NAMA for energy efficient refurbishment in the public building sector in Georgia

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Proposal
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Disclaimer

This proposal was developed as part of the Mitigation Momentum project and the here detailed version represents the final version at the end of the project. The proposal may however continue to be further refined by the Georgian government as the NAMA concept continues to evolve. The reader should therefore note that any of these potential changes are not reflected in this version of the proposal.
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Executive summary

This document describes a proposal for a NAMA in the Georgian building sector. Emissions from the building sector account for around 22.3% of emissions in Georgia’s energy sector and, because of low quality of building construction in the past, has the potential for significant energy and emissions savings measures. This NAMA concentrates on facilitating the energy efficient refurbishment of existing buildings as these contribute the majority of the emissions. Improved energy performance of buildings will also bring economic, health and environmental benefits.

The majority of the building stock in Georgia was built to low standards and has not been well maintained. Estimations exist that more than 70% of buildings in Georgia were built between 1950 and 1980 with low standards. These are Soviet era buildings built with common standards but it is estimated that 10-15% of these buildings are in a state of decay with only a limited building lifetime remaining. Energy efficient renovation of buildings would therefore bring multiple benefits not only in reducing greenhouse gas emissions and energy use, but also economic benefits, such as extending building lifetimes and savings on energy bills, and health benefits from improved living conditions. However, there are multiple barriers to energy efficient renovation of buildings in Georgia including long payback times because of the low price of energy and high price of materials and capital, lack of policy incentives or regulatory push and lack of administrative structures to facilitate large scale refurbishment. In the household sector, there are additional barriers as many buildings are comprised of owner occupied apartments and there is limited legal basis for collective actions in those buildings and only a weak tradition of voluntary co-operation.

This NAMA is part of the actions by the Georgian government (national and local) signalled by the low emission development strategy (LEDs) and by the intended nationally determined contribution (INDC) to transform the building sector. With the adoption of the EU Association Agreement and the planned entry into the Energy Community, Georgia is also required to assume more responsibility regarding mitigation activities, promoting energy efficiency and restructuring internal markets of energy supply in the region. There is a clear responsibility within government for new buildings but responsibility for and regulation of renovation is lacking. Given the multiple barriers and weak administrative structures, this NAMA concentrates on the renovation of public buildings and on creating the structures and capacity through a readiness programme that will enable the country to address its entire building sector in a second step. A whole building renovation programme is proposed in this NAMA proposal, this will require more capital than more limited retrofits of say insulation or replacement of windows, but has much higher economic and health/social benefits. Income from the energy savings can be used to offset some of the higher capital investments. The NAMA aims to support the Government of Georgia build experience and supply chains in energy efficient refurbishment of buildings and demonstrate an energy performance
contracting concept that can then be applied to the residential sector. It is expected that through this NAMA and through action by the Government on some of the regulatory barriers, additional NAMA proposal and programmes will be developed at a later date to implement energy efficient renovation in the entire building sector, including a larger financial component that will support renovation activities in the residential sectors.

Two phases are considered under the NAMA presented here. The first phase is a readiness programme to build capacity in the Georgian government and municipalities to plan and implement energy efficient renovation programmes. There are several components to the Readiness Programme which will be delivered through technical assistance:

- Proper characterisation of the building stock, including energy audits, and prioritisation for renovation
- Capacity building in preparation of terms of reference and evaluating tenders for energy efficient renovation of buildings for different building types and finalising contracts
- Capacity building in writing terms of reference for energy performance contracting and evaluating responses to the such terms of reference and finalising agreements
- Preparation of long-term programmes for energy efficient renovation of different type/functions of buildings
- Capacity building for financing and managing energy performance contracting for both municipalities and central government representatives
- Capacity building in monitoring, reporting and verification of renovation programmes and energy performance contracting

We estimate that the total technical assistance for this Readiness Programme is EUR 635 000 (excluding staff cost from government) and can be delivered within 12 months.

The second phase of the NAMA is a pilot phase. This phase aims to build experience both in the physical process of renovation and in the use of energy performance contracting in the process of renovation and demonstrate that it can be effective in Georgia. This phase will also include significant outreach and communication to ensure wide dissemination of the results and a large element of learning by doing. For the demonstration aspect to achieve the transformative effect that is needed, the pilot phase needs to be of sufficient size to properly demonstrate what can be achieved and build supply chain of materials and expertise. The pilot will therefore be carried out in at least two municipalities and at the central government level. Based on the characterisation of the building stock in the Readiness Programme, the municipalities and the government will each identify five priority buildings for renovation. To test different solutions in Georgia, the central government will set up a unit to manage the renovation of their buildings, including energy performance contracting. The municipalities will issue a tender for an external party to manage the renovation process including securing finance and energy
performance contracting. The external party can be a traditional energy services company (ESCO), either for profit or not for profit, or any other with the right qualifications. These entities would deliver the energy efficient renovation of 50,000 to 60,000 m² in a 3 year period, with monitoring and reporting of the performance of the buildings continuing after that period. Part of the contracting for the energy – efficient renovation work would include provisions to help disseminate the results from the renovation and the financing/contracting arrangements (allowing for commercial sensitivities).

The finance required for this phase of the NAMA is EUR 137 000 (excl. staff cost) for technical assistance in establishing the central government renovation unit and tendering for external parties and for the implementing of the outreach and communication component. In addition, up to EUR 18 million of long term loans will be needed for government and municipalities to carry out the necessary deep renovation in accordance with high energy efficiency standards. NAMA financing is also sought to make these loans accessible. To stimulate a holistic approach to building renovation and energy savings, long term financing at affordable interest rates, as well as investment funds coming from several sources will need to be made available.

Implementing the pilot phase of the NAMA presented here would have relatively small greenhouse gas benefits because of the limited number of buildings renovated. Savings will be around 300 tonnes of CO₂eq annually (0.3 ktCO₂eq/yr). However, if successful and scaled up to the household sector, we estimate 1200 kilo-tonnes of CO₂eq could be saved by 2030 compared to the countries own business as usual estimations. The financial benefits from energy efficient renovation of the pilot buildings will be in terms of avoided cost of new build, maintenance and energy savings over the lifetime of the building. In addition, the renovation programme will generate new jobs.

Regular monitoring will track the performance of the NAMA based on a set of indicators, which could lead to corrective actions in the course of implementation if appropriate. It will also help assess ex-post the NAMA impacts (including GHG and sustainable development impacts) and support. It will also help track the progress of NAMA activities on a regular basis through data collection from various sources. The information system for monitoring and verification needs to be developed as part of the readiness phase of the NAMA. This includes assigning the responsible entities for data collection and management.
1. Introduction

This document describes a proposal for a NAMA in the Georgian building sector. Emissions from the building sector account for around 22% of emissions in Georgia’s energy sector and, because of low quality of building construction in the past, the sector has the potential for significant energy and emissions savings measures. Both new and existing buildings need to be of a higher standard to achieve emissions savings. This NAMA concentrates on facilitating the energy efficient refurbishment of existing buildings as energy efficiency in new buildings requires the development of a new regulatory structure. This development is on-going. Improved energy performance of existing buildings will also bring economic, health and environmental benefits.

The barrier analysis for Georgia shows multiple barriers currently exist to refurbishment of residential buildings including ownership structure, long payback periods because of relatively low energy prices and high cost of finance, limited experience with modern technical solutions and poor awareness around energy efficiency. An additional barrier is that in many cases, only part of the building is heated currently. If buildings are more energy efficient then it is likely that some of the theoretical energy savings will be lost to provide a higher level of heating and thus increase comfort of living. The lack of a market for the provision of energy services as well as a challenging regulatory environment are further hindering the wider up take of energy efficient refurbishment. As a first step in reducing these barriers, this proposal is for a NAMA to fast track the refurbishment of public buildings. Given the types of barriers in Georgia, significant bilateral financial support is sought in the form of technical assistance in several areas. In addition, international funding for a loan scheme for energy efficient refurbishment of public buildings will be needed. The NAMA aims to build experience in the field of deep energy efficient refurbishment of buildings and to demonstrate and strengthen the concept of Energy Service Companies (ESCOs) as a tool to carry out and facilitate this deep energy efficient renovation. It is expected that through this NAMA and through action by the Government on some of the regulatory barriers, an additional NAMA proposal and programmes will be developed at a later date to implement energy efficient renovation in the entire building sector, including a larger financial component that will support renovation activities in the residential sectors.
2. **Current situation: the building sector in the national context**

In light of the ongoing international negotiations and the introduction of the Intended National Determined Contributions (INDCs) put forward by all parties to the United Nations Framework Convention on Climate Change in 2015, greenhouse gas (GHG) mitigation has received increased importance and attention in the national context. Being a Non-Annex I country to the Convention, Georgia does not have a quantified mitigation obligation, however in its INDC and Third National Communication, Georgia is exploring different mitigation targets and its energy demand sectors are envisioned to play a key role in contributing to the achievement of these targets.

In its communications to the UNFCCC Georgia typically differentiates between the Energy, Industrial Processes, Agriculture and Waste sector, LULUCF sector is excluded. In 2011 emissions from the energy sector held a share of 54.7% of the total emissions (excluding LULUCF)\(^1\).

![Figure 1 The share of sectoral emissions in total emissions of the country (without LULUCF), 1990-2011; TNC 2015](image)

\(^1\) Georgia’s Third National Communication, 2015.
Following the transport sector, the building sector is responsible for the second largest share of GHG emissions of around 22.3% within Georgia’s energy sector. The building sector therefore is among the priority areas targeted by the country in its mitigation efforts.

### 2.1 CO\textsubscript{2} emissions in Georgia’s building sector

In 2013, GHG emissions from Georgia’s building sector amounted to 2,398 ktCO\textsubscript{2}e, of these the majority of 74% were attributed to direct emissions from combustion of fossil fuels and the remaining 26% were indirect emission resulting from electricity consumption. Looking at the GHG emissions from the country’s building sector 86% of emissions occur in residential buildings, 5% - are connected to state owned and public buildings and the remaining 9% arise from private commercial buildings as illustrated in Figure 2.

![Figure 2 Emissions distribution in building sector, TNC 2015.](image)

The figure below gives the emission breakdown by fuel for the residential sector:
With natural gas and wood being used for heating and hot water supply, the amount of fossil fuel consumption can be decreased by the adoption of energy efficiency measures and small scale renewables. In addition economic development and the growth in income is further driving the increase in energy consumption. In general, Georgia’s cities that have the highest incomes will show the highest energy consumption per capita.

Georgia’s commercial building sector distinguishes between state owned buildings and private buildings. For commercial buildings that are state owned buildings the following categories were identified:

- Education (state universities, colleges)
- Healthcare and social aid (healthcare national centres, hospitals, dispensaries, etc.)
- Public Administration (Ministries, municipal buildings, state agencies, resource centre including schools)
- Commerce; Repair of vehicles, and domestic products
- Communal, Social and personal Service
- Hotels and Restaurants
- Operations with real estate
- Transport and Communication
As can be seen in Figure 4, the majority of emissions (63%) come from public administration buildings, such as ministries, municipal buildings, state agencies, schools etc. The second largest group form other education buildings such as universities and colleges with 14% and next are communal, social and personal service as well as healthcare and social aid buildings with 8% and 7% respectively. Targeting the state owned buildings from public administration, education and healthcare would address around 83% of emissions from the public building sector. This would cover around 4% of total emissions from Georgia’s buildings sector.

In its Third National Communication Georgia has estimated the business as usual (BAU) development of its energy consumption sector, within this sector it also offers estimates on the development foreseen up till 2030 in the building sector. Energy consumption is projected to increase especially in the transport and residential sector (see Figure 5).
Based on these BAU developments Georgia’s Third National Communication further provides mitigation scenarios for three different mitigation targets: 15%, 20% and 25% reductions from business as usual. The demand sectors are envisioned to contribute significantly to these emission reduction targets together with the electricity generation sector. For instance, under the 20% target, the residential sector provides the largest savings (37% of total savings), followed by industry (23%), transport\(^2\) (15%), and commercial (11%). The remaining 14% is attributed to electricity generation\(^3\) sector (TNC, 2015). Figure 6 provides an overview of the different contributions of the sub-sectors.

