ENERGY EFFICIENCY CENTRE GEORGIA

Municipal Energy Efficiency Policy Reforms in Georgia

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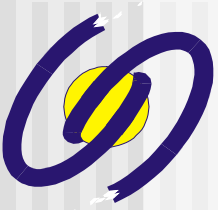

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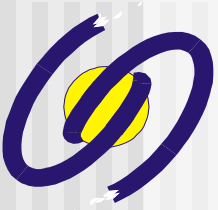

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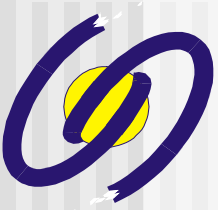

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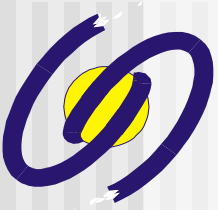

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GEORGIA-GENERAL OVERVIEW

Territory- 69,700 km², 9 regions
Population-about 4.4 million
Geography: mountain ranges and hills comprise 80% of Georgian territory

Climate The climate is dry and continental in eastern Georgia with hot summers and mild winters. The climate in western Georgia and on the Black Sea coast is warm and semitropical.
Capital-Tbilisi-population 1.480 ml
4 cities with population 100,000 and more

GEORGIA-Administrative division

Georgia is divided into 9 regions subdivided into 69 districts, and 2 autonomous republics.

Self-governing cities & population:

Tbilisi- 1 480 000; Batumi-180 000; Rustavi- 122 500;
Kutaisi-197 000; Poti-47 500;

Cities / towns of Georgia with population 20 000 and more

Zugdidi- 75 900	Senaki- 28 100
Gori- 50 800	Zestafoni- 24 500
Samtredia- 29 600	Marneuli -22 000
Khashuri- 28 300	Telavi- 20 100

National Statistics Office of Georgia - Population report (2012)

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GEORGIA-Energy Resources & Usage

	RESERVE	RESOURCE
Coal, (m toe)	185	300
Lignite (mtoe	20	-
Oil (mtoe)	42.5 (8.3+23.7+10.5)	850
Natural Gas (bcm)	8.4 (2.9+5.3+0.24)	180
Hydro (TWh)	32 (maximum economic potential)	80 (technical potential)

Hydro- cheapest and environmentally friendly local resource. only 12 % of hydro resources is yet used

Limited oil and gas reserves- In 2010 total crude oil production was 51,393 tons, while natural gas production totaled 7.8 mln.m^3.

Coal reserves makes possible to use it with the purpose of industrial production and usage

Electric power supply of Georgia and Tbilisi

Installed generation capacity- 4,470 MW of which 62% is Hydro Power Plants

Average annual electricity generation in 2010-2012 totaled 10,184GWh, of which approximately 78% was generated by hydros, 21% was generated at thermal power plants and rest was imported.

Electricity distribution companies: JSC Company "Telasi" in Tbilisi City,

JSC Company «Energo-Pro Georgia" almost in all regions of Georgia;

JSC Company "Kakheti Energy Distribution“ in Kakheti- annual distribution 200 ml. kWh to 117058 customers;

JSC Telasi distributes annually about 2 billion kilowatt-hours of energy to 416,500 individual, public and commercial customers

Natural gas supply and heating system in Georgia and Tbilisi

In 2011, 75% of the supplied primary energy was imported, out of which 43% was natural gas and 29% oil products

NG is mainly used for power generation and by households (heating & cooking). In rural Georgia main primary energy used for heating and cooking is firewood.

In Tbilisi NG is distributed by the Ltd "Kaztransgas". LTD "SOCAR Georgia Gas" is in charge of gas distribution & gasification of about 30 towns and regions and has 166 000 customers.

Wissol Gas Distribution supplies up to 12 000 subscribers in Telavi Region with NG.

Total Energy Consumption Pattern in Georgia 2011 based on IEA data

Energy Consumption by Sectors

Current Policy

Georgia made first steps towards energy efficiency back in the 1990-s through small scale donor supported programs. International, multilateral and bilateral agreements that require concrete energy efficiency and conservation actions from Georgia: Energy Charter Treaty and Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA);
Framework Convention on Climate Change and the Kyoto Protocol; Clean Development Mechanism (CDM) under the Kyoto Protocol; European Neighborhood Policy; MoU signed with Kingdom of Denmark in 2004;
Policy for efficient utilization of power resources is defined Parliament Resolution (June, 2006) on “Main Directions of State Policy in the Power Sector of Georgia”. Sound legislative basis and institutional framework should be created for improvement of EE in the country. So far neither legislation nor state funded EE projects have been put in place.

