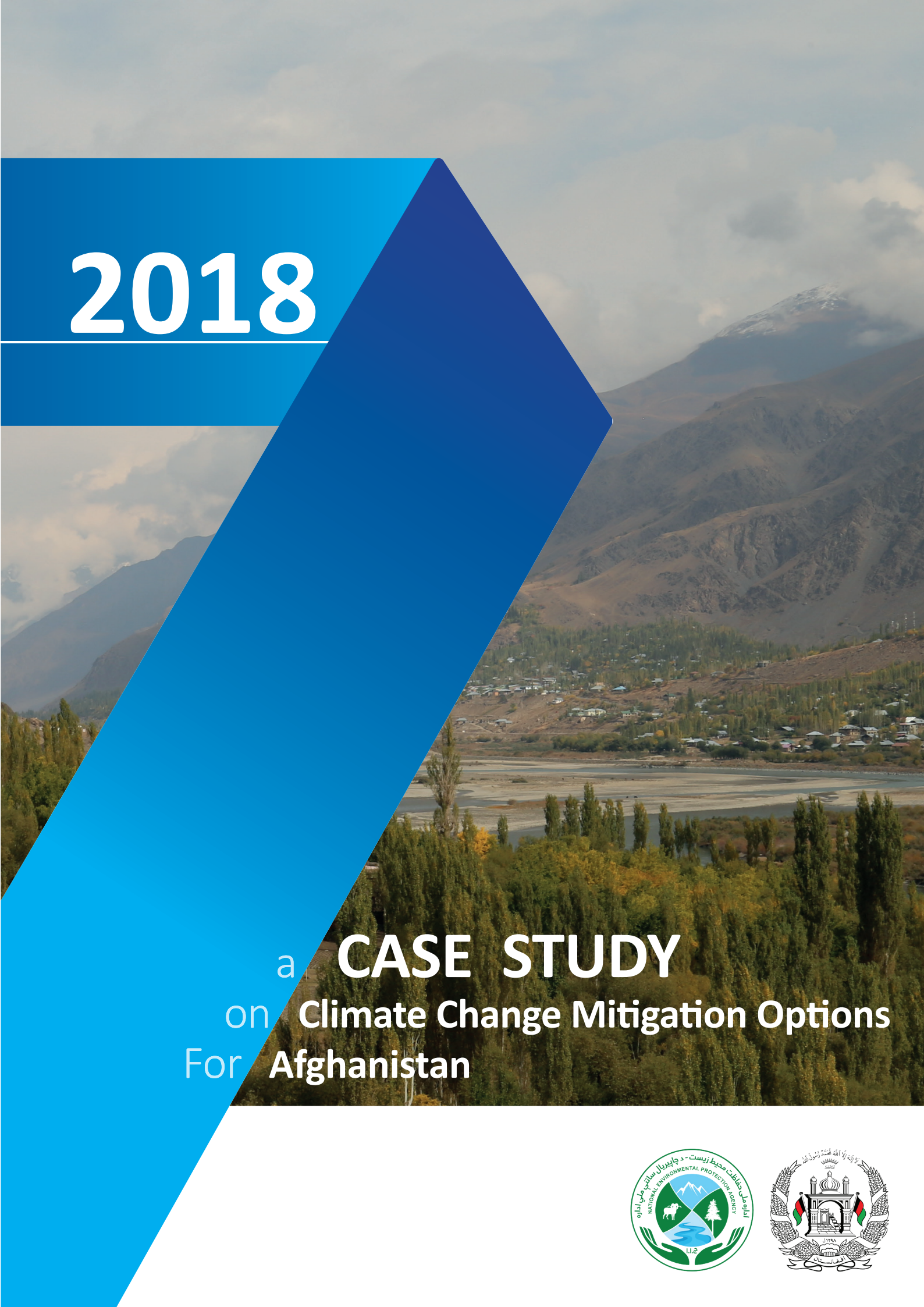

2018

a **CASE STUDY**

on **Climate Change Mitigation Options**

For **Afghanistan**

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CLIMATE CHANGE MITIGATION OPTIONS
For Afghanistan

