Sector-level policy gaps for climate change mitigation in Georgia

Summary of policy coverage and ambition raising potential

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Authors
Swithin Lui, Tessa Schiefer, Thomas Day

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1 Introduction

Georgia is entering a new era of climate policy, having recently adopted its first-ever 2030 National Climate Strategy and 2021-2023 Action Plan (CSAP) and updated Nationally Determined Contribution (NDC) to the Paris Agreement. In 2021, the documents have been approved by the newly established Climate Change Council, which oversees climate planning and processes, for parliamentary approval and later adopted by the government. Georgia is currently elaborating key policy documents such as its Long-Term Low Emission Development Strategy (LT_LEDS) to the United Nations Framework Convention on Climate Change (UNFCCC) and Integrated National Energy and Climate Plan (NECP) to the Energy Community. The processes above, housed primarily within the Ministry of Environmental Protection and Agriculture (MEPA) and its Climate Change Division (CCD), highlight climate change mitigation as a key national priority for the Government of Georgia (GoG) in the short-, medium-, and long-term.

Georgia's CSAP outlines planned sector implementation and priority areas for Georgia's greenhouse gas (GHG) emissions reductions for the period of 2021-2023. It serves as an action plan for the implementation of Georgia's Updated NDC, but also as a strategic document to determine feasible levels of ambition when updating the NDC in future revisions. The updated NDC unconditionally commits to limiting national GHG emissions to 35% below emission levels in 1990 (excluding emissions from land-use, land-use change and forestry (LULUCF) by 2030. While full implementation of the planned mitigation actions from CSAP would lead to significant emission reductions (see sections below), the strategy further outlines key priority areas in each sector to be explored; currently, these areas contain policy gaps where there is the greatest potential and interest for the identification and design of new mitigation policies and measures. Exploration of these areas can lead to the implementation of new activities for the next Action Plan with support from the international community.

This report assesses Georgia's sectoral mitigation policy coverage by identifying and exploring gaps in each sector and outlines the potential for further sectoral action, based on relevant and promising examples from international contexts. Motivations for the further exploration of these highlighted mitigation gaps for Georgia are three-fold, dependent on the sector:

1) Where CSAP actions are expected to achieve NDC sector targets, it would help **identify key actions to overachieve targets and provide an evidence base for increasing ambition**;
2) Where CSAP actions fall short of targets, **identified actions can help achieve them**;
3) Where sectors do not contain quantitative NDC targets and have few policy actions, **identified actions can help inform future sector mitigation strategy**.

This report can be used as a reference document providing a concise overview of potential priority actions in each of Georgia's sectors, where policymakers and climate finance donors can derive further activities and opportunities for technical and financial assistance. Discussion on the data and analytical components underlying the emission scenarios and GHG mitigation potential in Georgia's CSAP and NDC, which are heavily based on modelling and consultation exercises undertaken by NewClimate Institute and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), is therefore omitted from this document.

Section 2 provides an overview of Georgia's historical context, current status, and future outlook regarding GHG emissions and climate strategy. **Section 3** outlines planned actions and priority mitigation areas per sector from the CSAP and provides sector-by-sector analysis on policy gaps and international best practice policies for potential further mitigation action per sector. **Section 4** provides an outlook for future climate change mitigation planning in Georgia.

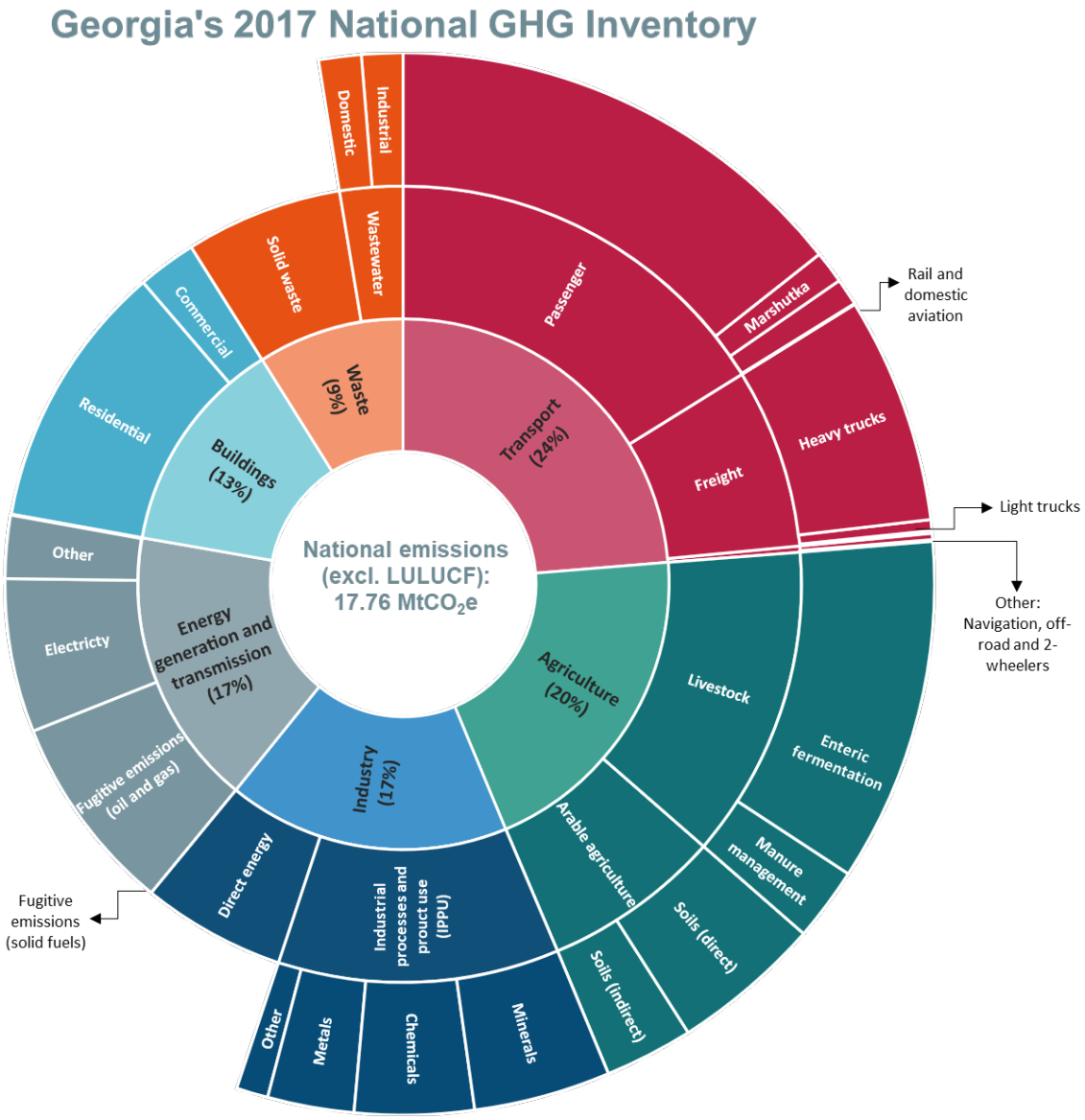
2 Greenhouse gas emissions and climate outlook

Status quo of greenhouse gas emissions

Georgia's sixth and latest national inventory was submitted in 2021 to the United Nations Framework Convention on Climate Change (UNFCCC) by the Ministry of Environmental Protection and Agriculture (MEPA) through the Fourth National Communication of Georgia (MEPA, 2021). Emissions totalled ca. 17.76 $MtCO_2e$ in 2017, with the majority of emissions from fossil fuel combustion for energy. **Figure 1** disaggregates the emission sources into energy end-use sectors and shows the emissions profile with sector and sub-sector detail.

Transport (24%), agriculture (20%), energy generation (17%), and industry (17%) sectors represented the largest emitters for Georgia in 2017, while buildings and waste made up the remaining emissions.

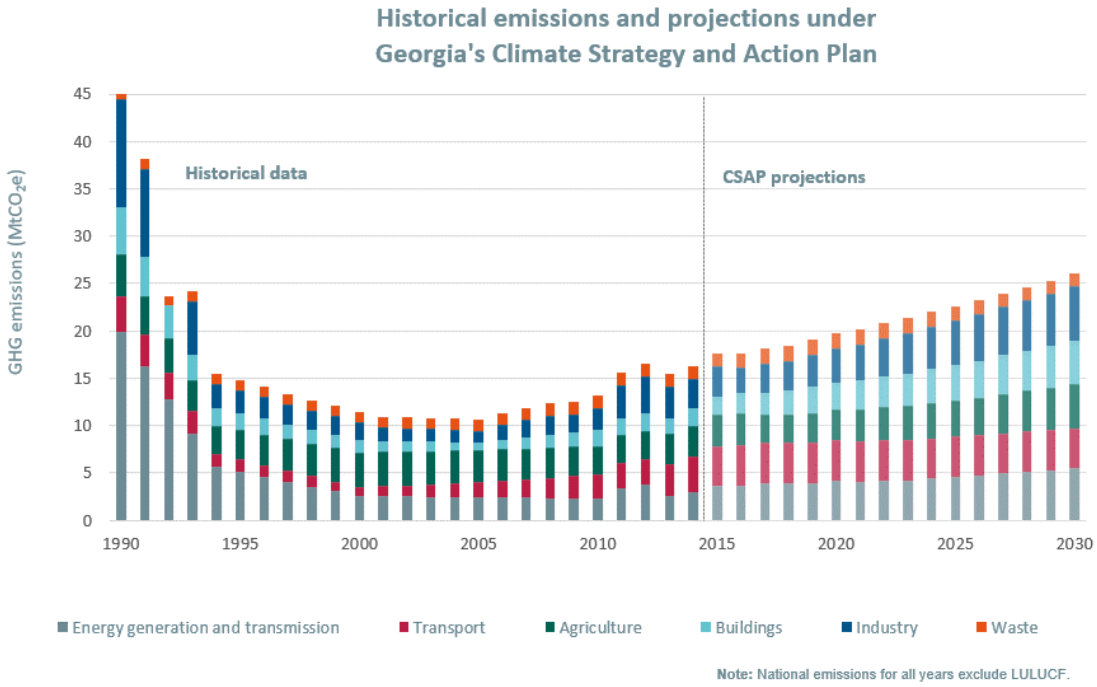
Figure 1 – Georgia's latest national inventory emissions with sector and emission source breakdown



Source: Authors elaboration based on Georgia's Fourth National Communication (MEPA, 2021).