Current Policy

Very first EE related paper was prepared back in 2007 in Tbilisi “Municipal Energy Efficiency Planning” (MEEP) covering energy efficiency aspects of municipal buildings developed with the assistance of ENSI- Norwegian energy efficiency and energy business development consulting company. But Tbilisi MEEP implementation was not followed up by Municipality.

In 2010 Tbilisi municipality got involved in EC funded project “Management of Domains Related to Energy in Local Authorities (MODEL)”. Created Energy team is involved in planning and implementation of EE measures within municipality, collection of energy data, identification of buildings with overconsumption.

Positive changes in terms of EE policy took place in 2010 by Tbilisi Municipality joining CoM and taking commitments to reduce CO_2 emissions by 20% by 2020.

CoM and Georgian Municipalities

After Tbilisi municipality signed the Covenant of Mayors it was followed by four other Georgian municipalities (Rustavi, Gori, Kutaisi & Batumi).
As Covenant of Mayors signatory city Tbilisi & Rustavi municipalities elaborated the **SEAPs** (Sustainable Energy Action Plan) envisaging implementation of energy efficiency measures. Recently, Gori municipality has completed work on its SEAP.
Tbilisi identified as being critical in improving the City's overall energy performance such sectors as: building sector, urban transport (private vehicles and public transportation), public lighting, municipal waste & waste water treatment management, and electricity & gas distribution networks and green spaces.
Buildings, transport and infrastructure, including lighting and green spaces have been identified by **Rustavi** as sectors having high potential of achieving energy saving.

TBILISI SEAP

Tbilisi SEAP was approved on 25/11/2011.Based on Baseline Emission Inventory (BEI) for 2009 and projection of increase in CO2 emissions by 2020 conducted within Tbilisi SEAP, strategies and main actions for each sector were elaborated: In case, actions proposed in SEAP are implemented, overall CO2 emissions in Tbilisi will be reduced 24% by 2020.

Transport

Short-term strategy (2011-2015)-Rehabilitation & development of transport infrastructure

Mid-term strategy (2012-2018) –increase share of public transportation. Develop electric transport network (tram and subway).

Long-term strategy (2018-2020) - decrease mobility of private cars, encourage low emission cars (restrictions and incentives)

TBILISI SEAP

Building Sector

Short-term strategy (2011-2015) increase efficiency of heating systems and share of renewable energy in heating (geothermal energy, biomass & solar energy) sub-sector within the municipal building stock (kindergartens, policlinics).

Mid-term strategy (2014-2017) apply same measures to public buildings not under administration of Municipality (schools, state agencies etc);

Long-term strategy (2015-2020) increase EE and RE share in heating in residential building stock.

Municipal Infrastructure Sector -covers six sub-sectors and aims at capturing methane (CH 4) from:municipal landfills (closed /new) and waste water treatment plants, burning or using captured methane as energy source, increasing EE and RE share in outdoor lighting, and developing green spaces.

RUSTAVI SEAP

In Rustavi SEAP as a baseline year 2011 was selected as closest to signing the CoM, with relevant data available. Such selection is in compliance with methodology defined for East European countries.

Building Sector

Municipal-Improvement of insulation in municipal buildings; Installation of solar collectors in kindergartens;

Residential-Improvement of insulation, installation of EE light bulbs in pilot buildings, construction of low-emission pilot building (social hostel).

Transport & infrastructure-improvement of infrastructure, arranging ,,greenways", renovation of transport fleet ,optimization of transport schemes

Outdoor (street and traffic) lighting-increase EE

Land use planning-planting trees and bushes in the city and adjacent territories

PROGRESS IN SEAP IMPLEMENTATION

As implementation of measures recommended by SEAPs are in initial stage, the presentation of any actual results at this time is not realistic. Moreover, start date for implementation of several planned measures is 2013 and beyond.

Another issue to be considered in this regards is that Tbilisi municipality doesn't have in place approved methodology for calculation and monitoring of SEAP implementation process.

