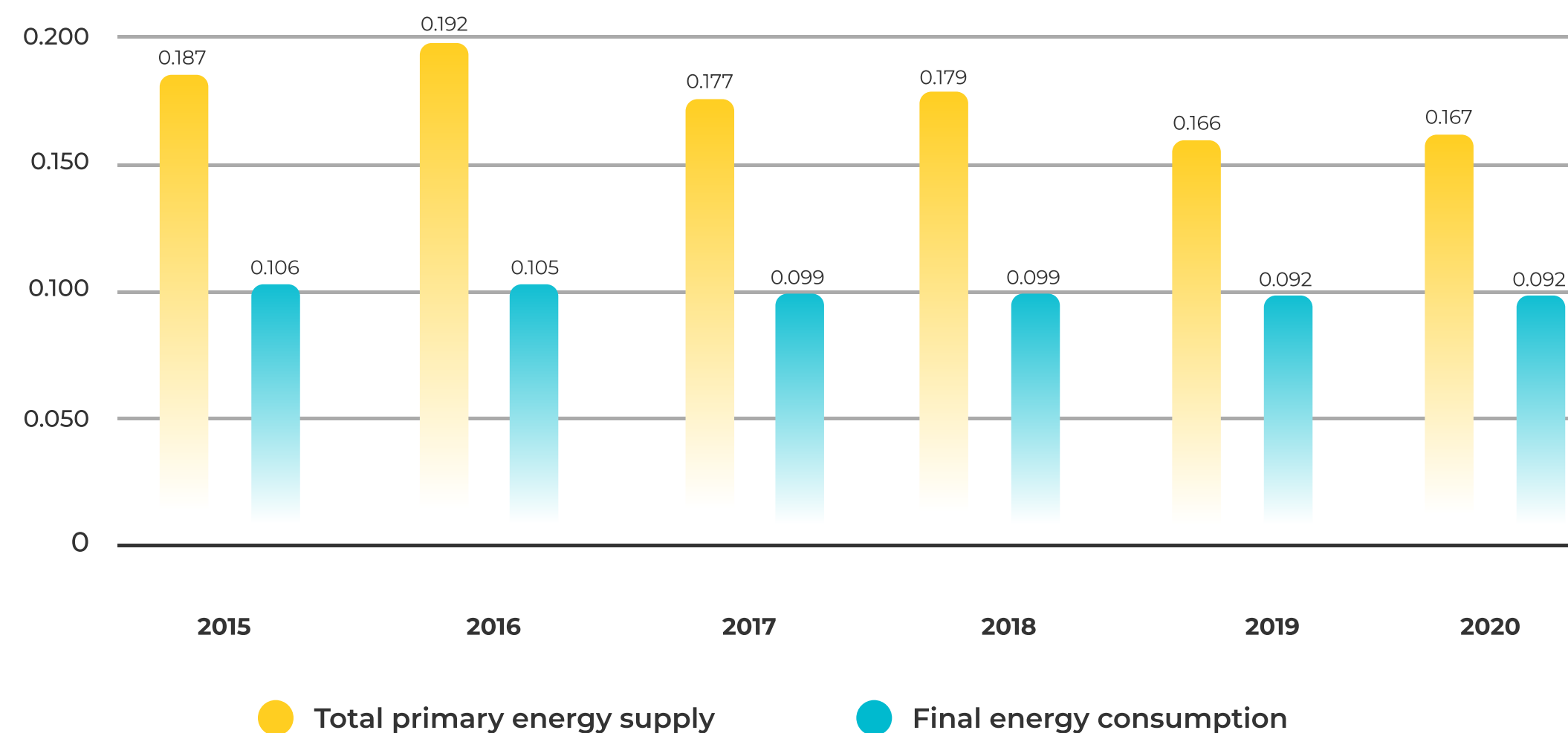
## The state of energy efficiency development in Ukraine

Ukraine's GDP energy intensity is one of the highest in the world:

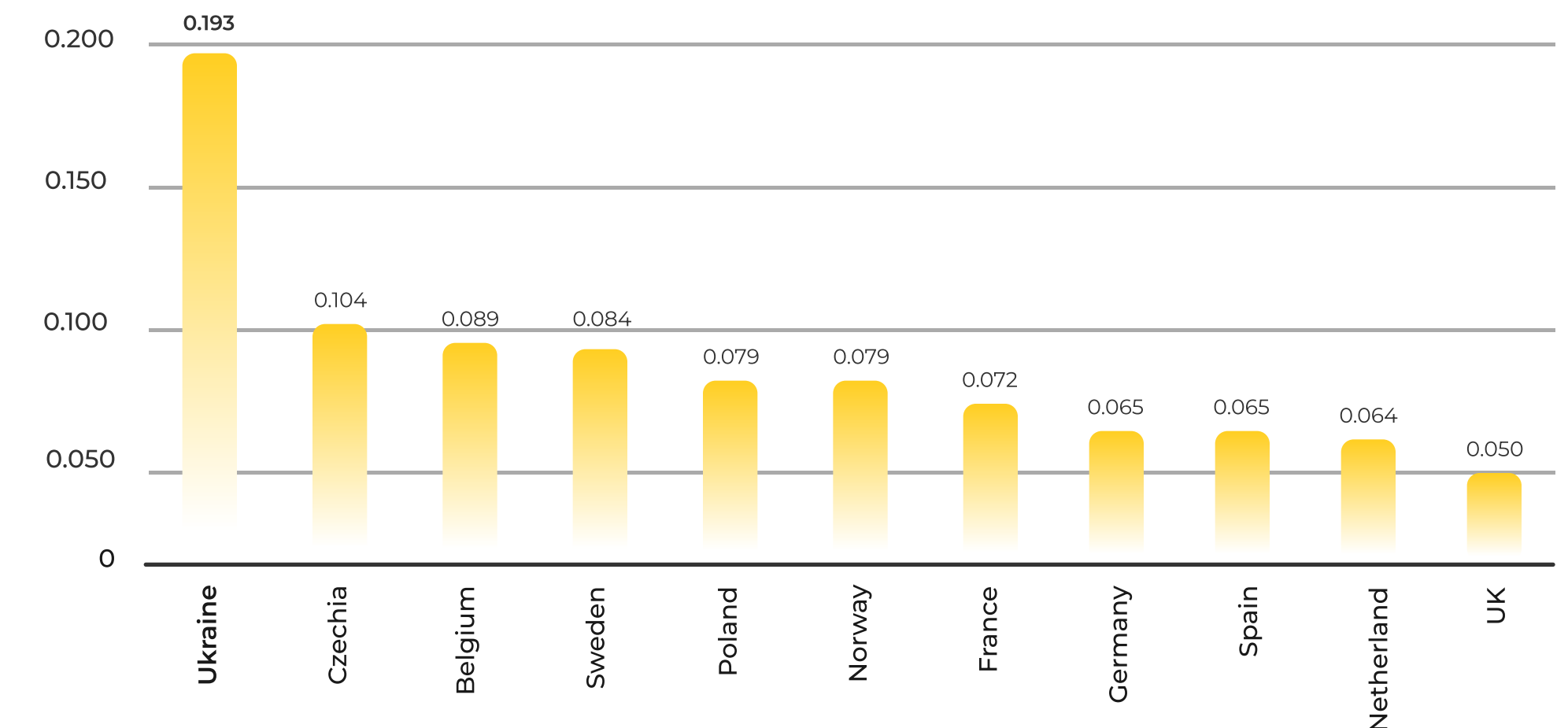
- 2.7 times higher than in Poland
- 3.3 times higher than in Germany

