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EU4Climate programme helps governments in the six EU Eastern Partner countries Armenia, Azerbaijan, Belarus, Georgia, the Republic of Moldova and Ukraine to take action against climate change. It supports countries in implementing the Paris Climate Agreement and improving climate policies and legislation. EU4Climate is funded by the European Union and implemented

Roadmap for Long-term Low-emission Development Strategy

AZERBAIJAN

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Contents

Acronyms

ARC	Agrarian Research Center
AS	Agrometeorology Services
ASA	Agrarian Service Agency
AZN	Azerbaijani manat (New)
AZM	Azerbaijani manat (Old)
DRR	Disaster Risk Reduction
EU	European Union
EWS	Early Warning System
FAO	Food and Agriculture Organization of the United Nations
FSA	Food Safety Agency
GIS	Geographical Information Systems
MoA	Ministry of Agriculture
MoE	Ministry of Economy
MoES	Ministry of Emergency Situations
MoENR	Ministry of Ecology and Natural Resources
NFP	National Forestry Program
NHS	National Hydrometeorology Service
NGO	Non-Governmental Organization
JSC	Joint Stock Company
UNFCCC	United Nations Framework Convention on Climate Change
WMO	World Meteorological Organization

1. Introduction

The scientific community almost unanimously agrees that the global climate is changing—and this change is strongly correlated with human activity. According to the IPCC's Special Report on Global Warming of 1.5 °C, human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate[1].

Greenhouse gas emissions (GHG) are increasing rapidly especially in many developing countries, due in part to the pursuit of national development goals. The drivers of increasing emissions in these countries are integrally linked with national and regional policies in many sectors including energy, transport and land use. Climate change policy may also impact broader national priorities, such as poverty alleviation, sustainable development and economic growth. Given these inter-linkages, aligning climate change priorities with economic development and/or growth strategies can help to advance national policy in a more systematic, cohesive and strategic manner.

Besides incorporating reduction of GHGs into national development strategies, a number of both developing and developed countries have launched preparing specific, comprehensive and long-term climate change strategies under different names, such as green growth strategies, climate-compatible development plans, low carbon development strategies and national climate change strategies and action plans. Following the EU initiative to introduce Low Emission Development Strategies (LEDS) in the international platform as a means of granting financial support to developing countries, the concept of LEDS was proposed in the United Nations Framework Convention on Climate Change (UNFCCC) negotiations in Copenhagen Accord (2009), Cancun Agreements (2010) and Durban outcomes (2011). No formal definition of LEDS has been provided in Cancun Agreements and subsequent COP decisions. However, common understanding of the concept is that a Low Emission Development Strategy (LEDS) should be a country led, long-term strategic plan to achieve economic growth and other development goals while reducing GHG emissions trajectories. The general purpose of a LEDS has been to help developing countries guide their processes and actions on climate change (mitigation and adaptation) in line with their development priorities. LEDS have been associated with national development plans and strategies outlining low emissions and climate resilient economic growth. Implementation of LEDS could be achieved through selection of measures, including NAMAs (Nationally Appropriate Mitigation Actions).

NAMAs are policies, programmes and projects devised under the UNFCCC as part of the Cancun Agreements at COP.16 (2010) as instruments to address, on a voluntary basis, GHG emission reductions specifically by developing countries. In the UNFCCC context, Developing Countries may undertake NAMAs to contribute to the global greenhouse gas (GHG) emission reduction efforts, on the condition of receiving support from developed countries. The concepts of NAMAs are submitted to the NAMAs Registry, administered by the UNFCCC Secretariat. Developing countries have been primarily using the NAMA Registry to seek funding for their NAMAs both for developing the concept and documentation, and for implementing those that

[1] IPCC, 2018: Global Warming of 1.5°C.An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press, p.4.

have been already planned. It is possible to enter in the registry NAMAs funded by developing countries from own resources. Developing countries are prepared to register NAMAs funded by themselves in order to seek public recognition of own voluntary mitigation efforts. Another purpose of the NAMA registry is to facilitate financial flows and capacity-building, and technology support for NAMAs provided to developing countries by Annex I Parties and international organisations.

LEDS reflect a country's unique circumstances and development goals, building on existing frameworks and country progress in addressing climate change. LEDS generally have common components that include greenhouse-gas inventories, business-as-usual scenarios, alternative emissions scenarios, high-priority actions, implementation plans, and evaluation.

Under the Paris Agreement, all countries, not just developing country - Parties to the Agreement, have been invited to communicate long-term low emission development strategies, taking into account their common but differentiated responsibilities and respective capabilities, in the light of different national circumstances (Art. 4.19 of the UNFCCC).[2] These strategies will play an important role in guiding countries toward the global temperature goals of limiting warming to 1.5-2°C above pre-industrial levels, and provide the necessary direction to inform the enhancement of nationally determined contributions (NDCs). In line with paragraph 35 of decision 1/CP 21, all Parties to the Paris Agreement are invited to submit to the UNFCCC Secretariat [3] their LT-LEDS. Similar to LEDS, development and submission of LT-LEDS are not obligatory, but rather voluntary. Parties to the Agreement that submit their LT-LEDS are expected to implement these from 2021 onwards.

The purpose of LT-LEDS is not merely to give a direction to long-term, low-emission, climate resilient development of a country, in line with its sustainable development goals, as in the case of LEDS under the UNFCCC. LT-LEDS are to demonstrate the pathway chosen by countries to (jointly) achieving the Long-Term Goal of the UNFCCC and Paris Agreement.

The Goal of the Paris Agreement formulated by Parties to the Agreement is to jointly hold the increase in the global average temperature to well below 2°C and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels. According to Article 4.1 of the Paris Agreement, „to achieve the long-term temperature goal set out in Article 2, Parties should aim to reach global peaking of greenhouse gas emissions as soon as possible, recognizing that peaking will take longer for developing country Parties, and to undertake rapid reductions thereafter in accordance with best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century, on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty".

The main aim of the report is to provide guidance to design preparatory studies for developing LT-LEDS for Azerbaijan in line with the country's national circumstances and the related international context.

The report consists of seven chapters and an annex. Key concepts behind low emission development (definition, scope and purposes of LEDS), evolution of LEDS in international climate policy discourse (including examples of LEDS worldwide) and preparation process of

[2] Article 4, paragraph 19, of the Paris Agreement: *Parties (should) "strive to formulate and communicate **l**ong-**t**erm **l**ow greenhouse gas **e**mission **d**evelopment **s**trategies, mindful of Article 2, taking into account their common but differentiated responsibilities and respective capabilities, in the light of different national circumstances"*

[3] The UNFCCC Secretariat is also serving the Paris Agreement.

LEDS will be explained in Chapter 1. In Chapter 2, global trends in relation to climate change policies and actions with a focus on important countries that are neighbouring and have strong trade relations with Azerbaijan will be addressed. The current socio-economic situation in Azerbaijan will be analyzed in the light of existing policies in Chapter 3. In Chapter 4, the legal, political and institutional framework for designing and preparing LEDS will be drawn. Chapter 5 will provide information on selected sectors (namely energy, transport, agriculture, land use, waste and industry) including sector-specific indicators and cross-cutting issues such as gender equality. In Chapter 6, emissions scenarios based on LEAP (Long-range Energy Alternatives Planning) model will be developed. Last but not least, key elements of implementation, monitoring and evaluation mechanism to increase transparency and accountability of LEDS policies will be submitted in Chapter 7. The Annex (Chapter 8) will include details of LEDS preparation process such as organizational issues (including actors mapping and stakeholders' responsibilities), institutional arrangements (including establishment of working groups) and risk management.

2. Long Term Low-Emission Development Strategies (LT-LEDS)

2.1. Definition, Scope and Purposes of LT-LEDS

LT-LEDS is a long term low emission development strategy that countries – Parties to the Paris Agreement were invited to submit in 2020 to the Secertariat of the United Nations Framework Convention on Climate Change (UNFCCC Secretariat), serving also the Paris Agreement which is an agreement concluded by Parties to the UNFCCC in 2015. Decision 1/CP.21 operationalising the Paris Agreement defined a voluntary character of the LT-LEDS. Like LEDS which were encouraged before the Paris Agreement had been adopted, LT-LEDS are country-owned and country-driven, high-level, comprehensive and long-term strategies developed by domestic stakeholders, aiming at decoupling the economic growth and social development from GHG emissions growth. However, unlike LEDS, LT-LEDS have a time horizon of 2050, and should present an outlook torwards climate neutrality that countries need to achieve in order to adequately contribute to the Long-Term Goal of the Convention and of the Paris Agreement.

By signing up to the Paris Agreement, the signatories jointly subscribed to the Paris Agreement Goal to (jointly) hold the increase in the global average temperature to well below 2°C and to pursue efforts to limit the global average temperature increase to 1.5°C above pre-industrial levels. According to the International Panel on Climate Change (IPCC), an international scientific body advising Parties to the UNFCCC, in order to jointly achieve the below 2 degree goal, total global CO2 emissions have to decline by about 20% in most pathways (10% to 30% interquartile range by 2030, depending on scenario) and reach net-zero around 2075 (*Total GHG emissions* reach net-zero by the end of this century). If Parties to the Paris Agreement jointly undertook to achieve the 1.5 degree goal (as recommended by the IPPC) by 2030 global net anthropogenic CO2 emissions would have to be reduced by 45% from 2010 levels and reach average 'net-zero' around 2050 (*Total GHG emissions* reach net-zero between 2063 and 2068**.**)

The special report of the IPCC on the 1.5 degree Goal (IPCC 1.5 SR) advocated the increase of joint global ambition of the Long Term Goal (LTG) from 2ºC to the 1.5ºC in order to increase the stringency of the target to safeguard the ecosystems and preserve biodiversity, and to enable better adaptation to climate change.

Under the 2-degree scenario, the world would lose all the coral reefs, for example, whereas in 1.5 ºC scenario, about half of the coral reefs could survive. Many more species would be lost under 2ºC than under 1.5 ºC scenario. Aiming at the more stringent 1.5°C global goal, countries would significantly reduce the expected biodiversity loss, and costs of adaptation to climate change.

LT-LEDS is a forward-looking, transformative, analytically-sound, actionable, low-emission growth strategy with a defined 2050 goal and a pathway towards reaching net-zero emissions. Developing countries, including Azerbaijan, have more time to peak their emissions than developed countries. Nevertheless, all countries have to achieve climate neutrality in the second half of this century.

Understanding the stakes that global community is facing, as many as 73 developed and developing countries have already subscribed to achieving net zero emissions by 2050.

All LT-LEDS submitted to the UNFCCC so far show the pathway to achieving climate neutrality/net zero emissions in 2050 or in the 2nd half of the century

There is no one-size-fits-all LT-LEDS framework. It should build upon and influence existing national strategies and processes.

LT-LEDS essential features can be summarized as follows:

- LT-LEDS is a policy instrument that identifies the sources of a country‘s GHG emissions and prioritizes options for their mitigation.
- LT-LEDS is defining 2050 emissions reductions goal, aiming at a date at which a counry will achieve climate neutrality/zero emissions in the second half of this century.
- LT-LEDS provides a pathway for the implementation of consecutive Nationally Determined Contributions of a Party to the Paris Agreement.
- LT-LEDS focuses on achieving development through mitigation actions.
- LT-LEDS helps to improve framework conditions for private sector investment in mitigation actions.

The approach for scoping an LT-LEDS depends on the national conditions. For instance, some rainforest countries may focus primarily on the forestry and agriculture sectors and include adaptation aspects, as these sectors are very vulnerable to climate change. Some newly industrializing countries may have the resources and data available to perform a comprehensive analysis of all sectors. Regardless of country’s circumstances, some essential elements for the LT-LEDS preparation are listed as follows:

- A long-term strategic vision with 2050-time horizon and and outlook towards achieving net zero emissions in the second half of this century, in line with the IPCC recommendations, based on and integrating national development priorities, global agreements and scientific projections.
- Baseline GHG emissions analysis and projections under a business as usual (BAU) scenario, juxtaposed with appropriate measures and scenarios, taking into account analysis of all options available to move as quickly as possible towards net-zero emissions in line with the IPCC recommendations, with 2050 goal as a signpost for the overall national efforts and a roadmap for consecutive Nationally Determined Contributions of a country to the Paris Agreement
- Mitigation opportunities and costs

- Prioritization of key mitigation sectors and measures into sectoral strategies according to some criteria such as marginal abatement, co-benefits, ease and timeframe of implementation, socio-economic and environmental impacts, vulnerability of mitigation actions, public-private partnership potential and synergies and trade-offs with existing national strategies and policies.
- Identification of policies and measures and definition of targets presented in a short- to medium-term implementation roadmap with 2050 timeframe, intermediate emission targets, a barrier analysis and a description of the necessary policy mix, the supporting institutional and legal framework and an assessment of capacity building needs.
- Assessment of needs for financial capacity building and technical support and identification of available domestic budget sources and potential sources of international financing.

LT-LEDS supports sector transformation through a national, economy-wide approach. It may serve a range of domestic purposes for government, the private sector, the general public as well as other institutions and stakeholders. The process of establishing a LEDS can enhance co-ordination across different ministries and communication with other stakeholder groups such as businesses and civil society, and also increase public awareness of climate change science and policy. LT-LEDS can help guide diversification and transformation of an economy, for instance from a fossil-fuel basis to a renewable one. Clarification on economic development and climate change priorities, including plans for domestic clean energy technologies, can in turn help provide early signals to investors in the private sector as well as for new possible directions for research and development.

Beyond the domestic functions that are served by the adopted LT-LEDS, it will also inform the international community about the contribution that country intends to make in terms of sharing the burden of global GHG abatement effort necessary to achieve the joint long-term global goal of the Paris Agreement. LT-LEDS will provide information to better assess global climate change impacts and actions and how mitigation actions are expected to impact emission trajectories. The international climate change community has an interest in better understanding planned growth pathways and future financial or technical support needs of countries that are articulated through LT-LEDS. Overall, LT-LEDS can help to enhance transparency, foster exchange of information and lessons learned, build trust across countries, and provide international recognition for climate actions. For these reasons, the UNFCCC Secretariat has been tasked by Parties to the Paris Agreement to prepare a synthesis report on LT-LEDS submitted by countries.

On the other hand, LT-LEDS could also help to steer funding/support to country-driven priorities.

2.2. LEDS in the International Climate Policy Discourse

The initial proposal to introduce LEDS, put forward by the EU in 2008[4], highlighted how information on planned low-carbon pathways can help to inform the international community about funding needs and priorities and to help gauge the level of global climate change action (where this information is available). This concept was bolstered by the preparation of strategic climate change planning documents by a number of countries, with leaders at the Major

[4] Clapp, C., Briner, G. and Karousakis, K. (2010). **Low-Emission Development Strategies (LEDS): Technical, Institutional and Policy Lessons**, OECD/IEA, COM/ENV/EPOC/IEA/SLT (2010)2, France, p. 12.

Economies Forum at L'Aquila, Italy in July 2009 declaring that their countries would prepare low-carbon growth plans.

At the 15th Conference of Parties (COP-15) in Copenhagen, low-emission development strategy was recognized as "indispensable to sustainable development". In the context of green growth initiatives promoted by development organizations, national institutions and non-governmental organizations (NGOs), the Copenhagen Accord[5] recognized that developing countries seeking to eliminate poverty and achieve sustainable development need to follow LEDS. This was further reflected in the Cancun Accords[6] and in the decisions in Durban[7].

Examples of LEDS worldwide

As of 2019, over 115 countries including South Africa, Indonesia, Cambodia, Colombia, Mexico and Bangladesh have developed LEDS, with support from over 75 international institutions. Several international initiatives have recently been set up to help prepare, and ultimately implement, LEDS, particularly in developing countries where the institutional capacity and resources may be limited. In addition, there are many bi-lateral initiatives underway, including support for LEDS or related capacity development from the EU, Japan, Norway and the US.

In this regard, two country cases are submitted as follows:

South Africa Long-Term Mitigation Scenarios (LTMS)

Starting from 2007, The World Bank, assisted by the UNDP and ESMAP (Energy Sector Management Assistance Program), supported implementation of South Africa's Long-Term Mitigation Scenarios (LTMS), which involved collaboration between the Department of Environmental Affairs and Tourism and the University of Cape Town.

The LTMS encompassed five scenarios, including a baseline scenario termed Growth without Constraints, to explore options for decreasing GHG emissions out to 2050, making use of the MARKAL optimization model for energy-related emissions. The support provided included an international peer review of the LTMS prior to submission to the Cabinet and the provision of substantial technical assistance on energy efficiency, demand side management, and power rationing in light of the urgency of these issues due to the acute power crisis that struck South Africa in January 2008.

The gap between South Africa's baseline scenario and the ambitious Required by Science scenario of 60 to 80 percent cuts in GHG emissions is projected at 1,300 MtCO2e by 2050, or more than three times current emission levels. Although achieving such cuts will require large-scale investment in low carbon electricity generation and structural reform, the work carried out suggests that early progress can be made through energy efficiency savings.

A large proportion of these savings would be obtained from a small number of industrial consumers through a Power Conservation Program (PCP), the title for a market-based power rationing system. This was introduced to complement other emergency measures in response to the power crisis, including the Standard Offer approach described below and heightened

[5] Copenhagen Accord (2009). Draft Decision CP.15: Copenhagen Accord, UNFCCC/CP/2009/L.7, 18 December 2009.

[6] Decision 1/CP.16 - The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention.