Georgia's emissions pathway under the Climate Strategy and Action Plan (CSAP), which integrates short-term mitigation measures, is expected to rise by 44% to 27.5 $MtCO_2e$ in 2030 from the 2015 baseline value (compared to a 75% increase with no mitigation measures) (**Figure 2**). Georgia's submitted NDC update targets a 35% reduction in GHG emissions from 1990 levels in 2030, equivalent to roughly 29.6 $MtCO_2e$ in 2030, suggesting that full implementation of economy-wide CSAP measures could overachieve NDC targets.

Figure 2 – Georgia's historical emissions and projections under the Climate Strategy and Action Plan



Source: Authors elaboration based on Georgia's Second Biennial Update Report (MEPA, 2019) and Climate Strategy and Action Plan (2021).[1]

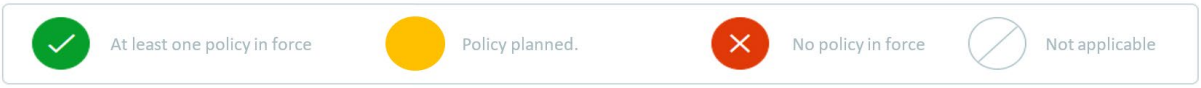
In both the CSAP and NDC pathways for Georgia, emissions from 2015 to 2030 increase economy-wide, as well as for each sector individually. This upward trajectory remains unaligned with a Paris-compatible pathway, under which Georgia emissions would need to start a peak-and-decline trajectory shortly after 2020 (in both 2 °C and 1.5 °C scenarios).

The comprehensiveness of mitigation measures developed for the CSAP varied by sector; only for the transport and waste sector substantial emissions-reducing measures were planned in the current cycle while the agriculture, buildings, industry, and energy generation sectors did not. The CSAP identified mitigation priority areas to be analysed in each sector as further mitigation potential exists, even in sectors where significant measures are already planned. The next section assesses the planned measures and mitigation gaps existing in each sector and proposes a potential shortlist of policy recommendations the sectors could further undertake based on analysis on policy coverage, international best practice examples, synergies with Agenda 2030, mitigation potential and policy barriers.

[1] This graph shows historic emission estimates from the Second Biennial Update Report instead of the latest National GHG Inventory Report as these were the basis for the CSAP projections.

3 Planned sector measures and priority areas

The following pages contain fact sheets for each sector, giving an overview of the sector status quo and illustrating potential mitigation actions for future implementation. First, the GHG trajectory, as well as planned actions and priority areas for future action from the CSAP, are summarised for each of the sectors. The following page then gives an overview of the current policy coverage in the respective sector. Mitigation policies are classified by policy type and rated along the following categories[2] to highlight policy gaps and areas where additional action is needed.



Following that assessment, up to three potential priority areas have been identified for consideration in each of the sectors based on an analysis of international best practices and applicability in the context of Georgia. For each of the identified measures, a factsheet presents a short overview of the measure, synergies with Agenda 2030[3] and its relevance in the context of Georgia. It further provides examples of best practices from other countries, that could serve as guidance or inspiration for policy design and planning. Lastly, the factsheets provide a brief overview of mitigation potential and cost estimate, derived from available literature, and highlight the most important barriers as well as technical analysis (TA) needs.

[2] Based on NewClimate Institute's Climate Policy Database
[3] Based on NewClimate Institute's SDG Climate Action Nexus (SCAN) tool.
Please note that SDG 13 (Climate Action) and SDG 17 (Partnerships for the SDGs) are not covered in the SCAN-tool and therefore also excluded from the analysis in this report. Potential links to SDG 13 are not listed as the SCAN-tool is designed to help identify linkages between climate actions and other development areas, thus these links are implicitly represented in the assessed sectoral mitigation actions. SDG 17 is not included because it is about mobilization of international resources to achieve the SDGs and is not a development area comparable to the other SDGs.

3.1 Energy generation and transmission

Targets and plans

GHG emissions (2017)

GHG emission levels were at **2.96 $MtCO_2e$** in 2015 (17% of total emissions) for the energy generation and transmission sector, predominantly from fuel combustion and fugitive emissions from oil and gas.

Current plans

Planned actions from the CSAP	GHG trajectory
• Support renewable energy (wind, solar, hydro, biomass) generation • Improvement of average efficiency of thermal electricity plants • Strengthen the capacities of renewable energy integration in the transmission network of Georgia • Develop new policy documents and legislation for the energy sector	The implementation of CSAP actions for the sector leads to projected emission levels of **5.47 to 5.62 $MtCO_2e$ in 2030**, an approximate 30% improvement from projected emission levels without any action. Georgia's updated NDC for the sector has the goal to limit emissions to below **5.69 $MtCO_2e$ in 2030**. This suggests that implementation of all CSAP actions would overachieve NDC targets for the sector.

Priority areas for enhanced action (CSAP)

- Further promotion of renewable energy (wind, solar, and hydro)
- Implementation of Georgian Energy Development Fund activities (including biogas)

Energy generation and transmission

Policy coverage

While dedicated measures with regards to energy efficiency and support for renewables are in place, Georgia's energy generation and transmission sector is still lacking effective financial instruments. Three potential priority areas have been highlighted for consideration in the energy generation and transmission sector:

- Introduce an overarching carbon pricing scheme
- Introduce a feed-in tariff for renewables
- Phase out fossil fuel subsidies completely

Energy generation and transmission

POLICY OPTION	OVERARCHING	CHANGE ACTIVITY	ENERGY EFFICIENCY	RENEWABLES	OTHER LOW CARBON	NON-ENERGY
Overarching sector-specific strategy	●	⊘	⊘	⊘	⊘	⊘
Long-term vision for the state energy policy (Ministry of Economy and Sustainable Development)						
Overarching carbon pricing scheme or emissions limit	✕	⊘	⊘	⊘	⊘	⊘
Removal of fossil fuel subsidies	✕	⊘	⊘	⊘	⊘	⊘
National energy efficiency target	⊘	⊘	✓	⊘	⊘	⊘
Draft Law on Energy Efficiency, National Energy Efficiency Action Plan (NEEAP)						
Support for highly efficient power plants	⊘	⊘	✓	⊘	⊘	⊘
National Energy Efficiency Action Plan (NEEAP)						
Renewable energy target	⊘	⊘	⊘	✓	⊘	⊘
National Renewable Energy Action Plan (NREAP), National Energy and Climate Plan (NECP)						
Renewable energy target for electricity	⊘	⊘	⊘	●	⊘	⊘
Support scheme for renewables	⊘	⊘	⊘	●	⊘	⊘
Law on Promoting the Production and Use of Energy from Renewable Sources						
Grid infrastructure development	⊘	⊘	⊘	✓	⊘	⊘
Ten-Year Renewable Energy Action Plans and Network Development Plans						
Sustainability standards for biomass use	⊘	⊘	⊘	✕	⊘	⊘

✓ At least one policy in force ● Policy planned. ✕ No policy in force ⊘ Not applicable

Source: Authors' elaboration based on IPCC categorisation (Sims et al., 2014) & Climate Policy Database (NewClimate Institute, 2019).

Energy generation and transmission

Potential policy action areas

Introduction of a carbon pricing scheme

Carbon pricing instruments may include a carbon tax or an emissions trading scheme. Those instruments can be applied for specific business activities, or across all sectors of the economy. Countries often introduce carbon pricing instruments into the power generation sector, for example by charging a tax to power producers per unit of fossil fuel. An emissions trading scheme can be included within a carbon tax programme, or standalone, to provide a degree of flexibility for actors across a sector, or even multiple sectors. Carbon pricing instruments can be made more effective by increasing the price levied in a tax, reducing the number of exemptions, and reducing the volume of emissions allowances allocated.

SDGs

Reduces air, water and soil pollution when displacing polluting energy sources.

Supports sustainable industrialisation through sustainability of power supply.

The deployment of renewables supports sustainable urbanisation.

Contributes to job creation and avoided dependence on imported resources.

Context

A carbon price thus provides an economic signal to polluters who can decide whether to continue to pollute and pay for it, to suspend their polluting activity or to invest in technology that reduces the emissions of their activity. Since many of the external costs associated with high-emitting technologies are not internalised in the price of production or consumption, such technologies and practices enjoy an artificial advantage over other alternative technologies and practices which may be more compatible with sustainable development trajectories. The use of a carbon price can reduce or remove this artificial advantage, allowing other - less polluting - technology options to become more competitive and viable. Currently, Georgia does not have an overarching carbon pricing or national emission trading scheme in place or planning.

Good practice

Chile's carbon tax was adopted in 2014, targeting only larger power sector installations with a tax rate of 5 USD/tCO_2e. The tax was amended in 2020 to increase the coverage of installations. The relatively low carbon price and the acceptability of offsets in the programme restrict its impact to an extent, but the measure is believed to have significantly reduced emissions from some installations and reduced local air pollution as a side benefit.[a]

The recently adopted planning of a **national ETS for Montenegro** covers the power and industry sectors and employs several design elements of the EU ETS. While the extent of the direct mitigation impact of an initial price of 24 EUR/tCO_2e has yet to be determined, revenues will be fed into the national Environmental Protection Fund and other renewable energy projects likely leading to additional emissions reductions.[b]

The way carbon pricing revenues are redirected will largely determine the social outcomes of the carbon pricing policy and will also affect how the policy is perceived.[c] In **Germany** for example, proceeds from the national carbon pricing system will be re-invested into climate protection or returned to citizens. To ensure that the costs do not put a burden on low-income populations, housing allowances are planned to increase by ten percent.[d]

Potential

The EU ETS is estimated to have saved more than 1 billion tons of CO_2 between 2008 and 2016, which translates to a reduction of 3.8% of total EU-wide emissions.

Aside from the direct mitigation potential, revenues from carbon taxes can provide a source of financing for other climate change mitigation projects.

Barriers

Often subject to high levels of industry opposition unless prices and allowances are restricted to levels that limit the impact.

Requires thorough planning process to establish a suitable instrument, with no guarantee of the political outcome.

Costs

The high costs for establishing instruments can be recovered by tax revenues.

TA needs

Assess industrial acceptance levels of carbon pricing schemes;
Impact analysis for different carbon pricing instrument designs

Source: Authors elaboration, based on data and literature ([a]IEA, 2020b; [b]World Bank, 2020; ICAP, 2021; [c]adelphi, 2018; [d]Federal Government of Germany 2019; [e]Bayer & Aklin, 2020.)

Energy generation and transmission

Potential policy action areas

Introduction of a feed-in tariff for renewables

A feed-in tariff for renewables that also covers solar PV and wind power provides financial incentives for rapidly scaling up renewable energy capacity in Georgia. Implementation of a sound and economically sustainable support scheme will provide a strong policy signal and the needed long-term financial stability for investors to attract large-scale projects. Introducing a feed-in tariff for renewables provides the necessary long-term financial incentives and market framework to attract large-scale investments into renewable energy projects.