\(^2\)It should be noted that many important measures in the transport sector, such as avoidance of travel and mode shifting, is not modelled in this version of MARKAL. Thus potentially the transport sector has higher potential for reducing emissions, than presented here.

\(^3\)This share can be much higher if more thermal generation is assumed in BAU, or if less thermal generation is allowed in mitigation scenarios.
Figure 6 Reduction of CO₂ emissions in different sectors for considered three mitigation targets; TNC (2015)

The Third National communication goes further and identifies that the most cost-effective reductions could be achieved through the residential sector. This would include measures like more efficient space and water heating, with a strong uptake of heat pumps (using electricity) and an increase in efficiency for residential lighting and other appliances. These measures would lead to a fairly strong reduction in gas consumption and increase in electricity consumption (TNC, 2015).

Table 1 Mitigation measures for building sector; (TNC, 2015)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description of measure</th>
<th>Anticipated emission reduction (20% reduction target), tCO₂e by 2030 compared to BAU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improvement of energy efficiency and promotion of renewable energy in residential sector</td>
<td>Measure should target the improvement of insulation, which will reduce fuel consumption both for heating and cooling, and promotion of heat pumps. These can be achieved by new building code and public outreach activities. Other targeted areas include residential lighting and electric appliances which can be achieved by introducing labelling system and stricter legislation on the use of incandescent bulbs. Existing “EnergyCredit” system should become more active and cover wider audience. Use of geothermal water and solar energy for water heating shall be promoted in areas with corresponding potential.</td>
<td>829</td>
</tr>
<tr>
<td>Increase of energy efficiency in commercial building and promotion of renewable energy sources</td>
<td>Measure should target the improvement of insulation in existing and new commercial buildings, which will reduce fuel consumption both for heating and cooling, and promotion of heat pumps. Initially the targeted buildings will be municipal and state owned buildings, where national and local governments can take direct</td>
<td>246</td>
</tr>
</tbody>
</table>
As of late 2015, only mitigation targets have been set and first priority measures have been identified for each subsector of the energy sector. Further in its INDC Georgia sets an unconditional target of 15% reductions below the business as usual scenario (BAU) for the year 2030. The 15% reduction target will be increased up to 25% in a conditional manner, subject to a global agreement addressing the importance of technical cooperation, access to low-cost financial resources and technology transfer. The implementation plan for achieving these targets are still being developed. For the building sector NAMAs are seen as suitable implementation vehicles that will support the achievement of the envisioned targets. Additionally, it is clear that Georgia’s cities will play an important role in the implementation of the measures within the building sector.

Several municipalities have already made data available during the process of signing on to the Covenant of Mayors (CoM) program. With the cities of Tbilisi, Kutaisi, Batumi, Rustavi, Gori, Zugdidi, Telavi and Akhaltsikhe joining the initiative over 40% of the population and 80% of the urban population are represented.\(^4\) As signatories to the Covenant of Mayors program, cities are required to publish so-called Monitoring Reports containing interim results every 2 years after submission of their SEAPs. Therefore a constant update of this data can be expected and further built on during the course of the NAMA development and implementation.

### 2.2 Georgia existing building stock

The existing building stock in Georgia is diverse in terms of construction types and functions, and spans the periods before, during and after the 20th century soviet era construction. With 53% of the population living in urban spaces and 47% in rural, there is also an especially large diversity in the types of residential buildings. Currently a comprehensive overview of the building stock is not available. However, some information and data collection has been performed on a city level. The description in this section is therefore taken from information mainly provided by a survey conducted in 15 cities\(^5\),

\(^4\) [www.migationpartnership.net/gpa](http://www.migationpartnership.net/gpa)

\(^5\) Performed by Remissia as part of component 1 of the EC-LEDS project.
among them the 6 big\textsuperscript{6} cities of Georgia (Tbilisi, Kutaisi, Batumi, Rustavi, Poti and Gori) and 4 relatively small cities (Zugdidi, Telavi, Akhaltsikhe and Zestafoni). Of these cities 5 are considered to be municipalities (Gori, Zugdidi, Telavi, Akhaltsikhe, and Zestafoni). The total surveyed population is 2,459,000 people, representing 55% of Georgia’s population.

2.2.1 Residential buildings

Georgia’s residential buildings account for the highest share of its emissions as well as energy consumption within the building sector. There are different ways to group Georgia’s residential buildings, presented here is the distinction first according to ownership structure and second with regards to age structure and location (mainly climatic zones) as these characteristics are vital to understanding the energy performance of the current building stock to then identify potential energy savings.

Starting with the ownership structure there are four main types in Georgia. While they are very similar, small important differences exist, that need to find consideration when attempting the large scale deployment of energy efficiency and deep renovation within the residential building sector.

Block buildings with common areas. For the maintenance of the common-use areas (incl. entrances, stair-foot/stair-head requiring also lightening and heat, roofs, elevators etc.) municipalities usually have co-financing programmes, which are seldom bound to energy efficiency measures or deep renovation activities. The residents within these block buildings typically own their flats and are organised in condominium associations to represent the interests of the residents. However, often participation in these associations is low and they are currently lacking juridical status.

So called social houses are being built by local-governments with a critical amount of low-income households and eco-migrants. Typically these houses for eco-migrants and IDP (Internally Displaced People) are being constructed through the Municipal Development Fund (MDF) established under the Ministry of Infrastructure and Regional Development (MoRDI). Initially these buildings belong to the municipality or MDF, but after a certain time residents have the opportunity to buy their flat under very soft/concessional conditions. In some cases (particularly in case of IDP) dwellings can also be granted by the government to residents with these particular statuses.

Historic residential buildings can mainly be found in big cities. These 1-3 storey buildings are privately owned, but limited rights for the owner exists to make significant reconstructions, especially for changing the building façade. For such buildings special permission is required from the municipalities to carry out renovation activities or outdoor insulation. Most of these historic buildings have been

\textsuperscript{6} Criteria for qualifying as a big city include the size of the population as well as level of development and general lifestyle.
constructed before the soviet era and while typically the energy efficiency characteristics are high in comparison to that era, especially in the case of wall insulation, the majority of these buildings are quite damaged and show major inefficiency due to damaged material.

From the energy audits conducted for the preparation of Sustainable Energy Action Plans (SEAPs) it can be seen that 1-2 storey private houses have the highest potential for energy savings if fully heated. This segment of the building stock can mainly be found in rural areas and small cities. At this stage however, it is unclear how government interventions could support in unlocking these potential energy savings.

Figure 7 Residential building types as found in urban and rural territories in Georgia

Figure 7 gives an overview of building type and how they are spread across the entire country.

As mentioned there are two key parameters used to group the energy performance of buildings, the age group (based on construction year) and the climatic zone where the building can be found. Typically throughout the world one finds that different standards were applied throughout different construction periods of buildings and depending on a building’s age it will show different degrees of wear that also have an effect on energy performance. This is especially the case in countries were renovations are done seldom or focus is put on (aesthetic) repairs rather than energy efficiency improvements.
In Georgia buildings constructed after 1920 and before 2000 are of special interest as they correspond to the standards applied during the soviet-era. Even after the collapse of the Soviet Union the standards for buildings were still widely used. It is estimated that around 10-15% of these buildings are severely deteriorated and have very limited life time left.

From the information gathered within the EC-LEDS survey, a first age group distribution based on floor area was calculated. Figure 8 gives an overview of these shares.

**Figure 8 Age group distribution based on floor area, based on the survey for EC-LEDS project**

It should be noted that the share of buildings built after 2001 is quite low at 3% which suggests an error in the data. Further research should be carried out ideally using another methodology than surveying of households.

More than 70% of residential buildings built in 1951-2000 are high block buildings, ranging in size between 5 and 9 stories. These buildings typically have 2-5 common entrances, with 50% of these entrances having open common spaces. This characteristic significantly lowers the overall energy efficiency of the whole building. The assessment carried out by several Covenant of Mayor’s cities show significant potential for savings. Most of these buildings do not meet basic energy performance standards, as they have been constructed in a quick and low-cost manner. Additionally, many show signs of neglect. Open entrances, thin walls, damaged frame and single glazed wooden windows are only a few characteristics that are in need of improvement.
Compared to the soviet-era block buildings private house with 1-3 stories are in a relatively good condition. The majority of these buildings have been built by their owners for their own use and are therefore often of a higher standard, also in terms of energy performance.

In addition to these types one can also find barrack type buildings in the big cities which are of very low living standard. As often the municipalities are responsible for constructing these type of social houses, they are an attractive segment for promotion of green buildings and energy efficiency concepts.

**Climatic zones**

Georgia is made up of two broad climate regions with West Georgia having a milder climate and more temperate winters than East Georgia. Currently only a limited amount of data exists on the typical energy performance of buildings in these climate zones. Further studies should be conducted in the two regions to better understand the variations within the buildings and Georgia’s mountainous territories should also be included.

While the residential buildings show variations in energy performance and building quality across the different age groups, among an age group characteristics are quite similar. This presents the opportunity that if ways are identified to overcome barriers faced within different age groups these solutions can be applied to the majority of buildings.

Based on the assessments made for SEAPs of 6 big cities signatories of CoM, the area of all municipal and public buildings is only 3% against 97% of residential area. While these cities do not cover the whole of Georgia the results can be seen as representative for the entire country.

### 2.2.2 Public and other non-residential buildings

In the early 1990s with the ending of the post-soviet period the segregation of state property started in Georgia. This process was based on the law of privatisation of state property issued by the Supreme Council of Georgia, the country’s highest legislative body. After a slow start the inventory and privatisation of state property has been on-going since 2005. Public buildings still make a significant share of state property, accounting 40% of total property. The main holders of the state building stock are the Ministry of Economy and Sustainable Development (MoESD) of Georgia, the ministries of economy of the Autonomous Republics (AR) as well as other ministries of AR, self-governing cities and municipalities. There are 60 municipalities and 12 self –governing cities in Georgia. All ministries and municipalities have administrative structures, with the relevant administrative buildings having different property status.

As of fall 2015, an accurate inventory of all public buildings does not exist in Georgia, however the MoESD of Georgia has been working on this issue. Two types of buildings should be defined when discussing Georgia’s public building stock: buildings having an ownership status and registered in the
Public Register and building not having any ownership status. The register of buildings which should be sold by the state consists of both of these types of buildings.

As is demonstrated in Figure 9 Georgia’s public buildings can be distributed into three ownership categories:

- Buildings belonging to the **state** and are in possession of the MoESD of Georgia or sectoral Ministries,
- Buildings belonging to the **Autonomous Republic** and are in possession of the Ministry of Economy of Autonomous Republic (e.g. Ajara) or sectoral Ministries and
- Buildings belonging to the **municipalities** and are in possession of the municipalities or self-governing cities.
All municipalities, self-governing cities and ministries have administrative buildings, however only tentative figures on specific buildings are available. Figure 10 presents the shares of Georgia’s public buildings that belong to the different governing entities.
Buildings belonging to the state as well as other state property are regulated under the Law on State Property of Georgia. Buildings which could belong to the municipalities and self-governing cities are defined in the Self-Government Code of Georgia.

The current policy approach of the government aims at maximum privatisation of the state property including public buildings, while keeping the minimum number of buildings needed to perform administration functions and responsibilities as state property. The next sections describe the different types of public buildings found in Georgia.