[7] Decision 2/CP.17 - Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention

customer awareness on the real-time status of the electricity system. The design of the PCP borrowed heavily from the experiences in Brazil and California which, like South Africa, suffered from many years of mispricing a scarce resource, impairing the power sector's ability to invest in new capacity. In Brazil, which faced an energy constraint, demand response was used to reduce power use (or MWh), while California had to confront a capacity crunch (a lack of power, or MW). South Africa was unique in the sense that the power system was both energy and capacity constrained, making the experiences from both places relevant.

A second component to the work was the review and discussion of international best practices in implementation of energy efficiency and demand side management, including the role of special purpose funds, such as the one operated by Eskom Pension and Provident Fund (a finance institution in South Africa). By analyzing the experiences of Australia, India, the United States (in particular, the states of New Jersey, New York, Texas, and California), and other countries, the work led to the recommendation of the Standard Offer approach, which is a mirror image of a feed-in tariff mechanism that can be used to create incentives for the delivery of energy efficiency improvements from a range of benchmarked technologies.

The Standard Offer would replace the previous approach whereby energy efficiency and demand-side management projects would bid into a central fund, with approval granted on a case-by-case basis. This process proved to be slow, cumbersome to administer, and non-transparent. As a result of the work undertaken, the Standard Offer approach was adopted by the Government of South Africa in 2010 and further extended in 2011, for the following energy efficiency projects: government-owned buildings, commercial buildings, existing housing developments, solar water heating projects, and energy conservation in the industrial sector.

The ownership of South Africa's LTMS study is driven by numerous entry points for stakeholder engagement. Scenario Building Team consisted of 80 individuals from government, industry, civil society, labor groups, and the technical community, spanning different sectors. Scenario teams commissioned research, identified mitigation actions, and debated and agreed on modeling inputs and assumptions. Long-Term Mitigation Scenario (LTMS) process highlighted the following good practices:

- Articulating Benefits in Concrete, Relevant Terms: Impact assessments of LEDS actions were conducted and published by government, research, and international organizations.
- Presenting an Objective, Balanced Assessment: LTMS shows both positive and negative impacts of LEDS actions on GDP, employment, and poverty.
- Enhancing Credibility: LTMS included stakeholder engagement and dialogue to understand and address key concerns and support broad consensus.

<u>Mexico Low Carbon Study</u>

This study provided an analysis of how the country could significantly reduce its emissions without hindering economic growth. By making a common cost-benefit analysis that included externality values where available, the study assessed low carbon interventions in five key sectors:

- Electric power - generation and distribution
- Oil and gas - extraction, processing, and distribution

- Energy end use - energy efficiency in the manufacturing and construction industries, and the residential, commercial, and public sectors
- Transport - primarily road transportation
- Agriculture and forestry - crop and timber production, forest land management, and biomass energy

The study used a cost effectiveness analysis to assess 40 near-term priority mitigation measures, which taken together could avoid 477 Mt CO2, costing Mexico approximately US$ 64 billion to 2030 (US$ 3b/year) to adopt. This could result in Mexico's GHG emissions being virtually the same in 2030 as they are today but with significant GDP and per capita income growth. Furthermore, this low carbon scenario is conservative as it is based on only 40 interventions and do not assume any major advances in technology.

The largest savings identified were from agriculture and forestry (150 Mt CO2e), comprising reforestation, commercial plantations, and measures to reduce emissions from deforestation and forest degradation. A double dividend was observed where improved forest management can be combined with the substitution of fossil fuels with sustainable biomass. Transport was the second largest contributor to GHG emissions savings (131 Mt CO2e), where rapidly expanding vehicle ownership has led to a four-fold increase in energy use since 1973. Here, integrated urban transport and land-use planning will be critical factors, alongside improvements in vehicle efficiency.

The study identified high priority actions with significant scale-up potential that could be undertaken over the next five years. These include wind farm development, particularly in Oaxaca State, bus rapid transit based on projects in Mexico and piloted in other parts of Latin America, cogeneration in Petróleos Mexicanos (PEMEX) facilities, avoided deforestation based on the Los Tuxtlas project in Veracruz, and an expansion of efficient lighting and appliances programs.

The results and findings of the Mexico low carbon study directly contributed to:

- The 2009 publication of Mexico's Special Climate Change Program 2009-2012, which identifies GHG savings of 51 Mt CO2e by 2012, leading to an 11 percent absolute reduction in emissions from a 2000 baseline by 2020
- The investment plan submitted by Mexico to the Clean Technology Fund
- Two investment loans by the World Bank to Mexico on urban transport and energy efficiency
- The formulation of Mexico's Development Policy Loan (US$ 401 million) from the World Bank in 2010 for low carbon development, which supports policy measures for clean energy, sustainable transport, efficient housing, and sustainable forest management.

Mexico's long-term target is to achieve a 50 percent reduction in emissions from 2000 levels by 2050. Achieving this will involve, in the words of the Government of Mexico, "policy mainstreaming" across all areas of the economy and society, and priority-setting at the "highest level of all tiers of government."[8]

[8] ESMAP. (2012). Low Carbon Growth Country Studies Program, **Planning for a Low Carbon Future: Lessons from Country Studies**, Knowledge Series 011/12, USA, p. 53.

2.3 LT-LEDS and their relationship with NDCs

The Paris Agreement represented a significant step forward in global efforts to tackle climate change in that, for the first time, it involves all Parties including both, developed and developing countries. Each Party to the Paris Agreement has to develop successive Nationally Determined Contributions (NDCs) every five years and each consecutive NDC must be more ambitious than the previous one. Countries also agreed on the no-backsliding rule, meaning that NDCs cannot lapse in any aspects of ambition compared with the previously declared efforts.

In the context of ambition, there is a strong link between NDCs and long-term low emission development strategies (LT-LEDS). Under the Paris Agreement, countries have been invited to communicate long-term low emission development strategies, taking into account their common but differentiated responsibilities and respective capabilities, in the light of different national circumstances (Art. 4.19 of the UNFCCC). These strategies will play an important role in guiding countries toward the global temperature goals of limiting warming to 1.5-2°C above pre-industrial levelsand provide the necessary direction to inform the enhancement of nationally determined contributions (NDCs).

LT-LEDS have a particularly important role to play under the Paris Agreement, as they will help guide the ambition levels in future NDCs. More and more countries, as well as sub-national actors such as cities, are setting ambitious, and often zero carbon, targets for 2050.

NDCs are stepping stones in the achievement of 2050 target and beyond. While LT-LEDS are voluntary, NDCs are obligatory under the Paris Agreement. Crucially, it is not possible to fully understand what the purpose of LT-LEDS is without taking into account the role of Nationally Determined Contributions as steps in achieving the joint global long-term goal of the UNFCCC and Paris Agreement.

Table: A comparison of LT-LEDS and NDCs

LT-LEDS	NDCs
Legal reference: Paris Agreement	Legal reference: Paris Agreement
Time horizon: (2021) – 2050	Time horizon: (2021) - 2030
Revision/correction: as appropriate (should be aligned with the NDCs evaluation)	NDC cycle: Global stocktake 2023, NDC review process 2024, next round of NDCs submissions 2025 (Article 4.9 of the Paris Agreement)
Status: not obligatory (Parties are invited to submit their LTS in 2020)	Status: obligatory under the Paris Agreement
Scope and content –not defined Possible elements listed in table 1. Sectors aligned with the NDC Consecutive NDCs as stepping stones towards the 2050 goal Need to announce the peaking of emissions and the levels of emissions in 2050 (Over 70 countries are planning to become zero emissions countries in 2025.)	Scope and content mitigation: Decision 4/CMA.1 provides guidance in relation to the mitigation part of the NDCs. Annex to this decision contains a list of possible pieces of information facilitating clarity, transparency and understanding of NDCs, split into six main categories: 1. Quantifiable information on the reference point;

	2. Time frames and/or periods for implementation; 3. Scope and coverage; 4. Planning processes; 5. Assumptions and methodological approaches; 6. Information on how the Party considers its NDC is fair and ambitious in the light of its national circumstances; 7. Information on how the nationally determined contribution contributes towards achieving the objective of the Convention as set out in its Article 2.
	Scope and content adaptation: Decision 9/CMA.1 contains guidance on information to be included in the adaptation communications. However, this information pertains also to the adaptation component of the NDCs. Suggested elements of the adaptation communication/adaptation part of the NDC are listed in the annex to the decision and may contain information on: a) National circumstances, institutional arrangements and legal frameworks; b) Impacts, risks and vulnerabilities; c) National adaptation priorities, strategies, policies, plans, goals and actions; d) Implementation and support needs of, and provision of support to, developing country Parties; e) Implementation of adaptation actions and plans; f) Adaptation actions and/or economic diversification plans (including those with mitigation co-benefits); g) How adaptation actions contribute to other International frameworks and/or conventions; h) Gender-responsive adaptation action and traditional knowledge, indigenous people's knowledge and local knowledge systems; i) Any other information related to adaptation.

	Decision 18/CMA.1 contains modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement. The reporting requirements, outlined in detail in the decision, will not kick in until 2024. The content of the current NDC to be submitted in 2020, should consider the need to report (to the UNFCCC secretariat), in advance of the first global stocktake, on the implementation of the assumed NDC targets, declared policies and measures.

2.4 Relation to Other National Strategies

The value-added of similar types of forward-looking strategies was recognized under previous international environmental agreements. The Rio Summit under Agenda 21, for example, introduced the concept of National Sustainable Development Strategies (NSDS), and suggested that all countries "should" develop one. These strategies aim to build upon and harmonize the various sectoral economic, social and environmental policies and plans that are operating in the country. As of 2009, 106 Member States of the UN were implementing NSDS, as per their reporting to the Secretariat of the Convention on Sustainable Development.

Existing development strategies vary with respect to the extent they incorporate climate change concerns. Equally, existing national climate change strategies may not necessarily be integrated with development planning.

Whether a LEDS is primarily a development strategy with a strong climate component, or vice versa, is likely to depend on the country's national circumstances and priorities. For example, developing countries may focus on addressing poverty while taking into account climate change, whereas developed countries may focus more on a comprehensive climate change strategy that encompasses economic growth planning. There is a risk of additional burden with too many overlapping, and potentially conflicting, strategies. Countries should consider carefully how these planning tools fit together and build upon each other. Figure 1 illustrates some existing national strategies that are relevant to both climate and development goals and could be used to feed into an effective LEDS[9].

9 OECD, p. 15-16.

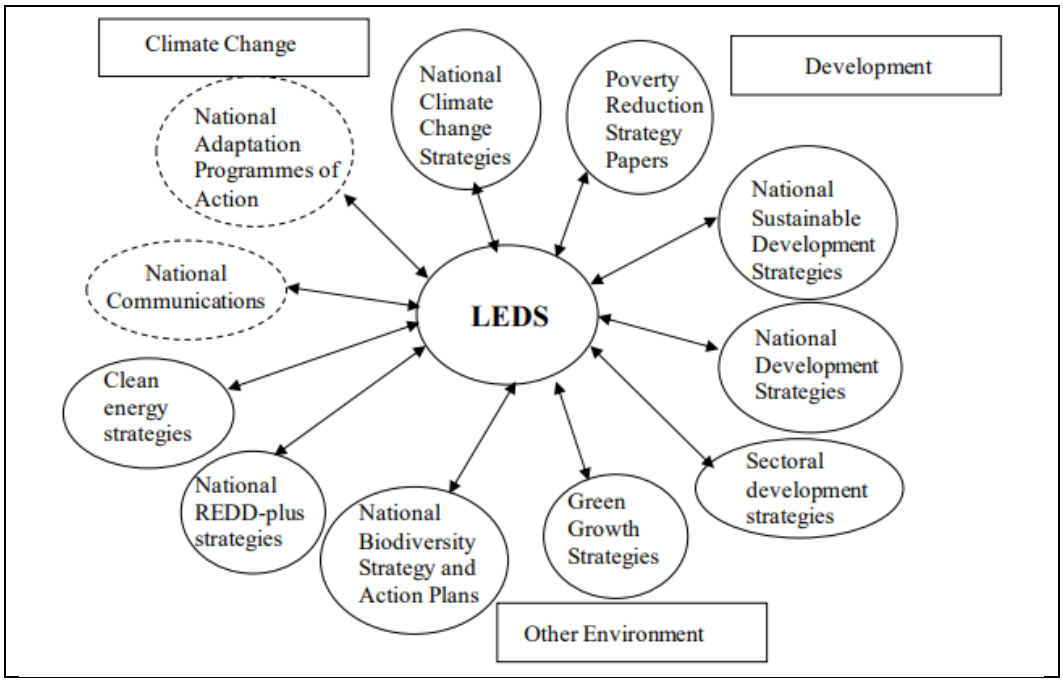


Fig 2.4.1 Existing strategies of relevance to LEDS

LT-LEDS with a 2050 target, focus on mitigation scenarios and their implementing measures, with regular updates synchronized with the NDC cycle. A vision of climate neutrality in the second half of this century becomes Long-Term Low Emissions Development Strategy with a primary purpose of guiding and supporting the implementation of Nationally Determined Contributions to the Paris Agreement.

How is a LT- LEDS unique, and what is its value-added? This can help to clarify what elements may usefully be included in a LT-LEDS versus what may be redundant of other exercises and thus left out to avoid duplication. For example, while many existing national climate change strategies may also contain forward-looking components, they may not adequately integrate economic development with climate change, so this could be a core objective of aLT-LEDS. Moreover, several of the existing national climate change strategies prepared to date only plan forward for the short-term, i.e. up to 2012.

2.5 Preparation process of LT-LEDS

A LT-LEDS is work in progress, as the underlying assumptions and projections need to be constantly reviewed and updated to reflect changing circumstances. Thus, the development of a LT- LEDS is a long-term, dynamic, cyclical process that should continue for years or decades as emission pathways change.

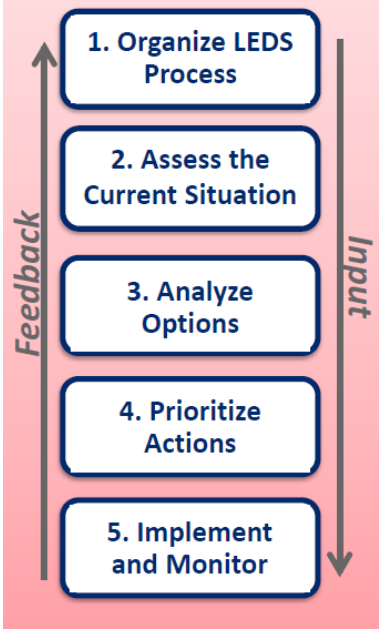


Fig 2.5.1 **Flow Chart of LT-LEDS Planning**

In the first step, Long Term Low Emission Development Strategy process is organized, and the necessary financial and human resources are assured. To this end, a clear vision for long-term, transformative LT-LEDS with 2050 time horizon should be driven by high-level political support and consensus building with stakeholders at all levels. Linking LT-LEDS vision and targets to national development goals is also critical. A strong cross-sectoral, whole-of-government institutional structure to support the LT-LEDS process helps to ensure robustness and longevity of LT- LEDS.

In the second step, the current situation is analyzed. A strong understanding of existing development objectives, analysis, policies, and planning processes will enable LT-LEDS teams to build on the existing efforts and engage key stakeholders in LT-LEDS-related planning and implementation. In this context, development objectives are identified to understand the country-specific context and drivers for LT-LEDS; existing policies, practices, analyses, and technologies (economy-wide and sector specific) are reviewed to assess their possible impact on development and emission trends; and existing institutional capacity is assessed to develop and implement LT-LEDS. Furthermore, LT-LEDS aim to create an environment for better-informed, data-driven economic, social, and environmental decision-making; comprehensive data on economic activity, development impacts, and GHG emissions are at the heart of such data-driven analysis. Developing a GHG inventory is a critical starting point for reducing GHG emissions.

The third step involves analyzing options by developing a business-as-usual (BAU) scenario and several low emission development scenarios until 2050, taking into account options for reaching the climate neutrality in line with the IPCC recommendations, and assessing development impacts. The choice of specific tools and methods to analyze LT-LEDS options until 2050 should reflect country priorities, existing options for emissions reduction, access to the means of implementation (finance, technology, capacity-building), and local expertise. In this regard, a transparent, economy-wide BAU scenario serves as a baseline for defining intermediate targets and tracking the impact of mitigation options. Low emission development scenarios provide information about how much and how fast emissions will change relative to the BAU scenario.

Assessing the impacts of LT-LEDS actions on development objectives informs analytically based decision making by identifying benefits and trade-offs to low emission development pathways and ensures alignment with national development goals.

In the fourth step, actions are prioritized, and implementation plans are prepared. The NDC becomes a stage of 5 years in which a progress towards 2050 goal is made, and the NDC cycle serves as a mechanism for checking the progress and correcting the long-term plans. A key component of a Long-Term Strategy is a portfolio of high-priority actions that, if enacted, have the potential to reduce emission trajectories and meet a country's development objectives. For that purpose, LT-LEDS actions are prioritized by transparent and analytically robust decision-making processes, and a broad set of criteria that reflect a country's specific development priorities is applied. Implementation plans contribute to actionable LT-LEDS by establishing finance, institutional, educational, and other enabling mechanisms for implementing high-priority actions. These plans also improve returns on investment and reduce risks of implementing high-priority actions which can help attract adequate financing to implement a LT-LEDS. Implementation plans that incorporate strategies generate investment opportunities.

The final step concerns implementation and monitoring. In this framework, LT-LEDS implementation is founded on effective programming, upfront formulation of indicators and evaluation. Effective LT-LEDS policy portfolios contain a coherent mix of fiscal and policy incentives; regulations and mandates; and an MRV system. Monitoring and evaluation facilitate LT-LEDS implementation by increasing transparency and accountability, enhancing stakeholder trust, facilitating adaptive management, and informing future programs.