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ABBREVIATIONS

ACCSAP	Afghanistan Climate Change Strategy and Action Plan
ACCI	Afghanistan Chamber of Commerce and Industries
AFOLU	Agriculture, Forestry and Other Land Uses
ANDS	Afghanistan National Development Strategy
BAU	Business As Usual
BUR	Biennial Update Report
CC	Climate Change
CCNIS	Climate Change National Information System
CDM	Clean Development Mechanism
CERs	Certified Emission Reductions
CH_4	Methane gas
CO_2e	Carbon dioxide equivalent
CO	Carbon monoxide
CFL	Compact Fluorescent Light Bulb
DABS	DA Afghanistan Breshna Sherkat
DNA	Designated National Authority
EE	Energy Efficiency
ENPEP	Energy and Power Evaluation Programme (Model)
FOLU	Forestry and Other Land Uses
GACMO	Greenhouse gas Abatement Cost Model
GDM	Gross Domestic Product
GEF	Global Environment Facility
Gg	Giga gram
GHG	Green House Gases
GoIRA	Government of Islamic Republic of Afghanistan
HH	Household
INC	Initial National Communication
IPCC	Intergovernmental Panel on Climate Change
IPPU	Industrial Processes and Product Uses
Kgoe	Kilogram Oil Equivalent
LEAP	Long-range Energy Alternatives Planning (Model)
LEDS	Low Emission Development Strategies
MDG	Millennium Development Goals

MRV	Measurement Reporting and Verification
MWe	Mega Wat electric
N_2O	Nitrous oxide gas
NAMA	Nationally Appropriate Mitigation Action
NAPA	National Adaptation Programme of Action
NCSA	National Capacity Needs Self-Assessment for Global Environmental Management
NDC	Nationally Determined Contribution
NEPA	National Environmental Protection Agency
NES	National Energy Strategy
NESP	National Energy Supply Programme
NG	Natural Gas
NOx	Nitrous oxides
NPP	National Priority Programme
NST	National Study Team
PoA	Programme of Activities
PIN	Project Idea Note
PSMP	Power Sector Master Plan for Afghanistan
PV	Photovoltaic
RE	Renewable Energy
REEEF	Renewable Energy and Energy Efficiency Fund
RRES	Rural Renewable Energy Strategy
SDES	Socio-Demographic and Economic Survey
SDGs	Sustainable Development Goals
SME	Small and Medium Enterprises
SNC	Second National Communication
SOx	Sulphur oxides
SWH	Solar Water Heater
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNEP	United Nation Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
U.S. EPA	United States Environmental Protection Agency

PART ONE

Greenhouse Gases Baseline and Mitigation Scenarios for Afghanistan

Kandahar © Fazlullah Fazli

I. General Information

1.1. Introduction

The United Nations Environment Programme (UNEP) is the United Nations systems designated entity for addressing environmental issues at the global and regional levels. Its mandate is to coordinate the development of environmental policy consensus by keeping the global environment under review and bringing emerging issues to the attention of governments and the international community for action.

UNEP's Crisis Management Branch, established in 1999 and based in Geneva, provides environmental assistance to post-conflict countries by, among other things, providing capacity building and technical assistance for post-conflict environmental administrations. UNEP has been requested by NEPA to provide on-going capacity-building support, including for the preparation of Afghanistan's first BUR under the UNFCCC that aims to build national capacity and create platforms to compile the national greenhouse gases inventory.

The Initial National Communication (INC) of the Government of the Islamic Republic of Afghanistan (GoIRA) to the United Nations Framework Convention on Climate Change (UNFCCC) reported the country's 2005 greenhouse gas (GHG) emissions; this report was submitted in 2013. The Second National Communication (SNC) was produced in 2017 and reported the 2013 GHG emissions. Decision FCCC/CP/2011/9/Add.1. 41-(g) states: "the first biennial update report submitted by non-Annex I Parties shall cover, at a minimum, the inventory for the calendar year no more than four years prior to the date of the submission, or more recent years if information is available, and that subsequent biennial update reports shall cover a calendar year that does not precede the submission date by more than four years". Based on this requirement, Afghanistan's first Biennial Update Report (BUR) estimated GHG emissions for 2017 using the Intergovernmental Panel on Climate Change (IPCC) 2006 Inventory Software.

Afghanistan's National Environmental Protection Agency (NEPA) is in the process of adopting the 2006 IPCC Guidelines and Inventory Software through an ongoing training programme. The SNC did not include baseline and mitigation scenarios; therefore, both scenarios had to be built in close cooperation with the National Study Team (NST). Afghanistan's Nationally Determined Contributions (NDC) doesn't identify specific projects/programmes for climate change adaptation or mitigation.

Instead, the NDC only presents a list of targeted sectors and sub-sectors. Therefore, it is crucial to identify and appraise specific mitigation programmes and projects in collaboration with the NST.

1.2. Methodological Issues

No GHG baseline scenarios were developed as part of Afghanistan's INC or SNC. To address this gap, as a part of the BUR, national experts and inventory compilers were introduced to tools and methodologies for collating and compiling baseline data to assess GHG mitigation options for key socio-economic sectors. In this case study, a base year and baseline scenario were developed in close collaboration with government line ministries and agencies. The study provides guidance for designing and assessing national and sectoral mitigation actions following a standardised approach for evaluating and reporting progress towards the achievement of mitigation goals.

