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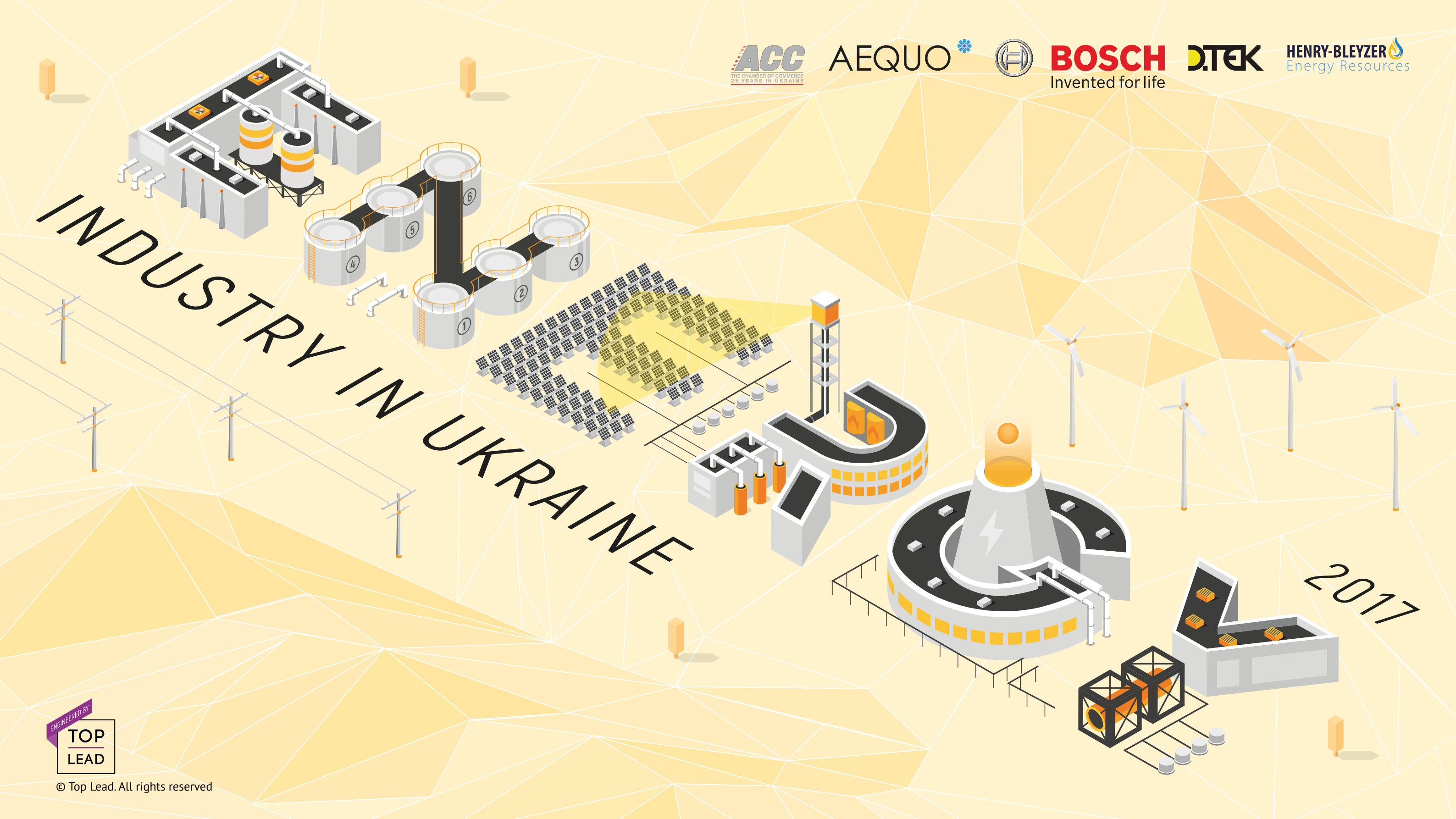
HENRY-BLEYZER
Energy Resources

INDUSTRY IN UKRAINE

2017

ENGINEERED BY
**TOP
LEAD**

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INTRODUCTION

HOW TO READ THIS GUIDE

Energy is measured in different ways. Most sources of energy are measured in physical terms: coal in tons and gas in cubic meters. Energy itself has additional units of measurement: heat – J, electricity – kWh.

In this guide, each source and type of energy is represented in traditional units of measurement. However, to ensure comparability, we have indicated tons of oil equivalent as the reference fuel on pages featuring energy balance and energy history.

It is important to distinguish sources of energy (coal, oil, gas and solar) and types of energy (thermal, electric, fuel). Each source and type is represented by a corresponding color, for example, gas is blue and thermal energy is orange.

It is worth remembering that volumes of energy production differ from volumes of consumption, as part of the energy is lost in the process of its transformation on the way from manufacturer to end user.

WHAT THIS GUIDE DEMONSTRATES

This guide reflects three things: the state of the energy market, the potential of the sector, and the areas that need reform. In this guide, we focus on each energy sector while looking at overall potential and the next steps.

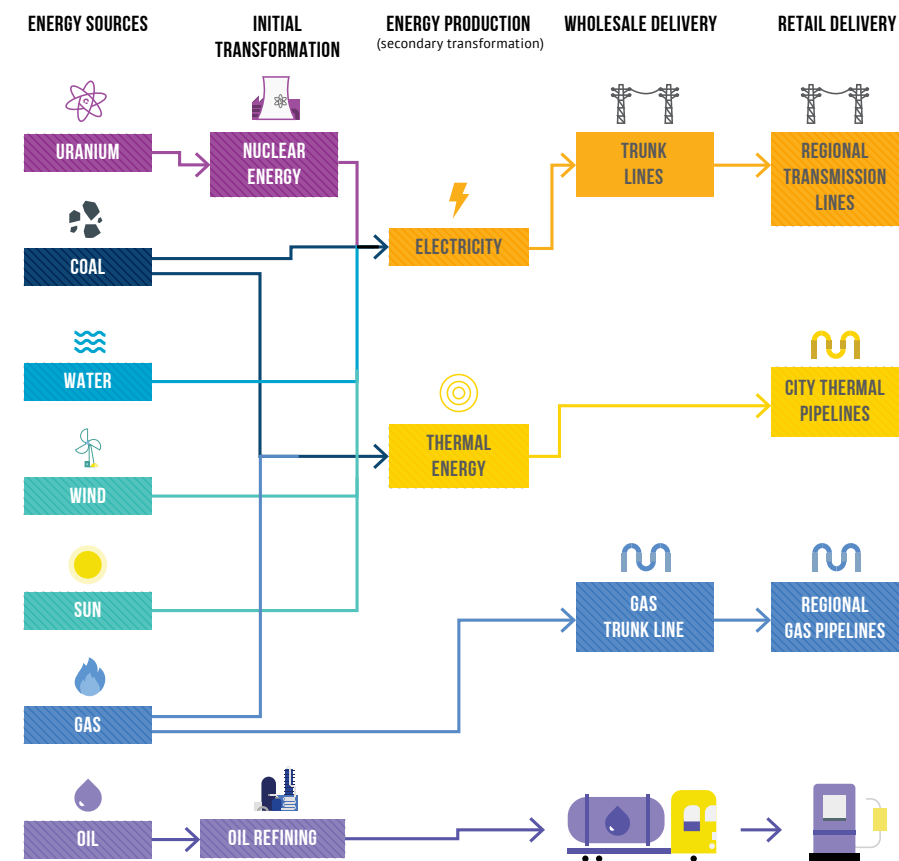
We explain the third energy package – these are the laws regulating the energy market of Europe. The Ukrainian energy industry needs to reform in line with this framework. This is crucial for Ukraine’s energy sector development.

The purpose of the handbook is to demonstrate not only production figures, but also to highlight economic efficiency. This is vital for Ukraine’s energy independence.

The task of this guide is to reflect the economic side of production and consumption. We wanted to make the guide as easy and understandable as possible, so in some cases we have departed from generally accepted professional terms and definitions.

*Special thanks to
Lilia Zubareva, Marina Polyakova,
Tetyana Temnyuk, Alyona Osmolovska,
Yulia Chervonooka, Inna Surzhok
and Alexander Karpenko.*

ENERGY: FROM SOURCE TO CONSUMER



WHY DID WE CREATE THIS REPORT?

Ukraine’s energy independence depends on a healthy industry governed by market forces at every stage from extraction to energy supply to consumer delivery. To achieve this, the energy sector requires reform. The nature of reform is already clear - the energy sector will develop to fit the rules established elsewhere in Europe.

SOURCES

- Association of Gas Producers of Ukraine
- Ukrainian Wind Energy Association
- State Inspection on Energy Supervision of Ukraine
- State Treasury Service of Ukraine
- State Service of Geology and Subsoil of Ukraine
- State Statistics Service of Ukraine
- State Fiscal Service of Ukraine
- State Enterprise “Energoatom National Nuclear Energy Generating Company”
- SE “Ukrenergo National Power Company”
- DTEK
- Renewable Energy Institute of the National Academy of Sciences of Ukraine
- Ministry of Energy and Coal Industry of Ukraine
- Naftogaz of Ukraine
- Gazprom
- Ukrhydroenerho
- Ukrtransgaz
- National Energy Security Fund
- Razumkov Centre
- Aequo
- British Petroleum
- Eurostat
- International Energy Agency
- Nuclear Energy Agency
- REN21
- The Guardian
- The World Economic Forum
- U.S. Energy Information Administration
- World Bank Group
- World Nuclear Association

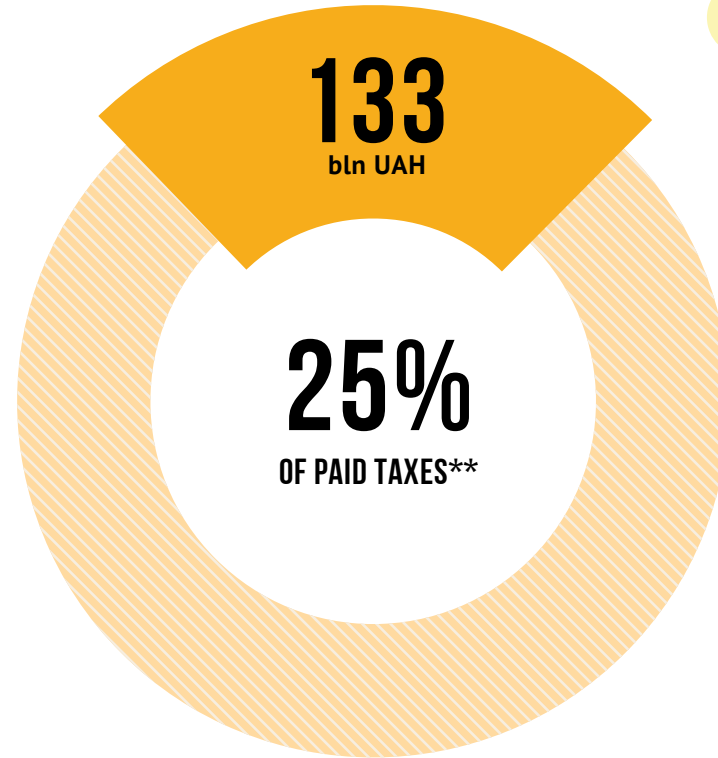
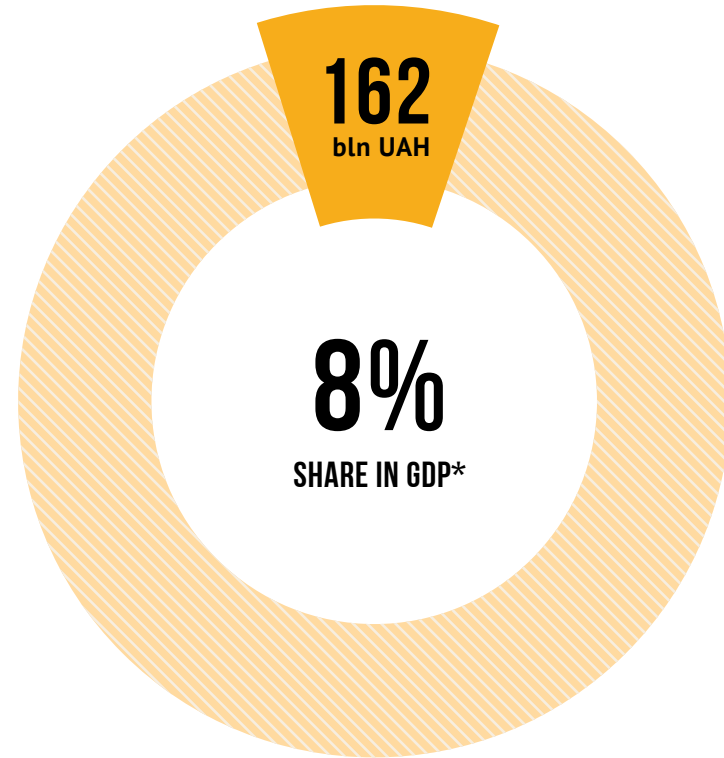
When calculating the role of energy in GDP we took into account data in the following areas:
 - extraction of stone and brown coal, crude oil and natural gas
 - production of coke and coke products, oil refining products
 - supply of electricity, gas, steam and conditioned air

- **UKRAINE AND WORLD ENERGY**

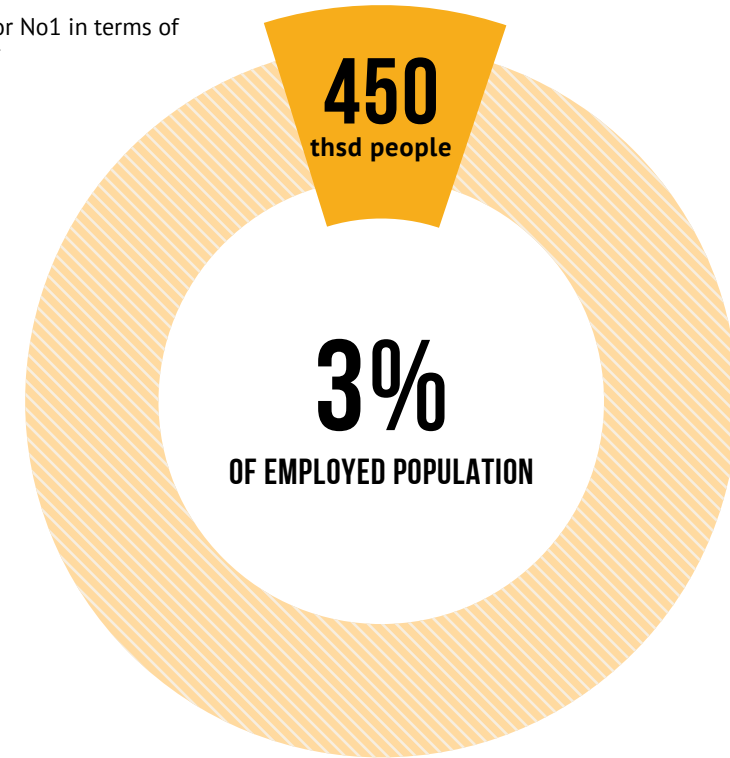


ENERGY INDUSTRY — A HUGE PART OF THE ECONOMY OF THE COUNTRY

Energy industry data for 2016.



Energy sector No1 in terms of taxes paid.**

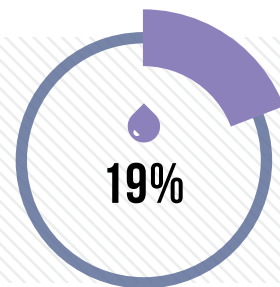


In 2015, the energy industry ranked fourth in terms of GDP share.

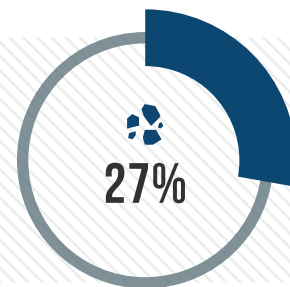


WHAT ENERGY SOURCES UKRAINE IMPORTS

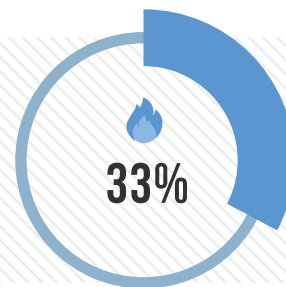
% of total usage



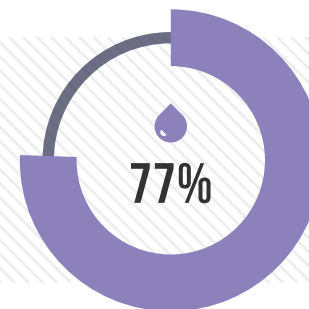
OIL AND GAS CONDENSATE



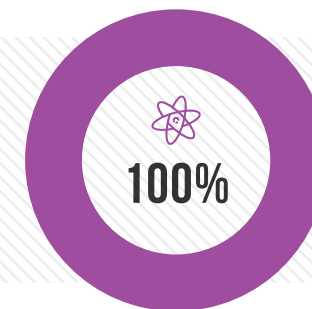
COAL



GAS



OIL PRODUCTS



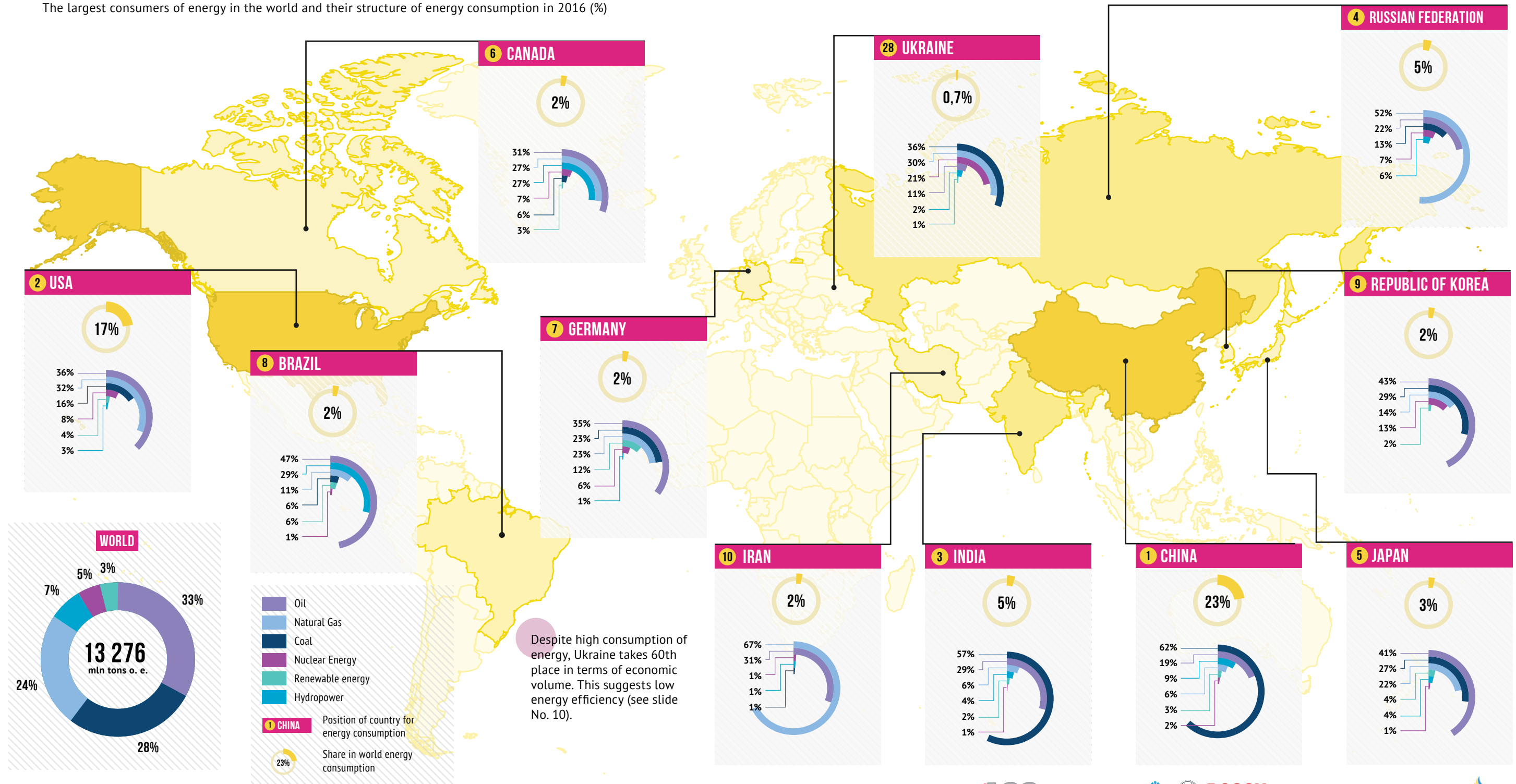
NUCLEAR FUEL

*for 2015 year **Calculation based on rating of the largest taxpayers according to figures from the State Fiscal Service of Ukraine

Sources: State Fiscal Service of Ukraine, Naftogaz of Ukraine, calculations based on statistics from the State Statistics Service of Ukraine

UKRAINE RANKED 28TH FOR ENERGY CONSUMPTION

The largest consumers of energy in the world and their structure of energy consumption in 2016 (%)

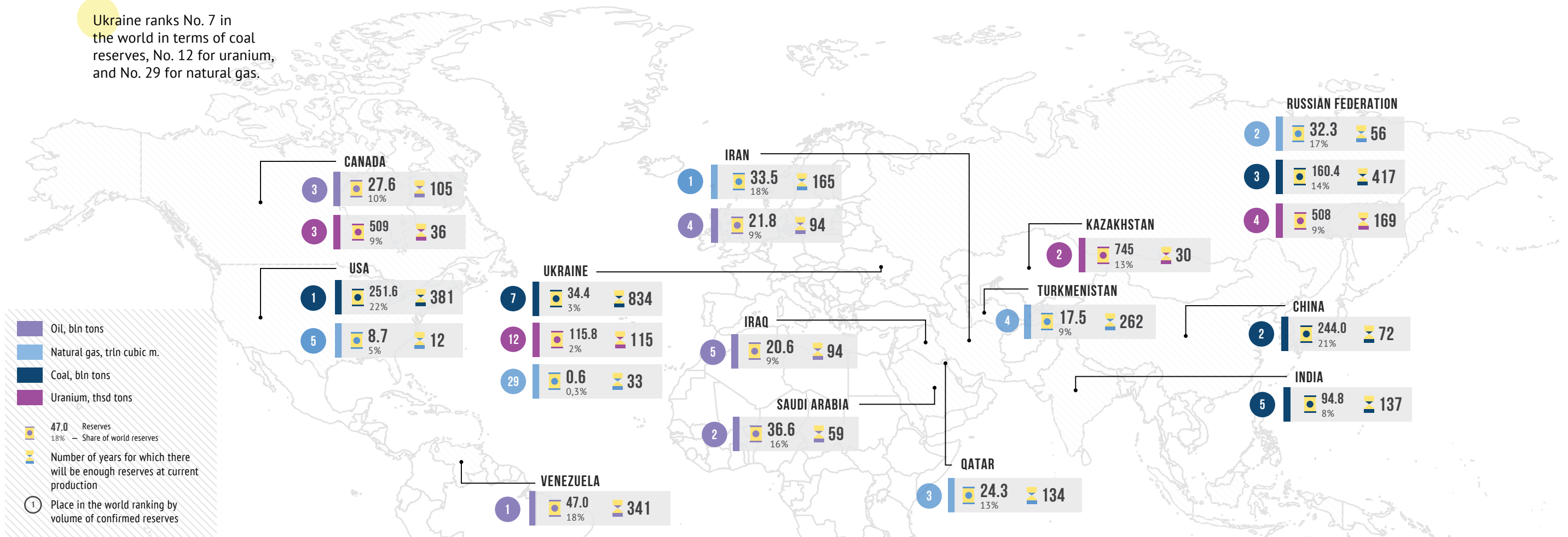


Despite high consumption of energy, Ukraine takes 60th place in terms of economic volume. This suggests low energy efficiency (see slide No. 10).

UKRAINE HAS SUFFICIENT ENERGY RESOURCES

Top five countries by volume of energy reserves at the end of 2016

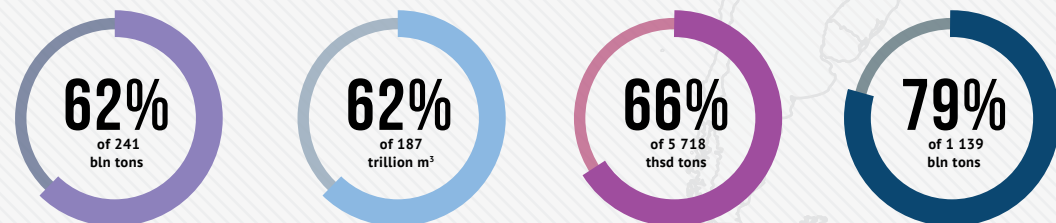
Ukraine ranks No. 7 in the world in terms of coal reserves, No. 12 for uranium, and No. 29 for natural gas.



