

Article

Experience with LEDS and NAMA Low Carbon Strategies: The Case of Georgia

Kakhaberi Mdivani ^{1,2} and Thomas Hoppe ^{3,*}¹ Climate Policy Department, Ecofys Germany, Am Wassermann 36, 50829 Köln, Germany² Climate Change Office, Ministry of Environment and Natural Resources Protection of Georgia, G. Gulila Str 6, 0114 Tbilisi, Georgia; k.mdivani@moe.gov.ge³ Policy, Organisation, Law & Gaming (POLG), Department of Multi-Actor Systems (MAS), Faculty of Technology, Policy & Management (TPM), Delft University of Technology, Jaffalaan 5, 2628 BX Delft, The Netherlands

* Correspondence: T.Hoppe@tudelft.nl; Tel.: +31-152-782-783

Academic Editor: Vincenzo Torretta

Received: 25 January 2016; Accepted: 1 June 2016; Published: 4 June 2016

Abstract: Low Emission Development Strategies (LEDS) and National Appropriate Mitigation Actions (NAMAs) have the potential to support developing countries in attaining low carbon goals. In spite of the evident potential, there is a need to learn from practice. This paper explores the case of Georgia. The main research question discussed is: What experience has been gained with the development of LEDS and NAMAs in Georgia? The study reveals that both LEDS and NAMAs are subject to barriers that considerably slow development processes: there is a lack of institutional capacity, little inter-governmental goal alignment and poor coordination of actions, a lack of experienced staff and insufficient, substantial, earmarked funding. Capacity building depends on support from organizations in donor countries. This paper contributes to a growing body of knowledge of the implementation of LEDS and NAMA.

Keywords: capacity building; climate change mitigation; low carbon development strategy; national appropriate mitigation action; policy implementation

1. Introduction

The Paris COP21 agreement has been greeted as a step forward towards setting stricter carbon reduction goals and urging Parties to set domestic targets and to formulate action plans that contribute to achieving these goals. In common with other countries, developing countries are also expected to submit pledges and strategies (in the form of “Intended Nationally-Determined Contributions” (INDCs)) in which they explain how to achieve Greenhouse Gas (GHG) emission reduction goals (as compared to Business As Usual (BAU) scenarios). An aggregate effect can be established based on these INDCs [1].

Developing countries need support when seeking strategies to achieve climate mitigation goals, in particular in terms of finance and the need to take poverty alleviation (and other co-benefit) priorities into account [2]. Therefore, they require different strategies than developed ones. Certain instruments, in particular the Clean Development Mechanism (CDM) (established following the 1997 Kyoto Protocol agreement), have been developed to support these countries in attaining low carbon goals. The CDM allowed developed countries and NGOs to provide financial support to developing countries seeking to formulate and implement low carbon strategies. More recently, policy approaches were launched in the form of “Low Carbon Development Strategies” (LCDS), later to be referred to as “Low Emission Development Strategy” (LEDS), and (in particular) “Nationally-Appropriate Mitigation Actions” (NAMAs), the latter originating from the 2007 Bali Action Plan (BAP). Following the introduction

of INDCs (at the 2013 Warsaw COP19 and later intensified after the 2015 Paris COP21 agreement), NAMAs are expected to contribute to attaining INDC emission reduction targets [3]. NAMAs and LEDS are currently seen as the key instruments, which with developing countries can contribute to carbon reductions [4], and have been described as an “indispensable” approach to sustainable development. Although much is expected of LEDS and NAMAs, the two approaches still need to demonstrate their added value, for instance in comparison to CDM (their “predecessor”). Nevertheless, there is a growing body of knowledge on (experience with) the development and implementation of LEDS and NAMAs, *cf.* [4–8].

This paper contributes to this body of knowledge by presenting the case study of Georgia, where NAMA preparation activities and LEDS programs have been undertaken since 2011. The main research question is: What experience has been gained with the development of LEDS and NAMAs in Georgia? In order to answer the main research question, four sub-questions have been formulated, the answer to which contributes to answering the main question: What is the current situation with regard to the set-up of institutional arrangements and capacity building for low carbon development strategies? What barriers to the implementation of LEDS and NAMAs are identified? And what lessons can be learned from NAMA preparation practices? Additionally, how do lessons from the Georgia case compare to other national case studies?

The paper is structured as follows. Section 2 presents background information on LEDS and NAMAs. Section 3 addresses research methods. Section 4 presents the Georgia case study. In Section 5 (“Discussion”), the results of the empirical study are positioned within relevant academic and professional debates. The paper ends with a concluding section, including a list of options for breaking down barriers that are related to the development of LEDS and NAMAs.

2. Background

2.1. Origin

Following the establishment of the United Nations Framework Convention on Climate Change (UNFCCC) as an international environmental treaty resulting from the United Nations Conference on Environment and Development (UNCED) negotiations in Rio de Janeiro in 1992, it was decided to “stabilise greenhouse gas concentrations in the atmosphere at a level that would prevent harmful anthropogenic interferences with the (Earth’s) climate system” [9]. During the 2015 United Nations Climate Change Conference, COP 21, held in Paris, the Parties agreed to set a goal of limiting global warming to less than two degrees Celsius (°C), as compared to pre-industrial levels, for net zero anthropogenic GHG emissions during the second half of the 21st century, and efforts (to be pursued by the Parties) to limit the temperature increase to 1.5 degrees Celsius (°C) [10].

2.2. Contributions by Parties to Attain the UNFCCC Emission Reduction Goals

To address contributions by the Parties to achieve the goal that was set at COP21, Parties were to establish and submit Intended Nationally-Determined Contribution (INDCs) (first addressed at the COP19 in Warsaw), identifying the actions a national government intends to take under the Paris Agreement. These give a first glance at whether the aggregate effect of all Parties’ contributions is adequate to minimize global average temperature rise and consistent with the latest scientific information in the 5th Assessment Report of the IPCC. They will form the basis of post-2020 global emissions reduction commitments included in the climate agreement [11]. In INDCs, countries are requested to outline the steps they are taking to reduce emissions nationally. The Paris Agreement set out revisiting of national goals to update and enhance (and if necessary to intensify) INDCs and programs to attain pre-set goals beginning in 2023 [10].

Prior to the Paris COP21 Summit, 146 Parties had submitted their INDCs. Most of the INDCs were national in scope; they addressed all major national GHG emissions or at least the most significant sources. Many contained quantified emission reduction targets, which took a variety of forms. Most

Parties provided information relating to planning processes, including specific aspects, such as the national process of the development and approval of the INDC; institutional arrangements; stakeholder engagement; policy and legislative issues; and priority areas for implementation [1]. The information provided in many INDCs indicated concrete areas for action to address climate change, such as the adoption of renewable energy, enhancing energy efficiency rates, fostering sustainable transport and the conservation and sustainable management of forests. Several of the INDCs highlighted the link between the implied actions to address climate change and the development priorities, including social and economic development and poverty eradication [1]. Conceptually speaking, INDCs should link up with domestic Mitigation Actions (MAs) and strategies. It is here that INDCs engage with two instruments that had been developed earlier: LEDS and NAMAs.

2.3. LEDS

The term “Low Emission Development Strategies” (LEDS) first emerged under the UNFCCC in 2008 [12]. Although there are several definitions and meanings, LEDS generally mean “forward-looking national economic development plans or strategies that encompass low emission and/or climate-resilient economic growth” [6]. LEDS can serve to advance national climate change and development policy in a coordinated, coherent and strategic manner. This includes issues like enhancing coordination across ministries and sectors, awareness-raising campaigns and stakeholder engagement. Besides serving domestic purposes, an LEDS can also serve to inform the international community (as per the UNFCCC) about national carbon reduction goals and action plans and how they would potentially impact emission scenarios. In turn, an LEDS would also reveal information on funding that developing countries require from the international community.

The preparation and development of LEDS can help establish an overarching framework that facilitates, enables or coordinates between multiple (domestic) Mitigation Actions (MAs), if deployed prudently [13]. Moreover, LEDS preparation should consider a proper fit with existing energy and (other domestic) sectoral policies and minimize the risk of overlap and conflicting strategies [12]. Basic elements of LEDs involve: a long-term strategic vision, baseline GHG emissions, mitigation opportunities and costs, key mitigation sectors and measures and identification of policies [3]. The meaning of LEDS, however, can gain different traction over time and might differ between different countries (in part due to specific national circumstances).

The development of an LEDS requires a balanced focus on the process of government coordination, stakeholder involvement and the result in the form of a strategy document that is not separate from the general national development strategy, but rather the formulation of a sustainable pathway to achieve the established development goals. A LEDS typically includes the elements of national options and prioritized actions for low carbon development in the medium and long term, sector-specific options and prioritized actions for reductions of GHGs and a roadmap showing how to implement the priority options both nationally and sector specifically [13]. In this way (on the national level), the INDC and (NA)MAs can be viewed as short- or medium-term goals, whereas the LEDS provides a long-term strategy for aligning economic development and climate change towards achieving low carbon and co-benefits goals (*cf.* [3]).

