



Ministry of Environment  
and Physical Planning

**Conceptual Framework for Monitoring, Reporting and  
Verification (MRV) of Climate Change Mitigation  
Actions in Macedonia**

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Ministry of Environment  
and Physical Planning



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## LIST OF ABBREVIATIONS

AFOLU	Agriculture, Forestry and Other Land Use
BAP	Bali Action Plan
BRT	Bus Rapid Transit
BUR	Biennial Update Report
CCAP	Center for Clean Air Policy
CCD	Climate Change Department (unit of the MOEPP)
CDM	Clean Development Mechanism
COP	Conference of the Parties to the UNFCCC
CPI	Climate Policy Initiative
ETS	EU Emissions Trading System
EU	European Union
GHG	Green House Gases
ICA	International Consultation and Analysis
INDC	Intended Nationally Determined Contribution
LEDS	Low Emissions Development Strategies
LULUCF	Land Use, Land-Use Change and Forestry
MA	Mitigation Action
MOEPP	Ministry of Environment and Physical Planning
MRV	Monitoring, Reporting and Verification
MW	Megawatt
NAMA	Nationally Appropriate Mitigation Action
NatComs	National Climate Change Communications
NCCC	National Climate Change Committee
NEIC	National Environment Information Centre (unit of the MOEPP)
NMVOC	Non-Methane Volatile Organic Compounds
QA/QC	Quality Assessment/Quality Control
SBSTA	Subsidiary Body for Scientific and Technical Analysis
TOD	Transportation Transit-Oriented Development
UNFCCC	United Nations Framework Convention on Climate Change
WBCSD	World Business Council for Sustainable Development
WRI	World Resources Institute

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# 1 INTRODUCTION

The goal of this report is to propose the most appropriate country specific conceptual framework for **monitoring, reporting and verification** (MRV) of climate change **mitigation actions** in Macedonia, taking into consideration relevant international requirements and existing domestic legal and institutional systems and capacities and future needs.

## 1.1 WHAT IS MITIGATION ACTION?

Climate change mitigation actions are subject to the United Nations Framework Convention on Climate Change (UNFCCC), adopted in 1992. Article 4 of the Convention defines the commitments of all Parties to address greenhouse gas (GHG) emissions. The Article states that all Parties, “...taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances...” shall “...Formulate, implement, publish and regularly update ... programmes containing measures to mitigate climate change by addressing anthropogenic emissions by sources and removals by sinks of all greenhouse gases...”<sup>1</sup>. The Convention further defines the objective of developed countries (Annex I Parties), in terms of GHG emission reductions, as returning to their 1990 levels of emissions of carbon dioxide and other greenhouse gases. In the case of developing countries, the Convention defines neither the GHG emissions reduction goal nor the nature or scope of mitigation measures. Thus, from its very beginning, the Convention set different levels of commitment for **developed** and **developing** countries.<sup>2</sup> This defines Macedonia as a developing country under the Convention.

The 1997 Kyoto Protocol has so far been the only quantitative commitment under the Convention assigning mitigation targets to the developed countries. Its objective was to reduce greenhouse gas emissions by five per cent below 1990 levels during the period from 2008 to 2012. With regard to developing countries, the Kyoto Protocol restates the general obligation to formulate and implement mitigation measures, taking into account common but differentiated responsibilities and ambitions to achieve sustainable development.

During the second commitment period of the Kyoto Protocol, Parties committed to reduce GHG emissions by at least 18 percent below 1990 levels during 2013-2020; however, the composition of Parties in the second commitment period is different from the first, with a number of developed countries, including USA, Russia, and Canada, not signing up for reduction commitments under the second commitment period. Some parties, for example the

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<sup>1</sup> United Nations Convention on Climate Change, [http://unfccc.int/essential\\_background/convention/items/6036.php](http://unfccc.int/essential_background/convention/items/6036.php)

<sup>2</sup> UNEP Risoe, 2013. Understanding the Concept of Nationally Appropriate Mitigation Action. Authors: Sudhir Sharma and Denis Desgain. Published by UNEP Risoe Centre, Denmark.

United States, have made political commitments to make reductions on its own, outside of the Convention, at least until the new global treaty is expected to be negotiated in Paris in 2015.

Developing countries were first engaged in mitigation actions commitments in 2007 in the framework of the Bali Action Plan (BAP). The Plan states that in order to have *“Enhanced national/ international action on mitigation of climate change...”* developing countries will take *“Nationally appropriate mitigation actions...in the context of sustainable development...”*<sup>3</sup> Thus, the concept of NAMAs was established. The BAP specifies that developed countries will take *“Measurable, reportable and verifiable nationally appropriate mitigation commitments or actions, including quantified emission limitation and reduction objectives...while ensuring the comparability of efforts among them, taking into account differences in their national circumstances”*.

During subsequent negotiations, the Convention has gradually introduced new mitigation framework for developing countries. The Copenhagen Accord in 2009 presented an important change because it used the term “supported NAMA” to refer to NAMAs seeking international support for their implementation, implying that developing countries may also implement NAMAs without any international support.<sup>4</sup> This concept of supported and unilateral NAMAs was further clarified in the Cancun Agreements in 2010, stating that *“developing country Parties will take nationally appropriate mitigation actions...aimed at achieving a deviation in emissions relative to ‘business as usual’ emissions in 2020”*.<sup>5</sup> This development meant that for the first time a common “commitment” is established for all developing countries to mitigate their GHG emissions.

Developing countries in Appendix II of the Copenhagen Accord have materialized this commitment, where they listed unilateral NAMAs. Macedonia’s NAMAs submission was one of the most comprehensive ones, reflecting its EU accession status and listing over 60 different mitigation actions in industry, transport, energy, waste, and agriculture and forestry. The NAMAs range from economy-wide measures, such as adoption of the EU Climate and Energy Package, to individual projects targeting specific power plants. The list of unilateral NAMAs Macedonia has proposed is listed as Appendix I to this report.

## 1.2 WHAT IS MRV OF MITIGATION ACTIONS?

Developed countries have always been subject to rigorous reporting and verification requirements under the convention through their National Communications and national inventory reports, which are to be developed by Parties and published and reviewed by the UNFCCC. Compliance of developed countries’ mitigation commitments under the Kyoto

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<sup>3</sup> Decision 1/CP.13. Bali Action Plan. The Conference of the Parties, <http://unfccc.int/resource/docs/2007/cop13/eng/06a01.pdf>

<sup>4</sup> Decision 2/CP.15. Copenhagen Accord, The Conference of the Parties, [http://unfccc.int/meetings/copenhagen\\_dec\\_2009/items/5262.php](http://unfccc.int/meetings/copenhagen_dec_2009/items/5262.php)

<sup>5</sup> Decision 1/CP.16 The Cancun Agreements, <http://unfccc.int/resource/docs/2010/cop16/eng/07a01.pdf#page=2>



Protocol has been measured by annual GHG inventory reports. This compliance review process of developed countries was *de facto* an MRV scheme, but it was not until the Bali Action Plan that the term “MRV” was introduced to the Convention, bringing together all aspects pertaining to transparency in the climate regime. Developing countries also submit national communications, however, as will be explained in Section 2 of this report, the reporting obligations placed on developing countries are much less stringent.

The NAMA developments taking place since 2007 necessitated a new MRV framework for mitigation action for developing countries as well. The concept of MRV for developing countries has been introduced in the Copenhagen Accord in 2009, which states that supported NAMAs will be subject to international MRV. This intent has been further elaborated in the Cancun Agreements in 2010, which determined that *“internationally supported mitigation actions will be measured, reported and verified domestically and will be subject to international measurement, reporting and verification in accordance with guidelines to be developed under the Convention”*, and *“domestically supported mitigation actions will be measured, reported and verified domestically in accordance with general guidelines to be developed under the Convention”*.<sup>6</sup>

In Cancun 2010 all Parties also agreed to submit National Communications every four years and in between every two years biennial reports (BRs) from developed countries, and biennial update reports (BURs) from developing countries. The BURs are to include not only a national inventory of emissions, but also a national inventory and information on mitigation actions. The information contained in these BURs will be subject to an international consultation and analysis (ICA) process. It was further decided in Durban that NAMAs for which international support is sought may be submitted to a UNFCCC Registry and that information required for NAMAs is similar to that provided on “mitigation actions” in BURs.

The Biennial Update Reports (BUR) will be one of the key information elements of the Convention and the future 2015 Paris agreement, because they will increase transparency through tracking mitigation progress and support provided on more frequent basis. In addition, BURs and the required national MRV system will enhance transparency and allow increased ambition at national level by providing the information basis for planning and implementing mitigation action.<sup>7</sup> The first BURs should be submitted to the UNFCCC in December 2014.

NAMAs will form the central instrument for addressing GHG emission reductions of developing countries. The Durban Agreement provides a general framework for what kind of information should be provided for NAMAs seeking international support, but negotiations have not provided direction on NAMA MRV mechanisms and guidelines.”<sup>8</sup> As was expected, more clarity on what constitutes MRV of supported NAMAs has emerged from the experience of internationally financed NAMAs, especially by the bi-lateral NAMA Facility, since 2013. The NAMA Facility is a joint UK-German effort to provide funds to ambitious NAMAs. One of the

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<sup>6</sup> *ibid.*

<sup>7</sup> <http://mitigationpartnership.net>

<sup>8</sup> UNEP Risoe, 2013. Understanding the Concept of Nationally Appropriate Mitigation Action

key criteria for funding by the NAMA Facility is a rigorous MRV framework.

The Green Climate Fund (GCF), set up by the Convention in the Cancun Agreements as an operating entity of the Financial Mechanism of the Convention (alongside with GEF), is presently establishing funding criteria and MRV requirements, based on the existing experience, including experience of the NAMA Facility. Over time, the GCF is expected to become the main multilateral financing mechanism to support climate action in developing countries.

The NAMA Facility MRV criteria are based on these five mandatory core indicators:

- Reduction of greenhouse gas emissions, direct and indirect
  - quantitative indicator, cumulative
- Private finance mobilized
  - quantitative indicator, cumulative
- Public finance mobilized
  - quantitative indicator, cumulative
- Number of users in target group
  - quantitative indicator, cumulative
- Likelihood of transformational change
  - qualitative indicator, self-assessment against criteria

Additionally, depending on the thematic focus of the NAMA, it is expected that up to two sector-specific indicators will also be selected, and each NAMA is requested to identify additional appropriate project-specific output indicators that correspond to its theory of change, overall goals, and the selected sector-specific indicators. These should include indicators to monitor outputs related to mitigation capacity, such as awareness of sector actors, capacities of key stakeholders to manage NAMA-related action and quality of the MRV system.<sup>9</sup>

Thus partially through official guidance by UNFCCC, and by experiencing “bottom-up” mitigation action financing activities, the general framework and specific requirements for internationally supported mitigation action MRV have emerged.

Though the COP19 in Warsaw adopted a decision on General guidelines for domestic measurement, reporting and verification of **domestically supported** nationally appropriate mitigation actions by developing country Parties<sup>10</sup>, it only gives general idea that the developing countries should “... measure domestically supported NAMAs, including the collection and management of relevant and available information and the documentation of

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<sup>9</sup> [www.nama-facility.org/NAMA\\_Facility\\_M\\_E\\_for\\_NAMA\\_Support\\_Projects\\_summary\\_June\\_2014.pdf](http://www.nama-facility.org/NAMA_Facility_M_E_for_NAMA_Support_Projects_summary_June_2014.pdf)

<sup>10</sup> Decision 21/CP.19

methodologies;”<sup>11</sup> Guidelines for domestic MRV of NAMAs are general, voluntary, pragmatic, non-prescriptive, non-intrusive and country driven, take into account national circumstances and national priorities, respect the diversity of NAMAs, build on existing domestic systems and capacities, and should help countries to set up their national MRV systems based on existing domestic processes, arrangements, methodologies and experts. However, following the existing experience from the developed countries as well as other existing experience, the principal interest of the MRV systems will be to measure emission reductions according to emission baseline scenario, as well as the progress of achievement of sustainable development goals or what is called co-benefits from policies and actions. As reported above, this is the underlying experience from internationally supported NAMAs, and will likely become the norm.

### **1.3 THE SPECIAL CASE OF MACEDONIA**

From the point of view of the Convention, Macedonia is a developing country. But by virtue of its approximation to the European Union and its full Contracting Party status in the EU Energy Community and the expected 2015 global climate change agreement, the country is and will be assuming upon itself significant mitigation commitments comparable to developed countries.

As will be discussed in section 2 in more detail, given the specifics of UNFCCC and EU MRV obligations, Macedonia will need to report on all of its mitigation actions that will reflect its EU and Energy Community commitment, however if Macedonia chooses it may report it via non Annex I country format. However, this would obviously create some friction between the type of information Macedonia will necessarily have (because of its EU obligations) but may choose not to report (because of its non-Annex I status). Consider the fact that Macedonia has submitted into Annex II of the Copenhagen Accord a list of mitigation actions that largely mirror the country’s obligations under its EU accession. Under these EU and Energy Community obligations, Macedonia not only has to implement these actions and policy changes, but it has to report on them to the EU using common reporting format that the EU normally uses, which not only complies with UNFCCC reporting standards, but goes in many instances much further than UNFCCC. So, Macedonia will have more than the necessary information to report as Annex I country, but because of its status as Non Annex I, it can—in theory—report on its mitigation actions in less comprehensive way as a developing country.

In respect to Macedonia’s actual mitigation action commitments—not just in respect to how they are MRV’ed—the obligations will fully reflect the country’s status as full Energy Community Contracting Party and EU candidate state. So it is in Macedonia’s own interest to report on its mitigation actions as if it were Annex I country, because that will best serve the country’s policymakers to ascertain the success or failure of policies and meet the political commitments. Because aside from being an international requirement under the UNFCCC, MRV of mitigation actions is also an important management tool for Macedonia to track

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<sup>11</sup> Ibid /paragraph 4(b)

progress in meeting its own domestic objectives and goals, as well as EU and Energy Community commitments.

In this respect MRV helps to identify national priorities (including NAMAs), as well as challenges and opportunities. It is a necessary component of policy planning and prioritization and improving policy coherence – it helps to keep track of lessons learnt from policy implementation to develop better policies in the future.