Tools comprising guidelines on how to reach reasonable assumptions for developing the baseline scenario and then translate assumptions into quantitative activity data and future GHG emissions were developed for the NST[1]. The tools also calculate emission reductions resulting from identified and approved mitigation activities, relating these reductions to annual baseline emissions. Mitigation programmes and projects were identified based on strict evaluation criteria to serve best and complement the country's development objectives and goals. Training was delivered to members of NST on using the tools, and cooperative work on building the baseline scenario was launched.

Per capita energy consumption and GHG emissions in Afghanistan for the year 2014 are 94 kg Oil equivalents[2] and almost 1.59 tonnes CO_2equivalents[3] which are by all accounts below world averages[4] of 1,920 kg oil equivalents and 4.97 tonnes CO_2equivalents respectively in 2014. Rapid growth expectations for Afghanistan will eventually lead to significant per capita energy consumption increase to the level needed to sustain a fair and decent standard of living. The baseline scenario was developed to reflect this anticipated trend.

Mitigation actions aim to ensure required future energy needs most optimally without compromising achievement of the Sustainable Development Goals (SDGs), i.e. more energy with less GHG intensity. As noted in Afghanistan's Nationally Appropriate Mitigation Actions report[5]: "By virtue of being a rather late entrant in the development process, Afghanistan potentially has the strategic advantage of 'leapfrogging', i.e. being able to step into higher-end technologies and completely bypass intermediate technologies." In this study, mitigation options were evaluated according to the goals and objectives set out in the Afghanistan National Development Strategy.

1. The tools are enclosed with this document.
2. http://data.worldbank.org/indicator/EN.ATM.CO2E.PC .
3. NEPA. (n.d) Afghanistan BUR-1
4. IEA Statistics © OECD/IEA 2014 (iea.org/stats/index.asp)
5. NEPA. (2016). NAMA

Major sectors and domains on which Afghanistan is expected to focus on the mitigation planning period (2015 – 2035) are electricity generation, industry and mining, solid waste management, transportation, and other infrastructures[6]. In line with national development plans, mitigation actions considered in this case study thus also focus on opportunities in these sectors.

In the context of the UNFCCC, a mitigation assessment is a national-level analysis of the various technologies and practices that have the capacity to mitigate climate change. Assessing a mitigation action entails understanding the advantages and disadvantages of various types of mitigation actions to inform the selection of mitigation strategies used for achieving the goal. In this study, mitigation options were identified and evaluated according to a predetermined set of criteria and prioritised accordingly.

Successful implementation of identified mitigation options requires defining accounting methods for tracking progress while maintaining consistency with applicable inventory methods. Each mitigation option will require a specific monitoring, reporting and verification (MRV) protocol, which entails evaluating what additional actions are needed to achieve the goal. In this study, the data necessary to monitor and evaluate the proposed mitigation actions were identified.

It was necessary to define target years based on the NDC targets adopted by the GoIRA and calculate baseline emissions for the target years to understand future emissions levels associated with meeting the goals. In this study, base year emissions were calculated for 2015 using 2006 IPCC Guidelines and a baseline scenario constructed based on nationally approved assumptions. The target year for achieving the impacts of the mitigation options is 2035.

A mitigation goal assessment will be easier to carry out if systems to collect data and apply the appropriate methods are already in place. For example, the assessment will require numerous data inputs, including a complete GHG inventory for the base year and emissions baseline scenario, at a minimum. Some goals, such as base year intensity goals and baseline scenario goals, require additional data like gross domestic product (GDP). This study proposes a Climate Change National Information System (NIS) to develop robust and credible data sets to make accurate goal assessments and enable informed decision-making.

In this report, the 2006 IPCC Guidelines for National Greenhouse Gas Inventories were used as a starting point for generating the base year and baseline emissions data necessary for assessing progress toward mitigation goals, so that consistency with the inventory methodology is maintained.

The GoIRA has communicated its Nationally Determined Contributions to the UNFCCC. This report highlights the sectors in which mitigation actions are expected[7]. Moreover, to achieve the NDC goals, the GoIRA has identified and published a list of

6. *Ibid.*

7. GoIRA. (2015). INDC

NAMAs within these sectors[8]. Since the NAMAs were presented in broad terms, this study identified specific options under the NAMAs. Those options in the programme or project categories are examined in more detail as the policy category options are already assessed to a large degree in other studies. An exception was made by proposing the implementation of a Renewable Energy and Energy Efficiency Fund and a Climate Change NIS.

Programmes or projects eligible for development under the Clean Development Mechanism (CDM) were identified and elaborated accordingly. Those options falling in the large-scale CDM project category may be developed into individual CDM projects. When several micro-scale projects are considered, then the CDM Programme of Activities (PoA) approach is recommended[9].