2.4. NAMAs

Although a clear, unambiguous definition for “Nationally-Appropriate Mitigation Actions” (NAMAs) is still absent (despite many attempts by researchers, NGOs and others to define or clarify it [4]) NAMAs can be viewed as a means to (partially) implement LEDS at the operational level, to give a face to more abstract policy and to seek a measurable, reportable and verifiable low emission development, often in the form of a project [3]. What distinguishes an NAMA from an MA is the “nationally-appropriate” concept for which NAMAs aim to “identify and implement development actions that are less GHG intensive compared to conventional practices”, essentially taking into account

specific national, contextual circumstances. In this way, “actions prioritized in NAMAs can be seen as ‘clean development actions’ instead of just efforts to reduce GHGs” ([14], p. 5).

NAMAs originate from the 2007 UNFCCC COP 13, which was organized in Bali, Indonesia [4]. The plan that resulted from the COP, the BAP, called for developing country Parties to undertake NAMAs in the context of sustainable development, supported and enabled by technology, financing and capacity building, in a measurable, reportable and verifiable manner. A key element of the BAP was to invite mitigation actions by non-Annex I countries, which resulted in developing countries agreeing to implement NAMAs.

In NAMAs, developing countries take mitigation actions to reduce emissions below a Business-As-Usual (BAU) scenario (as opposed to developed countries, which are expected to take on economy-wide emission reduction targets with reference to a base year [15]). Prior to BAP, developing countries were solely encouraged to submit measures to mitigate GHG emissions to gain support from the financial mechanism of the Convention [15]. Under the Copenhagen Accord (2009), non-Annex I Parties to the UNFCCC committed themselves to implementing mitigation actions in the context of sustainable development [16]. In order to decouple GHG emission growth from economic growth, (developing) countries are encouraged to develop national Low-Carbon Development Strategies (LCDS) (introduced in the Copenhagen Accord). During the 16th Conference of the Parties (COP) in Cancun (2010), it was decided that a registry was to be set up to provide a platform for countries to publish NAMAs seeking international support in order to facilitate matchmaking between NAMAs and available finance, technology and capacity building support. Countries were also permitted to use the registry to communicate unilateral NAMAs for recognition [17]. The Cancun Agreement, in defining developing country mitigation responsibility, also recognized that “social and economic development and poverty eradication are the first and overriding priorities of developing country Parties” [16].

There are three strategies for dealing with NAMAs. The first concerns “domestic (unilateral) NAMAs”. It considers the financial needs within the country. The second concerns “internationally-supported NAMAs”, which is where developed countries help the developing countries with investment and technological learning, while the developing countries do not have to commit to GHG mitigation as a target, but according to the countries’ preferences due to the BAP. The third strategy is “crediting NAMAs”, which is the process of selling and buying carbon credits [15]. The choice of a particular NAMA may be linked to a country’s institutional capacity (both for the design and implementation of MAs and possible Measure, Report and Verify (MRV) processes), emission profile and relative resource endowments [5]. NAMAs are thus typically tailored to the specific conditions and needs of nation states. In other words, they need to be appropriate given certain circumstances that apply to certain developing countries [13]. Once prepared, NAMAs can be submitted to the UNFCCC NAMA registry, which records NAMAs seeking international support or recognition, and to facilitate matching of finance, technology and capacity building efforts (typically by donor organizations in developed countries) to support these actions [4].

Closely related to NAMAs are processes that “measure, report and verify” climate change mitigation policy outcomes (MRVs) (indicated by GHG emission reduction and related indicators as assumed co-benefits [16]). An MRV system would have several functions: to increase the transparency of actions underway to mitigate GHG emissions; to enhance the ability to assess global emission trajectories and/or reductions; to identify countries/sectors where further actions could be taken, either unilaterally or contingent on support being provided; and to provide the necessary information to match proposed actions with support [18].

NAMAs are currently viewed as a key instrument under the UNFCCC to support concerted action on mitigation in developing countries [4]. The advantage of the mechanism is its flexibility, as it allows various types of activities to take place in short, medium and long time frames. This makes it possible to design comprehensive programs with greater transformative potential [19]. Given the needs of the developing countries, Coetzee and Winkler stress that a focus on lowering carbon emissions alone will

not suffice. In learning from experiences with CDM, NAMAs are said to appeal more to developing countries if they also address so-called sustainable development (*i.e.*, “co-benefits”) in particular the alleviation of poverty [4]. “Co-benefits” of GHG mitigation actions relate to Sustainable Development (SD) goals. According to Boos *et al.* [3] sustainable development indicators can be placed into social, economic and environmental categories. Examples of the social SD category concern such issues as: decreased energy poverty, energy security improvements, health improvements and improved access to energy. Examples of the economic SD category concern such issues as: reducing dependence on fossil fuels, energy cost savings, increased competitiveness, increase in the number of green jobs. Examples of the environmental SD category concern such issues as: reduction in local pollution, reduction in environmental pollutants, reduced spillage risks from oil transport or biodiversity protection ([3], p. 8). Efforts have been made to integrate SD criteria into NAMA conceptualization and institutionalization, in particular MRV [14,20].

2.5. Interlinkages between INCDs, LEDS and NAMAs

Since INDCs, LEDS and NAMAs are all important instruments to prepare and implement GHG mitigation policies in developing countries, one needs to understand how they relate to each other. INDCs can be viewed as a short- or medium-term goal, which is used when implementing an LEDS. In this context, an NAMA as a country’s pledge is similar to the mitigation component of INDC. Both NAMAs and INDCs are short- or medium-term goals, whereas the LEDS provides the long-term strategy for aligning economic development and climate change [3]. Developing countries will use NAMAs as implementation tools to achieve these INDC goals/targets. MRV systems, being developed and implemented for NAMAs in countries, will also enable developing countries to transparently report progress on implementing actions to achieve the goals of INDCs [3].

When designing the interlinkages among the INCDs, LEDS and NAMAs, it is necessary to embed these interlinkages in institutional frameworks. Mainstream efforts are likely to be enhanced, more focused and articulated, both with international requirements and with national needs, taking into consideration planning styles, leadership, inclusiveness, participatory processes and ownership [16].

2.6. Experience with the Development and Implementation of LEDS and NAMAs Since 2010

From the 2010 Cancun Agreement onward, NAMAs have been moving gradually from concept to concrete action. A fully-functional and publicly-available version of the UNFCCC NAMA registry was released in October 2013. At that time, however, “few countries had reached the stage where NAMA preparation and finance could start flowing” [19]. To support this process, projects were launched aimed at helping these countries to overcome startup problems. The projects had the objective to support governments to take NAMAs to the next level and contributing to knowledge sharing and cooperation within the wider expert community to disseminate or adopt best practice knowledge. Countries with no previous NAMA activities engaged in NAMA development, and new NAMAs emerged around the world. By May 2015, 88 NAMAs were registered, showing a steep increase since 2013 (when only 40 were registered) [21]. The registry, however, also showed a wide diversity in NAMAs submitted [4], which can be categorized according to: emission targets; strategies and plans; programs and policies; and projects [4,22]; or to the status of a submission to get recognition or to seek “funding, technology transfer or capacity building” as per the UNFCCC registry [4,16].

Ever since the NAMA registry became available, an increasing body of knowledge in the academic and professional literature has been published with case studies reporting national NAMA preparation processes. Countries on which studies have reported include: South Africa [23–25], Israel [26], Indonesia [27], Thailand [15], Brazil [28], Colombia [29], Peru [30] and Chile [31]. Moreover, numerous comparative studies have been conducted to explore barriers, enabling factors and effects [5–8]. One such comparative study revealed that NAMA and LEDS appear to have positively influenced mitigation actions in smaller developing countries, but not so much in larger ones [5].

Where co-benefits and the impact of NAMAs on the environment are concerned, NAMAs have been subjected to criticism. Until 2014, no approach had been developed to assess the Sustainable Development (SD) impacts of NAMAs, impacts that consist of SD indicators, procedures for stakeholder involvement and safeguards against adverse impacts [32]. The question of how SD impacts are to be integrated into NAMA processes remains open, as do questions regarding which impacts should be assessed and how they should be measured. A substantial body of research and best practices exists regarding how SD considerations have been integrated into the Clean Development Mechanism (CDM). The global and flexible approach to the selection of SD criteria and indicators found in these standards is common to all types of mitigation actions, but they may not be directly suited to NAMAs, since globally-defined standards may not be in the interests of the implementing host countries. NAMAs are much broader than the project-based CDM, potentially involving policy and sectoral actions, and may require additional or different SD assessment tools [14]. NAMAs are seen as a means to move away from BAU high-carbon pathways towards low-carbon, sustainable pathways. SD objectives are widely recognized as a key driver of NAMAs in developing countries [14]. Another issue concerns the growing need (to reach consensus) for financing actions that are greatly needed in rapidly-growing developing economies in order to spur significant reductions in GHG emissions. Nonetheless, it is believed that NAMAs are well suited to climate change mitigation actions in urban areas and certain economic sectors [33]. NAMAs are also considered to have a better potential in terms of feasibility than CDM [34].