To some extent, the NAMA concept from the Copenhagen Accords (meaning more of an overall commitment of a country to reduce emissions) has been supplemented in 2013 by Intended Nationally Determined Contributions (INDC), which should form the backbone of the legally binding 2015 agreement to apply mitigation commitments to all Parties. INDCs should reflect, in type and ambition, the responsibilities and capabilities of the Party concerned. Parties with the greatest responsibilities and capabilities should come forward with INDCs in the form of economy-wide absolute targets relative to a historical base year (*economy-wide absolute targets*) - including those Parties that currently have such commitments pre 2020 to ensure that there is no backsliding. While other types of commitment might be appropriate for Parties with fewer responsibilities and less capability, all Parties should aspire, over time, to eventually having economy-wide absolute targets because they provide the greatest certainty on emissions reductions while giving Parties flexibility on how to achieve those reductions. This means that Macedonia's INDC will necessarily reflect its current and future legal obligations vis-a-vis the EU and the Energy Community. **These obligations include not only meeting the actual commitment, for example, share of renewable energy, but also rigorous MRV system that provides information to policy makers, Macedonian citizens, and the EU, how and when this commitment has been met.**

Thus, the conclusion is that in the short-term, Macedonia can keep on reporting to the UNFCCC as a developing country. However, due to its legal obligations to the EU and the Energy Community and the forthcoming new climate change post 2020 agreement, it should eventually set up and operate MRV framework as if it were an Annex I country to the Convention. This report suggests the most appropriate methodological framework how to do that.

## 2 METHODOLOGICAL APPROACH TO MRV FRAMEWORK FOR MACEDONIA

### 2.1 SETTING MRV CRITERIA AND PERFORMANCE INDICATORS

There is no standard approach to evaluating the effectiveness of MRV systems. This report presents the methodology developed by the Climate Policy Initiative in 2012 when analyzing MRV systems of Germany, Italy, China, and USA.<sup>12</sup> It is a framework for evaluation that is consistent, systematic, and transparent, and can be applied for tracking individual projects, NAMAs, or sectoral or national policies and mitigation actions. For this reason, it is being used in this report as an example of transparent and comprehensive evaluation tool for an MRV system suitable for Macedonia.

The approach to evaluating effectiveness begins with identifying the basic objectives of a tracking system. While specific national contexts differ, all domestic MRV systems are designed to meet the following three objectives to some degree:

**I. Tracking achievement of existing policy targets:** Countries pursuing emissions reductions targets need to know if they are taking appropriate actions and meeting their own policy objectives with respect to GHG emissions.

**II. Informing future policymaking:** Policy operates within a dynamic environment; even a well-designed policy portfolio will need to be adjusted over time. Emissions data and policy tracking can inform the adjustment of current policies and influence the design of future measures by providing an accurate picture of performance and trends. Good data can also help identify where additional mitigation support may be required, both across countries and at the sub-national level.

**III. Informing domestic and international stakeholders:** To guide their own decisions, stakeholders at both the domestic and international levels need to have confidence in a country's emissions data and claimed policy outcomes.

The CPI framework identified six characteristics of MRV systems that are essential to meeting these objectives. In developing this list of criteria, it drew from guidelines established by UNFCCC for the preparation of parties' National Communications, as well as a review of other literature on the subject and discussions with national and international experts. Based on this review process, it identified the following six common criteria:

**Transparency:** Is the process open, accessible, and comprehensible to relevant

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<sup>12</sup> Climate Policy Initiative, "Tracking Emissions and Mitigation Actions: Evaluation of MRV Systems in China, Germany, Italy, and the United States" CPI Working Paper, June 2012.

audiences? The more accessible a system's data and methodologies, the more open the system is to having its results tested and scrutinized by the public (including civil society and other associations), and the data itself checked for anomalies. Transparent MRV systems increase the credibility of reported information and allow stakeholders to hold policymakers accountable for meeting targets.

**Comparability:** Is information comparable across time, agencies, and different levels of government? Is it comparable to other countries' data or reports? Consistency in how data are calculated and presented allows estimates of emissions, or of the impact of mitigation actions, to be added together or compared to each other, and facilitates learning across agencies and countries. Although changes in methods may indicate an evolving and improving system, mixing methods over time without any explanation or retroactive application makes evaluation of GHG inventories and mitigation actions difficult.

**Reliability:** Is information likely to be accurate? Both policymakers and outside stakeholders depend on receiving data that are accurate and unbiased. Elements of MRV system design—such as relying on well-vetted methodologies, building staff expertise, and opening up processes to third-party or expert review—can make it more likely that the system produces accurate information.

**Usefulness:** Does the MRV system connect to the policymaking process? An MRV system can only lead to future policy improvements if the information produced by the MRV system feeds back into the policymaking process in some way.

**Timeliness:** Is information collected and delivered frequently enough to support decision-making and meet other needs? An MRV system is better able to inform the policymaking process, and facilitate oversight by stakeholders and the public, if it delivers information in a timely manner.

**Completeness:** Does the system provide sufficient information to support decision-making in all important sectors? While some sectors and gases contribute more to climate change than others, MRV systems can provide a clearer picture of current status and more accurately inform future action if they are comprehensive.

All six of these criteria are important determinants of the effectiveness of tracking systems across a variety of policy contexts.

For each of these six criteria, a set of indicators was selected representing specific, observable features that, if present, make it more likely that a system meets a particular criterion. The indicators for each of the six criteria are listed on the following page. To gauge the extent to which criteria are met, a scale is used, which can be read as follows:

1. **Very** (transparent, comparable, reliable, useful, timely, or complete): All or almost all of the indicators are present in the country's MRV system.

2. **Fairly:** Most indicators are present, but some are missing or only partially present.
3. **Somewhat:** Some indicators are present but others are not; or indicators are present, but only to a limited extent.
4. **Not very:** Some indicators are present but most are not.
5. **Not at all:** None or almost none of the indicators are present.

**Table 1: CPI MRV Criteria and Performance Indicators**

<b>OBJECTIVES</b>	- Track achievement of existing policy targets - Inform future policymaking - Inform domestic and international stakeholders					
<b>CRITERIA</b>	<b>Transparency</b>	<b>Comparability</b>	<b>Reliability</b>	<b>Usefulness</b>	<b>Timeliness</b>	<b>Completeness</b>
<b>INDICATORS</b>	<ul style="list-style-type: none"> <li>• Are underlying data publicly available for review and use?</li> <li>• Are data collection and/ or emissions estimating methodologies publicly available and clearly described?</li> <li>• Is transparent expert review part of the reporting process?</li> <li>• Is there a clear identification of sources of uncertainty and methods for measuring it?</li> <li>• Does the system include standardized documentation of methods and key decisions, and strong record-keeping practices in general? Are there consistent procedures for</li> </ul>	<ul style="list-style-type: none"> <li>• Are consistent calculation and reporting methods employed over time, agencies, different levels of government, sectors, and/or policies?</li> <li>• If methodological changes are made, are they applied to previous years' data?</li> <li>• Does the system use internationally accepted units, protocols, methods, etc.?</li> </ul>	<ul style="list-style-type: none"> <li>• Are data collected, and are estimates made, based on sound, well-established, widely accepted methods?</li> <li>• Are data accessible and subject to third-party or public review?</li> <li>• Is the system itself—meaning the institutional and procedural apparatus responsible for developing emissions/mitigation estimates—subject to review either internally or by third parties?</li> <li>• Are data sources likely to be unbiased and accurate?</li> <li>• Is there a process for adopting the most up-</li> </ul>	<ul style="list-style-type: none"> <li>• Is there a clear mechanism for feeding information back into the policymaking process?</li> <li>• Is there strong integration in the institutional structure between policymaking and data collection?</li> <li>• Is information presented in different formats and at different levels of technical detail?</li> <li>• Are data used in quantitative analysis related to policymaking</li> </ul>	<ul style="list-style-type: none"> <li>• Does data collection occur on a regular schedule?</li> <li>• Does reporting occur on a regular schedule?</li> <li>• Is information collected and delivered frequently enough to provide policymakers (and other relevant audiences) a solid understanding of national circumstances/trends or policy performance?</li> </ul>	<ul style="list-style-type: none"> <li>• Are all relevant sectors covered?</li> <li>• Are all relevant gases covered?</li> <li>• Are all years since the base year covered?</li> <li>• Are all relevant source categories covered?</li> <li>• Is geographical coverage complete?</li> </ul>



	archiving results and documents?		<p>to-date methods or otherwise improving estimation methods over time? Are previous emissions and mitigation estimates recalculated using updated methodologies?</p> <ul style="list-style-type: none"> <li>• For all significant sources of emissions, are methods the most sophisticated available?</li> <li>• Does the system include a process for developing and maintaining institutional capacity over time—for example, through a dedicated, permanent staff with relevant expertise?</li> </ul>			
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## 2.2 NON-GHG CO-BENEFITS OF MITIGATION ACTIONS

Most non-GHG benefits of mitigation actions can be explained under the term “sustainable development.” Sustainability can be defined as “*the practice of maintaining processes of productivity indefinitely—natural or human made—by replacing resources used with resources of equal or greater value without degrading or endangering natural biotic systems*”.<sup>13</sup> More specifically, sustainability is a function of social, economic, technological and ecological effects. In the context of climate change mitigation, many of the strategies that reduce GHG emissions produce co-benefits that overlap with national sustainable development priorities. For example, reducing emissions through renewable power generation also expands access to energy, increases employment, and reduces air pollution.

There are numerous indicators and databases that measure the myriad aspects of sustainable development. Macedonia has two sets of its own separate “in-house” indicators that could be used in developing mitigation action MRV system in the country. First, the Ministry of Environment and Physical Planning developed set of environmental indicators in 2012. Second, and probably more relevant, the State Statistical Office established sustainable development indicators in 2014.<sup>14</sup> Either of these sets of indicators can be used in the Macedonian MRV framework. The social inclusion and social development indicators by the State Statistical Office appear to be adequate for inclusion in it.

However, the other Macedonian indicators are more or less general indicators measuring progress on macro level, and may not be usable to measure progress at smaller-scale mitigation action. They largely mirror some of Macedonia’s general policy obligations. For example, the energy and climate change indicators only include aggregate greenhouse gas emissions, total energy demand, energy import dependency, and share or renewables in energy production. Similarly, the sustainable development indicators are on macro level and are not suitable to measure progress of individual projects or measures. Some of them they can measure progress of sector-wide policies.

The first comprehensive set of indicators for use in measuring non-GHG benefits of mitigation actions, specifically of NAMAs, has been developed by the Center for Clean Air Policy<sup>15</sup>. CCAP proposes selecting indicators that will reflect how NAMAs support sustainable development and can best shore up domestic political support and international funding for their implementation. This approach, due to its comprehensiveness, and applicability to any mitigation action—on project level, on sector level, or countrywide—is suitable for Macedonia as well.

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<sup>13</sup> Melvin K. Hendrix, Sustainable Backyard Polyculture: Designing for ecological resiliency, Smashwords ebook edition. 2014

<sup>14</sup> [http://www.stat.gov.mk/Publikaciji/Odrzljiv\\_Razvoj\\_2014.pdf](http://www.stat.gov.mk/Publikaciji/Odrzljiv_Razvoj_2014.pdf)

<sup>15</sup> Center for Clean Air Policy: „MRV of NAMAs: Guidance for Selecting Sustainable Development Indicators“, October 2012, Washington, DC, USA

“In order to limit the burden on human and financial resources to measure and report data, policy-makers should select a small, core list of indicators that are specific, meaningful, measurable, and cost-effective to harvest (if not already being collected). They should also be pertinent and easy to understand. A secondary consideration is whether policy-makers want to compare sub national or project specific data, or highlight sector-wide changes. Developing universal indicators and methodologies will facilitate sub-national comparisons and data aggregation for national or sector specific monitoring. Finally, identifying and disaggregating metrics that show the impact on women and the poor can help promote programs that impact both growth and equity, and do not inadvertently disenfranchise these vulnerable groups.”<sup>16</sup>

There are two basic metrics to account for non-GHG benefits of mitigation action: action metric and sustainable development metrics.

- Action metrics indicate that mitigation actions are being implemented, such as establishing renewable energy portfolio standards or building waste treatment facilities. Progress metrics indicate the results of implemented actions, such as an increase in the renewable share of a nation’s power sales or tons of waste treated. Many of these metrics may already be necessary to measure GHG emissions, and if compared to historic data, can help assess the effectiveness of actions.
- Sustainable development metrics highlight the impact of actions on economic development, the environment, and public welfare. Examples include increased energy security, reduction of ground and surface water pollution, and reduced cost of power and transportation. By addressing citizens’ concern, they are critical to harnessing domestic political support and securing funding from contributing countries that are interested in both stabilizing atmospheric concentrations of GHGs and promoting sustainable development.

Lessons from the CDM include how to account for these benefits within GHG mitigating projects. Similar indicators can be used for GHG mitigating actions. They may include three sustainable development dimensions:

#### **Economic dimension**

- Provides livelihood and economic opportunities
- Provides proper safety nets and compensatory measures for affected stakeholders
- Promotes the use of cleaner, more efficient, environmentally-sound technology
- Provides new financial resources

#### **Environmental dimension**

- Complies with the environmental policies and standards

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<sup>16</sup> Reprinted with the permission of the Center for Clean Air Policy from: „MRV of NAMAs: Guidance for Selecting Sustainable Development Indicators“, October 2012, Washington, DC, USA

- Improves the quality of the environment
- Promotes sustainable use of natural resources

#### **Social dimension**

- Builds local stakeholder capacity through education and training
- Provides local resources and services to vulnerable groups

The full set of indicators is available in Annex 1, and may be used to provide additional metric for Macedonia's mitigation actions.

## **2.3 DETERMINING THE SCOPE OF THE MRV SYSTEM IN MACEDONIA**

International and domestic policy processes in Macedonia are creating new MRV needs. Some are linked to specific statutory requirements; others are less well defined and arise from broader policymaker, stakeholder, and public pressures and demands.

### **2.3.1 UNFCCC reporting requirements**

As highlighted in section 1 Parties to the UNFCCC have agreed to new international requirements for MRV of their GHG emissions and climate policies and actions. This section summarizes the new requirements in greater detail.

#### *2.3.1.1 Annex I parties: Biennial reporting on emissions, mitigation actions, and progress toward targets*

The most significant new MRV need for Annex I parties to the UNFCCC is the requirement to report more frequently on their mitigation actions and progress toward emissions reduction targets.

Starting from 2014, Annex I parties are required to submit biennial reports. These biennial reports will include:

- Information on current GHG emissions and projected emissions for 2020 and 2030;
- Information on progress toward climate mitigation goals;
- Information on mitigation actions and their impacts; and
- Documentation of climate-related support provided to developing countries, including financial, technology and capacity building assistance.