Due to the low energy efficiency of the economy, Ukraine's direct annual losses reach **USD 1+ bln** annually

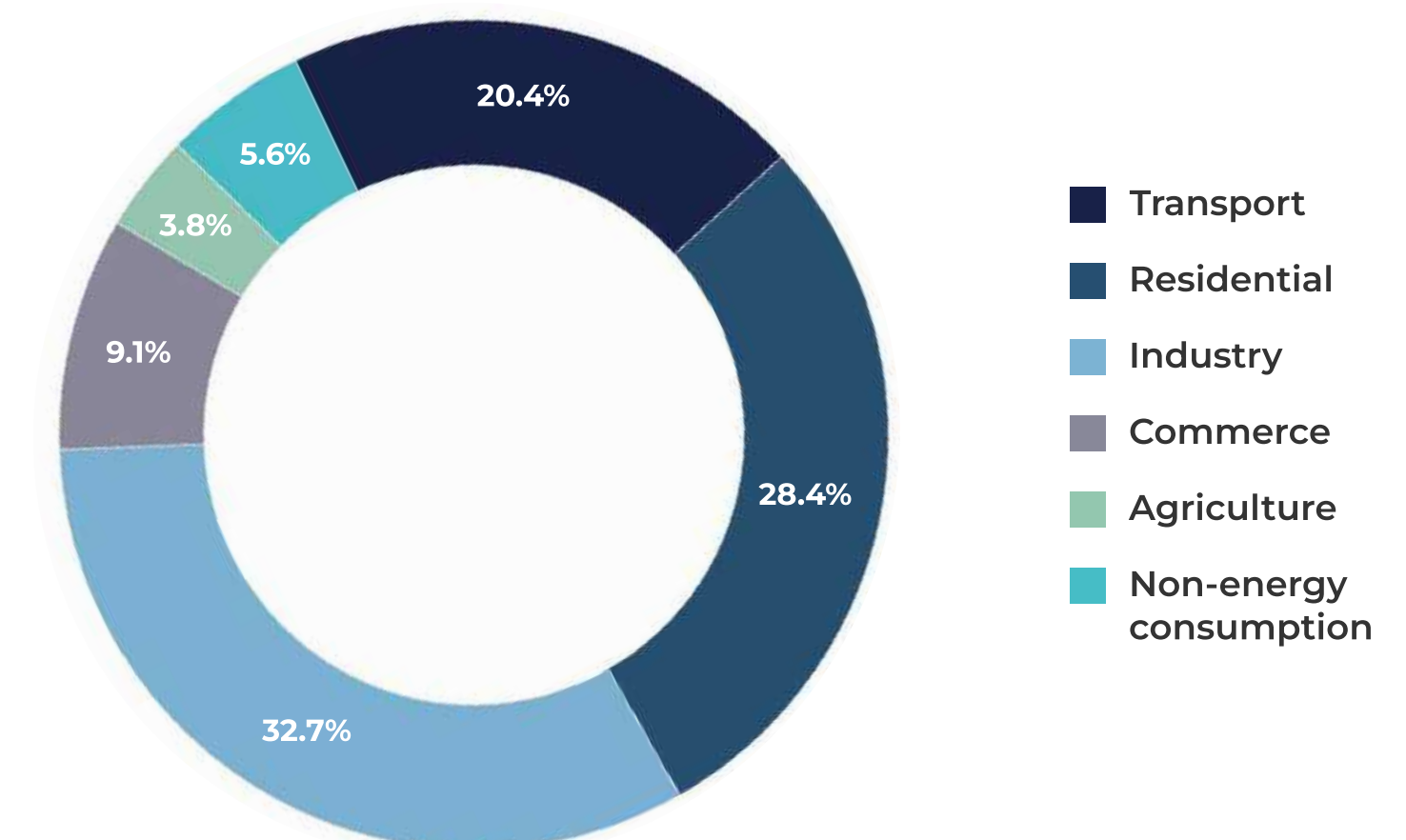
## Energy intensity dynamics, tons of oil equivalent / USD thsd, 2015-2020\*\*



