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Kanat Baigarin, Dr.

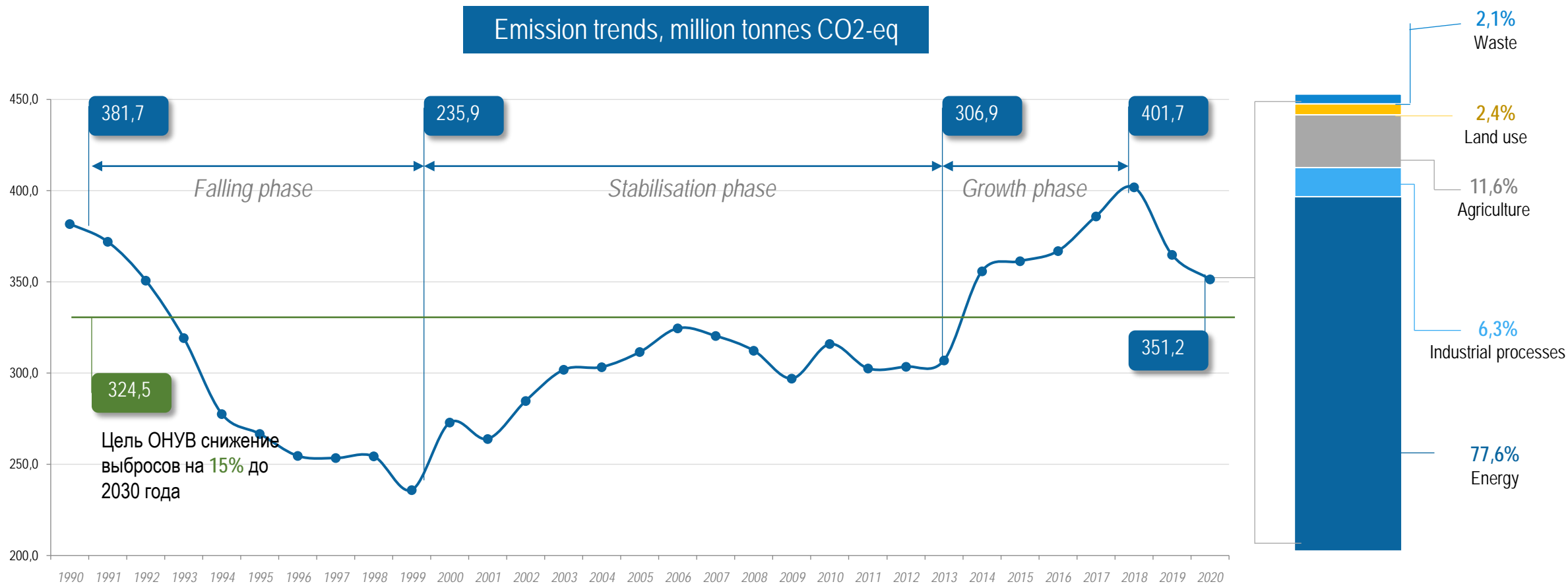
25th REFORM GROUP MEETING, SALZBURG, October 3-6, 2022

Kazakhstan's Way to Carbon Neutral Future

The decarbonization targets of Kazakhstan

- **1) Midterm target – NDC (national determined contribution):**
 - Unconditional target: minus 15% till 2030 from 1990 GHG level (ambition target)
 - Conditional target: minus 25% from 1990 GHG level
 - All GHG emission (including LULUCF)
 - Implementation roadmap for 2021-2025 developed with institutional and sectoral measures
- **2) Long-term target – Carbon neutrality till 2060:**
 - Announced at the Climate Change Ambitious Summit in December 2020
 - A Doctrine (strategy) on low-carbon development has been developed

EMISSIONS ARE ON THE UP TREND, MAJORLY CAUSED BY "ENERGY ACTIVITIES"



The main share of emissions comes from energy activities (77.6%)