The new reports will supplement parties' National Communications to the UNFCCC, which are the primary mechanism for reporting on mitigation actions and are submitted every four years. Information reported by Annex I parties will be subject to an "international assessment and review" process; this will involve a technical expert review of the biennial reports, as well as a peer review of progress toward emissions reduction goals under the UNFCCC's Subsidiary Body for Implementation.

The new biennial reports for Annex I Parties would have implications for mitigation action tracking systems, as well as for emissions tracking systems. Annex I parties already prepare annual emissions inventories; the biennial reports will require only summary information based on these. However, biennial reporting on mitigation actions is a substantive change, as Annex I parties currently report on mitigation actions to the UNFCCC only every four years. Parties will not be required to use a consistent methodology to report on the impact of their mitigation actions, but the increased frequency of reporting and external reviews will place additional pressure on parties to systematically track the implementation and outcomes of their mitigation activities.

Annex I parties will also be required to clarify their economy-wide emissions reduction targets and report on progress toward those targets. The information requested relates to the assumptions and methodology underlying the target (e.g., base year, gases, and sectors included). Parties are also required to report on their use of international offsets to meet their targets. For this purposes the Annex I Parties have in place national systems to monitor, report and verify GHG emissions.

#### *2.3.1.2 Non-Annex I parties: Biennial reporting on emissions, mitigation actions*

For non-Annex I parties to the UNFCCC, the new reporting requirements represent a significant change in international MRV needs. These parties will be required to report much more frequently and promptly on their GHG emissions than they have previously done.

Non-Annex I parties will be required to submit biennial update reports, with the first reports intended to be submitted by December 2014. The biennial update reports are required to include a GHG inventory not more than four years old. Inventories are only required to include CO<sub>2</sub>, methane, and nitrous oxide emissions. The new guidelines indicate that inventories should expand to include emissions of fluorinated gases, which are significant in some non-Annex I countries; however, this is not required.

Non-Annex I parties are also encouraged to report on mitigation actions, including implementation status and estimates of the impact of mitigation actions, as well as on international market mechanisms and domestic MRV activities. They are not required to use a common reporting format. The biennial update reports will be subject to a process of “international consultation and analysis,” including technical analysis by experts and “a facilitative sharing of views” under the UNFCCC’s Subsidiary Body for Implementation.

The new biennial update reports represent a significant expansion in the scope and frequency of MRV requirements under the UNFCCC. Until now, non-Annex I parties have not been required to produce regular inventories, and they have been encouraged, but not required, to provide information on methodologies and on mitigation actions. Producing inventories with no more than a four-year time lag, and producing updates every two years, will represent a dramatic change from current practices for virtually all non-Annex I parties. To date, the large majority of non-Annex I parties have submitted only one or two National Communications, usually with a gap of 7-9 years. Macedonia, however, has submitted its first three National

Communications in the span of 5 and 6 years. Moreover, its first BUR will be submitted at end of 2014 with a long list of mitigation actions, reflecting the country's status in the European Energy Community and its approximation to the EU.

The process of international consultation and analysis for the biennial update reports will represent the first formal analysis of information submitted to the UNFCCC by non-Annex I parties. Until now, National Communications from non-Annex I parties have not been reviewed.

## 2.3.2 European Union reporting requirements

### 2.3.2.1 Additional emissions monitoring under EU Monitoring Mechanism

The EU has proposed a new regulation on monitoring and reporting relevant to climate change, which if passed would revise the GHG Monitoring Mechanism Decision.<sup>17</sup> The proposed revisions would, in large part, formalize reporting requirements that have been agreed to under existing legislation. They are intended to help the EU and its members comply with new and emerging EU and UNFCCC reporting obligations.

The proposed revisions implement a new review and compliance cycle, established under the Effort Sharing Decision, for member states' binding annual emissions targets. They incorporate enhanced reporting on several topics, including land use, land-use change and forestry (LULUCF), maritime transport, climate adaptation, non-CO<sub>2</sub> impacts of aviation, and the use of revenues from auctioning of carbon allowances under the revised EU Emissions Trading System (EU ETS) Directive. They also introduce reporting on financial and technology support provided to developing countries, which would most likely go beyond the new UNFCCC reporting requirements on support.

The revisions require each EU member to establish a national, integrated system for preparing emissions projection scenarios and evaluating policies and measures. Members would be required to clearly layout the procedures and institutional arrangements for preparing emissions projections, as they currently do for inventory preparation. The revisions also require member states to check that the activity data, background data, and assumptions used to estimate emissions for GHG inventories are consistent with data used for reporting under legislation related to air pollution.

Although Macedonia is not subject to compliance with the EU GHG Monitoring Mechanism Decision as a whole, by virtue of its full status in the European Energy Community, and its EU accession negotiations, Macedonia has agreed to implement many individual EU Directives that imply significant mitigation action on the part of Macedonia, and *ipso facto* imply the need for strong MRV of these actions. Directive on buildings performance, renewable energy, energy efficiency, and others require that compliance is assured through credible MRV system.

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<sup>17</sup> [http://ec.europa.eu/clima/policies/g-gas/monitoring/index\\_en.htm](http://ec.europa.eu/clima/policies/g-gas/monitoring/index_en.htm)

### 2.3.2.2 Revised guidelines under the EU Emissions Trading System

Two new MRV rules are being introduced for the third trading period (2013–2021) of the EU ETS.<sup>18</sup> These new rules are intended to make EU ETS monitoring and reporting of greenhouse gas emissions more complete, accurate, and transparent, and improve comparability across EU members.

The first new rule, on monitoring and reporting, will change some of the requirements for installations that report under the EU ETS but does not significantly change requirements for member states. The second new rule relates to verification: It will allow small emitters (below 25,000 tCO<sub>2</sub>eq/year) to verify their own emissions rather than requiring third-party verification. This opt-out provision is intended to reduce administrative costs.

In addition to the two new rules, other upcoming EU ETS policy decisions may affect MRV needs for EU member states, including the carbon leakage list and potential changes to the auction timetable.

The carbon leakage list, which determines which installations receive a higher share of free allowances, will be revised in 2014. In 2009, when the Commission compiled the first carbon leakage list, ad-hoc data surveys had to be sent out to member states due to a lack of sufficient data. There does not yet seem to be any process in place to gather the necessary data for the upcoming carbon leakage assessment; EU members will likely need to track indicators and submit data to Eurostat, but the nature and size of the reporting burden will depend on guidance from the Commission.

In addition, the Commission is discussing changing the timetable of allowances auctions to improve the functioning of the carbon market. There seems not to be any process in place to evaluate the impact of this measure on the carbon market, so it is unclear what new MRV needs (if any) it would impose on member states or on the Commission. However, in order for the Commission to assess the effectiveness of this measure, it will need to establish indicators for success and track those indicators over time.

Transparent and consistent implementation by EU members is necessary in order to effectively carryout these changes within the EU ETS.

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<sup>18</sup> COMMISSION REGULATION (EU) No 601/2012 of 21 June 2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council

**Table 2: Summary of International MRV Commitments under the UNFCCC and Kyoto Protocol**

	<b>Annex I Party to Kyoto</b>	<b>Non Annex I Party to Kyoto</b>	<b>Macedonia*</b>
<b>GHG Inventory Requirements</b>			
Frequency	Submit annual inventories to the UNFCCC in an electronic format.	No set frequency; can be submitted in hard copy. Upon availability of resources	GHG inventory submitted in electronic format as part of the National Communication or Biennial Update Reports.
Coverage	Trends in emissions of the six primary GHGs <sup>1</sup> , from 1990 to the most recent year for which data is available; includes sectoral background data. Kyoto inventory systems have additional structural detail.	Trends in emissions for CO <sub>2</sub> , CH <sub>4</sub> , and N <sub>2</sub> O only, with estimates for other gases encouraged but not required from 1990 or 1994 for the first inventory and 2000 or later for the second; sectoral background data is not required.	Trends in emissions of the six primary GHGs are reported for 1990-2012, including the sectoral background data.
Standards	Use both the IPCC Guidelines and Good Practice Guidance and thoroughly document emissions estimation methods and data sources.	Use IPCC Guidelines; use of the Good Practice Guidance encouraged but not required. Documentation of methodologies is encouraged.	The IPCC Guidelines and Good Practice Guidance used for reporting and thoroughly document emissions estimation methods and data sources, as well as 2006 IPCC Guidelines for National GHG Inventories.
Methods	Generally adopt higher-tier methods	Generally adopt lower-tier methods	Generally adopt higher-tier methods.
Review	Subject to annual review by expert teams following agreed upon review guidelines. At least once every five years, inventory systems are subject to a more detailed in-country review. Parties to the Kyoto Protocol are subject to more rigorous review, and if review teams determine a Party's inventory report or system is deficient, the Party may be judged to be out of compliance and subject penalties	No subject to review	Subject to voluntary review by experts under the National Communication Supporting Programme (NCSP)
<b>National Communications, BURs, and Mitigation Action Requirements</b>			
NC Frequency	Submitted every five years	No specified frequency	Voluntary, submitted every five years
NC Content	National Communications include a description of each mitigation policy and measure, organized by sector and gas. Description includes status, implementing body, and, if possible, estimated effect on emissions to date and in the future.	Encouraged but not required to report on mitigation policies and measures.	National Communications include a description of each mitigation policy and measure, organized by sector and gas. Description includes status, implementing body, and, if possible, estimated effect on emissions to date and in the future.
BR/BUR Frequency	First one on 1 January 2014, then every two years	First one in December 2014, then every two years	First one in December 2014, then every two years
Content BR/NUR	Outline progress in achieving	GHG inventory not more than	GHG Inventory from 1990-2012



	emission reductions and the provision of financial, technology and capacity-building support to non-Annex I Parties.	four years old Information on mitigation actions	Information on mitigation actions
Actions	Subject to binding national emissions targets, and international monitoring and reporting requirements to verify the achievement of these targets	None	Voluntary international monitoring and reporting requirements
Review of NC	National Communications are also subject to international expert review, conducted in accordance with internationally-agreed guidelines	Not subject to review	Not subject to review
Review of BR/BUR	Subject to international expert review, conducted in accordance with internationally-agreed guidelines.	Process of international consultation and analysis (ICA)	Process of international consultation and analysis (ICA)

*\*Despite the fact that R. Macedonia is not Annex I Party, as an EU Candidate country it is trying to incorporate the Annex I UNFCCC reporting principles as much as possible in the framework of the National Communication or Biennial Update Reports. Sufficient allocation of the domestic budget for this purpose is still not provided and the reporting processes are project based.*

Given the specifics of UNFCCC and EU MRV obligations, Macedonia will need to report on all of its mitigation actions that will reflect its EU and Energy Community commitment, however if Macedonia chooses it may report it via non Annex I country format. This problem is explained in section 1 above. It is in Macedonia's own interest to report on its mitigation actions as if it were Annex I country, because that will best serve the country's policymakers to ascertain the success or failure of policies.

The following table presents the types of mitigation actions that would be monitored, and subsequently reported. For this, a robust national system has to be in place.

**Table 3: General MRV Scope**

Level of Action	Example
Target	National goal (such as reduction of GHG emissions compared to 1990)
Policy (also as NAMA)	Energy efficiency policy RES policy
Project (also as NAMA)	Feed-in-tariff scheme to install xx MW in renewable capacity
Corporate level	Emissions within boundary of a company
Facility level	Facility level emissions
Product level	Product level carbon footprint

## 2.4 QUALITATIVE ANALYSIS OF MRV METRICS

The EU and the Energy Community obligations outlined in the previous section provide the basis for reporting on the progress of all mitigation actions to be undertaken by Macedonia. Even if such reporting may not be required under the present status of Macedonia as a non-Annex I country, the reporting is necessary to determine the country's progress in its EU commitments.

In Table 4 below are listed the specific mitigation actions to be submitted by Macedonia in its Biennial Update Report later this year, plus few selected mitigation actions that stem from the country's commitment as a full member of the European Energy Community. The list of mitigation actions in this table may not be exhaustive, but it is not the purpose of this report to provide a complete list of Macedonia's mitigation actions. Rather, its purpose is to outline framework in which the national stakeholders will elaborate an MRV system that best reflect the specific conditions of Macedonia and its mitigation obligations.

**Table 4: Macedonian National Mitigation Actions**

Mitigation Action	Metric*	Non-GHG Co-benefits	GHG MRV Quality Indicators					
			Transparency	Comparability	Reliability	Usefulness	Timeliness	Completeness
<b>DEMAND SIDE</b>			(example scoring)					
<i>Buildings</i>								
Rulebook on energy performance in buildings	Sectoral energy consumption	Action/policy specific	1 very	2 fairly	3 somewhat	4 not very	5 not at all	1 very
Retrofit measures	Sectoral energy consumption							
Labeling electric appliances	No. of appliances sold by efficiency label							
Information campaigns, EE info centres	No. of centres, No. of campaigns							
New buildings directive – nearly zero energy buildings	Sectoral energy consumption							
Energy efficiency directive – 3% yearly rate of public buildings retrofit	Sectoral energy consumption							
Energy certificates for buildings required when selling	Sectoral energy consumption							
Phase out of incandescent bulbs	Sectoral energy consumption							
Phase out of resistive heating	Sectoral energy consumption							
<i>Transport</i>								
Railway extension to Bulgaria	Project specific							
More bicycle and walking paths	Length of paths							
Increased use of railways	Person km, freight km by rail							
Fuel economy improvements by vehicle replacement	Old vehicles retired							
Renewal of vehicle fleet	Replacement rate							

Mitigation Action	Metric*	Non-GHG Co-benefits	GHG MRV Quality Indicators					
			Transparency	Comparability	Reliability	Usefulness	Timeliness	Completeness
Improvement fuel economy and no tax for registration of hybrid and electric cars	Penetration rate							
<b>SUPPLY SIDE</b>								
<i>Electricity</i>								
The National Renewable Energy Action Plan describing the policies and measures aiming to achieve RES target in 2020	RE share in energy consumption							
Feed in Tariffs	kWh RE electricity generated							
Large Combustion Plant Directive (LCPD) implementation	GHG emissions, conventional emissions							
Decreasing losses in distribution	GJ energy saved							
Market	Efficiency of generation ,transmission , distribution							
CO2 + market	GHG emissions							
More renewables	RE share in energy consumption							
<i>Heat</i>								
More heat pumps	Penetration rate, sectoral consumption							
More district heating	Penetration rate, sectoral consumption							
More solar collectors	Penetration rate, sectoral consumption							
<i>Transport</i>								
Bio fuels – voluntary	Penetration rate, sectoral consumption							
10% Bio fuels	Penetration rate, sectoral consumption							

\* Specific metric may change depending on data availability

#### 2.4.1 Determine full list of mitigation actions

Up to now, the MRV framework has been described in general terms that can be applied to more or less any country. But, from now on country-specific approach is required. The first order of business is to prepare a full list of mitigation actions that will effectively be part of Macedonia's INDC. The first step in this direction is information contained in Macedonia's First Biennial Update Report—to be submitted in December 2014—which contains a great number of mitigation actions, both sectoral policies and actions, and individual projects. Further, Macedonia has indicated that it will submit its INDC by August 2015 at the latest. Both of these sets of documents are needed to determine the full scope of mitigation actions and projects that are to be undertaken by the country, stemming from its obligations in the European Energy Community and EU accession negotiation.