Legend:





- Oil, bln tons
- Natural gas, trln cubic m.
- Coal, bln tons
- Uranium, thsd tons
- 47.0 Reserves, 18% Share of world reserves
- Number of years for which there will be enough reserves at current production
- Place in the world ranking by volume of confirmed reserves

SHARE OF TOP-5 COUNTRIES OF WORLD RESERVES

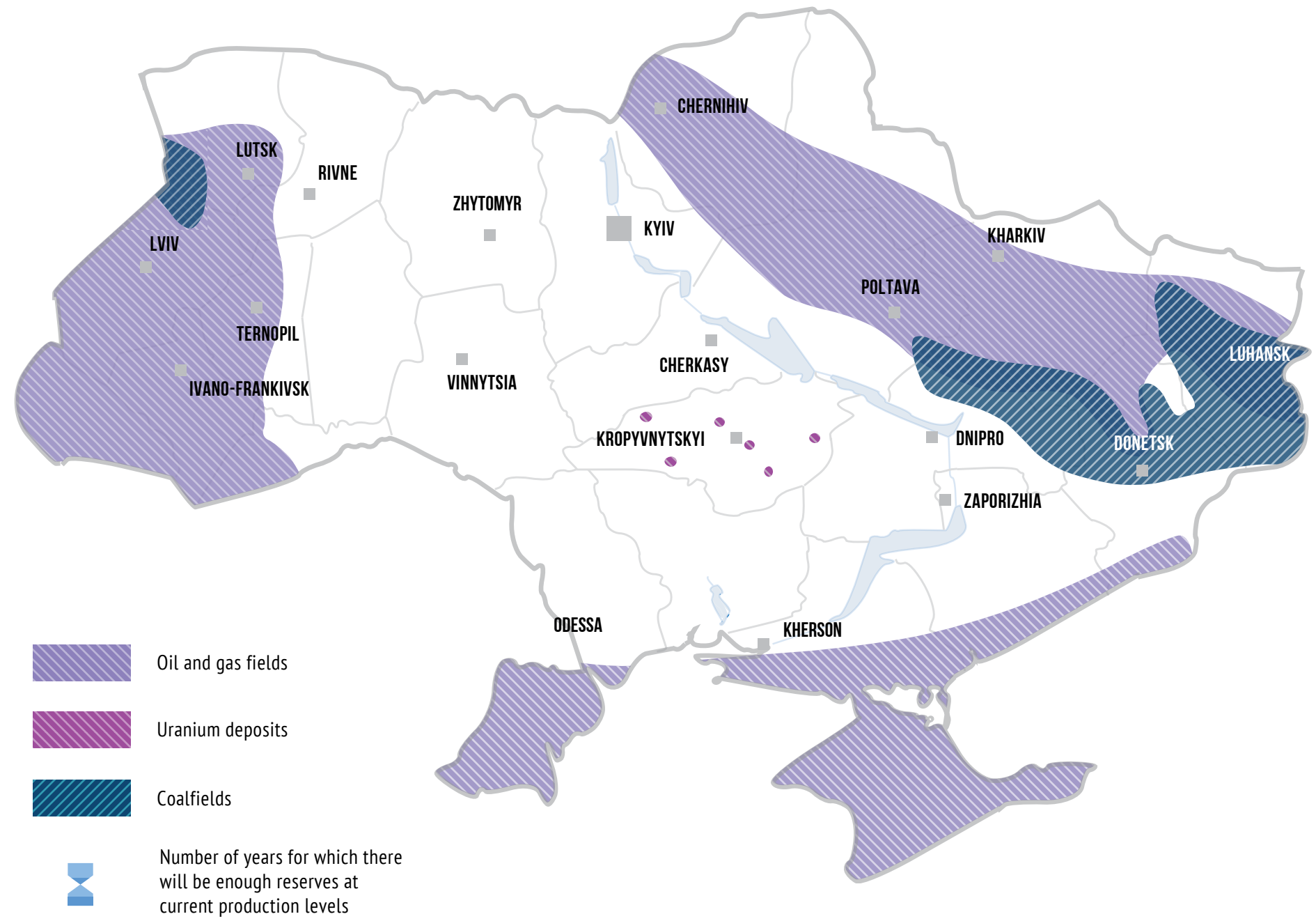


UKRAINE CAN BECOME ENERGY INDEPENDENT

Confirmed amount of energy resources in Ukraine at the end of 2016 and their location

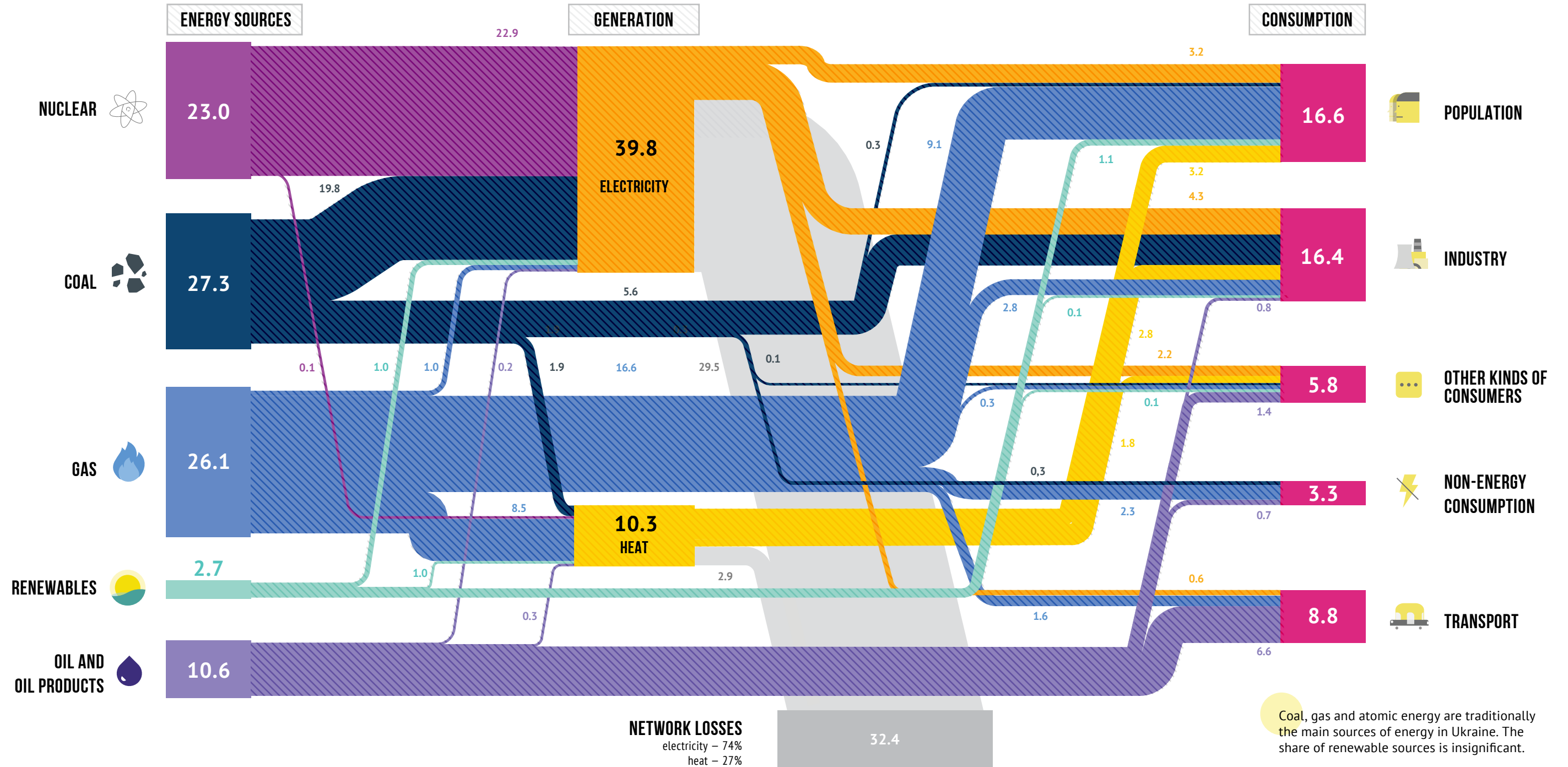
	VOLUME	
GAS 	591 000 mln m ³	33
COAL 	34 000 mln tons	834
URANIUM 	0.1 mln tons	115
OIL 	55 mln tons	25

Lack of investment in exploration, processing and energy efficiency, as well as complicated bureaucratic procedures, impede the development of Ukraine's energy sector.



ENERGY BALANCE OF UKRAINE

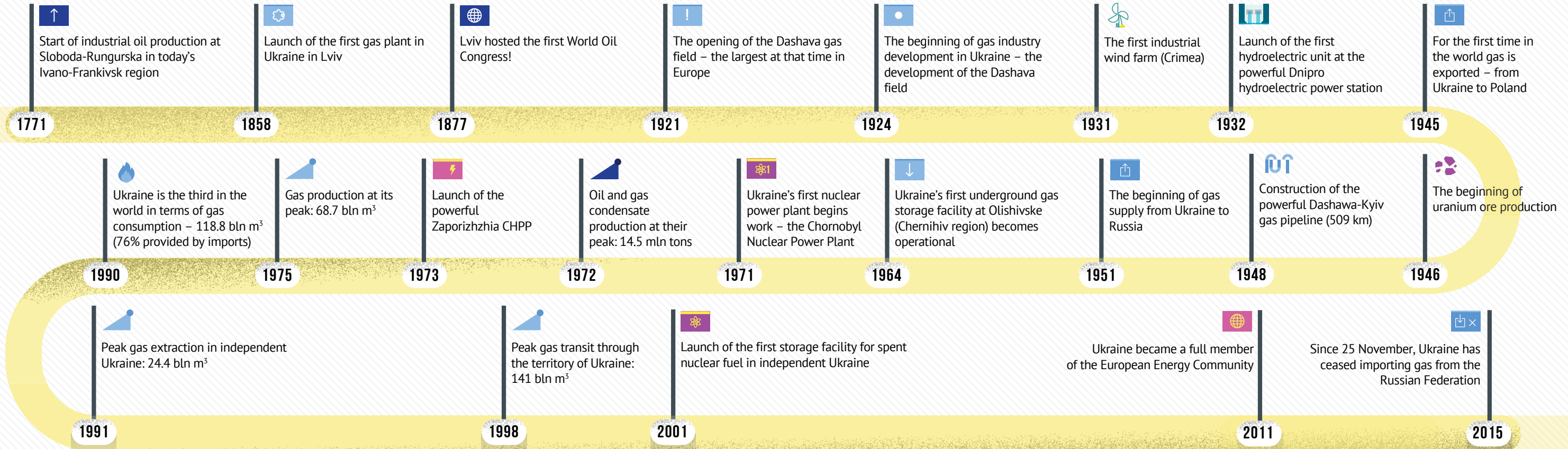
2015, million tons of oil equivalent



Coal, gas and atomic energy are traditionally the main sources of energy in Ukraine. The share of renewable sources is insignificant.

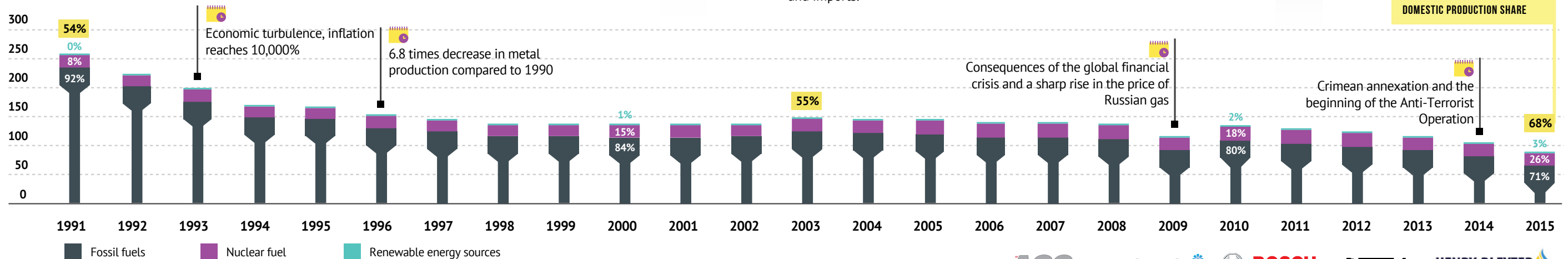
DURING 19-20 CENTURIES UKRAINE WAS ONE OF THE LEADING ENERGY STATES OF THE WORLD

History of the Ukrainian power industry



PRIMARY ENERGY SUPPLY IN UKRAINE

1991-2015, mln tons of o. e.



In Ukraine there is a clear tendency towards reduction of energy consumption and imports.

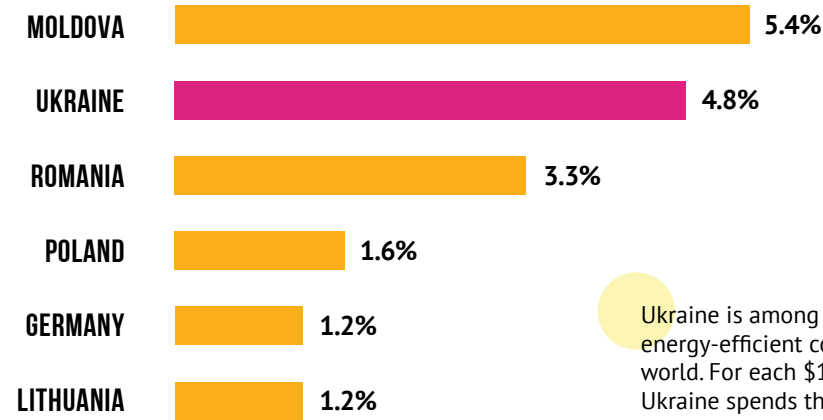
Source: State Statistics Service of Ukraine, Naftogaz of Ukraine, International Energy Agency, The Guardian, SE "Energoatom National Nuclear Energy Generating Company", Razumkov Centre, Ukrhydroenerho, Nuclear Energy Agency

UKRAINE IS AN ENERGY-INEFFICIENT COUNTRY

Rates of energy efficiency in the Ukrainian economy

LOSSES OF ENERGY DURING TRANSPORTATION AND DISTRIBUTION

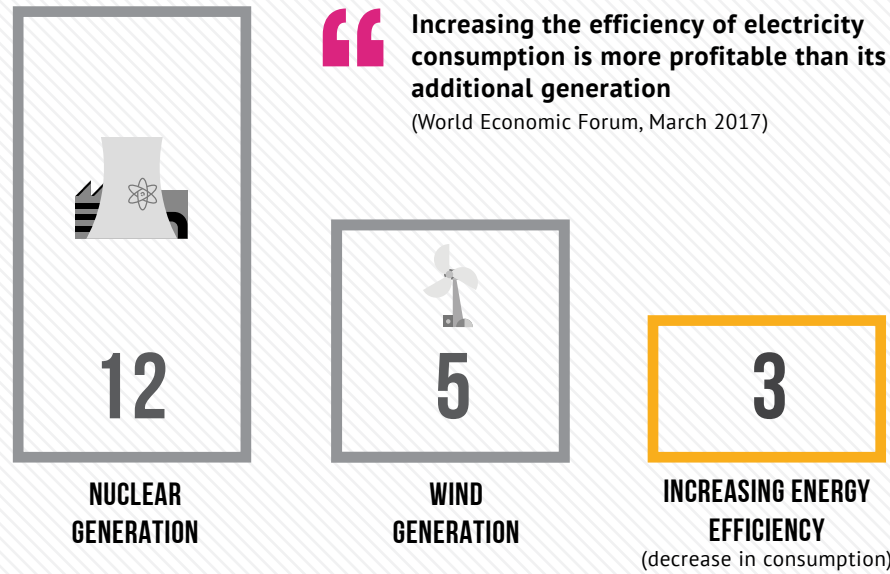
2015 (% of total produced)



Ukraine is among the top 20 least energy-efficient countries in the world. For each \$1,000 of GDP, Ukraine spends three times more on energy than Poland.

COMPARISON OF ELECTRICITY COSTS

USA Cents/kWh



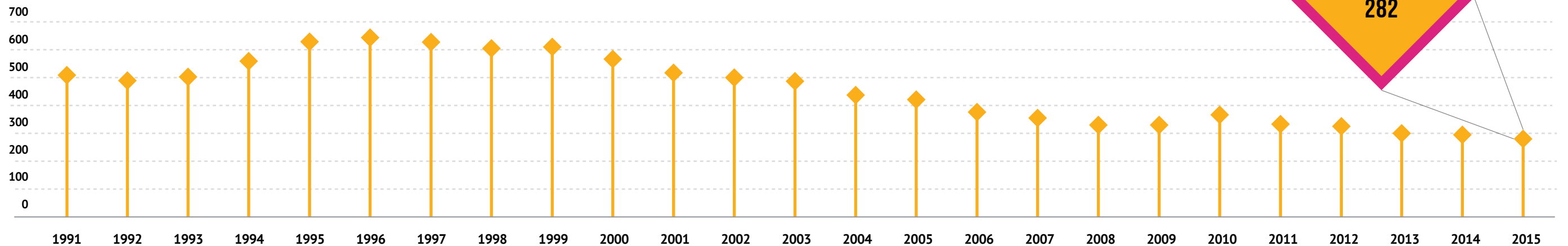
ENERGY INTENSITY OF GDP

kg of o. e./ thsd US dollars GDP per purchasing power parity



ENERGY INTENSITY OF GDP

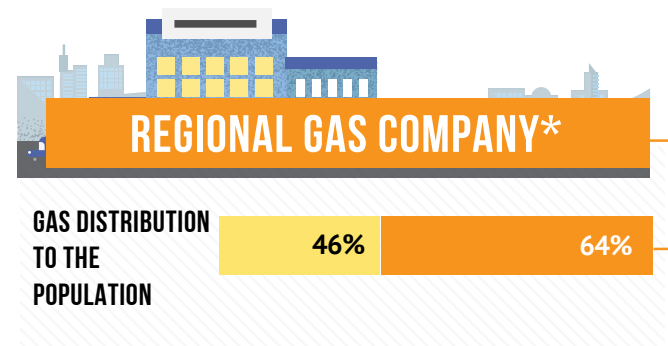
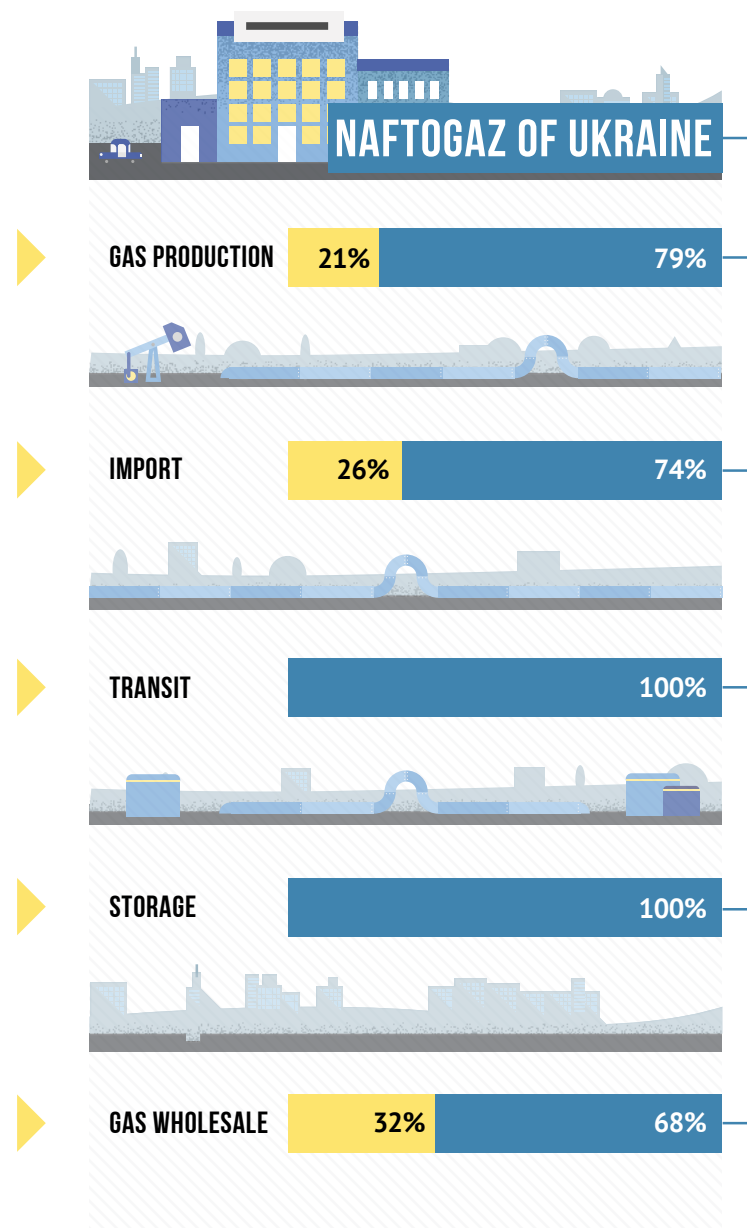
kg of o. e./ thsd US dollars GDP per purchasing power parity



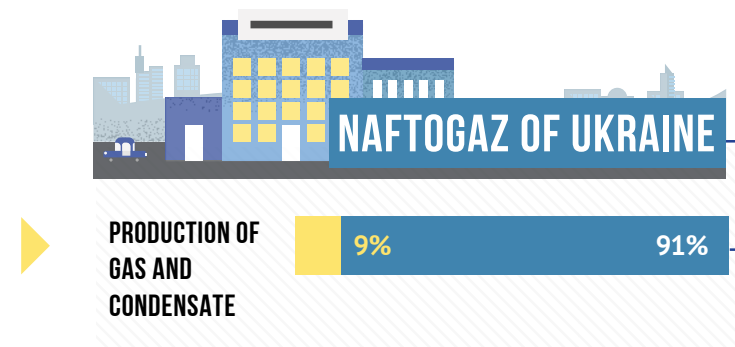
THE STATE IS THE MAIN PLAYER IN THE ENERGY SECTOR OF UKRAINE

The largest companies in the energy markets of Ukraine in 2016 (%)

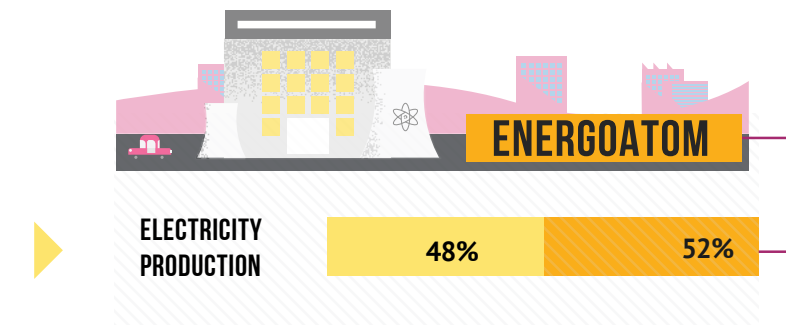
NATURAL GAS



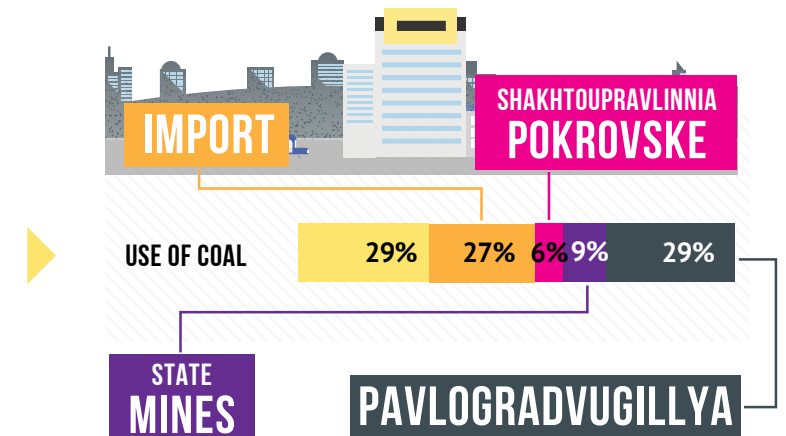
OIL



ELECTRICITY (PRODUCTION)

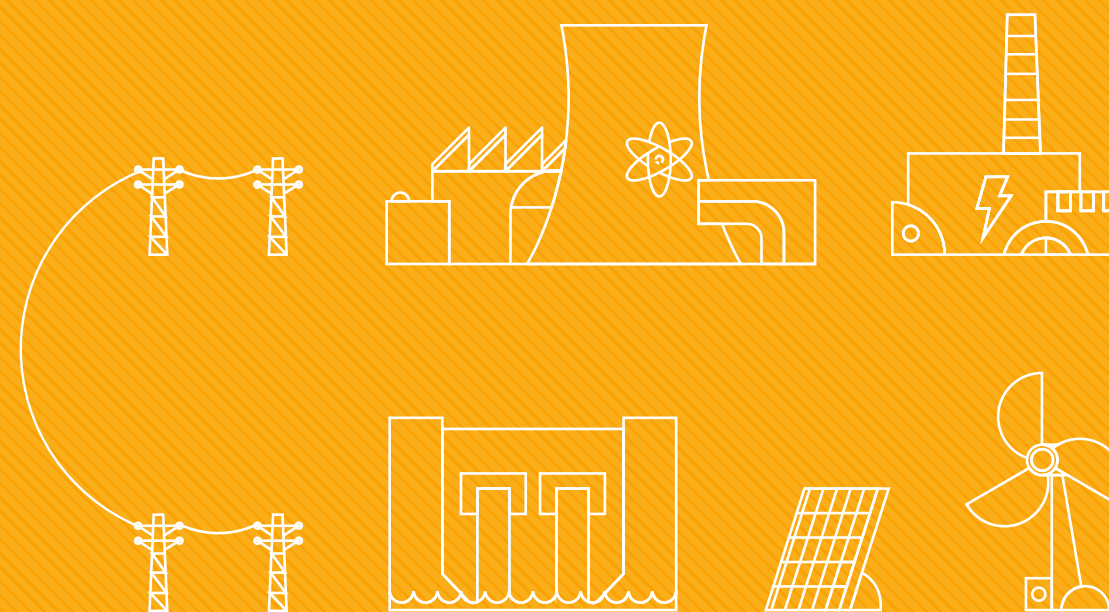


COAL



The slow pace of reforms complicates the development of the energy sector and reduces the investment attractiveness of the industry.