Experience reveals that there are many uncertainties and a lack of clarity surrounding the meanings and definitions of LEDS and NAMAs. Both concepts lack commonly-agreed definitions. As a result, the scope and aims of NAMAs vary considerably [4]. A study by Tyler *et al.* [6] revealed that NAMAs are widely interpreted by policy makers in developing countries as mitigation activities packaged for submission to the UNFCCC registry. However, they are not held to constitute the full set of mitigation activities in a developing country. New terminology may be needed to describe this broader set. There is also a diversity of MAs and capabilities and connected to that, a need for flexibility in definition, design and implementation [5]. The still-nascent nature of the concept is said to present an opportunity (with scope for flexibility, customization and innovation) for developing countries to shape NAMAs to their benefit and take action appropriate to locally-required development [4,5]. Notwithstanding the conceptual uncertainties regarding NAMA (due to the complexity of the issue and the slow nature of negotiations [4]), it is considered to be the only existing operational concept with which the international process might raise mitigation ambitions [4,6]. Moreover, in terms of reporting, the introduction of NAMAs is said to have increased the frequency and breadth of the requirements for developing countries [4].

2.7. Enabling Factors

The comparative studies [5–8] allow lessons to be drawn discerning barriers and enabling factors in relation to the preparation and implementation of LEDS and NAMAs.

First, NAMAs and LEDS have encountered many challenges during the design and implementation processes. Problems occurred due to a lack of clarity about the meanings of NAMAs and LEDS. This is unlikely to support mitigation ambitions. There is a lot of scope for clarity and conceptual elaboration in this policy space [6]. Second, the implementation of LEDS and NAMAs depends greatly on the policy environment in which they are to be implemented; this is considered a crucial factor [5,25]. More generally, if the climate change mitigation policy is to succeed, it has to be aligned with other policy objectives and integrated into broader policy packages, and policy makers ought to pay special attention to particular design and coordination issues that are pertinent to the successful joint implementation of several energy and climate change policy goals [35]. In a similar vein, the complexity of governance across multiple sectors is challenging. Moreover, NAMAs and LEDS are often subjected to setbacks that have to do with vested sectoral interests [25]. In order to tackle these problems, cross-agency collaboration and coordination need to be enhanced. However, low levels of

cross-agency collaboration and weakly-defined institutional responsibilities at sub-provincial levels are encountered in practice (e.g., [27]). Third, there is often a lack of financial support. This is related to the issue of deciding which NAMAs receive (financial) support and which do not (in the absence of harmonized criteria; this is considered a “highly political issue” [6]). Moreover, there is little evidence of due diligence being performed in relation to estimating costs and seeking creative financing [5]. Fourth, there is a great need to establish MRV approaches that clarify how to establish the climate change value of NAMAs, which should be accounted for in international cooperation [6]. However, technical and institutional capacities for sound MRV design and implementation are often absent in developing countries. Fifth, there appears to be lack of local ownership and active involvement of (local and regional) stakeholders in decision making processes. The latter is considered as time intensive and is therefore often set aside [6,7].

In response to challenges that LEDS and NAMAs have encountered, a number of enabling factors have been identified by scholars. These factors are summarized in Table 1.

Table 1. Enabling factors that support the design and implementation of LEDS and NAMAs. MRV, Measure, Report and Verify.

Enabling Factors	Literature References
- Presence of a long-term vision combined with the definition of short- and medium-term goals (<i>i.e.</i> , a formal policy document).	[7]
- A supportive policy, regulatory and planning context. Alignment of NAMAs with the existing priorities of a particular sector and ongoing national (policy) processes.	[5,7,24,25]
- Linking LEDS and NAMAs to national and sustainable development priorities, in particular alleviating poverty. Mitigation prospects alone will not sell NAMAs to decision makers in most developing countries.	[5,20]
- International support, particularly in the form of finance, with clearly-defined rules on how to allocate financial support between NAMAs based on harmonized criteria. In addition, stimulating private investment and contribution to sustainable development.	[5–8]
- High-level political ownership, commitment and leadership at the highest political level.	[7]
- Coordination across different key ministries, across different sectors and between sub-national levels (with clearly-defined institutional responsibilities).	[7,27]
- A participatory process involving key stakeholders, supporting inter-stakeholder collaboration with room for local ownership.	[6,7]
- Alignment of MRV approaches with international standards and guidelines. Clear (international) MRV approaches that provide guidelines on how the climate change value of NAMAs should be accounted for.	[6,7]
- Availability of technical capacities for the design and implementation of MRV.	[8]
- Use of processes for quality assurance and verification of MRVs through external experts.	[7]

3. Methods

This section presents information on case selection, data collection and data analysis. The study presented here is a case study of LEDS and NAMA development in Georgia. A case study research design was chosen to investigate a complex contemporary phenomenon in its “real life” context and to maintain a holistic and meaningful character [36,37]. As well as focusing on state-level developments, LEDS and NAMA design and preparation at the regional and local level were also analyzed.

3.1. Case Study of Georgia

Georgia was selected as a case study for two reasons: (i) it is was a relatively early adopter of the NAMA concept; and (ii) it was interesting as it was the first post-Soviet state in which an academic study of LEDS and NAMAs was to be conducted. Georgia started preparing NAMAs and

LEDS in 2011. NAMA development in Georgia addressed both urban and rural areas. The climate change initiatives and actions would create a promising position for Georgia as a frontrunner in the Caucasus region. In 2014, Georgia became involved in the so-called “Mitigation Momentum project” thanks to the approval of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, to finance the preparation of bankable NAMA proposals. Moreover, in the same year, Georgia received donor support for the implementation of the NAMA proposal “Adaptive sustainable forest management in the Borjomi-Bakuriani forest district” through the NAMA registry. In 2013, a third party, “Women in Europe for a Common Future” (WECF), became involved in the preparation of another NAMA proposal for the promotion of solar collectors and energy-efficient cooking stoves in rural areas of Georgia.

3.2. Data Collection and Analysis

Initially, a stakeholder analysis was conducted to generate knowledge about the stakeholders involved with NAMAs “so as to understand their behaviors, intentions, inter-relations and interests; and for assessing the influence and resources they bring to bear on decision-making or the implementation process” ([38], p. 338). Different stakeholders were addressed, not just policy makers and those responsible for the implementation of activities, but also independent NGOs, a business firm representative and experts from international agencies observing implementation processes. This was done to generate an overview of how relevant actors were involved in the LEDS and NAMA preparation processes. In particular, NAMA development was studied in three cities (Rustavi, Batumi and Gori). The study focused in particular on barriers encountered during the preparation process.

Prior to conducting in-depth interviews, data were collected, such as text documents, participation in workshops and several types of media and policy documents. This included Georgia’s communication listing in the chapeau of the Copenhagen Accord and the Memorandum of Understanding between the Government of the United States of America and the Government of Georgia (regarding LEDS and the Enhancing Capacity (EC)-LEDS project proposal, which were used to assess the government’s approaches to climate mitigation development). The SEAPs of Batumi, Gori and Rustavi were reviewed in order to assess local governments’ readiness to follow national climate action trends.

After gathering information and identifying general trends regarding the contextual analysis of ongoing activities, interviews were planned. Questionnaires included items on lessons learned from NAMA practices, the current situation regarding GHG mitigation actions, major trends regarding NAMA preparation and implementation, the compliance of stakeholders with program strategies, goal attainment of intervention strategies, the performance of NAMA action plans in cities and barriers encountered. Table 2 presents an overview of the interviewees who were contacted for this study. Interviews were conducted face-to-face and by telephone. Interviews were recorded and transcribed into text files, which were then used for data treatment and analysis. In some cases, a “snowball method” was used to retrieve additional informants who could serve as interviewees, as well as providing additional text documents. The files were used to construct the whereabouts and mechanism of the NAMA development processes. This also involved action research, as the primary researcher participated in actual NAMA work process meetings. A workshop on “challenges identified to data collection for preparation and monitoring of SEAPs of cities” was attended on the basis that the workshop was visited by representatives of both central and local government. The main topic of the meeting was about local government engaging in climate change mitigation activities. Data collection spanned the period from June 2014 until August 2014.

Table 2. The interviewees.

No.	Function	Institute
1	City Hall representative	Rustavi City Hall
2	City Hall representative	Batumi City Hall
3	Municipality representative	Gori City Hall
4	International expert	Centre for International Migration and Development
5	Climate change mitigation strategy expert non-Annex-I countries	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Corporation for International Cooperation; GIZ)
6	Climate change mitigation strategy expert non-Annex-I countries	Ecofys
7	Climate change mitigation strategy expert non-Annex-I countries	Center for Clean Air Policy
8	Climate change mitigation strategy expert in Georgia	Sustainable Development Center “Remissia”
9	NGO representative	Green Movement of Georgia
10	NGO representative	Energy Efficiency Centre—Georgia
11	International organization representative	German Corporation for International Cooperation, Energy research Centre of the Netherlands (ECN)
12	Head of the Climate Change office	Ministry of the Environment and Natural Resources Protection Georgia
13	Head of the Renewable and Alternative Energy Service	Ministry of Energy
14	Mayor	Georgia
15	Mayor	Rustavi City Hall
16	Condominium sector engagement project representative	Batumi City Hall
17	Private sector representative operating in the green buildings market	Charity Humanitarian Centre Abkhazeti Ltd. Wood Service

4. The Georgia Case Study

4.1. LEDS Development

Georgia is one of the partner countries in the low emission development initiatives launched by the United States in early 2011 [39]. The emission reduction targets of Georgia, as stated in the INCD that was submitted to UNFCCC (on 25 September 2015), concerned a 15 percent (unconditional) and 25 percent (conditional) emission reduction as compared to BAU to be achieved by 2030. The additional reduction up to 25% is conditional based on a global agreement addressing the importance of technical cooperation, access to low-cost financial resources and technology transfer [11,40,41].