In respect to its INDC, it should represent what Macedonia considers to be a fair and ambitious reflection of its responsibilities and capabilities and must be accompanied by upfront information. The official guidance by the Convention is that the kind of up front INDC information that a Party should provide, as well as which elements of the common MRV and accounting rules base will apply to its mitigation commitment, should follow from the Party's choice of INDC. Parties with the greatest responsibilities and capabilities should come forward with INDCs in the form of economy-wide absolute targets relative to a historical base year, including those Parties that currently have such commitments pre 2020 to ensure that there is no backsliding. While other types of commitment might be appropriate for Parties with fewer responsibilities and less capability, all Parties should aspire, over time, to eventually having economy-wide absolute targets because they provide the greatest certainty on emissions reductions while giving Parties flexibility on how to achieve those reductions.

So, while in the short-term Macedonia may go with sectoral, or even project-based MRV for some mitigation actions—where it can utilize its existing accumulated CDM MRV capacity and expertise—in the long-term it will probably assume economy-wide targets like EU Member States. This will certainly require good national MRV system that will be able to account for individual mitigation actions or projects, as well as tracking sectoral and economy-wide actions.

#### 2.4.2 Determine the right metric for a given mitigation action

Each mitigation action will require its own unique metric by which the **baseline and the progress** of the action can be measured.

##### 2.4.2.1 *Baseline v. Progress*

Great part of the data for each mitigation action's baseline will be obtained from the country's GHG inventory. However, the inventory is not renewed annually, or even biannually. This poses a problem for tracking mitigation action progress, because many of those actions are obligations under the EU or Energy Community commitments. It is not necessarily that the data is needed for reporting to the EU every year. Rather, Macedonian policy makers should need the data to measure progress of the policy to which have committed the country. Thus,

more frequent measures of progress of a given mitigation action needs to be taken, than is allowed by the national GHG inventory, and more detailed as well.

It is the task of the domestic stakeholders involved in policy implementation, statistics and data collection, and in economic, econometric, and energy modeling to brainstorm and determine the right mix of baseline data and progress data for each mitigation action. Selecting the right data may be sometime easy, because there might be just one set of data available. At other times, “hard” data will not be available and assumptions and estimations will be required. This may be especially true with some energy end-use data, such as disaggregation of household energy use by appliances, lighting, electric heating, etc. Expert estimates are required in those instances.

#### **2.4.3 Score each metric by MRV quality criteria**

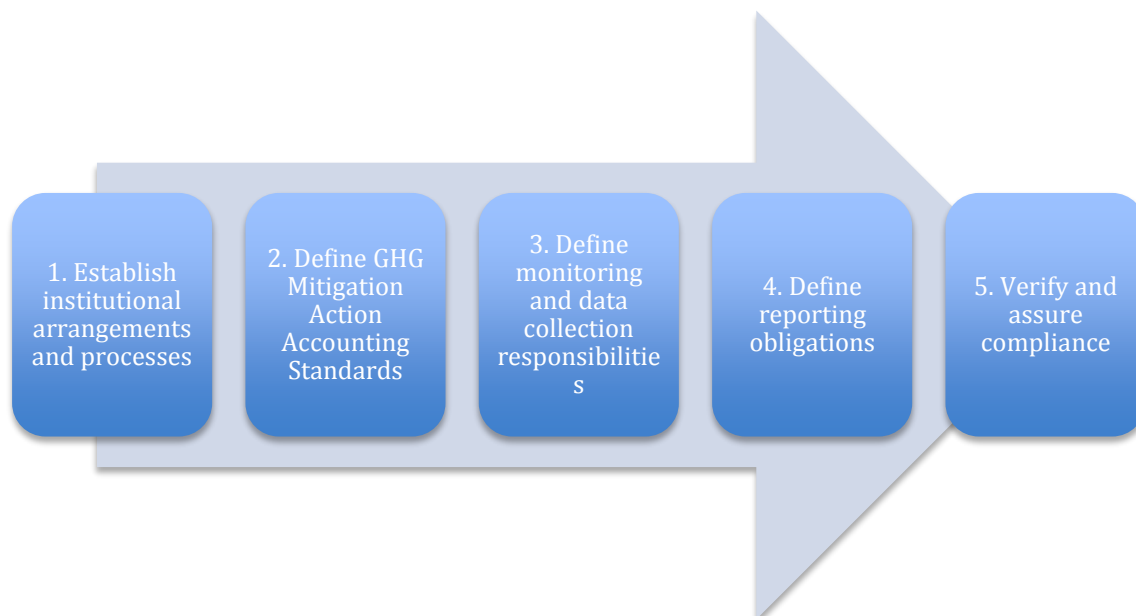
The metric for each mitigation action should be evaluated according to the criteria and indicators given in Table 1. This will be a process performed by brainstorming among data and policy experts, and may require some back and forth. If initial data set or metric defined for a particular mitigation action is deemed too unreliable, the data will have to be refined or changed in order to score a passable mark. What will be a passable mark will have to be determined by the experts. Clearly, size will matter here. Action that represents a good share of GHG mitigation will need to rely on good numbers. Inversely, action that is negligible should not consume disproportionate amount of energy and resources in data collection. Sometimes best estimates will have to serve their purpose.

#### **2.4.4 Assess non GHG co-benefits**

There are a number of metrics that can be used to measure how mitigation actions support sustainable, economic, or social development. One possibility is to use the indicators developed by CCAP, discussed in Section 2.1, and presented in Annex II of this report. Each action must be assessed separately, with a view to Macedonia’s national priorities. This will determine which metrics most compellingly measure the effect of implemented policies on the economic growth, poverty reduction and protection of the environment. The selection of such indicators, unlike those measuring GHG, is more subjective. Nonetheless, the indicators should be specific, measurable, cost-effective to harvest, relevant, understandable and most importantly meaningful to policy-makers and contributing countries. The MRV of sustainable development metrics can be potentially costly, requiring capacity building, technology, and significant human and financial resources for harvesting and analyzing data.

### 3 PATHWAY FOR IMPLEMENTING MRV FRAMEWORK IN MACEDONIA

The pathway for establishing MRV framework in Macedonia lies in taking the five broad steps. Each of the steps involves its own particular processes and difficulties. Some of the steps will be directly determined by results of further analysis. The five steps are:



We discuss the five steps in detail in the discussion below. A combination of the elements of these steps can present the national MRV system for Macedonia.

#### 3.1 STEP 1: ESTABLISH INSTITUTIONAL ARRANGEMENTS AND PROCESSES

The first step in the design of the MRV framework is to identify institutional responsibilities for policymaking, data collection, data analysis, reporting, and quality control and quality assurance (QC&QA). These responsibilities must be clearly defined in order to assure quality of data collection, monitoring of mitigation policy and action, and reporting. We will have to identify institutions that are or will be responsible for:

- Designing the overall climate change mitigation policy (having political responsibility)
- Implementing each mitigation policy/action, and for monitoring of its progress
- Developing accounting standards and/or data and information collection templates to comply with required data collection
- Monitoring and collecting data to inform the respective policy maker about policy progress success

- Analyzing collected data and information
- Reporting
- Quality control and quality assessment

Although policy coordination and advisory roles exist within the Ministry of Environment and Physical Planning, the real **political responsibility** rests with the Office of the Prime Minister and the Macedonian government as a whole. There is no single Ministry that has overall coordination role for climate change mitigation policy, because such policy is being carried out by several ministries at once. The key ministries in charge of individual policies affecting mitigation are:

- Ministry of Environment and Physical Planning.
- Ministry of Economy. This ministry implements most of the policies, activities and projects that directly and indirectly impact climate change mitigation. These policies include renewable energy and energy efficiency, power sector market policies, oil and gas policies, and conventional pollutants control on combustion installations.
- Ministry of Agriculture, Forestry and Water Economy. This ministry is in charge of the policies and their implementation for two highly important sectors vis-à-vis climate change mitigation. Namely, the agriculture and forestry, which is the most important sink resource in the country.
- Ministry of Transport and Communications.

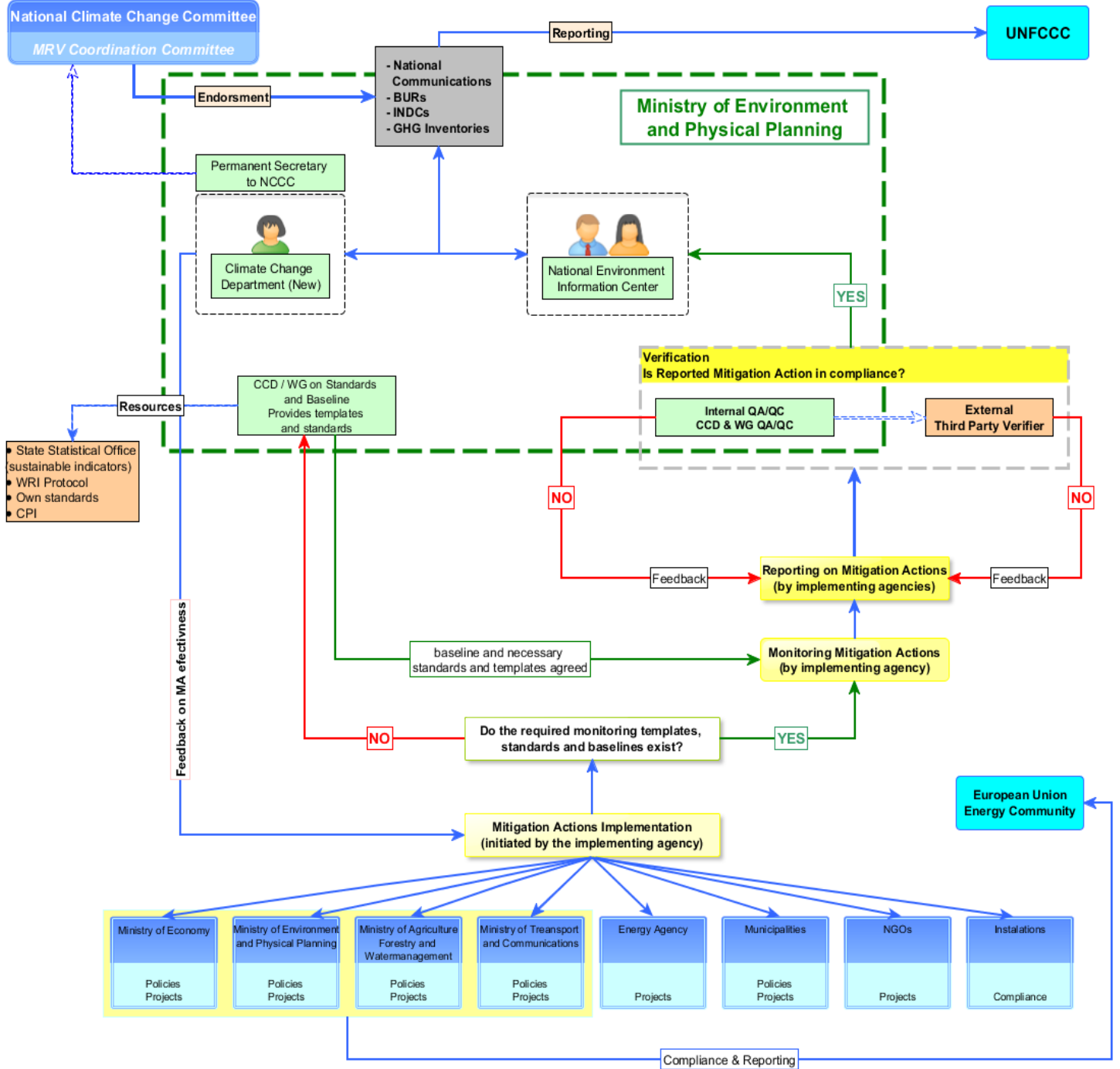
Additionally, the National Climate Change Committee has overall information and coordinating role for climate change policies. The NCCC is especially critical for two specific reasons: 1) it endorses reports submitted under compliance obligation to the UNFCCC, and 2) it serves as broad stakeholder forum for climate change policy discussions and implementation.

Each of these agencies is already responsible for the implementation of their own policies and actions that are embedding strong mitigation component. Regardless of climate change mitigation, each such agency already monitors whether such policy or action performs as expected and delivers results. It is thus natural that each agency assumes the responsibility to track effect of such actions on mitigating climate change. Unfortunately, at present none of these agencies report on historical greenhouse gas emissions though they have that possibility at least on an *ex-post* base. In such situation, the Ministry of Environment and Physical Planning should establish its own unit that calculates GHG emissions based on various reports produced by these agencies.

Having this in view, we recommend an institutional arrangement detailed in *Figure 2* below that involves the key Macedonian institutions. However, the main precondition of this institutional arrangement is the existence of appropriate legal regulation that will establish (1) rights of institutions to require monitoring of and reporting on the policies and actions, and (2) obligations of other institutions to provide such data and information. In this respect, in separate report the national consultant provides specific recommendation for legal amendments of the Law on Environment.



**Figure 2: Recommended Institutional Arrangement and Processes for MRV of Climate Change Mitigation Actions in Macedonia**



## 3.2 STEP 2: DEFINE GHG MITIGATION ACTION ACCOUNTING STANDARDS

This is an important step that will largely depend on the analysis that needs to be performed following the guidance of Chapter II of this paper: **Methodological Approach to Developing MRV Framework in Macedonia**. Having in mind that no standard approach to evaluating the effectiveness of MRV systems exist at present, Macedonia should perform the full analysis as recommended in Chapter II, and to decide thereafter how to proceed. Namely, based on the analysis' results, the Country may choose among several options that will be available. These options are briefly elaborated further below.