• ENERGY PRODUCTION



● ELECTRICITY

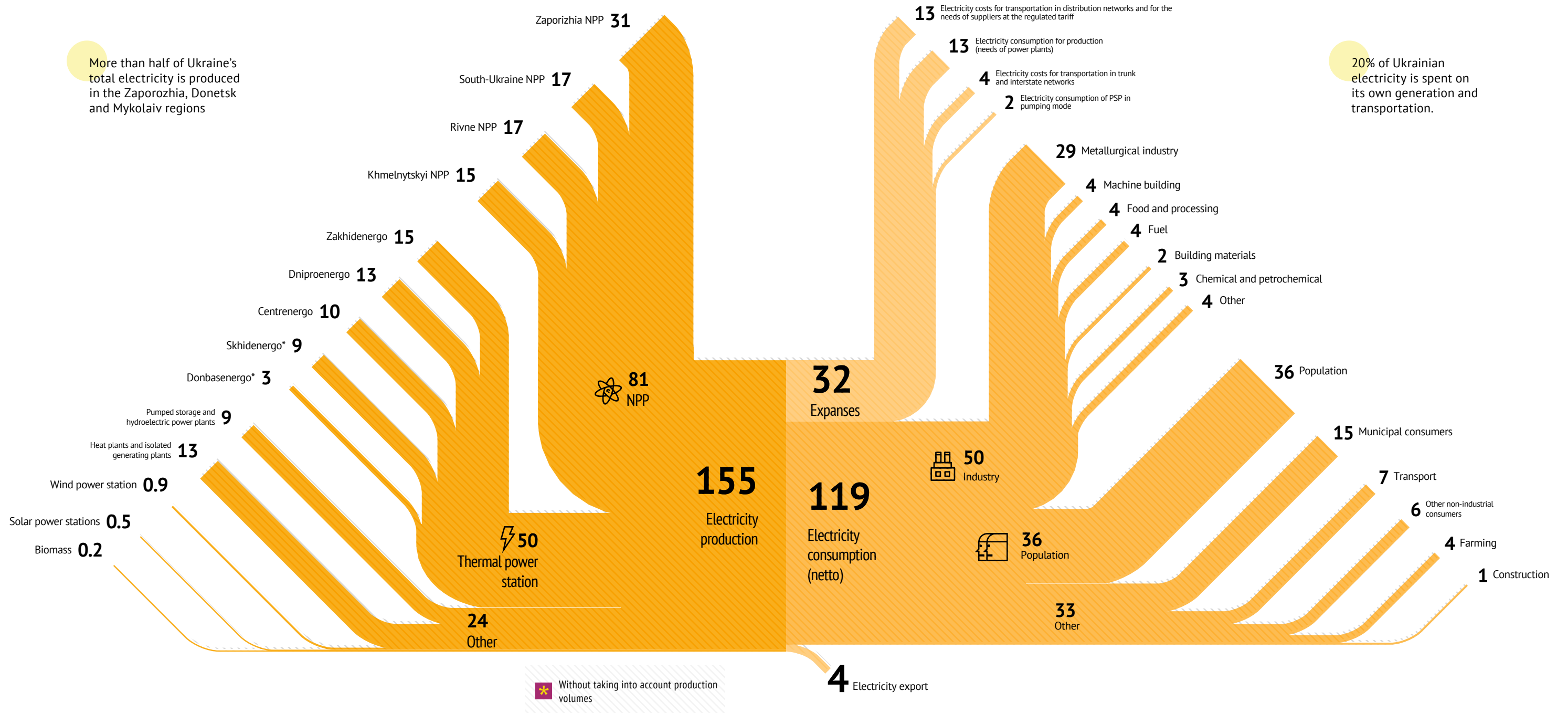
● THERMAL ENERGY

ELECTRICITY BALANCE

2016, bln kWh

More than half of Ukraine's total electricity is produced in the Zaporozhia, Donetsk and Mykolaiv regions

20% of Ukrainian electricity is spent on its own generation and transportation.



PLANS ENVISAGE A SIGNIFICANT SHARE OF NPP IN POWER PRODUCTION

There are plans to increase the share of **renewable energy sources** in Ukraine to 12% by 2020

12%

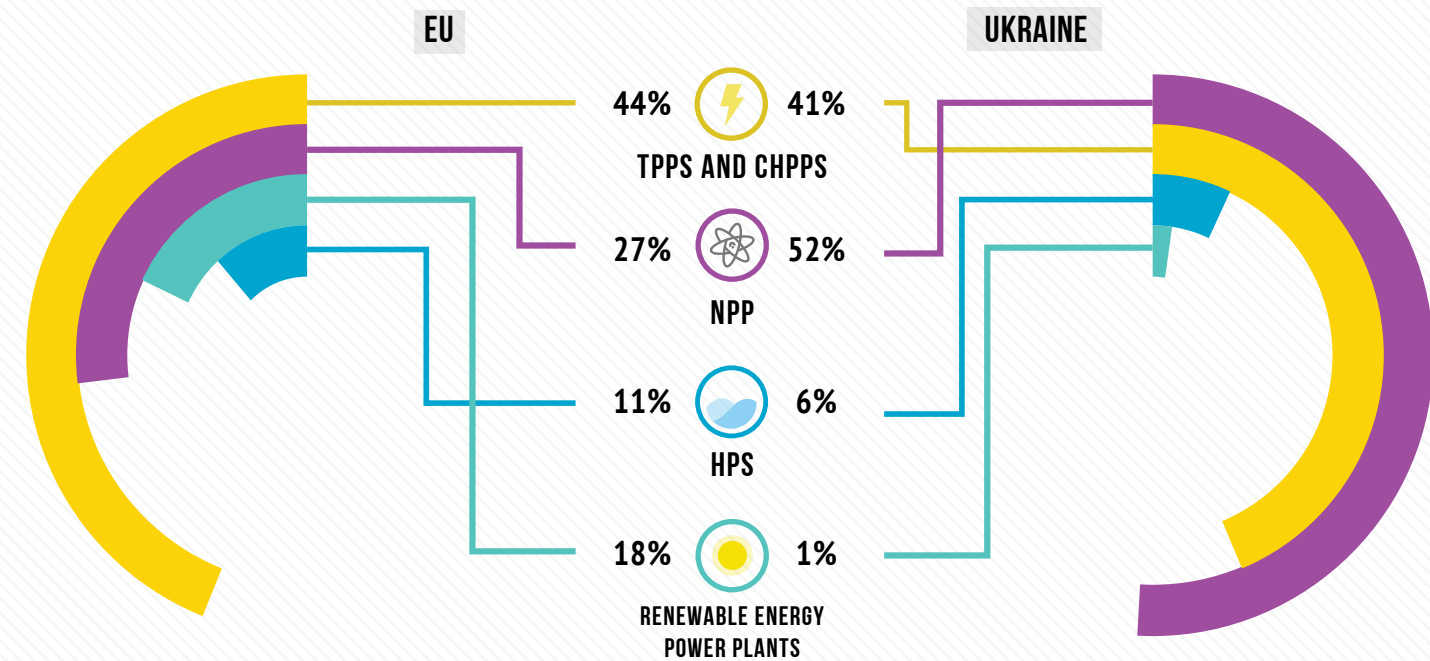
It is difficult to determine the **optimal structure of electricity generation**. Energy issues in each country have their own characteristics and advantages

In **Malta** more than **90%** of electricity is produced from **fossil fuels**.

In **France** **77%** of electricity is generated by **nuclear power plants**.

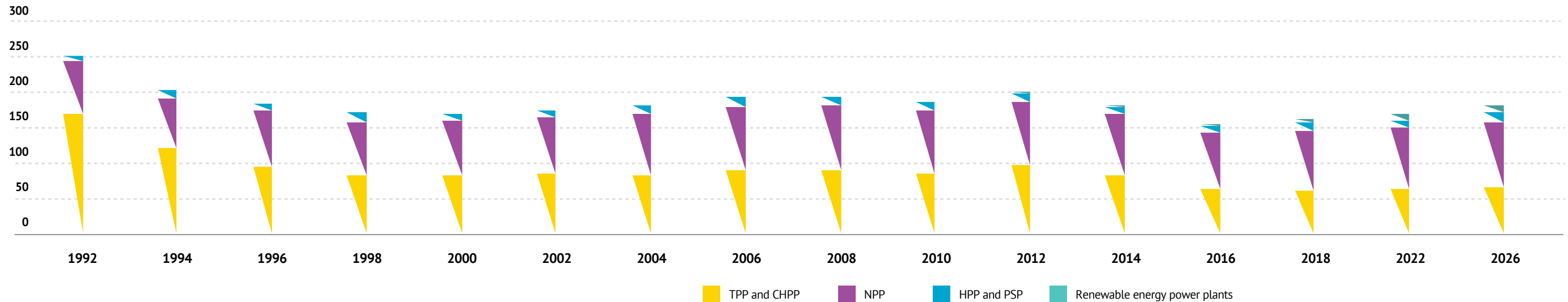
STRUCTURE OF ELECTRICITY PRODUCTION

2016, %



VOLUME AND STRUCTURE OF ELECTRICITY GENERATION IN UKRAINE

bln kWh

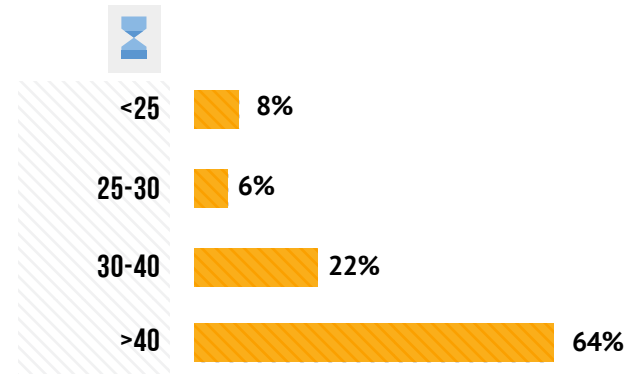


UKRAINIAN ELECTRICAL GRIDS ARE OBSOLETE AND DETERIORATING

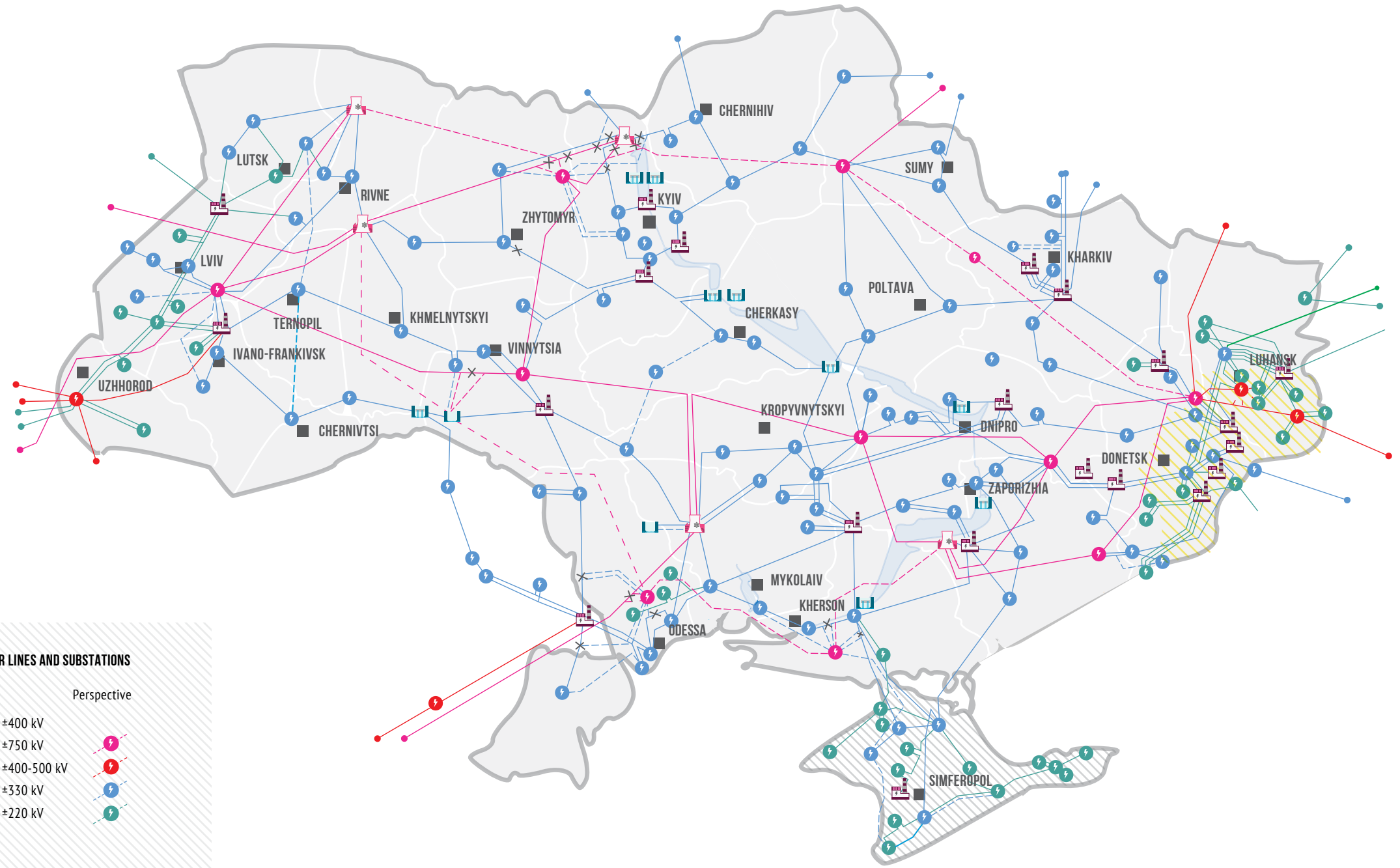
United Energy System of Ukraine as of the end of 2016

STATE OF TRANSMISSION NETWORKS LINES

as of December 31, 2016, years in operation, %



The key problem of the electric power industry is the high level of wear and tear of electric power equipment, the bulk of which went into operation in the 1960s-1970s and was designed in accordance with the norms of the 1950s.



TYPES OF ELECTRIC POWER PLANTS

- NPP
- TPP, CHPP
- HPP, PSP
- HPP, PSP, under construction

AR Crimea

ELECTRIC POWER LINES AND SUBSTATIONS

- | Current | Perspective |
|---------|-------------|
| | |
| | |
| | |
| | |
| | |

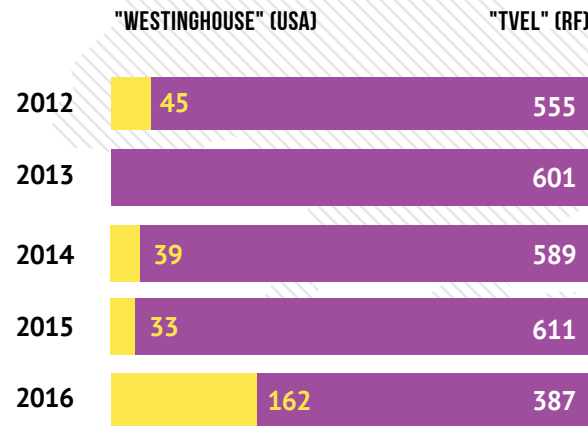
ATO Zone

THE NUCLEAR POWER INDUSTRY IN UKRAINE IS FULLY DEPENDENT ON IMPORTED FUEL

Data of nuclear sector

PURCHASE OF NUCLEAR FUEL

mln of US dollars



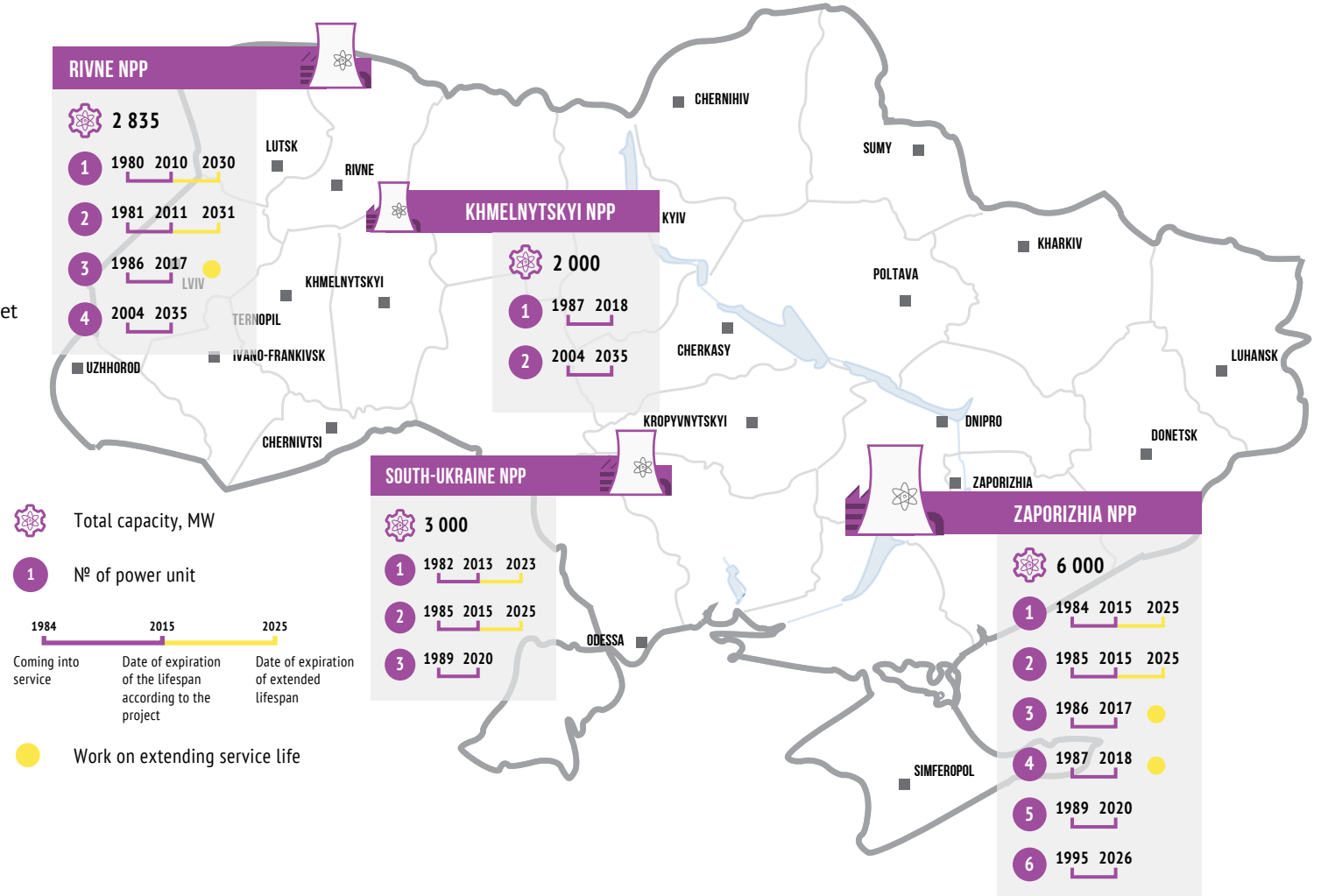
PROBLEMS

Dependence on the storage of spent nuclear fuel in other countries

Termination of the design life of most power units

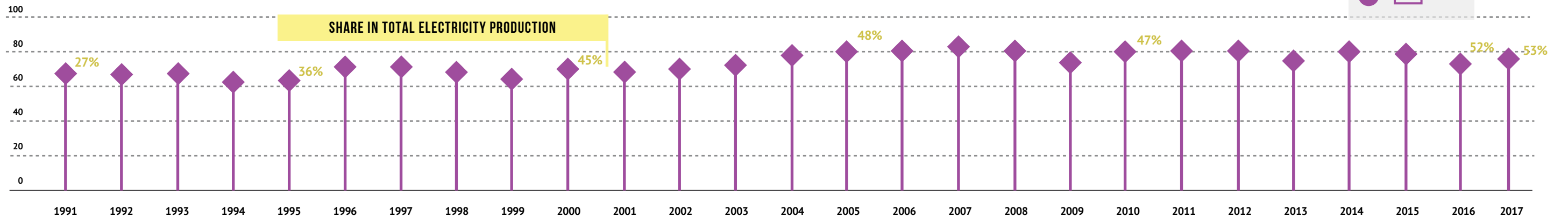
Dependence on the import of nuclear fuel

Ukraine holds 2% of the world's reserves of uranium, so it could independently meet its needs.