In 2013, a five-year program “Enhancing Capacity for Low Development Strategies (EC-LEDS) Clean Energy Program” was launched [42]. It received support, including financial aid, from US-AID. The objective was to support the Government of Georgia (GoG) in strengthening climate change mitigation efforts by supporting energy efficiency and the adoption of renewable energy production technology. The main goal of the program was to improve both responsibility towards low GHG emission development and to enhance the country’s sustainable use of natural resources. A multi-stakeholder approach brought together both government parties (central and decentralized governments) and private sector parties in joint decision making and the implementation of low carbon projects. The EC-LEDS program consisted of three key components: (1) quantification of GHG emissions; (2) emission reduction actions; and (3) institutionalization of climate change mitigation in ten municipalities. At the same time, however, Georgian cities were engaging with climate change mitigation actions in another way. By 2013, four of those cities had signed “Covenant of Mayors” (CoM) agreements, having prepared (local) Sustainable Energy Action Plans (SEAPs) of their own. The CoM is a European movement involving local and regional authorities, voluntarily committed to increasing energy efficiency and use of renewable energy sources on their territories. By their commitment,

CoM signatories aim to meet or exceed the European Union 20% CO₂ reduction objective by 2020. CoM has its background in the 2008 EU Climate and Energy Package, from which the European Commission launched the CoM to endorse and support the efforts deployed by local authorities in the implementation of sustainable energy policies [43].

Activities designed to facilitate the vertical coordination of actions in Georgia included: (1) the development and implementation of SEAPs; and (2) founding sustainable energy offices and regional sustainable energy resource centers. The cities that were to become CoM signatories were assisted by the program support groups to build capacity via: software supporting SEAP design, guidelines for GHG emission inventories and staff training in workshops addressing SEAP preparation milestones. The program anticipated the involvement of central government representatives. Figure 1 presents an overview of the procedures for SEAP preparation and implementation by cities.

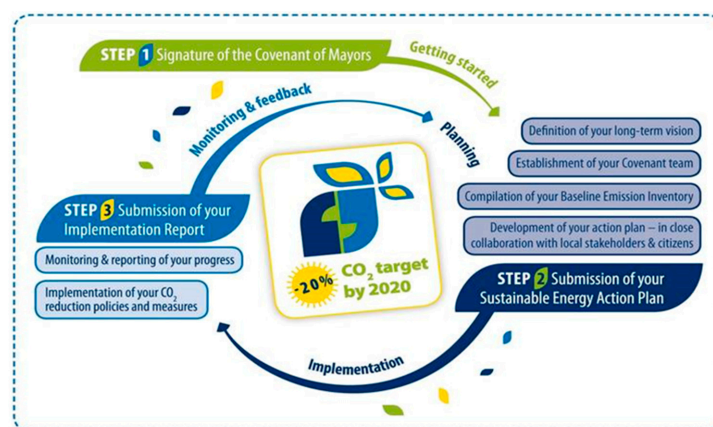


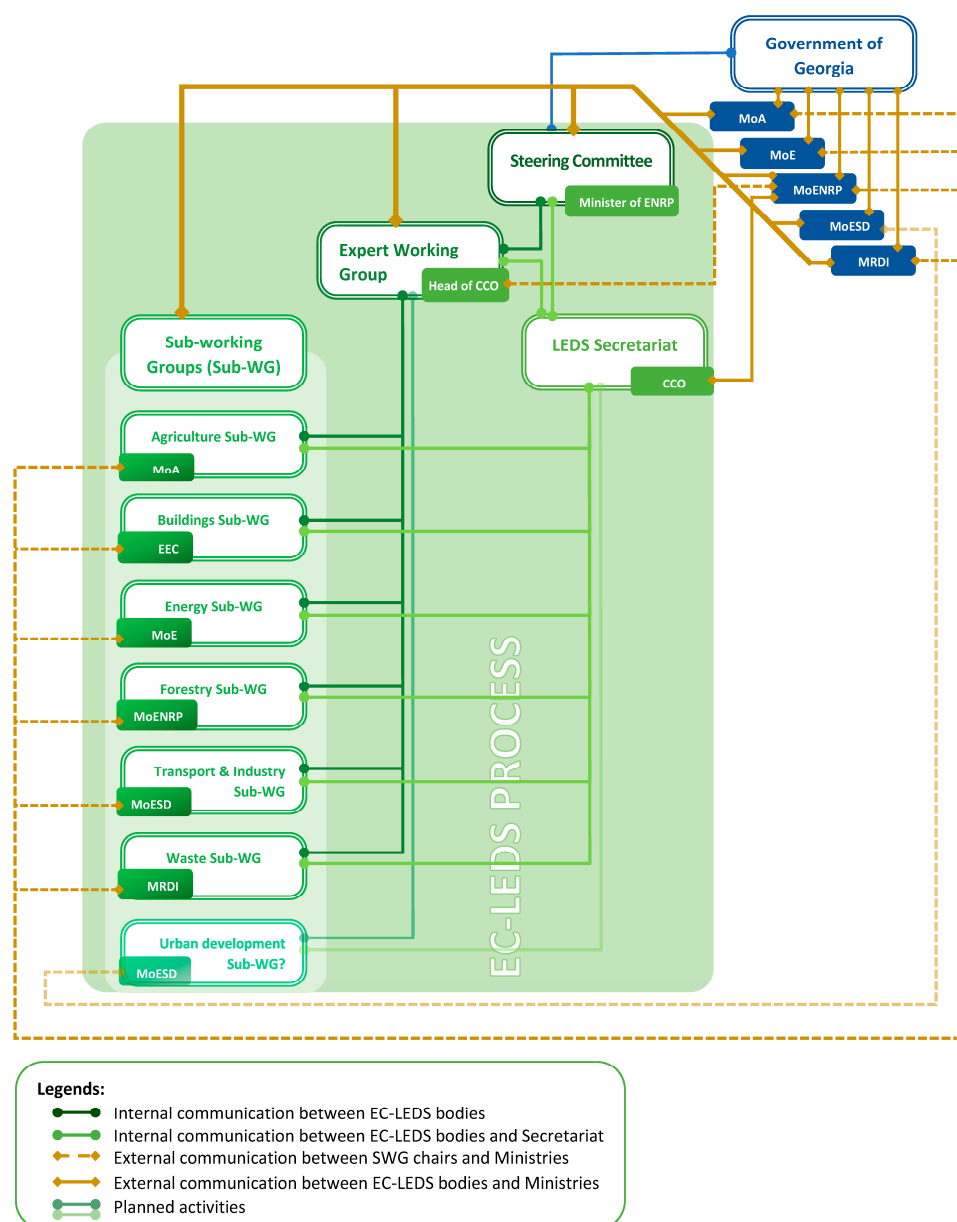
Figure 1. SEAP preparation and implementation by Georgian cities (source: [44]).

The main decision making body in the LEDS system is the Management Board (Steering Committee (SC)), which is chaired by the Minister of Environment and Natural Resources Protection. The Board consists of the highest level representatives of all climate change-related Ministries, the deputy ministers. The Steering Committee enables the LEDS design processes. It has the authority to adopt working plans, establish implementation units and communicate with the GoG. The committee considers reports, advice and plans and proposes actions for the Working Group, which is the counseling body of the managerial system. The Expert Working Group (EWG) includes civil servants from central government, as well as independent experts. The key functions of the group involve preparing detailed working plans that specify how LEDS targets are to be attained, identifying priority sectors and reporting to the SC on the progress made. Under the EWG, six sectoral Sub-Working Groups (Sub-WGs) have been established for the sectoral domains of agriculture, construction, energy, forestry, industry, transport and waste. The activities of each Sub-WG are controlled by the EWG to maintain the transparency and consistency of work related to technical and policy standards. The Sub-WGs provide regular updates of the technical work to the EWG. In addition, the Sub-WGs prepare sectoral policy visions and strategies. Since 2015, after the elaboration of the Sustainable Development Goals (SDGs), each Sub-WG was asked to address the issue of the fulfillment of the SDGs in their set of tasks (Table 3).

The WG assesses the sectoral policies developed by the Sub-WGs in a cross-sectoral approach. An amalgamated version is presented to the SC for final consideration. The Sub-WGs are coordinated by the different ministries in accordance with their working area (Figure 2). Further, the Climate Change Office (CCO) under the Minister of Environment and Natural Resources Protection of Georgia (MoENRP) performs the role of Secretariat to the LEDS process. The Secretariat is responsible for organizing the SC and WEG meetings. The CCO is also responsible for preparing adequate documents for the meeting and keeping all documents related to the coordinating committee.

Table 3. Universal SDGs corresponding to the LEDS Sub-WG aims.

