



JOINT SDG FUND



UNECE

POLICY DIALOGUE
**Food and energy resilience: policy, institutions
and people**

**ASSESSMENT OF ENERGY CONSUMPTION BY AGRICULTURAL AND FOOD
SECTOR SMALL BUSINESSES IN RURAL AREAS OF GEORGIA**

Liana Garibashvili (Consultant)

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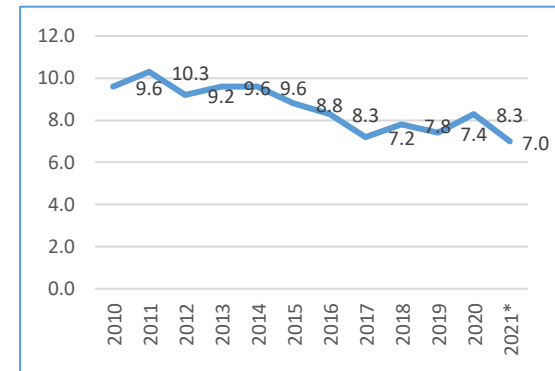


GENERAL CONTEXT

ENERGY

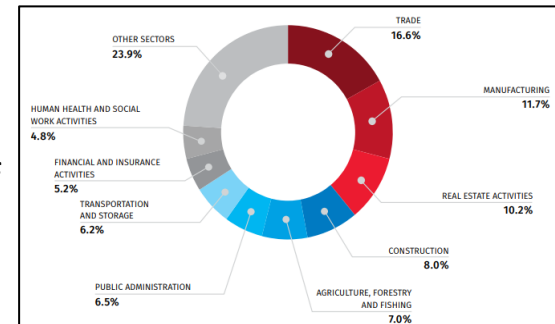


- About 40.2% of Georgians live in rural areas, (90%) are agricultural holdings/small scale farmers. About 60% of agricultural holdings are producing for own consumption and sell less than 10% of production and just only about 6% of agricultural holdings are producing primarily for sale.
- From 2,741 legal entities functioning in “Agriculture, forestry and fishing” sector 2,684 are small ones. In manufacturing sector, which includes food processing industry, the number of legal entities amounts to 16,175, from which 15,731 are small enterprises.
- Sector’s contribution to GDP - **7%**. Manufacturing sector’s share - **11.7%** includes “production of food, beverages & tobacco”.
- **123,833 households/20%** - receive social allowance
- In 2021 absolute poverty rate was 17.5%; rural absolute poverty - 21.3 %.
- *Self-sufficiency ratio for wheat is - 22%. More than 40% of vegetables, and more than 50% of meat, pork, poultry meat is imported.*



Weak economic performance and its low productivity can be attributed to:

- fragmentation of agricultural land & property rights leading to inefficient management of land resources; 87% of households own less than 1 ha of arable land, only 0.1% own more than 50 hectares.
- agricultural value chain (weak linkages, consulting and extension services, education, enforcement of standards)



ENERGY CONSUMPTION BY AGRICULTURE AND FOOD SECTOR IN GEORGIA

ENERGY



“Agriculture, forestry and fishery” (2020)-consumed 0.6% of total energy. Energy used for production of food, beverages & tobacco” - 8% of energy used by industrial sector, adding energy consumed by family holdings in 2020 was 128,932 TOE or **2,9% of total energy consumption**.

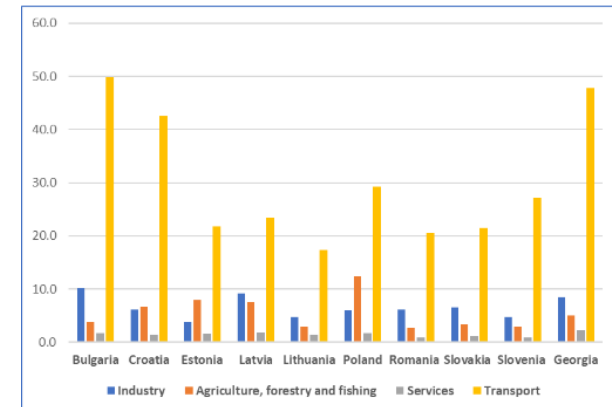
Energy Intensity level of primary energy for Georgia in 2019 was 3.83 MJ lower than the world energy intensity -4,7 MJ, though energy intensity of Georgian industry & agriculture is higher than in some European countries.