## Total energy consumption per unit of GDP, 2022\*



## Structure of final energy consumption, 2021\*





# ENERGY EFFICIENCY POTENTIAL

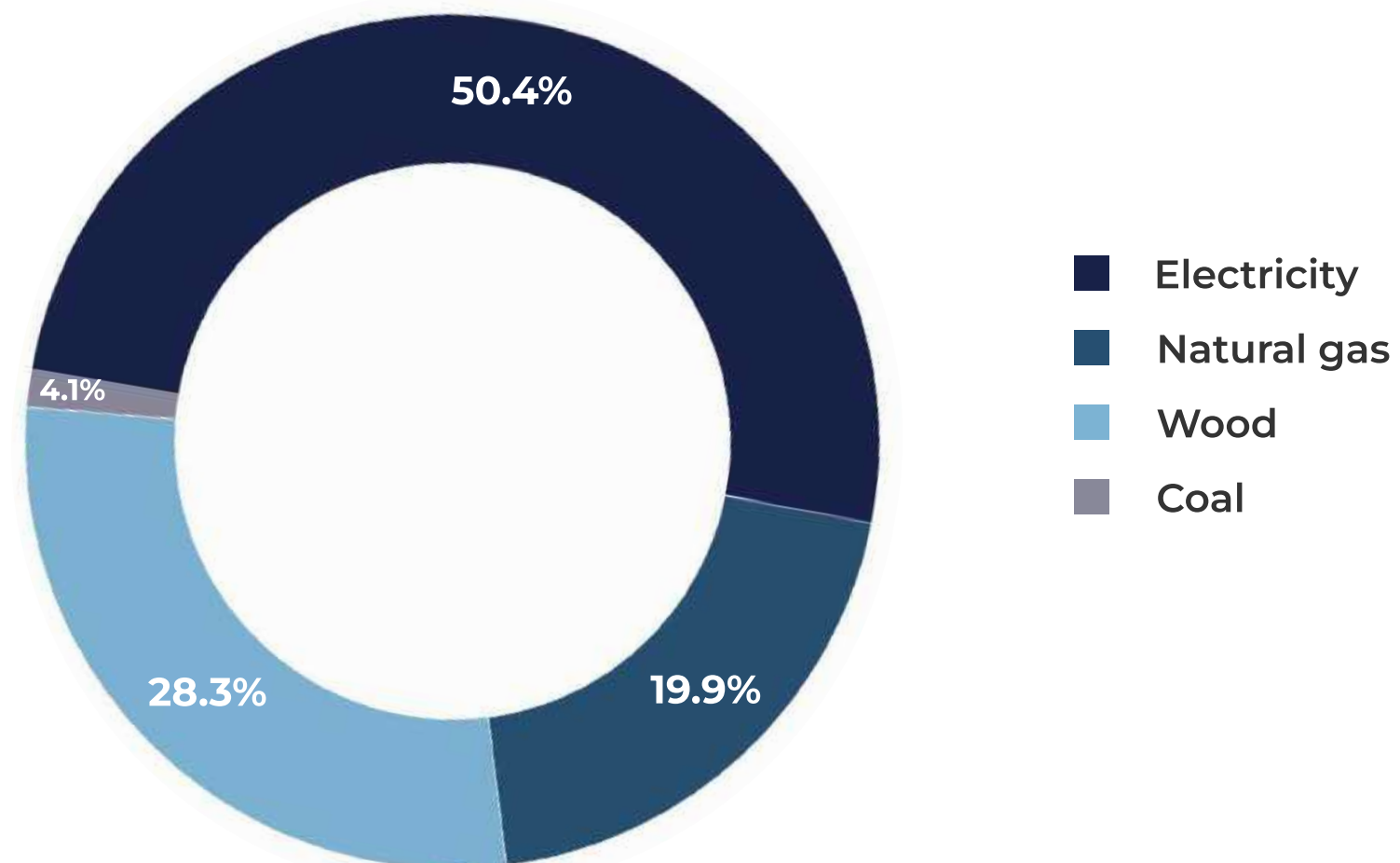
## Machine-building sector



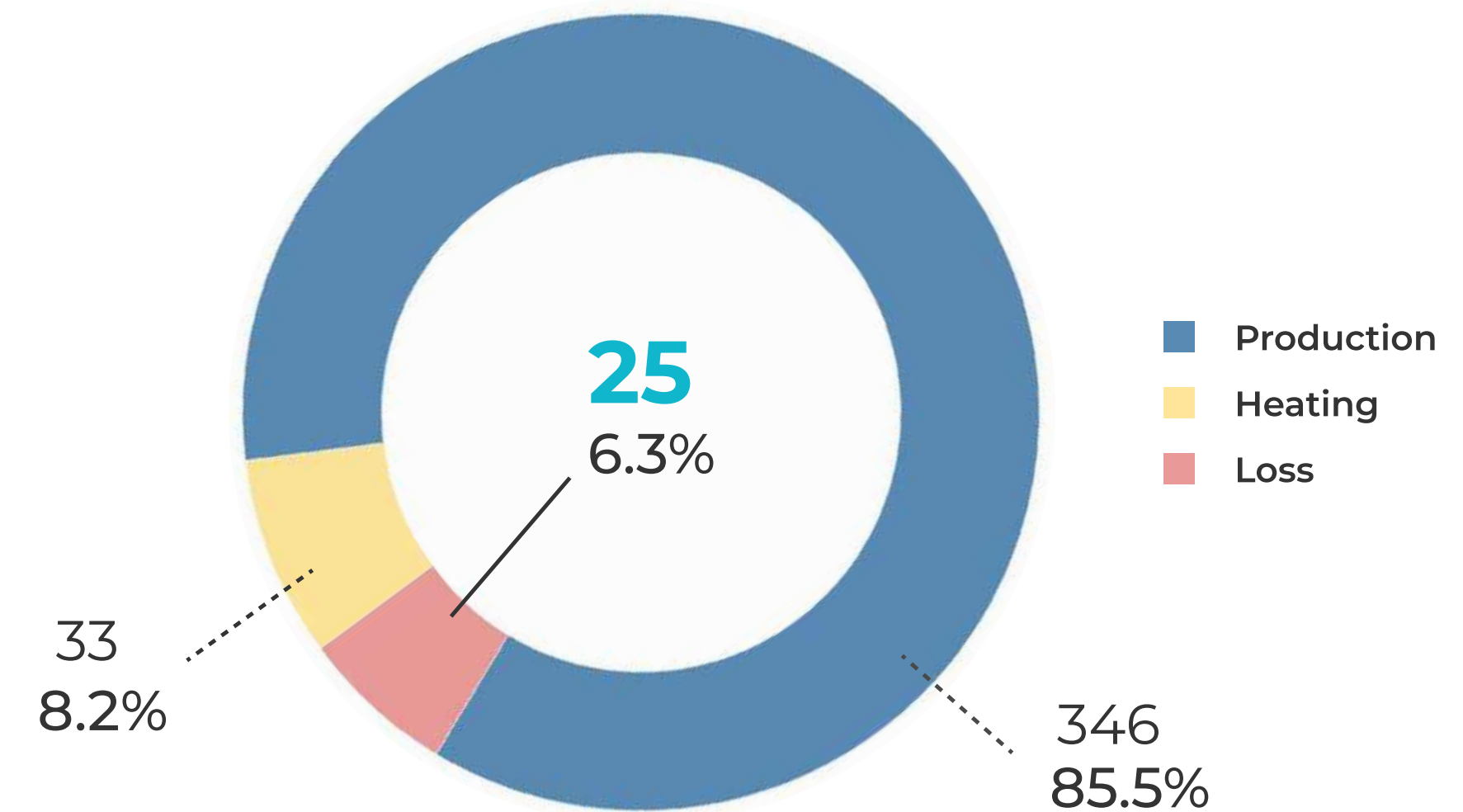
**61 %**

of energy savings can be achieved by implementing EEM with a simple payback period of less than 2 years\*

### Ratio of the main energy resources\*



### Cost of energy consumption, USD thsd/per year\*



### Investment opportunity: energy efficiency



**~USD 1 mln**

in total annual cost savings potential for large industrial enterprises\*\*

\* - The calculation of cost savings potential in the study is typical and can be applied to most large industrial enterprises