During the whole process, stakeholder participation and capacity building are crucial for the success of implementation. Some key success factors and key pitfalls for LT-LEDS planning can be identified as follows:

Key LT- LEDS success factors:

- Top-level commitment and leadership
- Integration into development planning, cross-cutting approach
- Strong data basis & scientific analysis (GHG inventory, BAU, scenarios, etc.)
- Transparency in approach and assumption
- Stakeholder participation and engagement
- Acceptance of technical assistance and use of peer-to-peer learning
- LT-LEDS viewed as a living and dynamic document
- NDC cycle aligned with LT-LEDS review and revision, if necessary (with no-backsliding rule as a safety factor)
- Inter-ministerial coordination structure including key ministries (finance, economy, energy, etc.)

Key LT-LEDS pitfalls:

- External imposition
- Poor integration of sectoral strategies
- Insufficient monitoring and evaluation
- Faulty corrective mechanisms
- Absence of stakeholders' support and involvement
- Lack of information

Suggested Organizational Framework and Process
Steering Committee (SC) for LT-LEDS preparation

Steering Committee for the Development of LT-LEDS (Long Term Low Emission Development Strategy) is established to plan and coordinate LT-LEDS preparation works, to ensure consistency between national development goals and LT-LEDS objectives set for 2050, to improve and revise LT-LEDS within the set timeframe.
The Steering Committee is composed of the representatives from relevant public institutions, ministries that coordinate the sectors causing emissions, and non-governmental organizations representing the business and trade community (for instance, sectoral associations and unions). In this regard, the following state agencies, private and non-governmental organizations are suggested to become the members of the Steering Committee:

1. The Ministry of Ecology and Natural Resources
2. The Ministry of Energy
3. The Ministry of Transport, Communications and High Technologies
4. The Ministry of Agriculture
5. The Ministry of Economy
6. The Ministry of Finance
7. The Ministry of Education
8. State Statistics Committee
9. Azersu Open Joint Stock Company
10. Azerbaijan Amelioration and Water Management OJSC
11. Azerenergy Open Joint Stock Company
12. Azerishig Open Joint Stock Company
13. SOCAR
14. Azeristiliktechizat Open Joint Stock Company
15. Center for the Analysis of Economic Reforms and Communication
16. Azerbaijan National Academy of Sciences
17. Sectoral Associations and Non-Governmental Organizations
18. Private sector (potential ones)

If necessary, other organizations can also be invited to the Steering Committee meetings, depending on the subject discussed, bringing additional expertise and knowledge as contributions to the SC discussions.

The Ministry of Ecology and Natural Resources which is the National Designated Authority under the UN Framework Convention on Climate Change should coordinate the work of the Steering Committee.

The Steering Committee should also take the initiative to coordinate preparation and implementation of consecutive Nationally Determined Contributions.

Working groups

The working groups are composed of members representing relevant public institutions, private sector, academia and non-governmental organizations. Working groups can be organized in line with sectors of the economy that will contribute to the implementation of the LT-LEDS, and of its interim steps, identified as subsequent Nationally Determined Contributions.

1. Working Group on the Reduction of Emissions in the Energy Sector (Ministry of Energy)

1.1. Oil and gas
1.2. Electricity and thermal energy
1.3. Transport
1.4. Utilities
1.5. Renewable energy sources

2. Working Group on Agriculture (including forestry) (Ministry of Agriculture)

3. Working Group on the Reduction of Industrial and Waste Emissions (Ministry of Economy)

The Ministry of Ecology and Natural Resources is the permanent member of each working group and should participate at the meetings organized by each group.

If necessary, consultants can be involved in the discussions held by working groups.

At the first meeting, the coordinator on sectors should be identified by each working group.

Relevant training sessions are organized for each group, subgroup and coordinators before performing tasks.

Coordinators (working groups) will hold periodic coordination meetings to measure progress and discuss issues related to each other. The first two coordination meetings are held next month. The date of the next coordination meeting will be decided after holding the first two meetings.

Working groups occasionally draft and submit relevant reports outlining possible mitigation measures and based on emissions' mitigation scenarios reflecting possible contributions of each sector to the achievement of the interim (NDC) and long-term (2050) targets.

The working groups act in accordance with following special regulations and procedures:

1) Subject to Steering Committee (SC) decisions, the working groups are responsible for conducting research and reporting on the progress to the Steering Committee. Their work is supported by consultants providing necessary expertise.

2) Working Groups will perform relevant functions and tasks within the limits of their authority, i.e. the following activities may be carried out during the LT-LEDS preparation process, subject to a decision taken by the Steering Committee:

- Activity 1: Analyze the current situation (in line with existing plans and regulations, including data collection and evaluation).
- Activity 2: Conduct SWOT analysis (emphasizing major gaps and barriers)
- Activity 3: Develop and analyze policy and strategy options based on mitigation scenarios (prepare a Business-As-Usual/reference scenario and low emission development scenarios (such as With-Measures and With Additional Measures Scenarios, for example).
- Activity 4: Identify SMART (Specific, Measurable, Attainable, Realistic, Timely) indicators for each policy and strategy option. Study the best international practices, review the application opportunities and submit proposals.

- Activity 5: Assess the impacts of those scenarios on development priorities and their costs and benefits. Ensure the synergy with other policies through climate mainstreaming. Integrate gender considerations into policy and strategy options
- Activity 6: Prioritize policy and strategy options based on regulatory impact assessment and comprehensive risk assessment
- Activity 7: Suggest a mechanism for monitoring and evaluation
- Activity 8: Summarize the reports by areas in the strategy, draft the final text, conduct the initial discussion session, make appropriate additions and amendments and submit it to the Steering Committee.

In their work, working groups will be supported by consultants representing a Consultancy recruited through public tender in the fourth quarter of the year 2020. Emissions scenarios will be developed using the (Long-range Energy Alternatives Planning (LEAP) model. Other modelling tools may be considered, if deemed necessary by the working groups members to achieve the best results

3) Each working group considers cross-cutting issues such as the impact of climate change on the related sector, GHG inventory works, developing climate-related policy and strategy, education and public awareness, gender equality, climate change adaptation, finance, capacity building, technology development, measurement, reporting and verification (MRV), market-based tools and implementation and monitoring.

4) Each working group will meet at least once a quarter, as stipulated in its specific workplan.

5) Minutes of each meeting, including coordination meetings, technical meetings and workshops, as well as the working group meetings are prepared and distributed to the participants.

Monitoring the development of LT- LEDS

The work of the working groups is monitored by the project management team and the Steering Committee supported by the external consultancy.

Internal monitoring will be organized during the drafting of the strategy. The Project team will submit interim reports (once every 6 months) on its work to the Steering Committee for discussion with the Working Group of the State Commission in order to monitor the project. This timeframe can be reduced in consultation with SC. The sections that are ready will be considered by the Steering Committee, and relevant recommendations and instructions will be provided. This approach will ensure the timely elimination of possible gaps and barriers without waiting for the finalization of the document. Such reports will also be submitted to UNDP.

The proposed timeframe is presented in the Gantt chart which constitutes an annex to this report.

The Gantt chart is provisional and will be subject to a discussion and approval by the Steering Committee.

Finalization and presentation of LT-LEDS

The draft strategy prepared by the project team will be submitted by the UNDP to the Government of Azerbaijan which is represented by the Ministry of Ecology and Natural Resources. Subsequently, the strategy will be sent to the relevant government agencies in accordance with the internal procedures guiding interministerial consultations. The comments received from these agencies will be summarized and forwarded to the project team to be considered during a review of the strategy. If necessary, individual consultations with sectoral ministries will be conducted to clarify the outstanding issues.

The project team will return the updated version of the strategy to the Ministry of Ecology and Natural Resources, once all necessary additions and amendments are made. If the Ministry of Ecology and Natural Resources has no further amendments to add to this version, the strategy will be submitted to the Cabinet of Ministers for approval.

The Ministry of Ecology and Natural Resources and the Project Team will answer any questions raised by the relevant departments of the Cabinet of Ministers. If necessary, the Deputy Prime Minister in charge of the sector will send the document to the relevant government agencies to receive further comments. After receiving the feedback, the Project Team, together with the departments of the Ministry of Ecology and Natural Resources and the Cabinet of Ministers will introduce relevant amendments to the text, and the document will be submitted to the Deputy Prime Minister for approval by the Cabinet of Ministers. The final procedure is the adoption of the Resolution of the Cabinet of Ministers endorsing the document.

If the President deems it acceptable, the Prime Minister will submit the document to the Presidential Administration for approval under a presidential decision.

LT-LEDS will be submitted to the UNFCCC Secretariat, in line with Article 4, paragraph 19, of the Paris Agreement and paragraph 35 of decision 1/CP.21.

Figure 2.5.2: Gantt chart with provisional timeline for the preparation of the LT-LEDS*:

	02/22	01/22	12/21	11/21	10/21	09/21	08/21	07/21	06/21	05/21	04/21	03/21	02/21	01/21
Submission of LEDS to UNFCCC														
Approval of LEDS by the Government														
Approval of the LEDS by LEDS Planning board and submission to Government														
WGs submission of final version of LEDS to LEDS Planning Board for approval														
Fourth meeting of WGs														
Prioritizing of policy and options, preparation of indicators, monitoring and evaluation mechanism														
Third meeting of WGs														
Preparation of policy and strategies and BAU scenarios by WGs														
Second meeting of WGs														
Current Situation analysis and SWOT analysis by WGs														
First meeting of WGs														

3. Current socio-economic situation in Azerbaijan

3.1. Demographic trends

According to the latest census, which was conducted in 2019, the population of Azerbaijan was just above 10 million persons with population density 115 per km^2. The distribution of population across the regions of Azerbaijan can be seen from the Figure 1 below. It is obvious that the largest share most dwelled regions are Baku and Ganja cities whereas the less dwelled regions are Khizi and Shahbuz rayons. Annual rate of population growth is estimated to be on average 0.9%. Based on UN estimates Azerbaijan population could approach to 12 million persons in 2050. The largest share of the population in Azerbaijan live in urban areas with 52.8% however this figure is under the global average which is about 55.2% according to World Bank estimates. On the other hand, 47.2% of the population lives in rural areas. The birth rate remains almost stable for the last decade and in 2018, it constituted 14.2 babies per 1,000 persons. Although it is much less than in 1990-1991 (26 babies per 1,000 persons), it is still higher than the most developed countries of the world. Despite the fact that fertility rate decreased over the last years it still remains relatively high – 1.8 in 2018 and due to this Azerbaijan's working age population (15-64) has grown rapidly since 2000.

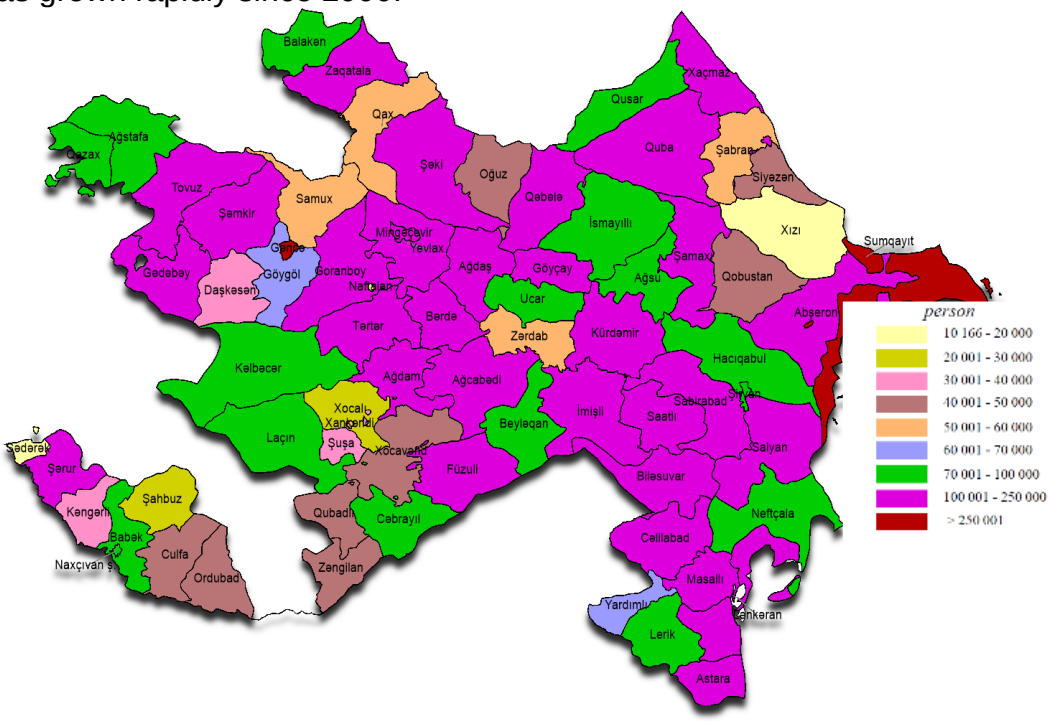


Fig 3.1.1. Distribution of population by regions of Azerbaijan

Demographic trends indicate further growth of the Azerbaijani population. According to the forecasts of UN, by 2030, the population of Azerbaijan will reach about 10.68 million, and by 2050, the population of Azerbaijan will be more than 11 million.

3.2. Economic structure of the country

Between 2000 and 2007, Azerbaijan boasted a per annum double-digit growth rate averaging 17.3% — one of the highest in the world. In the following years, 2008-2014, the country's growth rate was also positive and averaged around 3.8%. An extensive supply of crude oil coupled with high oil prices in global markets were the main contributors to such impressive economic development. The strong economic growth significantly improved living standards in the country. In particular, it led to a more than six-fold increase in per capita income of the population and a four-fifths decrease in the level of poverty. Subsequently, the World Bank included Azerbaijan in the list of upper-middle-income countries (as per the Atlas method)[10]. Also, a high level of investment activities was observed during the economic boom; Foreign Direct Investment (FDI) to the economy totaled USD53.4 billion between 2000-2014, of which more than 85% was directed to the oil sector and the remainder to the non-oil sector.

An economic slowdown was observed between 2015 and 2017. In 2016, the GDP growth rate in Azerbaijan was negative (3.1%) for the first time since 1995. The following year it showed a very modest but positive result (around 0.1%), despite large fiscal support. The stunning slump in crude oil prices was a major source of such trends in recent years. Starting from 2018, economic activities showed signs of recovery as the GDP growth rate was 1.4%. In 2018, the crude oil extraction sector contributed around 34% of the total GDP in Azerbaijan.

According to economic theory, a high concentration of economic activity in the oil and gas sector may lead to slower growth in other tradable sectors.[11] Certainly, this poses a potential challenge to economic diversification and the development of the non-oil sector. According to a recent Observatory of Economic Complexity report[12], Azerbaijan is among the low complex economies of the world, ranked 84th among 131 countries.

Despite the government's efforts to diversify the country's economy, the contribution of the manufacturing and agriculture sectors to GDP has been stagnant, around 5% and 6%, respectively, over the last decade (Figure 3.2.1).

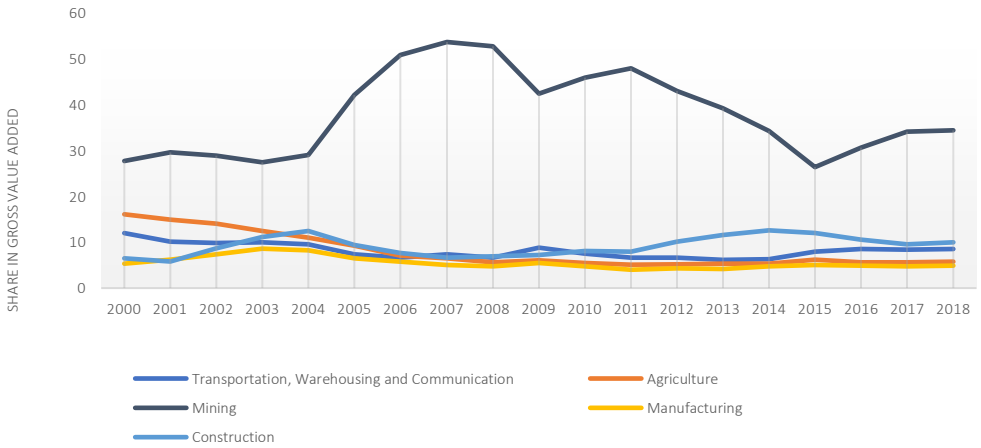


Fig 3.2.1 Sectoral composition of GDP, 2000-2018, in percentage

Source: The State Statistical Committee of the Republic of Azerbaijan

[10] https://datahelpdesk.worldbank.org/knowledgebase/articles/378832-the-world-bank-atlas-method-detailed-methodology

[11] The economic explanation for this phenomenon is that the increasing foreign exchange inflows associated with surging natural resource exports tend to drive up the real exchange rate. This, in turn, undermines the competitiveness of other tradable sectors such as traditional manufacturing and agriculture in both the domestic and global markets, leading to a crowding out of these sectors within the economy. This phenomenon is referred to as Dutch disease in economic literature.

[12] https://oec.world/en/profile/country/aze/

In light of the (relatively) low oil prices and declining demand for crude oil in global markets, one can conclude that the oil-led economic growth is likely to have negative implications for socio-economic development in the long term and, thus, could be unsustainable. This, in turn, necessitates the transformation to a new economic growth approach. Against this background, the government of Azerbaijan has initiated deep and sophisticated economic reforms in recent years. Being one of these efforts, Strategic Roadmaps (SRMs) for the future economic development were approved in 2016 to identify the economy's pioneering sectors, including agriculture and food processing industries.