ENERGY PRODUCTION ON NPP

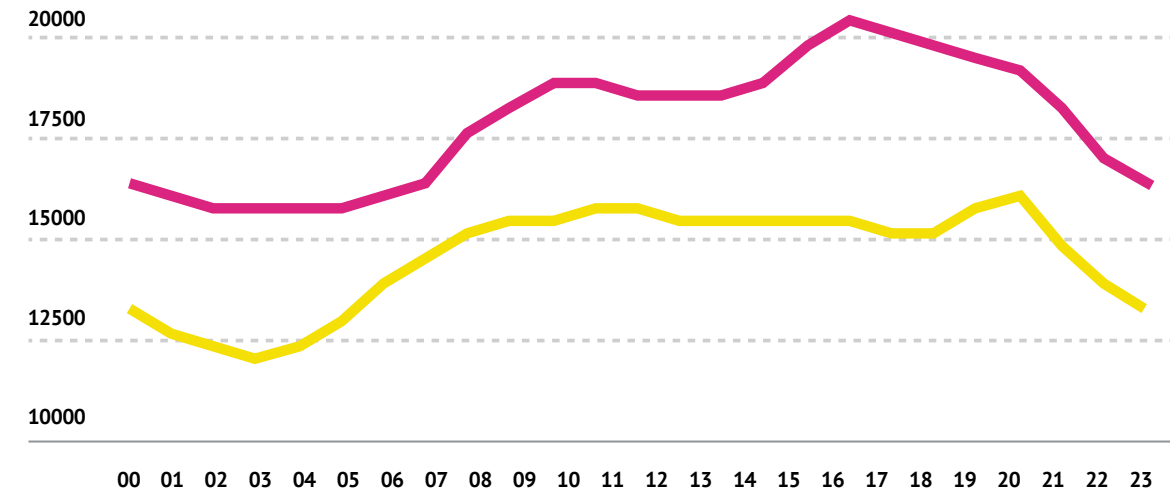
bln of kWh



THERMAL POWER PLANTS PROVIDE FLEXIBILITY OF ELECTRICITY PRODUCTION

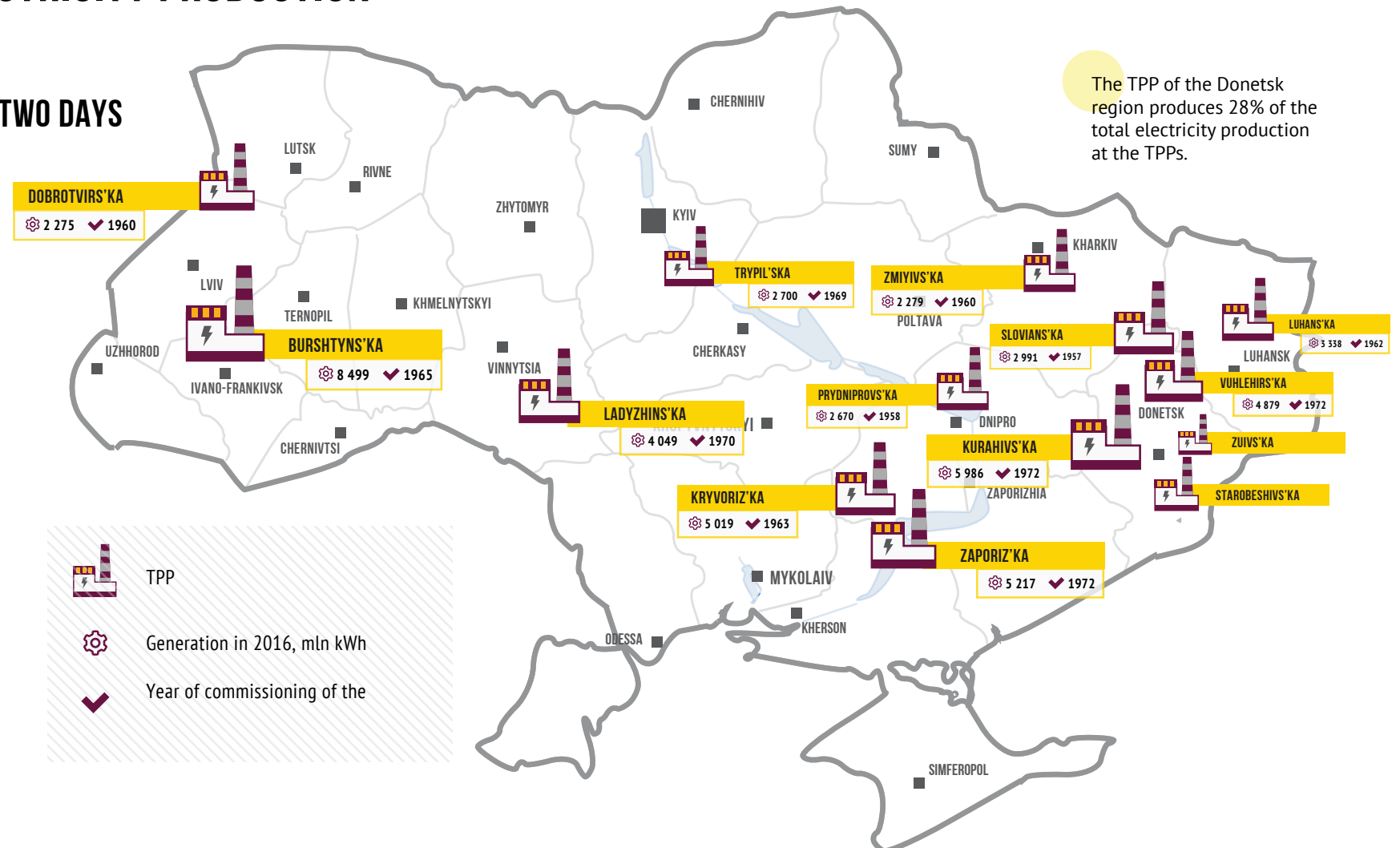
The main indicators of thermal power plants and combined heat and power plants

THE CHART OF ELECTRICITY CONSUMPTION IN UKRAINE ON THE EXAMPLE OF TWO DAYS



Electricity is a product which is both produced and consumed at the same time. TPPs provide the required flexibility in production at peak hours.

15.01.2017 (pink line)
15.06.2017 (yellow line)

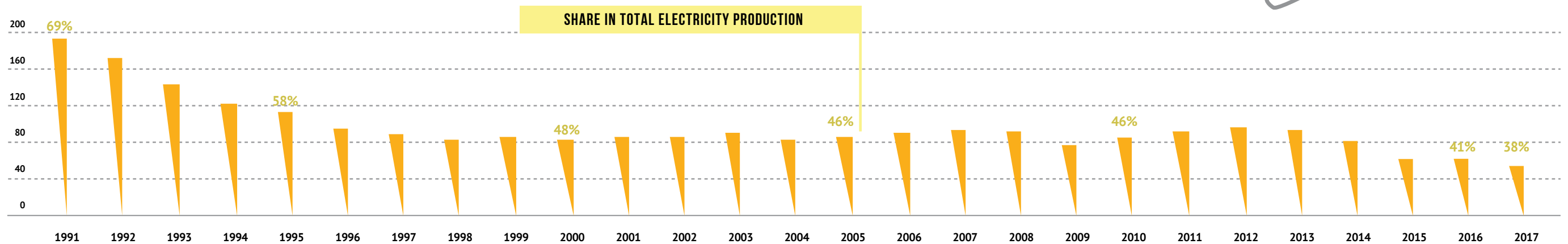


The TPP of the Donetsk region produces 28% of the total electricity production at the TPPs.

- TPP
- Generation in 2016, mln kWh
- Year of commissioning of the

PRODUCTION OF ELECTRICITY AT TPPS AND CHPPS

bln kWh



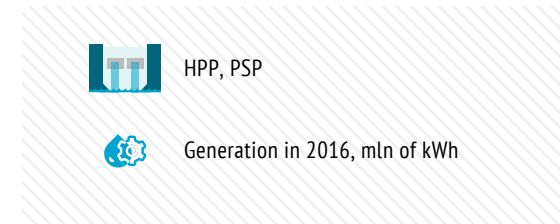
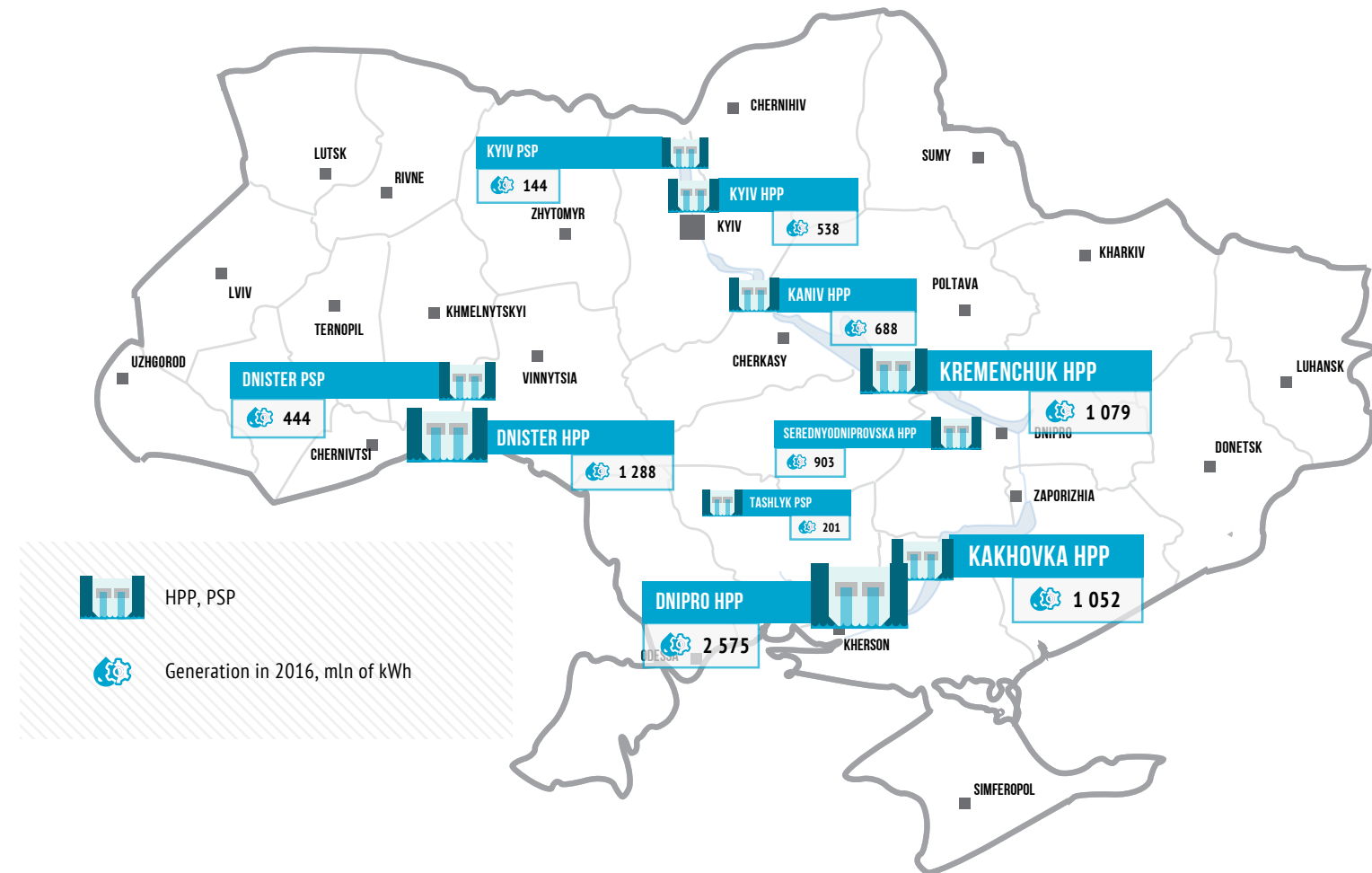
HYDROENERGETICS ACCOUNTS FOR THE BIGGEST SHARE OF RENEWABLE ELECTRICITY IN UKRAINE

The main rates of HPPs and PSPs in Ukraine

The world's largest hydroelectric power plant – **The Three Gorges Dam** – has a capacity equal to **41%** of the power of all power plants in **Ukraine**.

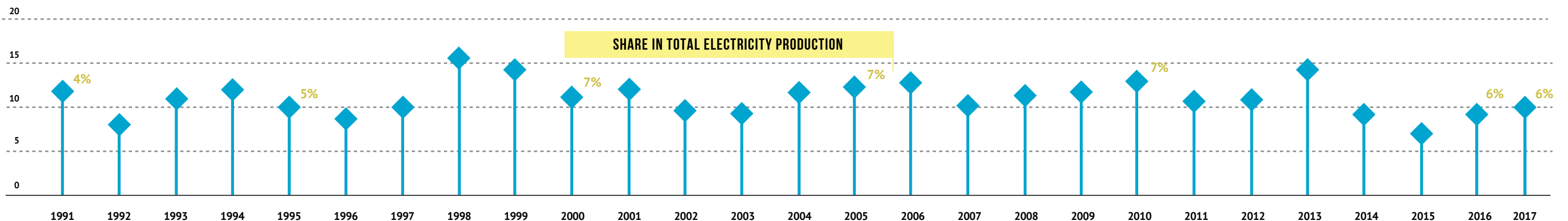
9 out of 10 of the most powerful power plants in the world are **hydroelectric power plants**.

Most of the hydroelectric power plants in Ukraine were built in the second half of the 20th century. Their share is 11% of the total power generation in the country.



PRODUCTION OF ELECTRICITY BY HPPS AND PSPS

bln of kWh

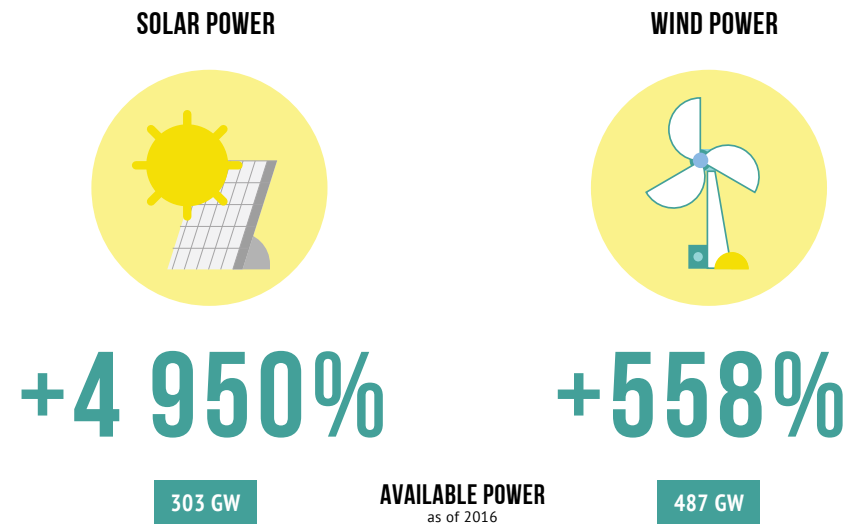


THE PACE OF DEVELOPMENT OF RENEWABLE ENERGY IN UKRAINE IS INSIGNIFICANT COMPARED WITH GLOBAL TRENDS

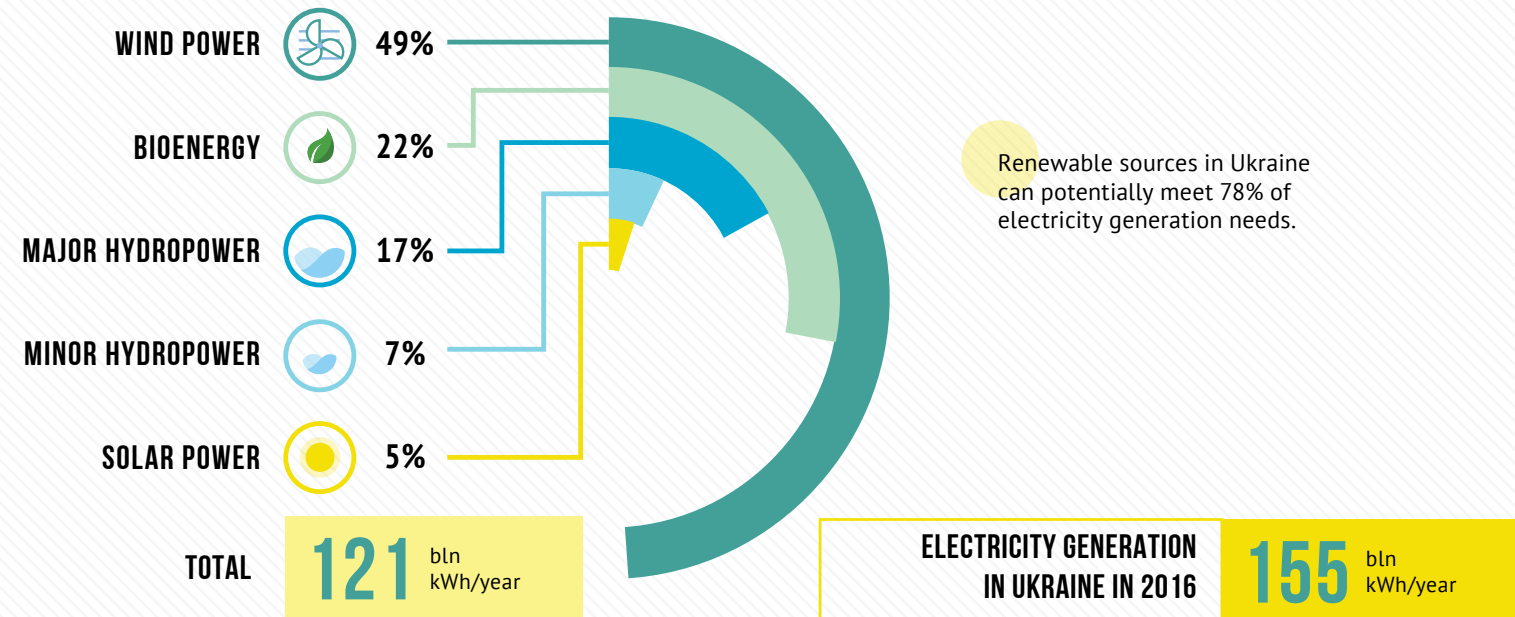
Potential and key rates of renewable energy in Ukraine and the world

INCREASE IN RENEWABLE ENERGY CAPACITY IN THE WORLD

2006-2016, %

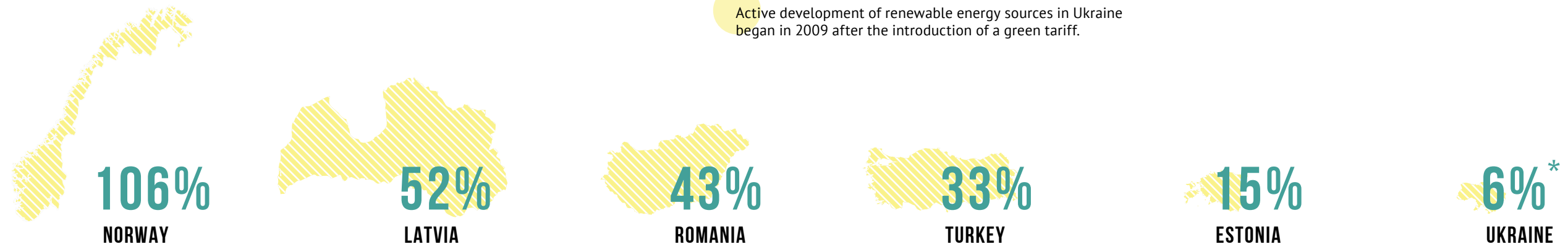


POTENTIAL OF RENEWABLE ENERGY IN UKRAINE



THE RELATION OF PRODUCED ELECTRICITY FROM RES TO CONSUMED ENERGY

in some countries in Europe in 2015, %



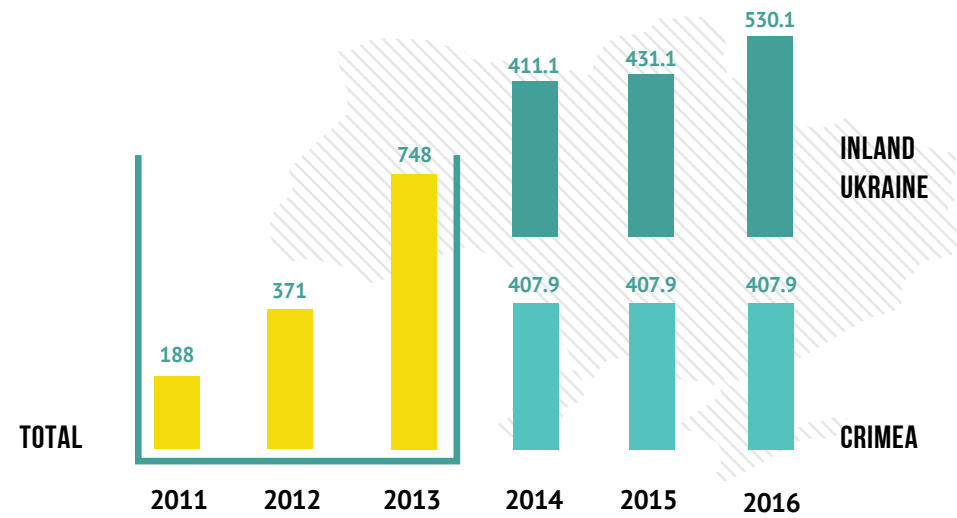
Active development of renewable energy sources in Ukraine began in 2009 after the introduction of a green tariff.

SOLAR ENERGY IS THE YOUNGEST AMONG RENEWABLES IN UKRAINE

The main rates of solar energy in Ukraine

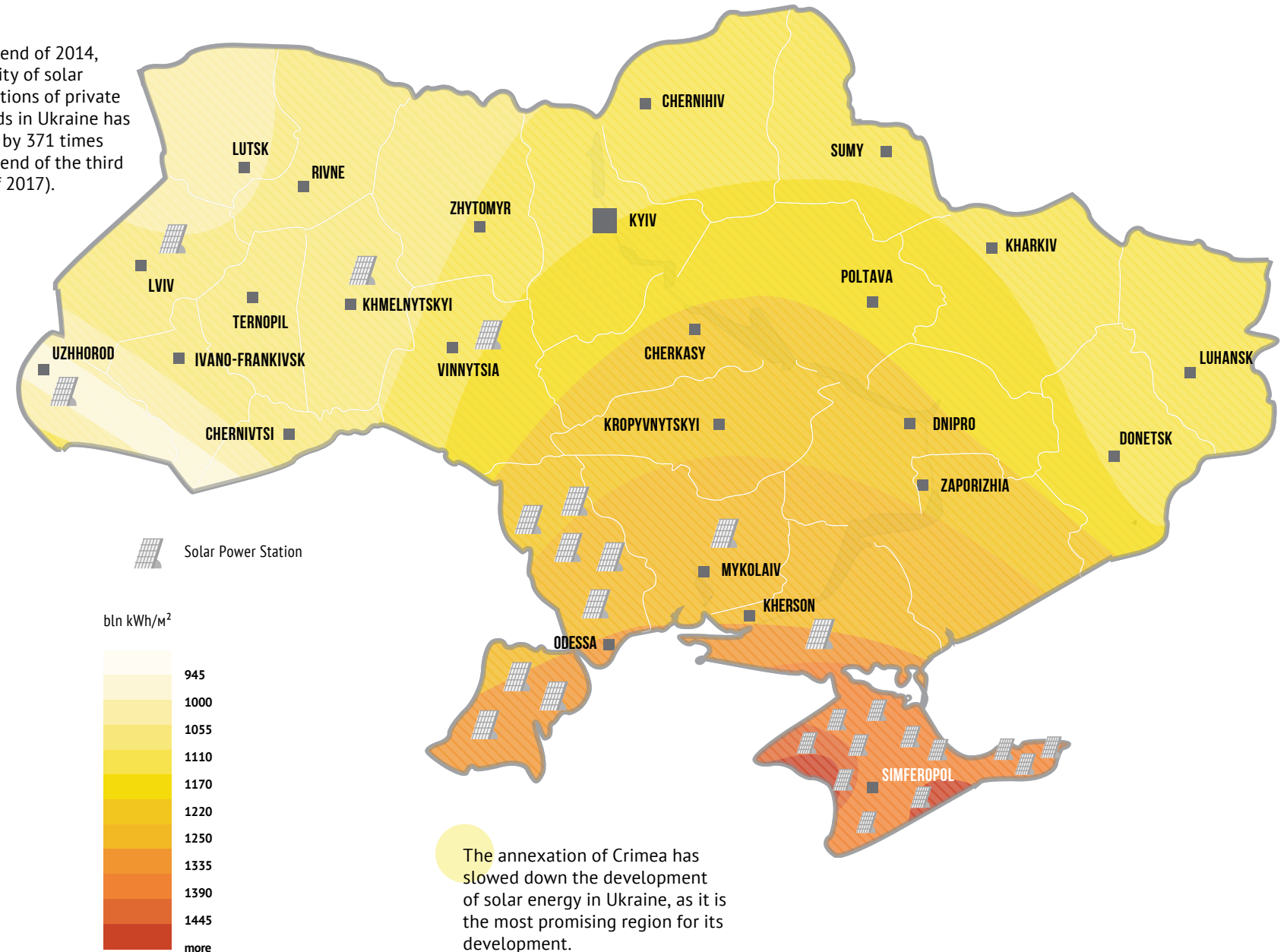
INSTALLED CAPACITY OF SPSS

MW



Since the end of 2014, the capacity of solar power stations of private households in Ukraine has increased by 371 times (as of the end of the third quarter of 2017).

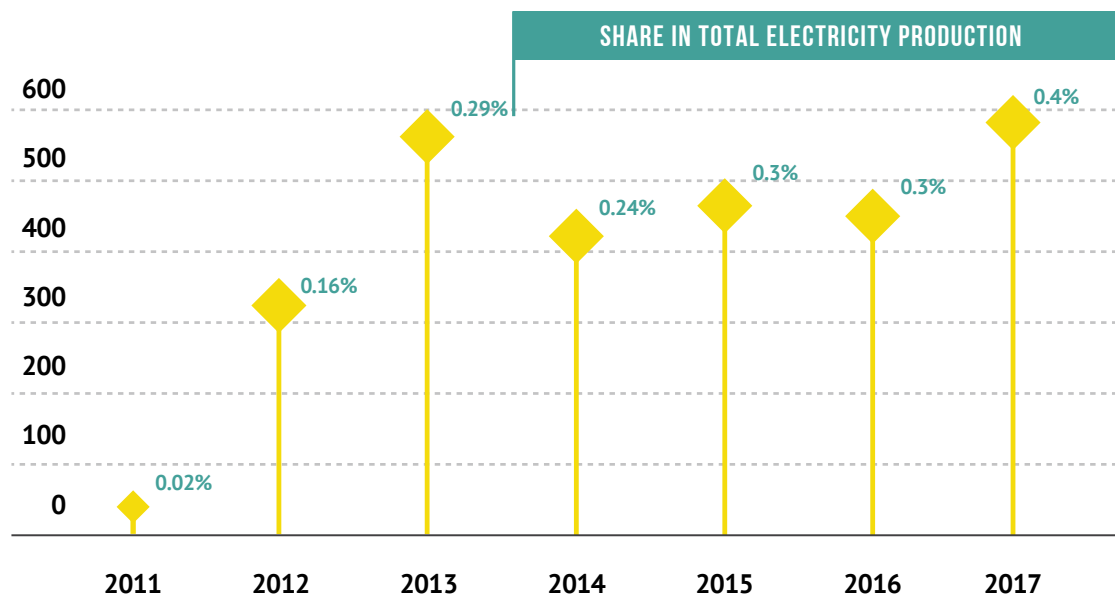
DISTRIBUTION OF SPECIFIC SOLAR RADIATION IN UKRAINE DURING THE YEAR



The annexation of Crimea has slowed down the development of solar energy in Ukraine, as it is the most promising region for its development.