SDGs

Reduces air, water and soil pollution when displacing polluting energy sources.

Supports sustainable industrialisation through sustainability of power supply.

The deployment of renewables supports sustainable urbanisation.

Contributes to job creation and avoided dependence on imported resources.

Context

Georgia is working to align its legislation with the EU energy acquis, including promoting renewable energy. Several laws and action plans have been put into place and planning, and the Georgian Energy Development Fund has been actively developing wind, solar and biomass projects in recent years. The Georgian Energy and Water Supply Regulatory Commission, municipalities and some businesses have implemented initiatives such as the launch of the net-metering programme that has prompted business and household investments into distributed rooftop PV systems.[a] To meet the country's growing electricity demand and stay on a trajectory that is compatible with the goals of the Paris Agreement, Georgia will need to increase its renewable energy capacity. This is attractive for the country due to its large potential for renewables, including an estimated annual generation potential of 4 TWh from wind and favourable solar conditions with approximately 6,500 sunlight-hours annually.[b] New renewable energy projects are on hold in anticipation of a new market model or support scheme.[a]

Good practice

In 2016, **Moldova** adopted the **Law on the Promotion of the Use of Energy from Renewable Sources**, which included the planning for administratively set feed-in tariffs and an auctions-based mechanism as well as the obligation of the central electricity supplier to purchase renewable electricity, guaranteed access to the grid, and priority dispatch.[c] The law is expected to lead to the construction of up to 168 MW of renewable capacity, including mainly wind and solar PV. In 2020, Moldovan energy regulator ANRE has approved a **15-year feed-in tariff (FIT) for renewable energy projects** with a generation capacity of no more than 1 MW, expecting to drive 15 MW of new solar capacity in the coming years.[d] In addition, the Moldovan government plans to introduce capacity auctions for larger projects with technology-specific tenders for a total capacity of up to 113 MW, designed in line with EU Guidelines which are mandatory for contracting parties of the Energy Community including Georgia.[d,c]

The **reform steps of Germany's renewable energy law** can be looked to for a long-term roadmap. Germany started with specific feed-in tariffs for different RE technologies in 2000, followed by optional feed-in premiums (FIP) in 2012 and obligatory premiums and auctions in the following years.[e,f] The most recent reform in 2021 includes increased capacity targets for all technologies as well as "innovative" non-technology-specific auctions.

Potential

Georgia-specific estimation based on the Second Biennial Update Report: 0.088 tCO_2e per MWh[g]

Barriers

High initial administrative burden related to implementation of regulatory and institutional framework; Public and political resistance due to concerns about increased electricity prices.

Costs

An EBRD technical assistance and implementation support project for Moldova was valued at EUR 500,000.[h]

TA needs

Comprehensive technical analysis package that will provide the necessary support to the relevant institutions for the practical implementation and an economically sustainable design of the support scheme.

Source: Authors elaboration, based on data and literature ([a]IEA, 2020a, [b]UNECE, 2019, [c]IRENA, 2019, [d]Bellini, 2020; [e]Agora Energiewende, 2019, 2021; [f]German Government, 2021; [g]MEPA, 2019; [h]EBRD, 2020).

Energy generation and transmission

Potential policy action areas

Phasing out fossil fuel subsidies completely

According to the International Energy Agency, fossil fuel subsidies for natural gas in Georgia amounted to 0.5% of GDP for electricity and 1.1% of GDP for the residential sector in 2017, which is equal to 6.7% of budget spending in the same year (IEA, 2020b). Although the government subsidies are implicit and not directly covered from the state budget, this is a significant loss of potential budget revenues and there are **numerous additional benefits of completely phasing out fossil fuel subsidies** in Georgia. Analysis of the International Energy Agency shows that budget could be redirected towards **additional energy efficiency improvements which can lead to higher macroeconomic stability, improved energy security as well as additional environmental benefits** (IEA, 2020b). Gas subsidies for thermal generation further results in downward pressure on end-user prices, which in turn does not encourage energy savings.

3.2 Transport

Targets and plans

GHG emissions (2017)

Direct transport sector GHG emission levels were **4.14 $MtCO_2e$ in 2017** (24% of total national emissions), with 68% of emissions coming from passenger transport and the remainder from freight.

Current plans

Planned actions from the CSAP	GHG trajectory
• Increase the share of low- and zero-emission and roadworthy private vehicles in the vehicle fleet • Encourage the reduced demand on fossil fuel and the use of biofuels • Promote non-motorized means of mobility and public transport • Implement innovative, evidence-based initiatives in the transport sector • Biodiesel production and sales • Measures included in Tbilisi's Green Transport Policy Action Plan • Measures listed in Batumi's Sustainable Urban Mobility Plan (SUMP) • Emission (NEEAP) quality standards on the import of vehicles • Develop international climate finance proposals for improved public and non-motorised transport (NMT) • Develop cost-benefit analysis and feasibility study to identify best options for additional policies for improving emissions intensity of vehicles	The implementation of CSAP actions for the sector leads to projected emission levels of **5.57 $MtCO_2e$** in 2030, a 22% improvement from projected emission levels without any action. Georgia's updated NDC includes the goal for the sector to reach **6.04 $MtCO_2e$** in 2030. This suggests that implementation of all CSAP actions would overachieve NDC targets for the sector.

Priority areas for enhanced action (CSAP)

- Replacing urban passenger transport with public transportation and non-motorised modes
- Replacing inter-city passenger transport with public transportation
- Improving efficiency of private light duty vehicles
- Shifting freight from road to rail transport

Transport

Policy coverage

Georgia's transport sector lacks a dedicated steering and implementing unit, as well as national strategies to implement low-carbon policies in a range of transport modes (e.g., e-mobility, non-motorised, freight). Most mitigation planning has occurred at the municipality level (action plans) and covers a short horizon. While major national policy actions have started addressing important policy areas (retiring inefficient cars, providing incentives for electric vehicles (EV) and hybrids), there remain policy areas where potential deeper action has been identified for implementation. Three potential priority actions have been highlighted for consideration in the transport sector:

- Development of an overarching e-mobility strategy for electrified transport modes
- Development of national and municipal strategies for non-motorised transport
- Infrastructure and regulatory reform of rail-freight sub-sector

Land transport

POLICY OPTION	OVERARCHING	CHANGE ACTIVITY	ENERGY EFFICIENCY	RENEWABLES	OTHER LOW CARBON	NON-ENERGY
Overarching sector-specific strategy	✗	⊘	⊘	⊘	⊘	⊘
Air quality standards	●	⊘	⊘	⊘	⊘	⊘
	Order of the Government Setting Ambient Air Quality Standards					
Urban planning and infrastructure investment	⊘	●	⊘	⊘	⊘	⊘
	Municipal action plans and financing programmes					
Support for modal share switch	⊘	●	⊘	⊘	⊘	⊘
	Municipal action plans and financing programmes					
Energy/emissions performance standards for energy efficient vehicles	⊘	⊘	✗	⊘	⊘	⊘
Support scheme for biofuels	⊘	⊘	⊘	✗	⊘	⊘
Other support for low-emissions land transportation	⊘	⊘	✓	✓	✓	⊘
	2016 Tax Law Amendment for energy efficient, electric, and low carbon vehicles; Municipal parking fee exemptions; Direct investment of municipal governments in low carbon vehicles.					
Tax on fuel and/or emissions	⊘	✗	✗	✗	✗	⊘

✓ At least one policy in force ● Policy planned. ✗ No policy in force ⊘ Not applicable

Notes/Source: Authors' elaboration based on policy categorisation based from IPCC (Sims et al., 2014) and Climate Policy Database (NewClimate Institute, 2019). Green shading indicates that policies for the given category are in place, red shows they are not, and yellow shading shows that policies are proposed or in planning.

Transport

Potential policy action areas

Development of Overarching E-mobility Strategy

A comprehensive e-mobility strategy is a central element to allow the uptake of EV for passenger and freight transport modes.[a] Elaboration of a strategic vision with synergistic policy packages is necessary to send strong policy signals to attract the large-scale financing and manufacturing needed for urban planning and infrastructure projects. Increasing e-mobility penetration for private, public, and commercial transport modes to replace fossil transport modes, coupled with a low-carbon electricity grid, reduces GHG emissions and creates a range of socioeconomic benefits for the achievement of Agenda 2030.

SDGs

- **Reduces air pollution and noise-induced illnesses through reduced vehicle transport demand.**
- **Contributes to implementing a sustainable transport system for cities**
- **Increases investments and supports adoption of clean technologies and infrastructure upgrades**
- **Reduces degradation of natural habitats through reduced pollution and waste**

Context

E-mobility penetration has only recently become prioritized in Georgia, primarily at the municipality level. There is no overarching e-mobility programme or strategy at the national or subnational level (existing municipality strategies only include electrified subways/trams or non-descriptive promotions of EVs, if at all), although the first installations of charging infrastructure for private electric vehicles (EVs) and imports of battery electric buses (BEBs) started in 2018. In 2020, there was a minimal share of EVs on the road (<1%) in Georgia, with the only form of national policy support being the removal of excise taxes for purchasing, which has had diminished impacts due to the low tariffs on fossil-fuel vehicles. [b,c] To implement sustainable policy action compatible with the Paris Agreement, Georgia will need to replace fossil vehicles with electrified modes and phase-out of fossil vehicles sales between 2030 and 2040.[d] The electrification of the sector to achieve mitigation and SDG goals are attractive to Georgia given the high mix of hydropower in the electricity grid and high incidence rates of air pollution. [c]

Good practice

The new **national EV roadmap announced by Thailand** in 2020 – led by an appointed National EV Policy Committee – can serve as a good practice example. The government's roadmap plans to increase penetration to 750,000 EVs (30% of total imports/production) and 3,000 BEBs by 2030 and outlines key policies including charging infrastructure guidelines, corporate tax exemption for EV projects, reduced import tariffs on machinery and raw materials.[e,f] Investment policy revisions led to up to 30 applications from large automakers and component suppliers in the industry, including many from China and Japan, which already have established trade relations with Georgia. One example is a new joint Thai-Chinese venture to plan capacity for 30,000-100,000 electric trucks a year.