4. Legal, political and institutional framework

4.1. Domestic laws in the field of climate change, international obligations of the country (environmental, energy, transport, agricultural laws, international conventions)

This section will outline the provisions of the Constitution of Azerbaijan on environmental protection (including climate change). Moreover, it will provide a brief analysis of the laws governing the environment and its various areas, including the legal regulation of climate change. These are mainly the laws:

- on Environmental Protection (1999);
- on Environmental Security (1999);
- on Industrial and Household Waste (1998, 2007);
- on Hydrometeorological Activity (1998);
- on Protection of Atmospheric Air; (2001);
- on Technical Safety (1999);
- on Protection of Public Health (1997);
- on Sanitary and Epidemiologic Wellbeing (1992) and others.

One of the main areas causing climate change and low emissions is the energy sector of the country. The major laws governing this sector will be analyzed, the provisions related to low emissions will be studied, weaknesses and gaps will be identified. The energy-related laws to be reviewed are the laws:

- on Energy (1998);
- on the Use of Energy Resources (1996);
- on Electrical Power (1998);
- on Electric and Heat Power Plants (1999);
- on Gas Supply (1998).

During the development of the strategy, the following laws governing the transport sector will be analyzed, and relevant proposals will be developed to address the gaps in this area of law in order to reduce emissions. These laws include:

- On Motor Transport (2008);
- on Transport (1999);
- on Aviation (2005);
- On Motor Transport (1999);
- on Road Traffic (1998), etc.

We will give a brief outline of the laws governing agriculture (including forestry and irrigation sectors) and make suggestions for their improvement. These regulatory acts include:

- Phytosanitary Control (2006);
- Soil Fertility (1999);
- Amelioration and Irrigation (1996);
- Organic Agriculture (2008);
- Land Code (1999);
- Forestry Code (1997);
- Water Code (1997) and others.

A brief description of the international instruments (conventions) which Azerbaijan has joined in the area of climate change will be provided, and the country's commitments will be stated. Moreover, the work carried out to address the issues arising from these documents will be outlined. The said conventions are:

- UN Framework Convention on Climate Change (1995), its Kyoto Protocol (2000);
- Paris Agreement under the UN Framework Convention on Climate Change (2016);
- The Convention of the World Meteorological Organization (1993);
- Vienna Convention for the Protection of the Ozone Layer (1996) and its Protocols;
- Stockholm Convention on Persistent Organic Pollutants (2003);
- Convention on Long-range Transboundary Air Pollution (2002) and others;
- Carbon Offsetting and Reduction Scheme for International Aviation of ICAO (1992);
- EU-Azerbajan Partnership and Cooperation Agreement (1999).

Additionally, a brief analysis of the country's financial and investment legislation will be conducted, and financial sources and mechanisms will be disclosed for ensuring the future implementation of the strategy.

In this section, analyzing the above-mentioned corresponding laws and codes, we will identify the strengths, weaknesses, and gaps of domestic laws efficient in the field of climate change, make relevant proposals, and draft recommendations to reflect them in the strategy to be developed.

The proposals and recommendations will be above all related to the introduction in the national legislation of climate change, and the issues set out by international law on low emissions and EU directives. These will first of all concern the laws on the Protection of Atmospheric Air and Industrial and Household Waste. Proposals will be made to review and re-adopt the laws on Hydro-meteorological Activity, Energy and Electricity due to their failure to meet modern requirements, and the requirements of international instruments to which Azerbaijan is a party, and relevant EU directives. We will recommend adopting new laws on Efficient Energy Use and the Use of Renewable Energy Sources.

Proposals will be developed as part of the LT-LEDS implementation plan, once it is adopted, to improve the laws governing water sector and flood events, adapt them to EU Water Framework and Floods Directives. These proposals will include the introduction of the Watershed Management Principle and the Integrated Water Resources Management Principle.

4.2. Policy framework for climate change (strategic roadmaps, state and national programs, strategies, action plans, etc.)

In accordance with the relevant laws of Azerbaijan, the practice for planning and projecting activities, strategies, state (national) programs, national action and comprehensive action plans are adopted for the development of individual sectors of economy and social sector, and the protection of the environment and natural resources separately and as a whole. These policy documents can be short-term (4-5 years) and long-term (10-15 years).

These policy documents adopted and implemented in the country cover specific areas and briefly include environmental, climate change and low emission issues.

The text of the strategy will briefly analyze the main points of related political documents and provide information on performed actions. The major strategic documents under implementation are:

- Strategic RoadMap for the National Economic Prospects of the Republic of Azerbaijan (2016);
- Strategic Roadmap for the Development of the Oil and Gas Industry (including chemical products) of the Republic of Azerbaijan (2016);
- Strategic Roadmap for the Production and Processing of Agricultural Products in the Republic of Azerbaijan (2016);
- Strategic Roadmap for the Development of Logistics and Trade in the Republic of Azerbaijan (2016);
- Strategic Roadmap for the Development of Utilities (electricity and heat energy, water and gas) in the Republic of Azerbaijan (2016);
- The 2nd Comprehensive Action Plan on Improvement of the Environmental Situation for 2006–2010 (2006), (Plan III is pending);
- National Program on Environmentally Sustainable Socio-economic Development in the Republic of Azerbaijan (2003);
- Azerbaijan 2020: Look into the Future Concept of Development (2012);
- State Program on Development of Fuel and Energy Complex of the Republic of Azerbaijan (2005-2015)
- (2nd policy document in the field - strategy is pending);
- National Program on Poverty Reduction and Sustainable Development in the Republic of Azerbaijan for 2008-2015 (2008), (the second program).
- State Program for Socio-Economic Development of the Regions of the Republic of Azerbaijan in 2014-2018 (2014)
- State Program for Socio-Economic Development of the Regions of the Republic of Azerbaijan in 2019-2023 (2019). (IV Program)
- State Program on the Reliable Food Supply of Population in the Republic of Azerbaijan for 2008-2015 (2008), (Program II);
- National Program on Reforestation and Afforestation in the Republic of Azerbaijan (2003), (next National Program is about to be approved);
- State Program on the Rational Use of Summer and Winter Pastures, Hayfields and the Prevention of Desertification in the Republic of Azerbaijan (2004), (work on the next program is underway);
- Program for the Development of Hydrometeorology in the Republic of Azerbaijan (2004);
- State Program for the Use of Alternative and Renewable Energy Sources in the Republic of Azerbaijan (2004);
- 2015-2020 State Program on Industrial Development in the Republic of Azerbaijan (2014);

- State Program on Water Problems and the Rational Use of Water (to be developed in 2020);

The existence of the above-stated strategies, state (national) programs and action plans will be indicated as an example of positive aspects in the political framework. The drafting and submission of National Communications (1st, 2nd, 3rd) and biennial interim reports to the Secretariat of Convention about the implementation of the commitments and tasks arising from the Framework Convention on Climate Change, and the completion of 4th National Communication will be shown among the positive aspects in the area of political activity.

The failure to fund the measures specified by the ongoing programs, strategies and plans in full and to follow up with new documents where the timeframe of previous documents is over, and to adopt a separate policy document on climate change in the country (national or state program, strategy) will be accepted as weaknesses and/or gaps.

Recent climate related international decisions and challenges, particularly the Paris Agreement, call for national governments to pay more attention to this area, including the low emissions field. In this sense, during the development of Low Emission Development Strategy, it will be proposed to include the issues of low emission and climate change as a separate section in future policy documents of various areas.

The implementation of the 1st National Forest Program and the 1st National Program on the Development of Hydrometeorology is finalized within the country. It will be recommended to include the development of new long-term (10-year) policy documents in both areas in the Low Emission Development Strategy.

The development of draft state programs for the development of electricity, heat supply and the automotive sector using renewable energy sources, and a strategy for energy saving and efficient use will be among the proposals that should contribute to the implementation of the 2050 goal.

Here, again the role of the interim programs addressing mitigation efforts of the country will be assumed by the consecutive Nationally Determined Contributions. The negotiations on the common timeframes have not yet been concluded but the majority of the countries have adopted 10-year NDCs, with a review and revision process every five years.

4.3. Institutional framework in the domain of climate change (stakeholders)

This section of the strategy will highlight the positive aspects of the institutional framework. I.e, the Ministry of Ecology and Natural Resources is appointed to be the National Designated Authority for the Framework Convention on Climate Change, the Paris Agreement and Green Climate Fund. A State Commission on Climate Change and a Working Group coordinating its activity are established by the decision of the National Government in order to ensure the implementation of the commitments specified by the Framework Convention. Under the Ministry there is National Hydrometeorological Department and a Climate Change and Ozone Center operating under this Department.

This section will outline the powers and responsibilities of all stakeholders as specified in their Regulations (Charters) in relation to the area under consideration. Stakeholders may include:

- The Ministry of Environment and Natural Resources
- The Ministry of Energy
- The Ministry of Transport, Communications and High Technologies

- The Ministry of Agriculture
- The Ministry of Economy
- The Ministry of Finance
- The Ministry of Education
- The Ministry of Emergency Situations
- State Statistics Committee (SSC)
- State Committee for Family, Women and Children Affairs
- SOCAR
- Azerenergy OJSC
- Azerishig OJSC
- Azeristiliktechizat OJSC
- Azerbaijan Caspian Shipping CJSC
- Azerbaijan Amelioration and Water Management OJSC
- Azersu OJSC
- Local executive and municipal bodies
- Relevant science and research institutions of Azerbaijan National Academy of Sciences (ANAS):
- The Institute of Soil Science and Agrochemistry
- The Institute of Erosion and Irrigation
- Azerbaijan Scientific Research Institute of Water Problems
- Azerbaijan State Design Institute for Water Facilities
- Scientific and Production Association of Hydrotechnics and Melioration in Azerbaijan
- “Ruzgar” environmental NGO
- Water specialists NGO
- Water user associations

Weaknesses and gaps existing in the activities of stakeholders operating in the field will be identified as a part of the Long-Term Low-Emission Development Strategy.

Proposals will be made to make necessary additions and amendments to related regulations (charters) for eliminating these weaknesses and gaps in the institutional framework and capacity building. In the first instance for upgrading the State Commission and the Working Group, and clarifying and enhancing their status It will be proposed to establish a structural unit within the National Hydrometeorological Department to coordinate international and national projects in the field of climate change, and its areas of activity will be specified.

5. Priority (selected) areas (status analysis, the determination of goals and activities, gender factor)

5.1. Mechanisms suggested for the energy sector for the development of low-emission development strategy (LT- LEDS).

Even though Azerbaijan has rich oil and gas reserves, today the development of energy efficiency and renewable energy sources (BOEM), at the same time the reduction of high energy losses due to the need to restore the electricity generation, transmission and distribution infrastructure of the country, ensuring the use of innovative technologies in all segments of the sector, etc. are the pressing challenges faced by the energy sector.

A coordination group comprised of the representatives of government agencies and other stakeholders will be established to draft a comprehensive document reflecting the low-emission targets in the energy sector of Azerbaijan, alongside with other sectors (agriculture, water management, industry, tourism, utilities, etc.) and a very complex process exploring the synergy of existing and expected strategies of all the other sectors will be launched. Close interaction of the energy sector with other sectors (agriculture, water management, industry, tourism, utilities, etc.) It significantly complicates the formation and introduction of LEDS principles in this sector.

Example: in the water sector, up to 50% of the prime cost of water is spent for electricity. It almost applies to all the world. But most of the time, water experts do not care about the essence of the issue. Such approaches can create some barriers for the formation and application of LEDS in this sector.

Low emission development strategy is not a stable process as it is. The implementation of this framework should be flexible in adapting to different current and projected country conditions and supplementing existing climate and development-related programs. It should, first and foremost, reflect developments with regard to the NDC review and revision process. The comprehensive energy sector modeling process for LEDS needs to consider national and international energy conditions and trends, as well as the existing targets and plans of the country. Terms of reference (scenarios, data), comments, suggestions and recommendations about the results of modeling until 2050 should be based on best practices and include the following issues:

1. Analysis of the energy sector of Azerbaijan looking forward to 2050 - including:

- institutional set-up and structural changes (Ministry of Energy, SOCAR, Azerenergy OJSC, Azerishig OJSC, The State Agency for Alternative and Renewable Energy (ABEMDA), Azeristiliktechizat OJSC);
- legislative and regulatory framework;
- production, consumption, demand and perspective development in the oil and gas sector until 2050;
- generation, transmission, and distribution of electricity and thermal energy until 2050;
- supply and demand for electricity and heat energy;
- The status of power plants and targets;
- energy consumption in industry, transport, agriculture, utilities sectors, etc. until 2050;
- demand and supply for fuel oil lubricants and their prospective development;
- structure of energy markets, supply and demand in the field of energy until 2050;
- energy tariffs, price policy;
- energy efficiency until 2050.;
- renewable energy sources (RES), their potential and generation capacity by these sources, short, medium and long
term targets.

2. Assessment of the status of the energy sector: the analysis of data reflecting the current situation, such as the results achieved under the Strategic Roadmaps and State Programs for GHG reduction, development goals, waste by sectors, economic and resource data
3. The analysis of energy sector options: the use and comparative analysis of the results of business as usual (BAU), low emission economic growth, and the long-term projections of GHG emission trajectories (for instance, LEAP). The use of various development scenarios designed to achieve targeted economic and development goals, as well as the scenarios to slow down waste growth and support climate change resilience

4. Prioritization of activities: identification of high priority measures and goals to achieve short, medium and long term (until 2050) and specific results, including:

- Determining indicative targets for energy saving
- Cross-cutting measures:

a) Oil and gas sector
b) Electricity sector
c) Heat supply
d) Energy efficiency of the industry, measures by industrial sectors
e) Energy consumption and efficiency in buildings and households
f) Projections and technological needs for sectors with high energy demand
g) Transformation of transport
h) Energy consumption in agriculture (demand, supply and efficiency)
i) Energy consumption in amelioration and water management (demand, supply and efficiency)

- Measures for energy supply
- Estimation of expected energy savings resulting from the implementation of the proposed measures; and the required investments
- Developing a comprehensive national action plan including financial needs and resources for the efficient use of the energy resources of Azerbaijan.

In this strategy the low emission development of the energy sector needs to be based on the elements of a unique triangle of - the reliability of energy supply, the sustainability of the energy sector, and the cost-efficiency of the process. In the light of energy efficiency, the latter shows that the goal is not only to save energy resources, but also to achieve economic growth as a result of these savings.

The existing gap between the practice in Azerbaijan and best international practices must be carefully assessed and a long-term strategic vision for a low-emission development of the energy sector must be established. Upon creation of the long-term strategic vision for the development of the energy sector of Azerbaijan, it is necessary to increase energy efficiency in the country and to identify the capacity for the optimal use of energy resources and further energy savings. The interaction between LEDS and the long-term Energy Strategy of Azerbaijan (underway) needs to be established during the analysis of the possibilities for the transformation of the energy sector, including future policy options and scenarios, and a green document must be the priority. Consequently, the expected long-term benefits of LEDS must be build upon the more efficient use of energy resources, the reduction of utility payments for businesses and ordinary citizens, and close communication and consultation with stakeholders at every stage of cooperation, starting from the earliest stages of the process of new job openings and strengthening of competitiveness in industrial facilities. Considering the globally accepted 3D (Decarbonization, Digitalization, Decentralization) approach to strategic vision, the use of BOEM and electrification need to be reflected more ambitiously.

It is necessary to develop a national action plan including specific goals, promote energy audit schemes and ISO energy management systems in this area, and to implement energy efficiency measures such as the use of public funding instruments. Considering the issues such as performing mandatory energy audits, stimulating measures to increase energy efficiency,

establishing responsible authorities and smart electric meter systems, strengthening the measures for raising consumer awareness and energy labeling of goods:

- Environmental design requirements for facilitating the development of energy labeling and for energy-consuming products
- Capacity building for eco-design based on best practices
- The selection and design of sector measures, the assessment of energy savings and targets, and the necessary funding measures need to be determined.

Too many energy resources are used to heat buildings in the winter season. An energy audit of two type residential buildings performed in Baku in 2013-2014 as part of one of the pilot projects funded by the European Union revealed that the application of quality thermal insulation can save 50% of the energy used by the buildings. What should be considered in the strategic areas for improving energy efficiency in the light of the above-stated:

- The results of the analysis of the minimization of energy losses at all stages of its transformation, from the primary source to the end users;
- Legislative and structural changes that will ensure the progress in heat supply;
- Necessary measures for achieving technological breakthrough and the creation of energy conservative equipment and devices based on the latest achievements of science and technology;
- Replacement of power plant and network equipment with new efficient and environmentally friendly alternatives, and ensuring a more qualified operation;
- Improvement of energy balance through RES development.

Moreover, the new Strategy needs to consider industrial field, in particular:

- RES as a strategic value chain of green deals;
- supporting low-carbon exports while maintaining supply chains;
- skills and innovation issues of green industry sectors;
- the significance of cheap financing for capital requiring green investments;
- introduction of advanced energy-saving technologies and the efficient use of resources.

All measures intended for modernizing the management system of the energy sector in Azerbaijan and increasing energy efficiency will open broad horizons for saving energy resources, creating new jobs, and can contribute assure energy security for future generations through diversification and exploring options for developing carbon neutral energy production and consumption patterns.

