

The European Union – Turkmenistan Sustainable Energy Days

International Conference

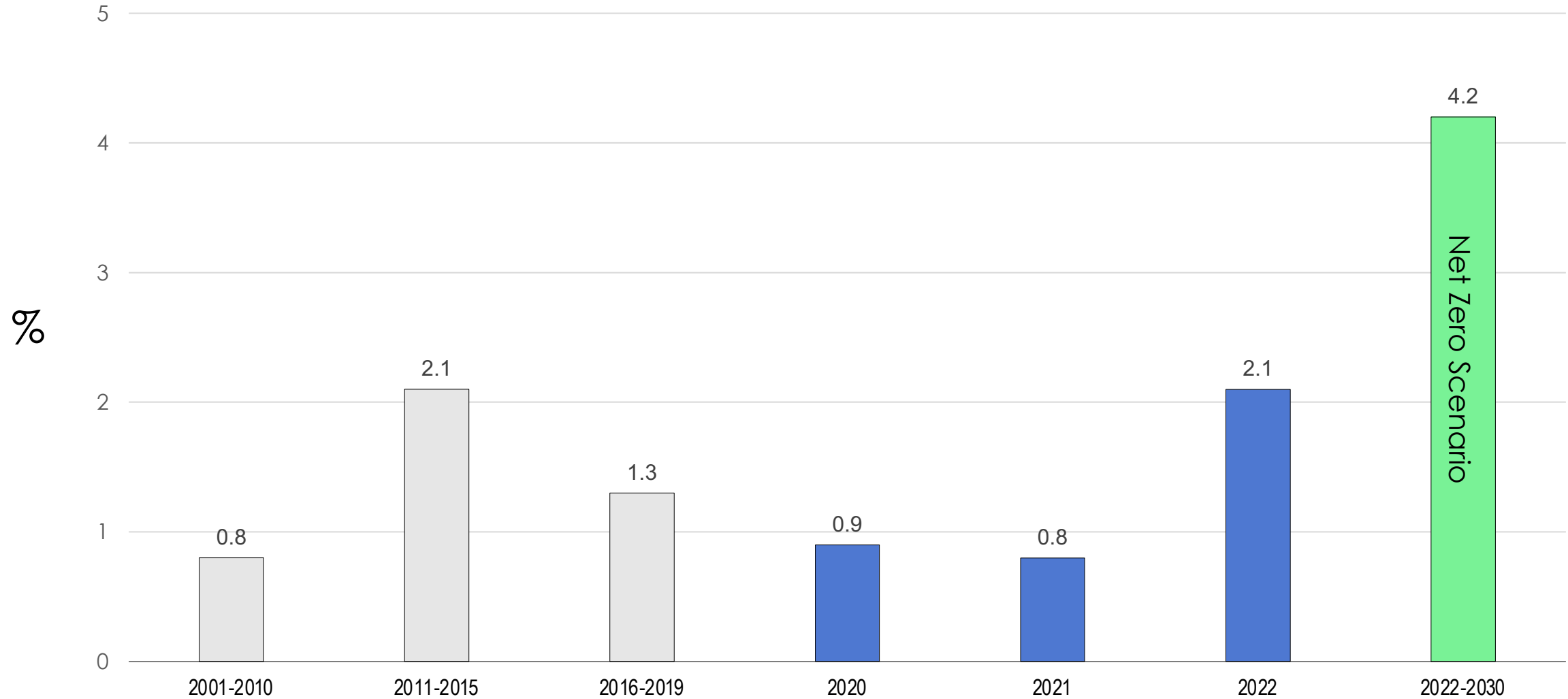
Sustainable Energy in Turkmenistan: prospects and challenges