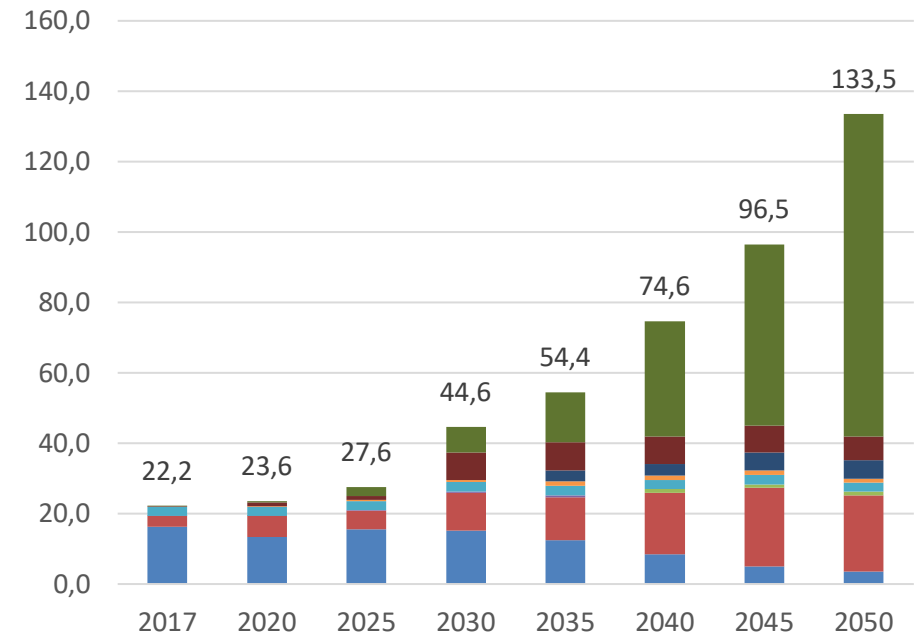
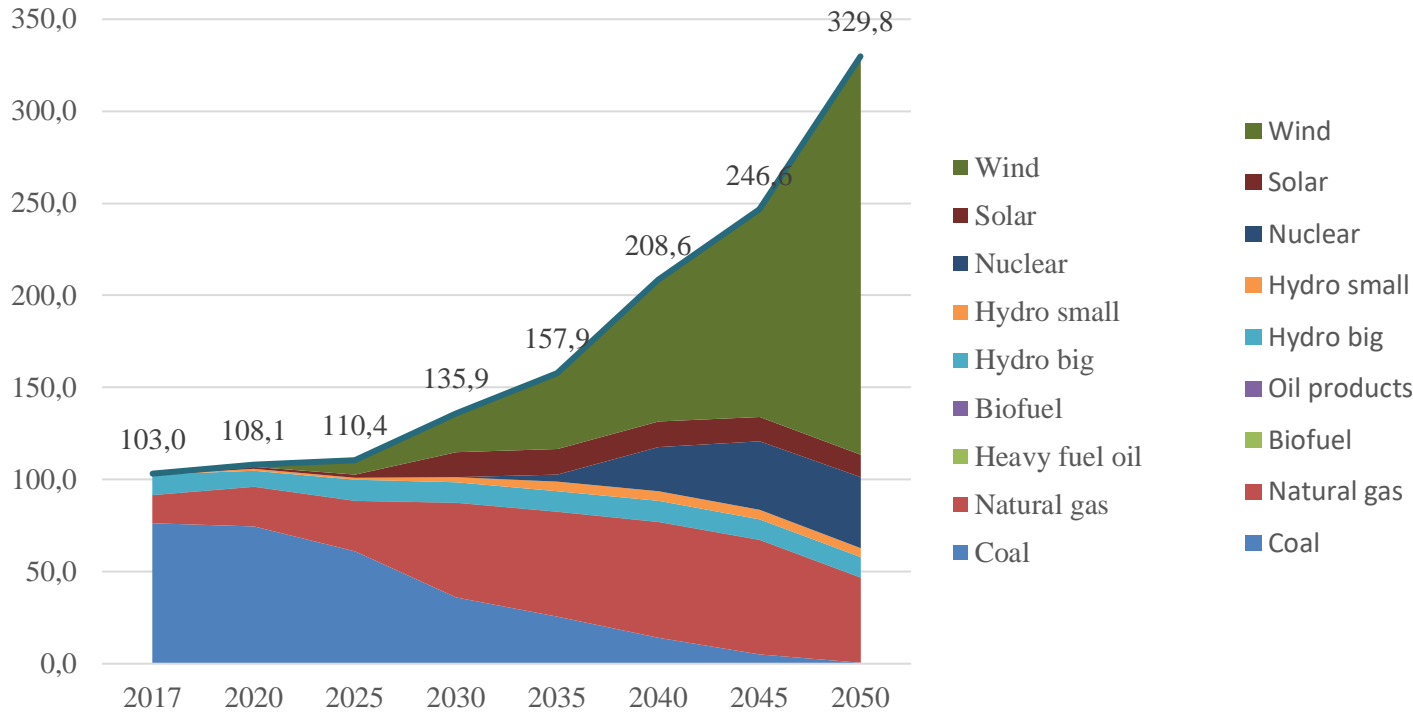
In the structure of emissions from energy activities, most of them are associated with fuel combustion (89.5%)

Decarbonization of the energy sector will play a key role in the energy transition process

Achieving NDC goals requires strong political will for deep infrastructure transformation



Power sector



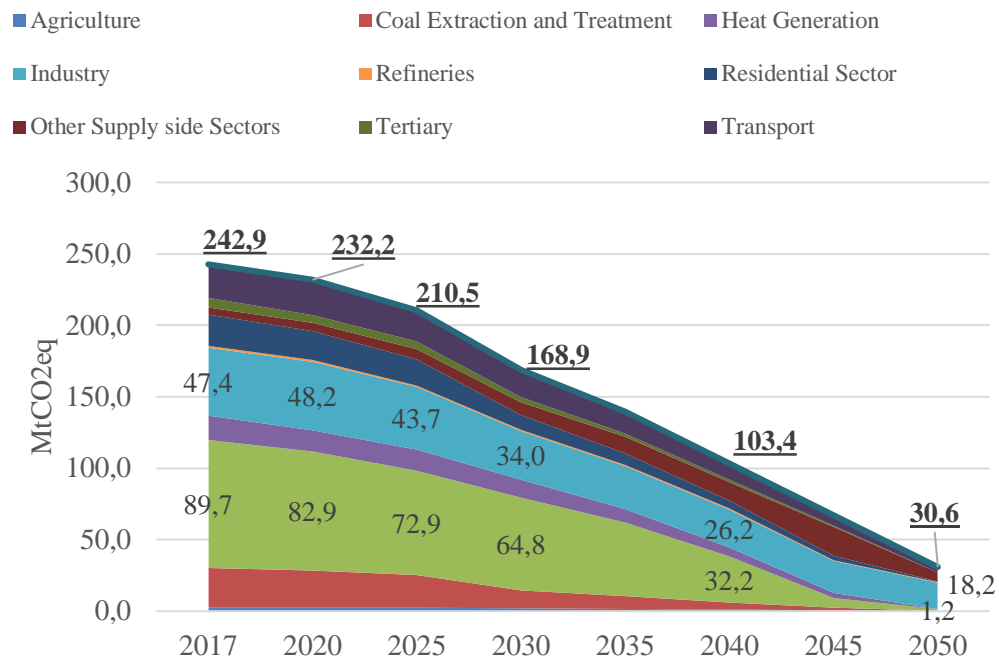
GHG emissions by 2050 - 21.4 MtCO₂eq -20.2 MtCO₂eq absorbed by CCS - leaving 1.2 MtCO₂eq.

Generation will increase from 108.1 billion kWh in 2020 to 329.8 billion kWh in 2050, more than 3 times.

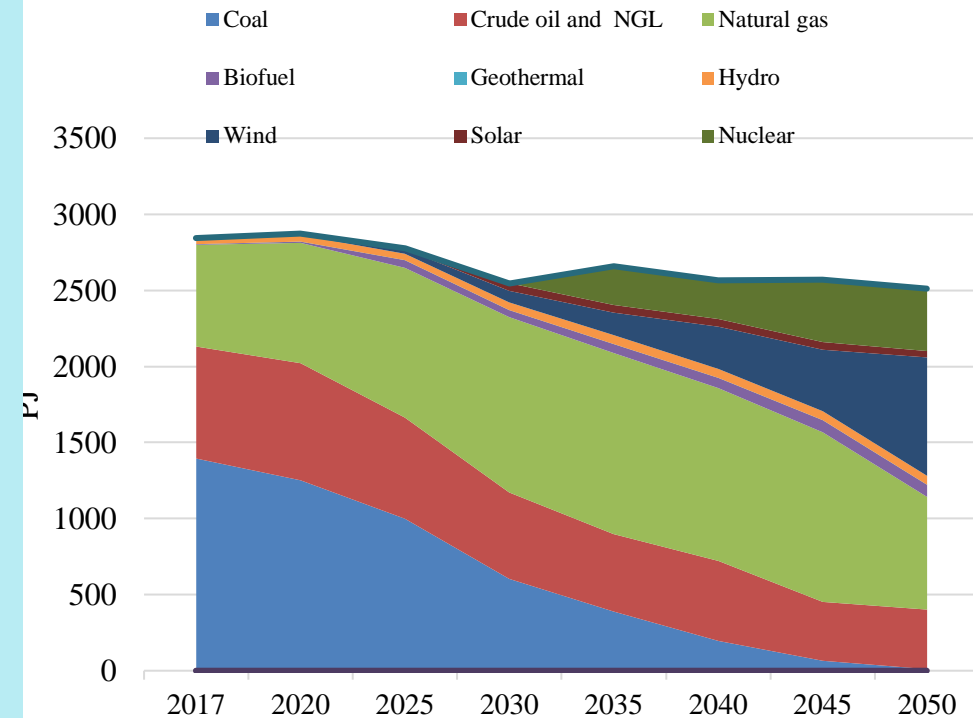
Installed capacity increases from 23.6 GW in 2020 to 133.5 GW in 2050, approximately 6 times