Energy Efficiency has a great role to play. As a result of future measures for thermal insulation of buildings, utility payments incurred by the consumers should be significantly reduced. LT-LEDS needs to consider that the power plants that are currently under construction will affect emissions for decades and avoiding undesirable technological infrastructure is a priority for low emission development. Analytically, LT-LEDS needs to model the lifetime operating costs and the benefits of all technology options, looking not only at the renewable energy but also at hydrogen and other technological solutions suitable in the context of Azerbaijan energy mix and natural conditions

Additionally, achieving 2050 climate change goals will require the transformation of our entire energy system, and it will lead to major challenges in policy reform, market design and regulation frameworks of energy sector. As an example, we can mention the current situation in the heat supply. i.e. Azeristiliktechizat OJSC ensures diagnostic research on the technical, organizational and financial situation and optimization measures in order to create a sustainable and reliable heating system in the country, reduce natural gas and electricity consumption and the efficient use of energy resources. Nevertheless, the work performed by Azeristiliktechizat does not embrace the entire country, and a preliminary analysis of the heating system in the country reveals the need to improve the organizational, economic and legal framework of the heat supply system in Azerbaijan. Ensuring sustainable development in this area, and the establishment of a reliable heat supply system and the reduction of natural gas and electricity consumption can contribute to GHG reduction.

Individually (privatized) electricity is currently produced only in a small number of small hydropower plants. The step taken towards distributed energy economy requires political decisions and that will stimulate investment in power plants. The following recommendations lead to private investment in power plants and the development of BOEM should be considered in the development of LEDS:

- legally guaranteed access to the network and guaranteed support for the transmission of generated energy to the network - requirements for the outcome of relevant contracts;
- providing financial support to renewable energy to enable such production facilities to operate with the current pricing system - in-feed stable energy prices or financial support for investment.
- providing financial support to independent energy producers to enable such production facilities to operate with the current pricing system - in-feed stable energy prices or financial support for investment.

It would be reasonable to develop proposals on the form of the exploitation and financing of energy power to be generated from renewable energy sources, taking into account the special importance of public-private partnership in terms of efficient use of public funds, the involvement of private sector resources, and risk sharing. The enhancement of legislation in the relevant area is a critical step in the implementation of renewable energy projects. In this regard, the creation of new generating capacity by 2020, as well as the increase in the share of renewable energy sources, including hydropower plants by 30% until 2030 will enable strengthening energy security, fulfilling the country’s commitment to reduce GHG emissions, creating new service and production facilities, and more jobs and natural gas savings. The 1 billion kWh of electricity to be generated from renewable energy sources will save about 200 million cubic meters of gas. Expected public investments, institutional measures and the involvement of the private sector can enable increasing the share of alternative energy in the country’s energy balance up to 50% by 2050.

In Azerbaijan energy industry is governed by the state, and energy prices are set by the state throughout the whole value chain. It starts with the initial energy prices (gas and oil) regulated by the government and continues from the wholesale prices of electricity to the retail prices for electricity and gas consumption. Rates are lower than the energy prices in other industrialized countries. Currently, an energy market with a large number of competitors is not in place. The creation of a market environment and the implementation of appropriate measures can create favorable conditions for introducing improved institutional environment and advanced management systems in the area of electricity production, supply, transmission and distribution,

attracting private investment, eliminating government subsidies, reducing electricity production costs and raising service quality.

The availability of sufficient back-up production capacity, regulatory authority, political will and human resources enable gradual transition to a liberal market model based on competition in the energy sector. While liberalization of the electricity market is a long-term process, the phasing and consistency of reforms in Azerbaijan, the management of the process by the state and the involvement of all market actors in the reform process need to be ensured. However, using a systematic approach to the transition to a low-carbon energy economy, it should cover the entire energy value chain and all energy vectors (electricity, heat and transportation fuel) from large-scale production to end users, combining physical requirements with policy, market and digital devices.

The SC working group on energy will have to consider energy security, energy supply, energy mix in options available under different mitigation scenarios, in order to propose a viable contribution of this sector to 2050 LT-LEDS, at the same time providing input to the consecutive NDCs.

5.2. Transport sector

Today as in the rest of the world, transport has become a major integral part of the economic infrastructure of Azerbaijan. The development of transport to some extent determines the development of civilization in a country. In the time of globalization, transport plays a key role in the efficient use of national resources of our country and in the process of integration into global economic system.

The strategy and development of transport depends on the socio-economic development of the country as a whole. These days the goal to develop transport system is consistent with the socio-economic and geopolitical goals of the state. The development of the transport system between different regions has a significant role in the realization of these goals.

In addition to the exceptional role the development of transport plays in the economy and living standards, it also impacts global climate change by emitting greenhouse gases (GHGs) into the atmosphere. Therefore, the strategy to be developed defines the transport system as one of the potential sources for the reduction of emissions.

The purpose of this report is to specify the most rational solutions in the strategy to be developed to mitigate the impact of demand for transport services, its infrastructure and development prospects towards climate neutrality in the second half of the century and 2050 contribution of transport to achieving the LT-LEDS 2050 goal.

5.2.1. Analysis of the current status of the demand for transport services

Today, transport has become an integral of the economic infrastructure of Azerbaijan. Transport is an important prerequisite for the organization of the economy and social sphere. The sustainable development of transport is a guarantee for economic integrity, free exchange of goods and services, the freedom of economic activity, competition and the improvement of people’s living conditions. The demand for types of transport increases as the sectors of industry, business relationships, tourism and other areas grow.

The transport system mainly comprises waterway, railway, aviation, motor transport and special transport types. Special transport includes subways, military transport, pipelines, etc.

The reforms implemented in the transportation fleet of our country is to some extent in line with the requirements of a market economy. One should mention the significant role of international and regional projects covering various modes of transport in the growth of the country economy and in Azerbaijan's integration into the world. These projects, which provide access to global markets, give a serious momentum to economic development.

It is well-known that one of the major factors fostering the development of states all over the world and creating conditions for their political, economic and cultural integration is interstate transport connections. Currently, regional programs in this area are implemented in the Republic of Azerbaijan with the support of international organizations, in particular the European Union (EU) countries. Currently, the roads between the regions of the country are repaired, and new roads are constructed in connection with the development of tourism (Figure 1).

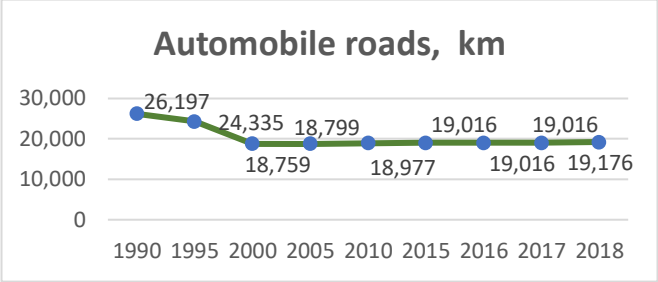


Figure 1 Repaired and newly built motorways

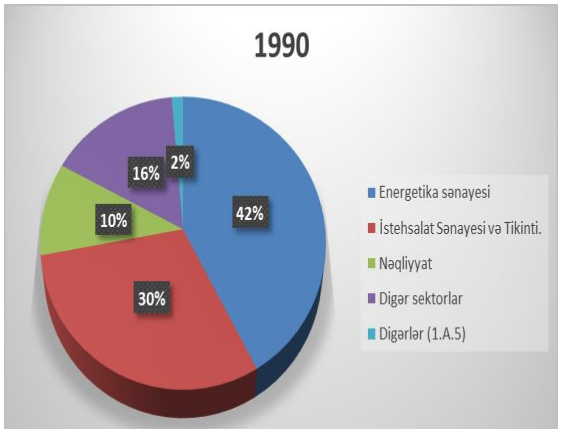
The repairing of roads and the construction of new roads, and the development of industry increase the import of types of transport, especially its special modes, and the travel length. Most of the imported and domestically-produced vehicles use natural fuels (gasoline, diesel and compressed natural gas). This increases GHG emissions.

This situation necessitates the solution of this environmental issue. Therefore, the construction of roads, the optimality of roadside infrastructure projects, the compliance of imported vehicles with modern standards, the adaptation of laws to current requirements and other related issues will be considered from an environmental point of view during the development of the strategy.

5.2.2. Transport infrastructure

In Azerbaijan transport system is seen as one of the most developed areas. Almost all transport systems used in the world are available. The sources of the transport category of the energy sector according to IPCC methodology are civil aviation, railway transport, road transport, water transport and pipelines. All these types of transport are available in Azerbaijan. Since the baseline year 1990, the transport sector has achieved a great progress, and the number of all types of transport has increased rapidly.

The growth in the number of vehicles has led to an increase in GHG emissions in Azerbaijan (Figure 2).



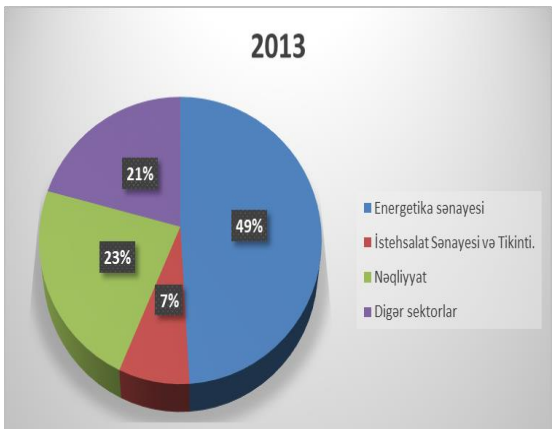


Figure 2 The share of categories in the total emission of the energy sector

As seen from the figure, in 2013 emissions from the transport sector has increased by 13% in comparison with the baseline year. Attention should be paid to increasing the accuracy of GHG source inventory and emission estimation process and mitigation measures should be taken into account.

In general, the inventory system in Azerbaijan is yet to improve. There are major barriers related to data acquisition and emission factors. The strategy has to study these barriers. Establishing appropriate legal mechanisms for obtaining information and paying more attention to the organization of scientific research on emission factors need to be seen as priority issues. Emission reduction scenarios and transport decarbonisation options need to be analysed in greater detail by the SC working group on transport.

Commercial aviation

The history of civil aviation in Azerbaijan dates back to the 1910s. During the years of independence, civil aviation fleet was enhanced with modern Boeing-757 aircrafts. Later, line aircrafts such as Airbus-319, Airbus-320, ATR-72 and ATR-42 were added to the fleet. Two-thirds of the fleet intended for cargo aircraft was upgraded with the procurement of more modern vehicles. Currently, Azerbaijani Airlines (AZAL) own a new fleet of 23 aircrafts.

There are uncertainties related to GHG reduction in civil aviation. An in-depth assessment is necessary to identify reduction measures by 2050.

Motor transport

The history of road transport in Azerbaijan dates back to the early twentieth century. In 1911 there were only 36 cars in Azerbaijan. The length of hard-surface road was only 210 km.

The establishment of flexible automobile industry to meet the demand for transport in industry, agriculture, defense and other areas was one of the important measures. The dynamics of change in the vehicle fleet is shown in the table below.

Table 1. Road transportation vehicles in Azerbaijan, units

Types of transport	1990	2010	2015	2016	2017	2018
Cars	260 210	815 683	1 129 596	1 136 983	1 147 437	1 170 672
Buses	14 044	29 569	31 057	30 958	30 788	30 704

Trucks	99 507	118 460	141 273	141 525	142 857	147 343
Special purpose cars	22 656	11 715	11 063	11 158	11 024	11 232
Other	2344	7 126	9 621	9 927	10 218	10 623
Total	**398 761**	**982 553**	**1,322,610**	**1 330 551**	**1,342,324**	**1 370 574**

As seen from the table, in 2018 the number of vehicles increased by about 3.4 times in comparison with the baseline year 1990. Thus, the strategy implies possibilities for measures of reduction in motor transport. The strategy should address the issues of improving the vehicle inventory system and types of transport and assess the prospects for GHG reduction by switching to alternative fuels and increasing the share of public transport. The in-depth studying of international practice in this field, and the experience of developed countries in the area of low-carbon policy will contribute to a well-planned sectoral strategy by 2050.

Subject to the Order of the President of the Republic of Azerbaijan dated February 13, 2017 with ref. number 2669, the Ministry of Transport was abolished and the State Road Transport Service was established to be included in the structure of the Ministry of Transport, Communications and High Technologies. The main purpose of the service is to ensure compliance with the requirements for the organization and regulation of passenger and cargo transportation.

Railway

The foundation of the railway in Azerbaijan was laid in 1878 and its construction was completed on January 20, 1880. It consisted of the Baku-Surakhani-Sabunchu railway, which was only 20 km long. Since that historical period, the railway has developed and improved, taking the growing demand for freight transport into account.

Unlike other types of transport, it operates in Azerbaijan as a low-carbon type of transport. Currently up to 59.7% of railway lines are electrified. The development of the economy, and the East-West and North-South corridors will accelerate the development of this type of transport.

Although the capacity for reduction in rail transport is less than in road transport, the strategy contains many sources for GHG reduction, and these sources will continue to grow. Therefore, the strategy should include the assessment of possible mitigation measures to be applied while expanding the railway transport.

Water transport

Water transport started to develop following the launching of offshore oil production. Especially in modern times, the need for maritime transport grows as production increases. State Maritime Administration was established in order to regulate maritime transport system. The administration is under Ministry of Transport, Communications and High Technologies of the Republic of Azerbaijan Ministry as the State Maritime Agency.

Currently, the maritime transport fleet hosts passenger ferries, roll-on/roll-off ships, oil tankers, dry cargo ships, pipeline, research, rescue, tow and diving vessels, excavator ships and unparalleled heavy crane vessels. Baku Shipbuilding Facility that was built several years ago in Azerbaijan produces all types of ships.

The 2050 strategy should address the issue of replacing old ships with new ones and changing the type of fuel.

Special and other types of transport

The number of special types of transport increases due to the enhancement of industry and construction areas, and the development of agriculture. On the other hand, being at war with Armenia Azerbaijan has to purchase modern military equipment to strengthen its army. Consequently, the amount of fuel used in transport has increased.

There are obstacles against the estimation of GHG emissions from these types of transport. Fuels used in special equipment are stated to be trade secrets making it difficult to obtain information.

5.2.3. Prospects for the development of the transport sector

As state above, the transport sector of Azerbaijan has developed in all directions. Some strategic programs are adopted to ensure this development. Among them are:

1. 2016-2020 State Program on the Development of Shipping in the Republic of Azerbaijan (07.11.2016)
2. Strategy for the development of the transport system of the Republic of Azerbaijan, State Program for the Development of the Transport System in the Republic of Azerbaijan (2006-2015),
3. State Program Regarding Updating and Development of Highways of the Republic of Azerbaijan (2006-2015),
4. State Program on Road Safety in the Republic of Azerbaijan for 2019-2023 (27.12. 2018).

The strategy document developed by the former Ministry of Transport included the following items related to the environment:

Financing of transport and road infrastructure is based on the following principles:

• The state funding of the operation and maintenance of state-owned facilities that ensure the safe and environmentally sustainable operation of the transport system.

Assuring sustainable development of the transport system. Subject to the basic principles of sustainable transport development, the solution of citizens' transport needs does not contradict with the priorities of public health and environmental protection and does not affect the interests of future generations.

The realization of these principles implies the following:

• Decisions related to the development and regulation of transport system and activities are evaluated in terms of economic efficiency, and in terms of environmental protection and security, ie all the stated priorities are equally valuable;
• Governments and citizens should be responsible for choosing the best eco-friendly transport options. Environmental consequences have to be considered in full when making management decisions in the field of transport and especially in the domain of motor transport;
• As part of the implementation of the Polluter pays principle, the consumer of transport services will pay for all the negative environmental effects connected with the provision of the service: from the consumption of resources to the recycling of vehicles;
• The transition to more environmentally friendly types of transport must be regulated during the governance of competition between types.
Ensuring safety and environmental requirements in transport requires the following functions including public administration tasks:

• Ensuring the safety of passengers' life, health and property, safe movement of vehicles, as well as the environmental protection by transport enterprises and carriers;

• adaptation of vehicles, roads, as well as appropriate technical means (works, services) ensuring the operation of transport to mandatory requirements for the safety of human life, health and property;
• Ensuring the protection of atmospheric air, soil, water, flora and fauna from pollution, efficient use of natural resources, assuring the safety of the environment and people in the process of transport activities;
• control over the implementation of necessary measures by transport enterprises (carriers) for the protection of the environment, atmospheric air, water basins, lands and the efficient use of natural resources.

5.2.4. Measures leading to reductions

The following were implemented in accordance with the Protocol No. 1, dated June 30, 2015 of the Road Safety Commission under the Cabinet of Ministers of the Republic of Azerbaijan:

- Introduction of restrictions on the movement of trucks with a permissible weight exceeding 5 tons in Baku city in the morning;
- The Establishment of free parking areas provided with necessary conditions at the southern and northern entrances of the city for vehicles coming to Baku from cities and regions of the Republic;
- Relocating bus stops from areas hindering traffic,
- creating bus stop “pockets”, where possible;
- creating special traffic lanes for buses dealing with regular passenger transportation;

BakuBus Limited Liability Company was established under the Resolution of the Cabinet of Ministers of the Republic of Azerbaijan No. 92, dated 03.04.2014. The main purpose of the company is to organize passenger services in accordance with international standards in the field of bus transport, to supply this area with modern vehicles, and to ensure technical and environmental safety during passenger transportation. First, BakuBus LLC brought 300 new liquefied natural gas buses of French production.

The Tax Code was amended to increase the types of alternative energy vehicles used in the Republic of Azerbaijan. I.e, in accordance with the Amendments dated November 30, 2018, starting from January 1, 2019 electric cars and from January 1, 2020 for a period of 5 years compressed gas buses designed to carry more than 10 passengers are exempt from value added tax (18%) on import. Recently, the number of these types of transport continues to grow.