State Energy Institute of Turkmenistan, Mary, 14 December 2023

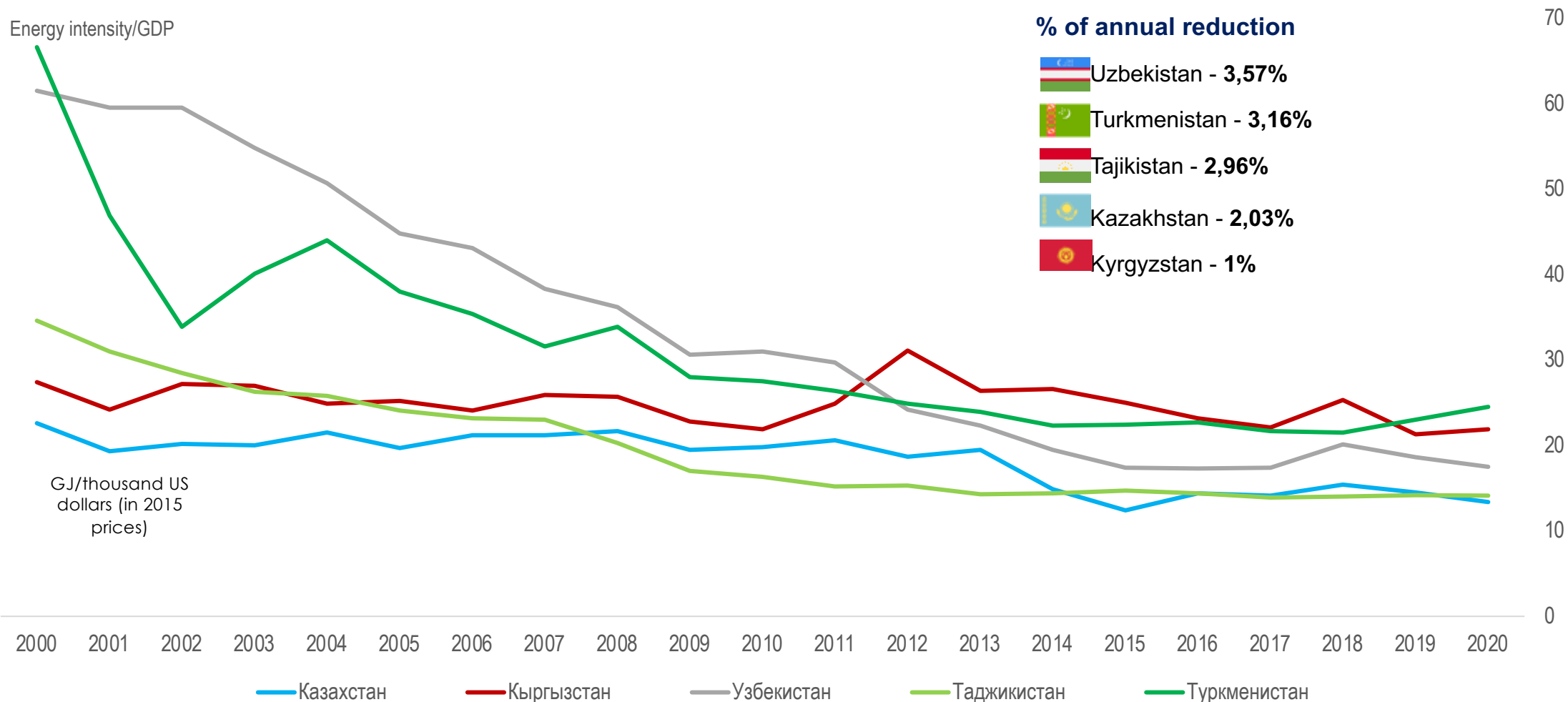
Promotion of EE in Kazakhstan – evolution and lessons learned

Zhaksylyk Tokaev
Energy expert, SECCA

Global increase in the energy intensity level of primary energy, annual change in carbon neutrality scenario, 2000-2030