Colombia's National Strategy for Electric and Sustainable Mobility aims to improve air quality and reduce emissions. The ministry of transport committed to sourcing 10% of the transport fleet as EVs or zero-emission vehicles (ZEVs) by 2025 and 100% ZEVs by 2035. In addition to supply-side incentives, demand-side policies include reductions on fuel and registration taxes, insurance premiums, parking fees and traffic priority privileges.[g,h]

Potential

EVs in countries with a high share of non-fossil fuels (e.g. hydro) can reduce emissions by 180 gCO_2e/km compared to the average European car.[i]

Barriers

High initial infrastructure costs; Low density of public and private charging points; Insufficient corporate and demand-side (including non-financial) incentives.[j]

Costs

L1 slow charging station (home charging infrastructure): 600-800 USD per charger

DC fast charging station (public charging infrastructure) – 50/100/150 kW: 28/75/140k USD per station[k]

TA needs

Infrastructure analyses of high-mileage EVs and optimised charging infrastructure; Ex-post analysis of pilot demand-side policy incentives; Impact analysis of EV penetration on electricity generation loads.

Source: Authors elaboration, based on data and literature ([a]Hall & Lutsey, 2017; [b]Gruetter & Kim, 2019; [c]NewClimate Institute, 2021; [d]Climate Action Tracker, 2020; [e]Amir, 2020; [f]Sangiam & McNeil, 2020; [g]Bnamericas, 2019; [h]World Energy Council, 2019; [i]Hausfather, 2020; [j]ADB, 2018; [k]ICCT, 2019).

Transport

Potential policy action areas

Development of national and municipality strategies for non-motorised transport

The development of a national non-motorised transport strategy, coupled with policy and urban planning guidance for municipalities, would directly address a priority policy area listed in the CSAP. This action, in addition to existing actions at the municipality level, would help Georgia further minimise motorised transport demand and reduce GHG emissions from internal combustion vehicles.

SDGs

Reduces air pollution and noise-induced illnesses through reduced vehicle transport demand.

Increases economic productivity through tech and infrastructure upgrades.

Improves road safety, sustainable urbanization, and preservation of natural and cultural heritage sites.

Improves resource efficiency with fuel savings and waste management from reduced vehicle runoff/pollution.

Context

Infrastructure for walking and cycling is lacking in most urban areas in Georgia, particularly in city capitals.[a] The lack of non-motorised transport (NMT) options has been exacerbated with the COVID-19 pandemic, when public transport users in Georgia have been forced to depend on other transport modes; without NMT services, transport activity is primarily shifted to Light Duty Vehicles (LDVs).[b] In cities with developed NMT infrastructure, the pandemic has led to increased NMT activity with positive mitigation and cobenefit impacts; these circumstances can provide a window of opportunity to pilot and implement new NMT measures.[c,d]

Good practice

In 2020, **Indonesia** (Ministry of Public Works) published its **National Vision of Non-Motorised Transport Infrastructure**, which frames a comprehensive elaboration process from vision definition to public consultation to developing policy targets and infrastructure improvements. The document includes analysis and design for pedestrian and cycling network designs based on transit points, activity centres, schools and residential areas.[e] Indonesia's complementary Non-Motorised Transport Policy Guideline also provides top-down guidance for cities with overviews of existing NMT policies and policy gaps in the country, responsible coordinating stakeholders and institutions, and recommendations to policymakers.[f]

Ethiopia also elaborated its **Non-Motorised Transport Strategy 2020-2029**, which has 10-year targets for modal share of NMT, gender, road safety fatalities for NMT users, air quality, GHG emissions, and motorised transport modes. It also includes infrastructure network implementation targets for 11 major cities, and a separate NMT strategy for Addis Ababa, the capital.[g,h]

Potential

- 4.5 km of NMT projects (Cape Town, 3% NMT modal shift) avoids **11 $ktCO_2e$/year**.
- 116 km of NMT projects (Nairobi) avoids **21 $ktCO_2e$/year**.
- 370 km of NMT route (CicloRuta network, Bogota, 3.3% NMT modal shift) avoids **55-57 $ktCO_2e$/year**.

Barriers

High investment needs for safe and convenient infrastructure projects; Revision of urban planning and space in city capitals; Public perception of pedestrian/cycling infrastructure quality, road safety, weather/temperature constraints, culture/behavioural considerations.[j,k]

Costs

- 4.5 km of NMT routes (Cape Town) **2.5M USD**
- 116 km of NMT routes (Nairobi): **103M USD**
- 370 km of NMT routes (Bogota): **1.1B USD**[h]

TA needs

Systematic review of NMT policy and infrastructure issues, ridership mobility constraints, and benefits; Comprehensive mapping of NMT infrastructure conditions and potential in municipalities; Design of policy objectives and guidelines for street/urban concepts, networks, regulations, and awareness programmes.[i]

Source: Authors elaboration, based on data and literature ([a]NEEAP Expert Team, 2017; [b]Kvashilava, 2020; [c]Goetsch & Quiros, 2020; [d]Wuennenberg, 2020; [e]ITDP & UNEP, 2020a; [f]ITDP & UNEP, 2020b; [g]Addis Ababa Road and Transport Bureau, 2018; [h]Ministry of Transport of Ethiopia, 2020; [i]UN Environment, 2019; [j]Massink et al., 2011; [k]World Bank, 2019).

Transport

Potential policy action areas

Infrastructure investment and regulatory reform of rail-freight subsector

Georgia would benefit from further infrastructure investments and regulatory reform to shift from road-freight to rail, helping to fill a key policy area gap involving inter-city transport logistics and strategy. Georgia's CSAP prioritisation to facilitate the shift has large climate mitigation potential given that rail-based freight is six times more energy-efficient than road-based and Georgian railways are completely electrified. The shift also generates additional SDG benefits through reduced pollution from trucking.

SDGs

Reduces air pollution-induced illnesses and deaths through reduced pollutant emissions.

Economic productivity through tech and infrastructure upgrades, railway profitability and job creation.

Industrial opportunities through infrastructure upgrades and improves resource/fuel efficiency.

Improves sustainable urbanisation with lower traffic congestion and greater utilisation of public space.

Context

Georgia is geographically located with access to maritime trade routes on the Black Sea coast and land-based corridors connecting Central Asia and China with Europe, creating advantageous trade hubs with high demand for freight activities. Freight activity represented over 30% of transport GHG emissions in 2015 and is expected to double by 2030,[a] with the majority currently carried by trucks on the East-West Highway. Infrastructure and regulatory reform of inter-city railroad systems also represent a long-term investment as freight carriage is key to railway profitability.[b] While Georgian Railways LLC has made significant infrastructure upgrades, including completion of the Baku-Tbilisi-Kars (BTK) railway and modernization of the Tbilisi-Makhinjauri network, challenges have been highlighted with the modernization of rolling stock and intermodal container terminals for loading road-freight volume onto rail.[c] Regulatory reforms, including separation of operations and infrastructure services, commercialization of operations, and building institutional capacity can improve the Railways' efficiency while addressing geopolitical strategies such as EU-Association Agreements (AA) and Deep and Comprehensive Free Trade Area (DCFTA).[d,e]

Good practice

Kazakhstan has strategic similarities with Georgia; both countries are regional Europe-Asia hubs for freight, have a high demand for freight transit with neighbouring countries, cooperate in regional networks, and are connected through the Trans-Caspian International Transport Route (TITR). Kazakhstan has undergone several significant regulatory reforms since 2001 to boost institutional governance, domestic supply chains, and infrastructure investment.[f,g] Since 2011, Kazakhstan's rail-freight traffic volume increased by a factor of 385 and attracted over 5 billion USD in freight (rail and road) infrastructure finance.[h,i]

Mexico is another example where a history of reform upgraded infrastructure and governance to boost freight volume and take advantage of geopolitical strategies (e.g. US-Canada-Mexico Trade Agreement).[j] By rewriting legislation, establishing transparent objectives for reform and designing frameworks in 30- and 50-year strategies, Mexico was able to attract large-scale investors and now transports the 11th most freight cargo by rail globally.[k,l]

Potential

- Life cycle analysis for new freight lines: net emission benefits over road freight in 2 years in best case, and 24 years at minimum.[m]
- Avoided emissions from freight modal shift for 50 Mt of cargo: **1,200 ktCO$_2$e/year**.[n]

Barriers

Lack of comprehensive impact analysis on infrastructure projects and priorities; Lack of long-term railway development plan and financing strategies for large-scale infrastructure.[h, o]

Costs

- Tbilisi-Makhinjauri modernization project (reconstruction 23-km, new 38-km, 7 tunnels): **~233M EUR.**
- BTK project (178km, 85% reconstruction, 15% new): **775M EUR**.[j]

TA needs

Cost-benefit analysis to prioritise capital-intensive projects; Governmental and public consultation process on project rankings; Design of a multi-decadal railway development roadmap with project priorities and financing.[i, p]

Source: Authors elaboration, based on data and literature ([a]NewClimate Institute, 2021; [b]Rail Freight Forward, 2018; [c]Forbes.ge, 2020; [d]Benmaamar et al., 2015; [e]Gitolendia, 2018; [f]ADB, 2017; [g]UNECE, 2019; [h]Papatolios, 2020; [i]Taisarinova et al., 2020; [j]World Bank, 2017; [k]Bnamericas, 2020; [l]Oxford Business Group, 2018b ; [m]IEA, 2019; [n]Grob & Craven, 2017; [o]Israelyan, 2015; [p]Jardine, 2017)

3.3 Industry

Targets and plans

GHG emissions (2017)

Direct GHG emission levels were at **3.01 $MtCO_2e$ in 2017** (17% of total emissions) for the industry sector, with 65% resulting from industrial processes (cement, ammonia and nitric acid, iron and steel, ferroalloys) and the remainder from energy use.

Current plans

Planned actions from the CSAP	GHG trajectory
• Reduce the level of greenhouse gas emissions from industrial processes and from energy consumption of industrial facilities by introducing modern technologies • Develop a system for studying the emission factors in the industry sector and for data management	The implementation of CSAP actions for the sector leads to projected emission levels of **5.19 to 5.69 $MtCO_2e$ in 2030**, a 10 to 26% improvement from projected emission levels without any action. Georgia's updated NDC for the sector has the goal to reach **5.69 $MtCO_2e$** in 2030. This suggests that implementation of all CSAP actions would achieve or overachieve NDC targets for the sector.