Source: GIZ Ukraine, analytical report on machine building, 2020

# ENERGY EFFICIENCY POTENTIAL

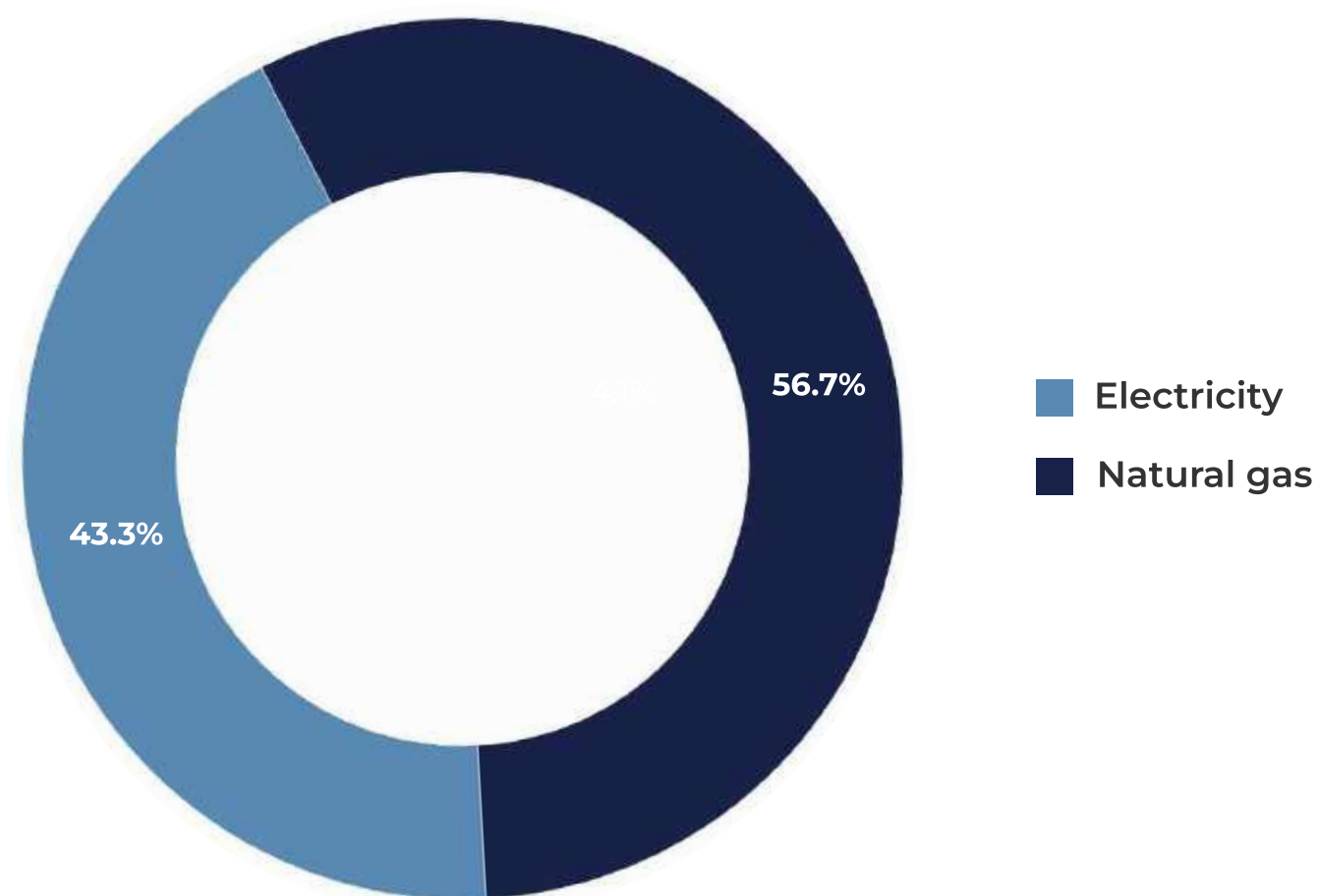
## Construction materials industry



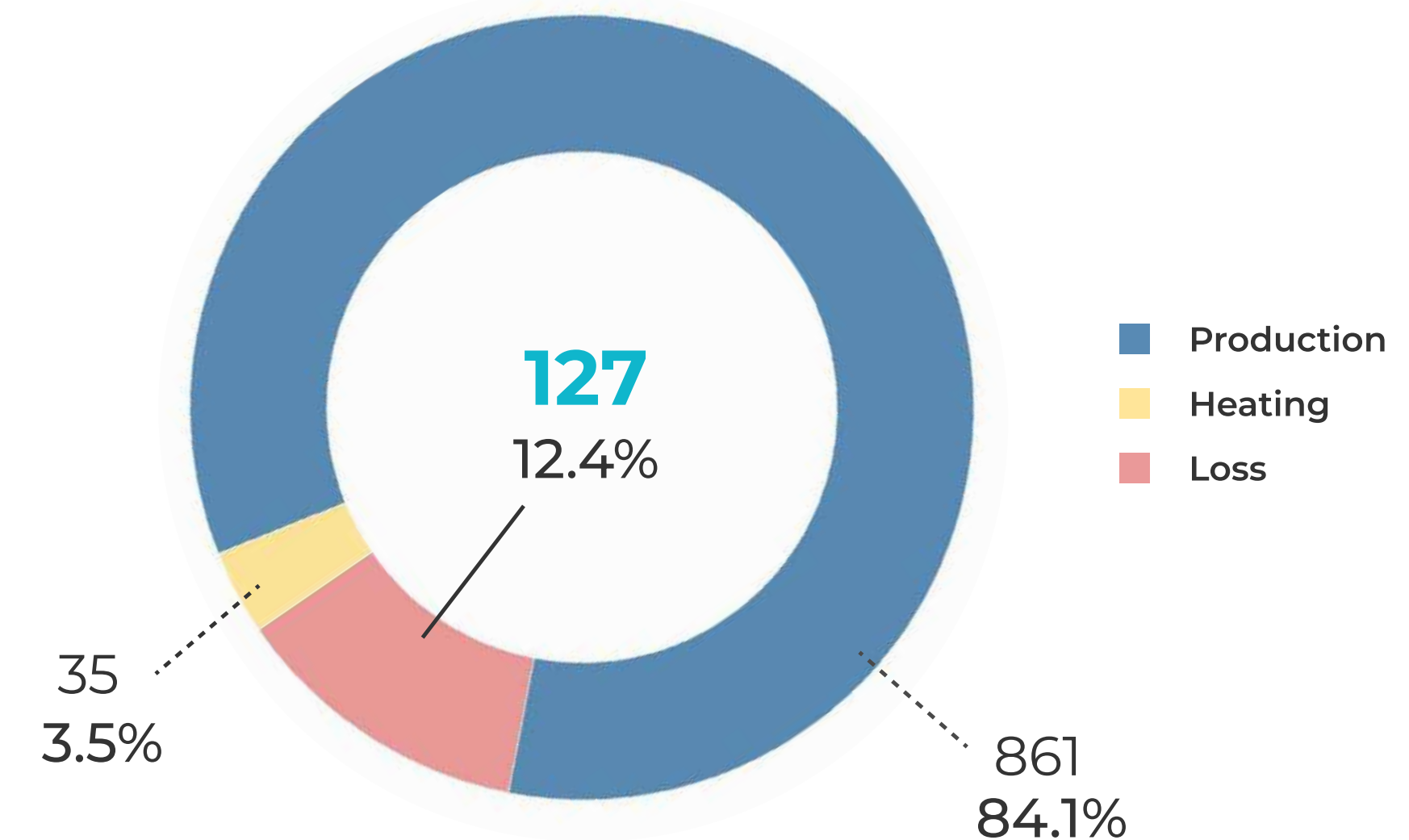
**82 %**

of energy savings can be achieved by implementing EEM with a simple payback period of less than 2 years\*

