



# Energy Transition Pathways for the 2030 Agenda SDG 7 Roadmap for Georgia



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# Energy Transition Pathways for the 2030 Agenda

# SDG7 Roadmap for Georgia



National Expert SDG Tool for Energy Planning

*Developed using National Expert SDG7 Tool for Energy Planning (NEXSTEP)*

# Energy Transition Pathways for the 2030 Agenda SDG7 Roadmap for Indonesia

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# Abbreviations and acronyms

|         |  |         |   |
|---------|--|---------|---|
| BAU     | business-as-usual  | LCOE    | Levelized Cost of Electricity                                   |
| CBA     | cost benefit analysis  | LEAP    | Long-range Energy Alternatives Planning                         |
| CCGT    | combined cycle gas turbine   | MCDA    | Multi-Criteria Decision Analysis                                |
| CFBC    | circulating fluidized bed combustion                                   | MEPA    | Ministry of Environmental Protection and Agriculture of Georgia |
| CPS     | current policy scenario  | MEPS    | Minimum Energy Performance Standards                            |
| CTF     | clean technology fund  | MJ      | megajoule   |
| EE S&L  | Energy Efficiency Labelling Program                                    | MoESD   | Ministry of Economy and Sustainable Development of Georgia      |
| ESCAP   | United Nations Economic and Social Commission for Asia and the Pacific | MT      | million tons  |
| ETS     | Emission Trading System  | MTF     | Multi-Tier Framework  |
| EV      | electric vehicle   | NAMA    | Nationally Appropriate Mitigation Action                        |
| GEOSTAT | National Statistics Office of Georgia                                  | NDC     | nationally determined contributions                             |
| GHG     | greenhouse gas   | NEXSTEP | National Expert SDG Tool for Energy Planning                    |
| ICS     | improved cooking stove   | PA      | Paris Agreement   |
| IPCC    | Intergovernmental Panel on Climate Change                              | PP      | power plant   |
| IRENA   | International Renewable Energy Agency                                  | SCGT    | single cycle gas turbine  |
| IRR     | Internal Rate of Return  | SDG     | Sustainable Development Goal                                    |
| Ktoe    | thousand tonnes of oil equivalent                                      |         |   |



# Foreword: ESCAP

Energy is the key enabler of development for the Asia-Pacific region's rapidly growing economies,

Like many countries in the region, Georgia has shown strong growth of both its economy and its demand for energy in recent decades. However, the advent of the 2030 Agenda for Sustainable Development signalled the advent of a new era of development across the region, based on inclusiveness, resilience and environmental stewardship. The COVID-19 pandemic has reinforced the need to change the region's development trajectory and to build back better. In this endeavour, transitioning to a sustainable, secure and least-cost energy system can form a key part of the recovery as well as pave the way for a more sustainable and equitable society.

Georgia's endowment of renewable energy resources – hydro power in particular, but also its abundance of wind, solar, geothermal and biomass potential – means that the country is well-positioned to establish a sustainable energy future.

Georgia's Roadmap for achieving Sustainable Development Goal 7 presents a detailed assessment aimed at helping the country to reach a clean and green energy future. It details a range of technical opportunities and policy options for reducing emissions, saving energy and lowering costs. The road map offers an opportunity to leverage a least-cost sustainable energy development pathway, and to direct the investment savings to other critical sectors – such as the health sector – in building back better from COVID 19.

However, Georgia's SDG 7 Roadmap is about more than just affordable and clean energy. The measures identified and recommendations made will not only reduce energy intensity and grow Georgia's renewable energy sector – with flow-on benefits in employment and health – but will also reduce its reliance on imported natural gas and petroleum fuels. Furthermore, the Roadmap presents an assessment of how Georgia can leverage its clean energy potential to export electricity to neighbouring countries through enhanced power grid connectivity.

The Roadmap takes a holistic approach to the energy system. Energy for heating, transport, industry and agriculture are considered in detail in an assessment that considers the impacts across the entire system. This is important for evaluating complex measures such as the electrification of transport which affects management of the power grid, petroleum and transport sectors.