**Administrative buildings**

The total area of administrative buildings as a proportion of the building sector in Georgia is less than 1%. There are three types of administrative buildings: historic buildings, belonging to the municipalities or state but that require special permission for rehabilitation; typical soviet era buildings and a limited number of very modern ones built in 2005-2012 mainly glass buildings.

**Public education buildings (schools and universities)**

The MoESD is the proprietor of the buildings of all types of state educational institutions, described in the following. Formally, educational institutions should agree with the MoESD all activities/initiatives/...
programmes that go beyond the state educational curricula and this is obligatory regarding the building and/or other property/infrastructure maintenance as well (for example, renting out the part of the building for cafeteria, rehabilitation of building, etc.).

The Ministry of Education and Science of Georgia has the function of supervising the decisions and initiatives of all types of educational institutions related to their buildings, property and infrastructure. Supervision is conducted through the L.E.P.L. “Educational and Scientific Infrastructure Development Agency” at the Ministry of Education and Science of Georgia.

The state educational institutions within the Georgian educational system are divided into six main types of institutions according to their mission and function: public schools, pre-school institutions, incl. kindergartens, higher education institutions, incl. universities, professional/vocational education institutions and scientific research institutes.

Although, a lack of clarity exists on who makes the final decision on rehabilitation (including under capital expenditures) of state educational institutions, the primary beneficiary of EE measures in state educational buildings will be state educational institutions themselves as they are eligible and responsible for paying the utility bills, including energy bills from their respective budgets allocated to them by the Ministry of Education and Science.

Public health buildings

After the collapse of the Soviet Union, the Georgian health care system entered a new phase with most of its buildings being privatised. Budget restrictions hindered the government from maintaining the majority of health care buildings. Currently around 95% of health facilities are privately owned. These health institutions are: hospitals, out-patient facilities, pharmacies, laboratories, health insurance, and pharmaceutical factories. In general, this means that managers and directors are responsible for maintenance of their health facilities.

Of the remaining public health institutions the MoESD is the primary owner. Only a few health facilities fall under the responsibility of the Ministry of Labour, Health and Social Affairs of Georgia. Mainly out-patient facilities are publicly owned on municipal level.

Taking a look at the public building stock of the two example cities Tbilisi and Batumi, the vast majority of municipal buildings are educational and cultural centres (~80%), health centres (~10%) and sporting facilities (~10%) (Batumi City Council 2014, Government of Tbilisi City 2011). Some cities make the distinction between strictly municipal buildings that include only administrative buildings as well as kindergartens and other non-residential buildings, incl. sport and art schools, clinics as well as guesthouses and restaurants. Most municipal buildings in Tbilisi were built during the soviet era and their designs feature no consideration for energy efficiency. Whilst most buildings have undergone moderate repairs, the installation of double-glazing in some cases is the only energy-related measure to
have been implemented. This makes them an attractive building category to target for the implementation of energy efficiency measures especially ones aiming to improve thermal insulation of buildings. The larger facilities like schools, clinics as well as guesthouses and restaurants also offer savings potentials with regards to space and water heating as well as electric appliances that often account for considerable shares among energy consumption as well as emissions within a building.

2.3 Georgia’s policy context

Georgia, a country of 4.5 million people and an economy in transition is situated in the South Caucasus, between the Black and the Caspian seas, to the south of the Great Caucasus mountain range. After the disintegration of the Soviet Union, Georgia restored its independence and started to build a democratic society, making the move closer to European structures its national and regional priority.

With the adoption of the EU Association Agreement and the entry into the Energy Community, Georgia is required to assume more responsibility regarding mitigation activities, promoting energy efficiency and restructuring internal markets of energy supply in the region. Raising its ambition levels and creating the necessary regulatory frameworks will allow Georgia to follow the European Union’s lead with regards to reduction in energy consumption, increase in energy efficiency and improvement in energy performance of buildings. The NAMA aims to support Georgia in its efforts to improve the energy efficiency of its building stock aligning with the strategy and targets that are currently being developed as part of its first National Energy Efficiency Action Plan (NEEAP).

Georgia is a Non-Annex I party to the UNFCCC, joining the Convention in 1994 and has submitted three National Communications, the Initial Communication in 1999 and its Second Communication 10 years later in 2009. With the national priorities focusing mainly on economic development in the past Georgia has been actively currently developing its national climate policy with the Third National Communication published in fall of 2015. The country has been able to build on different initiatives and policies that are already offering support with mitigation efforts. The key initiatives, programmes and policies are described in the following.

The Georgian government has further developing its Low Emission Development Strategy (LEDS) and its Intended Nationally Determined Contribution (INDC), which has been published in the fall of 2015. Georgia’s INDC foresees a mitigation target of 15% by 2030 below the optimistic BAU scenario and has further set an ambitious conditional target of 25% by 2030 below the same optimistic BAU scenario in case that sufficient international funding can be secured. The here described building sector NAMA and the framework for renovation it is able to build offers an important contribution to the achievement of the mitigation targets described in the country’s INDC.
The Georgia Action Plan for the EU’s European Neighbourhood Policy programme includes plans to continue working on regional infrastructure for energy transit and development across the Caspian and Black Sea region. Of particular relevance is that this agreement entails a gradual convergence towards the principles of the EU internal electricity and gas markets, including the commitment to progress in energy efficiency and the use of renewable energy sources (Energy Charter Secretariat 2012).

The adoption of the EU Association Agreement has significant consequences for the energy and building sector. In general terms, the Association Agreement requires Georgia to assume more responsibility for mitigation, to contribute to the development of regional energy security and energy infrastructure in the Southern Corridor, to promote energy efficiency, and to restructure internal energy markets for electricity and natural gas so as to ensure competition, efficiency and transparency. Specifically, the Association Agreement binds Georgia under a number of EU Directives, including Directive 2010/31/EU for energy performance of buildings and Directive 2012/27/EU for energy efficiency. The timeframe for implementation of the directives is still being negotiated.

Alongside the work on the EU Association Agreement, the Ministry of Economy and Sustainable Development (MoESD) is working on a number of initiatives on which action on energy efficiency in new buildings could be built. The most important ones are 1) elaboration of the Draft of the Construction Code that is planned to be submitted to the Parliament of Georgia for the hearing in November 2015 and 2) elaboration and implementation of 5-year action plan/strategy to introduce European technical standards- EuroCodes. The new Construction Code is a framework legal document regulating a wide range of issues of the construction sector of Georgia including certification of construction materials (locally produced) as well as certification of architects and engineers. The Article 103 of the draft code makes only general requirements on consideration and possible application of energy efficiency measures as well as potential of renewable energy resources in the building stock of the country. MoESD has no formal responsibility for existing building refurbishment, nor do other departments.

Through the Covenant of Mayors (CoM) scheme, a number of cities have demonstrated proactivity in the development of subnational agendas. The Covenant consists of the voluntary commitment of the signatory cities to meet and exceed the European Union 20% CO₂ reduction objective by 2020 through the implementation of Sustainable Energy Action Plans (SEAPs) covering energy efficiency, promotion of renewable energy and clean transport. The City of Tbilisi became the first Georgian signatory to the EU Covenant of Mayors programme in March 2010. Twelve cities in Georgia representing approximately 1.95 million residents have become signatories since then, with six (Tbilisi, Batumi, Rustavi, Gori, Kutaisi and Zugdidi) having completed and published their SEAPs. In terms of GHG mitigation, in the SEAPs the goal is to achieve 20% - 28% emission reduction by 2020. For Tbilisi, Batumi, Kutaisi, Zugdidi and Gori this target is relative to a projected baseline (BAU), whereas for Rustavi, it is relative to a base year. The building sector represents one of the key sectors addressed in the SEAPs and that should deliver emission reductions. The here described NAMA is able to fit into the municipalities SEAPs and support them in achieving their target and transforming their buildings.
The Georgian Green Building Council (GBC) and Winrock are developing a **voluntary scheme for labelling of green buildings**, with energy efficiency being an important component for developing green buildings. The focus is first on municipal and commercial buildings. They are working initially towards internationally recognised schemes such as BREEAM or LEED but the GBC is also working on a Georgia specific approach. This approach will be computer based and could support the Monitoring, Reporting & Verification (MRV) process. Marketing the scheme and creating a demand for the certificates will be an important part in determining its success.

The **Municipal Development Fund (MDF)** of Georgia, established in 1997, is a public entity under the Ministry of Regional Development and Infrastructure, with the overarching objective to strengthen institutional and financial capacity of local government units. Although the MDF officially belongs to the Ministry of Regional Development and Infrastructure, the Fund works across ministries and with all levels of governance including local city halls, municipal and national governance. The MDF cooperates with many of the major international donors for climate and development finance, including the World Bank, EBRD, ADB, KfW, USAID, UNDP, SIDA, as well as a number of national governments.

The MDF have implemented fifteen projects in the building sector since 2013, including renovations of municipal buildings and Internally Displaced Person (IDP) housing as well as the construction of new IDP housing units. Renovation projects are typically limited to essential work such as repairing facades, replacing rooftops and improving infrastructure and there is no systematic inclusion of energy efficiency.

The main streams of MDF funding come from the Government of Georgia, the World Bank, KfW, the EU, and USAID; these organisations contributed a total of approximately GEL 58 million (EUR 25 million) to building sector projects in the period 2013-2014, in the form of grants and loans.

### 2.4 Barriers to energy efficiency in buildings in Georgia

The building sector is among the most energy intensive sectors in Georgia and has a high potential for savings if energy efficiency measures were to be more widely deployed. However, currently a number of barriers to energy efficiency in the Georgian building sector exist.

Typically the building sector’s high segmentation makes the sector difficult to address. This also holds true for Georgia’s building sector. Buildings have different energy intensities depending on usage, size and style. Each building type will also have different energy saving potentials and suitable energy efficiency measures.

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efficiency measures to achieve these savings. This means that one solution will not fit the needs of all buildings. Furthermore, building sector issues in the majority of cases fall under the responsibility of several ministries. This means that numerous stakeholders are involved in the decision process. This increases the transaction costs for planning, construction and operation of a building and introduces principal-agent challenges for the development and implementation of energy efficiency measures. Presented below is a summary overview of key barriers to energy efficiency in several categories and sectors involved in Georgia’s building sector.

Regulatory and institutional barriers

As has been discussed in the previous section the Georgian Government is currently actively addressing the lack of energy, energy efficiency and climate policies. This lack in policy poses one of the key barriers hindering energy efficiency renovation. Additionally there is a lack of a legal framework that would support and regulate the countries construction sector to help stimulate the use of energy efficient products, materials as well as renewable energy sources in new buildings and renovation.

Another barrier towards energy efficient renovation in Georgia’s buildings is the lack of voluntary or obligatory standards for building elements and different technologies. While EE technology and materials are being introduced in new buildings, they are of varying performance and there is limited monitoring and recording of performance levels currently being installed in Georgia’s buildings. Regulating these practices through common standards would help the understanding of energy performance of the nation’s building sector.

For residential buildings, there is a barrier to finance for whole building renovation as condominium associations (CAs) are not legally registered persons or unions in Georgian law, and as such cannot implement corporate actions. In addition, there is no regulation that makes it mandatory for apartment owners to join the CA or to contribute to the costs of maintenance.

As new processes and policies are being developed, clear responsibilities need to be assigned to ensure that ownership is taken up from the ministries. This will help form a better understanding and clarity within the country on national as well as subnational level.

Financial barriers

Upfront expenditures for building materials are significant and energy efficient building materials are even more expensive. Typical lending interest rates in Georgia have improved from 17.9% in 2009 to 13.6% in 2013, but are still extremely high; by comparison, lending interest rates in the UK and the US in

2013 were 0.5% and 3.3%, respectively. This is relatively peculiar, given the very low rate of non-performing loans, the high depth of credit worthiness information, and the relatively high strength of collateral and bankruptcy laws which should protect the rights of borrowers and lenders and thus facilitate lending. In the absence of preferential loan packages, credit for energy efficiency measures is not attractive since such high interest rates can significantly lengthen the payback periods for energy efficient investments.