GENERATION OF ELEGTRICITY AT SPS

bln of kWh



2017 as expected by the Ministry of Energy and Coal Industry of Ukraine

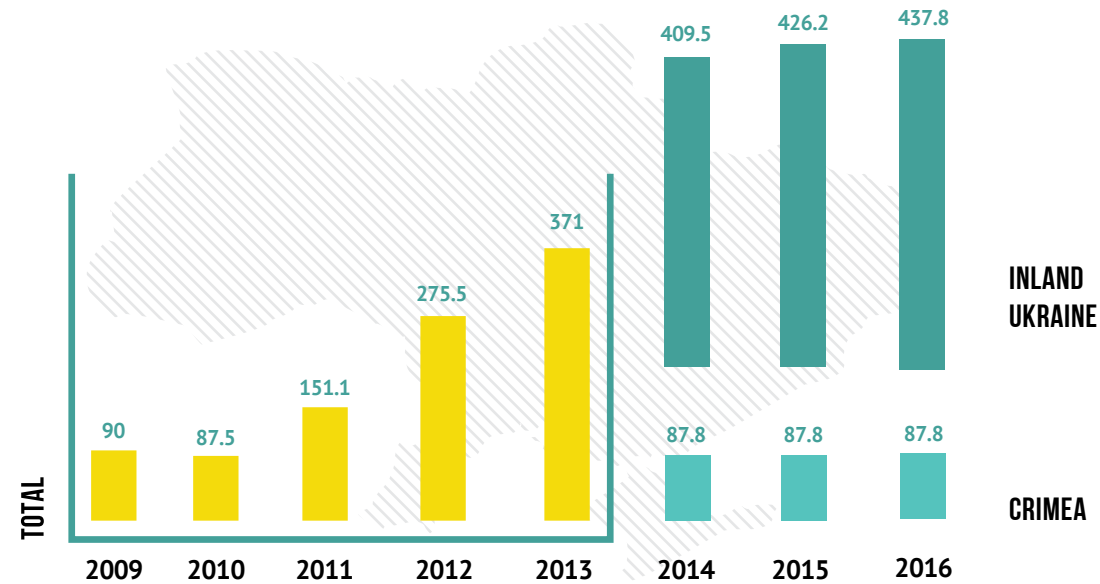
Source: Renewable Energy Institute of the National Academy of Sciences of Ukraine, SE "Ukrenergo National Power Company", State Statistics Service of Ukraine, Ministry of Energy and Coal Industry of Ukraine

WIND POWER IS ONE OF THE CHEAPEST SOURCES OF RENEWABLE ENERGY IN THE WORLD

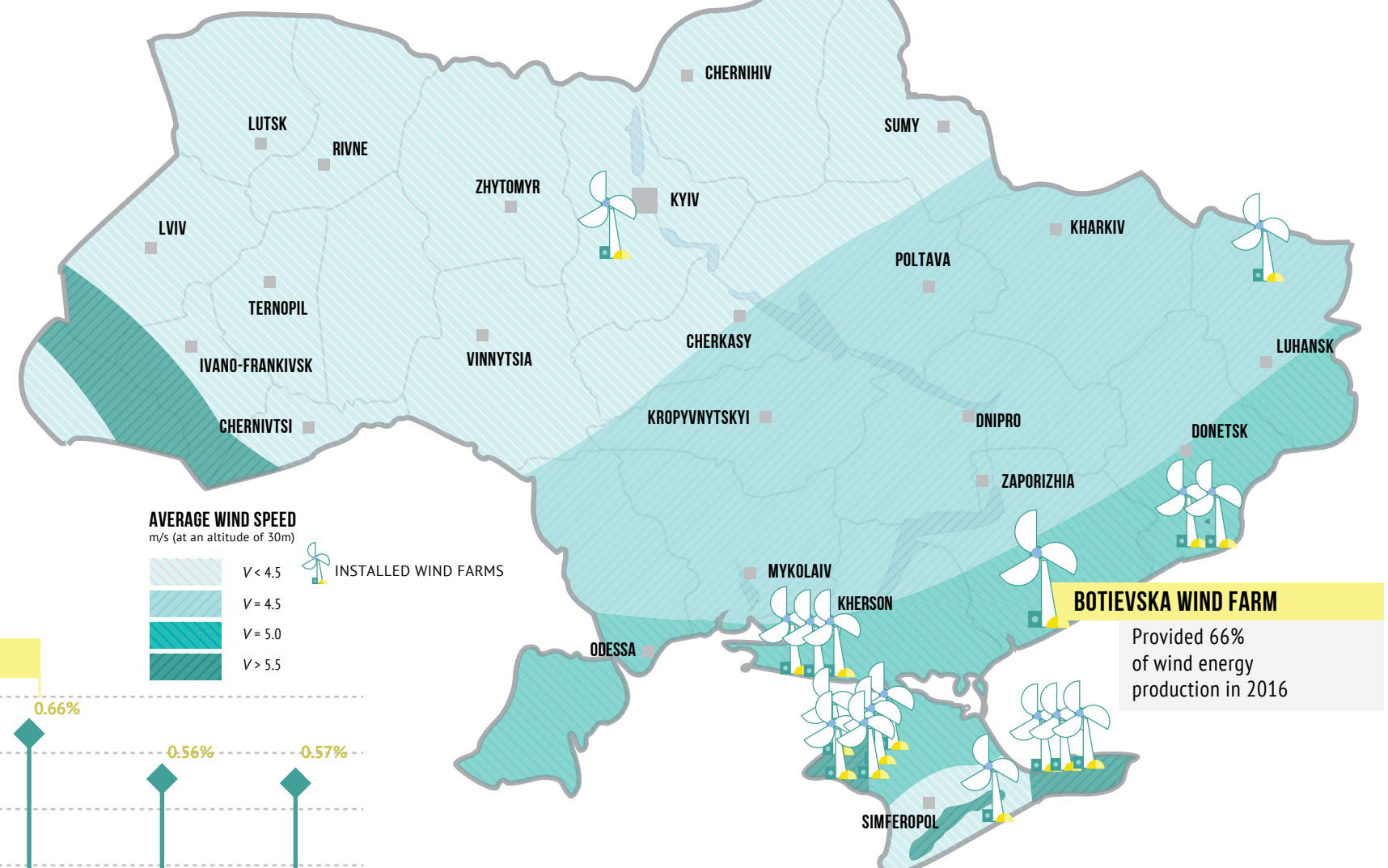
The main rates of wind energy in Ukraine

INSTALLED CAPACITY OF WIND FARMS

MW

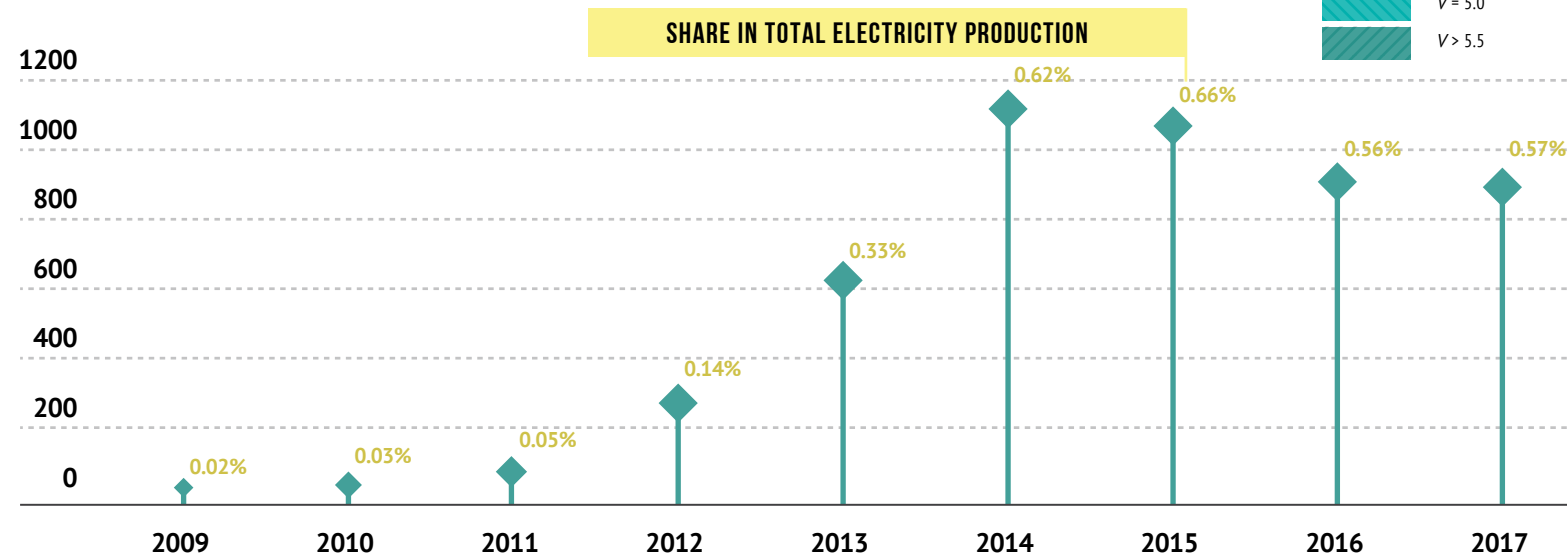


REGIONS OF UKRAINE BY INTENSITY OF WIND FLOWS



GENERATION OF ELECTRICITY AT WIND FARMS

mIn kWh



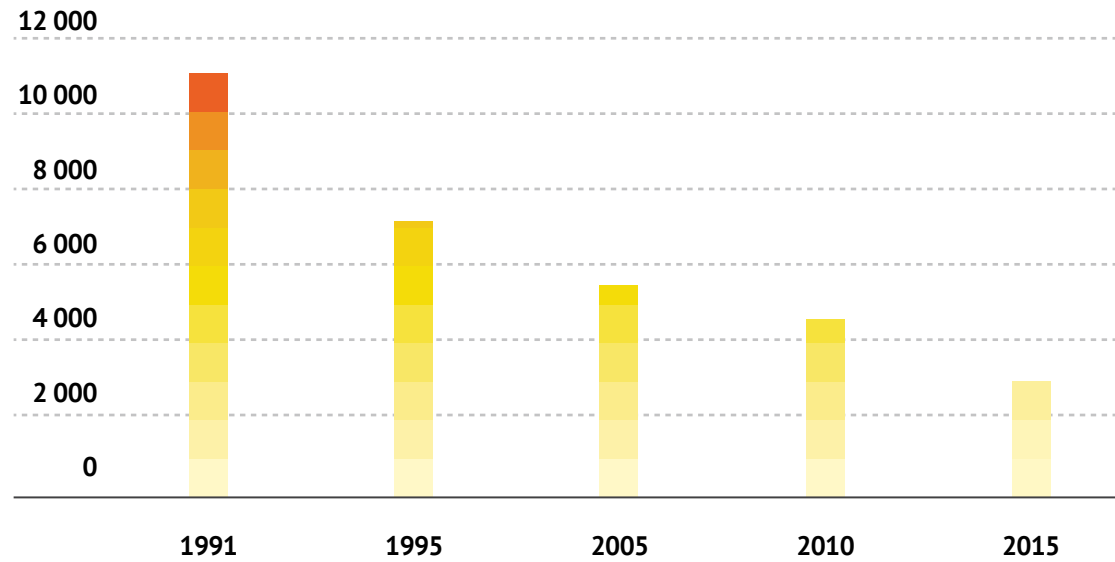
The greatest potential for wind energy is concentrated in the Carpathians. The development of this region will increase the energy independence of the western region of the country.

SINCE 1991, THE POPULATION HAS SIGNIFICANTLY INCREASED THE EFFICIENCY OF HEAT CONSUMPTION

Production and consumption of heat in Ukraine

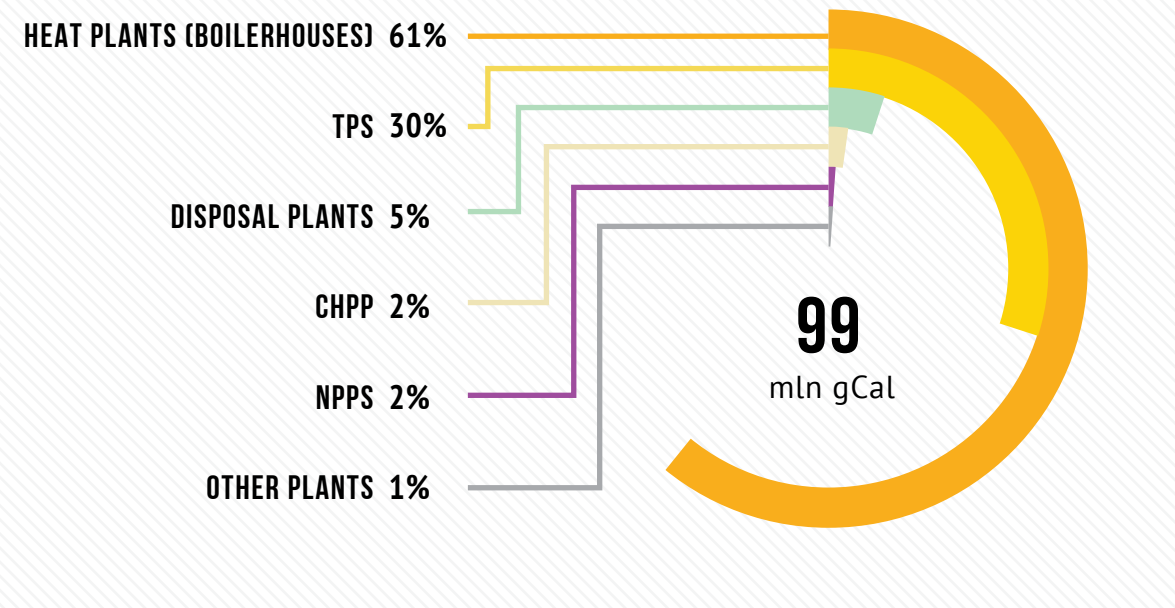
HEAT CONSUMPTION BY THE POPULATION

MJ/person



THE STRUCTURE OF HEAT PRODUCTION IN UKRAINE

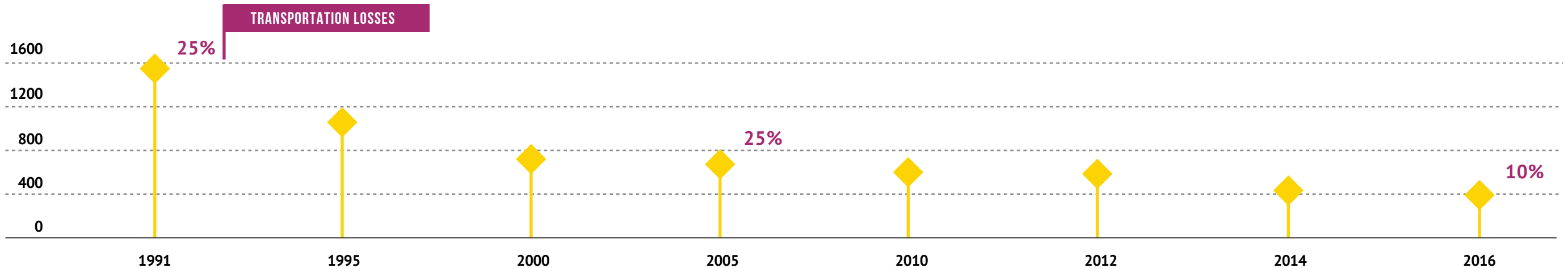
2016, %



Natural gas produces more than 70% of heat in Ukraine.

HEAT PRODUCTION

mln of MJ

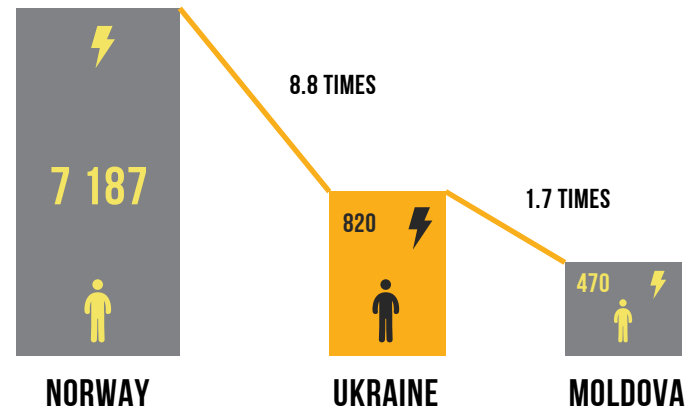


DNIPROPETROVSK REGION IS THE COUNTRY'S BIGGEST ENERGY CONSUMER

Consumption of electricity and thermal energy in 2016

CONSUMPTION OF ENERGY BY THE POPULATION

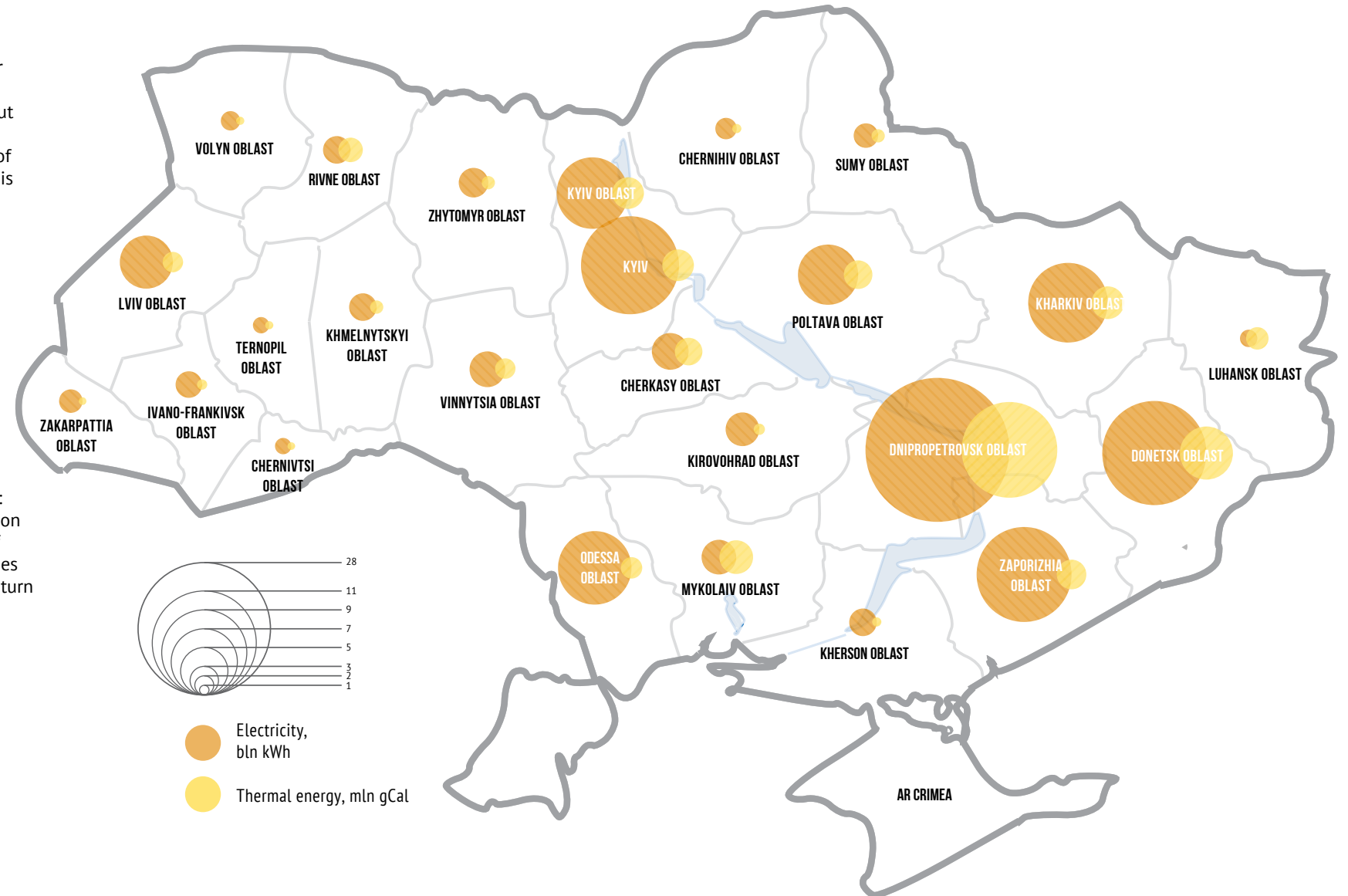
2015, kWh/per capita



Norway has the highest electricity consumption per capita in Europe, but this is not due to low efficiency but rather to the structure of consumption. The volume of heat per person in Norway is one of the lowest.

ENERGY CONSUMPTION BY REGIONS

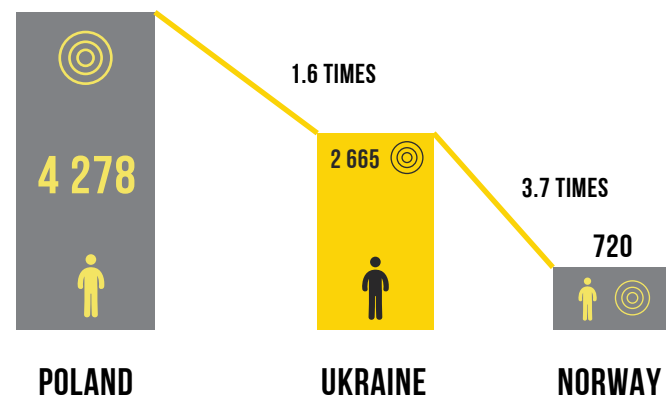
2016



Similar situation in Ukraine: energy consumption by region does not reflect the level of energy efficiency since it does not take into account the return on this consumption.