Georgian municipalities are currently working on the creation of the CO2 calculation tool that will assist them during SEAP development phase as well as in the SEAP implementation monitoring process

PROGRESS IN SEAP IMPLEMENTATION TRANSPORT SECTOR-TBILISI & RUSTAVI

Improvement of road infrastructure, including intensification of roads, construction Gelovani-Agmashenebeli tunnel ,new road from Hero's square and other similar measures to be implemented in near future will enable Tbilisi to reduce annual energy consumption in transport sector . In 2012 in Rustavi more than 3 km in length streets were constructed & rehabilitated and work will continue.

Traffic lights management system supporting "green ways" for vehicles on 6 very busy streets and avenues; Every year 15-20 traffic lights will be added, final number 160 traffic lights managed from Traffic Lights Management center in Tbilisi & Rustavi, installation sensors in traffic lights and their management.

PROGRESS IN SEAP IMPLEMENTATION TRANSPORT SECTOR-TBILISI & RUSTAVI

Public transport –**in Tbilisi**-Introduction of fleet of Ford Transit minibuses; optimization of bus routes decreasing lines from 125 to 92, All buses have GPS systems to monitor progress along routes and displaying accurate time on the monitors, improving ticketing system (common payment system, top up machines at bus stops); network of electronic display boards in all major bus stops; SMS service enabling passengers to get information on bus arrival time at specific bus stop; in 2012 in comparison to 2011 on average the number of passenger ridership by public transport, including buses and metro increased by 12%. **In Rustavi** optimization of bus routes to -6 routes; 23 bus stops were equipped with electronic display boards.

PROGRESS IN SEAP IMPLEMENTATION

TRANSPORT-PRIVATE CARS-TBILISI & RUSTAVI

Set of measures to decrease of usage of private cars in both cities include: creation of “environmental islands” where private traffic is prohibit/penalized, decrease of roads available for private cars, limitation of speed; introduction of fee for driving in city center; parking management & development of several parking structures.

40,000 parking spaces with annual fee of about 30 USD were created in Tbilisi. As estimated these actions might decrease modal share of private transport by 5% by 2020.

Re-introduction of obligatory technical inspection of cars planned for 2015 will help to replace highly polluting gasoline and diesel vehicles and decrease emissions.

PROGRESS IN SEAP IMPLEMENTATION BUILDING SECTOR-TBILISI

Municipal-space heating with local boilers operating on NG. In kindergartens NG heating systems were installed. Combined with refurbishment , including insulation of building envelope, expected energy savings and emissions reductions are achievable.

Residential-demo project for apartment building including: insulation of building envelope, central heating system on NG, installation of solar thermal systems for hot water supply.

Central heating for residential buildings in new environmentally friendly Green LISI Town. Works started in 2011 and only first phase of works have been completed.

Long-term municipal low cost financial mechanism in partnership with associations of apartment owners can make reality construction of central heating systems for apartment buildings on a wide scale.

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PROGRESS IN SEAP IMPLEMENTATION STREET LIGHTING SECTOR-TBILISI & RUSTAVI

Tbilisi- In 2009 -92560 light fixtures consuming 46800 MWh electricity- emissions 18720 tons of CO_2 eq. Annual growth 1.1%. Thus in 2020 el.consumption -52780 MWh and CO_2 emissions equal to 21111 tons. Smart street light management systems can reduce electricity consumption by 40-60%. 800 digital & centrally controlled distance management units are already in place. Cost of measure 3 ml.GEL and implementation will be completed by end of 2013.

As a pilot project LED lighting systems have been introduced on some streets, but with consideration of high investment and maintenance costs the expansion of such experience didn't follow.

Rustavi- will replace 10% of its high pressure mercury street lights with sodium light bulbs thus improving efficiency 2-2.5 times.

As alternative measure replacement of incandescent halogen lamps with LED light bulbs, reducing consumption more than by 50% and introduction of sensor management of street lighting, including regulation of streets' illumination in accordance with street traffic intensity is also considered

ENERGY EFFICIENCY CENTRE GEORGIA

PROGRESS IN SEAP IMPLEMENTATION

MUNICIPAL LANDFILLS-TBILISI

Consolidation of 4 operating landfills into one servicing whole Tbilisi-Norio Landfill (opened in 2011), equipped with methane capture devices. Captured methane is then flared;
Introduction of about 10 000 metal garbage cans in the city; New energy efficient garbage trucks and optimization of waste collection routes resulted in about 20% fuel savings. Key improvement in Tbilisi waste management system is introduction of tariffs and collection of payments.
Planned measures- Construction and operation of LFG flaring system at Norio landfill, Landfill Gas Collection (LGC) and Flare from closed Gldani 2 &Iagluja sites. If implemented the target for CO2emissions reduction for this sector in 2020 equal to about 249000 tons could be reached.