Several Georgian banks offer favourable loans for energy efficiency, based on donor activity from for example European Bank for Reconstruction and Development (EBRD) and the International Finance Corporation. Generally the loan facilities include a cash back element. There is however, a limit in capacity in some banks for administering the loans and very little proactive marketing of them making them not well known to potential clients. Surveys have found that many banks believe these programmes do not fall under their responsibility and should be run by other organisations. Therefore the awareness of the Georgian public as potential clients is very low with regards to available options for energy efficiency credit lines. In some cases, the process for approving the loans was also extended compared to loans without energy efficiency, although some banks have taken action to reduce this.

For private householders, expenditure on energy is a significant proportion of the monthly income but levels of comfort are low, with typically only one room being heated. Any energy efficiency gains are unlikely therefore to produce cost savings, instead the level of comfort will increase. This has co-benefits but is a barrier to financial mechanisms that aim to exploit cost savings.

Although municipalities are motivated, for example by the Covenant of Mayors, to raise energy efficiency in the building stock they are limited in the way they can act independently to attract financial resources, such as low-interest loans and credit.

Electricity distribution is performed by three major companies, at tariffs set by the independent Georgian National Energy and Water Regulation Commission (GNEWRC). These three companies have shared the market and there is no effective competition and no incentives for them to invest in energy efficiency.

Energy efficiency materials are available but are largely imported and as such subject to an import tax, making them more expensive than home manufactured products. Specifically insulation products such

11 idem
12 Results of baseline survey of the active banking sector and municipal funds of Georgia prepared by Sustainable Development Center Remissia, Nov 2014
as polystyrene tiles, rock wool and glass wool are not produced in Georgia. However, perlite, pumice, basalt mines are present in Georgia and it is possible to use these raw materials for manufacturing high quality insulation materials. The already mentioned lack of certification or agreed systems of standards hinders the guarantee of quality and performance levels of these materials and products.

**Residential sector**

Georgia’s residential building sector faces several significant barriers with regards to energy efficient renovation. As has been described in section 2.2, housing units are usually privately owned. This leads to a situation where units are serviced by individual closed heating systems and maintained/renovated individually and inconsistently from other units in the same building. Communal action is difficult to stimulate; basic communal infrastructure such as elevators are commonly in a state of disrepair because residents cannot agree on cost and responsibility sharing for maintenance and upgrades.

In cases that condominium associations are established by households of such buildings they currently do not have a juridical status and common property required for loan application. Although this barrier is currently being addressed by the Georgian government, these associations will still be limited to measures that can be implemented to common spaces. The issue of different renovation and performance levels of individual units will still remain.

The limited access to financing and the lack of clear structures as well as performance standards and processes further create uncertainty and confusion towards the opportunities lying within construction and renovation projects. In and especially outside the home, there is further a general lack of awareness of the need to conserve energy and of the ways to achieve this. Offices for example are often overheated and temperatures controlled through open windows.

The residential sector is impacted the most by the existing barriers with respect to financing, available information and existing and enforced regulation. This makes the residential difficult to address before these barriers have been broken down.

**Public sector**

The public building sector is faced by far fewer barriers then the building sector. These buildings can be targeted more easily, as they are (local) government owned, making it easier to implement energy efficient renovation. Opportunity exists especially on local government and municipal level, as the development process of the SEAPs has created awareness for energy efficiency in Georgian cities. However, interviews have shown that while municipalities are eager to take action and are currently involved in negotiations with different (international) financial institutions they also need an agreement from the Ministry of Finance to be able to take the loans.

**Capacity and informational barriers**
Whilst some indicative data has been made available at the city or project level through previous initiatives in the building sector, the availability of comprehensive and reliable data on the building stock on all scales is very poor. The available information is therefore not sufficient to provide clear signals to policy makers, private investors and commercial financers, and supply chain stakeholders.

There is a general lack of information about energy efficiency benefits and small scale renewable options for building owners. This leads to a situation where demand for sustainable buildings from individuals is relatively low. Some, mainly international, companies do look for sustainable buildings for their own operation for example ProCredit Bank’s new head office has been built to comply with energy efficiency standards and EU quality requirements.\(^{13}\)

The current lack of information, financial risks and weak institutional framework associated with energy efficiency in Georgia has been proven challenging in the effort to move forward with energy efficiency improvements. Energy efficiency measures require high technical capacity, stakeholder coordination and government incentives that can leverage private sector financing. Moreover, without stakeholders aware of the advantages of energy efficiency, these challenges will be increasingly difficult to tackle.

There is one well known building firm established by the Bank of Georgia, JSC \(m^2\) Real Estate, which is constructing 3 energy-efficient residential buildings and launching a fourth one using a renewable long term loan allocated by the International Finance Corporation (IFC). Otherwise there is a lack of capacity and knowledge on energy efficient design and energy efficient materials within the construction trade. The energy department of the Georgian Technical University in Tbilisi has training in this area but a link with the architecture school is not possible under the current curriculum. There is no shortage of building auditors but they would need specific training in energy efficiency and green building assessments.

### 2.5 On-going activities within Georgia

Currently there are a lot of activities on energy efficiency ongoing in Georgia as the country is increasing its ambition towards economic development in a sustainable and low carbon way. The different projects are acting on national, local and sector level, focusing on strategies, technologies and legal reform. The on-going activities are described below.

\(^{13}\)Results of baseline survey of the active banking sector and municipal funds of Georgia prepared by Sustainable Development Center Remissia, Nov 2014
The self-governing cities and municipalities have implemented several programmes, including a partnership programme that targets energy efficiency issues in buildings. The framework agreement on “Municipal Energy Efficiency Planning” (MEEP) covered energy efficiency aspects in buildings, the training of municipal key personnel, as well as the development of a municipal building database with the purpose of identification and reduction of energy consumption in the municipality-owned buildings and the planning of future energy saving actions. The agreement is being carried out with Energy Saving International (ENSI), a Norwegian energy efficiency and energy business development consulting company.

With the support from USAID over 30 pilot projects targeting energy efficiency have been implemented in Georgia. Activities have also included a research assessment on the overall energy efficiency and renewable energy potential in Georgia. The residential construction sector of Tbilisi has also been assessed from an energy efficiency perspective. USAID-Winrock launched the NATELI project, aimed at energy efficiency interventions in public and hospital buildings. The project framework has also foreseen cooperation with the municipality in targeting common properties of residential buildings.

In 2013 the Government of Georgia launched the development of LEDS (Low Emission Development Strategy) process supported also by USAID. Within this strategy building sector energy efficiency is one of the focus areas among other energy consuming sectors. The preparation of SEAPs (Sustainable Energy Action Plans) for 10 self-governing cities joining the Covenant of Mayors process is one of the activities of the EC-LEDS project. According to the assessments carried out in the SEAPs the largest energy savings potential is in building and the transport sector. Additionally, a simplified computer model MUNI-EIPMP is being developed within the EC-LEDS project. This model is aimed to assist municipalities with the assessment of BAU scenario and mitigation measures.

In 2015 two other important programmes have started supported by the European Bank for Reconstruction and Development (EBRD): the preparation of Georgia’s first National Energy Efficiency Action Plan (NEEAP) as well as an assessment study of the residential building sector and its energy saving potential. The information gained in this assessment will also be incorporated into the NEEAP.

In addition to these broader programmes focusing on activities for the entire sector, there are several activities taking place on a local level or targeting specific types of buildings, for instance within state educational buildings two programmes offer the potential for supporting energy efficiency.

**Improved Learning Environment Infrastructure Activity** under the project “Improving General Education Quality” is one of these opportunities. This project is located within the Millennium Challenge Account assistance of the United States of America. For this activity the rehabilitation of approximately 130 existing Georgian public schools is targeted. It includes structural upgrade, improvement to heating, electrical, water supply and sanitation systems, as well as provision of improved learning environment. The project further targets a substantial increase in energy efficiency and renewable energy sources.
Another opportunity lies within the Action Plan of the L.E.P.L. “Educational and Scientific Infrastructure Development Agency” which is currently being developed. While the plan does not specifically focus on energy efficiency, it does include a selection of these measures as mainstream activities. For instance the replacement of window frames as well as installation of central gas heating systems are part of the Agency’s Action Plan.

Similar measures are also targeted by most municipalities as part of their programmes aimed at rehabilitation of kindergartens. Especially after joining the Covenant of Mayor’s process awareness has been created on the benefits of these type of energy efficiency measures and an increase in these type of activities can be observed across several municipalities.

In the health sector rehabilitation activities are also taking place. The rehabilitation/reconstruction of state-owned health buildings is completely covered by the state budget as part of the 2015 state programme “Rehabilitation and equipment of the health facilities”\(^\text{14}\). This program is updated annually and while energy efficiency measures are currently not specific focus area, there is the opportunity to build on and expand current replacement activities. These include the replacement of windows and improvement of heat and hot water supplies.

Adding to these activities on state level, Georgia’s banking sector also offers a few activities to support energy efficiency. However, lack of coordination at the state level as well as a dependency on international funding is hindering the larger uptake and dissemination of these offers.

As of fall 2015 ProCredit Bank has been the only prominent bank that has included energy efficiency and environmentally friendly policy as a part of its vision. The Bank has its own target of 25% less energy consumption for its energy efficiency credit line.

Other banks also offer energy efficiency credit lines on a case by case basis mainly supplied through support from the European Bank for Reconstruction and Development (EBRD). While the EBRD provides the necessary technical assistance as well as free audits to all banks the policy and conditions under which the credit lines are administered are dictated by the EBRD. This is often perceived as hindering the wider dissemination of these services.

Georgia also has an active community of non-governmental organisations that support development of the country. This community (e.g. the Energy Efficiency Center, CENN, “Georgian Greens”, WEG, etc.) is very active in the use of energy efficiency and renewable energy sources in the building sector. Activities include the development of a proposal for a NAMA targeting the installation of 10,000 solar heaters and

\(^{14}\text{www.moh.gov.ge}\)
10,000 energy efficient wood stoves by the “Georgian Greens” in cooperation with Women in Europe for a Common Future (WECF). The first stage of this programme has been completed with support from the European Union and has successfully installed 50 solar heaters and 50 energy efficient wood stoves.

The NAMA presented in this proposal positions itself in the gap of these projects and will act as a vehicle for implementation of overarching national strategies. The structures that will be created through this NAMA will help other activities to find support and a framework for implementation. Similar as is seen in other international best practice, the NAMA will target in a first step the public sector to pilot renovation activities and showcase the benefits of energy efficient renovation. The goal will be to facilitate and encourage the residential sector to follow this public sector lead and to by doing so unlock the large mitigation potential in Georgia’s buildings.

3. NAMA Proposal

3.1 Objective

This NAMA proposal represents the first step of a NAMA framework to bring transformational change towards low carbon buildings in Georgia, in particular through the increase in energy efficiency in the building fabric, e.g. insulation, efficient windows.

This specific proposal, creates the structure for successful implementation of energy efficient refurbishment in public buildings. The objective is to carry out activities that not only boost refurbishment in the public sector but will reduce currently existing barriers to energy efficiency throughout Georgia’s entire building sector, especially the residential sector. Through different activities NAMA seeks to utilise the public sector as a leading example for the benefits of energy efficient refurbishment. Visible demonstration projects and piloting activities will allow the country to build capacity as well as create show case examples that will help mobilize the commercial and residential sectors to follow this lead in energy efficient refurbishment.