In 2020, Oil and NG import was 29,3% and 38,5%, respectively, of total energy consumption. It is crucial to conserve energy in agriculture & food industries (unstable markets, price increases).

By 2050 FAO anticipated -60% increase in food consumption over 2006–2007 levels.

Climate change can lead to severe droughts, floods, changes in water availability, in soil quality impact on agri-food systems. These may have an impact on rising energy demand. 2021-2023 Action Plan of Georgia’s 2030 Climate Strategy by 2030 emissions in the Georgian agricultural sector are expected to increase by **about 40%**.

Energy Intensity by Sectors-EU Countries and Georgia, 2020, TJ/M EUR



Energy Intensity Factor by Economic Sectors, EU and Georgia, 2020 [TJ/million EUR]

Country	Industry	Agriculture, forestry and fishing	Services	Transport
Bulgaria	10.2	3.7	1.7	49.9
Croatia	6.1	6.7	1.4	42.6
Estonia	3.8	7.9	1.6	21.7
Latvia	9.2	7.5	1.8	23.4
Lithuania	4.7	3.0	1.4	17.3
Poland	6.0	12.4	1.7	29.3
Romania	6.1	2.6	0.8	20.5
Slovakia	6.6	3.4	1.1	21.5
Slovenia	4.7	3.0	0.9	27.2
Georgia	8.4	5.1	2.2	47.7
EU-27 average	5.4	5.8	1.0	23.1

ENERGY CONSERVATION POTENTIAL



ENERGY

- Fruit & vegetable processing– modern, EE technological units & automated processes;
- New technologies for livestock breeding & meat processing.
- Substitute used technology with more EE (solar water system for electric water heater, lighting and HVAC systems, insulation, etc.)
- Behavior change, composting instead of inorganic fertilizers
- Bioenergy- residues from crop production & livestock
- Energy potential of residue from perennial crops is estimated at 1.565 TWh/year

Energy Audits performed in small size food sector enterprises revealed significant potential to decrease energy usage- energy-efficient measures related to electricity supply and consumption, steam generation and distribution, pumping and lighting systems, industrial refrigeration and cooling and furnaces, kilns and ovens could be recommended for application in the sector

Replacing outdated, inefficient technology with new, environmentally friendly, and EE machinery will enable local businesses to better compete on domestic and international markets. Institutional side of modernization involves changing behavior and management strategies to emphasize benefits of EE.