Projected GHG emissions and TPES



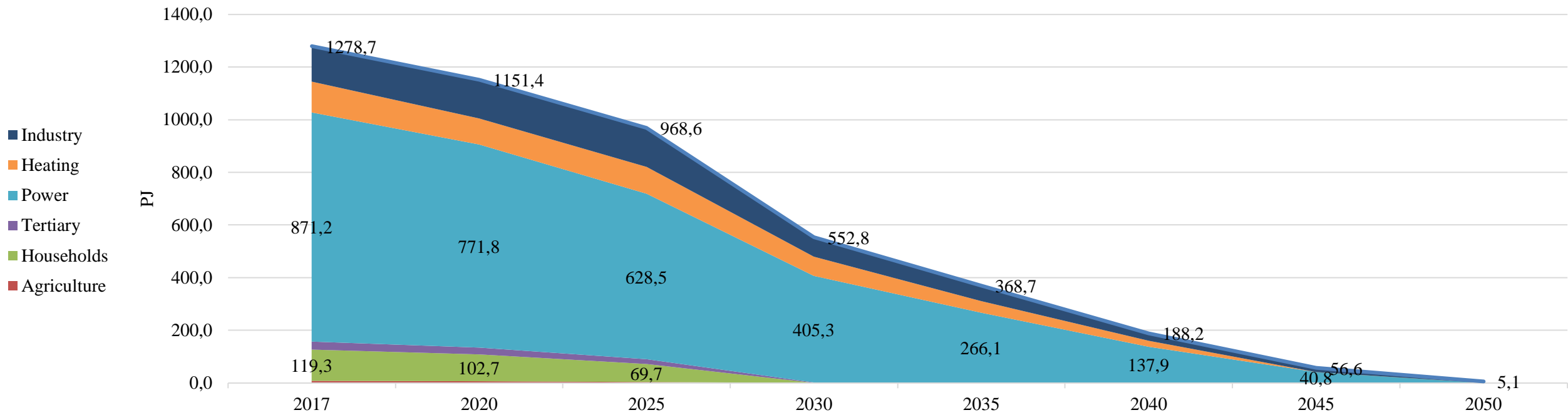
- **Midterm target – NDC (national determined contribution):**
minus 15% till 2030 from 1990 GHG level
(ambitious target)
- **Long-term target – (announced at the Climate Change Ambitious Summit in December 2020):**
Carbon neutrality by 2060



GHG emissions during 2017-2050 will decrease till 30.6 MtCO₂eq in 2050, or 7.9 times.

Is there any other way to decrease the GHG emissions without decreasing the use of fossil fuels?

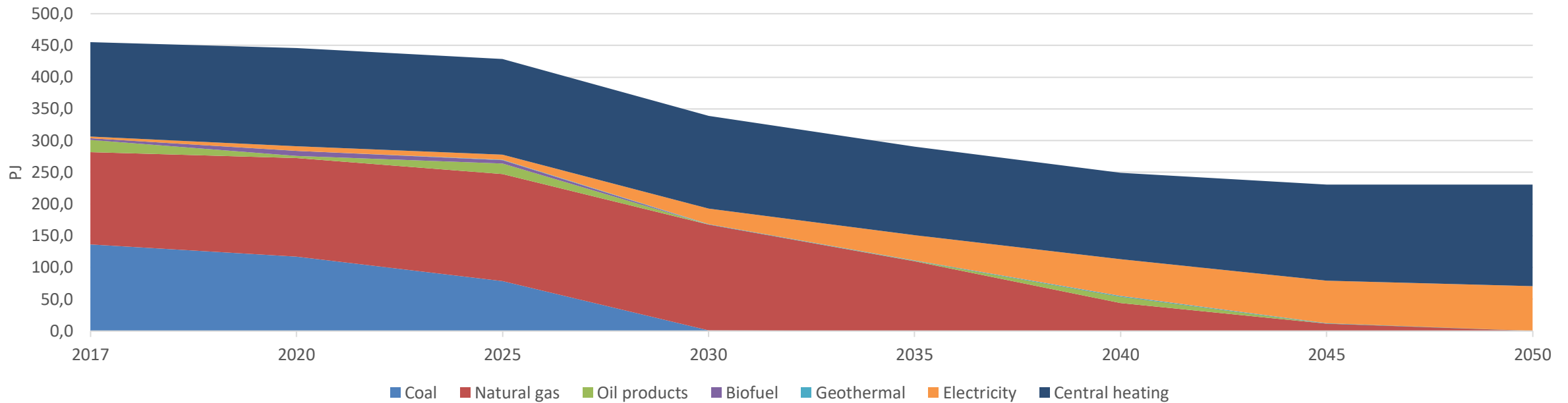
Coal phase out



In 2017, most of the coal is used in the power generation sector (about 74% by the structure of production)

By 2050, coal is practically out of use

Heating – process of electrification (heat pumps)



GHG in the heating sector (Residential and services sector) goes down to zero

In 2050, heat consumption includes district heating (70%) and electricity (heat pumps).