Priority areas for enhanced action (CSAP)

- Reducing emissions from steel production or support measures for the introduction of energy audits and certification schemes
- Shifting cement manufacturing industry towards the efficient use of waste for heating purpose

Industry

Policy coverage

Georgia's industry sector lacks an overarching strategy and dedicated policy action to bring the sector on a low emissions pathway. Most existing and planned mitigation measures are voluntarily implemented by individual company actors rather than from national laws or policies, which limits mainstreaming of sector-wide mitigation action. While national policy actions have started to address energy efficiency improvements, particularly for cement plants, there remain many policy areas where potential deeper action has been identified for implementation. Three potential priority actions have been highlighted for consideration in the industry sector:

- Reducing clinker-to-cement ratio and deploying innovative alternative materials
- Incentivising fuel shift in cement plants
- Encouraging material shift and reducing cement demand

Industry

POLICY OPTION	OVERARCHING	CHANGE ACTIVITY	ENERGY EFFICIENCY	RENEWABLES	OTHER LOW CARBON	NON-ENERGY
Overarching sector-specific strategy	✗	⊘	⊘	⊘	⊘	⊘
Overarching carbon pricing scheme or emissions limit	✗	⊘	⊘	⊘	⊘	⊘
Strategy for material efficiency	⊘	●	⊘	⊘	⊘	⊘
Strategic Vision towards Green Economy						
Support for energy efficiency in industrial production	⊘	⊘	✓	⊘	⊘	⊘
National Energy Efficiency Action Plan (NEEAP)						
Energy reporting and audits	⊘	⊘	✗	⊘	⊘	⊘
Minimum energy performance standards	⊘	⊘	✗	⊘	⊘	⊘
Support scheme for renewables	⊘	⊘	⊘	●	⊘	⊘
Law on Promoting the Production and Use of Energy from Renewable Sources						
Sustainability standards for biomass use	⊘	⊘	⊘	✗	⊘	⊘
Incentive for fuel switch in industrial plants	⊘	⊘	⊘	✗	⊘	⊘
CCS support scheme/ Carbon dioxide removal	⊘	⊘	⊘	✗	⊘	⊘

✓ At least one policy in force ● Policy planned. ✗ No policy in force ⊘ Not applicable

Notes/Source: Authors' elaboration based on policy categorisation based from IPCC (Sims et al., 2014) and Climate Policy Database (NewClimate Institute, 2019). Green shading indicates that policies for the given category are in place, red shows they are not, and yellow shading shows that policies are proposed or in planning.

Industry

Potential policy action areas

Reducing clinker-to-cement ratio and deploying innovative alternative materials

Reducing the clinker-to-cement ratio in cement production is essential to bring the sector on a lower carbon pathway. While promising alternative raw materials are widely available in Georgia, feasibility studies and demonstration projects are required to identify the most practical and advantageous solutions. Collaborative efforts among industry, public sector and research are needed to develop plant-level action plans. Reducing the clinker-to-cement ratio across cement plants in the country would reduce GHG emissions and create a range of additional sustainable development benefits.

SDGs

Reduces water use from process and material efficiency and reduced product demand.

Requires research and supports upgrading of technological capability.

Increases resource efficiency and contributes to decoupling growth from environmental degradation.

Material efficiency and improved product design support sustainable use of resources.

Context

The production of clinker is one of the main sources of industrial process emissions in Georgia, with production expected to considerably increase in coming years under a business-as-usual trajectory.[a] Although the transition from wet to dry method for cement production is already covered in both NEEAP and CSAP, there is still room for additional process improvements including the substitution of clinker with limestone, fly ash or steel slag. However, the availability of these traditional supplementary materials will decline along with a coal phase-out. Promising alternatives, such as calcined clay or natural pozzolanas, are gaining attention and should also be taken into consideration for future planning and when setting clinker-to-cement ratio standards.[c] Research suggests that such materials may be widely available in Georgia.[d] Setting an ambitious standard for clinker-to-cement is an attractive measure for Georgia as obligations under the EU Association Agreement include the approximation with environmental performance requirements set in the Industrial Emissions Directive (IED), including setting emissions limits based on Best Available Techniques (BAT) and process optimisation.[e]

Good practice

The **Low-Carbon Transition Roadmap of the Global Cement Sustainability Initiative** (CSI) can serve as an overall guidance for the long-term development of the Georgian cement sector. Research experts and industry stakeholders have together mapped out mitigation actions, barriers and enabling actions. HeidelbergCement, which is operating most plants in Georgia, is a member of the CSI. With regards to clinker substitution, the 2018 roadmap has set a target of reaching an average global clinker ratio of 0.60 by 2050.

Increased support for RD&D is needed, particularly to advance the large-scale deployment of technologies that have already shown promise. Public-private partnerships and green public procurement can help to generate early demand and can enable producers to gain experience and bring down costs.[f] As of 2020, a new supplement to the standard for cement certification in the EU (EN 197-5) is ready for adoption at the national level. It includes lower-carbon cements and thereby provides a driver for market uptake.[g] Incorporating this standard into EU green public procurement is currently ongoing.

Potential

In the EU, a reduction of **~100kg CO_2/t of cement** can be achieved through clinker substitution and alternative raw materials, accounting for **approx. 14%** total emissions from cement production.

Barriers

Availability and feasibility of alternative raw materials; Common practice, market awareness and acceptance need to be enhanced; Building standards and codes and cement certification need to be aligned.

Costs

For the EU it was estimated that operational costs could **decrease by EUR 3.1/t of cement** with calcined clays, while retrofit costs would range between **EUR 8-12 Million**[h]

TA needs

Availability and feasibility analyses of alternative binding materials in the context of Georgia; Studies to prevent deterioration of cement quality.

Source: Authors elaboration, based on data and literature ([a]Winrock International, 2017; [b]MEPA, 2019; [c]NewClimate Institute, 2020; [d]Skhvitaridze et al., 2018; [e]European Commission, 2020;[f]IEA, 2020;[g]Ecos, 2020; [h]Lehne and Preston, 2018).

Industry

Potential policy action areas

Incentivising fuel shift in cement plants

Incentivising fuel shift in cement plants is an essential part of bringing emissions associated with cement production down, as plants are currently almost exclusively running on fossil fuels. Promising technologies – including co-processing waste or electrifying cement production – are available or currently being implemented internationally. Technical needs assessments for upgrading existing cement plants and feasibility studies for the different technologies are needed to assess the full potential in the context of Georgia. Policies can target support to specific technologies, prompt the development of demonstration projects and scale up application across the country.

SDGs

Reduces air pollution-induced illnesses and deaths through reduced pollutant emissions.

Increases resource efficiency and supports the adoption of environmentally sound processes.

Contributes to technological and infrastructure upgrading, and to economic diversification.

Developing and implementing low emission energy sources in industry supports sustainable urbanisation.

Context

In 2019, almost all of the energy use in Georgia's cement sector was from fossil fuel sources including more than 80% from coal and 17% from natural gas.[a] Substituting conventionally used fuels by alternative fuels that are less carbon intensive will be key to drive down emissions in the sector. This is an attractive measure for Georgia as shifting the cement manufacturing industry towards the efficient use of waste for heating purposes has considerable synergies with the introduction of a more sophisticated waste management system, aligned with EU legislation. However, major barriers include the availability and competitiveness for biomass and ensuring its sustainability in reducing emissions.[b] Innovative approaches and international research efforts, e.g. with regards to electrifying cement production, should therefore be taken into account in the long term.

Good practice

The **EU cement sector** is world-leading in terms of alternative fuel substitution rates, with an average substitution rate of about 60%, reaching 95% for individual plants.[c] This is strongly driven by EU regulation as waste disposal is tightly regulated and landfilling costly. Waste producers, i.e. the cement industry, therefore have a critical incentive to seek other avenues for waste disposal.[d] The use of waste materials with simultaneous energy recovery and material recycling, referred to as co-processing, further contributes towards achieving the objectives of the EU circular economy package. At the Kakanj plant in **Bosnia and Herzegovina**, HeidelbergCement and GIZ, in form of a public-private partnership, have implemented a project to use industrial and municipal waste as an alternative fuel for cement production in line with the country's drive to establish a circular economy based on the EU model.[e]

An **innovative project is currently being conducted in Sweden.** Cementa, a subcompany of HeidelbergCement, and the energy producer Vattenfall are working together on the CemZero project to electrify cement production, focusing on the calcination process.[f] A feasibility study showed that electrified cement production is technically possible and likely cost-competitive with other options to substantially reduce emissions. Electrifying all cement production by 2030, could result in an emission reduction of around 5% of Sweden's total emissions.[f]

Potential

In 2019, approx. 1,600 GWh of coal and 325 GWh of natural gas were consumed in Georgia's cement sector.[a] This equates to roughly 630 $ktCO_2$.

Barriers

Availability of biomass and ensuring its sustainability; Waste management system needs to improve and be adapted accordingly

Costs

Increasing the rate of co-processing waste in the EU-28 cement industry from 43% to 60% could avoid the costs for about €12 billion of public investments in dedicated waste-to-energy incineration plants[d]

TA needs

Assessing the potential for sustainable biomass and co-processing in Georgia; Technical needs assessments for upgrading existing cement plants

Source: Authors elaboration, based on data and literature ([a]GeoStat, 2020; [b]NewClimate Institute, 2020; [c]ECRA, 2017; [d]Cembureau, 2018; [e]HeidelbergCement, 2018; [f]IEA, 2020)

Industry

Potential policy action areas

Encouraging material shift and reducing cement and concrete demand

Any avoided cement production is the cheapest and most efficient way of reducing emissions. Encouraging material shift through a dedicated strategy, and aligning building standards and practices accordingly is therefore a central element in bringing Georgia's cement sector on a lower carbon pathway. The mapping and analysis of innovative approaches and international best practices can help to move this forward and align Georgian legislation with that of the EU, particularly the European Green Deal. These measures should be complemented by an information campaign and exchange with industry and building sector stakeholders to enhance market awareness and acceptance and address existing market barriers.

SDGs

Reduces air pollution-induced illnesses and deaths through reduced pollutant emissions.

Contributes to technological and infrastructure upgrading, and to economic diversification.

Increases resource efficiency and supports the adoption of environmentally sound processes.

Developing and implementing low emission energy sources in industry supports sustainable urbanisation.

Context

Concrete demand can be reduced, sometimes by more than 50 per cent, by taking new approaches towards design, using higher-quality concretes, substituting concrete for other materials, improving the efficiency with which it is used on construction sites, and increasing the share of concrete that is reused and recycled.[a,b] Several demand-side measures are available to reduce the primary demand for cement. On one hand, cement can be substituted with alternative materials such as wood in buildings and recycled concrete in road infrastructure. On the other, material intensity can be improved through optimised design and the increased use of filler materials. With a considerable amount of infrastructure and building projects expected in Georgia in the coming years, developing a strategy for material shift and to reduce cement and concrete demand is highly relevant.