#	Sub-WG	Relevant SDGs
1	Agriculture	Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
2	Buildings	Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all.
3	Energy	Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all.
4	Forestry	Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss.
5	Transport and Industry	Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable. Goal 12. Ensure sustainable consumption and production patterns.
6	Waste	Goal 6. Ensure availability and sustainable management of water and sanitation for all.

**Figure 2.** Internal and external horizontal control coordination under LEDS.

4.1.1. Barriers to LEDS Implementation

Vertical policy integration is considered in multiple (sequential) components of EC-LEDS. The program offers a dialogue platform between national and local authorities. Although there is clearly an opportunity for vertical integration (and willingness at both the national and local levels), there is a lack of coordination between central and local levels of government. Moreover, the vertical integration process has a rather temporal and occasional nature. In the CoM-SEAP process, it is mostly local authorities that are involved in preparation processes. They determine the priorities and scope of mitigation actions at the local level, without discussing or coordinating this with central government actors. The involvement of central government in this process is very limited, as central government officers seem only to observe the process passively and attend local SEAP workshops only infrequently. Moreover, the EC-LEDS development process theoretically tends to emphasize vertical integration, but at the same time seems to neglect horizontal integration. The EC-LEDS steering committee composition opens up space for the involvement of local government representatives at the Sub-WG level. However, municipal-level representatives are usually absent from those WGs. Moreover, the involvement of national authorities in SEAP development workshops was only possible due to the program budget, which was internationally funded. A lack of financial resources from either the municipal or central government could severely impact climate change mitigation policy integration.

There seems to be much confusion between the stakeholders involved, particularly between the various ministries involved. There are different reasons for this. First, LEDS (and even the very “lowering of GHG emissions”) were conceived of as very abstract concepts. During expert WG meetings, attendees (all government officials) complained about “too much information”, an “unknown topic for the audience” or “still not understanding the very idea”. This seems to be related to improper prioritization of issues, where the co-benefits of low carbon actions and program goals are confused with the actual policy goals of lowering GHG emissions. Furthermore, the ministries involved tend to confine their views to their own areas of interest, while failing to embrace the interests and responsibilities of other stakeholders. What adds to the confusion is that stakeholders tend to speak their own “language”, which inhibits communication and, hence, inter-stakeholder coordination. This in turn leads to the evasion of tasks and a failure to initiate issues.

Moreover, the fact that the EC-LEDS program is supervised by the MoENRP has the consequence that other ministries view themselves as only providing auxiliary functions. Hence, they feel less responsibility to commit themselves to the program’s tasks. Additionally, the coordination committee group members also evaded their duties, which is related to a lack of formal commitment to LEDS, as it was not written down in department statutes, except for MoENRP. In turn, this seems to be related to the superficial attitude of departmental chiefs, which reveals little actual commitment when it comes down to (collective) program work. It turns out that direct departmental tasks are clearly prioritized over LEDS work. This is worsened by a lack of (continuous) expertise due to staff fluctuations and a lack of earmarked budgets due to poor prioritization of climate change mitigation goals on the national policy agenda.

4.2. NAMA Development

NAMAs in Georgia were developed in stages, from NAMA design, preparation, to implementation, simultaneously developing measuring reporting and verification procedures. An overview of this Georgian NAMA framework process is presented in Figure 3. Both NAMA ideas have been agreed with the focal ministry, and the proposal frameworks have been defined by cooperation with the CCO. Since the projects’ scope addressed municipalities and villages vertically, the vertical policy integration issue got on the policy agenda, which was later to become a bottleneck for both NAMAs. A significant cause would be the absence of methods of how to engage all levels of governments in the NAMA preparation process. Accordingly, the NAMA preparation processes took more time than originally planned, and none of the NAMA proposals would enter the implementation phase by 2015.



Figure 3. Overview of the NAMA development process.

Two NAMA proposals were under development in Georgia by 2014. One focuses on urban areas; the other on rural ones. The urban area NAMA focused specifically on energy efficiency in the built environment, while its rurally-oriented counterpart focused on the adoption of solar collectors and Energy-Efficient Stoves (EES) in farming communities. Both NAMAs strive to reduce GHG emissions via energy efficiency projects (focusing on lowering fossil energy demand). Accordingly, the GHG mitigation measures would be the input to LEDS, particularly in the building construction and energy sectors. Moreover, by promoting EES and solar collectors in rural areas, the NAMA project would address the reduction of the forest illegal logging and contribute to sustainable forest management. The two NAMAs would advance sustainable development through addressing issues, such as increasing the share of renewable energy in the national energy mix, improving energy efficiency rates and increasing afforestation and reforestation. Both NAMAs have international donors providing financial support. In addition, intermediary organizations are supporting project work, and local actors are involved in operational management.

The NAMA focusing on urban areas started in May 2013. It originated from a “Mitigation Momentum” project, which was approved and financed by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety. Ecofys GmbH and the MoENRP were involved as the main project managing entities. The NAMA project was set up to catalyze NAMA development and implementation, to provide a solution to the problem of slow NAMA development (not just in Georgia, but throughout the world as few countries have genuinely reached the stage where actual NAMA implementation can start and finance can flow [19]). This was the first time that stakeholders became engaged in the climate change mitigation actions process across different scales and levels: from local farmers to international organization and through most levels of Georgian government.

The NAMA focusing on rural areas was launched in February 2014. It had its origin in an initiative by “The Green Movement” (a Georgian NGO), which was funded by the EC. The project’s implementing agency was “Women in Europe for a Common Future” [45]. The NAMA aims to “deliver solar collectors and energy efficient stoves with technical and institutional capacity enhancement and appropriate policy advocating”. The NAMA proposal considered implementation in five of the nation’s regions (Kakheti, Mtskheta-Mtianeti, Imereti, Samtskhe-Javakheti and Samegrelo-Zemo Svaneti). In addition to spurring the diffusion of solar collectors, plans were made to expand the use of sustainable energy technologies, such as 10,000 energy-efficient stoves and 10,000 solar thermal collectors. In this NAMA, actions were primarily driven by local actors. This was a deliberate choice, based on previous experiences with projects with small-scale renewable energy provision.

During the preparation of two NAMAs, the proposal papers were represented to international donor organizations for their comments and consideration. The feedback given, however, revealed that both documents could not be moved to the implementation phase for several reasons. First, both documents had weak financial action plans, lacking arguments for creating a self-sustaining environment either in the building sector or the renewable energy sector in rural areas. Furthermore, none of the documents provided definite financial schemes for supporting a public-private partnership, which was crucial to engage citizens and address long-term benefits. Second, in terms of climate change benefits, both proposals were evaluated as relatively unambitious as compared to sector capacity in the country. One of the significant causes of the restricted mitigation measures that was revealed concerned

limited communication between stakeholders and a lack of vision by the different government levels. Finally, in spite of the NAMA proposals that were addressed, the Sustainable Development Goals, the co-benefits of the projects were not described (either in quantitative or qualitative form). Accordingly, during the NAMA preparation phase, this deficiency could not be adjusted in a timely fashion, and executive entities were not able to present the detailed information in a convincing way.

4.2.1. Barriers to NAMA Development

Barriers observed in relation to NAMA development concern: lack of communication, barriers of a young democracy, lack of knowledge, lack of (reliable) data and poor integration of NAMAs in regulatory frameworks.

Communication between different stakeholders was severely limited. For instance, prioritization of mitigation actions led to conflicts between different central government departments. Difficulties with communication between implementing organizations (like the German-based company Ecofys GmbH for the NAMA focusing on urban areas) and the Georgian public authorities were also observed. Communication was hampered by a lack of meetings, particularly strategy meetings in which the confluence of ongoing processes was assessed and tasks and performance related to solving operational barriers were discussed. This lack of focused communication was reinforced by implementing organizations planning separate meetings with stakeholders on their own. It is fair to state that many of these problems were related to an uncoordinated approach, for which local project parties were held to be responsible. As a consequence, there was little alignment in vision and operations. A joint stakeholder agenda had not yet been established by 2014.

Another important barrier when seeking to understand the lack of institutional capacity is related to Georgia's being a young democratic country still building a solid ground for the proper functioning of state institutions. Elections are a very important event in this regard. In the case of Georgia, the "winner takes all" principle applies to elections. This means that one victorious political party is entitled to enter office and (radically) change the institutional regime set by its predecessor. Hence, elections typically have a great impact on maintaining (or upsetting) climate change mitigation policies (in particular, the EC-LEDS program) by both central and local government. In 2014, both the rural and urban NAMA projects were severely hampered by election results, particularly the rural NAMA project, which depended greatly on collaboration with local governments. Due to a change of the government coalition following municipal elections, the local partners were forced to repeat tasks (and "reinvent the wheel"), which caused a serious delay. This problem was reinforced by a lack of (permanent) experienced civil service staff who could potentially have supported the new government coalition in formulating new climate change policies. In essence, this indicates insufficient capacity and perhaps management of human resources in the field of climate change policy at the local government level.