NAMA aims to help the Government of Georgia build experience in energy efficient refurbishment of buildings and in the utilisation of energy performance contracting concepts that can then be applied to other parts of the sectors, specifically the residential sector. For NAMA a whole building deep renovation approach is proposed. While this will require more capital than small scale retrofits targeting individual building elements like wall insulation or replacement of windows, the whole building approach is accompanied by much higher economic and health/social benefits than the building element approach. Additionally, income from energy savings can be used to offset some of the higher capital investments.
It is further expected that through the NAMA and through action by the Government on some of the regulatory barriers, an additional NAMA proposal with a larger financial component is envisioned at a later stage to implement energy efficient renovation in the residential sector.

3.2 NAMA proponents and stakeholders

The proponent of the proposal will be Georgia’s Climate Change Office within the Ministry for Environment and Natural Resources Protection (MoENRP), as it is the focal point of the UNFCCC (United Nations Framework Convention on Climate Change). It is further responsible for facilitation of the national mitigation strategies as well as the development of the countries Intended Nationally Determined Contribution (INDC). As the Ministry of Environment and Natural Resource Protection is the coordinator of the ongoing processes and mechanisms established under the UNFCCC the monitoring and reporting of the implementation of this NAMA and verification of the carbon reductions will fall under its responsibility.

In Georgia, as mentioned previously no single Government department has responsibility for the renovation of buildings. To implement the NAMA, the institutional responsibility will need to be assigned, either to a single department or to a cross-department steering group.

The new building/construction sector falls under the responsibility of the Ministry of Economy and Sustainable Development (MoESD), which is currently developing building code part of which is legislation on energy efficiency standards in buildings as well as leading on the activities necessary under the EU Association Agreement in buildings. The ministry is further acting as implementer of a current project supported by the EBRD that is aiming towards analysis of Georgia’s residential sector and drafting legal reform to enable this sector to move forward in energy efficiency matters. The MoESD therefore has an important role to play in setting the legal framework for building energy efficiency and removing regulatory barriers in this sector.

Other ministries will also play a role in implementing the NAMA. These include the Ministry of Energy (MoE) which has currently started the development of Georgia’s first National Energy Efficiency Action Plan (NEEAP). One of the main tasks under this programme will be setting energy efficiency targets for the country which will help create momentum and support structures for energy efficiency measure across all sectors, including buildings. Additionally, the Ministry of Energy jointly coordinates the activities under the Covenant of Mayor’s Programme with the MoENRP. Other departments that may help implementation due to their sectoral responsibility for certain buildings are the Ministry of Education and Science, Ministry of Defence and Ministry of Labour, Health and Social Affairs.
The Ministry of Finance will play a crucial role in providing of funds from the central governmental budget as well as accept and distribute national loans and international support. In the course of the Readiness Programme possible fund structures will need to be explored.

Currently Georgia’s cities are leading the way in terms of sustainable, low emission development. Therefore the Covenant of Mayor Cities will play a key role in the success of the NAMA by piloting energy efficiency measures and mitigation efforts as part of their Sustainable Energy Action Plans and strategies towards creating transformational change within their municipalities. The establishment of energy agencies or other ESCO models will be an important task for these cities. These models can then be utilised directly by the residential sector as well as indirectly by the municipalities to facilitate deep retrofits in their residential buildings. As the municipalities will take strong ownership and responsibility in this activity they have the ability to shape their energy agencies as needed by them and can move forward to the residential sector as soon as they are ready.

3.3 Scope and timeframe

Presented here is the indicative timeline for the phased NAMA approach proposed. In this approach, the NAMA will be split up into two phases with preparatory work kick starting by the end of the first half of 2016 alongside other projects that are currently ongoing in Georgia. Over the course of the following years we expect to see an increase in regulatory activities. In 2015, projects supported by the EBRD on National Energy Efficiency Action Plan (NEEAP) development and legal reform of the residential sector have started. The outcomes of these projects will be the first step in creating a policy environment that enables the implementation of energy efficiency measures across the entire building sector. Additionally the progress made in terms of the EU Association agreement is scheduled to be evaluated in 2017. The phased NAMA approach allows for the NAMA activities to build on the currently ongoing processes in the country and provides the flexibility needed to accommodate the ongoing and planned legislative progress currently ongoing in Georgia.

The NAMA seeks to create an umbrella set up for the different small size projects to support in a first step the government in understanding its building sector, the stakeholders active in it as well as the activities and achievements of creating more energy efficient buildings. It therefore considers two phases. The first phase of the NAMA is a readiness programme to build capacity in the Georgian government and municipalities to plan and implement energy efficient renovation programmes. There are several components to the Readiness Programme which will be delivered through technical assistance activities described in section 3.4.1.

The second phase of the NAMA is a pilot phase. This phase aims to build experience both in the physical process of deep renovation and in the use of energy performance contracting. This phase will also
include significant outreach and communication to ensure wide dissemination of the results and a large element of learning by doing.

Figure 11 Time frame of ongoing policy development and NAMA implementation

The time frame indicates the moments that have been identified as being ideal to build on the implementation process of other regulatory activities that are currently taking place or being planned. The years indicated correspond to current timelines envisioned by the processes themselves. The strength of the NAMA intervention is that it can be carried out in parallel to the development of national legislation. This way when the legislation is in place, the experience gained in renovating buildings and using energy performance contracting established under the NAMA can be applied to other buildings including the residential sector.

Institutional arrangement

Figure 12 gives a schematic overview of the envisaged institutional arrangement. Through the municipalities renovation activities will be carried out within the public sectors. The main ministries involved in the NAMA will create the regulatory framework and address barrier to support the implementation of the NAMA.
3.4 Concept and Methodology: NAMA components and activities

This NAMA proposal aims to create the necessary structures and experience to facilitate the deep renovation of Georgia’s buildings, starting with capacity building and piloting activities in public buildings, which are currently at a low renovation rate and when renovated are not targeting energy efficiency measures. NAMA comprises of two phases with the different activities.

As was discussed in the previous chapter 2.4 the country of Georgia is facing several barriers to energy efficiency in its building stock. Key barriers exist in energy efficiency regulation and the Government has started to develop this regulation, with key parts of the process started in the 2\textsuperscript{nd} half of 2015. In addition to the limited policy existing to help guide public and private actors, the current state of the Georgian building sector is not well understood in terms of typical energy performance levels, age groups and floor area distribution to name a few indicators.

This lack of data and information is currently hindering the full role out of energy efficient renovation in Georgia’s building sector. To address these barriers the NAMA seeks in its first phase to set up a “Readiness Programme” which highlights the initial activities needed to be carried out to set up a framework that will allow for successful energy efficient building renovation in Georgia. The second phase of the NAMA will then focus on the creation and implementation of piloting projects that will act as opportunities to learn and test successful techniques for carrying out and financing deep renovation on whole buildings. By combining these pilot projects with significant outreach and communication programmes, the NAMA seeks to ensure a wide dissemination of the results and to stimulate replication of these projects among the public and residential sector of the entire country.
3.4.1 NAMA phase I: Readiness Programme

To increase the rate of energy efficient renovation of Georgia’s buildings a number of preparatory and regulatory actions need to be carried out. This first phase can be seen as a readiness programme that will allow the country to build capacity, knowledge and awareness towards the topic of energy efficiency and low carbon buildings. The first phase therefore focuses on developing the capacity in the Georgian public sector to be able to pilot renovation activities and energy performance contracting in public buildings. This phase has the clear objective of creating the structures to enabling the scale up of activities towards the residential sector.

Under the Readiness Programme activities will be carried out to further advance the understanding of the Georgian building sector and create pillars to support energy efficiency measures within the country. It will also be an opportunity to identify a suitable implementing agency within the country to carry out the envisioned work in the public sector and beyond.

Activities

Table 2 Activities under the Readiness Programme

<table>
<thead>
<tr>
<th>Activity</th>
<th>Short Description</th>
<th>Responsible entity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity I.1</strong></td>
<td>Characterisation of the public building stock</td>
<td>Ministry of Economy and Sustainable Development (MoESD)</td>
</tr>
<tr>
<td>Activity I.1a</td>
<td>Set up of data collection process; incl. the overall management process and team/unit responsible for overseeing this process</td>
<td>MoESD with support from Technical Assistance</td>
</tr>
<tr>
<td>Activity I.1b</td>
<td>Carrying out of energy audits and creating catalogue of requirements to make building priority candidate for renovation</td>
<td>Characterisation unit, identified in Activity I.1a</td>
</tr>
<tr>
<td><strong>Activity I.2</strong></td>
<td>Set up of building stock characterisation, database/registry and monitoring system for changes in building stock (staged approach)</td>
<td>MoESD</td>
</tr>
<tr>
<td>Activity I.2a</td>
<td>Stocktaking of public/municipal buildings (incl. by regions/climatic zones, types, savings potential etc.)</td>
<td>Building sector management unit with support from Technical Assistance</td>
</tr>
<tr>
<td>Activity I.2b</td>
<td>Short listing of buildings that can be potentially targeted in phase II as piloting projects; from central governments and on municipality level</td>
<td>MoESD together with the municipalities</td>
</tr>
<tr>
<td><strong>Activity I.3</strong></td>
<td>Capacity building on energy performance contracting</td>
<td>Technical Assistance</td>
</tr>
<tr>
<td>Activity I.3a</td>
<td>Capacity building in writing terms of reference and evaluating tenders for building renovation for different building types and finalising contracts</td>
<td>Technical Assistance</td>
</tr>
<tr>
<td>Activity I.3b</td>
<td>Capacity building in writing terms of reference for energy performance contracting and evaluating responses to such terms of</td>
<td>Technical Assistance</td>
</tr>
</tbody>
</table>
The Readiness Programme will be an essential step to get Georgia on the way to energy efficient renovation and will form the basis for carrying out the rest of the activities.

### 3.4.2 NAMA phase II: Piloting Programmes

The second phase of the NAMA is a pilot phase. This phase aims to build experience both in the physical process of renovation and in the use of energy performance contracting. This phase will also include significant outreach and communication to ensure wide dissemination of the results and a large element of “learning by doing”. To achieve the transformative effect that is needed, the pilot phase needs to be of sufficient size. This will allow for proper demonstration of what energy and socio-economic benefits can be achieved in Georgia through deep renovation, while simultaneously building a supply chain of necessary materials and expertise.

The pilot will therefore be carried out in at least two municipalities and at the central government level. Based on the characterisation of the building stock performed in the Readiness Programme, each municipality and the government will identify priority buildings for renovation, totalling 50,000 to 60,000 m². These buildings will be put forward for deep renovation. To test different solutions in Georgia, central government will set up a unit to manage the renovation of their buildings, including
energy performance contracting. This may build on existing structures of implementing agencies, for example for schools. The municipalities will issue a tender for an external party to manage the renovation process including securing finance and energy performance contracting. The external party can be a traditional energy services company (ESCO), either for profit or not-for-profit, or any other with the right qualifications. Following the process that is established as part of Activity 1.3 “**Capacity building on energy performance contracting**” of the Readiness Programme municipalities will be able to evaluate the responses to their tenders. The requirements for entities that are eligible to bid for open tenders will be part of the Readiness Program. The process of tendering for ESCOs, evaluating bids and contracting is likely to take 12-18 months. Once contracts are in place, these entities would deliver the renovation of the 50,000 to 60,000 m² of public buildings in a 3 year period, with the first year dedicated to the preparation and tendering of the renovation work itself. Part of the contracting for the renovation work would include provisions to help disseminate the results from the renovation, including on-going monitoring of the performance of the buildings and the financing/contracting arrangements (taking into account commercial sensitivities).

The “Piloting Programmes” under the NAMA are envisioned to take part over the course of 4-5 years. During this entire time the central government as well as the chosen municipalities will be responsible for creating and executing compelling outreach and communication campaigns to ensure that the carried out deep renovations receive much attention from civil society.