**First**, using the results of this analysis, Macedonia may choose to develop its own and unique mitigation action accounting standards. The advantage of this approach would be tailor-made accounting tool that will reflect on the specific Macedonian circumstances, such as data quality and data availability, as well as the existing capacities to undertake specific tasks and work necessary. However, this approach is having an obvious disadvantage in terms of the requirement for a relatively large volume of work that would have to be carried out in order to develop own full GHG accounting standards.

**Second**, Macedonia may choose to use the Policy and Action Standard, possibly alongside with the Mitigation Goals Standard, that are developed by the World Resources Institute to account specifically for tracking changes over time of mitigation policies and goals. This standard was developed by the Greenhouse Gas Protocol (GHG Protocol), a partnership of businesses, NGOs, governments, academic institutions, and others, convened by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD).<sup>19</sup>

The Policy and Action Standard helps users to assess and report the GHG effects of policies and actions in an accurate, consistent, transparent, complete, and relevant way. The Standard provides a method for estimating GHG reductions from specific interventions, similar to project-level accounting. Obviously, the benefit of this option is in that it will in essence be costless and yet of high quality.

However, the disadvantage of the second option is in the nature of the Policy and Action Standard that applies to broader policies or actions, such as the renewable energy policy at the sector or jurisdiction level, rather than to individual mitigation projects, such as an individual solar photovoltaic installation.

Then again, the standard is applicable to policies and actions at any level of government (national, regional, municipal), in any sector, such as energy supply, residential and commercial buildings, industry, transportation, waste, and AFOLU (agriculture, forestry, and other land use).

Another benefit of this standard is in that it may be useful in the future as well, for estimating

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<sup>19</sup> <http://www.ghgprotocol.org>

the GHG effects of any Macedonian NAMAs that will be framed as policies or programs. It may also be useful for actions that comprise low-emissions development strategies (LEDS) and other national development plans.

**Third**, Macedonia may choose to combine the first two options. It can use some tools, methodologies, and approaches of the WRI Policy and Action Standard and adopt them to its own circumstances, without necessarily adopting the full WRI Standard framework. Alternatively, Macedonia can use the whole WRI standard for some mitigation actions accounting, for example for the most significant policies and measures with large impact on GHG emissions, and only some elements of the WRI standards, such as data templates, for some other mitigation actions.

Having in view the existing capacities and time limit, the consultants recommends the third approach. Namely, it provides readily made full accounting standard for the “big ticket” items, such as energy policy, where precise and accurate monitoring is most wanted, while giving the flexibility to monitor lower impact policies more flexibly and less expensively.

### 3.3 STEP 3: DEFINE MONITORING & DATA COLLECTION RESPONSIBILITIES

Monitoring and data collection for tracking and evaluating mitigation policy and action is a complex process that usually involves multiple agencies and ministries, each with its own responsibility for a particular mitigation policy or project that needs to be tracked. What makes it more difficult is that historically, most of the institutions in Macedonia responsible for such policy have not tracked effects of these policies on greenhouse gas emissions or sustainable development. Institutions that will perform the monitoring and data collection

#### Box 1: Standardized Templates

*The WRI GHG Protocol Initiative is developing two new standards: 1) the Policy and Action Standard, which provides guidance on quantifying the greenhouse gas effects of policies and actions, and 2) the Mitigation Goals Standard, which provides guidance on tracking progress toward national and sub-national GHG reduction goals. WRI is developing the standards through a global multi-stakeholder process which has provided very useful results to date, including sample **reporting template** that includes all of the reporting requirements of the Greenhouse Gas Protocol Policy and Action Standard. The collection of data under the Macedonian MRV framework could be carried out using these WRI templates as a starting point for tracking individual mitigation policies and actions.*

*Source: <http://www.ghgprotocol.org/policy-and-action-standard>*

thus need standardized forms, tables, spreadsheets, or databases that they will use to compile the information.

Again, Macedonia has two essential options to consider when defining how data and information on mitigation policies and actions will be collected and assessed. It can either develop its own accounting standard and processes, or it can utilize the Policy and Action Standard of the WRI that helps users to assess and report the GHG effects of policies and actions in an accurate, consistent, transparent, complete, and relevant way.

To maintain consistency in data quality,

it is recommended that all implementing agencies of mitigation actions be provided with **standardized templates** (See Box 2) for tracking individual mitigation actions, policies, and projects. These templates and manuals for their use should be developed by the future new **Climate Change Department (CCD)** of the Ministry of Environment and Physical Planning for which purpose the CCD may aspire to set up a special **Working Group on Data Standards and Baselines**. Such working group should include as minimum representatives of the individual agencies and ministries responsible for monitoring their respective mitigation actions, because these representatives will have detailed knowledge what type of information is readily available, and what information might needs extra effort.

One very important aspect is that the data collection templates should require compiling of information that is available at reasonable effort and cost, including their accuracy. Whenever possible, the data collection templates and manuals should use standardized methods for compiling activity data, and use standardized emission factors.

The challenge for data collection will be tracking activity data and assigning effects of individual policies and measures on activity data to individual policies and measures in cases when more than one policy has an effect on a particular activity data. For example, energy use in buildings will be affected by several policies, such as the Buildings Performance Directive, the Renewable Energy Directive, the Feed-In-Tariffs and the Net Metering Policies, and the Energy Efficiency Directive. Accurately determining the effect of each of these policies on buildings energy consumption—and greenhouse gas emissions—is important. However, such determination should be done by collecting standardized information as much as possible.

### **3.4 STEP 4. ESTABLISH REPORTING PROCESSES AND OBLIGATIONS**

Reporting of mitigation actions should comply with the spirit and the intent of the Convention (see Section 1), which means that measurable, reportable and verifiable nationally appropriate mitigation commitments or actions, including quantified emissions limitation and reduction objectives, by all developed country Parties, should be reported, while ensuring the comparability of efforts among them, taking into account differences in their national circumstances.

In this respect, Macedonia, as an EU candidate state and signatory of UNFCCC, should report at a minimum the following type of information:

- Defining the policy or action
- Identifying effects and mapping the causal chain
- Defining the GHG assessment boundary
- Estimating baseline emissions
- Estimating GHG effects ex-ante
- Monitoring performance over time of GHG reductions and goals

- Estimating GHG effects ex-post
- Assessing uncertainty, and verification

The above reporting obligations go beyond current reporting requirements placed on Non Annex I countries. However, Macedonia cannot select to report as if it is a Non Annex I country without obligations to reduce or limit GHG emissions, since the country had already assumed such obligations upon itself under its membership in the Energy Community that will be further strengthened during the future process of negotiation for membership in the EU. And those obligations carry the burden of reporting on the status of implementation. Thus it is only natural that Macedonia will report such information also to the UNFCCC.

The Reporting to the UNFCCC should be standardized and ideally performed by a single institution. We recommend that this institution should be the Ministry of Environment and Physical Planning with the new Climate Change Department being in charge for all reporting obligations to the UNFCCC, while the National Environment Information Centre will manage and publishes the GHG inventory.

Needless to say that these reports developed under the guidance of the CCD prior to being submitted to the UNFCCC ought to be endorsed by the National Climate Change Committee in order to reflect the broad stakeholder acceptance.

In addition to the reporting to the UNFCCC, the CCD can provide the agencies that are implementing mitigation policies and actions with the feedback information on the effectiveness of their mitigation. This two-way type of communication will provide more effective and more detailed feedback to the implementers than they may get from the National Communications or BURs.

### 3.5 STEP 5. ENSURE VERIFICATION, DATA ANALYSIS AND QUALITY ASSURANCE

The GHG assessment results are the ultimate subject matter assessed in the verification/assurance process. To verify that these results represent a true and fair account of the change in GHG emissions and removals resulting from a policy or action, the verifier assesses whether all the requirements of an accepted **accounting standard** are met.

Each step in the verification process constitutes a subject matter. The verifier needs to check that the information reported meets the requirements and that the methods and assumptions used are reasonable. A list of the main steps, or subject matters, involved in the estimation of GHG effects is included below:<sup>20</sup>

- The causal chain and list of all potential effects considered in the assessment
- The definition of the GHG assessment boundary around significant effects

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<sup>20</sup> World Resources Institute, 2014, Policy and Action Standard: An accounting and reporting standard for estimating the greenhouse gas effects of policies and actions

- The baseline methodology and assumptions
- The ex-ante and/or ex-post assessment methodology and assumptions
- The treatment of policy interactions
- The data collection and monitoring of the policy or action effects over time
- The assessment of uncertainty
- The assessment report

Ultimately, the competent authority (the Ministry of Environment and Physical Planning) should ascertain, and report on, whether the GHG assessment results were verified, and if so, the type of verification (first party or third party), the relevant competencies of the verifier(s), and the opinion issued by the verifier.

For Macedonia, we recommend that it uses two types of verification/quality control assurance processes:

- Full **third party verification** of few key policy instruments with significant impact in GHG emissions.
- “In house” **quality control/quality assurance**, using protocols and quality assurance guidelines.

Both, full third party verification as well as “In house” QC/QA need an accounting and reporting standard against which to assess the quality of the data, the data collection processes, assumptions made, and the resulting values and results. As we mentioned a number of times earlier, one such standard already exists specifically for assessing mitigation actions: The Policy and Action Standards of the WRI. Macedonia may select this standard, or it may opt to develop its own standard, using elements of the WRI standard.

We recommend that for the third party verifiers, the Ministry of Environment and Physical Planning should establish accreditation standards. The Ministry could automatically approve accredited verifiers under UNFCCC, and could develop criteria for other (domestic) verifiers. Several accreditation processes are known and available from other countries or from the UNFCCC. For some future Macedonian policies, such as the EU emissions trading scheme, third party verification is a required compliance step that must be taken by the participating installations. Thus it will not be an option not to have third party verification for some mitigation policies.

The “in-house” QC/QA should be performed by the Climate Change Department in close cooperation with the Working Group (WG) on QC/QC. To avoid conflict of interest, this WG should preferably not include representatives of institutions whose compliance is being assessed. Thus, several QC/QA working groups could be established to avoid this conflict of interest.

The purpose of the “in house” checks is to determine the level of confidence that the information reported is relevant, complete, accurate, consistent, transparent, and without material misstatements. Specifically, the process should inform whether monitoring of the respective mitigation actions has been performed in compliance with the prescribed templates, and whether the collected data is complete. Verification in this instance cannot ascertain whether each and every data provided by the monitoring institution is accurate. The ultimate purpose of the QC/QA process is to determine whether the collected data as a whole provides information of sufficient quality and quantity to infer from it effects of mitigation actions on greenhouse gas emissions and other effects, as described in earlier chapters.

**Box 2: WRI GHG Protocol List of Tools and Methods**

*The WRI Policy and Action Standard provides a list of resources that is intended to help users implement the GHG Protocol Policy and Action Standard. This spreadsheet can be sorted by sector and type of resource, and includes guidance, manuals, models, methodologies, standards, databases, and other tools. The list of tools and methods is very extensive as it includes over 300 separate entries. Before using a resource, its documentation should be reviewed for transparency, completeness, and applicability.*

*Source:  
<http://www.ghgprotocol.org/policy-and-action-standard>*

This means that the verification process involves an evaluation of whether the requirements of the standard have been met; that the GHG accounting and reporting principles have been followed; and that methods and assumptions chosen are reasonable. Verification should be a cooperative, iterative process that provides feedback, allowing users to improve accounting practices.

Members of the WG on QC/QA are encouraged to consult a very useful compilation of tools and methods on GHG mitigation action and data collection and assessment compiled by WRI (See Box 2). This tool can serve as a very useful reference and resource for data quality

assurance, and especially for using the correct methodologies for tracking mitigation actions and policies, even if the MRI Policy and Action Standard is not selected by Macedonia as its preferred GHG accounting tool.

### **3.6 MRV FRAMEWORK PRECONDITION 1: ESTABLISHING FORMAL AGREEMENTS TO FULFIL MONITORING AND REPORTING ACTIVITIES**

The MRV of mitigation actions is a long distance event that will spread over decades. It will be necessary to formalize roles of institutions through laws, decrees or other legal instruments, in order to formalize the system, and define procedures, relationships, and responsibilities.

In parallel with the development of the Conceptual Framework for Monitoring, Reporting and Verification of Climate Change Mitigation Actions, the National Expert on MRV was requested to draft a proposal for legal amendments to embed the Conceptual Framework in the national legal system. This report is presented as a separate document, and this section only summarizes the national expert’s conclusions. The national expert’s proposals are attached as Annex IV-VI to this report.

Having reviewed the existing legal framework, the consultant is of an opinion that the best approach for such a task would be to include appropriate legal provision(s) in the existing Law on Environment that would enable for adoption of the secondary legislation as well. However, as the MOEPP is planning to draft a completely new legislation that will deal with the climate change (the working title is the Law on Climate Action), the consultant strongly recommends all MRV aspects to be included in this law.

In this regard, this report is presenting proposals for three various legal documents:

- Draft provision for amending the Law on Environment (Annex IV);
- Draft Decision on establishing the List of mitigation policies and actions including the respective entities responsible for their implementation, and monitoring and reporting of their progress thereof (Annex V);
- Draft Rulebook on the methodology and schedule of the monitoring, reporting and verification system (Annex VI);

The Draft Rulebook follows the process of the MRV System as presented in Figure 2 above.

### **3.7 MRV FRAMEWORK PRECONDITION 2: GETTING THE PHYSICAL, HUMAN AND FINANCIAL RESOURCES**

The information must have proper flow, and the monitoring system should have preferably an online and systematized platform. This platform should be easy to access and user-friendly, with a procedure instruction manual. The platform should also provide reports and information, according to the reporting needs under UNFCCC, as well as under the EU obligations.

These steps will need to be carried out by trained professionals. The Macedonian government stakeholders need to commit themselves to the required resources to provide long-term stability to train and maintain in employment, the required personnel.