Georgia was a pioneer in using ESCAP's National Expert SDG Tool for Energy Planning (NEXSTEP) and was among the first countries in the region to develop a Sustainable Development Goal 7 Roadmap. The success of this cooperative effort is testament to our shared ambition for Georgia and the region to deliver on the sustainable energy vision of SDG 7. This Roadmap provides an example for other countries looking to understand how they can begin taking up the sustainable energy development opportunities within their own borders.

I look forward to Georgia's continuing leadership in delivering a secure, resilient and sustainable energy future as it builds back better from COVID-19.

**Mr Kaveh Zahedi**

Deputy Executive Secretary,  
Sustainable Development,  
United Nations Economic and Social  
Commission for Asia and the Pacific

# Foreword: Georgia

Georgia is committed to implementing the 2030 Agenda for Sustainable Development Goals (SDGs). The country has undertaken active measures to adjust the SDG targets and indicators according to its local conditions, challenges and opportunities. The implementation of the Sustainable Development Goals (SDGs) is mandatory for Georgia, and these types of documents help in meeting the commitments and, at the same time, facilitate the usage of local resources. The Government's policies and priorities are well-aligned with the SDGs – making them a very solid basis of the country's reform agenda.

It is noteworthy to highlight the fact that Georgia has made significant progress in putting itself well on track to achieving the 2030 Agenda. Notwithstanding this, there are still some challenges and sectors to be identified, where further work is needed to achieve the SDGs. Incorporation of the SDGs in national policy is one of the Government of Georgia's main achievements. This will be an essential component for incorporating the SDGs into the daily agenda of public institutions. One of the most important SDGs is SDG 7, which will be considered when developing national energy policies.

The Government has prioritized knowledge-based and innovation-driven economic development, and actively supports an increase of innovative activities by micro, small, and medium-sized enterprises; this includes start-ups and individuals and their participation in the digital economy. During the past five years, Georgia also took active steps towards responsible production and consumption.

Based on the foregoing, Georgia remains fully dedicated to the purpose of the implementation of the SDGs. The Ministry of Economy and Sustainable Development of Georgia expresses its gratitude to ESCAP, the counterparts and the experts involved for their work on "SDG 7 Roadmap for Georgia" and active cooperation. Sustainable development goals are getting more and more tangible and important. As a member of ESCAP, we look forward to continuing our cooperation.

**Mr David Tvalabeishvili**

Deputy Minister of Economy and  
Sustainable Development of Georgia

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MINISTRY OF ECONOMY  
AND SUSTAINABLE  
DEVELOPMENT  
OF GEORGIA





# Executive summary

Transitioning the energy sector to achieve the 2030 Agenda for Sustainable Development and the objectives of the Paris Agreement presents a complex and difficult task for policymakers. It needs to ensure sustained economic growth as well as respond to increasing energy demand, reduce emissions and, more importantly, consider and capitalize on the interlinkages between Sustainable Development Goal 7 (SDG 7) and other SDGs. In this connection, ESCAP has developed the National Expert SDG Tool for Energy Planning (NEXSTEP). This tool enables policymakers to make informed policy decisions to support the achievement of the SDG 7 targets as well as emission reduction targets (NDCs). The initiative has been undertaken in response to the Ministerial Declaration of the Second Asian and Pacific Energy Forum (April 2018, Bangkok) and Commission Resolution 74/9, which endorsed its outcome. NEXSTEP also garnered the support of the Committee on Energy in its Second Session, with recommendations to expand the number of countries being supported by this tool.

The key objective of this SDG 7 roadmap is to assist the Government of Georgia to develop enabling policy measures to achieve the SDG 7 targets. This roadmap contains a matrix of technological options and enabling policy measures for the Government to consider. It presents several scenarios that have been developed using national data, and which consider existing energy policies and strategies, and reflect on other development plans. These scenarios are expected to enable the Government to make an informed decision to develop and implement a set of policies to achieve SDG 7 by 2030, together with the NDC.