ENERGY INTENSITY OF GDP IN CENTRAL ASIA COUNTRIES



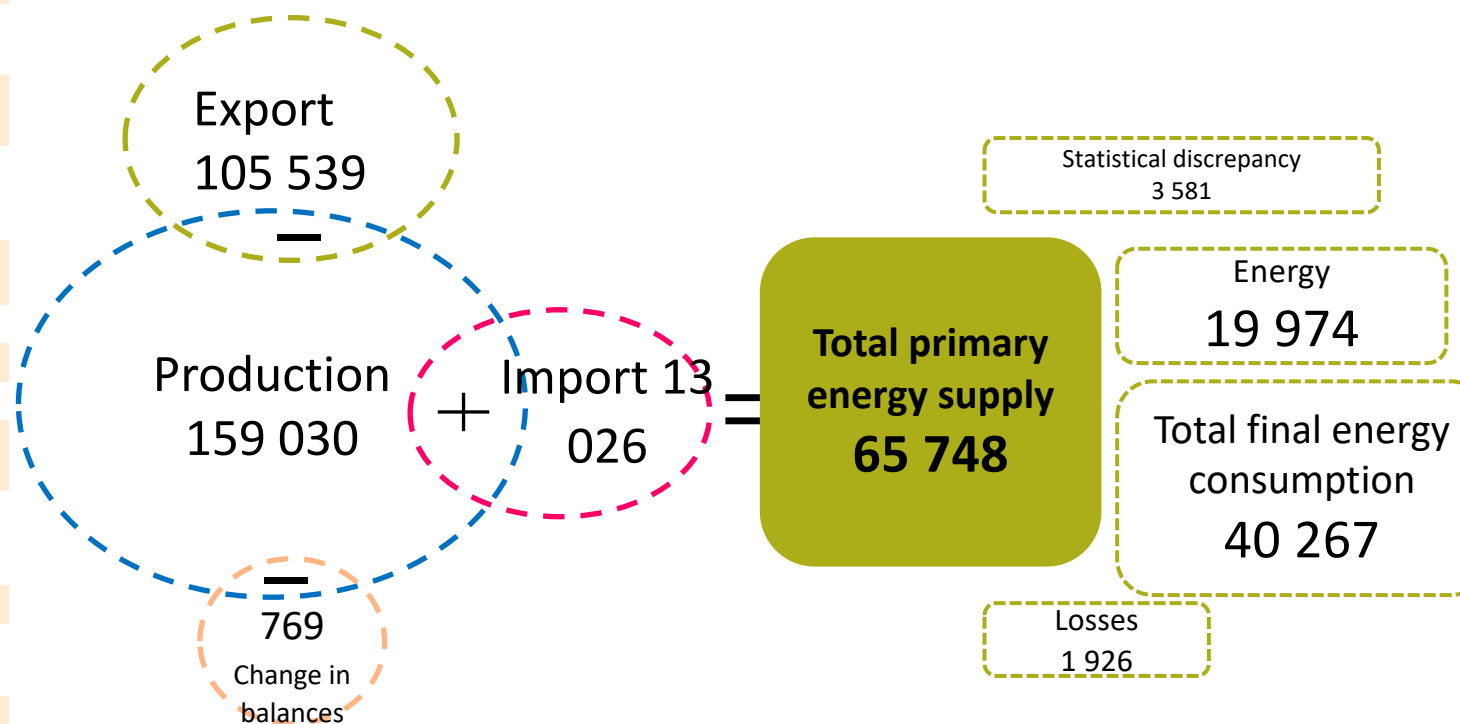
ENERGY SAVING POLICY



OVERVIEW OF THE FUEL AND ENERGY BALANCE IN KAZAKHSTAN

	2014	2020	Percentage change
Production	161 268	159 030	-1%
Import	7 472	13 026	74%
Export	-102 989	-105 539	2%
Changes in balances, international bunkers	-605	-769	
Total primary energy supply	65 146	65 748	1%
Total primary energy supply	65 146	65 748	1%
Statistical discrepancy	1 525	3 581	135%
Transmission	0	0	
Energy sectors	20786	19974	-4%
Losses	2 924	1 926	-34%
Total final energy consumption	39 912	40 267	1%
Total final energy consumption	39 912	40 267	1%
Housing	9 900	13 469	36%
Commercial and public services	3 581	3 974	11%
Transport	5 184	7 440	44%
Agriculture and fishing	895	832	-7%
Other and non-energy uses	2243	2034	-9%

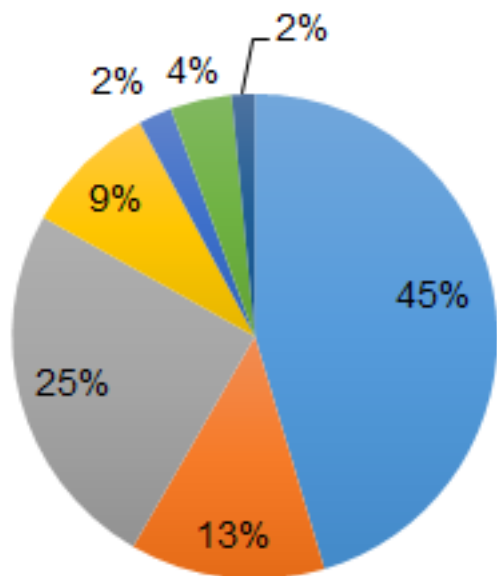
Calculation of total primary energy supply (TPES) and total final energy consumption (TFEC), 2020, thousand toe



TOTAL FINAL ENERGY CONSUMPTION IN KAZAKHSTAN

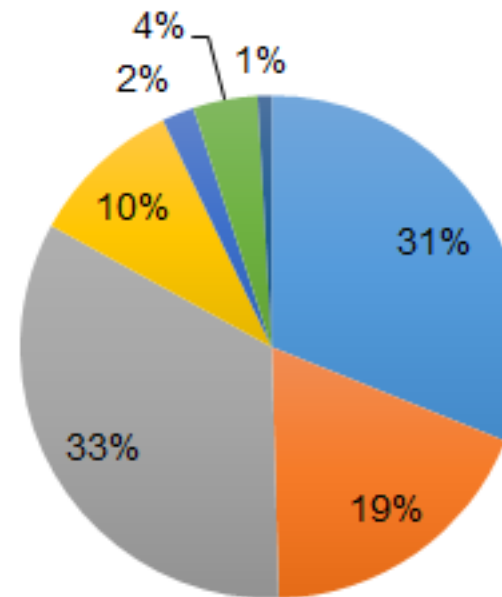


By sector in 2014



- Industry
- Transport
- Residential sector
- Commercial and public services
- Agriculture/forestry
- Not included in other categories
- Non-energy use

By sector in 2020



- Industry
- Transport
- Residential sector
- Commercial and public services
- Agriculture/forestry
- Not included in other categories
- Non-energy use

GOAL AND TASKS OF THE ENERGY SAVING CONCEPT OF KAZAKHSTAN

GOAL

ENERGY INTENSITY OF GDP TO BE REDUCED BY

10%

2021
0,35
t.o.e./thousand US dollars

2029
0,315
t.o.e./thousand US dollars

ENERGY CONSUMPTION PER FLOOR AREA TO BE REDUCED



GJ/m²

by **10%**
of the 2021 level

ENERGY CONSUMPTION PER CAPITA TO BE REDUCED BY



(GJ/m²)

by **5%**
of the 2021 level

KEY ACTIVITIES



UPDATING BUILDING REGULATIONS ON ENERGY SAVING

Commercial and residential sector



THERMAL MODERNIZATION

Residential sector



COMPLIANCE WITH ENERGY CONSUMPTION STANDARDS

Public sector



MONITORING OF PUBLIC PROCUREMENTS FOR COMPLIANCE WITH ENERGY EFFICIENCY REQUIREMENTS



COMPREHENSIVE MONITORING OF THE PUBLIC SECTOR

AIS STATE ENERGY REGISTER



SER entities consume 41% of the country's level, or 53.3 million tons of reference fuel



Entities not included in SER - 66%



Population - 10%



Losses - 2%

The country's consumption in 2017 amounted to 236.4 million tons of reference fuel