AT CONSUMPTION BY POPULATION

2015, MJ/per capita



- **OIL AND GAS INDUSTRY**



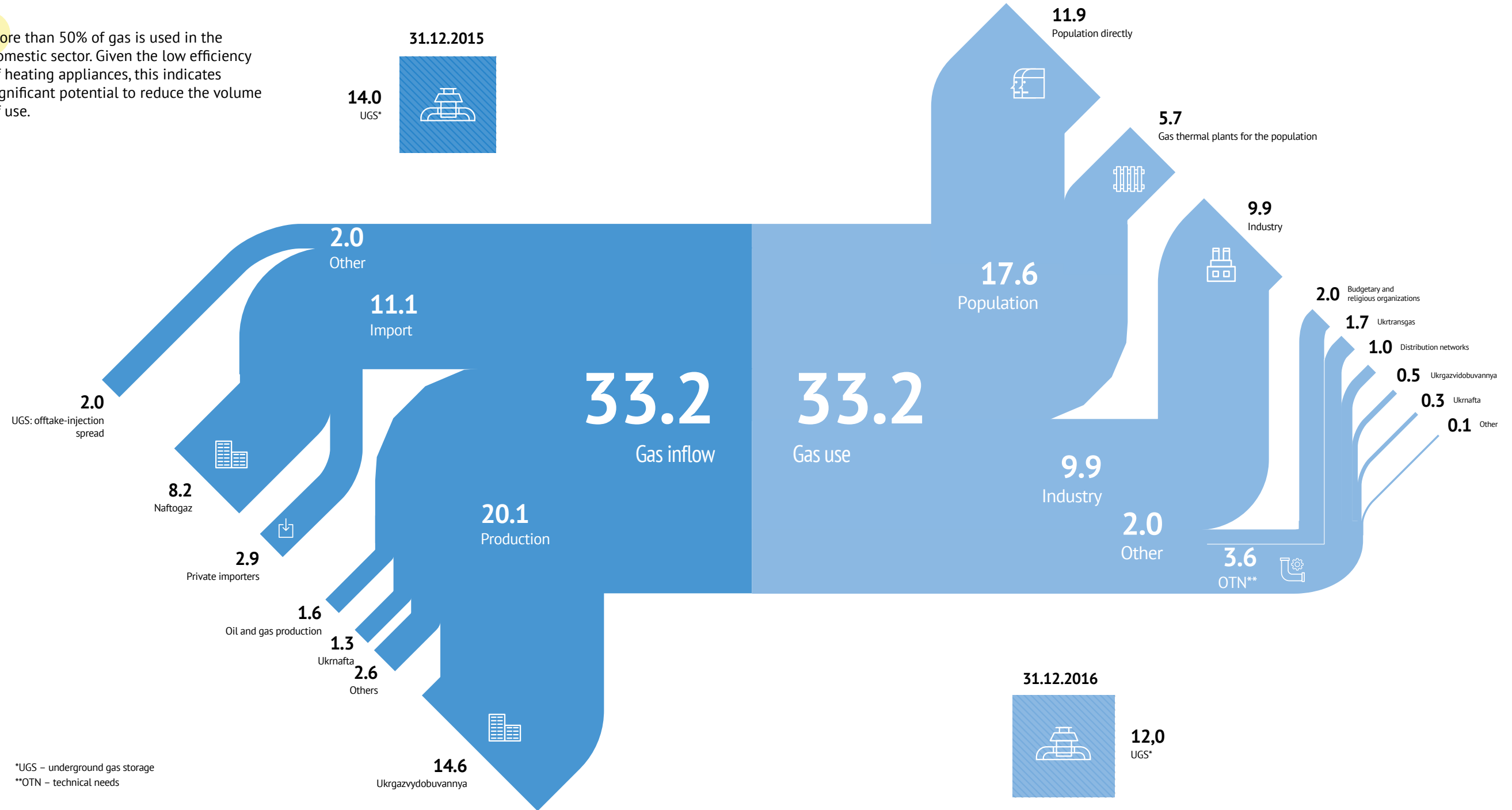
● **NATURAL GAS**

● **OIL**

GAS BALANCE

2016, bln m³

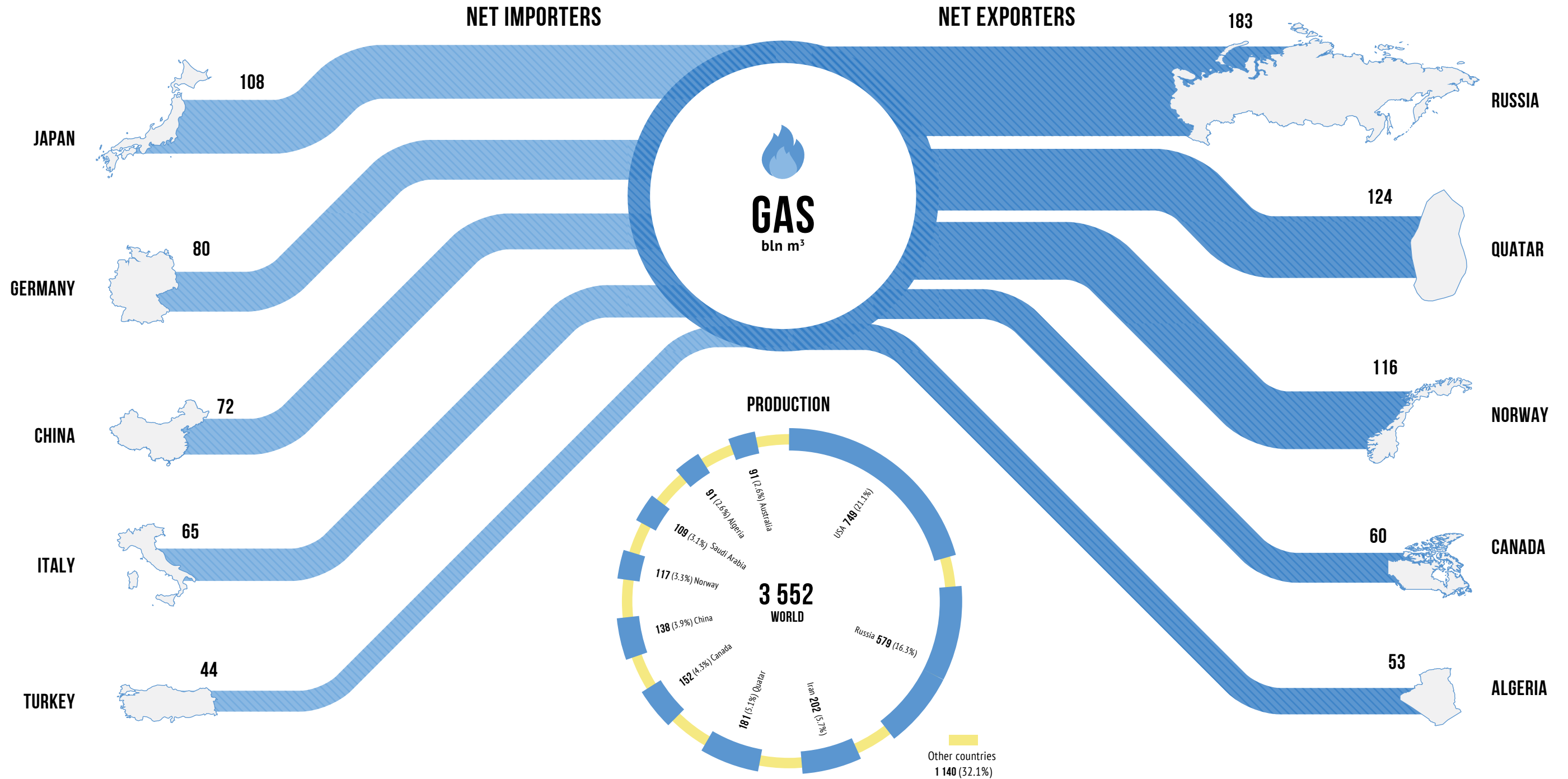
More than 50% of gas is used in the domestic sector. Given the low efficiency of heating appliances, this indicates significant potential to reduce the volume of use.



*UGS – underground gas storage
 **OTN – technical needs

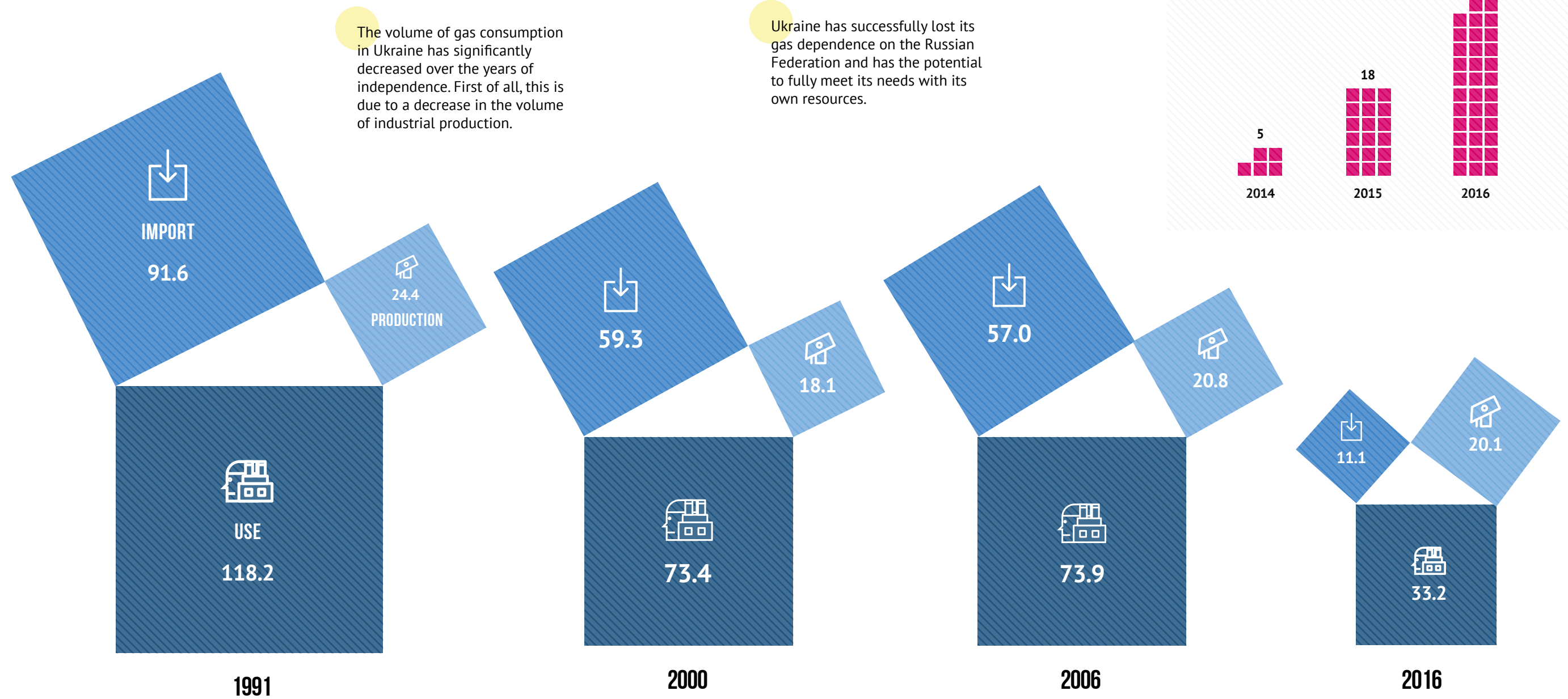
WORLD NATURAL GAS MARKET

Leading countries in the natural gas market



UKRAINE REDUCES GAS IMPORT AND INCREASES PRODUCTION

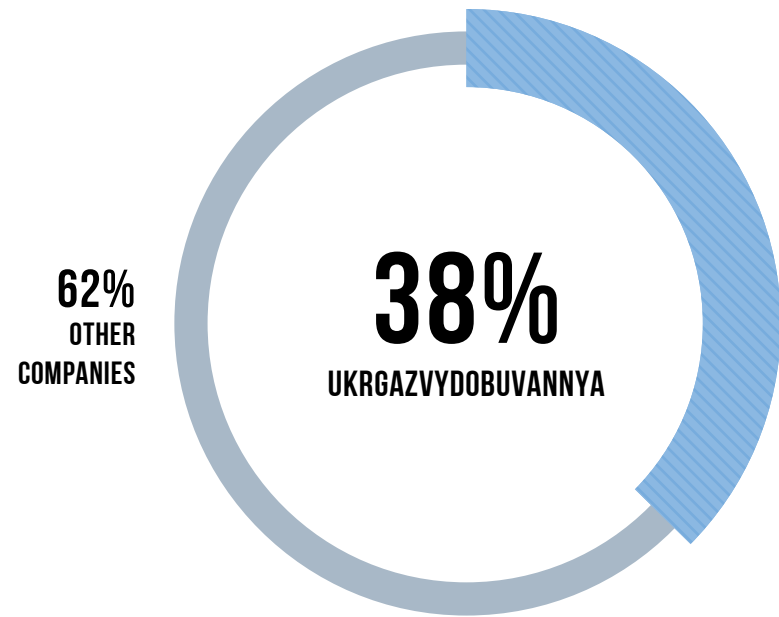
Production, import and use of natural gas, bln m³



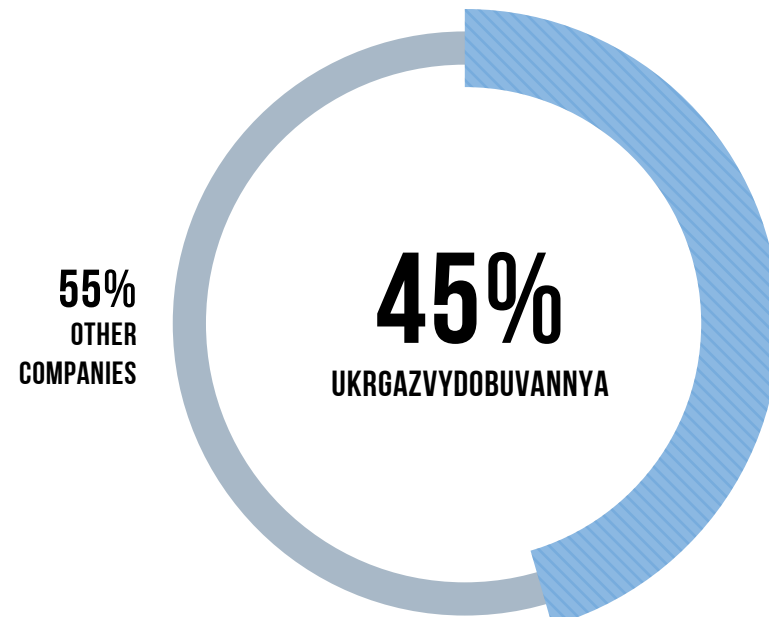
UKRAINE PLANS TO END IMPORTS OF GAS AFTER 2020

Production of natural gas in Ukraine

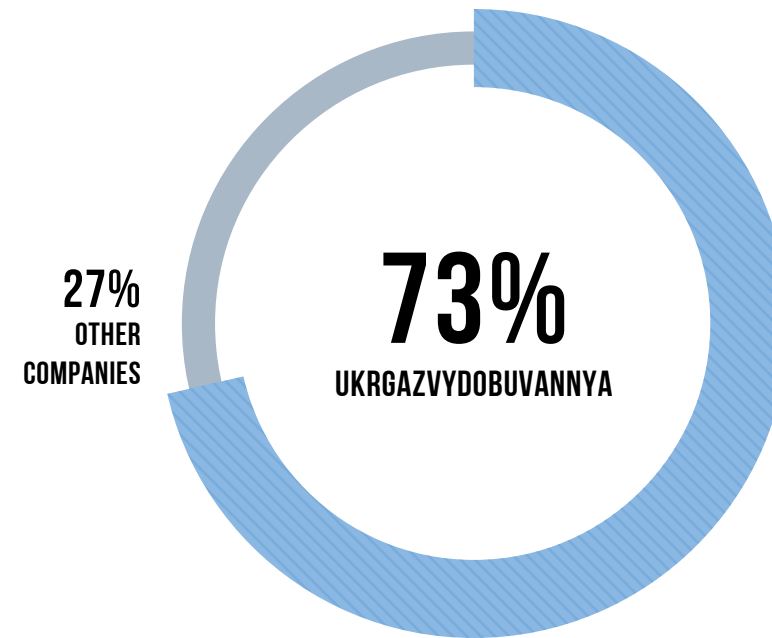
STRUCTURE OF SPECIAL PERMITS ISSUED



STRUCTURE OF CONFIRMED NATURAL GAS RESERVES



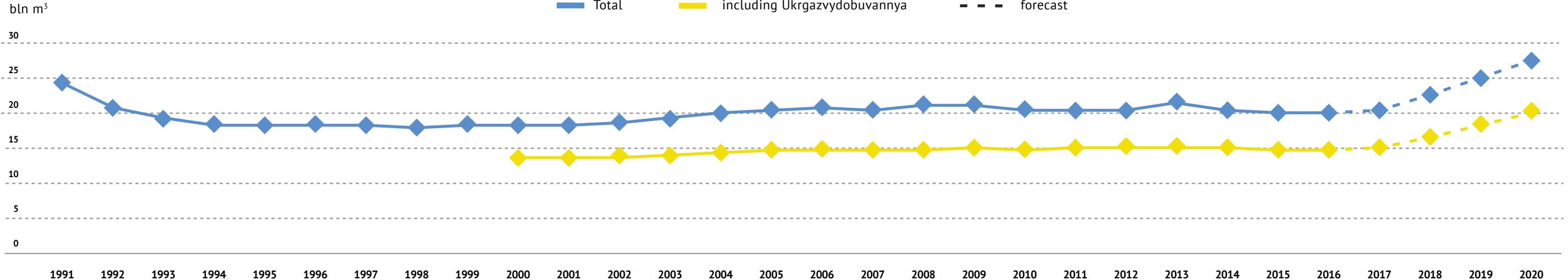
STRUCTURE OF NATURAL GAS PRODUCTION



Ukrgezvydobuvannya provides 73% of gas production in Ukraine, although it holds only 45% of all licenses for gas extraction.

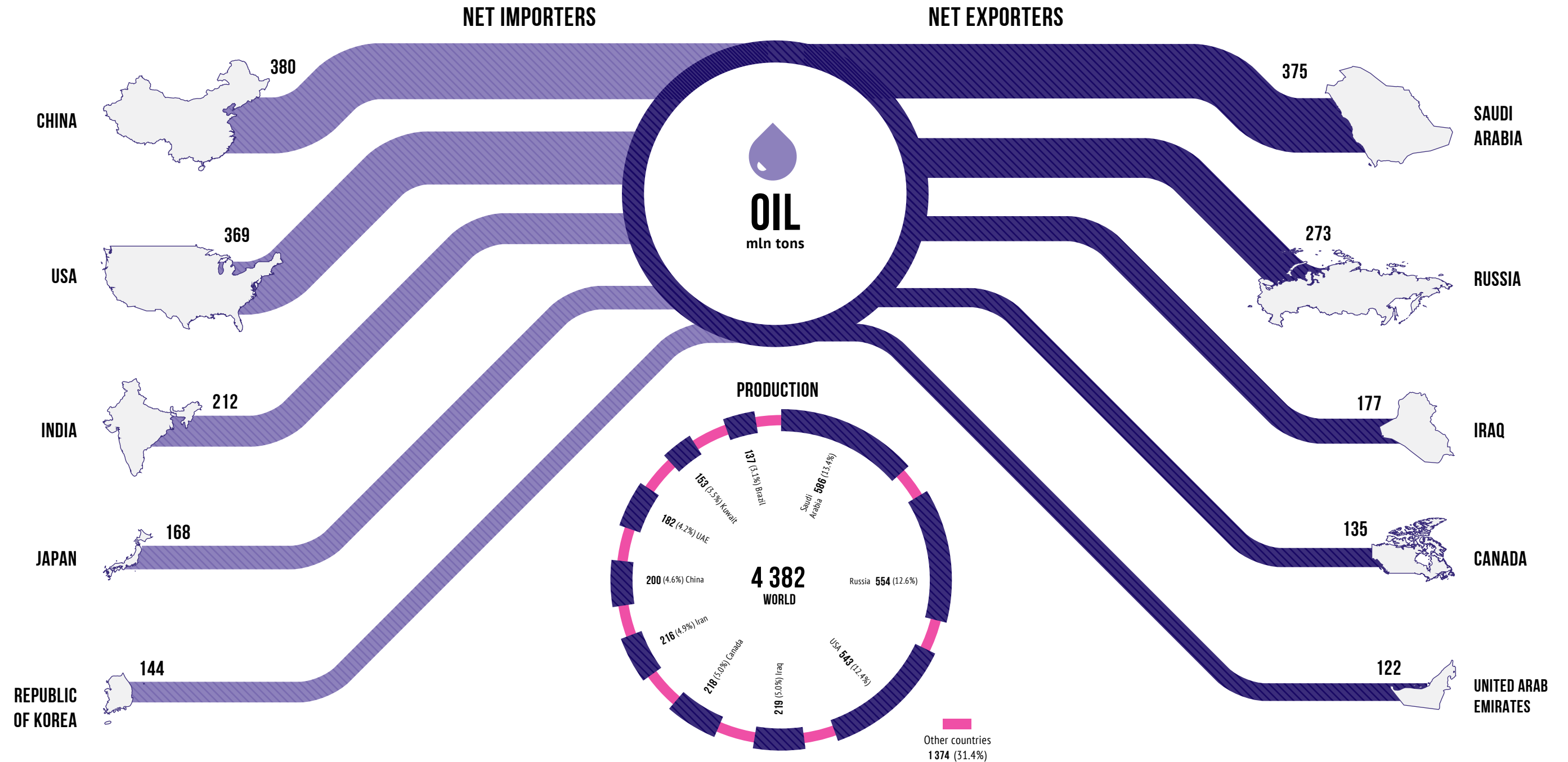
In order for Ukraine to meet its natural gas needs via domestic gas production, the extraction sector needs further liberalization and additional investment.