## A. Highlights of the roadmap

Georgia's progress towards achieving the SDG 7 targets is promising, but more needs to be done to achieve all SDG 7 targets by 2030 through a concerted effort and the establishment of an enabling policy framework. Georgia has successfully provided universal electricity access to its population; however, further promotion of electric cooking stoves is still required to connect the remaining 900,000 people with clean cooking technology and fuel between now and 2030. Energy efficiency improvement needs to be boosted across different sectors in order to achieve a 2.9 per cent annual improvement, reducing energy intensity to 3.8 megajoules per US\$ by 2030.

The existing trend indicates that the country will still miss the unconditional emission reduction target pledged under the Paris Agreement by a small margin. Emissions reduction can be achieved via demand side energy efficiency measures and through changing the fuel mix in the power sector. Achieving the unconditional NDC target, while at the same time meeting the SDG 7 targets, requires a 25.5 per cent share of renewable energy to be reached in the total final energy consumption (TFEC). The NEXSTEP analysis also shows that through the proposed improvement areas, Georgia's energy security can be further strengthened as these measures will reduce its reliance on natural gas imports.

The levelized cost of electricity from renewable power technologies has experienced a steep decline, becoming economically more competitive than the conventional fossil-fuel-based technologies. Georgia may leverage its abundant renewable energy potential, specifically hydropower, to provide clean electricity for its neighbouring countries. In addition to generating revenue from electricity sales, this also permits further emission reduction for these countries.

## B. Achieving Georgia's SDG 7 and NDC targets by 2030

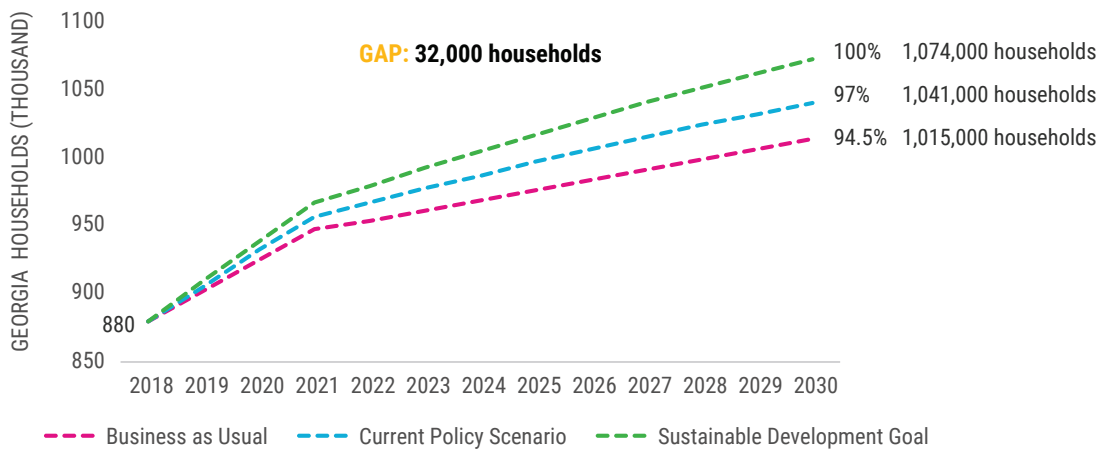
### Universal access to electricity

Georgia already achieved universal access to electricity in 2010. The 2007 Energy Policy for Georgia prioritizes improvement of service quality and the protection of consumer interests.

### Universal access to clean cooking

Georgia's access to clean cooking fuels and technologies was reported as 75.2 per cent in 2017. NEXSTEP analysis shows that the current rate of improvement of 2.7 per cent is not enough to achieve universal access to clean cooking (figure ES 1). Access to clean cooking will increase from 75.2 per cent in 2017 to 97 per cent in 2030, which will leave 109,000 people (32,000 households) in rural areas relying on inefficient and hazardous cooking fuels and technologies. Georgia needs to increase its efforts to achieve universal access to clean cooking fuels. This analysis indicates that electric cooking stoves will be the most feasible approach to ensuring universal access to clean cooking fuel by 2030.