In order to implement the actions and recommendations of this study, we assume the following:

- Full buy-in from policy- and decision-makers at all levels to guarantee agreement of and support from concerned stakeholders;
- Required data are or will be made available through the National Information System that is to be implemented in the short term;
- Human resources and technical needs are or will be available during the short term; and
- Relevant policies and necessary institutional arrangements are in place.
- The methods and assumptions applied in this study were developed with the following objectives in mind:
- To help users assess and subsequently report on the progress of mitigation actions in an accurate and relevant manner;
- To help policy- and decision-makers develop and implement practical actions for managing and reducing GHG emissions guided by their climate and/or sustainable development objectives; and
- To support Afghanistan's Government in meeting its obligations under the UNFCCC.

1.3. Glossary

LEDS: Low emission development strategies seek to promote economic development while adopting policies and technologies aimed at keeping GHG emissions lower than they would have been in a baseline scenario.

NAMA: Nationally appropriate mitigation actions constitute a set of host country-led mitigation actions that are expected to contribute to the process of sustainable development while reducing GHG emissions. LEDS are defined as the conceptual framework for the development of NAMAs.

Baseline Scenario: A baseline scenario for GHG emissions is a plausible and consistent description of how a system might evolve in the future in the absence of explicit and new GHG mitigation policies. Baseline scenarios are the counterfactual

8. NEPA. (2016). NAMA

9. http://cdm.unfccc.int/about/index.html

situations against which mitigation policies and measures will be evaluated. Baselines should not be a simple extrapolation of current trends because continuing to operate on a business as usual basis is not sustainable[10], but should consider the likely future evolution of activities that affect GHG sources and sinks.

Mitigation Scenario: Mitigation is defined as any anthropogenic interventions that can either reduce the sources of GHG emissions (abatement) or enhance their sinks (sequestration). Mitigation scenarios reflect a future in which specific policies and measures are adopted to reduce the sources or enhance the sinks of GHGs, and are used to compare and evaluate GHG mitigation policies and measures against the counterfactual situation described in the baseline scenario.

MRV: Measurement, Reporting and Verification is introduced in the Bali Action Plan under the UNFCCC with the requirement that certain actions should be measurable, reportable and verifiable. Specifically, in paragraphs 1(b)(i) and (ii) addressing mitigation, the plan calls for consideration of:

> Measurable, reportable and verifiable nationally appropriate mitigation commitments or actions, including quantified emission limitation and reduction objectives, by all developed country Parties [and] nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner[11].

In many cases, the term "monitoring" is used in place of "measurement" to include indicators that are not quantifiable. Certain NAMAs require qualitative assessment of progress indicators; this is the case in this study for mitigation actions not eligible for CDM, while for eligible actions the CDM Methodologies and Procedures describe the appropriate MRV.

1.4. Base Year Emissions Calculation

The year 2015 was adopted as the base year following BUR requirements[12]. Emissions from key category sectors, namely energy, industrial processes and product use (IPPU) and municipal solid waste, were calculated using the 2006 IPCC Guidelines and Software. The use of these guidelines anticipates their adoption in the future by the mitigation NST to generate up-to-date and comparable reports. Using 1996 Revised IPCC Guidelines is thus no longer recommended.

Emissions from the Forestry and Other Land Use (FOLU) sector in the 2015 base year are not estimated since these are irrelevant to baseline and mitigation scenarios. Being a key source, only methane emissions from Agriculture (Livestock) are presented.

In developing the base year emissions, activity data reported from the Greenhouse gas Abatement Cost Model (GACMO), SNC, INC and Power Sector Master Plan were applied with 2010 the base year considered for the GACMO exercise. To determine

10. GIRoA. (2007). ANDS. ENERGY SECTOR STRATEGY (2008 – 2013)

11 Breidenich & Bodansky 2009

12 Decision FCCC/CP/2011/9/Add.1. 41-(g)

these activity levels in 2015 from reported levels, growth rates assumed in GACMO for the period 2010–2015 were applied.

The latest Global Warming Potentials from the IPCC Fourth Assessment Report were applied in converting CH_4 and N_2O emissions to CO_2e, namely 25 for CH_4 and 298 for N_2O.

Tables 1.1 and 1.2 present the summary report generated by the IPCC Software.