EXTRACTION OF NATURAL GAS



WORLD OIL MARKET

Key countries of the global oil market

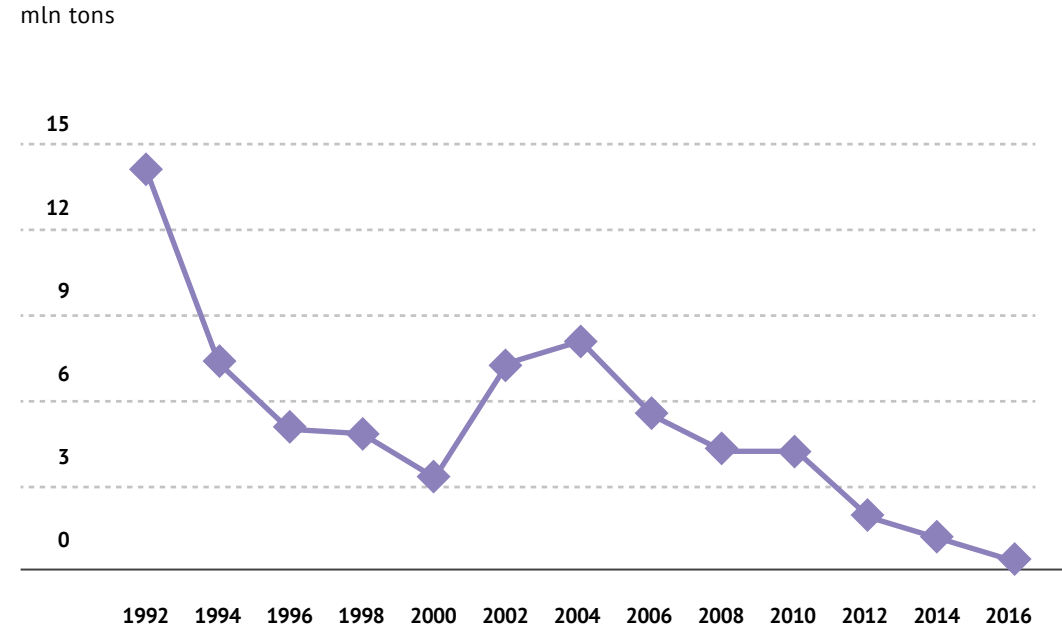


Source: British Petroleum

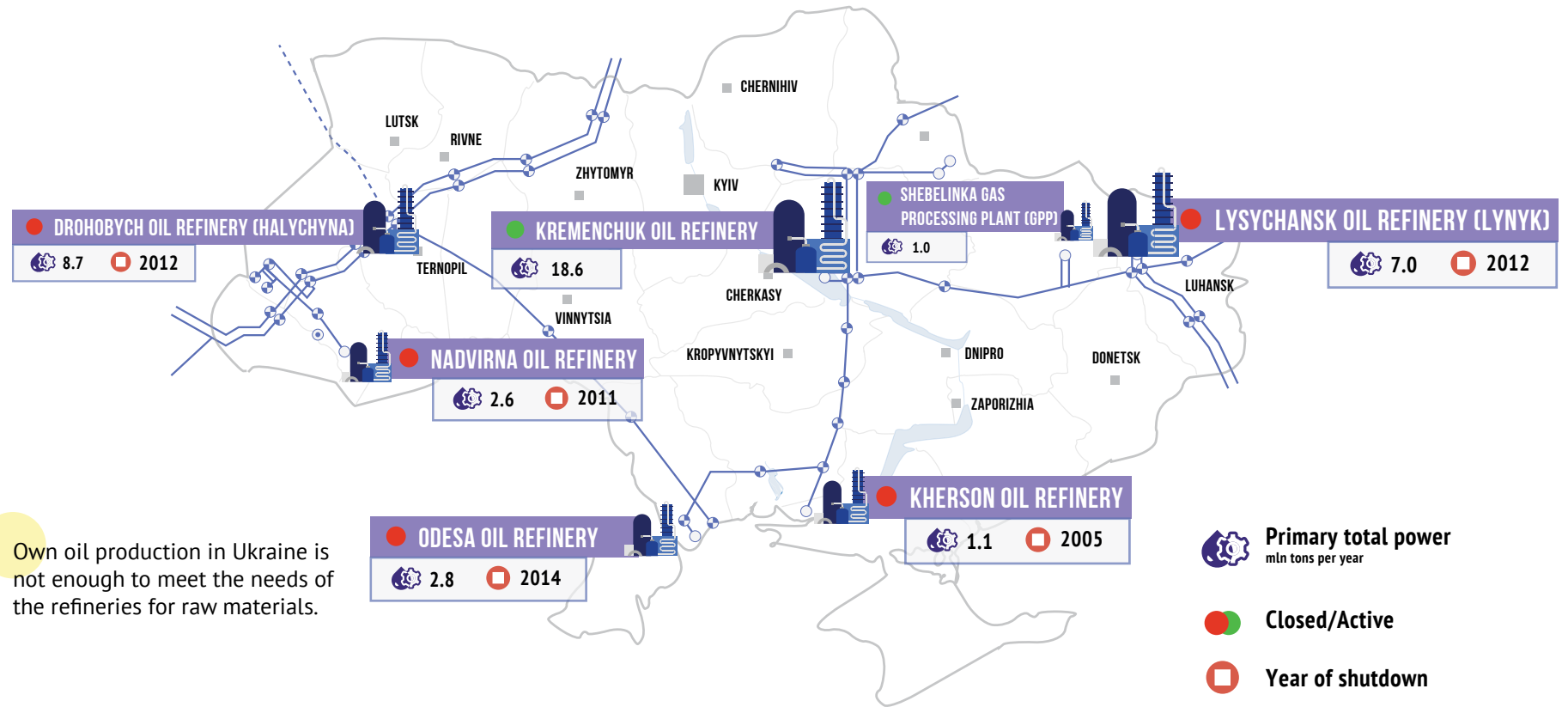
VOLUME OF OIL EXTRACTION AND PROCESSING REACHED HISTORICAL MINIMUM

Oil industry of Ukraine

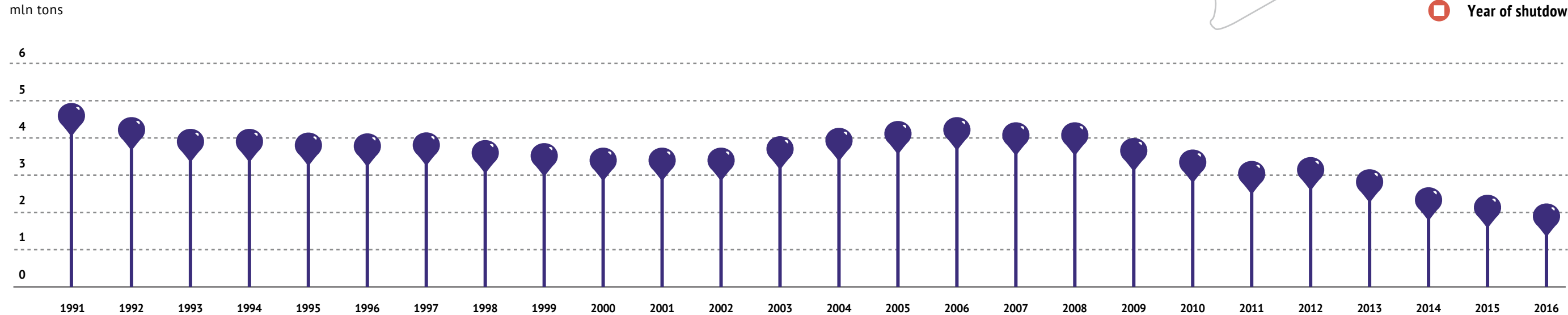
OIL REFINING BY UKRAINIAN REFINERIES



OIL REFINERIES OF UKRAINE

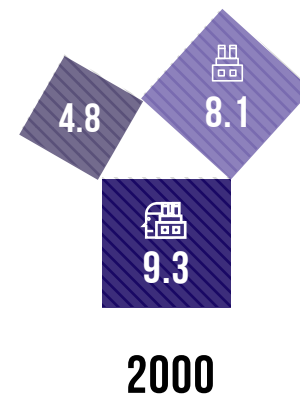
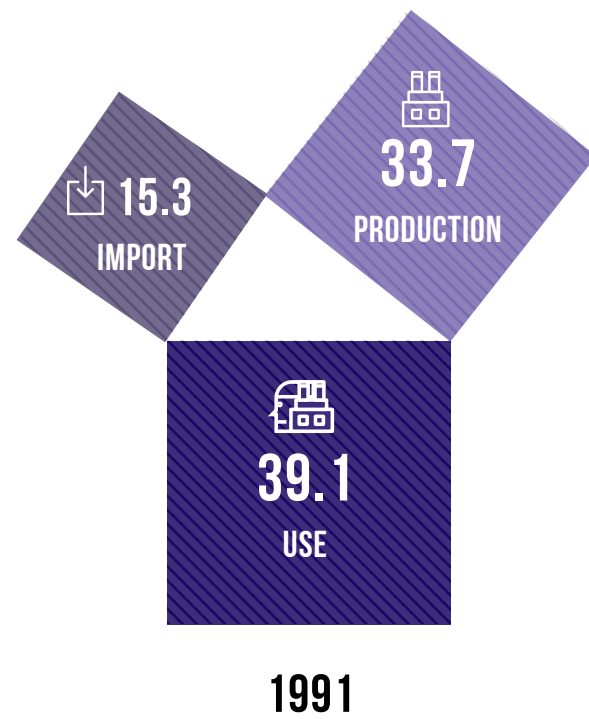


EXTRACTION OF CRUDE OIL AND GAS CONDENSATE

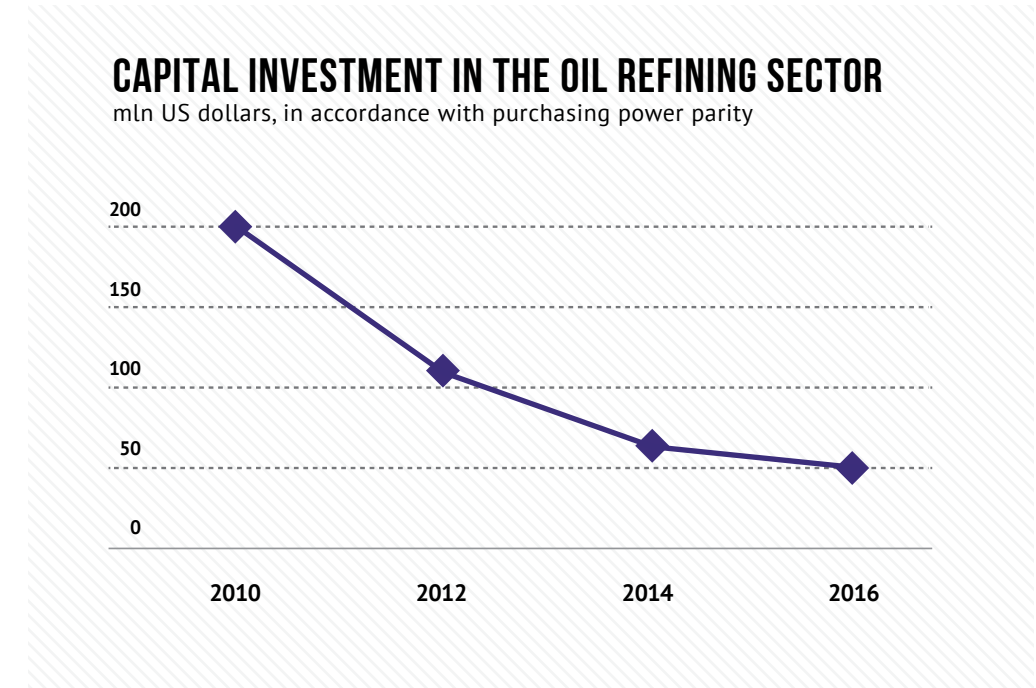


THE PRODUCTION OF OIL PRODUCTS OVER 25 YEARS HAS DECREASED BY A FACTOR OF 12

Production, import and consumption of oil products, mln tons



This investment dynamic excludes the possibility of an increase in the volume of oil refining in Ukraine.



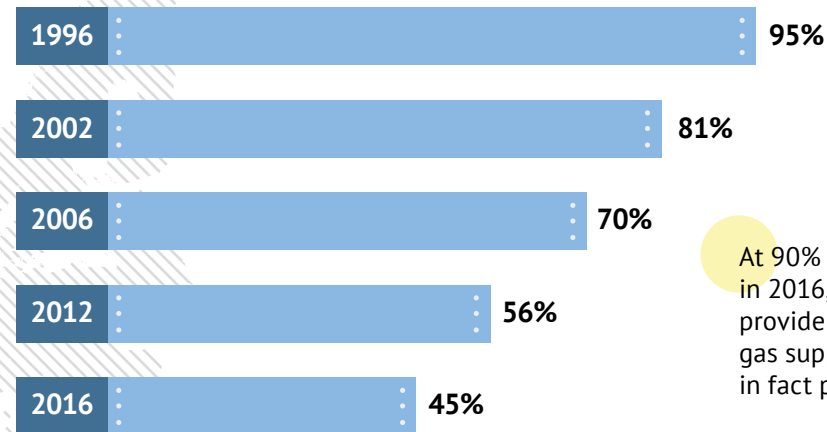
In 2001-2006, Ukraine was a net exporter of fuel.

Ukraine produces only 25% of its demand for oil products.

UKRAINIAN GTS IS THE MAIN TRANSIT ROUTE FOR THE RUSSIAN FEDERATION TO EUROPE

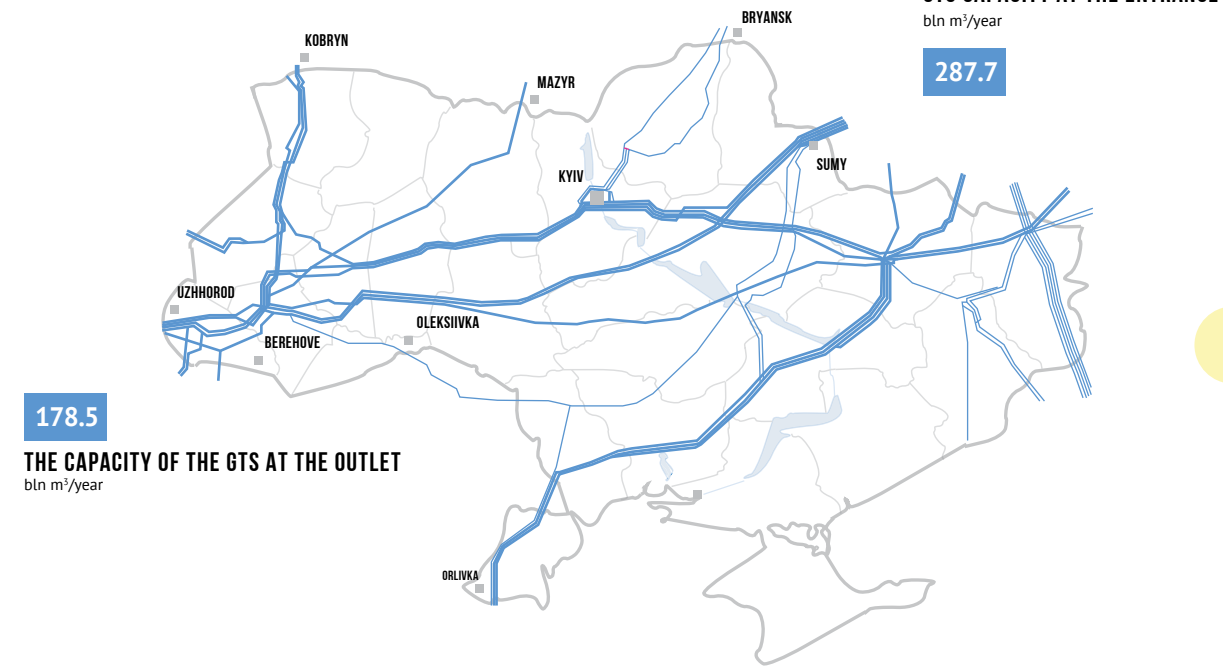
Transportation of oil and natural gas through the territory of Ukraine

SHARE OF UKRAINIAN GTS IN THE TRANSPORTATION OF RUSSIAN GAS TO EUROPE



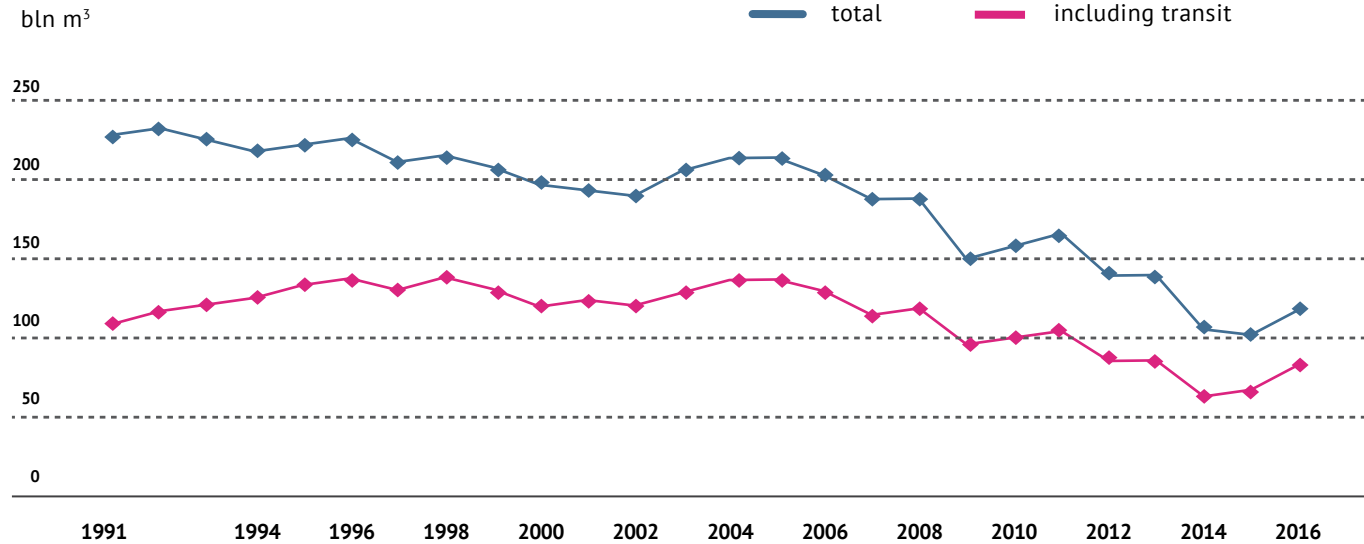
At 90% of transit capacity in 2016, Ukraine could provide 72% of Russian gas supplies to Europe, but in fact provided only 45%.

UKRAINIAN GTS

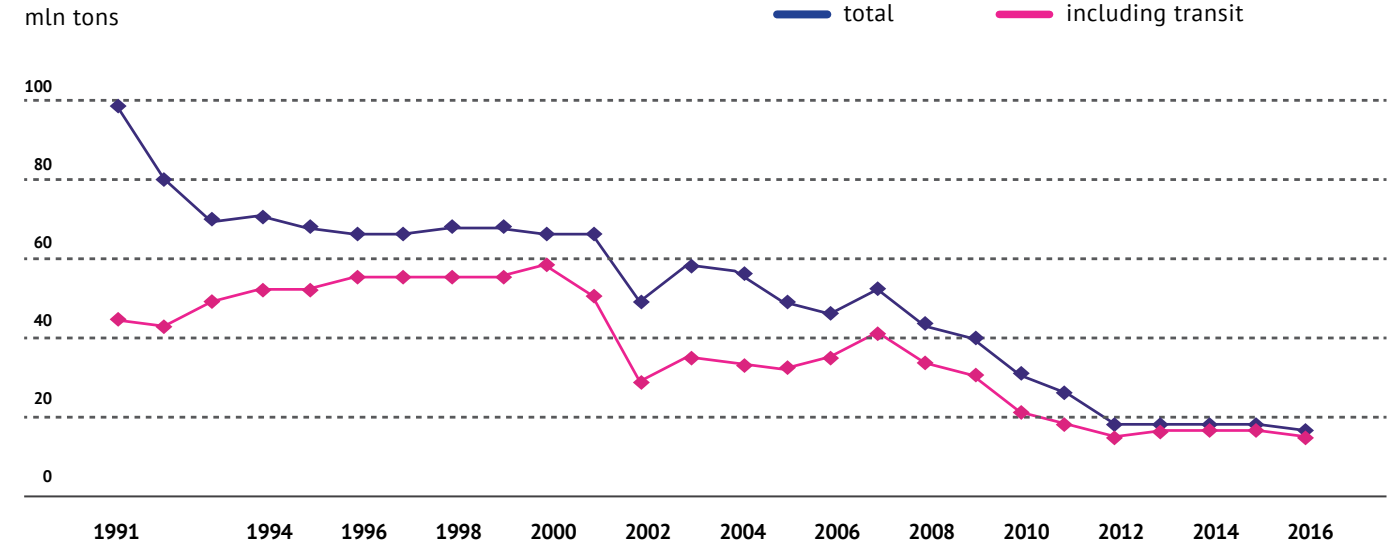


The planned construction of surplus transit capacities by the Russian Federation will completely exclude the Ukrainian gas transportation system from the transit of Russian gas.

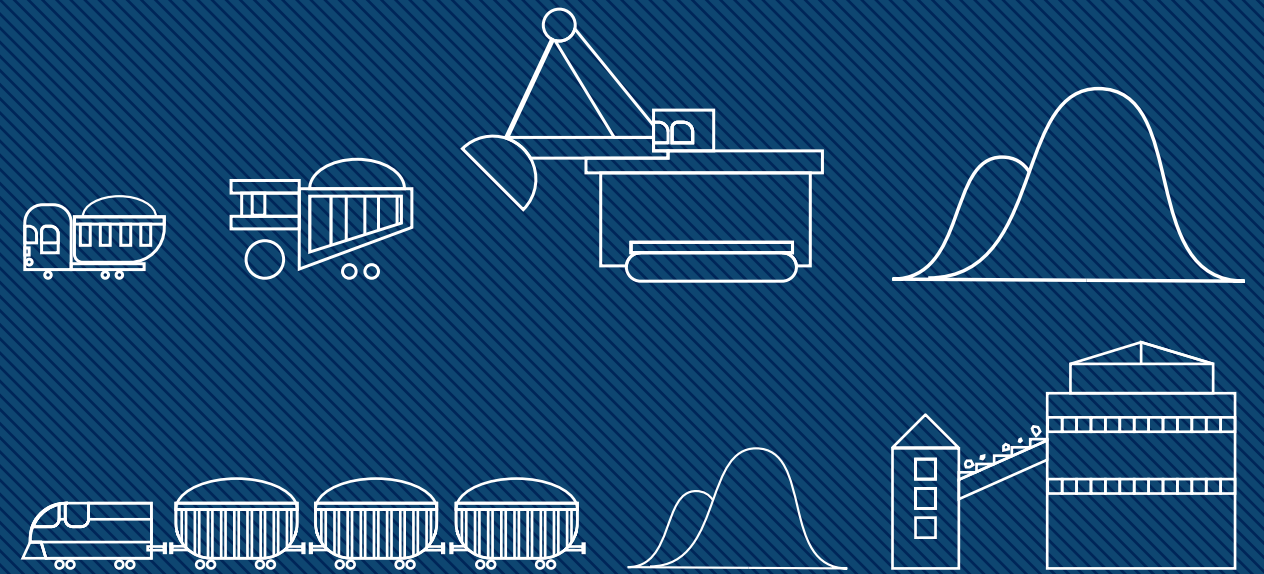
TRANSPORTATION OF NATURAL GAS

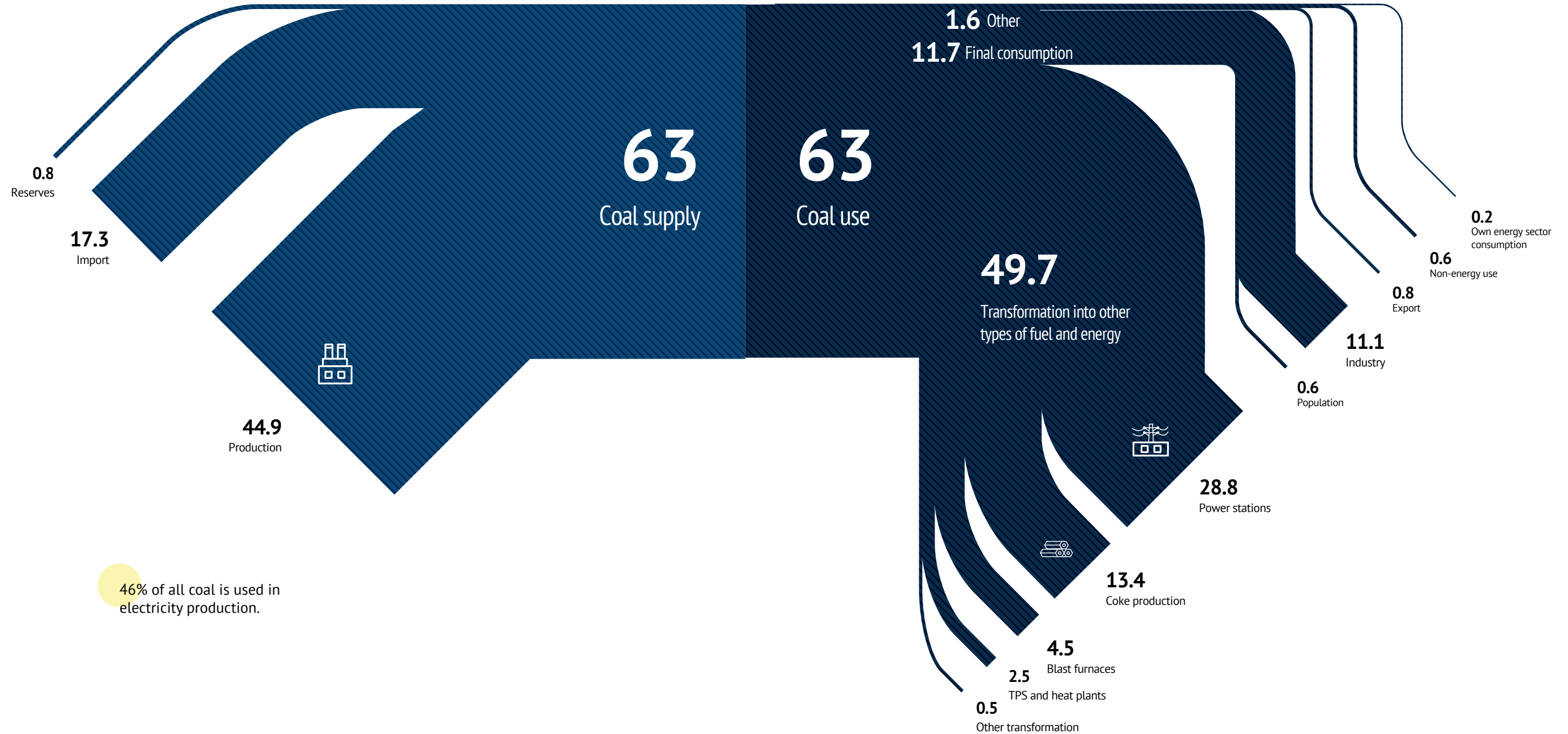


TRANSPORTATION OF OIL



- **COAL
INDUSTRY**

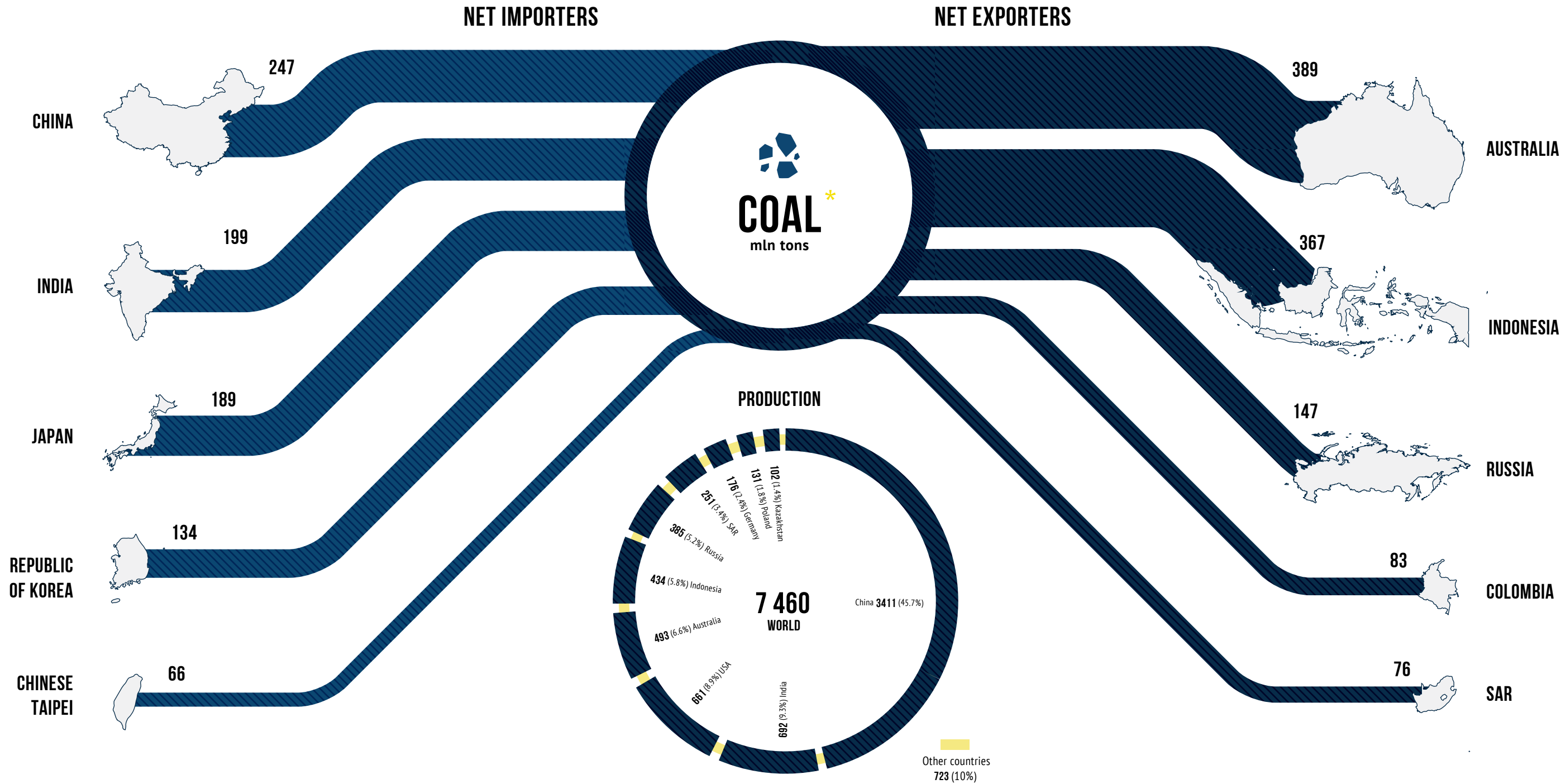




46% of all coal is used in electricity production.