**Figure ES 1. Access to clean cooking in Georgia**



### Renewable energy

The share of renewable energy in TFEC was calculated at 25.9 per cent (including traditional biomass) in 2018. Based on the current policy scenario, the share of renewable energy will decrease to 22.7 per cent by 2030, mainly due to the substitution of traditional biomass cooking stoves by other non-biomass cooking stoves.<sup>1</sup> In the SDG scenario, the share of renewable energy in TFEC will need to reach 25.5 per cent (excluding traditional biomass) by 2030, which will ensure the achievement of Georgia's unconditional NDC target.

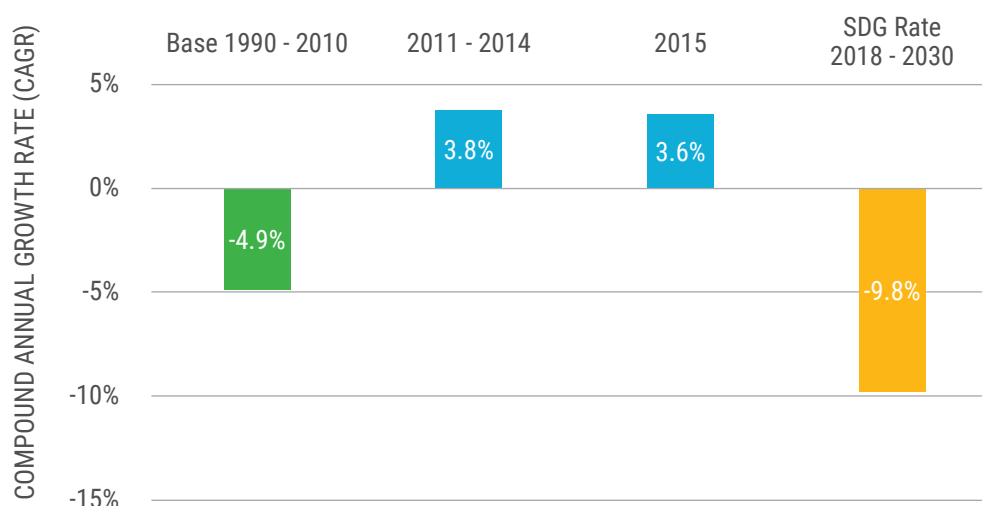
### Energy efficiency

Energy intensity in Georgia declined at an average annual rate of 4.9 per cent from 1990 to 2010, driven by the structural changes in Georgia's economy due to the closure of energy-intensive industries and decline in output. Achieving the SDG 7.3 target requires an annual improvement of 9.8 per cent of primary energy intensity (figure ES 2) to achieve the SDG 7 target of 1.74 MJ/US\$ by 2030 – a drop from 5.3 MJ/US\$ in 2018.

<sup>1</sup> In 2018, 24 per cent cooking energy was supplied by biomass.

The SDG 7.3 target for Georgia is not feasible; therefore, a revised target of 3.8 MJ/US\$ by 2030, a 2.9 per cent annual improvement which is in line with global targets, is recommended. In the current policy scenario, energy efficiency measures, if implemented, indicate that Georgia will only achieve a 2.2 per cent annual improvement in primary energy intensity by 2030.