Table 1.1. Base year (2015) GHG Emissions in Gg Gas

GHG Emission Source	Emissions (Gg)		
Categories	**Net CO_2**	**CH_4**	**N_2O**
Total National Emissions and Removals (excluding FOLU)	**6,638.38**	**541.31**	**0.14**
1 - Energy	**6,529.53**	**11.94**	**0.14**
1.A - Fuel Combustion Activities	6,519.74	0.86	0.14
1.B - Fugitive emissions from fuels	9.80	11.08	0.00
1.C - Carbon dioxide Transport and Storage	0.00	0.00	0.00
2 - Industrial Processes and Product Use	**149.56**	**0.00**	**0.00**
2.A.1 - Cement production	40.71	0.00	0.00
2.A - Mineral Industry	95.25	0.00	0.00
2.B - Chemical Industry	0.16	0.00	0.00
2.C - Metal Industry	13.44	0.00	0.00
2.D - Non-Energy Products from Fuels and Solvent Use	0.00	0.00	0.00
2.E - Electronics Industry	0.00	0.00	0.00
2.F - Product Uses as Substitutes for Ozone Depleting Substances	0.00	0.00	0.00
2.G - Other Product Manufacture and Use	0.00	0.00	0.00
2.H - Other	0.00	0.00	0.00
3 - Agriculture, Forestry, and Other Land Use	**0.00**	**492.05**	**0.00**
3.A - Livestock	0.00	492.05	0.00
3.B - Land	0.00	0.00	0.00
3.C - Aggregate sources and non-CO_2 emissions sources on land	0.00	0.00	0.00
3.D - Other	0.00	0.00	0.00
4 - Waste	**0.00**	**37.32**	**0.00**
4.A - Solid Waste Disposal	0.00	37.32	0.00

Table 1.2. Base year (2015) GHG Emissions in Gg CO_2e

GHG Emission Source	Emissions (Gg CO_2e)			
Categories	**Net CO_2**	**CH_4**	**N_2O**	**Total CO_2e**
Total National Emissions and Removals (excluding FOLU)	**6,638.38**	**13,532.79**	**41.20**	**20,212.37**
1 - Energy	**6,519.53**	**298.47**	**41.20**	**6,869.20**
1.A - Fuel Combustion Activities	6,519.74	21.42	41.20	6,582.36
1.B - Fugitive emissions from fuels	9.80	277.04	0.00	286.84
1.C - Carbon dioxide Transport and Storage	0.00	0.00	0.00	0.00
2 - Industrial Processes and Product Use	**149.56**	**0.06**	**0.00**	**108.91**
2.A.1 - Cement production	40.716	0.00	0.00	40.716
2.A - Mineral Industry	95.25	0.00	0.00	95.25
2.B - Chemical Industry	0.16	0.00	0.00	0.16
2.C - Metal Industry	13.44	0.06	0.00	13.50
2.D - Non-Energy Products from Fuels and Solvent Use	0.00	0.00	0.00	0.00
2.E - Electronics Industry	0.00	0.00	0.00	0.00
2.F - Product Uses as Substitutes for Ozone Depleting Substances	0.00	0.00	0.00	0.00
2.G - Other Product Manufacture and Use	0.00	0.00	0.00	0.00
2.H - Other	0.00	0.00	0.00	0.00
3 - Agriculture, Forestry, and Other Land Use	**0.00**	**12,301.15**	**0.00**	**12,301.15**
3.A - Livestock	0.00	12,301.15	0.00	12,301.15
3.B - Land	0.00	0.00	0.00	0.00
3.C - Aggregate sources and non-CO_2 emissions sources on land	0.00	0.00	0.00	0.00
3.D - Other	0.00	0.00	0.00	0.00
4 - Waste	**0.00**	**933.11**	**0.00**	**933.11**
4.A - Solid Waste Disposal	0.00	933.11	0.00	933.11

II. Baseline Scenario

2.1. Introduction

The baseline scenario – also called the Business As Usual (BAU) scenario – in UNFCCC literature signifies future developments in the absence of specific GHG mitigation actions. As such, BAU doesn't reflect simple extrapolation of existing conditions and trends; it should incorporate programmes and projects identified in sectoral development plans that are approved and committed.

Some of these actions may be considered as mitigation options; therefore, the effort to construct the baseline scenario has to carefully distinguish between actions dictated totally or partly by environmental considerations and actions irrelevant to climate change considerations.

Certain development goals and objectives are based on conditional programmes and projects, i.e. will be pursued if and only if specific conditions are fulfilled. For example, getting foreign financing assistance in the form of grants, soft loans and direct foreign investment, GHG adaptation and mitigation activities fall under this category; other activities are foreseen to be implemented by national private sector which in turn are subject to conditions that may not be fulfilled. Such activities should be carefully evaluated before inclusion in the BAU scenario. Only "must do", committed and highly probable activities should be considered in the BAU scenario. Based on these prerequisites, the baseline scenario is also called the Most Probable Scenario.

In the medium and long term, Afghanistan's economy will need to undergo major structural changes to meet its ambitious development goals (double-digit growth rate). The guidelines for such changes are more or less spelled out in national and sectoral policies and strategies; any baseline scenario, therefore, should observe these guidelines.