# ANNEX I: MACEDONIA'S LIST OF UNILATERAL NAMAS SUBMITTED UNDER APPENDIX II OF THE COPENHAGEN ACCORD

## Nationally appropriate mitigation measures for the Republic of Macedonia

GOALS		ACTIONS
<b>I. GHG emission reduction in electric power sector</b>		
I.1	Harmonization and implementation of EU legislation in Energy and Climate	- Energy and Climate Package - Liberalization of energy markets (electricity and gas)
I.2	Ensuring stability in energy supply with investment activities for building new big hydro power plants	HPP Boskov Most HPP Galiste HPP Cebren
I.3	Ensuring stability in energy supply with investment activities for building new thermal power plants on gas	CHP Skopje 230 MW CC gas (200-300 MW)
I.4	Increasing the share of renewable in the energy sector	Small hydro power plants Wind power plants Biomass electricity and PV panels
I.5	Improvement of the energy efficiency	- Building plants for production of combined heat and electrical energy (CHP). - Measures for reducing the losses in transmission and distribution of electricity. - Measures by the electricity consumers by introducing more efficient lamps, more efficient electric appliances etc. - Animation of the interested investors with favorable legal regulations and tax relieves.
<b>II. GHG emissions reduction in the industrial energy transformations and heating sector</b>		
II.1	Reduction of the use of carbon intensive fuels	Replacement of coal with liquid or gaseous fuels; replacement of liquid fuels with gaseous fuels
II.2	Improvement of the energy efficiency and energy saving	- Improvement of the energy efficiency of the boiler plants with permanent maintenance; - Replacement of old equipment in boiler rooms, with regular revitalization works; - Installation of measurement-regulation equipment and automatic control systems; - Better insulation, maintaining clean heat exchanging surfaces; - Utilization of heat content in flue gases; - Reduction of loses in systems for transportation of fluids; - Heat insulation of pipelines for transport of water, steam, fuels etc.; - Reduction of specific consumption of energy in the industry by introduction of up-to-date technologies and processes; - Improvements of the performances of thermal cycle; - Improvement of the standards for construction of buildings, better insulation, use of high quality materials
II.3	Increasing of the contribution of renewable energy sources in the country's energy balance	- Utilization of waste biomass as an energy source and as a raw material for production of briquettes and pellets;

		<ul style="list-style-type: none"> <li>- Installation of tens of boiler units on waste biomass in the agro-industry complex, industry sector and in households;</li> <li>- Rehabilitation, revitalization and expanding of the geothermal system Geoterma-Kochani;</li> <li>- Revitalization of other systems on geothermal energy;</li> <li>- Introduction of solar energy systems for heating and hot water supply (in hotels, hospitals, schools, public buildings, health resorts etc.)</li> </ul>
II.4	Awareness raising of the final consumers	<ul style="list-style-type: none"> <li>- Reduction of energy consumption in the households with measures of energy saving</li> <li>- Reduction of electricity use for heating</li> <li>- Introduction of measurement equipment and charging in accordance to the consumption</li> </ul>
<b>III. GHG emissions reduction in the transport</b>		
III.1	Improvement of the overall efficiency in the transport sector and energy efficiency of the vehicles	<ul style="list-style-type: none"> <li>- Revitalization, extension and better maintenance of the road and railway infrastructure;</li> <li>- Extension-spreading of the electrification of the railway network;</li> <li>- Modernization of the vehicle fleet;</li> <li>- Motivation for wider use of alternative fuels and other power systems (LPG, CNG, biodiesel, hybrid vehicles etc.)</li> </ul>
III.2	Improvement of the public urban and inter-city transport	<ul style="list-style-type: none"> <li>- Improvement in the planning, organization and control of the traffic;</li> <li>- Measures for regulation of the traffic in central urban areas;</li> <li>- Modernization of the transport equipment for the public traffic;</li> <li>- Synchronization of the road signalization in the towns;</li> <li>- Introduction of electronic pay toll charging;</li> <li>- Introduction of electrically driven types of transport, i.e. tramway;</li> <li>- Railway transport – electrification of the railway network</li> </ul>
III.3	Harmonisation of the national legislative, regarding the transport sector, with the European Union directives	<ul style="list-style-type: none"> <li>- Energy and Climate Package ( biofuels)</li> <li>- Regulation on fuels quality in accordance with the European Union norms</li> </ul>
<b>IV. GHG emissions reduction in the waste sector</b>		
IV.1	GHG emission reduction at the existing landfills	<ul style="list-style-type: none"> <li>- Technical improvement of the existing landfills</li> <li>- Installation of methane recovery and flaring systems at selected landfills</li> </ul>
IV.2	Improvement of the possibilities for efficient methane collection	<ul style="list-style-type: none"> <li>- Construction of regional solid waste disposal sites</li> </ul>

IV.3	Reduction of the nitrous oxide (N <sub>2</sub> O) emissions.	Implementation of legal measures for restriction of the economic activities that include uncontrolled burning of the waste Raising public awareness for restriction of the uncontrolled burning of the waste
IV.4	Reduction of the methane emissions from the wastewater	Expansion of the wastewater treatment plant network
<b>V. GHG emissions reduction in the agriculture and forestry</b>		
V.1	Enabling favourable pre-conditions for GHG emission reduction (laws, bylaws, institutional measures, support measures)	-Transposition and implementation of EU CAP legislation -Completion of institutional and legal reforms in irrigation sector -Increasing of the institutional and individual capacities for application of the available EU funds -Development of system for application of Good Agricultural Practices -Financial support for motivating the farmers to use mitigation technologies
V.2	Introduction/development of GHG mitigation technologies in agriculture	-Installation of methane recovery and flaring systems at selected farms -Research support program for development of new mitigation technologies and transfer of the existing ones -Program for introduction of practices that use the agriculture potential for renewable energy and carbon sequestration -Programmatic CDM projects
V.3	Strengthening the national and local capacities for carbon financing	-Training for CDM potential in agriculture -Training for preparation of CDM documentation
V.4	Education (of experts/farmers/decision makers) for application of mitigation measures/technologies in agriculture	-Current curricula and syllabuses upgraded with CC mitigation issues -Training of farmers for adopting new technologies -Familiarization of public and institutions with the problem of CC mitigation
V.5	Implementation of the national strategic documents in the forestry	-Forestation and re-forestation -Prevention measures against fires -Prevention of illegal cut

## ANNEX II: MENU OF SUSTAINABLE DEVELOPMENT METRICS, BY SECTOR

Drawing from the broad literature on sustainable development metrics as applied to activities that reduce GHG emissions, a menu of sustainable development indicators developed by the Center for Clean Air Policy<sup>21</sup> is presented for the following five sectors: Transportation; Renewable Power Generation; Residential, Commercial and Public Building Energy Efficiency; Industrial Energy Efficiency; and Waste Management.

Macedonia can use this menu to select a set of core indicators that best fit its national circumstances. Besides this menu of indicators developed specifically for mitigation actions (NAMAs), the sustainable development indicators developed by the Macedonian State Statistical Office and the Environmental Indicators by the Ministry of Environment can also be used, although some of them are too general. A brief analysis of these indicators is provided in Section 2.2

### TRANSPORTATION TRANSIT-ORIENTED DEVELOPMENT (TOD)

The TOD is an urban planning model that promotes the construction of strategic, mixed-use real estate within walking distance of high-capacity public transport. In addition to reducing emissions, sustainable urban development minimizes public infrastructure expenditures, reduces transportation and energy costs for users, increases neighborhood property values, and stimulates growth in the retail sector.

A key component of the TOD is creating a multi-modal transport system, including pedestrian and bike access ways, centered around a bus rapid transit (BRT) system or other high-capacity public vehicle system (e.g., light rail, subway, or high efficiency bus). The efficient public transportation systems are a pillar of sustainable development, connecting people to employment, schools, clinics, and commerce. Services elevate the poor in particular, who spend a significant portion of their income and time on commuting. Further, by relieving traffic congestion, cities are able to liberate hours of economic productivity and energy otherwise spent on roadways while reducing harmful emissions. Thus developing a comprehensive transit infrastructure surrounded by well-planned, mixed-use real estate has become a priority for many developing countries.

#### Economic Indicators

Public expenditure – TOD can induce a shift to more efficient land uses by creating high density communities that efficiently serve a greater number of residents while minimizing

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<sup>21</sup> Reprinted with the permission of the Center for Clean Air Policy from: MRV of NAMAS: Guidance for Selecting Sustainable Development Indicators, Julie Cerqueira, Stacey Davis, Steve Winkelman, Center for Clean Air Policy, October 2012.

infrastructure investment needs, such as water, sewer and electricity. Additionally, policies that lower use of low occupancy vehicles can reduce expenditures for road infrastructure construction and maintenance. Thus, TOD defers or avoids costs associated with public infrastructure, creating significant public expenditure savings

**Tax Revenue** – High-density populations in accessible urban areas can increase foot traffic at local businesses, thereby increasing retail sales. Additionally, demand for property in well-planned neighborhoods is often high, increasing property values. TOD thus generates additional tax revenues from these sources.

**Job creation** – Building public transit infrastructure creates temporary jobs in construction. The operation and maintenance of these systems also create significant numbers of permanent jobs. However, many people are employed by the informal transportation sector, especially the poor. As low carbon transport modes displace the informal sector, jobs in that sector will be lost. Thus, job creation in the transport sector should consider net number of jobs created.

**Leveraging of private financing** – Creating accessibility to neighborhoods through public transit can stimulate economic growth along public transit corridors. Public urban planning and investment in transport infrastructure can significantly leverage private sector investment in real estate. Several leverage ratios can be used to represent this indicator, including ratio of total funding to public funding; the ratio of private funding to public funding; or the ratio of public climate finance to broader public and private finance.

**Energy Security** - A shift to efficient public transport and non-motorized transit reduce overall transport related energy demand. The impact of these policies on energy security can be measured as the reduction in share (%) of imported oil.

**Fuel intensity** – High-occupancy vehicles and non-motorized transport reduce average fuel consumption per passenger-kilometer, or one kilometer travelled by one passenger. Declining fuel intensity trends can be an indicator of a long-term structural shift to low-carbon transport modes, such as the permanent decommissioning of obsolete buses and growing share of passenger trips via fuel-efficient buses.

**Fuel savings per capita** – Reducing private vehicle use decreases fuel consumption, in tons of oil equivalent saved. By measuring fuel savings per capita, the indicator accounts for population growth. Fuel savings are especially important for fuel-importing countries that may be less energy secure.

## **Social Indicators**

**Travel distance and time** - Traffic congestion on roadways increases the duration of passenger-trips and leads drivers to use circuitous routes to avert traffic, thereby increasing the distance travelled. Additionally, poor public transit design causes multiple transfers in often-inefficient segments to reach a destination, increasing both the distance and time travelled. Multi-modal and public transit projects reduce the time (hours) and distance (km) travelled per passenger-trip.

Access to public transit – To make serious gains in poverty alleviation, increasing access of disadvantaged groups to public transportation, and thus employment, is critical. This can be measured by the share (%) of population with access to low-carbon transport within a pre-determined distance of high-frequency transit, and can be disaggregated by socio-economic class, gender and geography to ensure equitable access.

Cost of transportation – For many urban poor, the cost of public transportation can present a significant barrier to access. Thus measuring the cost of public transit in comparison to other transportation modes in terms of average cost per passenger-trip or share of household income spent on transportation can give insight into the affordability of transport options.

Health – Vehicle emissions are one of the primary causes of urban air pollution. Measuring the change in respiratory infections per population is an indicator of the health impact of air pollutants as actions help reduce air pollution to levels that are protective of health.

Safety – Traffic congestion, outdated vehicles, aggressive driving practices and lack of pedestrian or bike pathways leads to dangerous conditions for users of all transportation modes. High-quality transit projects have been shown to decrease the number of accidents along BRT corridors (injuries, fatalities, and collisions).

#### **Environmental Indicators**

Air pollution - In addition to GHGs, fuel combustion from vehicles emits suspended particulate matter, nitrogen oxides, carbon monoxide, and ozone creating molecules that cause smog. Dense urban developments centred around efficient public transit reduce the number of passenger vehicle trips and lengths. Together, they significantly reduce air pollutants (in tons). Components of this metric include the amount of transport fuel avoided (in tons of oil equivalent) and the pollution intensity of transport fuels (tons of pollutants/unit of fuel). Since calculating non-point source pollutants can be challenging, pollutants can also be estimated by measuring the average level (concentration) of pollution in a given zone.

## **RENEWABLE POWER GENERATION**

Under the existing policy framework, global power demand is projected to double from 2009 to 2035, led by developing countries, which are expected to exhibit a 172% increase in demand for power. Recognizing that access to a modern, affordable and reliable power supply is paramount for economic development, poverty reduction and improved air quality, many countries have created a framework of policies, targets and financial mechanisms to stimulate renewable energy development. As a result, 37% of the electrical capacity added in 2011 was from renewable resources, worth \$257 billion -- 35% of which was invested in developing countries.

These significant investments have allowed nations to reduce fuel imports and diversify their energy matrix, thereby improving energy security and the balance of payments. Expanded access to energy for the poor and generation of skilled employment have also fostered

economic opportunities and reduced poverty in local communities. In addition, clean energy financing has facilitated technology transfer, allowing developing countries to build competitive domestic markets with products higher up the value chain. Altogether, this has improved economic stability and liberated financial resources that can be reinvested in social programs or used to leverage private sector investment.

### Economic Indicators

Energy Security – Sufficient and predictable access to energy supplies at a given price is vital to economic growth. Energy security is thus one of the primary drivers behind renewable energy. Figures exclude large hydropower. Large hydropower (>50 MW) capacity additions in 2011 are estimated to be 15-25.5 GW, worth up to \$25.5 billion. Including large hydropower, renewables accounted for almost half of capacity additions in 2011. Countries that depend heavily on imported fuel are more vulnerable to the energy price shocks and supply disruptions that reduce energy security. Exposure to these disruptions can be limited by minimizing import dependency via increased production of energy from indigenous sources. The change in share of imported fuels for power generation or change in share of total energy supply from renewable sources measure dependency on fuel imports and fossil fuels in general. Disaggregating by technology will more accurately reflect fuel diversity.

Job creation – As of 2011, renewable energy industries have employed roughly 5 million people, directly and indirectly. Nearly half of these are in the bioenergy sector, where growing, harvesting and distributing the feedstock is highly labour intensive. For other technologies, equipment manufacturing, installation, operation and maintenance are the key drivers of employment. A shift to renewable energy may also reduce employment at displaced power plants, thus direct job creation should consider the number of net jobs created. This can be derived from employment, training and social security records.

Balance of Payments – By reducing a nation's foreign currency expenditures on fuel imports, indigenous renewable energy production has a positive effect on the balance of payments. Using national energy statistics on the volume of imported fuels and price, one can determine the value of imported fossil fuels displaced by incremental renewable power generation.

Technology Transfer - With respect to technological development, estimating the total annual investment and financial flows in climate change technologies from the domestic and international, private and public sectors, and bilateral and multilateral sources is important to highlight the flow of investment in new technologies into developing countries. Another common indicator is the volume or value of joint research, development and demonstration (RD&D) activities. This indicator includes gross domestic expenditure on RD&D by all parties and covers capital expenditures and current costs related to technological innovation only. Knowledge exchange can be measured by estimating the number of training programs, workshops and site visits for building capacity in technology information, or the number of participants in these activities. It may also be possible to quantify transfers based on the number of intellectual property contracts signed in countries where such documentation and engagement exists.