PROGRESS IN SEAP IMPLEMENTATION WASTE WATER TREATMENT-TBILISI

"Georgian Water and Power" (GWP) -private company delivering drinking water to Tbilisi and its neighborhoods and providing wastewater services. Tbilisi water system is very energy intensive as compared to other cities. GWP owns 2 hydro-plants (Zhinvali and Tetrikhevi) to cover its own energy needs, and surplus energy is sold to the grid.

97% of Tbilisi population are covered by sewage network, and the city is serviced by Gardabani wastewater treatment plant. In 2011, none of the received wastewater was being treated -no energy spent.

Partial or complete rehabilitation of the plant to its design capacity in 2012-2020 with investments about 20mil.euro can result in estimated emission reduction target in 2020 of 163.87 tons. of CO_2 equivalent.

PROGRESS IN SEAP IMPLEMENTATION GREEN SPACES-TBILISI & RUSTAVI

In 2011 Tbilisi City hall started campaign “Plant a tree, make Tbilisi green”, supported by the Catholicos Patriarch Ilia II.150 000 trees were planted and process continues.

Within WWF funded project 100 hectares of forests would be restored in Tbilisi suburbs. Greening of adjacent territories of Tbilisi University, Tbilisi sea, former Gldani landfill will continue and more trees to current 30000 already planted will be added. Within Tbilisi about 100 public gardens and parks have been rehabilitated. In 2013 the rehabilitation works in Vakepark and Bukia garden have started. In future Mziuri Park and Tbilisi Zoo will be integrated into one massive green area, in city centre, Khudadovi & Turtle Lake Area Forest rehabilitation.

In Rustavi 1200 trees will be planted in parks, yards and other places of the city.

PROGRESS IN SEAP IMPLEMENTATION
PUBLIC AWARENESS ACTIVITIES

From 2011 **Tbilisi** municipality supports activities (exhibition of thematic posters, exhibition of students' works "Sustainable Energy in Architecture", kid's RE & EE projects , marathons, etc.) implemented within annual Georgian Sustainable Energy Weeks. As part of Tbilisi Municipal Intelligent Energy Days the European Display Campaign- display posters were developed for 10 municipal kindergartens (environmental performances of municipal buildings) was launched.

From 2012 **Rustavi** municipality in partnership with NGOs organizes periodically Intelligent Energy Days including such events as: "Let's Save Energy "for ethnic groups living in Georgia; organization of RE& EE training workshops in schools, organization of thematic exhibitions of young artists.

Policy Design Considerations

Due to voluntarily/non commitment nature of CoM policy, implemented energy efficient measures envisaged by SEAPs have a bit chaotic character.
Major policy document on efficient utilization of power resources is Parliament Resolution (June, 2006) on “Main Directions of State Policy in the Power Sector of Georgia”. Since then no sound legislative basis and institutional framework for EE improvement hasn’t been created.
Ministry of Energy started work on elaboration of state energy policy and drafting energy efficiency and renewable energy laws.
National Environmental Action Programme (NEAP) (2012-2016)
NAEP stipulates implementation of pilot projects in cooperation with Tbilisi City Hall in increasing EE in housing sector, promote utilization of RE by creation of pellet production facility, carry out technology needs assessment.

Policy Design Considerations

Transport -biggest pollutant in all cities. Lack of coordination between national and local agencies hinders efficient enforcement existing legal mechanisms ,Georgian Law on Traffic, Georgian Law on Traffic Safety; Georgian Law on Ambient Air Protection; Presidential Decrees on "Improvement of Environmental Safety of Road Transport" and on "The Conception of Transport Policy of Georgia".
Municipalities do not have strategic documents defining long- and mid-term objectives within transport sector, no obligatory technical inspection.
Introduction of traffic lights management system, optimization of bus fleet, extension of subway line, improvement of public bus services, improved road infrastructure, popularization of public transport use which started in Georgian municipalities will decrease the energy consumption in transport sector and result in emission reductions.