**Activities**

**Table 3 Activities under the Piloting Programmes**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Short Description</th>
<th>Responsible entity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity II.1</td>
<td><strong>Preparation and Tendering of ESCOs</strong></td>
<td>MoESD overseeing the Process management unit (TBD)</td>
</tr>
<tr>
<td>Activity II.1a</td>
<td><strong>Identify and choose leading CoM cities (e.g. Tbilisi, Batumi) to establish energy agencies or other type of ESCO model</strong></td>
<td>MoESD overseeing the Process management unit (TBD)</td>
</tr>
<tr>
<td>Activity II.1b</td>
<td><strong>Establish terms of reference for the ESCOs, including scope and financial arrangements and eligibility criteria (domestic and/or international ESCOs)</strong></td>
<td>MoESD together with municipalities and central government (responsible for the buildings to be renovated)</td>
</tr>
<tr>
<td>Activity II.1c</td>
<td><strong>Tender for the ESCO services</strong></td>
<td>Municipalities and central government (responsible for the buildings to be renovated)</td>
</tr>
<tr>
<td>Activity II.1d</td>
<td><strong>Contract ESCO</strong></td>
<td>Municipalities and central government (responsible for the buildings to be renovated)</td>
</tr>
<tr>
<td>Activity II.2</td>
<td><strong>Renovation of Demonstration Projects</strong></td>
<td>Successful bidders</td>
</tr>
<tr>
<td>Activity II.2a</td>
<td>Renovation of 50,000 to 60,000 m² in demonstration projects (around 20-25 buildings)</td>
<td>Successful bidders</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>Activity II.2b</td>
<td>Overseeing the renovation of demonstration projects</td>
<td>Contracted ESCOs or central management units</td>
</tr>
<tr>
<td>Activity II.2c</td>
<td>Monitoring of the payback periods and financial mechanisms of the ESCO</td>
<td>Central Management units and NAMA lead</td>
</tr>
<tr>
<td><strong>Activity II.3</strong></td>
<td>Outreach and Communication Activities</td>
<td></td>
</tr>
<tr>
<td>Activity II.3a</td>
<td>Set up a unit to manage the process of outreach and communication</td>
<td>Either centrally or 3 separate ones for activities carried out in municipal and governmental level</td>
</tr>
<tr>
<td>Activity II.3b</td>
<td>Information campaigns and awareness raising (e. g. benefits of outsourcing energy management)</td>
<td>Communication unit</td>
</tr>
<tr>
<td>Activity II.3c</td>
<td>Development of promotion material set for dissemination purpose, including project webpage, brochures etc. for specific</td>
<td>Communication unit</td>
</tr>
<tr>
<td>Activity II.3d</td>
<td>Awareness raising session with demonstration project staff and occupants (e. g. students)</td>
<td>Communication unit</td>
</tr>
</tbody>
</table>

### 3.4.3 Financial Component

While financing of deep retrofitting of soviet-era buildings cannot be fully covered by future energy savings alone, deep retrofitting offers a large array of co-benefits, which are very attractive for the Georgian case. These benefits include increased longevity and thus value of buildings, better health of inhabitants, increased safety, improved urban development and aesthetics. Therefore these investments can and should be covered from several sources.

The owners of these buildings (municipalities as well as residents) are responsible for maintenance and will observe an increase in costs as the building deteriorates. In this case, investments in deep renovation and weatherisation become more attractive, even if energy savings might not be very high. Especially, when looking towards the near future (in 0-20 years) these buildings will be beyond repair and will need to be replaced. In this context deep retrofitting and weatherization offers to protect these buildings from corrosion and extends the lifespan to at least 50 or more years, while typically costing much less than the cost of replacement of the entire building. Additionally a deep retrofitted building with the appropriate energy efficiency investments will require far less expenditure on annual maintenance, energy bills and emergency repairs.

The financing of such investments has shown to depend upon the availability of long-term financing at affordable interest rates, as well as investment funds coming from several sources. This is even more so
when individual building owners become the target group for stimulating investment in deep building renovation.

Looking first at a typical Georgian annual energy bill of public buildings the cost per ranges between EUR 3.02-8.82 per m², with schools and kindergartens showing the lowest energy uses and administrative buildings the highest. For typical state owned buildings that might be targeted for deep renovation this results in the following cost savings if deep renovation is carried out. Table 4 presents an example estimation for typical buildings found in Georgia. It is hereby assumed that the targeted in the Pilot Programme are fully heated and that cost savings of 30% can be achieved through the energy savings resulting from deep energy efficient renovation.15

<table>
<thead>
<tr>
<th>Building type</th>
<th>Floor area [m²]</th>
<th>Energy bill [in EURO/year]</th>
<th>Cost savings after deep renovation [in EURO/year]</th>
<th>Yearly payments to cover the costs of deep renovation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Art centers and schools</td>
<td>1,073</td>
<td>3,682</td>
<td>736 – 1,105</td>
<td>20,844 – 27,792</td>
</tr>
<tr>
<td>Museums</td>
<td>282</td>
<td>1,737</td>
<td>347 – 521</td>
<td>5,478 – 7,304</td>
</tr>
<tr>
<td>Libraries</td>
<td>321</td>
<td>1,278</td>
<td>256 - 383</td>
<td>6,236 – 8,134</td>
</tr>
<tr>
<td>Medical centers</td>
<td>1,071</td>
<td>5,501</td>
<td>1,100 – 1,650</td>
<td>20,805 – 27,740</td>
</tr>
<tr>
<td>Kindergarten</td>
<td>1,423</td>
<td>4,296</td>
<td>859 – 1,289</td>
<td>27,643 – 36,857</td>
</tr>
<tr>
<td>Administrative Buildings</td>
<td>1,108</td>
<td>9,776</td>
<td>1,955 – 2,933</td>
<td>21,524 – 28,698</td>
</tr>
<tr>
<td>Total</td>
<td>5,278</td>
<td>16,494</td>
<td>3,299 – 4,948</td>
<td>102,529 – 136,705</td>
</tr>
</tbody>
</table>

These achievable savings from the yearly energy bill of the local and central government can be connected to payback conditions under the loan schemes that will be developed as part of the NAMA. Based on the energy savings alone around 5% of the needed investment cost for the deep renovation

15 Assuming a 5% interest rate as well as 10 year payment period.
could be paid off. This takes into consideration an interest rate of 5% per year over a 10 year payment period. The remaining share could be covered for example through extra payments from the government support by a grant element. As part of the piloting phase proposed in this NAMA, more information will be gathered to make the financial component of future NAMAs stronger.
4. Implementation plan

This section presents the implementation plan for the NAMA that will enable the government of Georgia to take on the activities described in the previous chapter. Within this plan three steps are presented to guide the process towards enabling the implementation of the pilot projects which are outlined in the fourth and final step. The activities described in this NAMA proposal are designed to deliver the first steps needed to develop a holistic approach to deep renovation within the country.

The figure below is a schematic of the steps involved in setting up a strategy and implementation plan for low carbon renovation of buildings throughout the entire country of Georgia. The elements of the strategy and plan should be informed by the interactions with stakeholders and by the barriers analysis for public buildings reported in this proposal.

**Step 1**
- Appointment of responsible body for NAMA implementation, financial planning and MRV
- Appointment of programme officer responsible for overall implementation of specific activities
- Appointment of responsible person in each Ministry and municipality

**Step 2**
- Appointment of responsible entity for handling financial mechanism and allocation
- Implementation of Phase I: Readiness Programme
- Including the identification of implementing agency for phase II and other activities

**Step 3**
- Monitoring of progress of NAMA phase I activities
- Alignment with on-going activities
- Possible adjustment of envisioned timeline

**Step 4**
- Implementation of Phase II: Piloting Programmes
- Monitoring of progress of activities
- Development of further NAMA targeting deep renovation in other building subsectors

Figure 13 Schematic overview of steps to deliver deep renovation in Georgia’s building sector

The first and important step that will need to be made is deciding and appointing responsibility for the NAMA implementation as well as the detailed financial planning and the setup of the MRV framework for the NAMA. It is recommended that an existing or new government body take responsibility over the entire process, ideally including further NAMA concepts and initiatives that span beyond the here described NAMA for the public building sector. Next to a responsible body a specific programme officer should be appointed to oversee the different activities of NAMA implementation as well as contact...
points for the officer to interact with on central government and municipal level, where capacity building and piloting of activities will be carried out.

With these structures in place a separate entity should be appointed to manage the financial mechanism and allocation of funding to the different activities before the implementation of the Readiness Programme can be started. In addition to the activities detailed under section 3.4.1 the execution of the Readiness Programme should include the identification of an implementing agency that can carry out the activities described in the piloting programme (see section 3.4.2).

Step 3 in the implementation represents an important step within the process, as it allows for the monitoring of progress among the activities and the continuous alignment with other ongoing activities. As has been described before, Georgia is actively developing new energy policy and the year of 2015 has seen the start of several projects all geared towards bringing Georgia on to a path of sustainable and low carbon development. It will be important that the flexibility offered by this NAMA is effectively utilised to create synergies with other efforts and in supporting the implementation of the country’s vision.

The final step will be the implementation of phase II of the NAMA the piloting programmes as well as the continuous monitoring of the progress in activity and collection of data. Based on the lessons learned and the identified success factors further NAMA concepts should be developed to stimulate the wider implementation of deep renovation activities within other buildings subsectors.
5. Expected impacts

5.1 GHG emissions reduction

Initial assessments were carried out for a selection of representative municipalities currently active in the Covenant of Mayor’s programme. Based on energy audit data from these cities an estimate of typical ranges of emission reductions can be made. These estimates provide a first indication of the mitigation potential that lies within energy efficiency measures for Georgia’s building sector which is significant compared to the countries overall emissions, as has been described in section 2.1.

With heating being the major source of emissions among end-use in buildings, measures targeting the improvement of thermal insulation (through insulations of roofs, walls or energy efficient windows) and the replacement of space and water heating technologies (with more efficient technologies or technologies using renewable sources) will result in achieving the highest emission reductions. The audits have shown that the efficiency measures with the greatest impact target the improvement of wall insulation and the move to renewable energy sources are also associated with the highest investment costs.

It is also clear from the audits and national GHG emission inventory, that the residential sector is responsible for 86% of GHG emissions within the building sector, with individual houses accounting for the largest share in emissions among residential buildings in all cities except for Georgia’s capital Tbilisi. The energy audits further showed that heating was the main source of energy consumption with a share ranging from 50-95% depending on building type and city.

As energy audits look at individual buildings it is best to compare reduction potential based on GHG emissions per m² of heated floor area, as this allows for a common basis. Regarding emissions per m² the highest emissions come from residential buildings especially private houses as well as often from non-residential buildings like guesthouses, clinics and medical centres as well as restaurants. Among the building categories examined schools showed the lowest amount of emissions per m².

Additionally, the energy audits provide first estimates on reduction potentials associated with a variety of energy efficiency measures. As the audits were done for individual houses and the efficiency measures implemented varied depending on building type and city. For instance the use of wall and roof insulation in an administrative building in Batumi resulted in a reduction in GHG emissions of around 47%, whereas in a kindergarten in Kutaisi the installation of biomass heating, fluorescent lighting, roof
insulation and solar water heating reduce emissions by 24%, with the solar water heater showing the highest reduction potentials in kg CO₂ /m².

For an initial assessment we assume that emission savings of around 30% can be achieved through deep energy efficient renovation. The here described NAMA targets 50,000 to 60,000 m² which represents around 0.035 to 0.042% of Georgia’s building sector, corresponding to around 850 to 1,020 tCO₂ eq. Applying the potential savings of 30% around 250 to 300 tCO₂ eq can be saved through the piloting phase. These savings can be significantly scaled up by targeting a larger share of buildings and taking into consideration the business as usual projections up to 2030 described in Georgia’s INDC a much larger potential emission reductions exists, due to the increase in overall emissions foreseen in the coming decade.