## Social Indicators

Access to Modern Electricity – Currently 1.4 billion people globally do not have access to modern energy, limiting their potential to escape poverty and restricting economic growth. As demographic growth outpaces electrification, adding power production from renewable sources can expand access to underserved populations. Using household surveys, data regarding the share of households or population with access to modern energy can be collected. Disaggregating data into rural and urban populations will also provide insights into the impact of electrification efforts on poor, rural communities.

Affordability of Electricity – For millions of poor, availability of power services is insufficient to create access. The affordability of electricity is equally important. Thus, comparing local prices of electricity to the pre-project baseline will determine whether increasing renewable power generation has increased availability through lower cost of power for end users. This can be represented as the change in cost per unit of energy over time. Another parameter for measuring power affordability is evaluating the share of household income spent on fuel and electricity. This parameter could be expressed as household income spent on fuel and electricity, and household income for the total population and by quintile.

Health - Disease from energy-related air pollution is common to developing countries, induced by outdoor air pollution from fossil fuel power plants and indoor air pollution caused by the burning of traditional biomass for cooking or heating. The most commonly used indicator is respiratory infections but air pollution is also responsible for chronic obstructive pulmonary disease, ischemic heart disease, chronic bronchitis, and damage to the eyes. As women and children are disproportionately affected by indoor air pollution from cooking stoves, access to renewable power in rural areas is particularly important for improving gender equality.

## Environmental Indicators

Air Pollution – Fossil fuel based power generation, especially from coal fired power plants produce high levels of sulphur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), non-methane volatile organic compounds (NMVOC), particulate matter (PM), and heavy metals. Air pollution reductions can be measured by emissions intensities (quantity of pollutant emitted per unit of gross energy used), or changes to annual air pollutant emissions (tons) that consider total energy consumption and grid energy intensity. Air pollutant concentration is also useful metric, and can be measured through pollution sensors on smoke stacks or by modelling emissions. When multiple policies that reduce air pollution interact, it may be difficult to accurately measure air quality improvements and attribute these to the implementation of a single renewable power NAMA or policy. One option is to measure improvements resulting from a suite of policies instead of attempting to attribute results to a specific action. Finally, establishing an accurate baseline is critical to measuring progress in comparison to historical data. As assumptions are corrected, the baseline should be adjusted accordingly.



## RESIDENTIAL, COMMERCIAL AND PUBLIC BUILDING ENERGY EFFICIENCY

Global building energy consumption in 2009 rose to 2.8 billion tons of oil equivalent, and is projected to increase by 31% by 2030. Implementing energy efficiency measures in this sector thus has significant potential to reduce primary energy demand, increase energy security, defer the cost of expensive energy infrastructure, and produce energy cost savings for households, businesses and the government. Important to note is that energy efficiency measures are often not only cost-effective, but have negative abatement costs and are therefore affordable for all classes given the right financing mechanism. Energy efficiency can be encouraged through myriad policies, some of the most common of which include minimum energy performance standards, energy labelling, energy auditing, efficient building materials and lighting, and creating incentives and financing to facilitate efficient technology uptake.

### Economic Indicators

**Energy Security** – Many developing countries struggle to meet the energy demand of their citizens, often relying on increased energy imports to fill this gap. Energy security is influenced by the availability and price of energy, thus dependence on other states to supply fuel can make fuel-importing nations vulnerable to supply constraints or price shocks. In addition to increasing a nation's installed capacity, policies that reduce energy demand can lower the need for imported fuels to meet growing energy needs. Energy security can be monitored by measuring the reduction in imported fuels (in tons of oil equivalent) through energy efficiency measures and accordingly, the resulting reduction in share (%) of imported fuels in total power supply or energy demand.

**Deferred capacity additions** – By reducing power demand, energy efficiency reduces capital expenditures that would otherwise be used for power capacity additions. Using national estimates of reduced consumption as a result of energy efficiency measures, avoided or deferred capacity additions can be estimate (MW). It is important to note that this simple estimate does not account for capacity additions to support energy needs in other locations.

**Energy intensity of GDP** – This indicator highlights energy use per output. It is an indicator of economic efficiency and provides insights into the health of the overall economy. Economic efficiency is affected by the type of industries that are prevalent, thus trends that demonstrate a reduction in energy intensity can be indicative of nations that are transitioning into a post-industrial economy.

**Job creation** – Manufacturing of high-tech appliances, equipment and materials, and energy management and auditing create a range of skilled employment opportunities. Data on the net number of jobs created can be derived from employment, training and social security records.

**Energy cost savings** - Energy efficiency is a cost-effective means for reducing total expenditures on energy use that catalyzes other economic and social benefits. For the public sector, this liberates funding for infrastructure or social projects. Private sector savings can be reinvested in more productive activities. For households, and the poor especially, savings can be used to

stimulate the economy and improve quality of life. Energy cost savings are measured by the avoided cost of energy, determined by the amount of power saved (in MWh) and the cost of power per MWh.

Technology Transfer –In addition to behavioural changes, technological improvements are necessary for achieving significant energy savings. It is also an opportunity to build domestic capacity for production of high-tech products and to spur local innovation. Measuring total annual investment and financial flows in climate change technologies from a variety of sources – domestic/international, private/ public, bilateral/ multilateral – can provide insights as to the flow of investment in new technologies into developing countries. The value or volume of joint research, development and demonstration (RD&D), is another means of measuring technology transfer. Knowledge exchange can be measured by estimating the number of training programs, workshops and site visits for building capacity in technology information, or the number of participants in these activities.

### **Social Indicators**

Reduced household expenditure – By reducing the amount of energy needed to conduct household activities, households are able to spend less of their limited resources on electricity bills, or maintain expenditures while increasing consumption. This can be estimated through household surveys that examine the amount of energy avoided and the cost associated with those energy savings.

Quality of employment – Due to the technological nature of energy efficiency improvements, and the need for energy auditors and managers, employment produced by this sector requires skilled labour. Formal employment will often provide social benefits and higher wages, improving the quality of employment. This can be measured by skill level (number of training sessions), provision of social benefits (number of employees with access), and increased per capita or household income. Income should be on par with or greater than local or sectoral wages.

### **Environmental Indicator**

Air pollution – Energy conservation and efficiency reduce energy consumption and associated pollutants. By determining the emissions intensity of the electrical grid (tons of emissions per MWh) and the amount of energy reduced through energy conservation and efficiency measures (MWh), it is possible to estimate the reduction of annual air pollutant emissions (tons) attributed to energy efficiency.

## **INDUSTRIAL ENERGY EFFICIENCY**

Efficiency improvements have been shown to increase industrial productivity and competitiveness, providing further economic benefits to the sector and nation. Although roughly three-quarters of energy use in industry is utilized to power manufacturing processes, the remaining portion is used as raw material in the form of fossil fuels.<sup>38</sup> Reducing these raw

material inputs through improved efficiency and processes has the added environmental benefits of minimizing natural resource depletion. Equipment efficiency is particularly important in improving industrial efficiency. Two sources with significant energy conservation potential are heat-producing boilers and utilizing combined heat and power, or co-generation, to produce power and thermal energy. In 2009, global industrial energy consumption reached 2.3 billion tons of oil equivalent (TOE) and is projected to increase by 54% in the next twenty years. With many developing countries importing fuel to meet their growing energy needs, improving energy efficiency in industry can create much needed energy savings and promote energy security. In developing countries, the petroleum refining, and iron and steel industries have the greatest potential for energy savings, with an estimated savings of 4.6 and 5.4 EJ (exajoules) per year, respectively.

## **ECONOMIC INDICATORS**

Industrial energy intensity - This indicator provides information on the relative use of energy per unit of output, which is reduced through the implementation of energy efficient technologies and processes. Analysis of this indicator can provide insights into trends in technological improvements, energy management, output, product composition and fuel mix of industrial sectors. To aggregate this across industries, the denominator can be converted into output value. Although this facilitates comparison, it is influenced by market price fluctuations. Additionally, translating this metric into the absolute cost of production per unit of energy consumption provides a financial indicator of energy intensity. Firms may hesitate to provide this information due to its sensitive nature thus policy-makers should work with them to ensure information on individual firms will not be published, but instead aggregated by industry to facilitate energy intensity improvements and raise the competitiveness of domestic industries. It may be necessary to have independent monitors confirm data.

Modernization – Energy efficiency improvements are dependent on the replacement of obsolete equipment with modern technology. Modernization of industries in developing countries is critical to remaining competitive in the domestic and global market. Measuring the average age of technology (years) and investment in new capacity through firm surveys will indicate how firms are modernizing their processes.

Job creation – Productivity and competitiveness improvements generate larger profits, which can then be transformed into labour or wage increases. Industrial energy efficiency creates employment opportunities through manufacturing, operation and maintenance of energy efficient equipment, and energy management and auditing, for example. Data on number of jobs created can be derived from employment, training and social security records.

Competitiveness and productivity – Energy efficiency improves industrial productivity by reducing the cost of inputs, building a higher-skilled workforce, and improving product quality. This can be measured by determining the manufacturing value added (MVA) per unit of energy consumed (\$/MWh) or the MVA per value of energy consumed for specific sectors, and later aggregated for national values. MVA refers to the net output of a sector (sum of all outputs

minus intermediate inputs).

Deferred capacity additions – By reducing power demand, energy efficiency reduces capital expenditures that would otherwise be allocated to power capacity additions. Using national estimates for avoided power consumption as a result of energy efficiency measures and the energy intensity of the grid, avoided or deferred capacity additions can be estimated, in MW.

Energy security – With less than 10% of global industrial energy sourced from renewable resources in 2009, fossil fuel importing countries can improve energy security through industrial energy efficiency. Efficiency improvements are also a cost-effective counterpart to renewable capacity addition, which are expensive and can be less reliable due to their intermittent energy production. Energy security can be represented by measuring imported fuel avoided through energy efficiency (tons of oil equivalent) and accordingly, the resulting reduction in share of imported fuels in total power supply.

Technology transfer –Developing country industries seek opportunities to boost competitiveness. Demonstration through technology transfer promotes replication across other firms and industries. In developing countries, the industries with the greatest potential for technical improvement are petroleum refineries, alumina production, copper smelters, and zinc. The volume or value of joint research, development and demonstration (RD&D) is one means of measuring technology transfer. RD&D includes capital expenditures and current costs related to technological innovation. If available, one can also measure this indicator by the number of intellectual property contracts signed related to renewable energy or energy efficiency.

### **Social Indicators**

Quality of employment – Energy efficiency gains are often catalyzed by technological improvements, which require skilled labour to manufacture, install, operate and maintain equipment. This creates a range of skilled, formal employment that can be measured by skill level (number of training sessions), provision of social benefits (number of employees with access), and increased per capita or household income. Income should be on par with or greater than local or sector specific wages. Data can be derived from employment, training and social security records.

Health – Pollutants from fossil fuel combustion have deleterious health impacts not only on the general population, but especially on factory workers, who suffer from upper respiratory tract infections and asthma attacks as a result of poor work conditions. Furthermore, factories tend to be located in low wage areas, thus the poor suffer disproportionately from localized industrial pollution. Although many positive health impacts have been documented from energy efficiency improvements, measuring changes in the prevalence of respiratory infections in factory workers and the local population will give insights into the most commonly reported health effects of plant-produced air pollution.

## Environmental Indicators

Natural resource exploitation – As previously mentioned, one-quarter of industrial energy use is utilized as raw material inputs into manufacturing processes. Energy efficiency reduces the resource intensity of manufacturing, in terms of product inputs and materials use throughout the manufacturing process. Cement blending in particular diversifies the raw materials used, thereby reducing intensity of specific resources. This can be measured in terms of the reduction of natural resource consumption (tons, acres, etc.), compared with the baseline. Additionally, sector specific resource efficiency, measured in terms of resources consumed per unit of value added (e.g. tons/\$) can be gathered by industry and then aggregated nationally. Tracking this indicator over time will identify trends in resource exploitation and efficient use.

Air pollution – Fossil fuel combustion in power plants produces a variety of harmful air pollutants. Most prominent among these are sulphur oxides, nitrogen oxides, smoke and suspended particulates. Efficient industrial processes reduce energy use and subsequently the amount of pollutants released from power plants. By determining the emissions intensity of the electrical grid (tons of emissions per MWh) and the amount of energy reduced through energy conservation and efficiency measures (MWh), one can estimate the reduction of annual air pollutant emissions attributed to energy efficiency (tons or concentration).

## WASTE MANAGEMENT

As populations and incomes rise in developing countries, effectively managing waste becomes increasingly challenging for developing countries, in particular for municipalities responsible for handling waste with limited financial resources. Lack of proper waste management can reduce the quality of life for residents. An integrated solid waste management system is a comprehensive program that manages waste at all points of the life cycle. Key components include “Reduce, reuse, recycle” strategies, decentralized house-to-house collection, composting of organic material, disposal in sanitary landfills and utilizing landfill gases to produce energy.

### Economic Indicators

Public expenditure – Strategies that minimize waste generation through 3R programs and composting to eliminate organic waste matter reduce pressure on municipalities to site more landfills, which require significant investments to purchase land for siting and the construction of the landfill. Thus, deferring or avoiding these infrastructure costs can create significant public expenditure savings.

Job creation – Employment is created through the manufacturing, installation, operation and maintenance of waste facilities. Additionally, the informal waste sector provides income for the nation’s poorest, who are often waste scavengers. Professionalizing waste collection, transport and disposal will create employment opportunities, but will also displace many of those working informally. Thus, employment indicators should measure the net number of

jobs created to accurately account for the impact on employment.

Technology transfer – Pioneering projects can demonstrate the financial viability of urban solid waste systems and introduce new technology such as landfill-gas-to-energy equipment. The total annual investment and financial flows in climate change technologies, especially from the private sector, bilateral and multilateral sources highlights the flow of investment in new climate technologies into developing countries. Domestic development of new technology can be captured in terms of the volume or value of joint research, development and demonstration (RD&D) activities, and includes gross domestic expenditure on RD&D on capital expenditures and current costs related to technological innovation. Knowledge exchange can be measured by estimating the number of training programs, workshops and site visits, or the number of participants in these activities.

Energy production – Waste treatment facilities that utilize methane emissions to produce power contribute to local energy production (kWh) and self-sufficiency. If power generation exceeds the facility's needs, this power can be sold back to the local grid to improve the availability of power to local communities.