**Figure ES 2. Georgia's energy efficiency target**

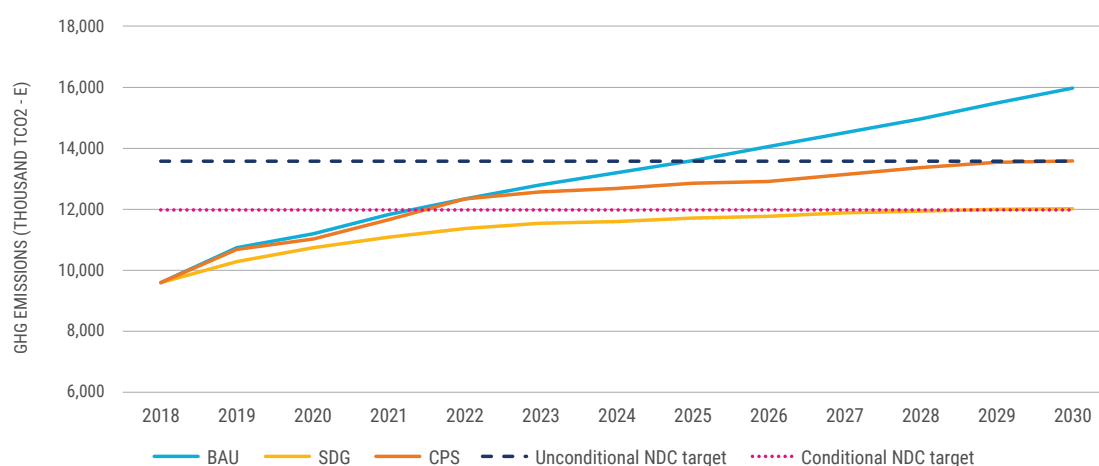


There are ample opportunities for Georgia to achieve this target as well as even implement a higher rate of improvement. These include, for example, minimum energy efficiency standards (MEPS), rapid deployment of electric vehicles and improved energy efficiency in new commercial buildings. These opportunities are discussed in later sections of this report.

### Nationally Determined Contributions

Georgia's current policies in the energy sector will achieve the NDC unconditional target of 15 per cent reduction of GHG emissions compared to business-as-usual (BAU) by 2030. Energy sector emissions in the BAU scenario are modelled to reach 15.97 million tonnes CO<sub>2-e</sub> (MtCO<sub>2-e</sub>) by 2030. Emissions in the current policy scenario are projected to reach 13.58 MtCO<sub>2-e</sub> by 2030, which will miss the NDC unconditional target of 15 per cent reduction in GHG emissions by a small margin of 8,000 tCO<sub>2-e</sub>.

**Figure ES 3. Comparison of emissions by scenario, 2000-2030**



## C. Important policy directions

The key policy recommendations to help Georgia accelerate the energy transition to achieve SDG 7 and NDC targets include:

- (i) **Targeted interventions in rural areas are required to achieve universal access to clean cooking in rural areas.** The electric cooking stove is the recommended technology option for Georgia to achieve this target. This option should be prioritized for the rural areas, which are grid-connected but still rely on traditional biomass cooking stoves. Implementation of this programme will cost the Government US\$1.28 million to achieve universal access to clean fuels and technologies for cooking by 2030;
- (ii) **Decarbonisation of heat is a major challenge overlooked by current policies.** The NEXSTEP analysis recommends the adoption of energy-efficient heat pumps to replace old natural gas boilers in Georgian households. Such a measure not only decreases Georgia's energy intensity, but also reduces reliance on natural gas imports;
- (iii) **Electrification of transport is a viable solution with cheap electricity from hydropower.** The NEXSTEP analysis recommends a long-term electrification strategy for Georgia. Fuel-switching from oil products to electricity will enhance energy security by reducing import as well as reduce emissions and establish Georgia as a leader in sustainable transport;
- (iv) **Investment in wind and solar power should be promoted.** The levelized cost of electricity analysis recommends increasing investments in wind and solar power. Georgia can achieve additional benefits by reducing natural gas imports as well as reduced vulnerability to hydropower seasonal variation and emission reductions in line with NDC targets. The additional investment needed to increase the share of wind and solar in power generation can be supported by a price on carbon. It has been estimated that a carbon price of US\$40/tCO<sub>2e</sub> would level the playing field for renewables as well as attract investors;
- (v) **Georgia has the potential to export 10 TWh per annum of clean electricity in 2030.** The NEXSTEP analysis includes the target of 10 TWh annual electricity exports as outlined in the "Ten-Year Network Development Plan" of Georgia, 2018-2029. Georgia may leverage its cheap and abundant renewable energy sources for electricity generation, boosting its electricity sales in more lucrative electricity markets in neighbouring countries.