### Ratio of the main energy resources



### Cost of energy consumption, USD thsd/per year



### Investment opportunity: energy efficiency



**USD 11 mln**

in total annual cost savings potential for large and medium-sized enterprises in the construction materials sector\*

\* - The calculation of cost savings potential in the study is typical and can be applied to most large industrial enterprises

Source: GIZ Ukraine, analytical report on non-metallic building materials, 2020



# INVESTMENT CLIMATE

## Energy companies and state institutions



The main electricity transmission networks and large power plants, specifically hydroelectric and nuclear power stations, are state-owned



However, a significant part of thermal power plants, as well as energy facilities utilizing renewable sources such as wind and solar power stations, are privately owned

## Major electricity suppliers in Ukraine



**Energoatom**  
nuclear power plants



**DTEK and Centrenergo**  
thermal power plants



**Ukrhydroenergo**  
hydroelectric power plants



The National Energy Company "Ukrenergo" is the key management body in the energy sector. It is a private joint-stock company with 100% of its shares owned by the state, subordinated to the Ministry of Energy of Ukraine, and is responsible for the transmission of electricity to distribution companies

## State institutions in the energy sector



**Ministry of Energy of Ukraine**  
general energy issues, strategic planning



**The State Service of Geology and Subsoil of Ukraine**  
issues related to the extraction of minerals, oil and gas



**National Energy and Utilities Regulatory Commission (NEURC)**  
energy market regulation, tariff regulation, licensing



**State Energy Saving Inspectorate of Ukraine**  
energy efficiency and energy saving issues



**Ministry of Ecology and Natural Resources of Ukraine**  
environmental aspects of renewable energy sources, including solar and wind energy

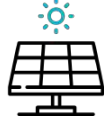


## Green energy development prospects

Ukraine actively promotes the development of green energy through legislative initiatives. **The National Energy and Climate Plan (NECP)** emphasizes the necessity of producing clean energy and reducing coal usage

Ukraine plans to **reduce** greenhouse gas **emissions** to **65%** of the 1990 level and achieve a **27%** share of **renewable energy sources**, replacing electricity generated from coal with renewable energy as one of the decarbonisation measures

A decision to hold pilot auctions for the allocation of support quotas in 2024, including auctions for the support of renewable energy, has been adopted by the Cabinet of Ministers of Ukraine. Support for auction winners will take the form of a market premium.

### Structure of the additional annual quota for RES

	sun	11 MW
	wind	88 MW
	other RES <small>(biomass, biogas, small HPP)</small>	11 MW



### Green rate

- Officially implemented in 2009
- The rate in 2024 is **EUR 0.117** per **1 kWh**
- Subject to a standard tax of **19.5%** (18% PIT and 1.5% military tax)
- Encourages private owners to install their own electricity generation capacities, allowing them to sell the produced electricity to the state



Private companies have the opportunity to actively implement alternative energy sources such as solar panels, wind turbines, and small hydroelectric plants, thereby promoting the sustainable development of the energy sector in Ukraine

\* - at the rate of EUR 1 - UAH 46.16, average rate;  
the tariff differs depending on a number of criteria, such as the type of generation and the category of consumers, etc.



# INVESTMENT CLIMATE

## ESCO program

The Energy Service Company (ESCO) program is a business model where a company provides energy services to improve energy efficiency at a client's facility. The savings from reduced energy consumption are used to cover the investment costs and generate profit. After the agreed contract term expires, all economic benefits are transferred to the client.