Based on energy audits of typical buildings carried out in Georgia’s cities it is assumed that around 30% of emissions savings can be achieved through the envisioned renovation activities. Using the share that the target floor area represents compared to the overall floor area of Georgian buildings savings of 200-400 tCO₂ eq can be achieved through the piloting activities described in this NAMA. This can be scaled up by targeting a larger share of buildings and more savings through energy efficient renovations can be achieved compared to the business as usual projects described in Georgia’s INDC.

Using results obtained through audits carried out by signatories to the Covenant of Mayor’s process that are supported by ENPI software and expert judgements indicate that the emission reduction potential per m² of public buildings varies between 15 and 25 kgCO₂ eq, this would result in higher emission savings of 750 to up to 1,500 tCO₂ eq.

Once the specific buildings targeted in the piloting phase have been chosen together with the different renovation measures, further estimates on emission reductions should be carried out and recorded for the government to be able to actively track the achieved savings.

5.2 Transformational change towards low carbon buildings in Georgia

Georgia stands at the beginning of incorporating energy efficiency into its policy environment, especially with regards to addressing its energy consumption across all sectors. Georgia’s residential buildings are by far its largest final energy consumers. Energy consumption and the resulting greenhouse gas emissions are expected to increase further as the country continues to develop economically, as especially GDP and population continue to grow in its cities. However, the lack of a robust energy efficiency framework is currently hindering the country wide deployment of energy efficiency measures, especially in the building sector. The presented NAMA seeks to address this challenge and create the first structures to achieve the transformational change needed for Georgia to realise low carbon buildings across its building sector.
5.2.1 Strengthening institutional capacities

The envisioned activities under the NAMA and structural changes towards how building renovation is carried out will allow for a strengthening of the capacities of the Ministry of Economy and Sustainable Development as well as the Ministry of Energy. Both ministries have already taken greater responsibility to incorporate energy efficiency into their fields and are actively exploring ways to design policy and regulation that target the increase in energy efficiency. With the development of Georgia’s first National Energy Efficiency Action Plan both energy supply and demand will receive more attention on national government level.

5.2.2 Capacity building in energy efficiency contracting for the renovation of buildings

The Government of Georgia does not have enough experience to write, evaluate and finalise agreements through tenders on energy contracting designed for deep building renovation. The capacity building activities under the Readiness Programme, will lead the way towards stronger energy efficient procurement practices, currently not executed in Georgia.

5.2.3 Building and strengthening capacities of energy efficiency products and services providers, including from the private sector

The NAMA will further have an impact with regards to building capacity on deep renovation activities covering high energy efficient improvements within the construction industry. Through the demonstration projects that will receive much attention through a number of targeted outreach campaigns. These projects will allow not only the construction industry to gain knowledge and experience in deep renovation but also (local) government officials. This will support the country in establishing effective practices for renovating more of its building stock, beyond the public sector.

5.2.4 Piloting of the concept of Energy Service Companies

Energy Service Companies (ESCO) have risen to popularity in many countries as a means to address challenges faced in the field of energy efficiency implementation. In the European Union especially the ESCO model has received much attention and support as a promising, innovative vehicle for translating Member States high level energy efficiency targets, as required under EU law, into actions. ESCOs with their variety and flexibility across services as well as financing options can help address the complex challenges and barriers often hindering the wider implementation of energy efficiency.

While ESCOs offer great flexibility and various solutions the current situation in Georgia still poses some challenges to the usual business model of ESCOs, where the main profits are made based on the amount of energy saved. Low energy prices, a short heating period and limited share of heated space within dwellings and kindergartens will limit the return on energy efficiency investments. Creating first piloting structures and community based ESCOs in form of energy agencies can support especially Georgian municipalities in the implementation of their energy saving targets, currently being developed under the
Sustainable Energy Action Plans (SEAPs). Starting of these activities on a local level will support the overall process of extending the community model throughout the country, once the energy efficiency framework is in place.

5.3 Sustainable development benefits

The NAMA will also offer a range of sustainable development benefits, including economic, social and health benefits as well as an increased level of comfort within buildings. A few of the additional benefits are described below. With the continuing progress in the NAMA development these benefits will be further elaborated.

5.3.1 Economic benefits

Currently many householders use only a small portion of their incomes to heat their homes for economic reasons, resulting in under heated dwellings and lower levels of comfort. While improving the energy efficiency of residential buildings may not bring direct cost savings (if savings are instead used to heat more of the building) but will give cost savings against a business as usual scenario. In addition, the fabric of poorly heated homes tends to deteriorate more quickly resulting in increased expenditure on repairs. While energy savings are not expected to occur in Georgia’s residential sector, reduced energy-related public expenditures are likely, improving the public budgetary position and freeing up funds that can then be used for other programmes.

Other economic benefits that are achieved by strengthening energy efficiency measures in buildings include job creation, due to increase in renovation activities, energy auditing as well as jobs in the construction and energy efficient material production. This benefit will also be seen through the implementation of the NAMA in which market creation for energy efficiency services and products form a key element.

The increase in asset values especially in commercial property is also observed as a benefit from improving the energy performance of a building. There is evidence that (international) investors are willing to pay a rental and sales premium for energy efficient property or certified buildings. A similar increase in asset value is also being observed in the residential sector, although at a slower rate than for commercial buildings.

5.3.2 Energy Security

Energy security is an important priority of the country. All national calculated reference scenarios further indicate an increase in energy use as the country continues to develop. The increase in energy use goes hand in hand with an increase in energy imports under business as usual. Facilitating energy efficiency gains within Georgia can therefore offer great benefits with respect to energy security. The
European Commission Joint Research Centre further states in its report on European ESCO Markets that “Reducing of the Energy dependence and energy intensity of the Country are strategic aims of the government. Energy efficiency can decrease the energy dependence and shall contribute to strengthening of Georgian economy. Implementation of projects based on the ESCO concept can be a possible model for financing of EE.”

5.3.3 Social and health benefits

Due to low-income and limited access to capital to invest in heating systems often only part of the home is heated in Georgian buildings. The low energy efficiency of residential buildings in Georgia further leads to energy loss and waste that increases the issue of low comfort levels inside dwellings. There is a well-documented link between poorly heated homes and several health effects. These include cardiovascular and respiratory diseases, as well as more minor illnesses such as cold and flu. These health effects can result in excess winter deaths in the older population and long term health effects for infants. Improving the energy efficiency of residential buildings will therefore have a positive impact on the health of the population. Improved levels of comfort should also have a positive impact on mental well-being.

5.3.4 Environmental

As energy for heating and domestic hot water is mainly provided by natural gas, the move to small scale renewables and the reduction in demand will reduce the need for these resources, especially when looking at the municipality buildings, for which natural liquid gas hold a share of 10 - 36% of final energy consumption depending on the region. Natural resources are therefore protected and added benefits include reduced pollution due to gas usage.

6. Costs & Support needs

This chapter lays out the estimated programme and technology costs needed for the successful implementation of the NAMA. First the programmes costs associated with the Readiness Programme under phase I are presented followed by the costs for the piloting activities. The Costs are split into estimated costs for the different activities as well as estimated on the cost for staff that will be responsible for supporting the implementation on municipal and central government level. These costs will be provided by the government.

Section 6.2 presents a first estimation of technology costs based on an estimation for deep renovation costs. This estimation should be further refined once the targeted buildings for renovation have been selected.

6.1 Programme costs and NAMA support needs

Programme costs for phase I: Readiness Programme

Table 5 Activities under the Readiness Programme and associated costs

<table>
<thead>
<tr>
<th>Activity</th>
<th>Short Description</th>
<th>Estimated costs (in EURO)</th>
<th>time of government staff</th>
<th>Cost for staff provided by government (in EURO)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity I.1</strong></td>
<td>Characterisation of the public building stock</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity I.1a</td>
<td>Set up of data collection process; incl. the overall management process and team/unit responsible for overseeing this process</td>
<td>50,000</td>
<td>2 staff; 10 days each</td>
<td>400</td>
</tr>
<tr>
<td>Activity I.1b</td>
<td>Carrying out of energy audits and creating catalogue of requirements to make building priority candidate for renovation</td>
<td>75,000</td>
<td>2 staff; 10 days each</td>
<td>400</td>
</tr>
<tr>
<td><strong>Activity I.2</strong></td>
<td>Set up of building stock characterisation, database/registry and monitoring system (staged approach)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity I.2a</td>
<td>Stocktaking of public/municipal buildings (incl. by regions/climatic zones, types, savings potential etc.)</td>
<td>20,000</td>
<td>1 staff; 5 days</td>
<td>100</td>
</tr>
<tr>
<td>Activity I.2b</td>
<td>Short listing of buildings to be targeted in phase II as piloting projects; from central governments and municipalities’ buildings</td>
<td>10,000</td>
<td>3 staff (1 per entity); 10 days each</td>
<td>600</td>
</tr>
</tbody>
</table>

Total costs: 635,000

Cost for staff provided by government: 53,300
Overall the programme costs for phase I of the NAMA would amount to **EUR 635,000** with an additional **EUR 53,300 in staff costs** which would be provided by the government.

<table>
<thead>
<tr>
<th>Activity I.3</th>
<th><strong>Capacity building on the topic of energy performance contracting</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity I.3a</td>
<td>Capacity building in writing terms of reference and evaluating tenders for building renovation for different building types and finalising contracts</td>
</tr>
<tr>
<td></td>
<td>60,000</td>
</tr>
<tr>
<td></td>
<td>6 staff (2 per entity) 20 days each</td>
</tr>
<tr>
<td></td>
<td>2,400</td>
</tr>
<tr>
<td>Activity I.3b</td>
<td>Capacity building in writing terms of reference for energy performance contracting and evaluating responses to such terms of reference and finalising agreements</td>
</tr>
<tr>
<td></td>
<td>60,000</td>
</tr>
<tr>
<td></td>
<td>6 staff (2 per entity) 20 days each</td>
</tr>
<tr>
<td></td>
<td>2,400</td>
</tr>
<tr>
<td>Activity I.3c</td>
<td>Capacity building for financing and managing energy performance contracting</td>
</tr>
<tr>
<td></td>
<td>20,000</td>
</tr>
<tr>
<td></td>
<td>6 staff (2 per entity) 10 days each</td>
</tr>
<tr>
<td></td>
<td>1,200</td>
</tr>
<tr>
<td>Activity I.3d</td>
<td>Capacity building in monitoring, reporting and verification of renovation programmes and energy performance contracting</td>
</tr>
<tr>
<td></td>
<td>30,000</td>
</tr>
<tr>
<td></td>
<td>6 staff (2 per entity) 15 days each</td>
</tr>
<tr>
<td></td>
<td>1,800</td>
</tr>
<tr>
<td><strong>Activity I.4</strong></td>
<td><strong>Financial, regulatory and legal set up</strong></td>
</tr>
<tr>
<td>Activity I.4a</td>
<td>Set up of legal environment to support commercial ESCO market</td>
</tr>
<tr>
<td></td>
<td>30,000</td>
</tr>
<tr>
<td></td>
<td>4 staff for 120 days</td>
</tr>
<tr>
<td></td>
<td>9,600</td>
</tr>
<tr>
<td>Activity I.4b</td>
<td>Set up regulation for ESCO</td>
</tr>
<tr>
<td></td>
<td>50,000</td>
</tr>
<tr>
<td></td>
<td>4 staff for 120 days</td>
</tr>
<tr>
<td></td>
<td>9,600</td>
</tr>
<tr>
<td>Activity I.4c</td>
<td>Reformulating public procurement rules to include EE services and EE technology</td>
</tr>
<tr>
<td></td>
<td>30,000</td>
</tr>
<tr>
<td></td>
<td>2 staff for 80 days</td>
</tr>
<tr>
<td></td>
<td>3,200</td>
</tr>
<tr>
<td>Activity I.4d</td>
<td>Establish strategy for securing and distributing available funding (private, public and international)</td>
</tr>
<tr>
<td></td>
<td>40,000</td>
</tr>
<tr>
<td></td>
<td>4 staff for 120 days over 1 year period</td>
</tr>
<tr>
<td></td>
<td>9,600</td>
</tr>
<tr>
<td>Activity I.4e</td>
<td>Establish financial authority for the funding and identify the implementing agency</td>
</tr>
<tr>
<td></td>
<td>100,000</td>
</tr>
<tr>
<td></td>
<td>4 staff for 120 days over 1 year period</td>
</tr>
<tr>
<td></td>
<td>9,600</td>
</tr>
<tr>
<td>Activity I.4f</td>
<td>Development of the financial mechanism to make loans available for government and general public</td>
</tr>
<tr>
<td></td>
<td>60,000</td>
</tr>
<tr>
<td></td>
<td>2 staff for 60 days each</td>
</tr>
<tr>
<td></td>
<td>2,400</td>
</tr>
</tbody>
</table>
## Programme costs for NAMA phase II: Pilot Programme