District heating is mostly generated by heat pumps (64%) and from petroleum products

Transport

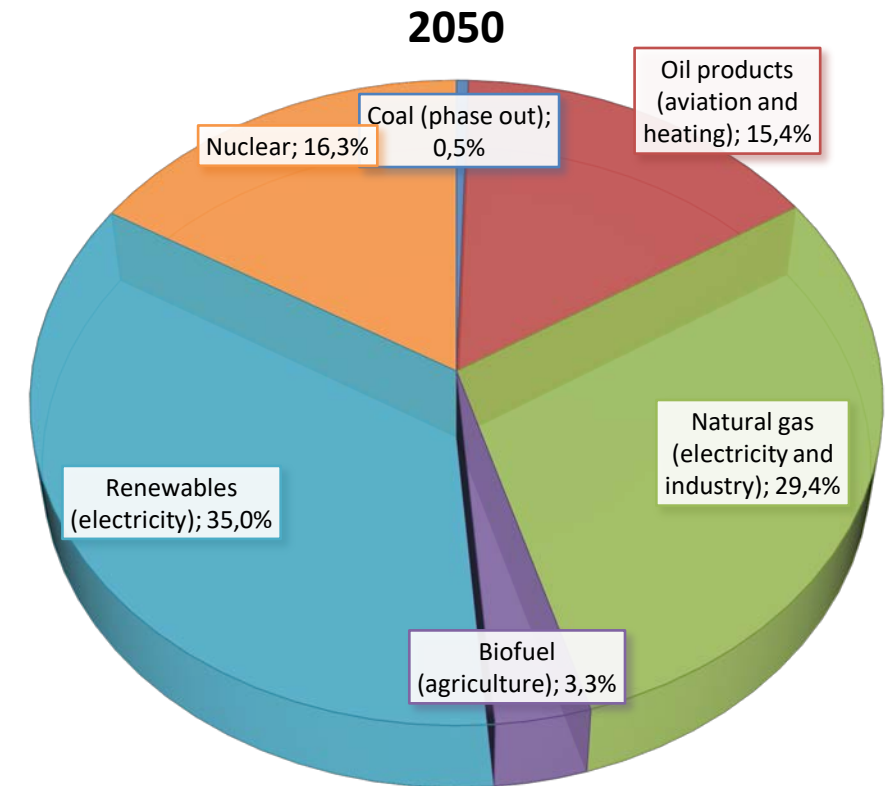
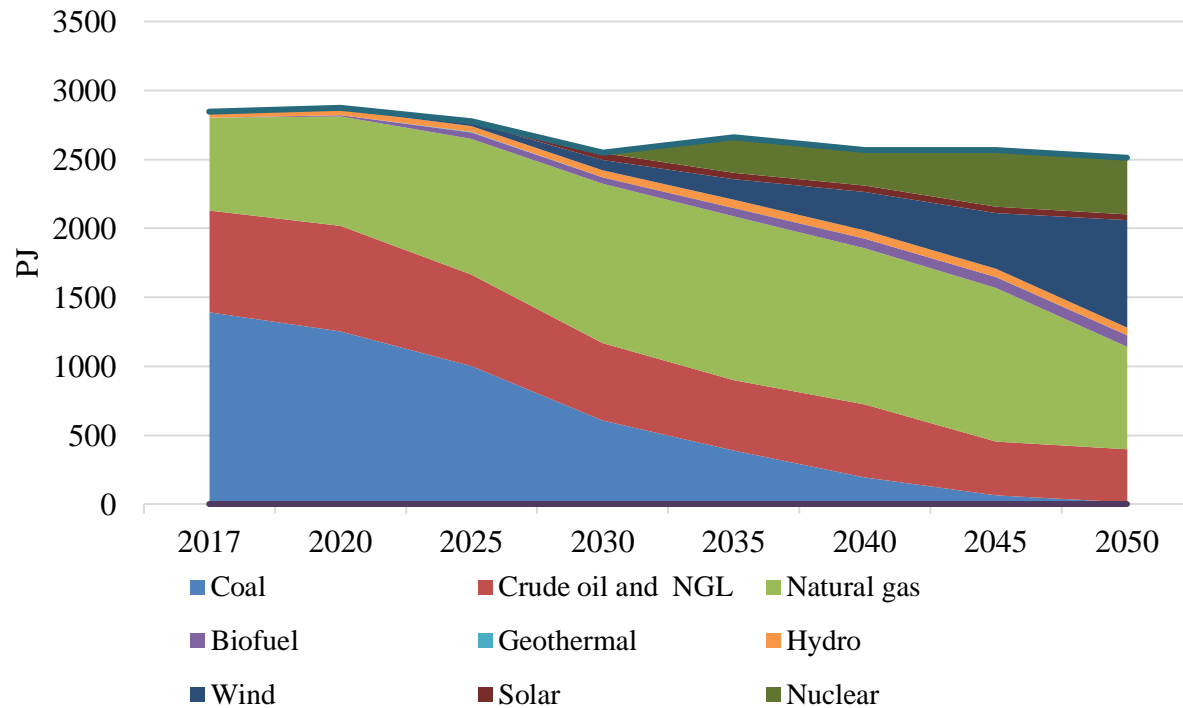


GHG in transport are reduced from 24.5 MtCO₂eq in 2017 to 3.6 MtCO₂eq by 2050 (aviation and trucks)

More than half of the energy used (57%) in 2050 comes from electric vehicles.



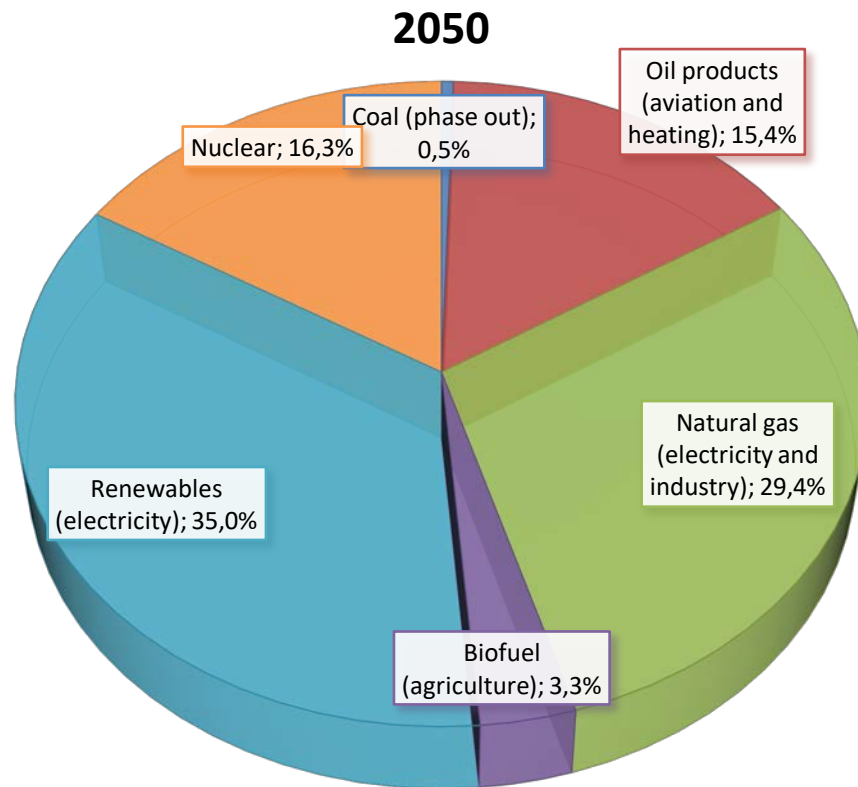
Total Primary Energy Supply (TPES)