**604 ESCO contracts**  
successfully implemented

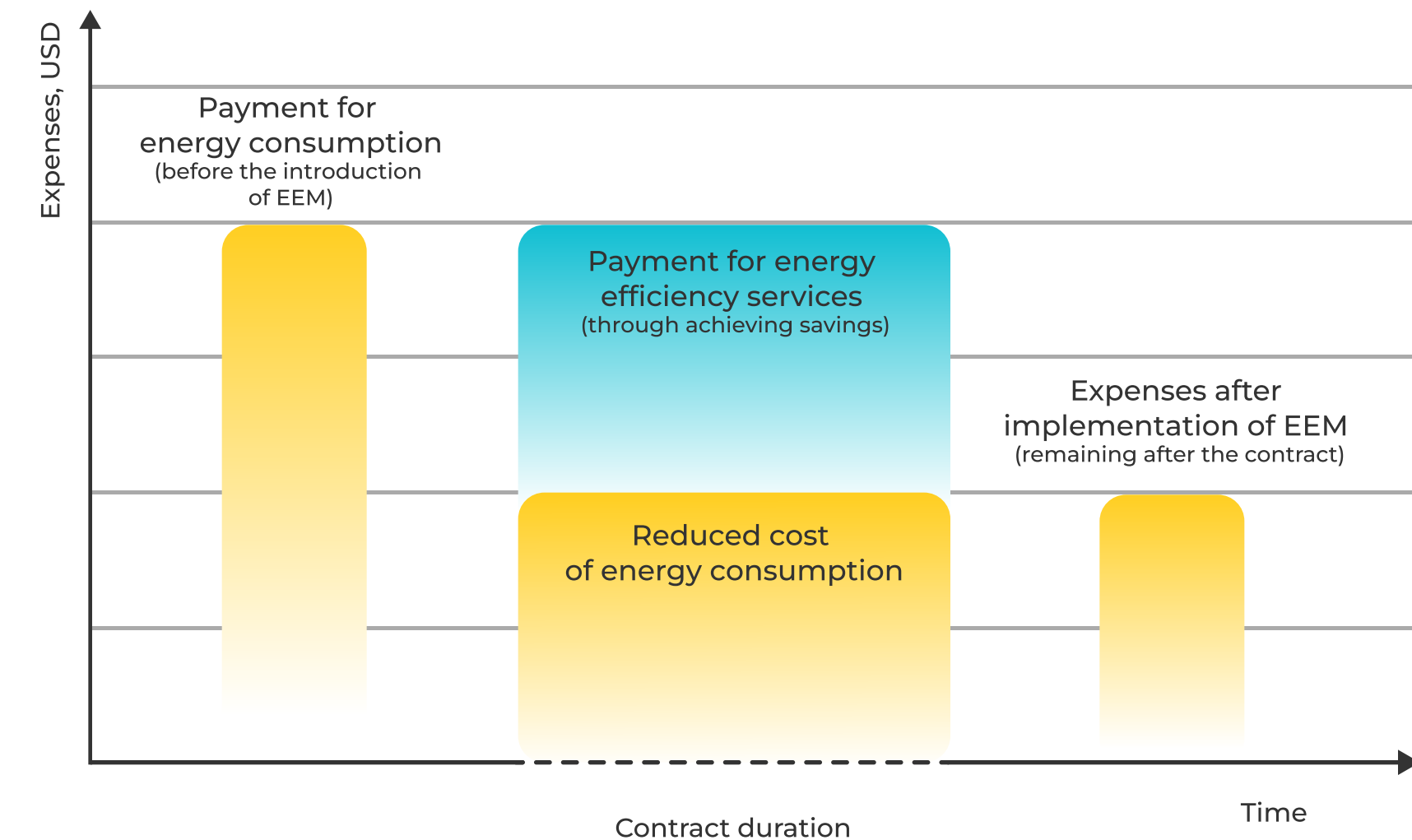


**USD 1.68 bln**  
total amount



**USD 8.5 bln**  
potential of the ESCO contracts

### ESCO contract model



### Investment opportunity: energy efficiency



**70 thsd**  
**state institutions**  
require thermal modernisation

# INVESTMENT OPPORTUNITIES

## Natural resources



**700+ bln m<sup>3</sup>**  
gas reserves



**80+ mln ton**  
oil reserves



**20 000+**  
mineral deposits



**100+**  
types of minerals  
(including lithium, zirconium,  
cobalt, titanium, beryllium,  
niobium and others)

## Ukrnafta projects



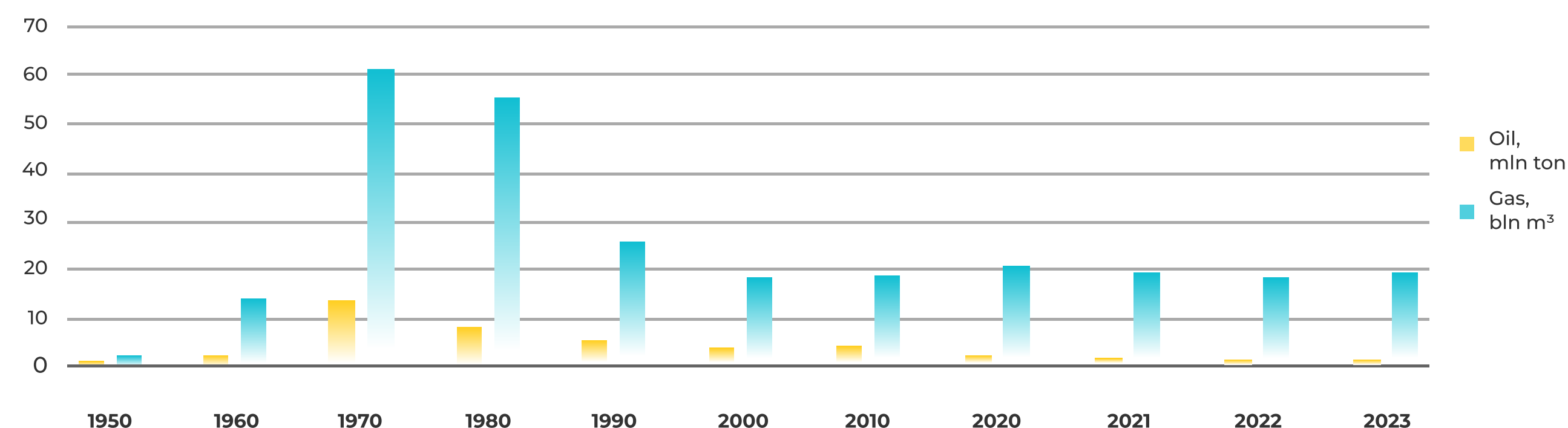
**20+ fields**

joint development under the PSA

The reserves of the fields is:

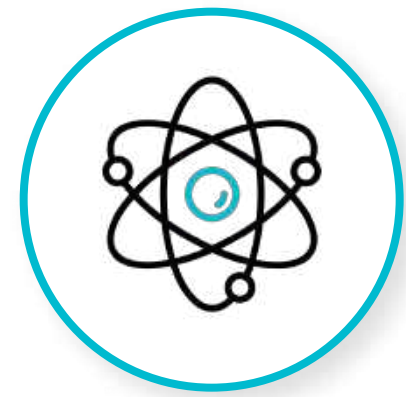
- 12 mln tons of oil
- 31 bln m<sup>3</sup> of gas

## Oil and gas extraction in Ukraine, 1950-2023



# INVESTMENT OPPORTUNITIES

## Nuclear energy



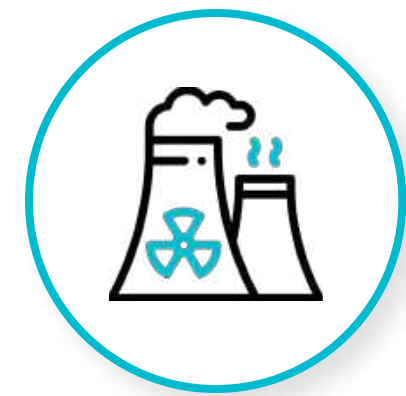
**49.2%**

the share of nuclear energy in the energy sector of Ukraine in 2023



**13835 MBt**

total capacity of 15 operating NPP units



Ukraine's nuclear energy sector ensures stable operation with a long service life. Most of nuclear reactors were commissioned in the **1980s**, with their operational **lifespan extending beyond the 2040s**



Nuclear power generates electricity without emitting carbon into the atmosphere during operation, and aligning with Ukraine's energy strategy goal of achieving carbon neutrality in the energy sector



As of 2023, Energoatom envisages creating its own nuclear fuel production line in Ukraine

**Investment opportunity:** small modular nuclear reactors



**USD 1.2 bln**

investment required for one 200 MW nuclear reactor module

Ukraine has potential for the development of small modular nuclear reactors and the introduction of these technologies to build its own production. The capacity of modular nuclear reactors ranges from **50 to 500 MW\***