Policy Design Considerations

Building sector is major sector requiring EE improvements while new national construction codes are not in place. Old Soviet codes for structural stability of buildings are used for engineering calculations, for thermal engineering of buildings these codes are used on a voluntary basis. Currently with the GIZ assistance work on “Code of Spatial Planning and Construction Activities” is underway. One chapter will be devoted to energy efficiency

Municipal waste. No specific law. Laws regulating this sector-“Law on Environmental Protection” and “Law on Healthcare” ,on local level according to the Georgian Organic Law on Local Self-Government, collection and disposal of waste is responsibility of local-government. Legislation does not require municipalities to develop municipal waste management plans.

Policy Design Considerations

Capabilities of municipalities for successful energy management system providing for collection and creation of database, analysis and assessment of database, methods of analysis and evaluation of available information, determination of information sources and all other steps related to municipal energy management even in Tbilisi **are very low**.

National Association of Local Authorities of Georgia (**NALAG**) plays important role for capacity building of local municipalities throughout Georgia on municipal development programs.

Donor supported programs like “Covenant of Mayors Capacity Building Model for Ukraine and Georgia: Model Solution for Eastern Partnership and Central Asian Countries” & “Development of a CO2 Calculation Tool for Georgian Municipalities” (GIZ) provide guidelines and methodologies for effective implementation of EE activities, establish energy management system, training of energy managers.

Financial opportunities for municipalities to implement energy efficiency projects

Joining CoM municipalities took ambitious energy and environmental plans. European Local Energy Assistance **(ELENA**) facility can assist them to develop large investment projects and bring them to reality. Run by the EIB, ELENA provides financial and technical assistance to attract funding for sustainable energy projects. ELENA covers up to 90% of technical support cost needed to prepare, implement and finance the investment programme, including feasibility and market studies, programme structuring, energy audits and tendering procedure preparation. This will also help attract funding from private banks and other sources, including the EIB (European Investment Bank). In the period February-June, 2012 ELENA has been on mission trip in Georgia and conducted market study.

Financial opportunities for municipalities to implement energy efficiency projects

In 2012 **EIB** opened 50 million Euro credit line for Georgian **TBC bank** to finance energy and environmental projects carried out by SME, mid-caps and public entities through leasing schemes.

The **Eastern Europe Energy Efficiency and Environment Partnership (E5P)** is a multi-donor fund managed by the EBRD designed to promote energy efficiency investments in Ukraine and other eastern European countries. Grants under E5P are allocated for such areas: district heating, energy efficiency projects, environment projects- as waste water or renewable energy. Recently sighed memorandum will enable Georgia to enjoy financial resources of E5P.

Green for Growth Fund (GGF) provides innovative methods to finance municipal energy infrastructure that are complementary to government financing. In Georgia GGF is active in hydro sector

Conclusions and Recommendations

There is need for government to elaborate comprehensive energy policy or strategy

Government of Georgia should:

- Develop and enforce legislation, policies, measures to promote EE.
- Consider experience of other countries, utilize technical and financial assistance of domestic and international institutions.
- Adopt and ensure enforcement of new building codes
- Develop programs for improving EE in various sectors of economy.
- Modernize existing building stock (EE improvements should result in better comfort and safety).
- Enforce legal mechanisms in transport sector and initiate re-introduction of obligatory technical inspection of cars to decrease emissions.

Conclusions and Recommendations

Georgian Municipalities should develop special strategic documents defining long- and mid- term objectives focusing on EE & environmental aspects within transport, building and infrastructure sectors;

- Government should start development and adoption of law requiring municipalities to develop and implement waste management plans.
- Targeted EE education campaigns and actions, awareness raising activities both at national and local levels

Conclusions and Recommendations

Institutional Framework

Government should:

- Strengthen capacity of Ministry of Energy to develop and implement EE & RE strategies and programmes;
- Strengthen capacity of ministries and other institutions responsible for development and enforcement of necessary legal framework in building, transport, infrastructure and waste management sector;
- Ensure that all state institutions have adequate resources and mandate for the implementation of EE policies and programmes.
- Municipalities should develop and implement an integrated municipal energy management system
- All state institutions both at national and local level should ensure Better coordination of efforts among state institutions and NGOs acting in the area of EE;

Financing Energy Efficiency

Government should analyze opportunities created by various international financial institutions to provide resources for funding energy efficiency programs.

Establish attractive financial mechanism:

✓dedicated financing to businesses and households - partnering with financial institutions;

✓direct financing to non-financial institutions= renewable energy companies or projects, energy service companies, and energy efficiency service and supply companies.

THANK YOU