Energy supply is reduced by 12% by 2050 compared to 2017



CONCLUSIONS



By 2050:

- Coal phase out naturally (elaborated plan - natural withdrawal of capacities);
- Renewables (Distributed);
- Natural gas as intermediate energy (use of domestic gas that is exported);
- CCS – (required research);
- Nuclear (detailed study of the issue, low-power reactors);

**DECARBONIZATION is not a RISK but
POSSIBILITIES**



British Embassy
Nur-Sultan



NAZARBAYEV
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NATIONAL CONSERVATION
INITIATIVE

CONCLUSIONS

By 2050:

- Coal - almost complete phase out - natural withdrawal of capacities;
- Natural gas - used for maneuvering facilities and in industry (steel)
- Petroleum Products - aviation and district heating
- Biofuels - in agriculture for the production of biodiesel instead of diesel for vehicles
- RES - for electricity generation
- Atom - 5.2 GW of capacity by 2050
- Hydrogen - not selected in the solution due to the high cost of technology

Problems and solutions:

- Coal phaseout process (using “mining” to invest in alternative capacities)
- Sufficiency of gas (use of domestic gas that is exported)
- Adequacy of natural reservoirs for storing CO₂ from CCS (research)
- Atom (detailed study of the issue, low-power reactors)

THE STRATEGY OF THE REPUBLIC OF KAZAKHSTAN FOR ACHIEVING CARBON NEUTRALITY UNTIL 2060 (Draft)



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Achieving carbon neutrality will occur both by reducing emissions and by absorbing and capturing them



GOAL:

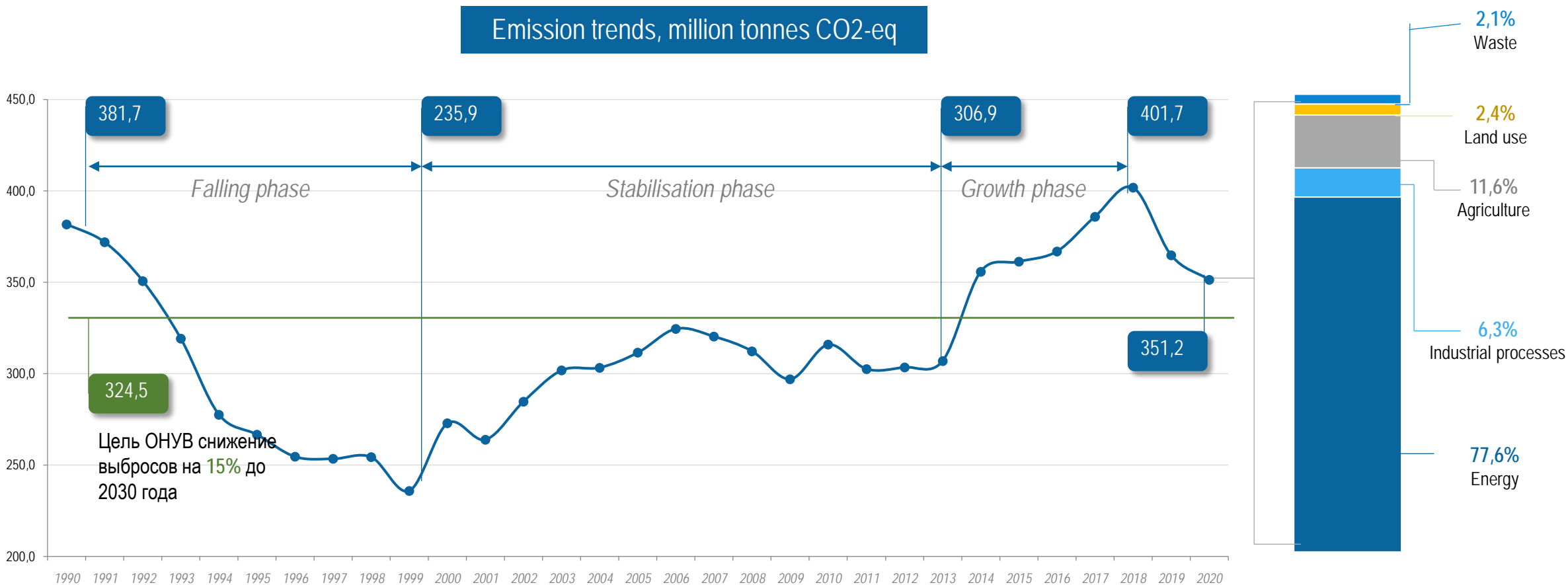
Achieve sustainable economic development to climate change and carbon neutrality by 2060

mln. tons of CO2-eq

	1990	2020	2030 NDC	2040*	2050*	2060 Carbon neutrality
Total emissions	385,6	342,8	344,7	305,8	187,1	95,2
<i>Capture</i>	0	0	0	-67,6	-51,4	-50
<i>Absorption</i>	-3,9	8,4	-20,3	-28,3	-40,3	-45,2
Net emissions	381,7	351,2	324,4	209,9	95,4	0,0

* Indicative emission level, which will be revised with subsequent updates of the Strategy