Finally, Afghanistan is facing serious constraints regarding data availability, data quality and data collection and processing. Establishing a reliable and functional Climate Change NIS is the cornerstone in all climate change-related activities. It is thus strongly recommended that the GoIRA develop a GHG NIS as part of its adopted NAMA "Support to National Policy and Guideline Development".

2.2. Methodology

In most countries, analytical models are used to generate the BAU based on adopted assumptions. Examples of such models are Energy and Power Evaluation Programme (ENPEP), an integrated energy modelling system developed by Argonne National Laboratories, and the Long-range Energy Alternatives Planning (LEAP) System developed and supported by the Stockholm Environment Institute.

In the case of Afghanistan and until such model is adopted by the relevant entities, BAU and mitigation scenarios should be developed and analyzed in a bottom-up approach where activities are first developed at the sector/sub-sector level and then bundled in a national scenario.

Constructing the BAU scenario is a collaborative effort. Representatives of all key sectors must participate in this endeavour to obtain the best insights.

The necessary data on the activities that produce GHG emissions should be collected from sources identified through literature review. Data sources include periodic reports issued by concerned institutions, specialized sectoral and sub-sectoral studies, surveys, relevant technical papers, and national and international standards and specifications. Development of scenarios requires a projection of some current levels to future levels of each type of activity. Such projections, in turn, draw on assumptions made about population growth, GDP, and other macro variables, which can be obtained from official institutions such as NSIA.

In normal circumstances where time series for independent and dependent data are available, the methodology would be the construction of simplified econometric models to forecast future target dependent variables (consumption, production, emission) based on independent (population, GDP) variables. Independent explanatory variables in the case of Afghanistan need not be based on regression calculations, but on estimates and assessments that are put together from experience in other countries with a similar economic environment (the PSMP presents an example of such a methodology)[13].

In many cases, the adopted time frame for the baseline and mitigation scenarios (2015 – 2035) may surpass planning periods adopted in different sectoral plans. In this case, a simple extrapolation of target variables (based on expert judgment) to cover future gap periods is justified.

13. ADB. (2013). PSMP

2.3. Baseline Emissions Calculation Spreadsheet

For the short term, and until a more comprehensive tool is adopted, national experts may use the spreadsheet accompanying this report that was designed specifically for the case of Afghanistan to aid in constructing the baseline scenario. The spreadsheet calculates baseline scenario emissions based on planned/committed projects. These projects are identified based on the above assumptions and introduced in the spreadsheet.

In addition to these projects, the model allows for Normal Growth Rates for each fuel demand that should also be developed based on the assumptions presented above. GHG emissions Greenhouse gas by the spreadsheet based on fuel consumption results. The spreadsheet includes a simplified approach to calculate CH4 emissions from the Domestic Solid Waste and Livestock sectors.

2.4. Uncertainty in Base Year (2015) Emissions Estimation

Emissions/removals estimates are based on: (1) conceptualization; (2) models; and (3) input data and assumptions (e.g. emission factor and activity data). Each of these three can be a source of uncertainty. Bias in conceptualization can be prevented wherever possible by using appropriate quality control (QC) procedures. Ideally, procedural QC techniques need to be applied when estimating uncertainty levels. Calculations need to be reviewed and updated at different stages of the inventory compilation, and all assumptions and estimations of industry experts need to be recorded and documented as supporting evidence for the uncertainty analysis[14].

As for the emission factors and activity data used in the base year (2015), in the case of Afghanistan Tier 1 methods and procedures were applied and default factors provided in the 2006 IPCC Guidelines were adopted. Therefore, the emission factors default uncertainty estimates provided by IPCC Guidelines and embedded in the IPCC Software are reflected in the analysis.

As for activity data uncertainty, and as noted previously, Afghanistan is facing severe problems of data availability, QC, sharing and processing. Therefore, for the compilation of the activity data, the experts' judgement method was used as a result of a series of consultation meetings with key stakeholders and data providers. No proper documentation of data was available, and no set of data were subject to QC procedures. Thus, the activity data used in the baseline year are highly uncertain, similarly to other data reported under the INC, SNC and other reports. Once better quality data becomes available, only base year emissions would need to be recalculated using the IPCC 2006 Inventory Software and then introduced in the baseline and mitigation scenarios calculations.

Actual base year activity data uncertainty for the key categories identified and examined below exceed default uncertainties reported by the IPCC 2006 Guidelines. Therefore, the uncertainty analysis report generated by the 2006 IPCC Software is not relevant.