5.2.5. Measures for reducing emissions

The growth rate of transport in Azerbaijan does not take into account the growth rate of atmospheric emissions in full. The 3.4-fold increase in road traffic in 2013, the commissioning of two road transports and a shipyard, and the development of the railway system in the country are inevitable. Therefore, the Strategy must integrate all these factors to achieve low-carbon development in the field of transport.

Nevertheless, it should be noted that some measures are in progress in this area. One of these measures is the decision made in relation to the metro. The Order No. 1408, dated 18.03.2011 of the President of the Republic of Azerbaijan on Additional Measures for the Prospective Development of the Baku Subway was signed in order to reduce bus traffic in Baku, where 30% of the population of the Republic of Azerbaijan resides. The adopted Development Scheme implies the phased expansion of the existing metro network by 2030. It is envisaged to increase the number of lines to 5, the number of stations to 76 and the total length of roads to 119 kilometers.

Additionally, the following projects are underway in the country:

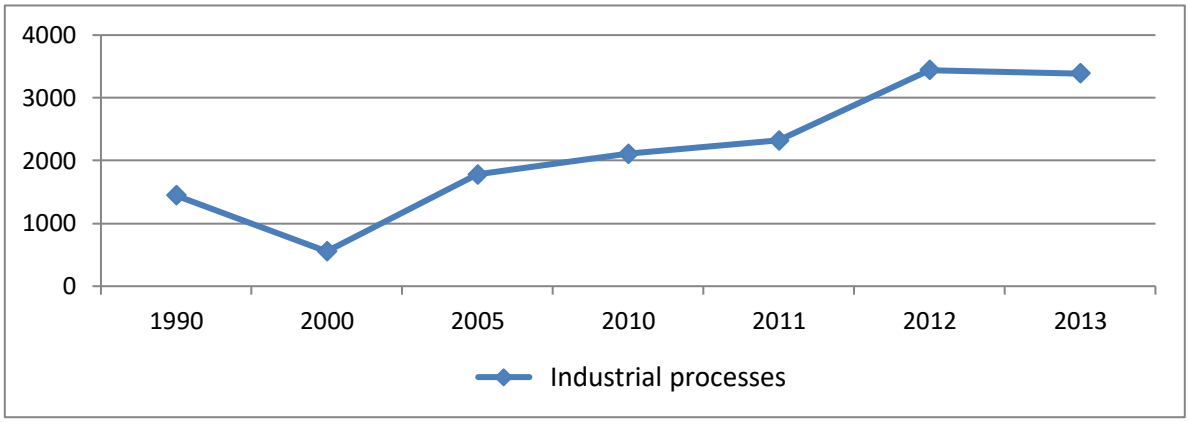
- The project for Decarbonization of Transport in Developing Economies in 2019-2022, implemented by the International Transport Forum (IFF) and the Ministry of Transport, Communications and High Technologies
- The First National Action Plan on Energy Efficiency developed by the Ministry of Energy

Moreover, we can mention the installation of charging stations at 14 stations with the support of GreenCar LLC, the Azerbaijan Automobile Federation and the IDEA (International Dialogue for Environmental Action) Public Union as part of the projects that have been implemented since 2014. Even though these measures have led to reduction in GHG emissions, Azerbaijan's contribution to the fulfillment of its commitments under the Paris Agreement may not be significant. Therefore, the strategy to be developed needs to assess the future contribution of the transport system to a maximum extent.

Industrial Processes and Product Use (IPPU) sector

According to the results of the latest GHG inventory of 2013, 5.4 % of total waste fell into the category of industrial processes. The diagram below shows the trend of change in GHG emissions of this category in Azerbaijan since 1990:

Diagram 1. Change of GHG emissions by industrial sectors in 1990-2013, thousand tons, CO_2 equiv.



Processes and Products Use sector of Azerbaijan are as follows.

Table 1. Total emissions in IPPU sector, thousand t CO_2 equiv.

Source:	2011	2012	2013
Cement production	465.09	658.06	721.76
Lime production	1,65	12.68	8.03
Ethylene production	179.30	159.95	181.52
Metallurgical production	401.85	470.85	270.51
Aluminum production	107.30	864.74	839.50
Use of oil lubricants	24.70	24.76	26.35
Substitutes and stationary cooling systems	1142.57	1248.93	1341.35
Total IPPU	**2322.46**	**3439.97**	**3389.02**

Following 2000, as in all sectors of the economy, the Republic of Azerbaijan has also achieved a great success in the development of industry. In 2015 the industrial production increased by 3.1 times in comparison with 2000. Over this period, numerous projects have been implemented to create competitive modern industrial areas, and to improve the infrastructure of industry, new jobs were created, and the country has stepped into a new stage of industrial development.

In 2004, a new period of industrial development started in the Republic of Azerbaijan. Over this period, a part of the revenues obtained from the oil and gas sector was allocated to the development of various sectors of industy, state programs were developed to optimize the industrial structure in regions, significant work was carried out to solve the issue of energy supply, and to improve the overall infrastructure. Favorable business environment established in the country, as well as the important decisions for governing entrepreneurship have played a significant role in the development of industry. As a result of the recent state support to the development of entrepreneurship, the share of the private sector in GDP in 2015 equaled 81.2%. As the logical progression of the carried-out work, 2014 was declared the “Year of Industry” in the Republic of Azerbaijan under the Order No. 212 dated January 10, 2014 of the President of the Republic of Azerbaijan, and the action plan for industrial development was implemented. Moreover, 2015-2020 State Program on Industrial Development in the Republic of Azerbaijan was approved by the Order no. 964 dated December 26, 2014 of the President of the Republic of Azerbaijan. Moreover, the Strategic Roadmap for the Development of Heavy Industry and Mechanical Engineering in the Republic of Azerbaijan adopted in 2016 also provides for measures to develop country’s industry in 2025 and after this period. Priority 1.2. of the Road Map sets the target to achieve optimal energy efficiency.

Serious work was undertaken in recent years to commission new production facilities in the field of heavy industry and mechanical engineering for the diversification of the structure and regional coverage of the industry. The establishmment of Sumgait Technology Park, Sumgait Aluminum Plant, Ganja Aluminium Smelter, Sumgayit, Gadabay and Dashkasan gold and copper processing plants, Garadagh Cement Plant, Sumgayit Carbamide Plant, agricultural machinery and automobile plants in Ganja, Nakhchivan Automobile Plant, Power Transformer Manufacturing Plant of ATEF Group, Sumgait Plastic Processing Plant, Mingachavir Electronic Equipment Plant, steel pipe, solar panel and metal construction enterprises, etc. are important developments for the country economy.

Recycling enterprises were registered in Balakhani Industrial Park, and a modern shipbuilding facility was put into operation in Garadagh Industrial Park. Works are in progress to involve science-based and innovative productions in High Technology Park. Works are in progress in Neftchala Industrial District for launching car production together with Iran Khodro Company of the Islamic Republic of Iran.

Installation in Pirallahi Industrial Park of new production facilities for pharmaceutical industry which is a new area for the country. Preparations are made to create the necessary conditions and infrastructure for local entrepreneurs working in light industry and other areas within Mingachevir Industrial Park, Masalli, Sabirabad, Hajigabul, and Neftchala Industrial Districts.

As seen in Table 1, despite the economic growth, the increase in GHG emissions was not so large, due to the closure of many enterprises polluting the air and their replacement with new, modern, eco-friendly enterprises.

At the current stage, it is necessary to take a number of measures to modernize the industry and diversify the non-oil sector taking into account modern challenges and new initiatives, including the creation of opportunities that will ensure the involvement of existing natural and economic resources in the economic turnover, the establishment of new priority areas of production and

industrial parks along with traditional industries, strengthening industrial capacity of regions, and the development of industry on the basis of innovations. I.e. the full use of assets and natural resources of industry will be ensured by 2025, the effective work experience will be fully implemented in enterprises in order to achieve the planned progress in the heavy industry and engineering industry in the medium term. Undoubtedly, all the above-stated will contribute to the achievement of the country's reduction target under the Paris Agreement by 2030.

GHG emissions occur during various industrial activities. Emission sources mostly result from chemical and physical transformations during industrial processes (for instance, furnace smelting in the iron and steel industry, the production of ammonia and other chemical products from minerals used as chemical raw materials, and cement industry are the main examples of industrial processes that generate a significant amount of CO_2). These processes generate carbon dioxide (CO_2), methane (CH_4), nitrogen I oxide (N_2O), hydrofluorocarbons and (HFCs), perfluorocarbons (PFCs).

Moreover, greenhouse gases are emitted during use in refrigerators, foams and aerosol cans. For instance, HFCs are used as alternatives to ozone-depleting substances (ODMs) in a variety of products. Similarly, sulfur hexafluoride (SF_6) and N_2O are used in a number of industrial products (SF_6 is used in electrical equipment, N_2O as a propellant, mainly in aerosol products in the food industry) or by end users (SF_6 in running shoes, N_2O in anesthesia).

Initially the following mechanisms will be used to develop the LCDS in the Industrial Processes and Products Use (IPPU) sector:

1. Cement and lime production

1.1 Comparative analysis of current short, medium and long-term strategies, programs and goals;

1.2 Considering global trends and best international practices;

1.3 Studying domestic demand and export options based on demographic indicators and their forecasts and cost-benefit analysis;

1.4 Identifying targets for 2050 in line with these forecasts

2. Chemical industry emissions

2.1 Comparative analysis of current short, medium and long-term strategies, programs and goals;

2.2 Considering global trends and best international practices;

2.3 Studying domestic demand and export options based on demographic indicators and their forecasts and cost-benefit analysis;

2.4 Identifying targets for 2050 in line with these forecasts

3. Ethylene production

3.1 The comparative analysis of short, medium and long-term goals;

3.2 Recommendations for consideration, application and use of global trends and best international practices;

3.3 Studying domestic demand and export options based on demographic indicators and their forecasts and cost-benefit analysis;

3.4 Identifying targets for 2050 in line with these forecasts

4. Metallurgical industry emissions

This category of industrial processes and product use sector comprises the following subcategories:

As a result of improvement in the management of cast iron, steel, ferro compounds, aluminum, manganese, lead and zinc production processes, proposals will be made to ensure LCDS by 2050.

4.1 The comparative analysis of short, medium and long-term goals;

4.2 Recommendations for consideration, application and use of global trends and best international practices;

4.3 Studying domestic demand and export options based on demographic indicators and their forecasts and cost-benefit analysis;

4.4 Identifying targets for 2050 in line with these forecasts

5. Estimation of CO_2 emissions from the use of oil lubricants (which are natural fuels) as raw materials

The best option would be to assess the GHG emissions by obtaining data from enterprises using these raw materials. Nevertheless, it is clear that this information is not always available. The use of the term “non-energy use” varies from country to country. Oil lubricants are liquids used as lubricating materials. In accordance with their composition, petroleum oils and synthetic oils, as well as semi-synthetic oils are divided into the following groups of intended use.

6. Emissions of fluorinated substitutes for ozone-depleting substances

Hydrofluorocarbons (HFCs) and, to a limited extent perfluorocarbons (PFCs) are considered to be alternatives to ozone-depleting substances (ODMs) that have been excluded under the Montreal Protocol.

Current and possible areas of HFC and PFC application include (IPCC/TEAP, 2005):

- refrigerator and air conditioner;
- firefighting and the prevention of explosion;
- aerosols; dry cleaning with solvents; pressure blowing of foam;

We will study the most advanced international technologies of this area and prepare recommendations for their application and use as part of sectoral contribution to the 2050 emissions reduction goal.

5.5. Agriculture

In the early years of independence of the Republic of Azerbaijan, like all the sectors of economy, the agrarian sector had also fell into steep decline. While gross agricultural output fell by an average of 12 percent annually between 1992 and 1995, it has steadily risen since 1996 (excluding 1997 and 2014). Even though in 2016 the overall economic growth had slowed down in the country, still growth was observed in the agricultural sector. Growth in agriculture equaled 6.6 percent in 2015, 2.6 percent in 2016, 4.2 percent in 2017, 4.5 percent in 2018 and 7.2% in 2019.

Table 5.1

Crop production in the Republic of Azerbaijan (thousand tons)

Years	1990	1995	2000	2010	2015	2016	2017	2018	2017 \

									2018,%
Cereals	1413.6	921.4	1540.2	2000,5	2999.4	3065.1	2928.8	3309.2	**+13**
Potato	185.2	155.5	469.0	953.7	839.8	902.4	913.9	898.9	**-1.6**
Vegetable	856.2	424.1	780.8	1 189.5	1275.3	1270.6	1405.6	1521.9	**+8.3**
Orchard products	67.5	41.9	261.0	433.6	484.5	464.8	438.1	401.9	**-8.3**
Fruit	367.4	324.4	477.0	729.5	888.4	882.8	954.8	1010.8	**+5.9**
Grapes	1196.4	308.7	76.9	129.5	157.1	136.5	152.8	167.6	**+9.7**
Sugar beet	–	28.1	46.7	251.9	184.3	312.6	410.1	277.2	**-32.4**
Cotton	542.9	274.1	91.5	38.2	35.2	89.4	207.5	233.6	**+12.6**
Tobacco	52.9	11.7	17.3	3.2	3.5	3.6	5.3	6.3	**+18.9**
Sunflower for grain	0,6	0,7	3.7	15.5	18.4	16.6	29.8	23.6	**-20.8**
Tea leaves	30.7	9.41	1,08	0,54	0,58	1,02	0,78	0,87	+11.5
Meat (slaughter weight)	175.5	109.4	153.6	244.9	298.6	302.2	316.8	326	**+2.9**
Milk	970.4	826.5	1031.1	1535.8	1924.5	2009,9	2024.1	2080.4	**+2.8**
Eggs, million pieces	985.3	455.8	542.6	1178.6	1552.9	1609.8	1714	1676.2	**-2.2**
Wool (physical weight)	11,2	9	10,9	15.6	17	16.7	16	15.8	**-1.3**
Cocoon, tons	4902	1100	66.6	6	0.236	70.8	245.2	513.9	**+9.6**

Based on the information provided by SSC.[13]

As seen from Table 1, the production of numerous agricultural products has increased during the years of independence. In particular, after the agrarian reforms, a significant increase was achieved in the production of food products, and the supply of the population with locally produced food products was improved. Analysis of statistics reveals that although there is an increase in gross agricultural output in the country, a greater success can be achieved in order to realize the full capacity. It should be mentioned that especially the number of livestock has grown significantly over the years of independence (Table 2). Nevertheless, we have to consider the fact that the limited land resources in Azerbaijan, the occupation of a part of the pastures is a limiting factor in the development of livestock. On the other hand, the reorientation of some winter pastures to arable lands over recent years has also posed new challenges to the development of sheep breeding.

Table 5.2

Number of animals, birds and bee families in Azerbaijan (thousands), January 1

Years	**Large cattle**	including		**Sheep and goats**	including		**Pigs**	**Birds**	**Bee families,**
		Herd of cows	Herd of buffaloes		sheep	goats			

[13] https://www.stat.gov.az/source/agriculture/

									thousand units
1995	1632.8	1340.9	291.9	4557.6	4373.1	184.5	33.4	14417.8	53.5
2000	1961.4	1664.4	297.0	5773.8	5279.7	494.1	19.7	14711.1	54.0
2005	2315.8	2007,2	308.6	7488.8	6887.4	601.4	22.9	18253.3	95.7
2010	2582.4	2299.7	282.7	8331.2	7723.9	607.3	5.3	22041.6	164.0
2015	2697.5	2445.2	252.3	8645.4	7987.3	658.1	6.1	28851.7	243.0
2016	2708.3	2466.0	242.3	8677.1	8025.6	651.5	5.2	27559.4	251.2
2017	2698.5	2484.3	214.2	8614.8	7966.5	648.3	4.4	28009.5	260.1
2018	2673.0	2476.3	196.7	8454.3	7821.0	633.3	4.9	30473.4	271.7
2019	2658.8	2482.6	176.2	8304.1	7681.7	622.4	5 5.	30498.4	501.0

Source: Based on the information provided by SSC[14].

In general, the limited land resources of Azerbaijan stipulate the rejection from extensive farming and the choice of the path of intensive development. I.e. 55% or 4.78 million hectares of the total territory of Azerbaijan, that is 8.66 million hectares are agricultural lands.

Table 5.3

Land resources of the Republic of Azerbaijan

Years	**Population, thousand people**	**Area, thousand km²**	**Arable lands, thousand ha ***	**Land under crop, thousand ha**	**Derelict lands, thousand ha**	**Perennial plantings, thousand ha**	**Mowing and grazing areas, thousand ha**	**Forest-covered fields, thousand ha**
1970	5227	86.6	4253.0	1339.3	…	264.2	2279.6	1031.2
1980	6206.7	86.6	4282.0	1360.9	…	404.8	2335.4	1040.4
1990	7218.5	86.6	4382.9	1589	80.8	347.4	2365.7	1038.8
2000	8114.3	86.6	4740.4	1766.8	58.8	236.8	2678	1037.4
2010	9111.1	86.6	4766.8	1842.7	41.4	227.4	2655.3	1040.7
2015	9705.6	86.6	4769.8	1897.5	40.2	237.0	2595.1	1040.3
2016	9810.0	86.6	4772.9	1959,1	39.8	241.1	2532.9	1040.3
2017	9898.1	86.6	4777.5	2054.7	39.8	246.8	2436.2	1040.3
2018	9981.5	86.6	4779.5	2057.9	40-50	255	2426.6	1040.2

Source: Based on the information provided by SSC[15].