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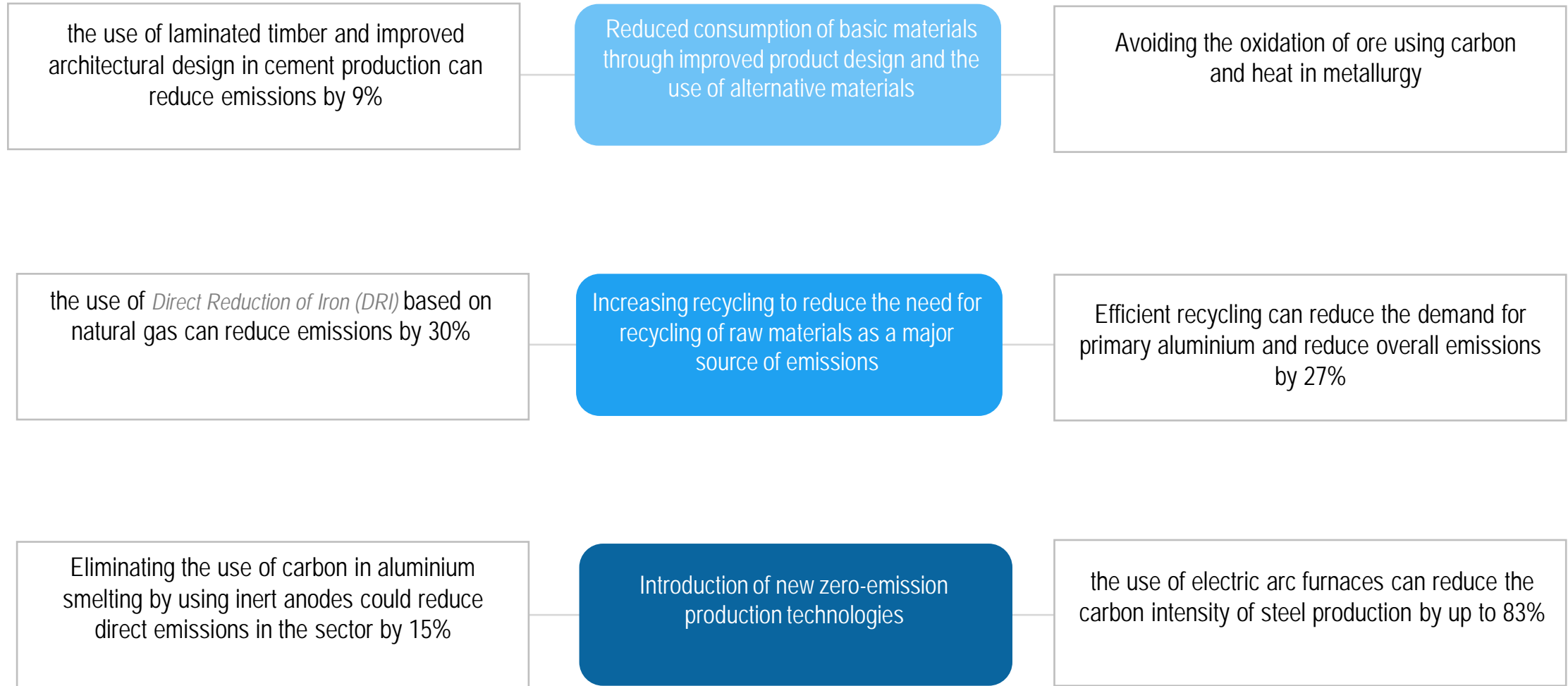
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Achieving NDC goals requires strong political will for deep infrastructure transformation

THE DECARBONISATION OF INDUSTRIAL PROCESSES REQUIRES SIGNIFICANT CHANGES ON BOTH THE DEMAND AND SUPPLY SIDES



DECARBONISATION OF THE SECTOR WILL BE ACHIEVED BY INCREASING THE SUSTAINABILITY OF AGRICULTURAL PRACTICES AND FOREST MANAGEMENT



Sustainable farming and livestock management

- the use of biogas plants on all livestock farms
- Use of new feed additives *(to reduce methane emissions from livestock)*
- creation and development of new pastures, sustainable pasture management;
- Improving the accuracy of mineral fertiliser application
- Integration of biodiversity in agricultural land and adoption of organic farming practices



Improving irrigation

- Improved water supply and irrigation, waterlogging
- Restoration and maintenance of the Caspian Sea, the Aral Sea, Lake Balkhash and Lake Alakol;
- Improvement of the Syrdarya's water regime, afforestation along the river



sustainable forest management and reforestation

- Developing and implementing a mechanism for granting soil and forest credits
- 2 billion tree planting programme (2021-2025)
- State forestry programmes
- private forestry programmes
- Sustainable management of degraded forests

ACHIEVING CARBON NEUTRALITY IN KAZAKHSTAN WILL REQUIRE A PROFOUND TRANSFORMATION OF THE ENTIRE ENERGY SECTOR



Decarbonisation of primary energy supply

- Reducing leakage during extraction and transportation
- Improving the efficiency of mineral extraction



Decarbonisation of electricity and heat production

- replacing existing infrastructure at the end of their economic life with carbon-free and low-carbon
- A ban on the design and construction of new coal-fired plants without CCS technology, once the cost of such technology becomes affordable
- Introduction of gigawatt solar and wind generation capacity
- introduction of market prices for energy services
- all new energy generated without CO2 emissions should be counted as offset carbon units



Decarbonisation and highly efficient energy end-use

- energy efficiency improvement
- Encouraging households and small medium-sized enterprises to install RES, a simplified system of issuing/purchasing offset carbon units from implementation

DECARBONISATION OF THE BUILDING SECTOR WILL BE ACHIEVED BY IMPROVING ENERGY EFFICIENCY AND SWITCHING TO HEATING BASED ON RENEWABLE ENERGY



Energy efficiency

- Thermal insulation, use of energy efficient appliances, modern heating systems and energy management
- thermo-modernisation of existing buildings
- Change of building regulations, introduction of a system of building acceptance for compliance with the requirements of the relevant energy efficiency class
- Introduction of a white certificate system (*for planning and monitoring energy efficiency and energy conservation improvements by any energy users*)
- introduction of automated heat control and metering systems



Transition to heating based on renewables

- Introduction of renewable energy sources and efficient technologies for space and water heating (*modern gas and electric boilers, photovoltaics and solar water heating*)
- Increased use of electricity and district heating by the commercial sector and households instead of direct combustion of fossil fuels
- application of microgeneration using RES, including increased generation from rooftop solar panels
- widespread distributed generation operating autonomously and integrated into the local Smart Grid
- biogas at all wastewater treatment plants.