14. 2006 IPCC Guidelines Vol. I Chapter 3 UNCERTAINTIES

2.5. Key Category Analysis

A "key category" is defined as a category that is prioritized within the national inventory system because its estimate has a significant influence on the country's total inventory of GHGs in terms of the absolute level, the trend, or the uncertainty inflected in total emissions and removals calculation. Key categories are identified using Approach 1 with a pre-determined cumulative emissions threshold[15].

Key categories are those that, when summed together in descending order of magnitude, add up to 95% of the total level, aimed at establishing a general level where key categories will cover 90% of inventory uncertainty. Table 2.1 presents a summary of the analysis.

Table 2.1. Key Category Analysis

IPCC APPROACH 1 KEY CATEGORY ANALYSIS – LEVEL ASSESSMENT					
IPCC Category Code	**IPCC Category**	**GHG**	**2015 estimate Gg**	**Level assessment %**	**Cumulative Total of level assessment %**
1.A.3-	Transport	CO_2	2278.42	34.18%	
1.A.4-	Other Sectors (Household & Commercial)	CO_2	1773.61	26.61%	60.79%
1.A.2-	Manufacturing Industries and Construction	CO_2	1754.25	26.32%	87.11%
1.A.1-	Energy Industries	CO_2	713.46	10.70%	97.81%
2.A.2-	Lime production	CO_2	95.25	1.43%	99.24%
2.A.1-	Cement production	CO_2	40.72	0.61%	99.85%
1.B.2-	Oil and Natural Gas	CO_2	9.80	0.15%	100.00%
Total	**Total CO_2 Emissions**	**CO_2**	**6665.50**	**100**	

Trend Assessment can be concluded by comparing emissions from energy sources that are identified as key categories in Table 2.1 above and reported for 2013 in the SNC with emissions for the same categories reported in 2015 (due to rapid demand growth in an energy-starved economy). Observed growth rates indicate that emissions from energy use have much stronger growth trends than other sectors. Assessing future development plans also indicates a structural change in the economy (service sector growth at the expense of agriculture, large and energy-intensive mining projects, the rapid growth rate in the transport sector and other energy-starved sectors potential demand) leading to maximizing the share of emissions from energy at the expense of other sources.

Based on the above assessment, we can conclude that the categories Transport, Other Sectors energy consumption (Household and Commercial), Manufacturing Industries and Construction energy consumption, and Energy Industries are GHG emission key sources.

15. 2006 IPCC Guidelines Vol. I. Chapter 4

2.6. Sector-Specific Baseline Assumptions

Only key category sectors that have potential mitigation actions are considered, other categories are not relevant to the achievement of Afghanistan's NDC.

The following assumptions were adopted based on discussions and analyses carried in collaboration with government line ministries and agencies in November 2018. Baseline GHG emissions estimates were based on these assumptions. A spreadsheet was provided to the NST where the assumptions are introduced in a quantified form to facilitate baseline emission calculations.

2.6.1. Power Sector

The National Energy Supply Programme (NESP)[16], in line with the Power Sector Master Plan (PSMP)[17], aims for the delivery of sufficient electricity to support economic growth at a rate of about 10% per annum. Shortage of power is a major impediment to development; for example, 89% of industries surveyed by ACCI have indicated the lack of availability of power as the main bottleneck.

Based on the above, a normal growth rate of 2% for fuel consumption in the sector (excluding demand by new additions) is considered when calculating sector emissions. The baseline scenario reflects this target when scheduling additional power-generating capacities to the national grid and RE applications in other sectors. Fuel demand by each new plant addition was added to the base year fuel demand starting from the year of commissioning the plant. A power plant instalment schedule covering the 2016 – 2035 periods was produced based on the assumptions resolved below; the final schedule is presented in Table 2.2 below.

To obtain affordable electricity, Afghanistan has to exploit its domestic energy resources of which there are three: natural gas, coal and oil. Existing reports emphasize the high probability of developing natural gas sources in the country and hold an optimistic view in this regard. Baseline scenario should reflect this position and assume a larger share for natural gas and coal in the future energy demand.

Thermal power plants depend entirely on developments in domestic fossil fuel exploration and production; in Afghanistan, 444bn m^3 of technically recoverable natural gas in addition to the identified reserves were discovered.

Diesel generators with short installation periods and simple operating processes will remain the first option in the first few years until larger thermal units with longer construction periods (and relatively long periods needed to exploit natural gas and coal deposits) are introduced.

The coal reserves of Afghanistan are estimated to be 73 million tons[18]. If these are exploited, the consumption of coal-fired power plants would exceed the historical peak of Afghan domestic coal production by ten times.

16. MEW. (2014). NESP: P.1
17. ADB. (2013). PSMP
18. MEW. (2008). Energy Strategy

It is improbable that an expensive and complicated project like a 400–800 MW coal-fired power plant, as proposed for a mine at Bamyan, would be feasible in the medium term. Only smaller (100-200 MW) coal power plants should be considered in the baseline scenario.