WORLD COAL MARKET

Key countries of the global coal market

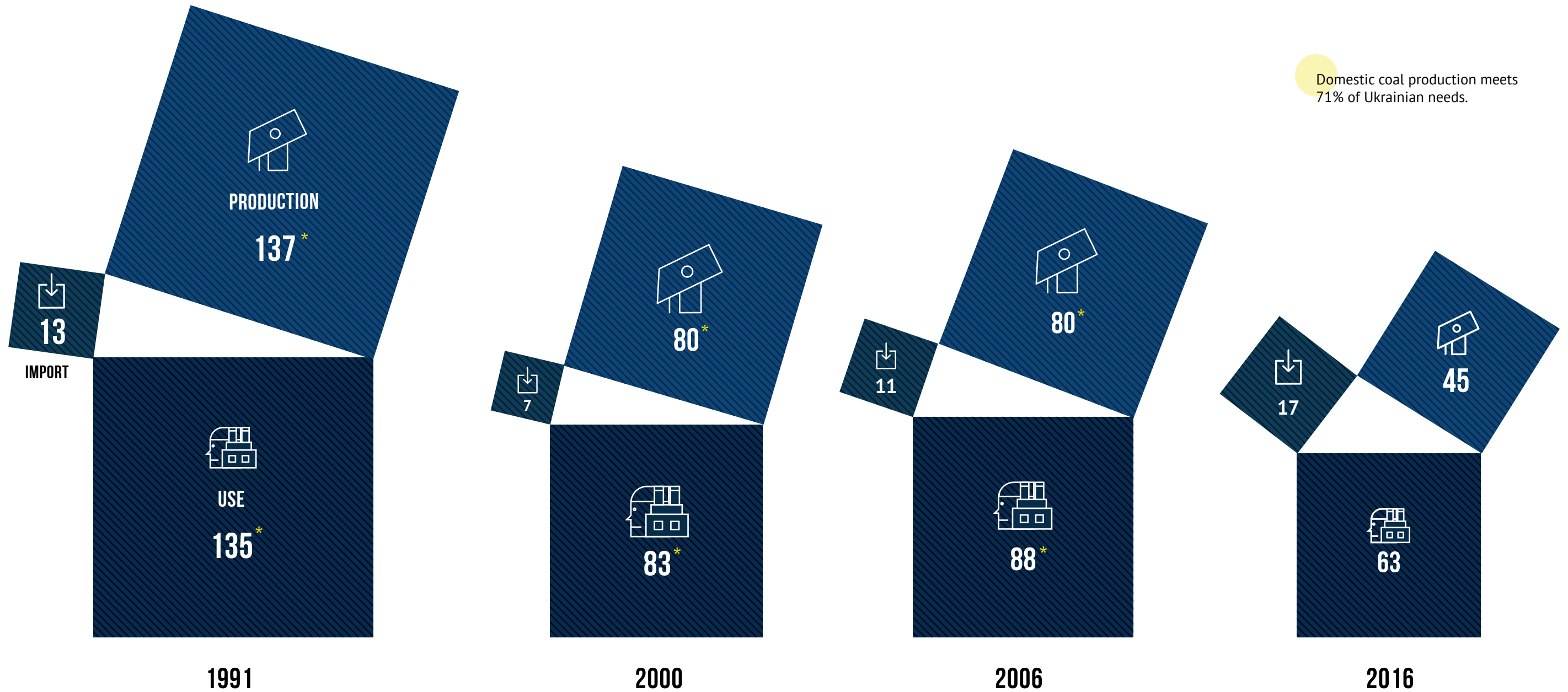


Source: International Energy Agency, British Petroleum

* preliminary data

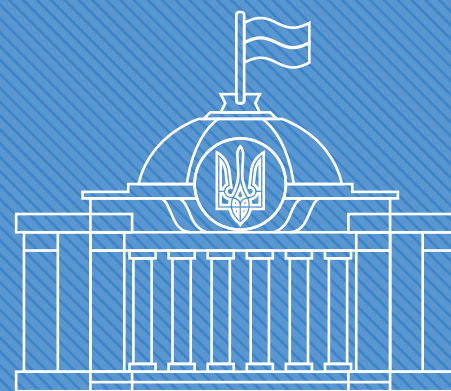
UKRAINE DOES NOT FULLY MEET ITS NEEDS WITH ITS OWN COAL

Production, import and use of coal, mln tons



Domestic coal production meets 71% of Ukrainian needs.

- **REFORMS AND PERSPECTIVES**

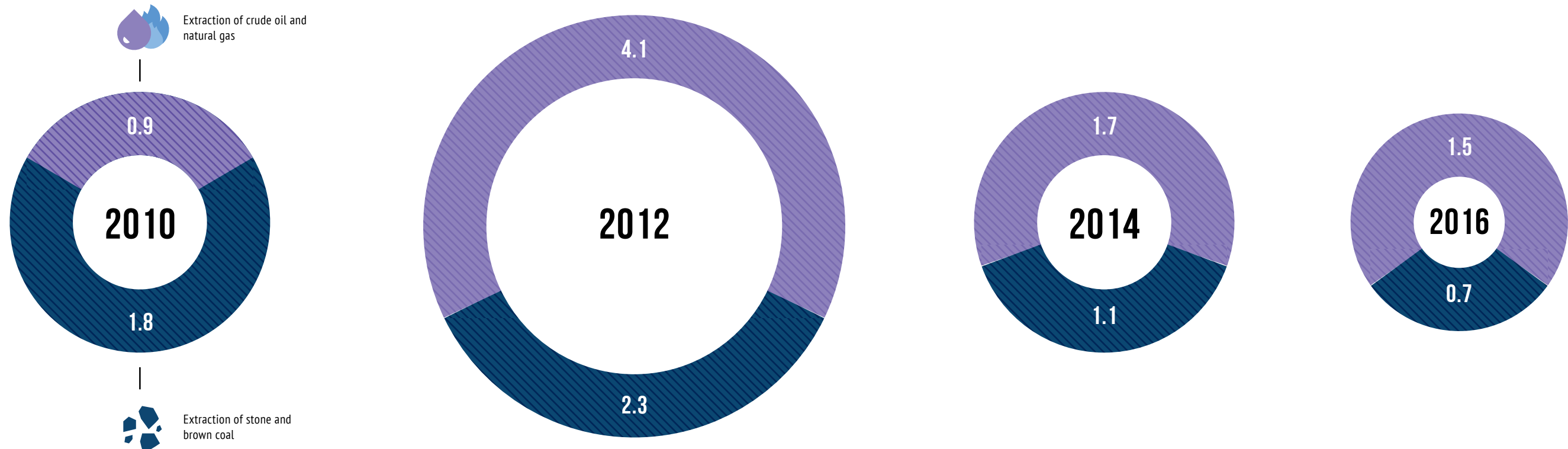


INVESTMENTS IN THE ENERGY SECTOR

Dynamics in Ukraine and the situation in the world

CAPITAL INVESTMENT IN THE SECTOR OF THE EXTRACTION OF FUEL AND ENERGY MINERALS

bln US dollars in accordance with purchasing power parity

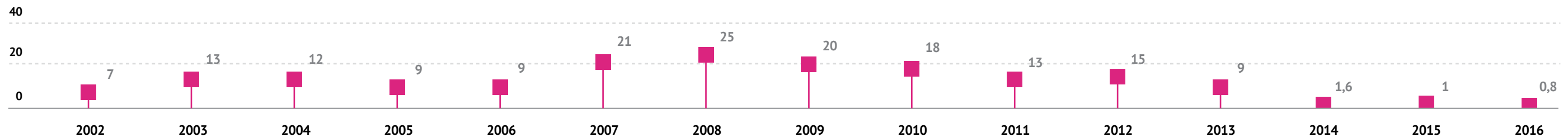


In 2015, the world invested 45% of total energy investment in the oil and gas sector and only 4% in coal.

In 2015, every eighth dollar of global energy investment was aimed at improving energy efficiency.

EXPENDITURES FROM THE CONSOLIDATED BUDGET OF UKRAINE ON RESEARCH AND DEVELOPMENT IN THE FUEL AND ENERGY SECTOR

bln US dollars in accordance with purchasing power parity



Ukraine Energy Strategy 2035:
 “Safety, Energy Efficiency, Competitiveness”

Approved by the Government of Ukraine
 on **18 August, 2017.**

STRATEGIC GOALS



Solving energy security issues

import
<33%



Reducing energy intensity of GDP

<0.13
 tons of o. e./thsd US dollars



Increasing share of RES

>25%
 in generation

STAGES OF IMPLEMENTATION



2017-2020
MARKET REFORMS

- Market reforms and stimulation of competitive relations.
- Creation of attractive investment environment.
- Implementation of the third energy package.
- Implementation of the system of stimulating tariff formation.
- Reconstruction of nuclear and thermal power units.
- Gas self-sufficiency.



2021-2025
OPTIMIZATION AND INNOVATIONS

- Synchronization with ENTSO-E.
- Implementation of the National Plan for Reducing Emissions from Large Combustion Plants.
- Creation of mechanisms to attract investment for new construction projects.
- Movement towards EU ecological standards.
- Efficient heat supply.

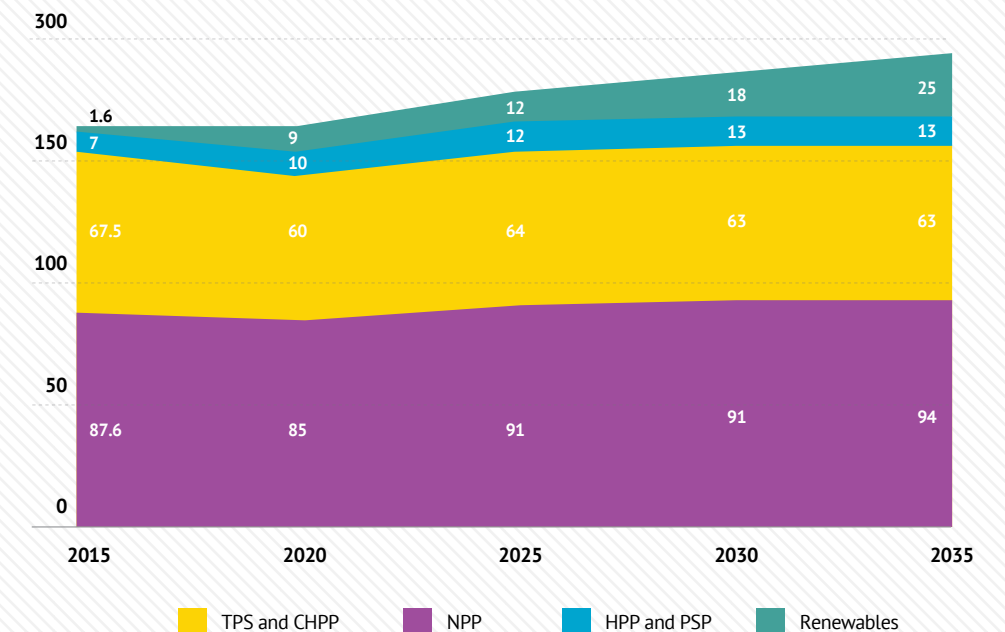


2026-2035
SUSTAINABILITY

- Creation of new generating capacities.
- Achievement of the planned levels of SO₂, NO_x and dust emissions.
- Achievement of 25% of RES in the energy mix.
- Development of the intellectual network.

FORECAST OF ELECTRICITY GENERATION

up to 2035, bln kWh



Being the Contracting Party to the Energy Community Treaty, Ukraine undertook to implement EU energy legislation

OBLIGATIONS CONCERNING GAS MARKET ARE PRESCRIBED BY:



DIRECTIVE 2009/73/EC concerning common rules for the internal market of natural gas and repealing Directive 2003/55/EC

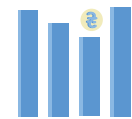
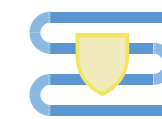
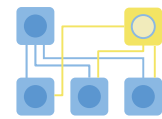


REGULATION (EC) No 715/2009 on conditions for access to the natural gas transmission networks and repealing Regulation (EC) No 1775/2005



Directive 2004/67/EC concerning measures to safeguard security of natural gas supply

THIRD ENERGY PACKAGE



Unbundling

Obligation to create an independent regulator

Third-party access

Implementation of a new model of tariff formation

Obligation to introduce new balancing regime

Security of supplies

Customer Protection and Protection of Vulnerable Customers

Obligation to ensure the natural gas market opening and market pricing

GENERAL PROVISIONS OF THE INDICATED OBLIGATIONS IMPLEMENTED BY THE LAW OF UKRAINE "ON THE NATURAL GAS MARKET"

CMU Resolution No. 496 of July 1, 2016 "On Unbundling of Gas Transmission and Storage (Injection, Withdrawal)"
CMU Resolution No. 801 of November 9, 2016 "On the Establishment of Public Joint-Stock Company "Main Gas Pipelines of Ukraine" etc.

Law of Ukraine No. 1540-VIII of September 22, 2016 "On the National Commission for State Regulation of Energy and Utilities"



NCSREU Resolution No. 2493 of September 30, 2015 "On the Approval of the Gas Transmission System Code"
NCSREU Resolution No. 2494 of September 30, 2015 "On the Approval of the Gas Distribution System Code"
NCSREU Resolution No. 2495 of September 30, 2015 "On the Approval of the Code of Gas Storages and criteria according to which a contractual access regime or a regulated access regime applies to a certain gas storage"

NCSREU Resolution No. 2517 of September 30, 2015 "On the approval of the Methodology for determination and calculation of tariffs for the service of natural gas transmission for entry and exit points based on long-term incentive-based regulation"
NCSREU Resolution No. 3158 of December 29, 2015 and NCSREU Resolution No. 348 of March 28, 2017 on setting tariffs for the service of natural gas transmission for entry and exit points (by cross-border pipelines and for consumers in Ukraine)

NCSREU Resolution No. 2493 of September 30, 2015 "On the Approval of the Gas Transmission System Code"

Ministry of Energy and Coal Industry of Ukraine Order No. 686 of November 2, 2015 "On the Approval of the Rules for Safe Natural Gas Supply"

CMU Resolution No. 187 of March 22, 2017 "On the Approval of the Regulation on special functions of subjects of natural gas market to safeguard public interests in the operation of the natural gas market"
Benefit and subsidy schemes






 Pending implementation
 Implemented

KEY CHANGES IN THE UKRAINIAN ENERGY MARKET



ELECTRICITY






Plans are in place to create a new model for the electricity market by the end of 2019, involving in particular:

-  segmentation of the electricity market into 6 markets:
 - balancing market;
 - day ahead market;
 - bilateral contract market;
 - intra-day market;
 - market of auxiliary services;
 - retail market.
-  unbundling of electricity distribution and transmission activities from other types of activity;
-  new parties entering the electricity market - traders (business entities that purchase electric energy solely for the purpose of its resale, except for sales under contracts for the supply of electric energy to consumers);
-  implementation of system of special functions to safeguard public interests in the operation of the electricity market;
-  consumer's free choice of electricity supplier.



NATURAL GAS





Creation of a new model for the natural gas market, in particular:

-  unbundling of transmission of natural gas from production, distribution, supply of natural gas, activities of wholesalers;
-  implementation of a new model of tariff setting (setting tariffs for the service of natural gas transmission for entry and exit points);
-  introduction of a new system of third-party access to the natural gas market, in particular, introduction of capacity allocation system;
-  introduction of new balancing rules;
-  transition to market pricing model.





REGULATOR


Legislative framework for measures to ensure the Regulator's independence:

-  appointment of the Regulator's members following an open competitive selection process;
-  financing of the Regulator by means of regulatory fees payable to a special fund of the State Budget of Ukraine by entities operating in the energy sector and public utilities;
-  no requirement for the Regulator's decisions to be approved by bodies other than the Antimonopoly Committee of Ukraine that is in charge of competitive business environment;
-  increased salaries for the Regulator's members and Chairman.

BASIC REGULATIONS AND DOCUMENTS

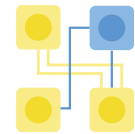
 Law of Ukraine No. 2019-VIII of April 13, 2017 "On the Electricity Market"

 Law of Ukraine No. 329-VIII of April 9, 2015 "On the Natural Gas Market"

 Law of Ukraine No. 1540-VIII of September 22, 2016 "On the National Commission for State Regulation of Energy and Utilities"

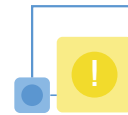
- The Law of Ukraine "On the Electricity Market" of April 13, 2017 No 2019-VIII.
- Signed by the President of Ukraine on June 8, 2017.
- The new market model is set for introduction from July 1, 2019.

THE ESSENCE OF REFORM



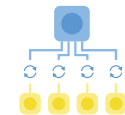
UNBUNDLING

Separation of oblenegos into supplier company and distribution network operator

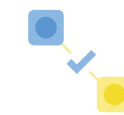


DEREGULATION

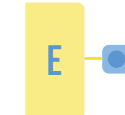
Consumer is in the middle, not the regulator



Changing the structure of the wholesale market

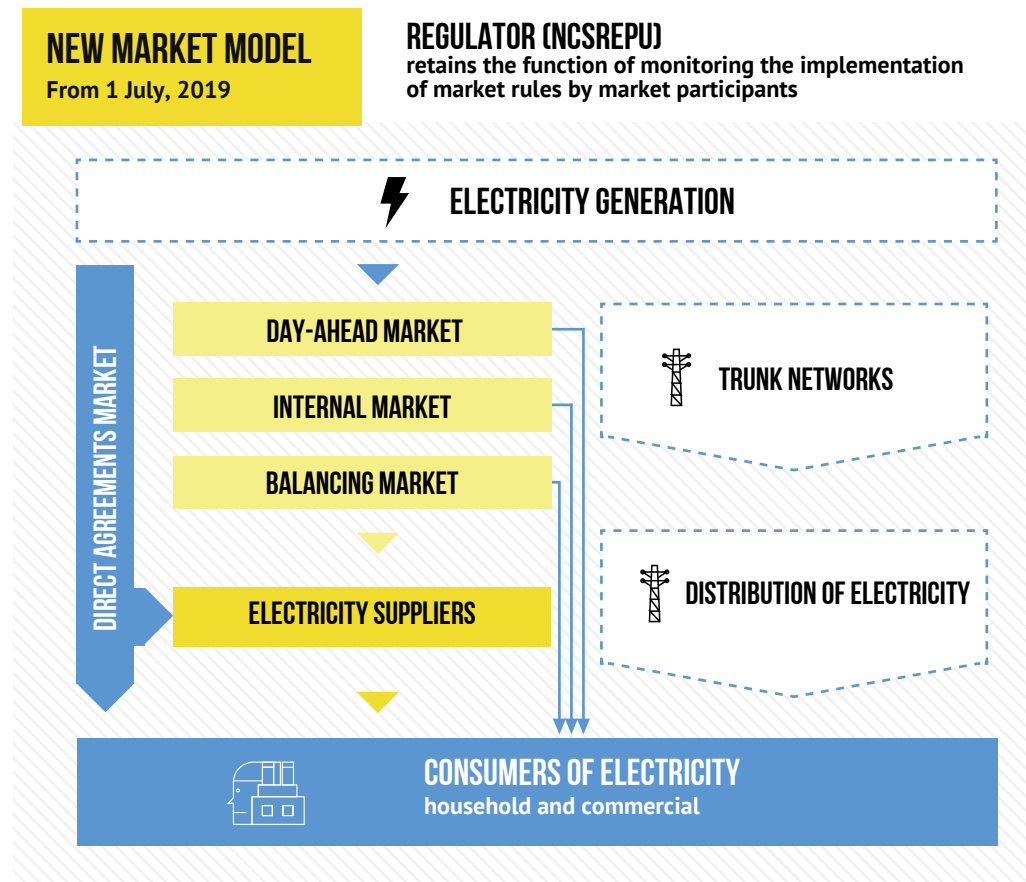
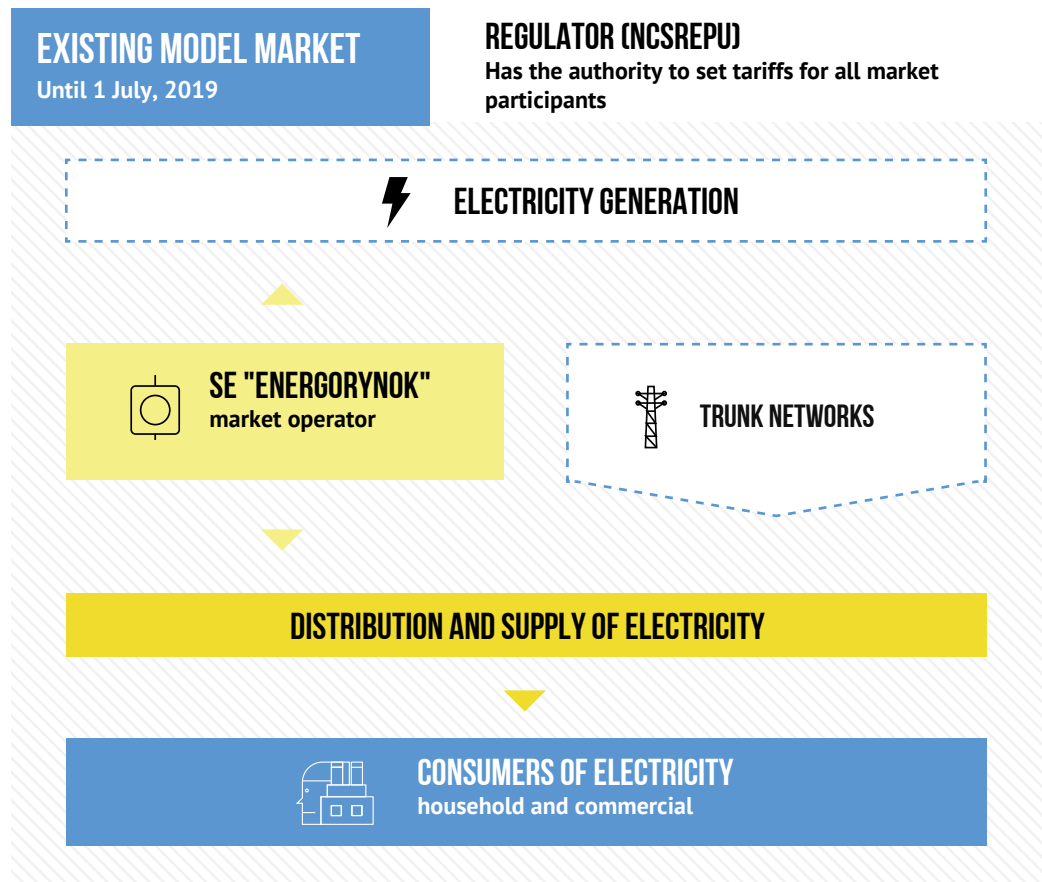


Creation of the retail market



Integration with ENTSO-E

WHOLESALE MARKET FUNCTIONING SCHEME



MAIN STAGES OF REFORM

HARMONIZATION OF SECONDARY LEGISLATION

- Rules of the market
- Rules of the day-ahead market
- Rules of restrictions management
- The procedure for access to interstate crossings
- Code of commercial accounting
- Code of transmission system
- Code of distribution systems
- The procedure for payment of the fee to join
- Rules of the retail market
- The procedure for the purchase and sale by guaranteed buyer

FROM JUNE 2018

- Testing operations
- Provider of universal services
- Supplier of last resort
- UNBUNDLING

FROM 1 JULY 2019

- Implementation of the new market
- Transition period – NPPs and HPPs are financing high tariffs for RES

FREE MARKET



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