Tax revenue – The privatization of waste management contributes to municipal tax revenues both from firms managing waste operations and from increased employment. Value of waste related by-products – Waste reduction activities such as composting and recycling create by-products with an economic value, as do waste elimination activities such as incineration to produce refuse-derived fuel. These can be measured in terms of their economic value.

### **Social Indicators**

Access to waste management services – Uncollected waste has many negative impacts on human health, the environment and even economic growth. Thus access to services, measured by the share of population or households with access to waste management services, is an important component of sustainable development. This indicator could be disaggregated by socio-economic class and geography to highlight equitable access by previously underserved communities.

Health - Uncollected waste and open landfills facilitate the proliferation of disease vectors such as rodents, flies and mosquitoes. As a result, residents in the periphery of uncollected waste or landfills are exposed to a range of diseases including typhus, salmonella, leptospirosis, dengue and malaria. Waste scavengers are particularly vulnerable to waste-related disease, suffering from skin infections, parasitic infections, injuries from hazards on disposal sites, and tissue damage through respiration, ingestion or skin contact. Harvesting reliable data on health outcomes and directly attributing them to municipal solid waste management practices can be challenging. As indicated above, there are numerous diseases that result from exposure to untreated waste, thus monitors must determine which diseases and afflictions will be measured. The poor in particular are less likely to solicit medical treatment at central facilities due to cost of care, transportation and time off of work, for example, therefore it may be necessary to collect data through household surveys to determine the change in disease

prevalence.

Capacity building – Due to the decentralized nature of urban solid waste generation and management, the sector provides an opportunity for education and community participation, especially of marginalized groups and women, to develop local strategies for reducing and managing waste. Although the economic benefits of these activities can be difficult to quantify, developing countries value the role waste NAMAs can play in empowering local communities. Capacity building can be measured by number and type of knowledge assets produced, such as publications and workshops.

Quality of employment – Labourers in the informal waste sector often operate under hazardous conditions with low income and few social benefits. Shifting these workers into the formal sector can provide additional skills (number of training sessions), increased wages (per capita or household income), a safer worker environment (share of labourers with access to safety equipment), and access to benefits. Data can be gathered from employment, training and social security documents and surveys.

#### Environmental Indicators

Water quality – Capturing and treating leachates in sanitary landfills reduces the pollution load of discharged effluent and runoff, thereby improving the quality of ground and surface water. These co-benefits can be measured by the level of pollutants in ground and surface water near landfills (in mg/l), in particular biological oxygen demand, chemical oxygen demand, and coliforms, among others. The weighted average percentage change can be used when analyzing more than one pollutant.

Air quality – Although the waste sector is a significant contributor to GHG emissions, it does not produce large quantities of air pollutants unless incinerated.<sup>49</sup> Thus air quality considerations are typically centred around odour produced by decaying organic waste, and can be measured through household surveys indicating the change in number of households affected by waste-related odour. Where waste is incinerated, air pollution can be measured with monitoring devices at waste incinerating facilities to determine the concentration of pollutants emitted, or through household surveys to determine the number or share (%) of households burning waste.

## ANNEX III—EXAMPLE OF BEST PRACTICE IN MRV: COLOMBIAN TRANSIT ORIENTED DEVELOPMENT NAMA

In Annex 2 we present an example of recently developed MRV framework for the transit oriented development NAMA in Colombia. This NAMA is one of only five NAMAs fully funded today by the NAMA Facility ([www.namafacility.org](http://www.namafacility.org)). As such, its MRV framework has been endorsed and approved by the NAMA Facility.

There are several reasons why this MRV framework is applicable for Macedonia:

- It evaluates both national and local level policies and practises, and is thus applicable for project level, municipal level, and sector or nation-wide level mitigation actions.
  - For example, national policies (and practices) for replication of TOD are mainstreamed into policy and planning with inter-institutional coordination mechanisms in place.
  - Local technical assistance causes at least 3 TOD neighbourhoods and/or TOD projects in target cities to advance through the process benchmarks
- It already established monitoring & evaluation (M&E) system which is producing data for adaptive management and learning at both local and national level
- It developed multiple indicators, both mitigation and co-benefits measurement that are already being tested in practice
- It has developed a system of activity level tracking and evaluation of mitigation actions against control groups, allowing for more accurate policy evaluation.

The Colombian TOD NAMA MRV system is presented here as a presentation by the NAMA's Technical Delivery Organization the Center for Clean Air Policy.



## ANNEX IV: DRAFT PROVISION FOR AMENDING THE LAW ON ENVIRONMENT

*Article \_\_\_\_\_*

### **[National] System for Monitoring, Reporting and Verification of the Climate Change Mitigation Actions**

- (1) For the purpose of ensuring the timeliness, transparency, accuracy, consistency, comparability and completeness of reporting by the [State] [the Republic of Macedonia] to the UNFCCC Secretariat, as well as for tracking the progress in achieving the goals of domestic climate change mitigation policies and actions, the state administrative body accountable for the matters related to the environment shall set up and maintain the [National] System for Monitoring, Reporting and Verification of the Climate Change Mitigation Actions ('the MRV System') that shall encompass data and information resulting from the implementation of the policies and actions.
- (2) The minister accountable for the matters related to the environment shall adopt the methodology and schedule of the monitoring, reporting and verification system. The methodology shall include description of the manner of maintenance and management of the data and information related to the mitigation policies and actions.
- (3) The National Climate Change Committee ('NCCC') shall be empowered to coordinate the activities of the MRV System referred to in paragraph (1) of this Article.
- (4) For the purpose of operational management of the MRV System referred to in paragraph (1) of this Article the state administrative body accountable for the matters related to the environment shall set up a Climate Change Department ('CCD'). The Head of the CCD shall act as a Permanent Secretary to the NCCC.
- (5) By January 31 every year, the Government of the Republic of Macedonia, at the proposal of the state administrative body accountable for the matters related to the environment, shall establish the List of mitigation policies and actions including the respective entities responsible for their implementation and monitoring and reporting of their progress thereof ('Data Suppliers').

# ANNEX V: DRAFT DECISION ON ESTABLISHING THE LIST OF MITIGATION POLICIES AND ACTIONS INCLUDING THE RESPECTIVE ENTITIES RESPONSIBLE FOR THEIR IMPLEMENTATION, AND MONITORING AND REPORTING OF THEIR PROGRESS THEREOF

Based on Article \_\_\_\_\_ paragraph (5) of the Law on Environment, the Government of the Republic of Macedonia, at its session held on \_\_\_\_\_, have adopted this

## **DECISION**

**establishing the List of mitigation policies and actions including the respective entities responsible for their implementation and monitoring, and reporting of their progress thereof**

### *Article 1*

This Decision establishes the List of mitigation policies and actions including the respective entities responsible for their implementation and monitoring, and reporting of their progress thereof as provided in Annex 1 that is integral part of this Decision.

### *Article 2*

This decision shall enter into force the next day following its publication in the Official Gazette of Republic of Macedonia.

*President of the Government of the Republic of Macedonia  
/name and signature/*

Appendix – Annex 1: The List of mitigation policies and actions including the respective entities responsible for their implementation, and monitoring and reporting of their progress thereof

# ANNEX VI: DRAFT RULEBOOK ON THE METHODOLOGY AND SCHEDULE OF THE MONITORING, REPORTING AND VERIFICATION SYSTEM (ANNEX VI)

## **Ministry of Environment and Physical Planning**

Pursuant to Article \_\_\_ of the Law on Environment (“Official Gazette of the Republic of Macedonia” number \_\_\_\_/\_\_\_\_), the Minister of Environment and Physical Planning adopted

### **RULEBOOK on the methodology and schedule of the monitoring, reporting and verification system**

#### **Chapter I. Basic provisions**

##### *Article 1*

##### **Subject matter**

This Rulebook establishes a mechanism for the:

- (a) monitoring, reporting and verification of the data and information related to the mitigation policies and actions;
- (b) maintenance of, and management with the [electronic] registry of the data and information related to the mitigation policies and actions;

##### *Article 2*

##### **Definitions**

For the purposes of this Regulation, the following definitions apply:

- (a) ‘policies and actions’ means all instruments which aim to implement commitments under Article 4(2)(a) and (b) of the UNFCCC, which may include those that do not have the limitation and reduction of greenhouse gas emissions as a primary objective;
- (b) ‘data suppliers’ means legal entities (public and private) that are accountable for the implementation of any policies and actions that may relate to the mitigation of the climate change;
- (c) ‘quality assurance’ or ‘QA’ means a planned system of review procedures to ensure that data and information quality objectives are met and that the best possible estimates and information are reported to support the effectiveness of the quality control programme and to assist Data Suppliers;

- (d) 'quality control' or 'QC' means a system of routine technical activities to measure and control the quality of the information and estimates compiled with the purpose of ensuring data integrity, correctness and completeness, identifying and addressing errors and omissions, documenting and archiving data and other material used, and recording all QA activities;
- (e) 'indicator' means a quantitative or qualitative factor or variable that contributes to better understanding progress in implementing policies and actions and greenhouse gas emission trends;
- (f) 'ex ante assessment of policies and actions' means an evaluation of the projected effects of a policy or action;
- (g) 'ex post assessment of policies and actions' means an evaluation of the past effects of a policy or actions;
- (h) 'projections without measures' means projections of anthropogenic greenhouse gas emissions by sources and removals by sinks that exclude the effects of all policies and measures which are planned, adopted or implemented after the year chosen as the starting point for the relevant projection;
- (i) 'projections with measures' means projections of anthropogenic greenhouse gas emissions by sources and removals by sinks that encompass the effects, in terms of greenhouse gas emissions reductions, of policies and measures that have been adopted and implemented;
- (j) 'projections with additional measures' means projections of anthropogenic greenhouse gas emissions by sources and removals by sinks that encompass the effects, in terms of greenhouse gas emissions reductions, of policies and measures which have been adopted and implemented to mitigate climate change as well as policies and measures which are planned for that purpose;

*Article 3*  
**Objectives**

- (1) The MRV system is established, organised and maintained as electronic database of relevant complete and updated data and information in order to enable:
  - (a) regular monitoring and update of the registry of data and information on and information related to the mitigation policies and actions;
  - (b) national projections of anthropogenic greenhouse gas emissions by sources and removals by sinks, organised by gas [or group of gases] and by sector
  - (c) preparation of the National Climate Change Communications and Biennial Update Reports to be submitted to the UNFCCC
  - (d) ...

## Chapter II. Monitoring, Reporting and Verification

### Article 4

#### Monitoring

- (2) Data Supplier shall perform regular monitoring of all policies and actions enumerated in the List referred to in paragraph (5) of Article \_\_\_ of the Law on Environment following the methodology and indicators defined by this Rulebook and/or the individual standards agreed with the Climate Change Department ('CCD') of the Ministry of Environment and Physical Planning ('MOEPP').
- (3) Data Supplier pursuant to paragraph (1) of this Article, shall enter into negotiation with the MOEPP to define individual standards prior the implementation of the relevant policy or action enumerated in the List referred to in paragraph (5) of Article \_\_\_ of the Law on Environment.

### Article 5

#### Reporting

- (1) Data Suppliers shall report the data and information related to the policies and actions that limit or reduce greenhouse gas emissions by sources or enhance removals by sinks, which shall include but not limited to the following:
  - (a) the objective of the policy or action and a short description of the policy or action;
  - (b) the type of policy instrument;
  - (c) the status of implementation of the policy or action;
  - (d) where used, indicators to monitor and evaluate progress over time;
  - (e) where available, quantitative estimates */ex ante* assessments/ of the effects on emissions by sources and removals by sinks of greenhouse gases for a sequence of four future years ending with 0 or 5 immediately following the reporting year;
  - (f) where available, estimates of the projected costs and benefits of policies and actions, as well as estimates, as appropriate, of the realised costs and benefits of policies and actions;
- (2) Twice a year, by July 31 and January 31, Data Suppliers shall provide the MRV System with the data and information referred to in paragraph (1) of this Article.
- (3) Data Suppliers shall provide the MRV System with the data and information referred to in paragraph (1) of this Article in the format as required by the templates designed and provided by the NEIC of MOEPP.
- (4) Data Suppliers shall appoint an official empowered to [monitor and] report the data and information related to the mitigation policies and actions.
- (5) The official referred to in paragraph (1) of this Article shall ensure for:

- (a) regular and timely collection of the data and information related to the mitigation policies and actions,
- (b) regular and timely submission of accurate data and information related to the mitigation policies and actions in the format specified by the CCD

*Article 6*  
**Verification**

- (1) The state administrative body accountable for the matters related to the environment through its CCD shall be accountable for the quality control ('QC') and quality assurance ('QA') of the data and information reported by the Data Suppliers pursuant to paragraph (1) of Article 5.
- (2) The state administrative body accountable for the matters related to the environment may outsource the performance of the QC and QA from paragraph (1) of this Article.
- (3) The CCD shall return the report to the respective Data Supplier in case the content of such report does not comply with requirements for indicators and standards as set by this Rulebook or the individual standards agreed with the CCD [pursuant to paragraph (2) of Article 2].
- (4) Data Suppliers shall resubmit the updated report to the MRV System within 10 working days upon receiving the returned report from CCD.

**Chapter III. Management and Maintenance**

*Article 7*

**Management and maintenance of the data and information of the MRV System**

- (2) The CCD of the MOEPP shall operate and manage the MRV System pursuant to paragraph (4) of Article \_\_\_\_ of the Law on Environment.
- (3) MOEPP shall make available to the public, in electronic form, any relevant assessment of the costs and effects of national policies and actions that limit or reduce greenhouse gas emissions by sources or enhance removals by sinks along with any existing technical reports that underpin those assessments.
- (4) The National Environment Information Centre ('NEIC') of the MOEPP shall maintain the electronic database [registry] of and shall perform the analysis of the data and information related to the mitigation policies and actions for the purpose of preparing the:
  - (a) National Climate Change Communication
  - (b) Biennial Update Report
- (5) Both CCD and NEIC shall ensure the provision of necessary training and capacity building of the officials referred to in paragraph (3) of Article 5. The training and capacity building shall include, inter alia, topics related to the methodologies,

procedures and guidelines for monitoring and reporting the data and information related to the mitigation policies and actions.

*Article 8*

**Entry into force**

This Rulebook shall enter into force on the day following that of its publication in the "Official Gazette of the Republic of Macedonia".

*Number* \_\_\_\_\_

*Date* \_\_\_\_\_

*Skopje*

*Minister,  
/name and signature/*