Good practice

The EU Strategy for a Sustainable Built Environment is due to be launched in 2021 as a part of the Circular Economy Action Plan in line with the European Green Deal. The strategy will ensure that buildings are renovated and constructed in a sustainable manner.[c] In the context of the revision of the Construction Product Regulation, the strategy will include a measurement for the sustainability performance of construction products, for example by introducing recycled content requirements for building materials. The strategy will further promote the cooperation between architects, local authorities and engineers, and foster skills and trainings to deliver energy-efficient designs and lower-carbon concrete mixes. For the EU it is assumed that 30% of building materials and road infrastructure could be substituted with alternative materials by 2050, while 10%-35% of demand could be reduced through smart design and manufacturing.[a,b,d]

Potential

~600 $kgCO_2e$ per avoided tonne of cement or ~180 $kgCO_2e$ per avoided tonne of concrete[f]

Barriers

Building standards and practices need to be aligned;

Availability and feasibility of alternative building materials and capacity to recycle concrete; Common practices, market awareness and acceptance need to be enhanced

Costs

Unknown

TA needs

Mapping and analysis of innovative approaches and international best practices; Feasibility study for these practices in the context of Georgia

Source: Authors elaboration, based on data and literature ([a]Lehne & Preston, 2018; [b]NewClimate Institute 2020; [c]FleishmanHillard, 2021 [d]Cembureau, 2020; [e]European Commission 2020;[f]HeidelbergCement, 2020)

3.4 Buildings

Targets and plans

GHG emissions (2017)

Direct GHG emissions from energy demand in buildings accounted for **2.31 $MtCO_2e$** in 2017 (approximately 13% of total national emissions), pre-dominantly from residential buildings. In addition, the use of electricity in buildings also accounted for 0.8 $MtCO_2e$ in 2017, approximately 22% of the total emissions from electricity generation and transmission.

Current plans

Planned actions from the CSAP	GHG trajectory
• Develop a system for energy efficiency certification of buildings • Raising consumer awareness about energy efficiency • Encourage energy-efficient approaches and installation of energy-efficient lighting in residential, commercial and public buildings • Support use of solar energy for water heating and use of energy-efficient stoves • Train high professional standard personnel in energy efficiency	The implementation of CSAP actions for the sector leads to projected emission levels of **4.6 $MtCO_2e$ in 2030**, only a nominal improvement from projected emission levels without any action. Georgia's updated NDC has not set an emissions target for the sector. The identification of further mitigation action is critical for the sector.

Priority areas for enhanced action (CSAP)

- Creating information system for energy efficiency of buildings
- Improving energy efficiency of residential buildings
- Heating supply in residential buildings
- Updating climate-specific standards of construction

Buildings

Policy coverage

The Georgia-EU Association Agreement binds Georgia to the implementation of a number of Directives related to improved energy efficiency in the building sector, including the development of new policies. This has been one of several driving forces for the development and adoption of energy efficiency standards for new constructions, equipment and appliances. However, the strength of those standards can still be developed further, and several other potential policy areas in the sector remain unaddressed.

Remaining policy gaps include urban planning strategies that address energy consumption in buildings, support schemes for renewable energy in the provision of heating, cooling, hot water and cooking, and taxation policy that targets energy consumption and fossil fuels in the sector.

Two potential priority areas have been highlighted for consideration in the building sector:

- Financing instruments for residential energy efficiency improvements
- District- and building-level heating with renewable energy

Buildings

POLICY OPTION	OVERARCHING	CHANGE ACTIVITY	ENERGY EFFICIENCY	RENEWABLES	OTHER LOW CARBON	NON-ENERGY
Overarching sector-specific strategy	✗	⊘	⊘	⊘	⊘	⊘
Urban planning strategies	⊘	✗	⊘	⊘	⊘	⊘
Building codes and standards as well as support for highly efficient construction	⊘	✓	⊘	⊘	⊘	⊘
2020 Law on Energy Performance in Buildings						
Performance and equipment standards as well as support for highly efficient appliances	⊘	✓	⊘	⊘	⊘	⊘
2020 Law on Energy Performance in Buildings						
Support scheme for heating and cooling	⊘	⊘	⊘	✗	⊘	⊘
Support scheme for hot water and cooking	⊘	⊘	⊘	✗	⊘	⊘
Energy and other taxes	⊘	✗	✗	✗	✗	⊘

✓ At least one policy in force ● Policy planned. ✗ No policy in force ⊘ Not applicable

Notes/Source: Authors' elaboration based on policy categorisation based from IPCC (Sims et al., 2014) and Climate Policy Database (NewClimate Institute, 2019). Green shading indicates that policies for the given category are in place, red shows they are not, and yellow shading shows that policies are proposed or in planning.

Buildings

Potential policy action areas

Financing instruments for residential energy efficiency improvements

Financial instruments that support retrofit of building envelopes for existing residential buildings – such as insulation and weatherisation – can significantly reduce energy consumption for spatial heating and associated emissions. A wide range of financial instruments exists including subsidised credit lines, as well as the establishment of energy service companies (ESCOs). Such measures should be complemented by awareness campaigns and other interventions to address market barriers to ensure uptake from home- and building-owners. Further policy in this area is a key priority of both the buildings and forestry sections of the 2021 Climate Strategy and Action Plan.

SDGs

Reduced expenditure on energy increases disposable income and saving potential.

Improved warmth and comfort can lead to improved physical and mental health outcomes.

Heating becomes more affordable resulting in less fuel poverty.

Decent jobs are created in sustainable industries for construction and in supply chains.

Context

The poor energy efficiency performance of the existing building stock is an economic, social and environmental issue in Georgia. Georgia uses approximately 50% more energy per unit of floor space than EU countries with a similar climate, due to the poor energy performance of much of the existing residential building stock dating from the Soviet era.[a] Energy consumption in Georgia would be far higher still if it were not for substantial fuel poverty. The nation's average urban household spent approximately USD $45 per month on utility bills in 2015, equal to 25% of the average net monthly income for non-professional trades.[b] Despite encouraging developments at the policy and planning level in recent years, these efforts have not yet been able to affect a significant improvement on the availability of attractive financial instruments for the retrofit of the residential building sector.

Good practice

Armenia's programme to de-risk and scale-up investments in energy efficient building retrofits is projected to mitigate 5.8 $MtCO_2e$ over a 20-year period. The programme was awarded a USD 20m grant from the GCF, along with loans of nearly USD 100m, to be used to increase the affordability of loans for retrofit, as well as the provision of technical assistance for the removal of market barriers.[c] Armenia's 2020 Energy Efficient Buildings Roadmap continues to plan beyond these measures for the deeper decarbonisation and modernisation of the sector.[c]

The EBRD has supported **Moldova** and **Ukraine** with the development of a **Residential Energy Efficiency Financing Facility,** subsidising commercial bank's credit lines to individuals and companies retrofits in residential buildings. In Moldova, market barriers limited the uptake of the programme, with only EUR 6.8m disbursed between 2012 and 2017, mostly through small scale loans to private individuals for window upgrades. The programme in Ukraine will be supported by an extensive energy efficiency awareness campaign to increase uptake.[d]

Potential

Direct emission reductions in soviet-era multiapartment buildings could reach approximately 72% through basic window and door weatherisation, insulation of exterior structures and roof insulation.[e]

Barriers

Poor availability of information and statistical data on the existing building stock for policy formulation; Lack of affordable credit for retrofit; Lack of legal structures for collective action in multi-apartment buildings.

Costs

Upfront capital expenditure less than USD 100,000, with 5-8 year payback period, for envelope efficiency measures on multi-apartment buildings with ca. 100 apartments. [e]

TA needs

Development of inventory and more granular statistical data on the existing residential building stock.

Source: Authors' elaboration, based on data and literature ([a]Kochladze 2012, [b]GEOSTAT 2016, [c]GCF Documentation, 2016, [d]EBRD-GEFF, n.d., [e]Government of Tbilisi City 2011, MOE 2015; Abulashvili 2013; World Bank 2015; Kochladze 2012, 2021 CSAP).

Buildings

Potential policy action areas

District- and building-level heating with renewable energy

A shift to renewable energy carriers for heating in buildings can lead to the decarbonisation of the greatest source of emissions in the building sector. Promising technologies – including waste-to-energy, geothermal heat pumps, biomass energy and advanced solar thermal technologies – are more feasible for centralised heat supply systems at the district- or building-level, than at the level of individual units in multi-apartment buildings. Feasibility studies and demonstration projects are required to test the feasibility of different potential renewable energy sources in different contexts. Policies can target support to specific technologies, prompt the development of demonstration projects and scale up successful applications.

SDGs

Reduced expenditure on energy increases disposable income and saving potential.

Improved warmth and comfort can lead to improved physical and mental health outcomes.

Decent jobs are created for heating installations and in supply chains for sustainable technologies.

Development of new technologies and supply chains in Georgia.

Context

Most households in Georgia are heated by individual heaters, from natural gas, firewood or electricity. Georgia's major cities are adequately endowed with geothermal and solar energy potential for heating. Sustainable biomass and waste-to-energy are also touted as attractive options. These technologies are more feasible when applied at the district or building level. District heating was in widespread use in Georgia before the collapse and complete dismantling of this infrastructure in the 1990s.[a] The weakness of formal cooperation between homeowners in many multi-apartment buildings remains one of many barriers to the introduction of building-scale heating equipment or the revival of smaller-scale district-heating networks. The feasibility of new small-scale district heating in newly constructed communities is yet to be thoroughly tested.

Good practice

A key component of **Armenia's Scaling Up Renewable Energy Program's (SREP) Investment Plan (IP)** is the development of distributed geothermal heat pump and solar thermal heating systems, through subsidised commercial credit lines. The programme is evaluated to have led to the mobilisation of the market in Armenia for small-scale heating technologies;[b] early adopters continue to be supported to further mature this market for more widespread adoption across the sector.

Qingdao, one of **China's low carbon pilot cities**, is implementing a new large-scale district heating and cooling network powered by shallow ground geothermal, solar thermal and industrial waste heat. The programme aims to deliver heat to the city's population of 400,000 residents with emissions savings of 1.4 $MtCO_2e$ per year.[c]

Potential [d]

The switch to renewable energy carriers can completely decarbonise spatial heating where used, an emissions source responsible for nearly 11% of national GHG emissions.

Barriers

Lack of affordable credit for new heating equipment; Lack of legal structures for collective action in multi-apartment buildings; Lack of demonstration projects and market.

Costs [e]

Upfront capital expenditure of approximately USD 33,000, with a 3-year payback period, for central heating with biomass or geothermal on multi-apartment buildings with ca. 100 apartments.

TA needs

Feasibility studies for centralised heating systems using waste-to-energy, geothermal heat pumps, biomass energy and advanced solar thermal technologies, in different building contexts.