Another barrier is a lack of knowledge in the domain of climate change mitigation, in particular concerning the rather novel NAMA mechanism. Each organization involved in implementing NAMAs encountered problems related to knowledge gaps. For instance, international organizations and even central government departments were not familiar with specific situational (national, regional and local) circumstances. Understanding these circumstances, however, is crucial when preparing feasible NAMAs (proposals and the implementation itself). At the local level, language difficulties and a lack of understanding of cultural issues led to problems in operational management. The success of these kinds of local projects depends to a great extent on preliminary studies that address situational and cultural backgrounds and the identification of related barriers.

Moreover, the national implementing organizations (for the urban area NAMA, this would be the Sustainable Development Centre "Remissia"; for rural NAMA, this would be the Greens Movement of Georgia) revealed limitations in their understanding of the basic concepts and working mechanism of NAMAs. Both proposal writing and elaboration of the MRV system require a systemic understanding of the entire NAMA process (from barrier analysis to monitoring). This seems to be related to a limited vision on the part of the implementing organizations regarding the way the processes were to be

handled. There are four reasons for this. First, there is an ambiguous role distribution between the key stakeholders involved, in particular between national government departments. Whereas there is a clear overlap of interests and even responsibilities, it is not clear how tasks are divided, which leads to operational problems. Second, an incomplete analysis may limit the design and implementation of NAMAs even more. For instance, important external events, like natural disasters or geopolitical conflicts, are left out of the analysis. Third, lessons from previous projects (on encountering and overcoming operational barriers) are not transferred to those that are starting up. Fourth, there is a lack of available staff in Georgia trained to work on projects that require multidisciplinary working skills. This might be related to Georgian universities, which predominantly offer training in fundamentally mono-disciplinary sciences.

The availability of data also seems problematic. In the Georgian NAMA projects, processed data at the local level were not shared with GHG inventory teams. Although large amounts of data were collected, only a few were actually made available for use in the inventory. This is due in part to the data owner deciding not to disclose the data. According to experts, there are a number of reasons for this. First, there is no regulatory framework that makes it mandatory for energy suppliers to disclose data to the appropriate government institutions. Second, the nature of the data required is highly specific, and the collection of such data cannot be done without a special order.

Furthermore, NAMA development turns out to depend closely on *de facto* decision making (case-by-case), whereas a coherent development framework is absent. Barriers regarding NAMA integration in policy frameworks seem related to the following factors: lack of vertical integration, conflicts with current regulatory frameworks, lack of an allocated budget, a lack of capacity in local governments and a lack of equipment to measure NAMA project outcomes. Finally, project working areas tend to be selected based only on the views of the implementing entities' individual managers, not as a result of a stakeholder consultation process.

5. Discussion

In this section, the results of the Georgia case study are positioned within wider academic debates on LEDS and NAMAs, particularly in the realm of experiences with these instruments in other countries. In doing so, we reflect on the Georgia case study from the perspective of the enabling factors that have been listed in Table 1.

First, in the Georgia case, *official policy documents* (with visions and plans) appeared to be present (in line with Kurdziel and Röser [7]). There has been an official five-year EC-LEDS-program since 2013 (supported by US-AID) and a Mitigation Momentum project by the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety financing NAMA proposals since 2014, and by Summer 2015, an INCD was submitted, listing strategic goals with mid-term targets and means.

In the Georgia case, there was not much of a *supportive policy context*, in which LEDS and NAMAs could easily be aligned with key national processes (cf. [5,7,24,25]). As regards LEDS, there was poor prioritization of climate change mitigation goals on the national policy agenda. Concerning NAMAs, there were problems regarding Georgia as a “young democracy” and the use of the “winner takes all” principle, which led to severe NAMA project delays in 2014 (and indirectly, to poor institutional capacity). Moreover, the case revealed a lack of available (and continuous) staff, sufficiently trained to work on projects that require multidisciplinary working skills, in particular those required in MAs.

The Georgia case revealed that LEDS and NAMAs were (officially) *linked to sustainable development goals* [5,20]. In the EC-LEDS program, this involved a comprehensive set of co-benefits, setting goals to: alleviate hunger, increase food security, improve nutrition, promote sustainable agriculture, ensure access to clean and affordable energy, protect and restore vulnerable ecosystems, sustainable management of forests, make cities resilient, ensure sustainable production and consumption, water sanitation and to ensure access to sustainably-managed water. Moreover, the NAMAs were to contribute to co-benefits, such as afforestation and reforestation and the empowerment of women in rural areas.

Regarding the *presence of financial support, through international support or private investments* [5–8], the Georgia case presents a multi-faceted image. LEDS received aid from different donors: there was direct financial support from USAID (for the EC-LEDS program), GoG (in the “Mitigation Momentum” policy) and donor aid for the NAMA “Adaptive Sustainable Forest Management in Borjomi-Bakuriani Forest District”. Another NAMA received funding from the EU (via “Women in Europe for a Common Future”). Furthermore, (indirect) financial support came from (existing) local government initiatives and CoM.

Commitment and leadership at the highest political level [7] was present to a reasonable degree, as revealed by the delegation of the EC-LEDS program to MoENRP. However, the central government’s failure to engage with regional and local stakeholders can be viewed as a shortcoming in this sense. In a similar vein, coordination across different key ministries, across different sectors and between sub-national levels [7,27] was rather poor. Regarding LEDS, there was a lot of confusion between the ministries involved. They tended to confine their views to their own areas of interest, while failing to embrace the interests and responsibilities of other stakeholders. MoENRP, which was in charge, led to other ministries viewing themselves as only providing auxiliary functions and, hence, showing little commitment.

Regarding NAMAs, there were many problems that were eventually related to an uncoordinated approach. Moreover, initially, there was an ambiguous role distribution between the national government departments involved. Whereas there was a clear overlap of interests and even responsibilities, it was not clear how tasks are divided. Besides poor horizontal policy integration, there also appeared to be poor vertical policy integration (which applied to both LEDS and NAMAs). Coordination between central government and local governments was more or less absent. However, there were few means available for central government to engage all levels of government in NAMA preparation processes.

Participatory processes involving key stakeholders [6,7] were initiated in the Georgia case, but they turned out to be rather erratic. Regarding LEDS, stakeholders tended to speak only their own “language”, which inhibited communication and, hence, inter-stakeholder coordination, which in turn led to the evasion of tasks and a failure to initiate issues. Communication between different stakeholders in the NAMA preparation processes was also limited. Implementing organizations only planned meetings with stakeholders separately. A joint stakeholder engagement agenda was not established.

Clear and uniform conceptual understanding of LEDS, NAMAs and MRV [6,7] appeared absent and led to confusion. LEDS (and even the very “lowering of GHG emissions”) were conceived of as very abstract concepts, even by central government officers. Regarding the development of NAMAs, each organization involved encountered problems related to knowledge gaps. Moreover, international organizations and central government departments were not familiar with specific situational (national, regional and local) circumstances and, hence, encountered problems when setting up MRVs.

When preparing MRVs, the *availability of technical capacities* for the design and implementation of MRVs [8] turned out to be problematic. The LEDS program suffered from a lack of (continuing) expertise due to staff fluctuations and the absence of an earmarked budget. The same held for the set-up of NAMAs, which suffered from a lack of (multiple forms of) capacity: e.g., precious knowledge from realized projects was not transferred to the new ones, and there was a serious lack of equipment to measure NAMA project outcomes.

The use of processes for quality assurance and verification of MRVs through external experts [7] was present in the Georgia case, as shown by the involvement of multiple professional foreign organizations, like Ecofys GmbH, US-AID and UNFCCC, granting a NAMA proposal. However, their involvement did not mean that the numerous problems mentioned previously could be solved.

6. Conclusions

This paper started with the research question: What experiences with LEDS and NAMA development were gained in Georgia? Sub-questions addressed building capacities and institutional frameworks, barriers to implementation and a comparison with the international literature.

A LEDS program was designed and implemented. Two NAMAs are in preparation, but thus far have failed to reach the implementation stage. The LEDS concerned the “Enhancing Capacity for Low Development Strategies Clean Energy Programme” (EC-LEDS). The program covered both national and sub-national measures. It aimed to facilitate ongoing local low carbon processes (that follow from CoM projects), and it encouraged central government to elaborate low emission development visions and strategies by enabling inter-departmental, cross-sectoral dialogues. NAMA preparation in Georgia involved two projects, one focusing on urban areas (targeting enhancing energy efficiency in the built environment) and the other on rural areas (targeting the adoption of solar thermal systems and energy-efficient stoves (EES) in farming communities).

Both LEDS and NAMA developments in Georgia are subject to barriers that considerably slow development. Both vertical and horizontal policy integration were limited under the EC-LEDS program. NAMA preparation relied heavily on bottom-up initiatives, international aid and collaboration between supportive professional organizations and local actors. In this sense, the CoM agreements of Georgian cities and the development of SEAPs are considered highly important, requiring careful attention in the LEDS and NAMA development process. The shift from a predominantly decentralized, bottom-up, low-carbon approach (prior to preparation of NAMAs) to an approach that includes a considerable top-down orientation appeared to be challenging, essentially in the area of organizing communication between different levels of government and between government and stakeholders. Moreover, preparing a MRV system met difficulties, as it was difficult to disclose data from particular sources. In addition, there was a lack of capacity to prepare for sound data collection.