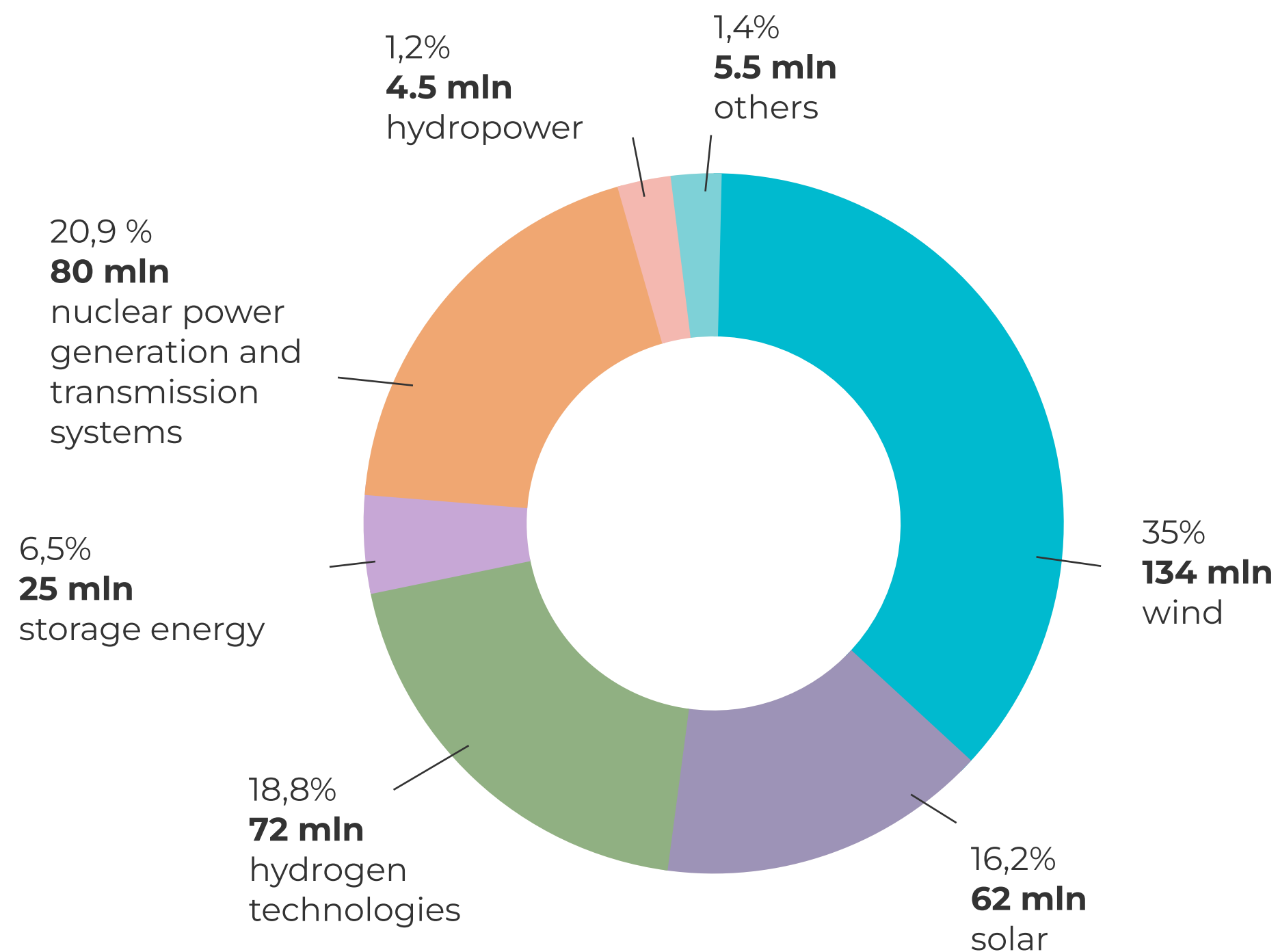
# INVESTMENT OPPORTUNITIES

## Green energy



**6 mln tonnes** (about **USD 73 mln**) of conventional fuel can be saved per year in Ukraine through the use of clean energy\*

Investment opportunities for new energy capacities  
by energy sector, mln USD



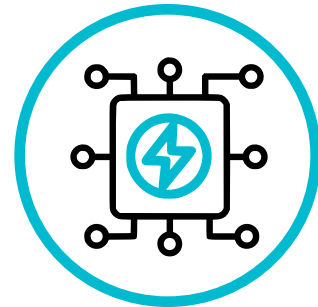
**874 GW**  
RES potential in Ukraine

**USD 383 bln**  
investment opportunities for new energy capacities according to the Energy Strategy until 2050

About  
**USD 12 bln**  
of investments have been attracted in renewable energy over the past 10 years in Ukraine

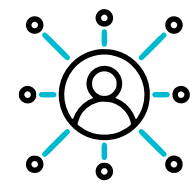
# INVESTMENT OPPORTUNITIES

## Distributed power generation



The development of a **distributed power generation** — is a government priority for 2024-2025, which involves a system of small local energy facilities that transfer surplus energy to the general grid

### Expected



#### Self-sufficiency with energy

consumers have the opportunity to power their homes and businesses by independently distributing energy according to their needs, and transferring the surplus to the integrated energy system



#### Combining different energy generation facilities

such as solar panels, wind turbines, gas plants, cogeneration at thermal power plants and boiler houses, batteries, small hydro plants



#### Energy security and sustainability

the use of small power generation facilities is an opportunity to gain resilience against hostile attacks, accidents and imbalances in the energy system

### Advantages

- ⚡ Rapid construction of power facilities
- ⚡ Reduction of losses in electricity transmission
- ⚡ Reducing dependence on imports
- ⚡ Increased investment in communities
- ⚡ Development of regional innovations
- ⚡ New workplaces

### Investment incentives



**exemption from import duties and VAT**  
energy equipment for citizens and businesses



**loans for business**  
SMEs: up to **UAH 150 mln** for 10 years at **5-9%**

Large business: up to 7 years at **14-16%** for alternative generation



**compensation for Home Owners Association from the state under the "Grindim" program**

**UAH 1 mln** for solar panels

**UAH 2 mln** for heat pumps

up to **UAH 5 mln** loans



**simplification of connection procedures** to the electricity and gas distribution networks, reduced timeframes, no need to go through land allocation procedures and environmental impact assessment



**concessional lending** for the purchase of power equipment  
Small business: at **5%** deposit rate

population: at **0%** deposit rate (up to UAH 480 thsd for 10 years without collateral, up to 10 kW of capacity)



# INVESTMENT OPPORTUNITIES

## Energy and gas storage



**2.5 bln m<sup>3</sup>**

of gas was accumulated by foreign companies in Ukrainian underground storage facilities



**Customs Warehouse service** – Underground gas storage operator service, which allows customers to store natural gas in underground gas storage facilities in Ukraine in a customs-free regime for 1095 days **without paying taxes and customs duties**

**up to 10 bln m<sup>3</sup>**

Ukrainian storage facilities ready to be offered to foreign companies

over **1000 companies** from 29 countries use Ukrainian underground gas storage facilities as customs warehouses



**Short-haul** – service of the gas transmission system operator that allows to receive a **discount on transportation** between certain interstate entry and exit points for transit transportation

The Ukrainian TSO has the capacity to receive:

- Incoming - **304 bln m<sup>3</sup>** per year
- output - **146 bln m<sup>3</sup>** per year



**800 MW**

Capacity requirements for energy storage facilities (ESF)



worth **1.2 USD bln**

New special auctions for ancillary services for the procurement of ESF

- for a long period of up to 5 years
- a market participant may receive a deferral of up to 3 years to build capacities
- The cost of ancillary services, determined by the results of the auction, is protected from fluctuations in the UAH currency by conversion into EUR