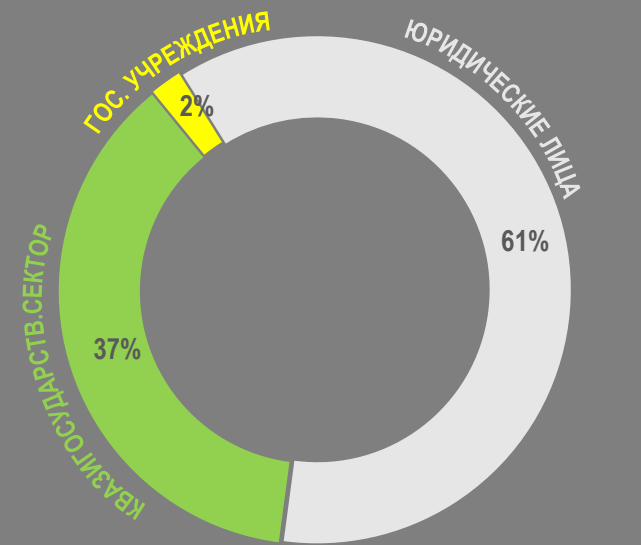
In 2016, the Ministry of Investment and Development of the Republic of Kazakhstan began digitalization of energy efficiency indicators
DIGITALIZATION of the State Energy Register (SER) and reporting



40% SER entities provided data to AIS SER
www.aisger.kz



Funded by the European Union



GOVERNMENT INSTITUTIONS

QUASI GOVERNMENTAL ENTITIES

LEGAL ENTITIES

SER ENTITIES

5198

2856

1632

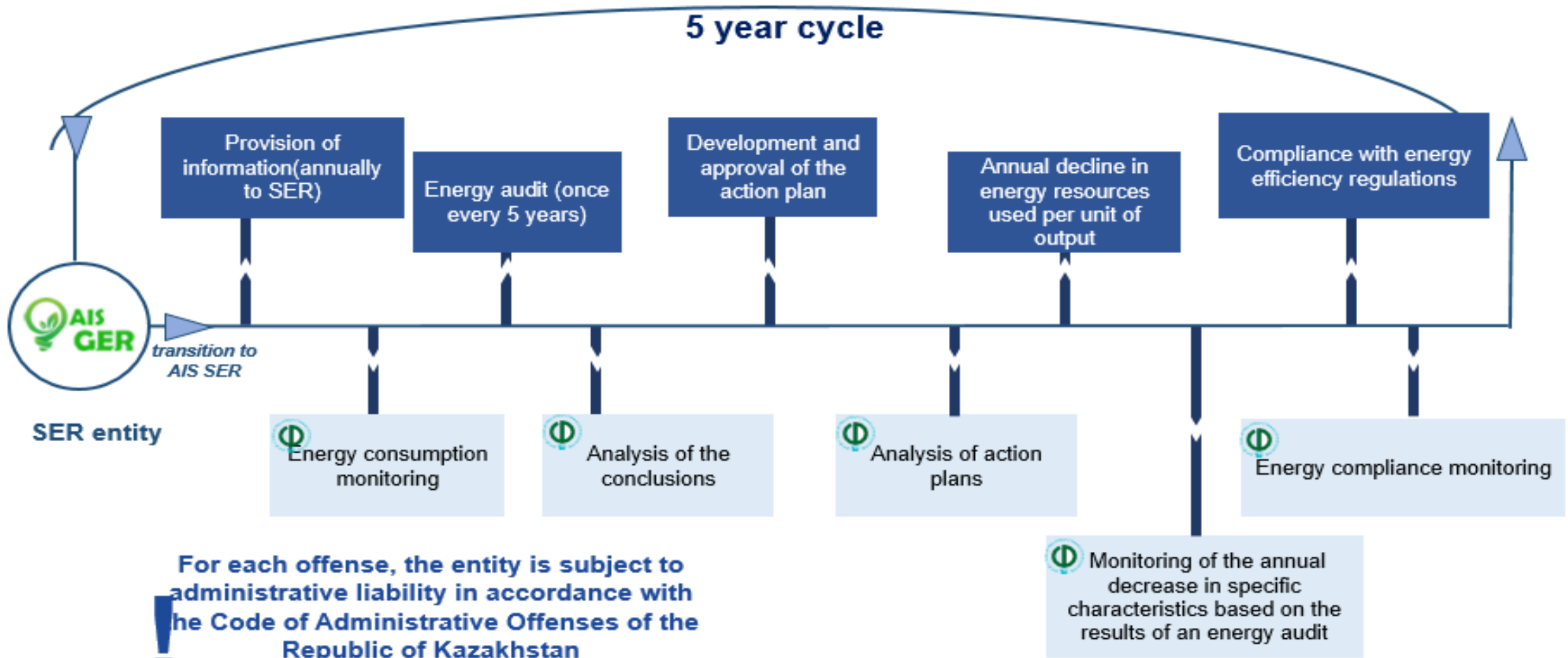
710

2017

AIS STATE ENERGY REGISTER



5 year cycle



AI STATE ENERGY REGISTER

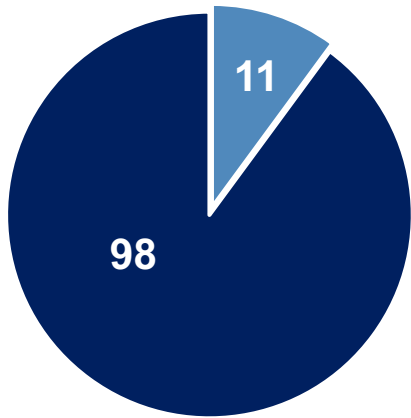


Energy resource	Measurement unit
Coal	t
Coal briquettes, balls	t
Lignite (brown coal)	t
Crude oil	t
Gas condensate	t
Natural gas	m3
Associated petroleum gas	m3
Coke and semi-coke	t
Sawdust and wood waste	t
Aviation gasoline	l
Motor gasoline	l
Jet fuel gasoline type	l
Kerosene	l
Diesel fuel (Gas oils)	l
Fuel oil	t
Furnace fuel	t
Liquefied gas (propane and butane)	t
Purified gases, including ethylene, propylene, butylene, butadiene and other petroleum gases	t
Stripped gas	m3