Table 4 presents an overview of barriers encountered in the EC-LEDS program and the implementation of the (two) NAMAs in Georgia. The majority of these barriers originate from poor prioritization of climate policy by (most departments of) the central government, poor coordination between government bodies, institutional inertia and a lack of capacity. This was revealed in problems regarding uncoordinated policy approaches, little alignment of visions and poor coordination of actions between central and local governments, lack of experienced staff and an inadequate (earmarked) budget. It appears that the climate change mitigation policy at the state level is only taken seriously by the MoENRP. Table 5 presents a list of options for breaking down some of the listed barriers.

Table 4. Barriers encountered (LEDS and NAMA).

Barriers Observed in the EC-LEDS Program Implementation	Barriers Observed in NAMA Preparation
Lack of coordination between central and local tiers of government.	Lack of communication due to: <ul style="list-style-type: none"> • uncoordinated approach; • lack of meetings to discuss strategic, cross-case issues (between projects).
Vertical policy integration processes have a rather occasional (non-structural) nature.	Georgia is a young democracy, with young, underdeveloped institutions in terms of climate policy. <ul style="list-style-type: none"> • Elections cause uncertainties regarding the continuation of NAMA projects; • New (local) government coalitions have little knowledge and experience in climate policy; • Lack of training of fixed specialized staff (poor human resource management).
“Gap” between central government preparing EC-LEDS and local governments (cities) preparing SEAPs. In the SEAP, process it is only local authorities that are involved in preparation processes (and <i>vice versa</i> regarding central government involvement in EC-LEDS: municipal representatives do not participate in LEDS WGs).	Lack of knowledge due to: <ul style="list-style-type: none"> • poor situational analysis; • low level of cross-organizational learning; • limitations in the availability of staff.
The LEDS program stresses vertical policy integration, but neglects horizontal policy integration.	Lack of available data due to: <ul style="list-style-type: none"> • low level of data sharing; • highly specific requirements that apply to data collection; • lack of formal obligations that require energy suppliers to provide data.
Lack of (earmarked) program budget.	<i>Ad hoc</i> decision making (little strategy and coordinated action).
High degree of confusion between stakeholders, particularly between the various departments involved (who tend to confine their views to their own focal areas).	
LEDS are perceived as very abstract concepts by the very stakeholders involved in its implementation.	
Improper prioritization of issues by central government (GoG).	
Ownership of the LEDS process by MoENRP. Other stakeholders (particularly other departments) feel less committed.	
Lack of compliance and task evasion by stakeholders who do not prioritize or commit themselves to LEDS.	
Lack of expertise and personnel.	

Table 5. Options for breaking down barriers.

Barriers	Options for Breaking Down the Barriers
Lack of coordination between central and local levels of government	<ul style="list-style-type: none"> • Since the SEAPs are prepared at the local level, their involvement in an LEDS elaboration process would be helpful; not only for vertical integration, but also for more feasible action plan procurement. The appropriate place where local authorities' involvement can be provided would be in the Sub-WGs under the LEDS. • In order to improve the poor level of coordination between central and local levels of government, inter-governmental discussion should be facilitated. The permanent distant communication services, such as video calls, webinars and teleconferences under the LEDS and CoM process would provide advantages in terms of reducing the demand for face-to-face meetings and the reduction of travel costs. • In order to strengthen the vertical integration under the CoM process in Georgia, a regulatory framework, such as a MoU, between central government coordinators and local government officers should be established. By signing the memorandum, both parties are expected to take their own responsibilities, which might facilitate the coordination between government levels in a vertically-organized manner.
Knowledge outflow	<ul style="list-style-type: none"> • Since both LEDS and NAMA development require time-consuming processes and include multi-stakeholder approaches, personnel outflow is rendered inevitable. In order to reduce adverse effects, it would be better if all kinds of information were saved as hard copies by the climate change office secretariat of the LEDS process. The information would be sorted by subject, such as: meeting reports, technology options and evaluations, analytical materials, procedures or decisions to be made.
Limitations in understanding the basic concepts and working mechanism of NAMAs by the national implementing organizations	<ul style="list-style-type: none"> • In order to address donor organization's feedback, particularly in the financial chapter rewriting, the national implementing organizations would need capacity-building measures. One of the possible options would be to address a learning-by-doing approach by providing external expert support.
Lack of data/information	<ul style="list-style-type: none"> • Setting up a sophisticated data collection system in the country is crucial for defining a holistic picture with regard to GHG emission by economic sectors and geographical coverage. Moreover, the inventory-in-depth is a step forward during mitigation project idea selection and estimating the level of ambition. • Accordingly, the MoENRP as a focal point of climate change mitigation issues in the country is required to manage such an inventory system. The data collection can be implemented by out-sourcing by cooperation with an appropriate statistics unit, such as the National Statistics Office of Georgia. • Before the statistics office starts operation with regard to data collection for the GHG emissions inventory, a legal framework should be established to regulate coordination between the statistics agency actors from both the public and private sectors.

In reviewing the results of our analysis, we tend to agree with one of our interviewees who stated that, “ . . . NAMA is a mitigation project package, and not a ‘magic instrument’ which requires responsible effort from those entities involved”. The Georgian case illustrates that there are many barriers that prevent the successful preparation and implementation of NAMAs. Given the complexity of the issues concerned, this does not come as a surprise. Besides efforts made by MoENRP, however, greater effort is required from the other central government departments, local governments and other stakeholders involved to create the favorable conditions in which NAMA implementation can succeed.

Acknowledgments: The first author would like to express his sincere gratitude to the University of Twente, particularly the Master of Environmental and Energy Management program office, for offering an advanced academic course and training in research skills. The authors are grateful to the representatives of the local and national governments in Georgia and the independent experts for their input during the fieldwork. The authors would like to thank Frauke Röser, Christian Elermann, Thomas Day and Nick Harrison, who donated their precious time and shared experience. The authors also thank the Open Access Fund of Delft University of Technology for providing the budget to publish this article and two independent reviewers for their valued comments on previous versions of this article.

Author Contributions: Kakhaber Mdivani and Thomas Hoppe conceived of and designed the case study. Kakhaber Mdivani collected the data. Kakhaber Mdivani and Thomas Hoppe analyzed the data. Thomas Hoppe and Kakhaber Mdivani wrote the paper.

Conflicts of Interest: The authors declare no conflict of interest.

Abbreviations

The following abbreviations are used in this manuscript:

BAP	Bali Action Plan
CoM	Covenant of Mayors
COP	Conference of the Parties
EU	European Union
GHG	Greenhouse Gases
GoG	Government of Georgia
IPCC	Intergovernmental Panel on Climate Change
LEDs	Low Emission Development Strategy
MoE	Ministry of Energy
MoENRP	Ministry of Environment and Natural Resources Protection
MoESD	Ministry of Economy and Sustainable Development
MoF	Ministry of Finance
MoU	Memorandum of Understanding
MRDI	Ministry of Regional Development and Infrastructure
NAMA	Nationally-Appropriate Mitigation Actions
NGO	Non-Governmental Organization
PV	Photovoltaic
SEAP	Sustainable Energy Action Plan
WG	Working Group
UN	United Nations
UNFCCC	United Nations Convention on Climate Change
USAID	United States Agency for International Development

References

1. United Nations Framework Convention on Climate Change (UNFCCC), Ed.; *Synthesis Report on the Aggregate Effect of the Intended Nationally Determined Contributions*; UNFCCC: Paris, France, 2015.
2. Wlokas, H.; Rennkamp, B.; Torres, M.; Winkler, H.; Boyd, A.; Tyler, E.; Fedorsky, C. *Low Carbon Development and Poverty: Exploring Poverty Alleviating Mitigation Action in Developing Countries*; MAPS Energy Research Centre: Capetown, South Africa, 2012.
3. Boos, D.; Broecker, H.; Dorr, T.; Sharma, S. *How Are INDCs and NAMAs Linked? A Discussion Paper on the Links between INDCs, NAMAs and LEDs by the GIZ TUEWAS Working Group in Collaboration with the UNEP DTU Partnership*; Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH: Eschborn, Germany, 2014; pp. 1–16.