### Table 6 Activities under the Pilot Programme and associated costs

<table>
<thead>
<tr>
<th>Activity</th>
<th>Short Description</th>
<th>Estimated costs [in EURO]</th>
<th>time of government staff</th>
<th>Cost for staff provided by government [in EURO]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Total costs</strong></td>
<td>137,000</td>
<td></td>
<td>30,560</td>
</tr>
<tr>
<td><strong>Activity II.1</strong></td>
<td><strong>Preparation and Tendering of ESCOs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity II.1a</td>
<td>Identify and choose leading CoM cities (e.g. Tbilisi, Batumi) to establish energy agencies or other type of ESCO model</td>
<td>50,000</td>
<td>2 staff for 40 days each</td>
<td>1,600</td>
</tr>
<tr>
<td>Activity II.1b</td>
<td>Establish terms of reference for the ESCO, including scope and financial arrangements and eligibility criteria (domestic and/or international ESCOs)</td>
<td>20,000</td>
<td>1 staff for 60 days</td>
<td>1,200</td>
</tr>
<tr>
<td>Activity II.1c</td>
<td>Tender for the ESCO services</td>
<td>5,000</td>
<td>1 staff for 15 days over 2 year period</td>
<td>1,500</td>
</tr>
<tr>
<td>Activity II.1d</td>
<td>Contract ESCO</td>
<td>2,000</td>
<td>2 staff (legal &amp; admin) for 100 days over 2 year period</td>
<td>4,000</td>
</tr>
<tr>
<td><strong>Activity II.2</strong></td>
<td><strong>Renovation of Demonstration Projects</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity II.2a</td>
<td>Renovation of 50,000 to 60,000 m² in demonstration projects (around 20-25 buildings) (see technology costs 6.2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity II.2b</td>
<td>Overseeing the renovation of Demonstration Projects</td>
<td></td>
<td>3 staff (1 per entity) for 100 days over 2 year period</td>
<td>6,000</td>
</tr>
<tr>
<td>Activity II.2c</td>
<td>Monitoring of the payback periods and financial mechanisms of the ESCO</td>
<td></td>
<td>3 staff (1 per entity) for 1 day over 2 year period</td>
<td>60</td>
</tr>
<tr>
<td><strong>Activity II.3</strong></td>
<td><strong>Outreach and Communication Activities</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity II.3a</td>
<td>Set up a unit to manage the process of outreach and communication</td>
<td>20,000</td>
<td>3 staff (1 per entity) for 100 days over 2 year period</td>
<td>6,000</td>
</tr>
<tr>
<td>Activity II.3b</td>
<td>Information campaigns and awareness raising (e.g. benefits of outsourcing energy management)</td>
<td>10,000</td>
<td>3 staff (1 per entity) for 100 days over 2 year period</td>
<td>6,000</td>
</tr>
<tr>
<td>Activity II.3c</td>
<td>Development of promotion material set for dissemination purpose, including project webpage, brochures etc. for specific</td>
<td>20,000</td>
<td>3 staff (1 per entity) for 40 days</td>
<td>2,400</td>
</tr>
<tr>
<td>Activity II.3d</td>
<td>Awareness raising session with demonstration project staff and occupants (e.g. students)</td>
<td>10,000</td>
<td>6 staff (2 per entity) for 15 days</td>
<td>1,800</td>
</tr>
</tbody>
</table>
Overall the programme costs for phase II of the NAMA would amount to \textbf{EUR 137,000} with an additional \textbf{EUR 30,560 in staff costs} which would be provided by the government. These staff costs cover the time and salary of government employees assigned to overseeing the tendering and renovation processes.

Please take note that the costs for Activity II.2a Renovation of 50,000 to 60,000 m² in demonstration projects (around 20-25 buildings) are presented as part of the technology costs under section 6.2, as these are directly connected to the costs associated with the deep renovation of the selected buildings.

### 6.2 Technology costs

To make a first estimation of the technology costs connected to the deep renovation of the selected buildings the overall targeted square meters were examined. It is estimated that the cost of deep renovation would fall around EUR 200 - 300/m² in Georgia.

Based on these estimations around EUR 10 to 18 million would be needed to cover the deep renovation costs for the buildings targeted by the central government and the municipalities.

There is limited information on actual deep renovation costs in Georgia, so a conservative assumption has been made that they are similar to but slightly higher than other ex-soviet countries because of the need to import more materials. When the buildings have been selected for the piloting and properly characterised, this estimate for technology cost should be further refined for use in future planning.

### 7. Monitoring, Reporting and Verification (MRV) system

The objective of the MRV system will be to monitor the impacts of the NAMA, report and verify them. This section describes the monitoring process, including the selected indicators and responsible entities, how collected information will be reported and verified. Overall responsibility for the monitoring system will rest with proponent of the NAMA, Ministry for Environment and Natural Resources Protection. However, during the readiness phase of the NAMA, specific responsible bodies will need to be identified.

#### 7.1 Monitoring

Regular monitoring will track the performance of the NAMA based on a set of indicators, which could lead to corrective actions in the course of implementation if appropriate. It will also help assess ex-post...
the NAMA impacts (including GHG and sustainable development impacts) and support. It will also help track the progress of NAMA activities on a regular basis through data collection from various sources.

Table 7 shows indicators, data sources and responsible entities for data collection for the ex-post assessment of the NAMA’s impacts and support.

The information system for monitoring and verification needs to be developed as part of the readiness phase of the NAMA. This includes assigning the responsible entities for data collection and management.

<table>
<thead>
<tr>
<th>Indicator, parameter and unit</th>
<th>Source of indicator data, including database/tools</th>
<th>Frequency</th>
<th>Uncertainty</th>
<th>Measured /modelled /calculated /estimated?</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHG impacts of renovation programme</td>
<td>Number of buildings renovated</td>
<td>Database to be developed</td>
<td>Annual</td>
<td>Low</td>
</tr>
<tr>
<td>GHG impacts of renovation programme</td>
<td>Indicators used to update baseline scenario for existing buildings: historic annual electricity and primary thermal energy consumption (kWh/m²)</td>
<td>Collected by the energy auditors on the basis of energy bills</td>
<td>At the application stage</td>
<td>Low</td>
</tr>
<tr>
<td>GHG impacts of renovation programme</td>
<td>Final electricity savings and primary thermal energy savings (kWh/m²)</td>
<td>Collected by the selected entities carrying out the energy performance contracting</td>
<td>Annual</td>
<td>Low</td>
</tr>
<tr>
<td>Job creation</td>
<td>Number of employees in new and existing companies that provide energy services for buildings</td>
<td>Accreditation system to be developed</td>
<td>Annual</td>
<td>Low</td>
</tr>
<tr>
<td>Indicator, parameter and unit</td>
<td>Source of indicator data, including database/tools</td>
<td>Frequency</td>
<td>Uncertainty</td>
<td>Measured /modelled /calculated /estimated?</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------------------</td>
<td>-----------</td>
<td>-------------</td>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>Creation of new companies</td>
<td>Number of new companies accredited for providing energy services for buildings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saved energy costs from end users</td>
<td>Energy savings by source from GHG impacts ex-post assessment Energy prices for electricity, gas</td>
<td>GHG impacts ex-post assessment Government source on energy prices</td>
<td>Annual</td>
<td>Low</td>
</tr>
<tr>
<td>Saved energy subsidies for the Georgian government</td>
<td>Energy savings by source from GHG impacts ex-post assessment x Energy subsidy prices for electricity, gas</td>
<td>GHG impacts ex-post assessment Government source on energy subsidies</td>
<td>Annual</td>
<td>Low</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicator, parameter and unit</th>
<th>Source of indicator data, including database/tools</th>
<th>Frequency</th>
<th>Uncertainty</th>
<th>Measured /modelled /calculated /estimated?</th>
</tr>
</thead>
<tbody>
<tr>
<td>International loans</td>
<td>Loans disbursed</td>
<td>Government information system</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Third party finance to ESCOs</td>
<td>Amount of TPF required, provided and reimbursed finance provider</td>
<td>Finance provider system</td>
<td>Annual</td>
<td>Low</td>
</tr>
<tr>
<td>Domestic and international support to NAMA activities</td>
<td>Programme costs spent</td>
<td>Government information system</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indicator, parameter and unit</th>
<th>Source of indicator data, including database/tools</th>
<th>Frequency</th>
<th>Uncertainty</th>
<th>Measured /modelled /calculated /estimated?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstration effect of the renovated buildings</td>
<td>Number of views of web based publication</td>
<td>Part of web design</td>
<td>Annual</td>
<td>Low</td>
</tr>
</tbody>
</table>
Table 7. Preliminary Indicators and data sources for the ex-post assessment of the NAMA’s impacts and support

<table>
<thead>
<tr>
<th>Indicator, parameter and unit</th>
<th>Source of indicator data, including database/tools</th>
<th>Frequency</th>
<th>Uncertainty</th>
<th>Measured/modelled/calculated/estimated?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstration effect amongst professionals</td>
<td>Number of building professionals with interest in energy efficient renovation</td>
<td>Baseline survey and survey after 1 year following completion of demonstration project</td>
<td>Once</td>
<td>Medium</td>
</tr>
<tr>
<td>Demonstration effect of ESCO</td>
<td>Number of ESCOs established in Georgia</td>
<td>Survey after 5 years</td>
<td>Once</td>
<td>Low</td>
</tr>
</tbody>
</table>

7.2 Reporting

Collected data will be reported in an annual report that contains general information as well as specific information on the NAMA programmes. Standardized calculation sheets will be used to report indicators from Table 7.

General information includes:

- The objective(s) and the intended audience of the report
- The year the report was developed
- Whether the report is an update of a previous report
- Progress of NAMA activities on the basis of data collected
- The annual and cumulative sustainable development impacts calculated on the basis of indicators and data collected as presented in Table 7.
- The aggregated annual and cumulative GHG impacts in metric tons of carbon dioxide equivalent and of individual GHGs
- The aggregated annual and cumulative support provided.

Information that is specific to each component includes:

- The implementation period
- The ex post GHG assessment period
- The baseline scenario
- The annual and cumulative GHG impacts in metric tons of carbon dioxide equivalent and of individual greenhouse gases (calculated on the basis of indicators and data collected as presented in Table 7)
- The annual and cumulative support provided (calculated on the basis of indicators and data collected as presented in Table 7).

The reporting format could be adapted to fill expectations from specific entities, e.g. international funder(s).

### 7.3 Verification

Third party verification is proposed for GHG and sustainable development impacts. Part of the verification costs will be covered by international funder(s). Verifiers would be accredited according to the requirements by an accreditation body recognised by both the NAMA funder(s) and Georgia.

As a large number of activities will take place under the NAMA, a sampling approach will be applied. Details of this approach will be agreed upon with the funder(s). The annual report will form the basis of the verification process.