Energy resource	Measurement unit
Oil and shale coke	t
Oil and shale bitumen	t
Blast furnace gas	m3
Coke gas	m3
Gas obtained by distillation at oil refineries	m3
Electricity	kWh
Thermal energy	gcal
Anthracite	t
Wood	t
Brown coal (lignite) briquettes and balls	t
Coking coal	t
Steam coal with a calorific value of more than 23.865 MJ/kg (ash-free)	t
Coal concentrate	t
Steam coal with high ash content	t
Coal resins	t
Jet fuel kerosene type	l
White spirit	l
Lubricants	l
Charcoal, including agglomerated one	t
Ferroalloy gas	m3

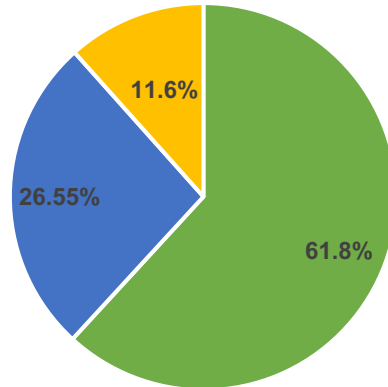
Monitoring compliance with target energy efficiency indicators for SER entities (TOP-109)

109
large SER entities



■ Не предоставили информацию
Did not provide information

218
key indicators



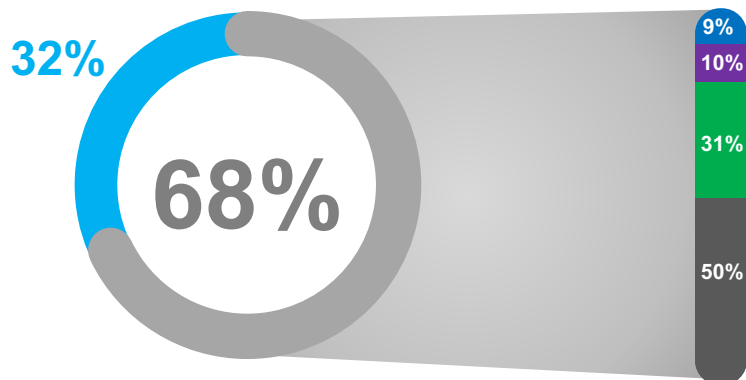
■ Снижение до целевых индикаторов
■ Превышение целевых индикаторов
■ Отсутствуют данные
Reduced to target indicators
Exceeded target indicators
No data

700
medium-size SER entities

240
standards by type of product

ENERGY CONSUMPTION STANDARDS and ENERGY EFFICIENCY CLASSES

Number of government facilities
11 056



● Central heating ● Autonomous heating
● Electricity ● Diesel ● Natural gas ● Coal