4. Coetzee, K.; Winkler, H. The international policy context for mitigation actions. *Clim. Policy* **2014**, *6*, 4–11. [[CrossRef](#)]
5. Winkler, H. Emerging lessons on designing and implementing mitigation actions in five developing countries. *Clim. Dev.* **2014**, *6*, 1–3. [[CrossRef](#)]
6. Tyler, E.; Boyd, A.; Coetzee, K.; Torres Gunfaus, M.; Winkler, H. Developing country perspectives on “mitigation actions”, “NAMAs”, and “LCDS”. *Clim. Policy* **2013**, *13*, 770–776. [[CrossRef](#)]
7. Kurdziel, M.-J.; Röser, F. *Summary Report Good Practice Analysis 2.0 on INDCs, LEDS, NAMAs and MRV New Cases 2015*; International Partnership on Mitigation and MRV, Low Emission Capacity Building Programme, Ed.; NewClimate Institute: Berlin, Germany, 2015; pp. 1–12.
8. Garibaldi, J.A.; Winkler, H.; Lèbre La Rovere, W.; Cadena, A.; Palma, R.; Sanhueza, J.E.; Tyler, E.; Torres Gunfaus, M. Comparative analysis of five case studies: Commonalities and differences in approaches to mitigation actions in five developing countries. *Clim. Dev.* **2014**, *6*, 59–70. [[CrossRef](#)]
9. United Nations Conference on Environment and Development (UNCED). *Agenda 21*; United Nations: Rio de Janeiro, Brazil, 1992.
10. United Nations Framework Convention on Climate Change (UNFCCC). *Adoption of the Paris Agreement*; UNFCCC: Paris, France, 2015; pp. 1–32.
11. Climate Policy Observer. *Climate Policy Observer, Monitoring Climate Policies*; INDC: Venice, Italy, 2016.
12. Clapp, C.; Briner, G.; Karousakis, K. *Low-Emission Development Strategies (Leds): Technical, Institutional and Policy Lessons*; OECD: Paris, France, 2010.
13. Lütken, S.; Hinostroza, M.; Sharma, S.; Olsen, K. *Low Carbon Development Strategies: A Primer on Framing Nationally Appropriate Mitigation Actions (NAMAs) in Developing Countries*; Danmarks Tekniske Universitet, Risø Nationallaboratoriet For Bæredygtig Energi: Copenhagen, Denmark, 2011.
14. Holm Olsen, K.; Bizikova, L.; Harris, M.; Boodoo, Z.; Gagnon-Lebrun, F.; Bakhtiari, F. *Framework for Measuring Sustainable Development in Nammas*; International Institute for Sustainable Development: Paris, France, 2015.
15. Sritong, N.; Pattanapongchai, A.; Winyuchakrit, P.; Peerapong, P.; Limmeechokchai, B. CO2 Mitigation in Thailand’s Nationally Appropriate Mitigation Actions (NAMAs): Policy Analyses of Power Generation. In Proceedings of the 2011 International Conference and Utility Exhibition on Power and Energy Systems: Issues & Prospects for Asia (ICUE), Pattaya City, Thailand, 28–30 September 2012.
16. Hinostroza, M.; Sharma, S.; Karavai, M. *Institutional Aspects of NAMA Development and Implementation*; UNEP Risø Centre: Copenhagen, Denmark, 2014.
17. United Nations Framework Convention on Climate Change (UNFCCC). *Report of the Conference of the Parties on Its Eighteenth Session, Held in Doha from 26 November to 8 December 2012*; Nations, U., Ed.; United Nations: Bonn, Germany, 2013.
18. Ellis, J.; Moarif, S.; Kim, J. Reporting and recording post-2012 GHG mitigation commitments, actions and support. In *OECD/IEA Climate Change Expert Group Papers*; OECD: Paris, France, 2009.
19. Hänsel, G.; Röser, F.; Hoehne, N.; Tilburg, X.; Cameron, L. *Annual Status Report on Nationally Appropriate Mitigation Actions (NAMAs)*; ECN Policy Studies: Petten, the Netherlands; Amsterdam, the Netherlands, 2014.
20. Fridahl, M.; Linnér, B.-O. Objectives for Nationally Appropriate Mitigation Actions (NAMAs): Moving from Mitigation to Sustainable Development for more Ambitious Climate Policy. In *Beyond 2015: Exploring the Future of Global Climate Governance*; The Centre for Climate Science and Policy Research (CSPR), Department of Thematic Studies—Environmental Change, Linköping University: Amsterdam, the Netherlands, 2014; pp. 1–21.
21. United Nations Framework Convention on Climate Change (UNFCCC), Ed.; The UNFCCC NAMA Registry; Fact Sheet #3. In *The UNFCCC NAMA Registry*; UNFCCC: Bonn, Germany, 2015; pp. 1–6.
22. Röser, F.; Van Tilburg, X.; Davis, S.; Höhne, N. *Annual Status Report on Nationally Appropriate Mitigation Actions (NAMAs)*; Ecofys: Washington, DC, USA, 2011; pp. 1–24.
23. Boyd, A.; Rennkamp, B.; James Dane, A.; Winkler, H. Current approaches to MRV in South Africa: A scoping study. *Clim. Policy* **2014**, *14*, 397–416. [[CrossRef](#)]
24. Tyler, E.; Boyd, A.S.; Coetzee, K.; Winkler, H. A case study of South African mitigation actions (For the special issue on mitigation actions in five developing countries). *Clim. Dev.* **2014**, *6*, 49–58. [[CrossRef](#)]
25. Upadhyaya, P. Aligning Climate Policy with National Interest: Disengagements with Nationally Appropriate Mitigation Actions in South Africa. *J. Environ. Policy Plan.* **2016**. [[CrossRef](#)]

26. Ayalon, O.; Lev-On, M.; Lev-On, P. Greenhouse gas emission mitigation plan for the State of Israel: Strategies, incentives and reporting. *Clim. Policy* **2015**, *15*, 784–800. [[CrossRef](#)]
27. Jaeger, A.; Nugroho, S.B.; Zusman, E.; Nakano, R.; Daggy, R. Governing sustainable low-carbon transport in Indonesia: An assessment of provincial transport plans. *Nat. Resour. Forum* **2015**, *9*, 27–40. [[CrossRef](#)]
28. Lèbre La Rovere, E.; Olimpio Pereira, A., Jr.; Burle Schmidt Dubeux, C.; Wills, W. Climate change mitigation actions in Brazil. *Clim. Dev.* **2014**, *6*, 25–33. [[CrossRef](#)]
29. Delgado, R.; Cadena, A.I.; Espinosa, M.; Peña, C.; Salazar, M. A case study on Colombian mitigation actions. *Clim. Dev.* **2014**, *6*, 12–24. [[CrossRef](#)]
30. Zevallos, P.; Postigo Takahashi, T.; Paz Cigaran, M.; Coetzee, K. A case study of Peru's efficient lighting nationally appropriate mitigation action. *Clim. Dev.* **2014**, *6*, 43–48. [[CrossRef](#)]
31. Sanhueza, J.E.; de Guevara, L.E.A. A case study of Chilean mitigation actions. *Clim. Dev.* **2014**, *6*, 34–42. [[CrossRef](#)]
32. Holm Olsen, K. Sustainable Development Impacts of Nationally Appropriate Mitigation Actions: An integrated approach to assessment of co-benefits based on experience with the Clean Development Mechanism. In *Forum on Development and Mitigation*; Breakwater Lodge, Graduate School of Business: Cape Town, South Africa, 2014.
33. Lefèvre, B. Incorporating cities into the post-2012 climate change agreements. *Environ. Urban.* **2012**, *24*, 575–595. [[CrossRef](#)]
34. Lucon, O.; Romeiro, V.; Pacca, S. Reflections on the international climate change negotiations: A synthesis of a working group on carbon emission policy and regulation in Brazil. *Energy Policy* **2013**, *59*, 938–941. [[CrossRef](#)]
35. Halsnaes, K.; Garg, A.; Christensen, J.; Ystanes Føyn, H.; Karavai, M.; La Rovere, E.; Bramley, M.; Zhu, X.; Mitchell, C.; Roy, J.; *et al.* Climate change mitigation policy paradigms—National objectives and alignments. *Mitig. Adapt. Strateg. Glob. Chang.* **2014**, *19*, 45–71. [[CrossRef](#)]
36. Gerring, J. *Case Study Research. Principles and Practices*; Cambridge University Press: Cambridge, UK, 2007.
37. Yin, R. *Case Study Research; Design and Methods*; Sage Publications: Thousand Oaks, CA, USA; London, UK; New Delhi, India, 2003.
38. Varvasovszky, Z.; Brugha, R. How to do (or not to do) . . . A stakeholder analysis. *Health Policy Plan.* **2000**, *15*, 338–345. [[CrossRef](#)] [[PubMed](#)]
39. United States Agency for International Development (USAID)/Caucasus. *Enhancing Capacity for Low Emission Development Strategies (EC-LEDS) Clean Energy Program*; USAID: Tblisi, Georgia, 2013.
40. United Nations Framework Convention on Climate Change (UNFCCC). *Georgia's Intended Nationally Determined Contribution Submission to the UNFCCC*; UNFCCC: Bonn, Germany, 2015; pp. 1–8.
41. United Nations Framework Convention on Climate Change (UNFCCC). *INDCs as Communicated by Parties*; United Nations: Bonn, Germany, 2016.
42. MoENRP. Available online: www.moe.gov.ge/index.php?sec_id=119&lang_id=ENG&project_id=92 (accessed on 14 July 2014).
43. Covenant of Mayors Office. Covenant of Mayors for Climate & Energy. 2016. Available online: http://www.covenantofmayors.eu/about/covenant-of-mayors_en.html (accessed on 2 June 2016).
44. Covenant of Mayors—Kerry County Council Experience. County Kerry Covenant of Mayors STEP Seminar Alternative Financing for Sustainable Energy. 2014. Available online: <http://www.slideshare.net/stepinterregivc/xavier-dubuisson-xdl-2014-03-21-step-confco-kerry-comxdc> (accessed on 2 June 2016).
45. Women in Europe for a Common Future (WECF). *About WECF*; United Nations: Amsterdam, the Netherlands, 2014.