Source: Authors' elaboration, based on data and literature ([a]Vardigoreli, 2002, [b]Republic of Armenia, 2019, [c]Day et al., 2018, [d] 2021 CSAP, [e]Government of Tbilisi City 2011).

3.5 Waste

Targets and plans

GHG emissions (2017)

Direct GHG emission levels were at **1.56 $MtCO_2e$ in 2017** (approximately 9% of total emissions) for the waste sector, with 67% of sector emissions coming from solid waste disposal.

Current plans

Planned actions from the CSAP	GHG trajectory
• Reduce GHG emissions from existing unauthorized dumpsites and non-hazardous landfills • Support waste recycling • Reduce greenhouse gas emissions from wastewater • Develop a data-based waste management system • Upgrade and improvement of Tbilisi's landfill • Utilisation of landfill gas in Kutaisi, Rustavi, and Batumi's non-hazardous waste landfill *(financial support sought)* • Paper waste recycling *(financial support sought)* • Capture and recovery of GHGs in Tbilisi, Batumi, and Kobuleti's wastewater treatment plants *(financial support sought)* • Education and awareness raising on organic waste management *(financial support sought)* • Establish a consolidated process for collecting and updating data for the waste sector *(financial support sought)*	The implementation of CSAP actions for the sector leads to projected emission levels of 1.10-**1.37 $MtCO_2e$ in 2030**, a 35-54% improvement from projected emission levels without any action. Georgia's updated NDC contains no emissions target for the sector in 2030.

Priority areas for enhanced action (CSAP)

- Improved data collection system
- Biodegradable waste management
- Establishing Maximum Permissible Limits (MPL)
- Moving towards reducing and recycling

Waste

Policy coverage

The National Waste Management Strategy and Action Plan, which is currently being updated, provides a strategic vision and important framework to bring the sector on a low emissions pathway. With donor support, old landfills are being closed and new ones compliant with EU requirements are being constructed, and methane capture and utilisation is gradually being implemented at landfills and wastewater facilities. While recycling targets (e.g. paper or glass) are included in the strategy, its current version only calls for the development of concrete targets and measures to reduce the landfilling of biowaste. While many municipalities are starting to integrate provisions from the Strategy and Action Plan, actual progress on improved waste separation and reduction is currently limited.

Two potential priority areas have been highlighted for consideration in the waste sector:

- Improving waste management for biowaste
- Reducing waste generation through Pay-As-You-Throw Schemes

Waste

POLICY OPTION	OVERARCHING	CHANGE ACTIVITY	ENERGY EFFICIENCY	RENEWABLES	OTHER LOW CARBON	NON-ENERGY
Overarching sector-specific strategy	✓	⊘	⊘	⊘	⊘	⊘
Incentives to reduce landfilling and improved practices	⊘	●	⊘	⊘	⊘	⊘
National Waste Management Strategy and Action Plan, CSAP						
Recycling targets and practices for different waste sources	⊘	✓	⊘	⊘	⊘	⊘
National Waste Management Strategy and Action Plan, CSAP						
Improved biowaste management	⊘	●	⊘	⊘	⊘	⊘
Reduce and reuse of wastewater	⊘	●	⊘	⊘	⊘	⊘
Increased energy efficiency in waste management facilities	⊘	⊘	●	⊘	⊘	⊘
Support for waste-to-energy	⊘	⊘	⊘	✗	⊘	⊘
Methane capture and utilisation from landfills and wastewater facilities	⊘	⊘	⊘	⊘	✓	⊘
National Waste Management Strategy and Action Plan, CSAP						

✓ At least one policy in force ● Policy planned. ✗ No policy in force ⊘ Not applicable

Notes/Source: Authors' elaboration based on policy categorisation based from IPCC (Sims et al., 2014) and Climate Policy Database (NewClimate Institute, 2019). Green shading indicates that policies for the given category are in place, red shows they are not, and yellow shading shows that policies are proposed or in planning.

Waste

Potential policy action areas

Improving waste management for biowaste

Biowaste includes organic waste, such as food or green waste, that produces methane when dumped into landfills. Improved waste management for various other types of waste are already included in Georgia's National Waste Management Strategy and Action Plan and targeted by different projects. For biowaste both large-scale composting facilities and decentralized composting approaches, such as community composting, should be combined to cover different parts of the country. Public awareness and education are integral to ensure citizens engagement.

SDGs

- **Reduces air, water and soil pollution and related illnesses and deaths.**
- **Increases economic productivity through technological upgrading and innovation.**
- **Supports the development of sustainable and resilient infrastructure for the waste sector.**
- **Supports sustainable urbanisation and reduces the environmental impact of cities.**

Context

Around 900,000 tons of waste is generated annually in Georgia and in 2018 still more than 75% ended up in landfill sites. While there are a few recycling companies in the country, they do not have access to all recyclable materials they could potentially process as waste is not being properly separated. However, Georgia has set itself ambitious recycling targets in its Waste Management Strategy and Action Plan, and various support projects are currently being carried out. The recycling of biowaste, though, is less of a focus to date. The "Green Waste Recycling and Composting Centre" planned for Kutaisi is the first of its kind in Georgia; the experience should be adopted for building additional composting stations in the future, particularly for areas covering large parks or other green spaces.[a] To further promote biowaste composting, home or community composting can decrease the need for separate bio-waste collection and reduce waste transport and management costs. These measures align with obligations under the EU-Georgia Association Agreement.

Good practice

GHG emissions from waste are continuously decreasing in the **European Union**. According to the EU Waste Framework Directive from May 2018, bio-waste must either be separated and recycled at source or collected separately and not mixed with other types of waste by the end of 2023.[b]

Financed by EBRD and EU the existing landfill in the **Ukrainian city of Khmelnytskyi** is closed, and two new cells with modern recycling and composting facilities are being constructed in line with EU standards. The city is buying new waste collection vehicles and containers to encourage residents, public institutions and businesses to separate their waste, accompanied by an educational campaign in schools, kindergartens and public organisations.[c]

Slovenia has one of the lowest shares of bio-waste in municipal waste generated in all of Europe. Almost half of the population is covered by community or home composting. In general, producers of bio-waste are encouraged to compost themselves and if they do not do so, they have to separate it for separate collection by public services which is mandated by Slovenian law since 2011.[d] Education and promotion through the public waste management company Snaga, including many activities on social media, is an important success factor.

Potential

The project in Ukraine is estimated to save 150 $ktCO_2e$ per year with 300,000 inhabitants covered[c]

Community composting in Italy: ~40% emission reduction compared to landfilling[e]

Barriers

High initial infrastructure costs for large-scale projects;

Public acceptance and behaviour change

Costs

The project in Ukraine is being financed by a €36.5m financial package from EBRD and EU; The pilot project in Kutaisi has been estimated at €40,000; Research in Italy has shown that community composting can reduce costs by 34-50% compared to landfilling.

TA needs

Analysis of process and lessons learned from project implementation in Kutaisi; Pilot project and study to assess feasibility and acceptance of community composting in the context of Georgia

Source: Authors' elaboration, based on data and literature ([a]BlackSea, 2020, [b]European Parliament, 2019, [c]EBRD, 2020b, [d]EEA, 2020; [e]Bruni et al., 2020).

Waste

Potential policy action areas

Reducing waste generation through Pay-As-You-Throw Schemes

Pay-As-You-Throw (PAYT) schemes are proven to have a significant impact on household waste reduction in many countries, particularly in Europe. Through an economic incentive, it leads people to act desirably rather than simply restricting undesirable behaviour. Such incentivisation is proven to lead to waste reduction and is commonly associated with increased recycling rates. A gradual establishment at the municipal level and strategic awareness and information campaigns engaging citizens are important success factors of such an intervention.

SDGs

Reduces water pollution through reduced waste production.

Increases resource efficiency by reducing waste production.

Reduces the adverse per capita environmental impact of cities.

Contributes to reduced waste generation through prevention.

Context

Georgia's National Waste Management Strategy and Action Plan envisions Georgia to become "a waste preventing and recycling society", among other things, by implementing the "polluter pays principle". While concrete actions for introducing full cost recovery and extended producer responsibility (EPR) are planned and currently being implemented, additional measures to target the individual household level could be introduced in the medium term. A gradual establishment of PAYT systems at the municipal level, taking into consideration the conditions and specificities of each municipality as well as international best practices, is most promising. The introduction of a PAYT scheme can be a cumbersome administrative process; the ongoing reform of Georgia's waste management system however provides a unique window of opportunity to ease implementation.

Good practice

In October 2016, **Romania** included in its waste framework legislation to implement PAYT schemes. The country ranks among those in Europe with the lowest waste generation per capita. An example of how to gradually introduce PAYT is the city of Salacea, which in partnership with Zero Waste Europe and Zero Waste Romania has successfully implemented a PAYT scheme with accompanying measures in 2018 leading to a reduction of 55% in waste generation. Besides introducing the PAYT scheme existing communal street bins and containers were replaced by a door-to-door separate collection system for different waste streams including bio-waste. The involvement of all stakeholders, including local and regional authorities and waste operators as well as technical experts was key to success. To ensure citizens engagement a four-week education program was run before the new system started operations, along with an awareness campaign throughout the program including stickers on bins, local volunteer training to answer citizens inquiries, distribution of information materials and guidance.[a,b]

In **France**, 5.6 million people were covered by different PAYT schemes by 2019 and the Energy Transition for Green Growth law defines the objective of expanding the schemes to cover 25 million by 2025. Practices vary between communities e.g., one approach is paying a fixed charge that includes an allowance for a number of garbage bags per year, and then paying an extra fee for each additional bag or a door-to-door pick up where each bin is electronically counted. On average, practices have led to a reduction of non-recyclable waste of about 30-50%.[c,d]

Potential

A 55% reduction in waste generation and decreasing the share of landfilled waste from 98% to 55% was achieved in Salacea[a]

In France, PAYT schemes are leading to a reduction of between 30% and 50% non-recyclable waste on average[c]

Barriers

High initial infrastructure costs and administrative burden;

Citizens engagement and acceptance;

Illegal dumping as a consequence of increased costs

Costs

Unknown

TA needs

Infrastructure and financial feasibility analyses

Source: Authors' elaboration, based on data and literature ([a]GIZ, 2020, [b]Zero Waste Europe, 2019, [c]Connexion, 2020, [d]Jobert, 2016).

3.6 Agriculture

Targets and plans

GHG emissions (2017)

GHG emission levels were at **3.48 $MtCO_2e$** in 2017 (approximately 20% of total emissions) for the agriculture sector, predominantly from enteric fermentation, agricultural soils, and manure management.