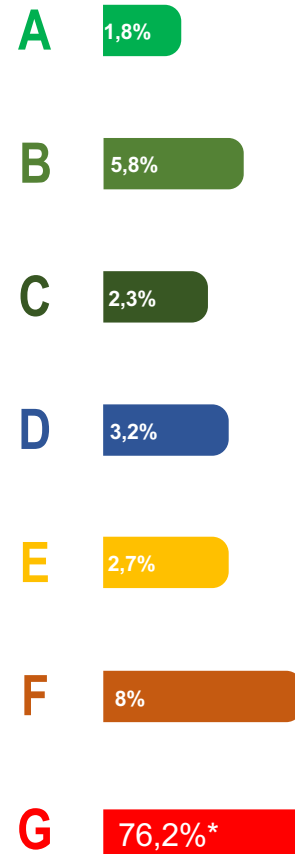


Exceeded standards

2 476



ENERGY EFFICIENCY OF GOVERNMENT FACILITIES



* of which 66% are educational institutions



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MONITORING PUBLIC PROCUREMENT OF GOODS, WORKS AND SERVICES

LEGAL FRAMEWORK



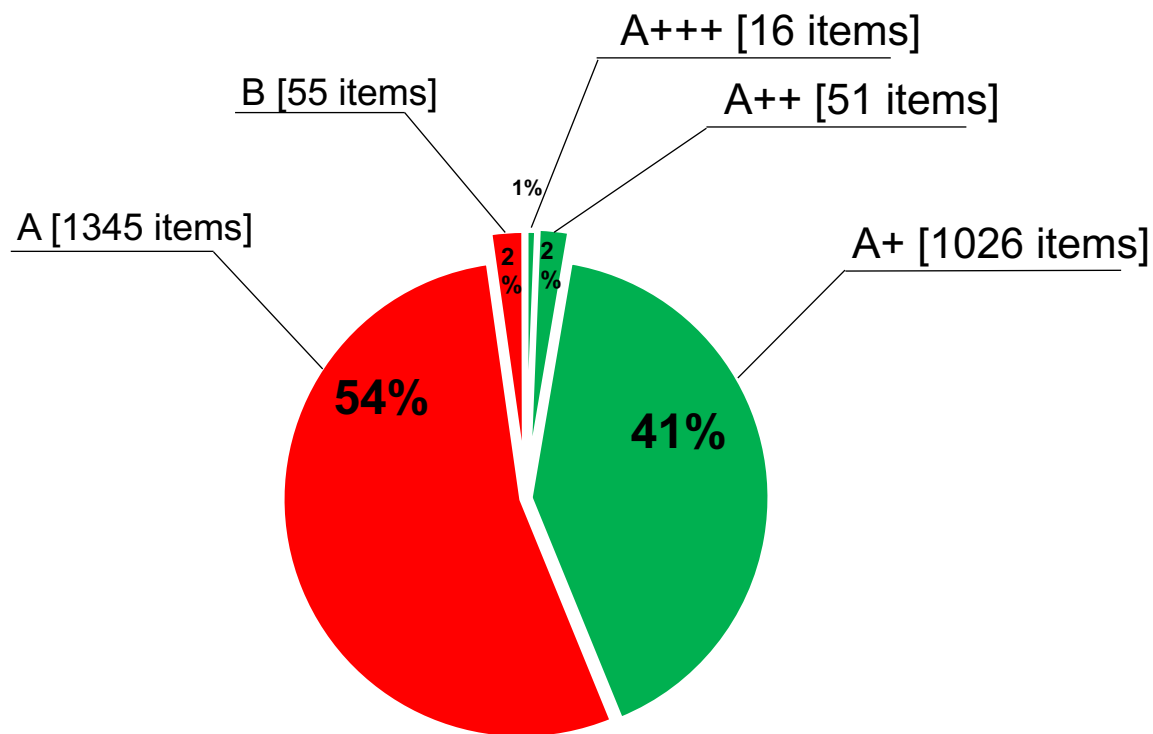
On establishing requirements for energy efficiency of goods, works, services in public procurement and procurement of goods, works, services dated November 11, 2022 No. 627



On approval of the Rules for monitoring public procurement and procurement of goods, works, services in the field of energy saving and improving energy efficiency dated December 1, 2022 No. 673



On establishing requirements for energy efficiency of goods, works, services in public procurement and procurement of goods, works, services dated November 8, 2022 No. 619



■ A+++ ■ A++ ■ A+ ■ A ■ B ■ C

A total number of refrigerators with defined energy efficiency classes

2494

Meeting the established requirements

1093

(from A+ to A+++)

Not meeting the established requirements*

1401

(A, B, C)

* According to the order of the **Ministry of Industry and Infrastructure Development of the Republic of Kazakhstan** dated November 11, 2022 No. 627, household refrigeration appliances must have an energy efficiency class of **at least A+**.



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KEY ENERGY SAVING ACTORS



**Ministry of Industry
and Construction of
the Republic of
Kazakhstan**



Legal entities



Energy auditors



Training centers



**Electric Power and Energy
Saving Development Institute
(EEDI)**



Government agencies

ENERGY AUDIT



890

SER entities

Ind. entrepreneur

- **3**

Legal entities-

613

Quasi sector-

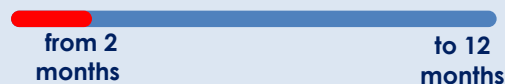
274



Energy audit

- ▶ Quasi > 1 500 tons of reference fuel
- ▶ Legal entities > 1 500 tons of reference fuel
- ▶ Every **5 years**

Duration

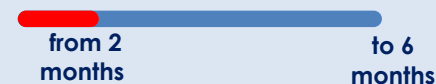


Express energy audit

Provided that:

- ▶ There is a previous EA
- ▶ There is an EM system
- ▶ Consumption reduced **by 5%**

Duration

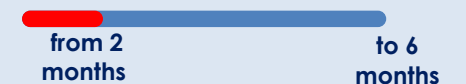


Target energy audit

Can be performed for:

- ▶ A particular resource type
- ▶ An individual building
- ▶ A particular equipment
- ▶ **As needed**

Duration



QUALIFICATION REQUIREMENTS according to ST RK 3838-2023

Energy audit. Qualification requirements for an energy auditor



QUALIFICATION REQUIREMENTS



A degree in Engineering or related technical major



work experience (including 1 year in the field of energy efficiency)



Certificate of course completion



Grade of Electric Safety Permit

Experience in conducting energy audits

either



10 entities with buildings, structures and constructions

or



5 industrial entities or those consuming more than 15,000 tons of reference fuel per year

or



5 entities with buildings, structures, constructions and
3 industrial entities or those consuming more than 15,000 tons of reference fuel per year



ANALYSIS OF ENERGY AUDIT REPORTS



Law of the Republic of Kazakhstan “On energy saving and improving energy efficiency”

Terms of reference by Industry Committee of the Ministry of Industry and Construction of the Republic of Kazakhstan

Order of the Minister for Investment and Development of the Republic of Kazakhstan No. 1129 “Rules for analyzing reports on energy saving and improving energy efficiency”