Energy Saving Measures in:	Energy Savings
Electricity supply and consumption	
Potential energy saving opportunities are:	
<ul style="list-style-type: none"> > Shut-off sections which do not require electricity when in operation; > Cogeneration; a precondition is the coincidence of electricity and the relatively high demand for steam. 	
Steam generation and distribution	
Steam and high temperature hot water boilers offer many energy savings opportunities which can make significant cost savings to industries. The most appropriate option depends on the type of boiler and heating system, the requirements of the process or other heating demands and budget.	
<ul style="list-style-type: none"> > Locate and repair steam leaks in fittings, equipment and steam traps 	10% - 15%
<ul style="list-style-type: none"> > Insulate pipelines and equipment 	3% - 13%
<ul style="list-style-type: none"> > Increase condensate return rate. In case there is no condensate return line at all, consider retrofitting of condensate return line in the whole system or in parts of it where it is financially viable 	Up to 10%
<ul style="list-style-type: none"> > Retrofit the boiler with economizer and recover flue gas heat, if flue gas temperature remains high, after cleaning (economizers are usually viable for boilers with a capacity of over 3 MW) 	5%, up to 15% for condensing boilers
<ul style="list-style-type: none"> > Install Variable Speed Drives (VSDs) for fans, blowers and pumps 	Up to 50% of energy use are achievable by reducing the fan or pump motor speed by 20% Up to 5%
<ul style="list-style-type: none"> > Make use of waste heat from production processes to preheat combustion air 	Case specific
<ul style="list-style-type: none"> > Use of alternative fuels such as biomass 	Case specific
<ul style="list-style-type: none"> > Improve housekeeping and maintenance 	Case specific
Pumping Systems	
<ul style="list-style-type: none"> > Shut down unnecessary pumps 	Case specific
<ul style="list-style-type: none"> > Replace oversized pumps with more efficient models 	1-2%
<ul style="list-style-type: none"> > Change the speed of a pump for the most efficient match of horsepower requirements with output 	5-40%
Lighting systems	
<ul style="list-style-type: none"> > Use of high efficiency lamps and luminaires¹ 	~ 75% from incandescent to LED lamps and ~45% from T12 to T5
<ul style="list-style-type: none"> > Implement automatic time switches and motion detectors 	
<ul style="list-style-type: none"> > Implement modern lighting management systems 	~ 30 - 50%
Industrial refrigeration and cooling²	
<ul style="list-style-type: none"> > Reducing refrigeration leakage 	
<ul style="list-style-type: none"> > Use of high efficiency compressors – increase the compressor size 	
<ul style="list-style-type: none"> > Good housekeeping of refrigeration plants 	
Furnaces, kilns and ovens	
<ul style="list-style-type: none"> > Operating at optimum furnace temperature³ 	5-10%
<ul style="list-style-type: none"> > Optimum capacity utilization 	Case specific
<ul style="list-style-type: none"> > Use of high temperature heat recovery systems (recuperators) 	10-30%



- ❖ Businesses are largely motivated by productivity
- ❖ Minimal understanding or awareness of energy-saving strategies.
- ❖ Local EE and RES project experience is insufficient.
- ❖ Lack of qualified technical skills in implementation & maintenance of clean energy technologies.
- ❖ Commercial banks lack necessary experience to finance these initiatives and have limited understanding of the potential environmental and economic benefits of such projects.
- ❖ No fiscal and tax incentives, and innovative financial instruments.
- ❖ IFIs promote EE and RES development in the country with their credit lines, efforts still not enough, limited and tied to the particular projects/interests.
- ❖ **Massive and all-inclusive information campaign is necessary.**

RECOMMENDATIONS

ENERGY



- “Enterprise Georgia” and “RDA” introduce EE potential assessment for small business and procurement of EE machinery & equipment during implementation process. –
- Create data collection mechanism for EE potential assessment of components of various food production systems, create sub-sector benchmark indicators and use those indicators to define support mechanisms to companies for improvement of EE performance.
- Provide government support or facilitate donor support to programmes for energy auditing of small enterprises and provide assistance to small businesses to assess their EE potential, help them to define necessary measures to improve their energy & environmental performance.
- Support creation of horizontal platform for knowledge sharing & information exchange among experts, small business owners and stakeholders interested in improving EE in SMEs. This can be done on the basis of experience of RECP (Resource Efficiency & Cleaner Production) Clubs established by UNIDO.
- Support sector associations, clusters, organizations with expertise in EE to provide expert advice, assess sector EE potential, assist companies with preparation of business plans and financial proposals for loan applications to banks and assist companies with reporting to bank.
- Support design and development of proposals for EE or RE projects which reduce, avoid, or remove GHG emissions and contribute to climate change mitigation for inclusion of sector enterprises in carbon offset trade projects.



THANK YOU FOR YOUR ATTENTION!!!

LIANA GARIBASHVILI

[E-mail: garibashvililiana@gmail.com](mailto:garibashvililiana@gmail.com)

Cell phone:+995 599 54 87 82