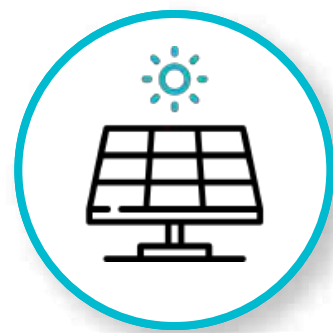
# INVESTMENT OPPORTUNITIES

## Recovery of losses in the energy sector

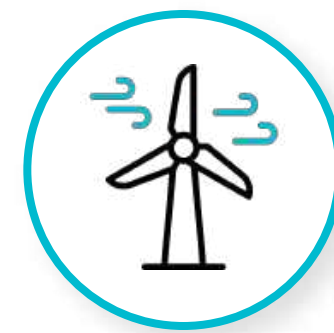


**8500 MW** of generating capacities were lost in the electricity sector as a result of military actions in Ukraine as of spring 2024\*

## Restoration of capacities through alternative energy



**43**  
solar plants  
if 1 solar plant -  
200 MW



**425**  
wind plants  
If 1 wind plant -  
20 MW



**1700**  
biomass plants  
if 1 biomass plant -  
5 MW



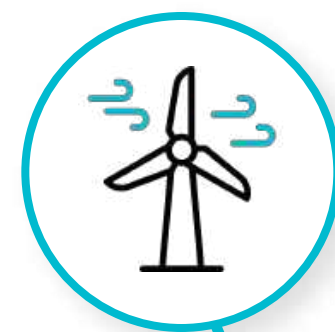
**8500**  
biogas plants  
if 1 biogas plant -  
1 MW

## or in combination (and related investment needs)



**30**  
solar plants  
6000 MW

**EUR 5.5 bln**



**90**  
wind plants  
1800 MW

**EUR 3 bln**



**100**  
biomass plants  
500 MW

**EUR 400 mln**



**200**  
biogas plants  
200 MW

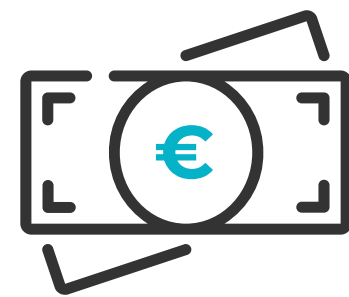
**EUR 2 bln**



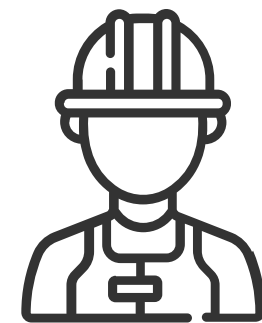
# INVESTMENT INCENTIVES

## Significant investments

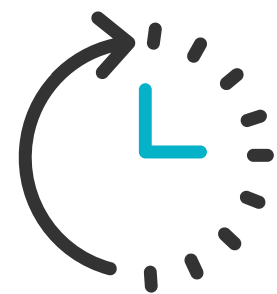
### REQUIREMENTS FOR INVESTMENT PROJECT



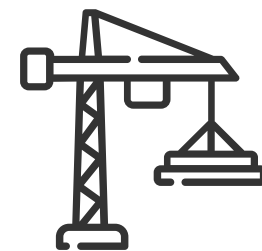
**EUR 12+ mln**  
of investment



**10+**  
of new jobs



**up to 5 years**  
of project  
implementation



**construction,  
modernization,**  
technical and/or  
technological  
reequipment of objects

**ENERGY SECTOR STATE SUPPORT IS LIMITED TO THE  
PRODUCTION OF BIOGAS AND BIOMETHANE**

### FORMS OF SUPPORT



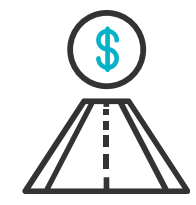
**CIT exemption\***  
(for 5 years by choice)



**Exemption from VAT**  
for importing new  
equipment and  
components to it \*\*



Exemption from **import  
duties** for new equipment  
and components to it \*\*



Construction/compensation  
for built **engineering and  
transport infrastructure**  
(highways, communication  
lines, utilities, etc.).



Lease of **state or  
communal land plots**  
without land auctions



Compensation for **costs  
of connection to  
engineering and  
transport networks**



**Land tax exemption/  
reduced land tax rates**



Exemption from  
compensation **for  
losses of forestry  
production**

### AMOUNT OF SUPPORT

**up to 30% CAPEX\*\*\***

\* Not applicable to projects in the field of extraction for the purpose of further processing and/or enrichment of natural resources.

\*\* List and volume of equipment is approved by the CMU for each project.

\*\*\* The applicant, not earlier than 18 months before the date of submission of the application to the authorized body, may make investments in investment facilities in the amount not exceeding 30% of the total amount of significant investments required for the implementation of an investment project with significant investments



**For more detailed information, we recommend to draw  
attention to the following regulations**



# INVESTMENT INSURANCE

## International Agency



A formalized agreement on the implementation of the investment insurance mechanism for foreign investments: **2022**  
Annual rate: **2-3%**  
Insurance period: **10 years**  
Coverage of the amount of losses: **up to 90%**  
**Sure Trust Fund:** USD 110 mln, goal - USD 330 mln

## Ukrainian agencies



Law No. 9015 "On Amendments to the Law of Ukraine "On financial mechanisms for stimulating export activity" regarding insurance of investments in Ukraine against military risks": **2023**  
Annual rate: **0.49% - 8.05%**  
Insurance amount: **UAH 200 mln**  
Insured for 5 months in 2024: **UAH 2.93 bln**



Property insurance against war risks: **2024**  
Implemented cases: **Grain elevators**

**1-3%**  
acceptable level  
of insurance rates

**82%**  
businesses are ready  
to insure during of war

## Government agencies



Ship insurance in the Black Sea: **2023**  
Containers with grain, iron ore, and steel, electrical equipment, fodder  
Annual rate: **0.75%**  
Coverage amount: **USD 50 mln**



Memorandum on coverage of American, international and Ukrainian investments in Ukraine: **2023**  
Coverage of the amount of losses: **up to 85%**  
Insurance for SMEs: **USD 50 mln**  
Insurance of the agricultural sector, manufacture: **USD 300 mln**



**22 export-import agencies:** Germany, WB, USA, Japan, Canada, Italy, Poland, Norway, Slovakia, France, Bulgaria, Estonia, Latvia, Lithuania, Czech Republic, Austria, UAE, Portugal, Spain, Sweden, Finland, Denmark  
Volume of the collected fund: **EUR 1 bln**





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GUIDE

## TRANSFORMING UKRAINE



+38 098 567 88 99



INFO@UKRAINEINVEST.GOV.UA



WWW.UKRAINEINVEST.GOV.UA/EN



MUZEINYI LN, 12 KYIV, UKRAINE, 01008