Conducting an energy audit for the SER entity

Submitting the energy audit report to the AIS SER

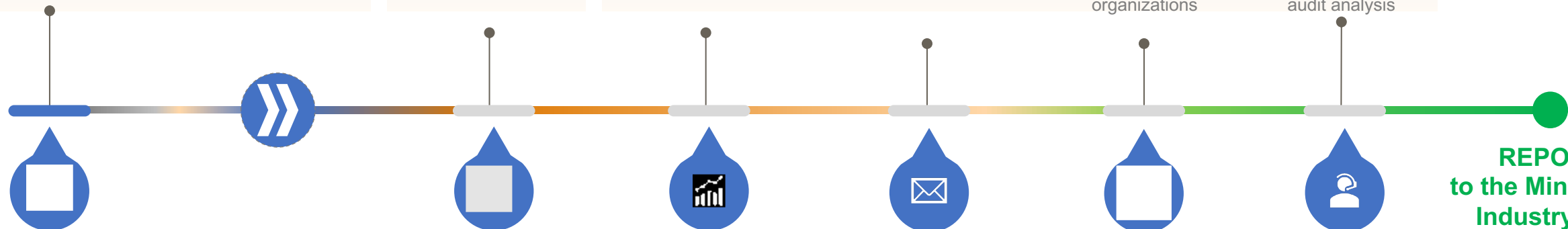
Selecting **200** energy audit reports for analysis

Analyzing energy audit reports

Sending analysis results to SER entities and/or energy audit organizations

Feedback from the SER entity and/or energy audit organizations

Providing **consulting** services based on the results of the energy audit analysis



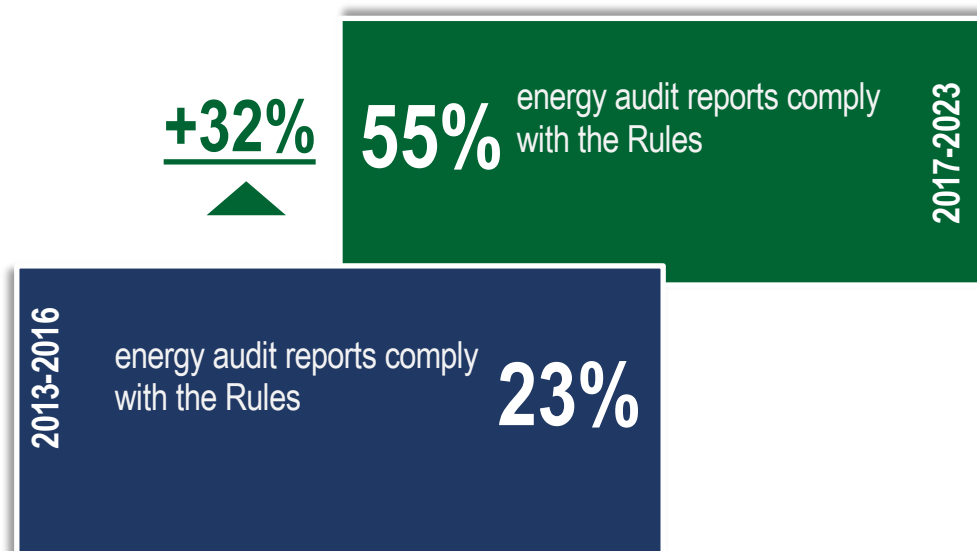
REPORT to the Ministry of Industry and Construction

Order of the Minister for Investment and Development of the Republic of Kazakhstan dated November 30, 2015 No. 1129 “On approval of the Rules for analyzing reports on energy saving and improving energy efficiency”

ANALYSIS OF ENERGY AUDIT REPORTS



! THE QUALITY OF ENERGY AUDITS IS INCREASING!



NUMBER OF ENERGY AUDITORS

204

LEGAL ENTITIES

carrying out activities in the field of energy saving and energy efficiency improvement

424

ENERGY AUDITORS

certified by the Ministry of Industry and Infrastructural Development

at least

4

ENERGY AUDITORS

in each energy audit company, according to the Law "On Energy Saving"

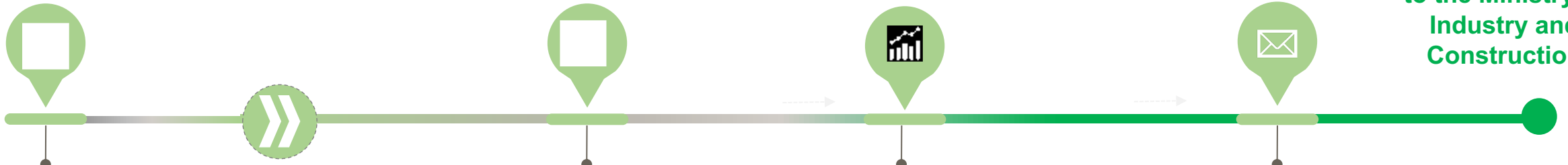


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ANALYSIS OF ACTION PLANS



**REPORT
to the Ministry of
Industry and
Construction**



**Approval of the EE
Action Plan by the
SER entity**

**Submitting the
Action Plan to the
AIS SER**

Selecting **150** Action Plans for Energy Saving and Energy Efficiency Improvement to be analyzed