[14] https://www.stat.gov.az/source/agriculture/
[15] https://www.stat.gov.az/source/agriculture/

As seen from the table, only 2.1 million hectares of agricultural land are crop fields. The agricultural land per capita in the country is equal to 0.48 hectares, including 0.21 hectares of crop field. The per capita area of pastures and hayfields is limited.

Currently, there are 1,449,500 hectares of irrigated land i.e. lands having irrigation network in the country. 1214.2 thousand hectares of the irrigated lands are lands under crops and 176.2 thousand hectares cover perennial planting. Although soil and climatic conditions in Azerbaijan allow to increase the area of irrigated land up to 3.0-3.5 million hectares, it is impossible to realize due to limited water resources.

We should note that located in the arid zone, Azerbaijan has only limited water resources. Thus, surface water resources if the country equals 32.2 billion m 3 and in drought years this figure is 22.6 billion m^3. At the same time 70% of surface water resources originate outside the country. The volume of groundwater equals 5.2 billion m^3. About 21 billion m^3 of available water resources are stored in warehouses, and only 12 billion m^3 of it is used. About 60-70% of the used water falls to the share of agriculture. In years with normal rainfall, the estimated water shortage in the country equals 3.7 billion m^3 and raises to 4.7–5 billion m^3 in years with insufficient rainfall.

Since it is a country with limited water resources, it is important to take appropriate support measures applied in global practice in order to stimulate the expansion of the use of modern water-saving irrigation methods in Azerbaijan.

We should also note that the state programs adopted in Azerbaijan also target to realize this capacity in the upcoming years and increase agricultural production. The SC working groups should look at the potential of agriculture to contribute to lowering GHG emissions of the country by 2050, with interim medium term targets corresponding with the NDCs implementation periods, especially with regard to increasing carbon content in soils, lowering methane emissions from cattle and sheep, shift to climate resistant and less water intensive crops, etc caetera. Nature based Solutions (NbS) are among the most efficient and least cost options available, while safeguarding biodiversity and preventing further degradation of the environment.

Table 5.4

Targets of the adopted sectoral state programs related to agriculture

No.	**Measures**	**2017 (Factual)**	**Target**
1.	**Tobacco until 2021** *- average productivity* *- land under crops* *- production volume*	 16 c/ha 3,2 thousand ha 5.2 thousand tons	 20 c/ha 6000 ha 12 thousand ha
2.	**Raw cotton production in 2022**	207 thousand tons	500 thousand tons
3.	**row rice in 2025** *- average productivity* *- land under crops* *- production volume*	 31,1 c/ha 5,1 thousand ha 15.9 thousand	 40.0 c/ha 10 thousand ha 40 thousand ha

		tons	
4.	Wine export until 2025 (HS code 2204-2205)	$ 6 million	will increase 5 times
5.	**Citrus fruit production by 2025**	42.8 thousand tons	100 thousand tons
6.	**Wet cocoon production until 2025**	245.2 tons	6.0 thousand tons
7.	**Tea growing until 2027** - land under crops - green tea leaf collection	 1114.3 ha 775.2 tons	 3000 ha 8.5 thousand tons

Source: State Programs[16]

The increase of production by 2025 will also have environmental impacts. For instance, the increase in raw rice fields will also increase GHG emissions in agriculture. Statistics confirm that at present the agricultural sector has a significant role in GHG emission.

Table 5.5

GHG emission by sectors (million tons of CO2 equivalent)

	1990	**2005**	**2010**	**2015**	**2016**	**2017**
Energy	63.9	39.2	36.6	38.5	38.1	37.9
Industrial processes	1,4	1,8	2,1	3.1	3.1	3.1
Agriculture	6.3	6.5	7.2	7.2	7.1	7.1
Land use, replacement and forestry[2])	-3.7	-5.3	-5,4	-5 5.	-5 5.	-5 5.
Waste	1,7	2,0	2,3	2,6	2,6	2,6
Total considering land use, replacement and forestry	73.3	49.5	48.2	51.4	50.9	50.7
Total excluding land use, replacement and forestry	69.6	44.2	42.8	45.9	45.4	45.2

Source: Based on the information provided by SSC[17].

Strategic Roadmap for Agricultural Production and Processing in the Republic of Azerbaijan adopted by the Decree dated December 6, 2016 of the President of the Republic of Azerbaijan 18 for the first time in the history of the Republic included a provision related to the adaptation of measures for the development of livestock breeding to the goal of reducing greenhouse gas emissions. The Strategic Roadmap also specifies the measures to assess the impact of climate

[16] The following state programs were used to compile this table: State Program for the development of cotton growing in the Republic of Azerbaijan in 2017-2022; State Program on the Development of Tobacco Growing in the Republic of Azerbaijan in 2017-2021; State Program for the Development of Tea planting in the Republic of Azerbaijan 2018-2027; State Program for the Development of Raw Rice Growing in the Republic of Azerbaijan in 2018-2025; State Program for the Development of Silkworm Breeding and Sericulture in the Republic of Azerbaijan in 2018-2025; State Program for the Development of Citrus Fruit Growing in the Republic of Azerbaijan in 2018-2025; State Program for the Development of Winemaking in the Republic of Azerbaijan in 2018-2025.

17 https://www.stat.gov.az/source/environment/

18 http://e-qanun.az/framework/34254

change on agriculture and to develop an adequate adaptation plan, and to reduce carbon emissions in the agricultural sector (*Measure 7.2.2*).

Also, integration of the creation of protective forest strips in the Strategic Road Map (Measure 7.2.3) is a positive aspect in terms of GHG absorption. Subject to this measure, the creation of layered protective forest strips at the edges of cultivation lands will be supported and an action plan for the development of protective forest areas will be developed until 2025. Relevant works will be carried out in the field of protective afforestation, and the creation of forest strips with the involvement of international donors. Interalia Azerbaijan has joined Bonn Challenge to recover the forest landscape in degraded lands. It has undertaken to recover 270,000 hectares of forest by 2030. In general, setting the target to increase forest areas in Azerbaijan can significantly contribute to the absorption of greenhouse gases. I.e. the National Forest Program for the Protection and Sustainable Development of Forests in the Republic of Azerbaijan aims to cover 20 percent of the country territory with forests by 2030. Considering that today 11 percent of the territory of Azerbaijan is composed of forests, we can say that it is a very serious target.

It should be noted that Azerbaijan also aims to increase agricultural production in the upcoming years. For instance, the goal is to increase the land under raw rice to 10,000 hectares and its production to 40,000 tons by 2025. The draft State Program on Intensive Livestock Development and Rational Use of Grazing and Pasture Areas targets to increase livestock production in the country.

We also have to consider that currently the development of livestock breeding in the country increases the pressure on pastures. The overloading of pastures and grazing lands has made the grass cover significantly sparser; the dried grass productivity of winter pastures has reduced to 3-4 centners, and high erosion is observed in pastures. Continued increase in the number of livestock can significantly reduce the role of pastures in GHG absorption and start the reverse process.

Also, the use of fertilizers in crop production is subsidized and farmers are encouraged to use fertilizers. Consequently, in 2018 the import of mineral fertilizers to the country increased 8 times in comparison with 1995. As seen from the table, the import of nitrogen fertilizers also increased 5.4 times over this period. For information purposes it should be noted that current global trend is to reduce the use of nitrogen fertilizers in agriculture. These measures should be reviewed in the context of 2050 LT-LEDS ultimate goal of limiting GHG emissions in line with the IPCC recommendations.

Table 5.6

Import of mineral fertilizers by type, physical weight

Years	Total mineral fertilizers	including			
		nitrogenous	phosphated	with potassium,	etc.
1995	36.1	36.1	-	-	0,0
2000	40.5	32.9	0,1	1,3	6.2
2005	77.3	54.2	14.2	5.9	3
2010	49.2	33.0	0,1	4.6	11.5
2015	152.1	104.2	3.7	2,5	41.7
2016	166.9	96.2	0,1	8	62.6
2017	180.6	120.6	0,01	8.1	51.9

2018	286.7	194.9	0,02	8.1	83.7

Source: Based on the information provided by SSC[19].

In 2019 SOCAR Carbamide plant with a capacity of 650-660 thousand tons of carbamide production was launched in Azerbaijan. It implies that in the coming years the price of nitrogen fertilizer will be lower in the country and its use in agriculture will increase.

Table 5.7.

The application of mineral fertilizers to lands under crops, 100% nutrients

Years	**Total thousand tons**	**per sown hectare, kg**	**of this**								**Specific weight of fertilized area in total sowing, %**
			wheat	**cotton**	**tobacco**	**potato**	**vegetables and orchard crops**	**fodder crops**	**gardens**	**vineyards**	
1998	2,2	4	3	8	13	-	-	-	-	-	9
2010	31.7	18	20	25	76	16	37	4	20	15	34
2011	20.4	12	15	30	34	10	19	2	9	6	54
2012	28.1	16	20	31	65	28	20	5	11	6	61
2013	29.3	16	20	30	66	28	24	4	12	7	68
2014	34.1	19	23	33	71	31	30	4	15	7	46
2015	40.6	23	21	35	72	26	28	9	17	8	58
2016	80.7	44	51	101	120	34	53	14	43	43	70
2017	118.7	63	62	144	114	41	62	18	52	60	72
2018	141.3	72	86	84	141	81	91	35	63	40-50	84

Source: Based on the information provided by SSC[20].

As seen from the table, the stimulation of mineral fertilizers in agriculture has led to an increase in the share of the fertilized area. I.e, while in 1998 the share of fertilized area in the total land under crop was 8%, in 2018 it reached 84%. Although the application of mineral fertilizers is a positive development in terms of increasing productivity, it also has the effect of increasing GHG emissions.

[19] https://www.stat.gov.az/source/agriculture/

[20] https://www.stat.gov.az/source/agriculture/

Especially nitrogen fertilizers play an important role in increasing productivity in modern agriculture, but also have a serious impact on GHG emissions.

In general, the measures taken to develop agriculture in the country will increase GHG emissions, unless a shift in the policy will aim at increasing efficiency while lowering emissions from the agricultural sector. Therefore, it is essential to prioritize the agricultural sector when developing the Long-Term Low Emission Development Strategy for Azerbaijan. In order to contribute to global efforts to combat climate change, Azerbaijan has set in its first NDC a target of reducing greenhouse gas emissions by 2030 for 35% in comparison with 1990 baseline. The prioritization of the agricultural sector within the Long-Term Low Emission Development Strategy of Azerbaijan will also contribute to the achievement of this goal.

5.6. Waste management sector

Nowadays domestic solid waste management has become one of the economic, social and environmental issues. The special indicators of per capita household waste generated in large cities equals an average of 0.5 kg per day, and the figure is growing.

According to the results of the GHG emission inventory in Azerbaijan in 2013, 1.2% of the total emissions in the country falls to the share of the waste sector. We should note that around 90% of urban areas are partially covered by waste collection services in the Republic of Azerbaijan. However, in all cities of the country except for Baku, waste is managed in a primitive order and modern technologies such as methane capturing and flaring, not to mention waste to energy projects, are not in place. In rural areas, almost no waste collection service is available.

This sector is one of the sources of greenhouse gases such as methane (CH_4), carbon (CO_2) separating from both solid waste landfills and wastewater treatment, and N_2O gases originating from human activities, and plays an important role in global warming.

Solid waste can be disposed by burial, recycling, burning or conversion into energy (waste is also used directly as fuel). The most important gas generated in this sector is methane. Two main sources of methane generation in this sector are landfills and wastewater treatment.

2006 IPCC Guidelines deals with the following categories of the waste sector:

4A Solid waste disposal;

4B Biological treatment of solid waste;

4C. Incineration and open burning of waste;

4D. Wastewater treatment and discharge;

4E. Other

Currently, the management of the waste sector in line with modern best practices is one of the most critical issues for our country in terms of development of the non-oil sector and diversification of the economy.

The main objectives of Long Term Strategy will be to improve basic collection and neutralization processes, including the establishment of regional landfills and transfer points that will render waste management services in the regions, as well as to ensure the efficient use of available resources for building development schemes and investments that will improve solid waste collection, recycling and disposal in all rural and urban areas. Scenarios: BAU (Business-as-usual) and WIM (With Measures) until 2050 have to be developed, and options to prevent dramatic increase of waste volumes, especially in rural areas, as well as waste to energy

conversion and a national programme of circular economy corresponding with the existing and potential emission reduction opportunities should explored by the relevant SC working group, supported by the selected consultancy.

Mechanisms proposed for the development of Long-Term Strategy in waste management sector:

5.6.1 Domestic solid waste management

5.6.1.1. Analysis of the current institutional set-up of solid waste management.

(center - Clean City OJSC, at the level of local executive authorities and municipalities)

- Identification of barriers, gaps;
- Analysis of the best international practices and developing proposals for eliminating barriers and gaps;
- drafting proposals for the introduction of best practices in order to improve governance at all levels, taking regional specifics into account;

5.6.1.2 The analysis of current national solid waste management programs and development plans (including local) and strategies.

- Analysis of existing strategies and programs
- Comparative analysis of short, medium and long-term goals;
- Considering global trends and best international practices;
- Analyzes based on forecasts on population distribution by regions;

5.6.1.3. Assessment of the state of landfills

- Analysis of relevant information on the amount of waste, and its management,
- Study of quantitative and qualitative indicators by the sources of emission from existing landfills,
- Assessing the economic, social and environmental benefits of effective solid waste management
- Forecasting solid waste generation based on future strategic development goals and demographic indicators of the country;
- Identifying targets in line with these forecasts
- Sources of funding for waste management

5.6.1.4. Assessment and selection of management methods based on economic analysis considering the local specificities of regions

- Assessment of efficiency by regions for the purpose of integrated use of organic waste (methane capturing, compost production, etc.);
- Biological treatment of solid waste
- Burning for energy, etc.
- Analysis of the possibilities to expand solid waste collection services for all residential and non-residential enterprises from district centers to large settlements, in line with the number of population and the pace of industrial development;

5.6.1.5. Public education on the economic, social and environmental benefits of solid waste management, effective public awareness campaigns, analysis of the current status of new technologies and staff training, and preparation of adequate proposals;

- Analysis of the current status of communication, awareness and human resources,

- Conducting surveys at various levels;
- Assessment of barriers and gaps
- Prioritized implementation of relevant campaign activities at all levels;

5.6.1.6. Developing an action plan covering the goals until 2050;

Summarizing the activities mentioned in the previous paragraphs;

Uncertainty analysis;

The comparative analysis and consideration of alternative options

Developing short, medium and long term (2050) action plans;

5.6.2 Wastewater management

5.6.2.1. Analysis of the current institutional set-up of wastewater management.
(center - Azersu OJSC, at the level of local executive authorities and municipalities)

- Identification of barriers, gaps;
- Analysis of the best international practices and developing proposals for eliminating barriers and gaps;
- Drafting proposals for the introduction of best practices in order to improve governance at all levels;
- Assessment of the status of existing sewerage, aeration and wastewater treatment plants,
- Analyzing the possibility of installing methane tanks for collecting methane gas at selected stations;
- Prioritization of aeration stations to specify short, medium and long-term targets;

5.6.2 2. Setting targets until 2050

- Summarizing the activities mentioned in the previous paragraphs;
- Uncertainty analysis;
- The comparative analysis and consideration of alternative options
- Developing short, medium and long term (2050) action plans;

6. Use of emission scenarios (based on LEAP model)

Mechanisms proposed for projecting emission scenarios based on the LEAP model (within the framework of completed or ongoing project experiences and lessons) as part of the development of low emission development strategy (LEDS)

Long-term low-carbon development planning is a relatively new domain or direction in Azerbaijan. The government plans to use long-term scenario analysis (long-term planning of energy alternatives) based on the LEAP instrument and use its results to project GHG emissions. The team to be established to this effect will develop various scenarios for the period until 2050 and allow the Azerbaijani government to analyze various options for the development of LCDS which is one of its commitments under the Paris Agreement, and draft scenarios on how to fulfill these commitments mainly in the energy sector.

6.1 Analysis of initial database data on GHG emissions

6.1.1 Analysis of the inventory data of GHG emissions

Analysis of data on total and per capita GHG emission forecasts covering the period until 2050
Analysis of carbon intensity data in the country in recent years (last 15-20 years)

6.1.2. Population

Population of the country, growth dynamics over the last 15 years (analysis of official DCK data).
Projections of population growth trends and demographic development

6.1.3. Gross Domestic Product

GDP dynamics over recent years (20 years) (in comparison with manat and US dollar)
Defining and projecting GDP growth rates until 2050.

6.1.4. BAU scenario of emissions

Emission scenarios for energy, industry, agriculture, transport and waste management sectors (the analysis of BAU and other reference points)
Total GHG emission per capita until 2050, based on BAU scenario
BAU scenario used for projections of future emissions assuming no action, or no new action, is taken to mitigate the problem
Taking into account the uncertainties related the main parameters of the model

6.1.5. Reference/With Measures scenarios of emissions

Reference scenarios are developed considering the country's NDC, national development programs and strategies by sectors.
Analysis of global low-emission development trends and consideration of these trends in reference scenarios
Feasibility, cost and income analysis
The comparative analysis of options
Reference scenarios developed taking the activities envisaged in the LT-LEDS into account
Total GHG emission per capita until 2050, based on the reference scenario

7. Gender factor in priority (selected) areas

Climate change is the most important issue facing the world today while achieving gender equality is one of the unfinished business of our time, and one of the greatest human rights challenges in the world.