Current plans

Planned actions from the CSAP	GHG trajectory
• Implement sustainable management of soil and pastures and support the introduction of sustainable domestic animal feeding practices • Build capacities of generating scientific evidence for development of climate-smart approaches in the agriculture sector	The implementation of CSAP actions for the sector leads to projected emission levels of **4.62 MtCO2e in 2030**, only a nominal improvement from projected emission under the reference scenario. Georgia's updated NDC does not contain an emissions target for the sector in 2030. The identification of further mitigation action is critical for the sector.

Priority areas for enhanced action (CSAP)

- Improved data collection system
- Regulating burning practices and replanting windbreaks
- Regulating irrigation practices
- Regulating overgrazing and unsustainable use of soils
- Agroforestry direction

Agriculture

Policy coverage

While a Climate Smart Agriculture working group has been set up and several support projects are working on making Georgia's agriculture sector more profitable, it is lacking dedicated policies across all mitigation dimensions. Besides the mitigation measures directly linked to agriculture sector activities, it is important to tackle other policy-related barriers such as addressing land tenure rights in rural areas or providing access to affordable finance in the form of microcredits.

Two potential priority areas have been highlighted for consideration in the agriculture sector:

- Improved manure management systems for cattle and swine
- Reduction of synthetic fertiliser use

Agriculture

POLICY OPTION	OVERARCHING	CHANGE ACTIVITY	ENERGY EFFICIENCY	RENEWABLES	OTHER LOW CARBON	NON-ENERGY
Overarching sector-specific strategy	●	⊘	⊘	⊘	⊘	⊘
Data collection framework	✕	⊘	⊘	⊘	⊘	⊘
Improved manure management	⊘	●	⊘	⊘	⊘	⊘
Incentives to reduce emissions from enteric fermentation	⊘	●	⊘	⊘	⊘	⊘
Improved crop and grazing land management	⊘	●	⊘	⊘	⊘	⊘
Incentives to reduce synthetic fertilizer use	⊘	●	⊘	⊘	⊘	⊘
Increased food productivity	⊘	⊘	⊘	⊘	⊘	✕
Incentives to reduce food demand	⊘	⊘	⊘	⊘	⊘	✕
Support for highly efficient farming machinery	⊘	⊘	✕	⊘	⊘	⊘

✓ At least one policy in force ● Policy planned. ✕ No policy in force ⊘ Not applicable

Notes/Source: Authors' elaboration based on policy categorisation based from IPCC (Sims et al., 2014) and Climate Policy Database (NewClimate Institute, 2019). Green shading indicates that policies for the given category are in place, red shows they are not, and yellow shading shows that policies are proposed or in planning.

Agriculture

Potential policy action areas

Improved manure management systems for cattle and swine

The capture and utilisation of biogas from livestock manure has the potential to reduce GHG emissions in Georgia's agriculture sector through methane avoidance. Anaerobic digestion facilities can be used on individual farms or on a cluster of farms to generate electricity, further reducing emissions when replacing fossil fuel use, such as natural gas, or avoiding tree removal for firewood.[a] Georgia should start with assessing the feasibility of different manure management systems and their implementation in its specific country context.

SDGs

Reduces air, soil and water pollution and induced illnesses.

Improves the access to affordable and clean energy through biogas production.

Reduces water contamination from nitrogen, thereby improving access to safe drinking water.

Contributes to sustainable management and efficient use of natural resources.

Context

Manure management, particularly for cattle and swine, is a large source of emissions in Georgia's agriculture sector. With industrialised farming, and thus emissions, expected to grow in the coming years, an improved manure management system is a central element of any strategy to bring the sector on a low emissions pathway. The use of lagoons to handle cattle and swine manure was identified as a feasible option in the context of Georgia in previous sector stakeholder consultations and has been highlighted as a priority area in the CSAP.[b] Technologies for biogas digestion are mature in some markets but are not yet in widespread use in the country, due to low awareness and poor accessibility to microfinance. Since the introduction of a net metering regulation in 2017, conditions for biodigester use are significantly more attractive for farm operators, who can generate savings or revenue from the utilisation of captured biogas.

Good practice

In **Moldova**, 6,000 farmers were trained in improved manure management practices in a three-year GEF funded project. The project took a two-step approach: 1) removing barriers to enable the use of biogas by introducing a legal and regulatory framework and 2) local capacity building on sustainable manure management practices. While only preparatory work for the construction of biodigesters had started under the project, the capacity building component was very successful.[c] Against an initial target of 10%, 63% of the engaged farmers reported having implemented improved manure management activities. In addition to the farmers, about 3,000 other stakeholders including local authorities, specialists, entrepreneurs and consultants participated in targeted training activities.[d]

A project in **Armenia** supported by the EU has helped two rural communities, that mainly live on cattle breeding, to build greenhouses for organic vegetable farming and to install heating equipment that uses biogas produced from manure. This has allowed the communities to gain profits and create stable new jobs locally. The biogas can also be used for producing electricity when it's not being used for heating the greenhouses. The communities are planning on selling the energy to electric networks to get additional income. This has created a snowball effect in neighbouring communities that now also want to implement biogas production.[e]

Potential

The emission reduction potential at the global level is estimated at 79%, a similar potential (80%) was found in previous research and stakeholder consultations conducted in Georgia.[b,f]

Barriers

High initial infrastructure costs; Lack of awareness and acceptance among farmers; Feasibility across different farm types

Costs

Abatement costs at the global level are estimated at approximately **92 USD/tCO$_2$e**, but while initial infrastructure investments can be high, fuel costs, for example for natural gas, may be displaced.[f]

TA needs

Analyses of technical and financial feasibility for different farm types as those can differ depending on farm structure and currently implemented systems.

Source: Authors' elaboration, based on data and literature ([a]IFAD, 2019, [b]Winrock International, 2017, [c]GEF, 2015, [d]World Bank, 2014, [e]EU Neighbours, 2019, [f]Ahmed et al., 2020)

Agriculture

Potential policy action areas

Reduction of synthetic fertiliser use

A reduction of synthetic fertiliser application, achieved for example through more precise application or the use of organic alternatives, can significantly reduce emissions associated with agricultural soils in Georgia. The use of such techniques are attractive to farmers if they are aware and trained in practices for more efficient fertiliser application. As emissions from synthetic fertiliser use are projected to further increase in coming years, if no action is taken, this is an important measure for bringing Georgia's agriculture sector on a low emissions pathway.

SDGs

Reduces air, soil and water pollution and induced illnesses.

Contributes to achieving increased resource-use efficiency in the agriculture industry.

Reduces water contamination from nitrogen, thereby improving access to safe drinking water.

Contributes to reducing degradation of ecosystems and biodiversity loss by applying sustainable practices.

Context

In a short period of time, Georgia has become highly reliant on synthetic fertilisers. With a growing value of agricultural output the use of synthetic fertiliser has more than tripled between 2010 and 2015, with the current level considerably higher than the global average. Training activities and awareness campaigns for farmers are needed to highlight the short- and long-term benefits of reduced fertiliser use, as well as options for organic alternatives. Public investments in fertiliser subsidies could in some cases be redirected towards such activities. Regulatory change to ensure long-term security of land-tenure is needed to further incentivise sustainable practices, while the development of a dedicated fertiliser strategy with clear reduction targets could be a helpful for guiding the transition.

Good practice

Montenegro's 3rd National communication includes measures to reduce emissions from synthetic fertiliser use. The measure consists of awareness and training activities for farmers to reduce the amount of synthetic nitrogen fertilisers applied to soils, in combination with improvements in manure application techniques to reduce ammonia emissions from organic fertilisers. Montenegro has set itself a reduction target of 20% by 2030 by implementing these measures.[a]

In **Denmark** a wide range of policy instruments were introduced over the last decades to reduce synthetic fertiliser use, implemented through a number of Action Plans. Each of the Action Plans set clear, quantitative targets and estimated the contribution of individual measures and initiatives, which allowed the government to adjust policies according to progress and the achievement of these targets. Between 1990 and 2011 the application of synthetic fertilisers had dropped by 45%. Policy instruments included financial incentives, such as taxes, requirements for farmers to track their fertiliser use or regulatory policies, such as application limits.[b]

Potential	Around 20% of GHG emissions (~100 $ktCO_2e$) associated with synthetic fertiliser use could be offset through simple fertiliser management, like in Montenegro, with additional potential if taking more advanced measures, like in Denmark.	**Barriers**	Lack of awareness and education programmes for farmers; Regulatory change and dedicated strategy needed
Costs	Cost-neutral or even cost-beneficial	**TA needs**	Technical analyses to determine best practices in the context of Georgia and realistic targets for fertiliser reduction.

Source: Authors' elaboration, based on data and literature ([a]Ministry of Sustainable Development and Tourism Montenegro, 2020, [b]IGES, 2015, [c]Ahmed et al., 2020).

4 Outlook

2021 marks a critical year for Georgia's medium-term climate planning and mitigation action. At the time of writing, Georgia's Climate Strategy and Action Plan (CSAP) and Updated NDC have been approved by both MEPA and the Climate Change Council and adopted by the Parliament of Georgia. In addition to the list of mitigation measures and GHG emission reduction targets set out in both national documents, the CSAP also presents priority areas with existing policy gaps to be explored for further mitigation action.

The time for action is pressing. The CSAP includes many actions to be implemented in the short term. The first period for entities to report on the achievement of their actions is already at the end of 2021, which means that with only limited time left activities need to get underway. In 2023, the first update of the CSAP is scheduled to take place. Until then new measures need to be identified and further developed, including for example those highlighted in this document. Most of the identified measures will need dedicated additional studies and analyses to inform the best options for policy design and implementation. This is a process that must start immediately if it is to bear fruit by 2023.

There is strong momentum for ambitious climate action. First, Georgia is currently in the process of developing a Long-Term Low Emission Development Strategy (LT-LEDS) as well as the Integrated National Energy and Climate Plan (NECP). These may give another impetus to identify deeper decarbonisation measures. Second, the recovery from the pandemic can be taken as another opportunity to provide and seek large scale investments into measures and infrastructure that support job creation and a more sustainable economy in the long-term. In general, many of the identified climate change mitigation actions would benefit Georgia due to synergies with national development objectives and the Agenda 2030 as well as obligations under political agreements such as the EU-Georgia Association Agreement.

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NewClimate – Institute for Climate Policy and Global Sustainability gGmbH

Cologne Office
Waidmarkt 11a
50676 Cologne
Germany

T +49 (0) 221 999833-00
F +49 (0) 221 999833-19

Berlin Office
Schönhauser Allee 10-11
10119 Berlin
Germany

E info@newclimate.org
www.newclimate.org