Analyzing action plans

Evaluating and analyzing **the effectiveness** of energy saving and energy efficiency measures carried out by SER entities

based on the results of the energy audit

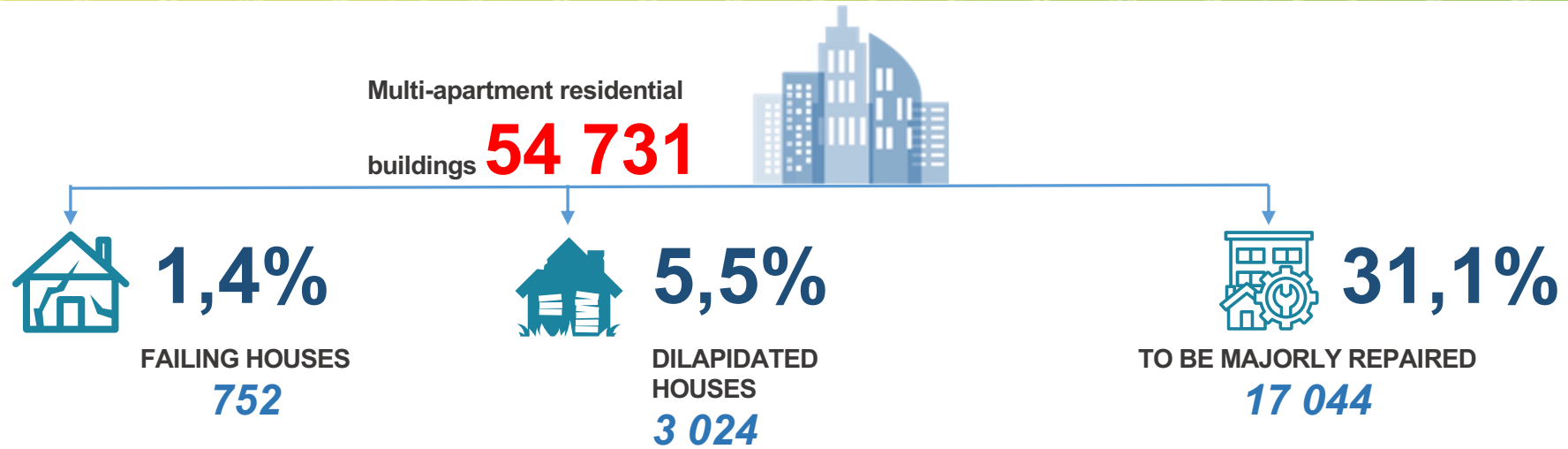
Law of the Republic of Kazakhstan "On energy saving and improving energy efficiency"

Terms of reference by the Ministry of Industry and Construction

Order of the Minister for Investment and Development of the Republic of Kazakhstan No. 391 "On approval of the requirements for the form and content of the action plan for energy saving and improving energy efficiency"

Order of the Minister for Investment and Development of the Republic of Kazakhstan dated March 31, 2015 No. 391 "On approval of the requirements for the form and content of the action plan for energy saving and improving energy efficiency"

HOUSING STOCK IN KAZAKHSTAN



Building-level heat meters installed
31 940

Building-level water meters installed
27 604

Need for building-level heat meters
8 487

Need for building-level water meters
10 219

Share of buildings equipped with building-level meters

76%

Target level

2025

100%

ENERGY EFFICIENCY LABEL CURRENTLY IN USE



ENERGY EFFICIENCY LABEL



Energy efficiency class of a building is based on the energy audit results

"Arrow" icon is to be opposite the corresponding letter designation of the energy efficiency class

Month and year when the energy audit report was received

Building address

Year of commissioning

Heated area of the building

B

June 2022



Actual specific consumption of thermal energy for heating and ventilation of the building during the heating period (based on the energy audit results)

INFORMATION ON THE BUILDING

Astana, Yesil district, Uly Dala street, 16/1

Year of commissioning: 2012

Area: 1,000 m²

SPECIFIC ENERGY CONSUMPTION

150

kW*h/m²

WORLD BANK PROJECT "IMPROVING ENERGY EFFICIENCY IN KAZAKHSTAN"



GRANT FUNDS **21,7 mln US dollars**



IMPLEMENTATION PERIOD June 1, 2015 - June 10, 2022



PROJECT IMPLEMENTATION

A TOTAL OF **96** FACILITIES MODERNIZED

PROJECT BENEFITS



Energy savings up to **25 %** and **500 million KZT**



Over 2 thousand workplaces created



Share of local materials and services amounted to **85%**



More than **4 thousand** LED street lights installed



Emission reduction of **259 010 tons of CO2**



Funded by
the European Union

ELECTRIC POWER AND ENERGY SAVING DEVELOPMENT INSTITUTE JSC



MAINTAINING STATE ENERGY REGISTER (SER)



ANALYZING ENERGY AUDIT REPORTS



EVALUATING AND ANALYZING ACTIVITIES HELD BY SER ENTITIES



PROVIDING EXPERT OPINION



CREATING AND MAINTAINING ENERGY EFFICIENCY MAP



DEVELOPING INTERNATIONAL COOPERATION



CENTER FOR ADVANCED TRAINING



IMPLEMENTING "IMPROVING ENERGY EFFICIENCY IN KAZAKHSTAN" PROJECT

By the order of the Minister for Investments and Development of the Republic of Kazakhstan dated November 30, 2015 No. 1130, ELECTRIC POWER AND ENERGY SAVING DEVELOPMENT INSTITUTE JSC was defined as the NATIONAL INSTITUTE FOR DEVELOPMENT IN THE FIELD OF ENERGY SAVING AND ENERGY EFFICIENCY