Gender equality is included in the Paris Agreement as being integral to social transformation and climate action. Besides being a fundamental human right, advancing gender equality and women's leadership in climate action is essential to reach climate transformational pathways to tackle the climate crisis and ensure social justice[21]. UNDP realizes the need for all 'on-board' to

[21] UNFCCC, the Paris Agreement, Preambular para-11, Article 7 para - 5, Article 11, para -2. http://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf

act as proactive agents to meet national determined contributions (NDCs) targets and deliver climate-resilient development in Azerbaijan.

How can gender equality support low emission development?

Gender equality is fundamental to achieving sustainable development, as recognized by the Sustainable Development Goals (SDGs)—explicitly in SDG 5 on gender equality, and as a prerequisite to achieving other SDGs, from improved education to social-economical to addressing climate change. By actively engaging both women and men in all segments of society, Azerbaijan can tap into hidden potential and make its transition to low carbon society truly sustainable. For example, women often play a central role in sectors where emissions can be substantially reduced in tandem with development benefits, such as efficient household energy use, support to income generation activities, and shaping consumption patterns towards low emission products. In addition, identification of women as active members of society and promoting their participation in new/nontraditional climate related job opportunities, for example as renewable energy technicians and entrepreneurs, will contribute to poverty reduction and economic growth. Studies show that gender diversity in high level decision making has a positive impact on business performance and investment in general, as evidenced by the better performance of companies with more women on their board with regard to returns on investment, and equity[22].

Structural inequalities can affect the acceleration of NDC implementation. Apart from physical infrastructure, increasing investments in social infrastructure are needed for acceleration.

- **Energy sector.** The energy sector remains one of the least gender diverse sectors in the economy in Azerbaijan. Despite, the country has made progress in ensuring an equal status for women and men under the law and addressing gender gaps. However, women and girls face structural and cultural challenges in career development (horizontal and vertical segregation in labor market, including choosing professions, employment opportunities that prohibit the use of female labor, etc.) and the lack of women in leadership positions in the energy sector compounds the difficulty in recruiting and retaining female leaders. According to the economic indicators of 201823, 88.8% of industrial production processing, 89.1% of electricity, gas and steam production and supply, 90.8% of the transport sector employees are men, and their average monthly salary is 599.4 manat up to 3165.8 manat. Women labor using mainly in three areas: health and social services (77.6%), education (73.1%), recreation, entertainment and arts (62.9%). Their average monthly salary is 222.6 up to 341.6 manat. Significant difference in these indicators shows structural and cultural barriers for women in Azerbaijan.

  This is especially important given the role that women can often play as key drivers of innovative and inclusive solutions. As such, gender diversity and the broad participation of women in the energy sector are needed for an efficient usage of energy and successful clean energy transition. For this reason, Azerbaijan government and industry need to act to address these obstacles and overcome barriers to full participation and career advancement. One option would be setting measurable targets and adopting policies and programmes to help foster change.

[22] Interview with David Solomon, CEO of the Goldman Sachs. Forbes Media. https://www.forbes.com/sites/kimelsesser/2020/01/23/goldman-sachs-wont-take-companies-public-if-they-have-all-male-corporate-boards/?fbclid=IwAR2foVr1I-ImzAEYM34656QUazTfDm78zx9jrFrlbTL-Bt9DSDNOjSqZDoo#60ed21709475

23 The State Statistics Committee Report 2018. https://www.stat.gov.az/source/gender/

- **Public transport.** Travel options do not always match the needs of women. For instance, pricing or infrastructure needs to accommodate women's travel patterns, safety concerns and typical responsibilities such as childcare and shopping. If women are excluded over an extended period, it is unlikely that planning initiatives will develop in a way that suits them. Women's voice in transport planning and management thus helps to ensure their needs are on the agenda.
- **Agriculture sector.** Azerbaijan's population is 9.9 million where 49.9% is male and 50.1% is female. More than half (52.9%) of this population live in urban areas, compared to 47.1% who live in rural areas24. Women comprise 55.8% of the agricultural workforce in the country. Even with climate change, evidence indicates that agricultural transformation and male out-migration can in some cases create new wage employment opportunities for women. However, gender-based constraints such as land tenure, access to financial resource and technology, climate information, advice, climate services must be overcome for women to successfully implement LEDS measures and gain from high value export crops.

Integrating gender equality goals into LT-LEDS

Recognize women as key stakeholders within climate change policies, and also, address women as key to achieving low emission development pathways are curtail step forward. One of the ways this is done is by creating spaces for women to voice their needs, concerns, and ideas, and by enabling women to join and benefit from LT-LEDS initiatives.

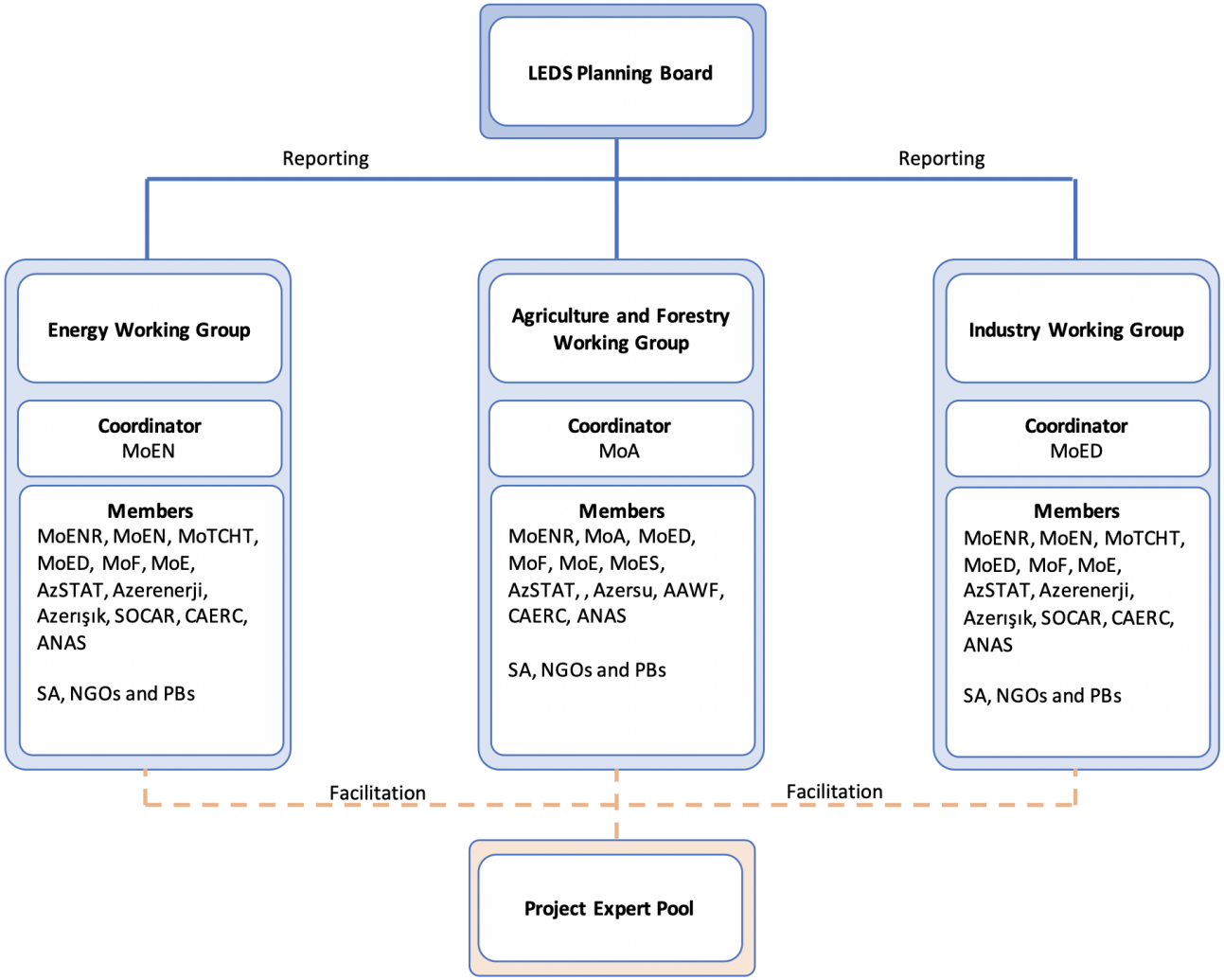
Integrating gender equality into LT-LEDS implementation requires overcoming institutional, structural, social, economic, cultural, and financial barriers, by:

- ensuring that LT-LEDS Preparation Steering Committee and Sectoral Working Groups include representatives of the State Committee of Women, Children and Family Affairs and relevant women's organizations;
- building both, the capacity of women's groups and of institutions responsible for climate change policies, and increasing decision makers' capacity and awareness on gender equality, to enable all stakeholders to speak the same language;
- democratizing financial mechanisms and removing bias toward small scale finance schemes, which are often more appropriate for gender responsive climate and energy projects or to support female-led businesses;
- collecting sex disaggregated data to identify barriers and opportunities for women and men to benefit from interventions, including impact monitoring;
- combining gender mainstreaming and women's empowerment measures to create a level playing field for both men and women and to accelerate gender equality goals to action on the ground.

24 The State Statistics Committee Report 2018. https://www.stat.gov.az/source/gender/

Annex:

Suggested organisational chart for the LT-LEDS development process



Abbreviations:

Ministry of Ecology and Natural Resources (MoENR)
Ministry of Energy (MoEN)
Ministry of Transport, Communications and High Technologies (MoTCHT)
Ministry of Agriculture (MoA)
Ministry of Economic Development (MoED)
Ministry of Finance (MoF)
Ministry of Education (MoE)
Ministry of Emergency Situations (MoES)
The State Statistics Committee (AzSTAT)
Azersu OJSC
Azerbaijan Amelioration and Water Farm OJSC (AAWF)
Azerenerji OJSC
Azerışıq OJSC
State Oil Company of Azerbaijan Republic (SOCAR)
Azəristiliktəchizat OJSC
Center for Analysis of Economic Reforms and Communications (CAERC)
Azerbaijan National Academy of Sciences (ANAS)
Sectoral Associations (SA) and NGOs
Private Businesses (PBs)

References

Azerbaijan. 2020. Azerbaijan - General information. [online]. Baku. [Cited 02 March 2020]. https://azerbaijan.az/related-information/237

ClimaEast. 2020. Pilot Project in Azerbaijan. [online]. [Cited 18 April 2020]. http://www.climaeast.eu/clima-east-activities/pilot-projects/pilot-project-in-azerbaijan

CoA. 1995. The Constitution of the Republic of Azerbaijan. Baku. 1995. (also available at https://static2.president.az/media/W1siZiIsIjIwMTgvMDMvMDkvNHQzMWNrcGppYV9Lb25zdGl0dXNpeWFfRU5HLnBkZiJdXQ?sha=c440b7c5f80d645b)

CoD 2012: "Azerbaijan 2020: Look into the Future" Concept of Development (CoD)**.** Baku, 29 December 2012. (also available at http://www.e-qanun.az/framework/25029)

Clapp, C., Briner, G. and Karousakis, K. (2010). Low-Emission Development Strategies (LEDS): Technical, Institutional and Policy Lessons, OECD/IEA, COM/ENV/EPOC/IEA/SLT (2010)2, France.

Cox, S. and Benioff, R. (2011). International Assistance for Low-Emissions Development Planning, NREL/TP-6A00-49972.

ESMAP. (2012). Low Carbon Growth Country Studies Program, Planning for a Low Carbon Future: Lessons from Country Studies, Knowledge Series 011/12, USA.

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. (2013). Low-Emission Development Strategy (LEDS), Germany.
United Nations Framework Convention on Climate Change, www.unfccc.int

USAID. (2016)., Introduction to Low Emission Development Strategies for Policymakers in the Asia Region, USA.

DoP. 2019: Decree of the President of Azerbaijan on Improvement of the structure and management of the Ministry of Ecology and Natural Resources, 2019. Baku. (also available at https://president.az/articles/31541)

DoP. 2001. President degree on the establishment of the Ministry of Ecology and Natural Resources. Baku. (also available at http://e-qanun.az/framework/2993)

DoP. 1992. President degree on establishment of the State Hydrometeorology Committee. Baku. (also available at http://www.e-qanun.az/framework/6939)

FCoAR. 1997. The Forest Code of the Azerbaijan Republic (Adopted by the Law of Azerbaijan Republic № 424-IQ 30 December 1997). Baku. (Available from: http://e-qanun.az/code/5)

Huseyn, R. 2018. Production of competitive products in agrarian sector: challenges of globalization and development opportunities. Baku, "Avropa", 2018, 408 p.

IPCC, 2018: Global Warming of 1.5°C.An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press.

IoG. 2020. The annual report of the Institute of Geography of the Azerbaijan National Academy of Sciences [online]. Baku. [Cited 17 March 2020]. https://igaz.az/az/content/2

LCoAR. 1999. The Land Code of the Azerbaijan Republic (Adopted by the Law of Azerbaijan Republic № 695-IQ 25 June 1999). Baku. (also available at http://e-qanun.az/code/6)

LoMI. 1996. Law on Melioration and Irrigation of the Azerbaijan Republic (Baku, June 5, 1996. # 116-IQ.) Baku. (also available at http://e-qanun.az/framework/4170)

LoHA. 1998. Law on hydrometeorological activities of the Azerbaijan Republic (17 April 1998, № 485-IQ). Baku. (also available at http://e-qanun.az/framework/3290)

LoES. 1999. Law on Ecological Security of the Azerbaijan Republic (June 6, 1999 No. 677-IQ). Baku. (also available at http://e-qanun.az/framework/3851)

LoEP. 1999. Law on Environmental Protection of the Azerbaijan Republic (June 6, 1999 No. 678-IQ). Baku. (also available at http://e-qanun.az/framework/3852)

Ministry of Agriculture of the Republic of Azerbaijan (MoA). 2020. History of the Ministry. [online]. Baku. (also available at: https://www.agro.gov.az/en/the-ministry/about-us)

MoENR. 2015: Third national communication to the United Nations framework convention on climate change Republic of azerbaijan. Ministry of Ecology and Natural Resources Republic of Azerbaijan, Baku, 2015 (also available at: https://unfccc.int/resource/docs/natc/azenc3.pdf)

MoENR. 2019a. Ministry of Ecology and Natural Resources of the Republic of Azerbaijan. Radiometeorology and Aerology Center [online]. Baku. [Cited 15 February 2020]. http://eco.gov.az/az/fealiyyet-istiqametleri/hidrometeorologiya/merkezler/radiometeorologiya-ve-aerologiya-merkezi)

MoENR. 2019b. Ministry of Ecology and Natural Resources of the Republic of Azerbaijan. Hydrometeorology [online]. Baku. [Cited 15 November 2019]. http://eco.gov.az/az/hidrometeorologiya/olkenin-hava-iqlim-seraiti)

Ministry of Ecology and Natural Resources of the Republic of Azerbaijan (MoENR). 2020. About Ministry of Ecology and Natural Resources of the Republic of Azerbaijan [online]. Baku [Cited 15 February 2020]. http://eco.gov.az/az/nazirlik/nazirlik-haqqinda)

National Security concept (NSCRA). 2007. National security concept of the Republic of Azerbaijan. Baku. (also available at http://e-qanun.az/framework/13373)

National Hydrometeorological Service (NHS). 2020. National Hydrometeorological Service. [online]. Baku. [Cited 20 May 2020]. http://eco.gov.az/az/nazirlik/tabeli-qurumlar/milli-hidrometeorologiya-xidmeti

SRM. 2016. Strategic roadmap on agriculture and agricultural products processing sector in the Republic of Azerbaijan. 16 December 2016. [online]. Baku. (Available from: http://e-qanun.az/framework/34254)

SPPRSD. 2008. State Program on Poverty Reduction and Sustainable Development in the Republic of Azerbaijan for 2008-2015. Approved by the Decree #3043 of the President of the Republic of Azerbaijan dated of September 15, 2008 [online]. Baku. [Cited 18 May 2020]. http://e-qanun.az/framework/15399

State Statistical Committee of Azerbaijan Republic (SSC). 2019a. Statistical Yearbook of Azerbaijan 2019. Baku, 2019, 788 p.

State Statistical Committee of Azerbaijan Republic (SSC). 2019b. Women and men in Azerbaijan. Statistical yearbook. State Statistical Committee of the Republic of Azerbaijan. Baku 2019. 216 p.

State Statistical Committee of Azerbaijan Republic (SSC). 2019d. The Agriculture of Azerbaijan. (Statistical yearbook). State Statistical Committee of the Republic of Azerbaijan. Baku 2019. 644 p

State Statistical Committee of Azerbaijan Republic (SSC). 2019e. Sustainable Development Goals. State Statistical Committee of the Republic of Azerbaijan. Baku 2019. 212 p.

State Statistical Committee of Azerbaijan Republic (SSC). 2020a. Agriculture, forestry and fishing. [online]. Baku. [Cited 05 May 2020]. https://www.stat.gov.az/source/agriculture/?lang=en)

State Statistical Committee of Azerbaijan Republic (SSC). 2020c. MDG indicators of the Republic of Azerbaijan. [online]. Baku. [Cited 07 May 2020]. https://www.stat.gov.az/source/millennium/source/MDG_en-05.01.2017.pdf)

World Bank. 2018. Azerbaijan Agriculture Sector Risk Assessment. October 1, 2018. AGR Europe and Central Asia.Report No: AUS0000254.

World Bank. 2014. World Bank: Building Resilience to Climate Change in South Caucasus Agriculture edited by N. Ahouissoussi, J. E. Neumann, and J. P. Srivastava. Washington, DC. (also available at: http://documents.worldbank.org/curated/en/193691468012673593/pdf/Building-resilience-to-climate-change-in-South-Caucasus-agriculture.pdf)