THE TRANSPORT DECARBONISATION MEASURES WILL BE IMPLEMENTED ALONG THREE MAIN LINES



Abbreviation

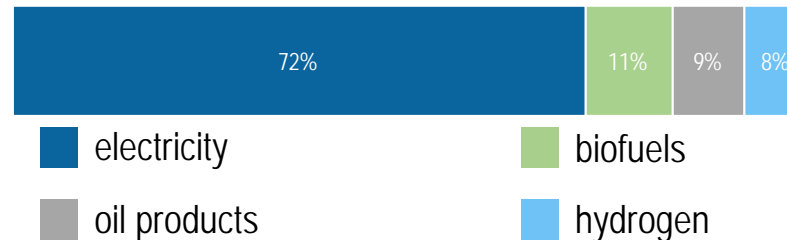
reducing the need for road travel

- improving urban planning and transport infrastructure
- Expansion and improvement of the public transport network and railway infrastructure
- Optimisation of passenger and freight transport
- Establishment and expansion of infrastructure for bicycles, electric scooters and walking, etc.



Shift

a shift towards alternative fuels



- Incentives for the purchase and ownership of electric cars and electric buses through the recycling fee
- accelerated construction of charging infrastructure for electric vehicles in cities
- electrification of the railway, etc.



Improvement

improving urban planning and mobility

- for cities with more than 100,000 inhabitants, the adoption and implementation of Sustainable Urban Mobility Plans
- in cities with more than 100,000 inhabitants, introduction of an electronic geo-information system for traffic management
- introduction of automated traffic monitoring and management systems

CHANGE OF PUBLIC CONSCIOUSNESS THROUGH RESPONSIBILITY, EDUCATION, CIVIL PARTICIPATION IN DECISION *(New Information Doctrine)*

INFORMATION - INTEREST - INITIATIVE AND PARTICIPATION



DEVELOPMENT OF A "LOW-CARBON" CULTURE

- Promoting values and lifestyles through media and education (*school curricula, volunteering and social movements, promotion of low-carbon goods and services*)
- National activities (*low-carbon development days in the regions, formation of model organisations*)



CITIZEN ACTIVISM IN THE TRANSITION TO LOW-CARBON DEVELOPMENT

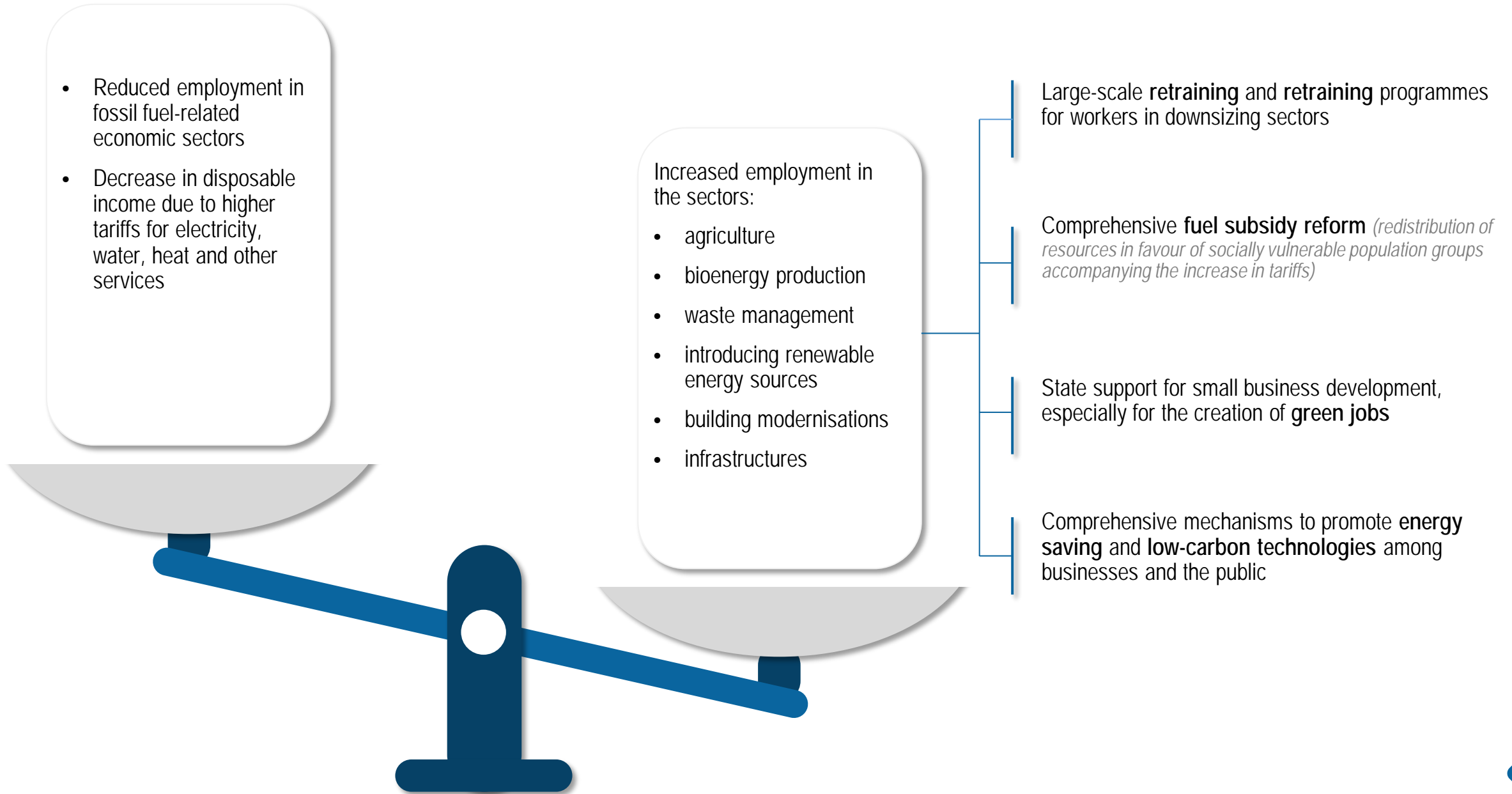
- specialised digital resources:
 - calculation of a personal transition plan for the NRM (*climate impacts and actions to reduce emissions*)
 - calculation of the personal carbon footprint
 - Informing about waste management
- Educational projects on new lifestyles (*energy efficiency, frugal consumption, etc.*)



FEEDBACK AND PARTICIPATION IN DECISION-MAKING

- sociological studies
- social justice measures for vulnerable groups
- Public consultation (*parliament, NGOs, expert community*)

NUMBER OF NEW WORKING POINTS WILL SIGNIFICANTLY INCREASE LOSS IN Fossil fuel-related SECTORS *(New Employment Policy)*



THE STRATEGY WILL ACT AS A TOP-LEVEL DOCUMENT



National priorities
(for the medium term, currently up to 2025)

National Development Plan of the Republic of Kazakhstan
(No timeframe for implementation, currently up to 2025)

National security strategy of Kazakhstan
(for the medium term, currently up to 2025)

The country's spatial development plan
(No timeframe for implementation, currently up to 2025)

Concepts of sector/sphere development
(for 5-10 years)

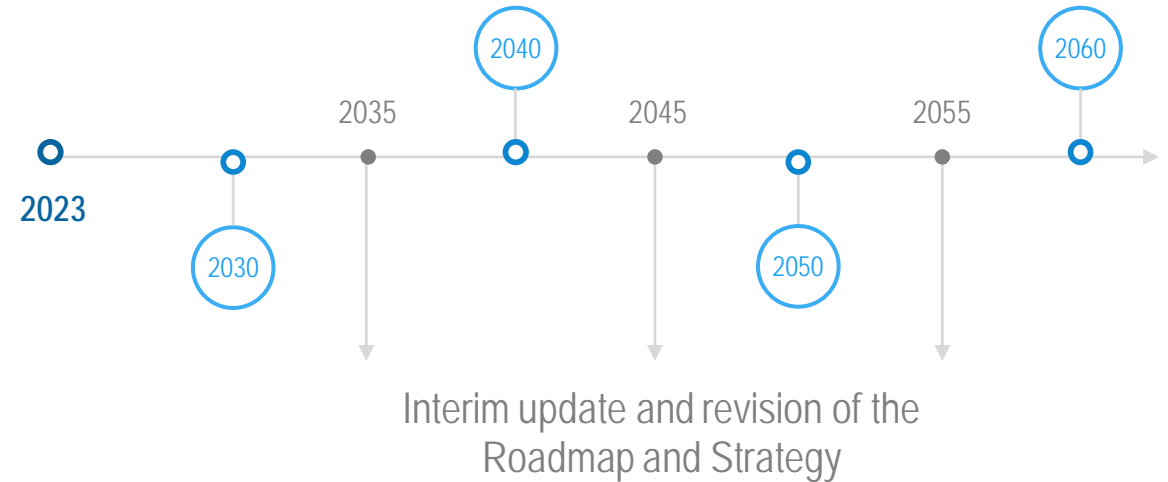
National projects
(no implementation deadline fixed)

CS development plans
(every 3 years for 5 years)

Plans for the development of a region, a city of national importance, the capital
(for 5 years)

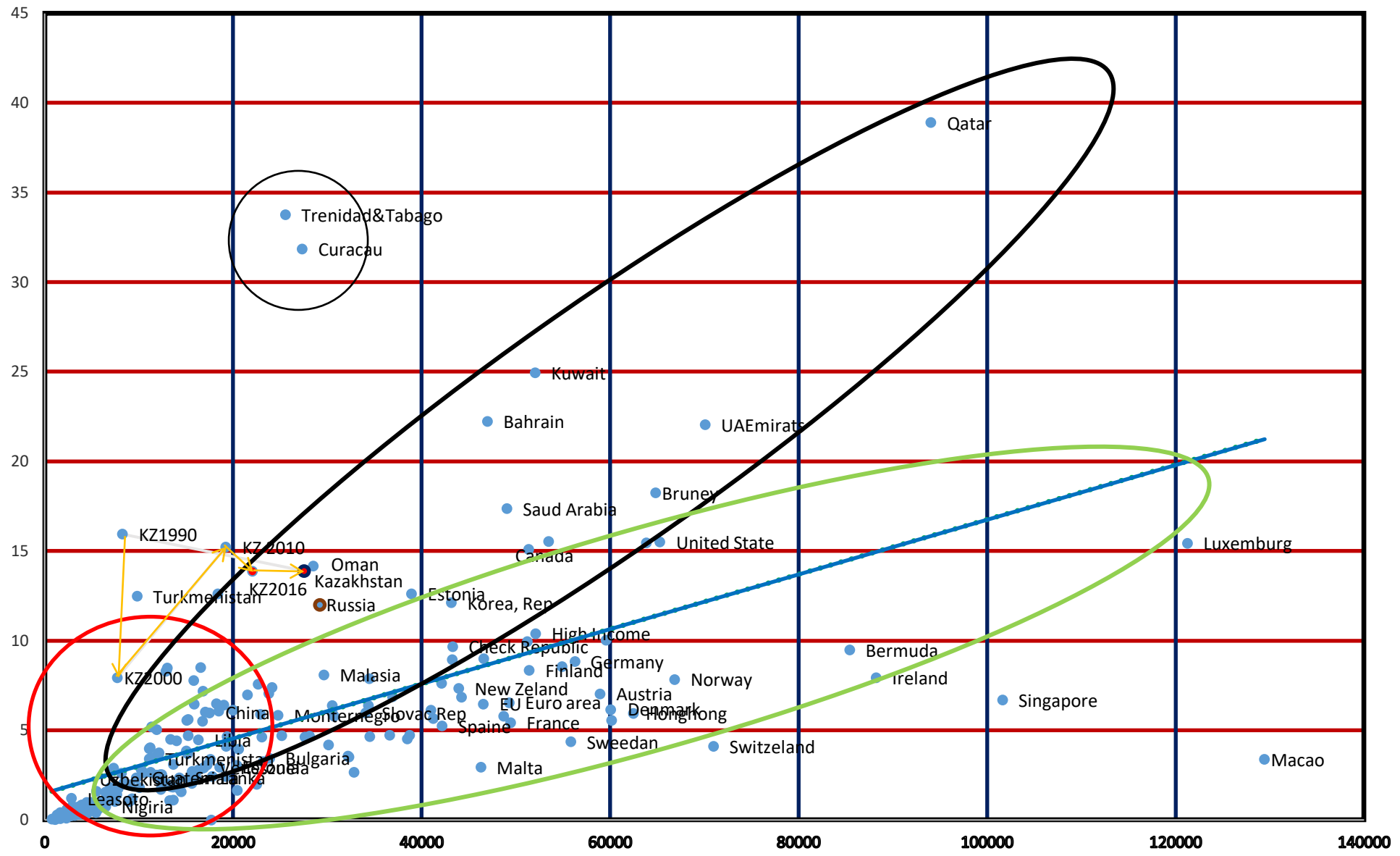
National companies' development plans
(no implementation deadline fixed)

As part of the implementation of the Strategy, a 10-year **roadmap** will be developed



All subordinate documents of the State Planning System will be revised to reflect the provisions of the Strategy

GHG(CO2) - GDP WorldWide Country Diagram





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Thank you!