A 100 MWe gas-fired power plant (servicing mining projects) cannot be installed at the present rate of gas production unless new wells drilled. There is enough gas, discovered and undiscovered, in northern Afghanistan to supply gas to several gas-fired power plants. The wells for extracting this gas have to be installed. The first such unit is assumed to supply the grid in 2020.

A major source of natural gas comes from the Turkmenistan–Afghanistan–Pakistan–India (TAPI) Pipeline, which is under construction and is expected to operate in 2019[19]. The pipeline will provide 5 billion cubic meters (180 billion cubic feet) to Afghanistan[20], providing an additional amount of natural gas to supply the power sector and industry. A new electricity transmission system to connect Afghanistan, Pakistan, Kyrgyz Republic and Tajikistan, called CASA-1000, is under implementation which will also benefit the electricity system in Afghanistan. Several medium to small scale RE projects (example KAJAKI dam second phase with 100 MW capacity) are underway which will also improve the situation.

The list of potential generation plants presented by the Power Sector Master Plan includes hydropower as well as thermal generation options using local gas and coal deposits. However, these options face some barriers.

Focusing on local generation for covering the expected demand will need great efforts to build new power plant facilities; the estimated construction period for new hydropower plants is about eight years and uncertainties in the exploitation of coal deposits are high. The baseline scenario will exclude the use of coal in the short range (< 2022) and consider coal-fired power plants after that.

Table 2.2. Power Sector Baseline Scenario: Future fossil fuel-based power plants

Fuel type	Year	Type of unit	Capacity factor hours	Installed capacity MW	Total MWh Production	Fuel consumption TJ
NG	2020	Combined cycle	6000	100	600000	4320
NG	2025	Combined cycle	6000	100	600000	4320
NG	2030	Combined cycle	6000	100	600000	4320
Coal	2022	Thermal	6000	100	600000	7689.6
Coal	2030	Thermal	6000	200	1200000	15379.2
Diesel	2018	Generator	5000	40	200000	3870

19. Reuters. Turkmenistan starts work on gas link to Afghanistan, Pakistan, India. Available (December 2018) at: https://uk.reuters.com/article/turkmenistan-gas-pipeline-idUKKBN0TW05Q20151213

20. THE DIPLOMAT. (2015) A Fillip for the TAPI Pipeline.

Fuel type	Year	Type of unit	Capacity factor hours	Installed capacity MW	Total MWh Production	Fuel consumption TJ
Diesel	2019	Generator	5000	40	200000	3870
Diesel	2020	Generator	5000	40	200000	3870
Diesel	2021	Generator	5000	40	200000	3870

The cost of large hydropower plants is high, ranging from 2 million to 5 million dollars per MW, translating into billions of dollars (for example, Dashtijum plant in the Panj-e- Amo river has a capacity of 4000 MW with a total estimated cost of 8,000 million dollars and Kunar A (Shaal) plant in Kunar river has a capacity of 789 MW with a total estimated cost of 2,000 million dollars)[21].

These options are not considered in the baseline scenario based on the assumption that electricity generated from these plants will not substitute electricity generated using fossil fuels; if total supply exceeds demand, then imported electricity will be limited. As a result, GHG balance will not be affected; thus micro and small hydropower plants will be considered under the mitigation scenarios.

2.6.2. Household and Commercial Sectors

As a result of anticipated economic development and improvement in living conditions, consumption in the household and commercial sectors will increase. According to a recent survey[22], the proportion of the population with primary reliance on clean fuels and technology for cooking is 25.2% and for heating only 4.2%. The survey also reports a significant increase in demand for commercial fuels in household and other sectors.

A major cause of deforestation in Afghanistan is the use of wood as fuel for heating and cooking. Raising fuelwood use efficiency (e.g. more efficient wood stoves) may reduce the rate of deforestation, but the only feasible substitute that can stop forest degradation is the introduction of commercial fuels (especially liquid fuels) in the market in an easily accessible and affordable way. The Energy Sector Strategy[23] emphasized the importance of developing petroleum products sub-sector. This study considers a 4% growth rate in commercial and household demand for petroleum products.

Growth in the sector's demand for electricity is reflected in emissions from the power sector, and it is concluded that demand for electricity will remain supply-constrained over the baseline time period.

Rural households that depend on biomass sources for more than 90% of their energy needs[24] will shift from traditional fuels (wood, dung) to commercial fuels at a slower rate than urban households.

21. ADB (2008). PSMP: P. 5-6
22. CSO. (2016/17). ALCS
23. MEW. (2008). Energy Strategy
24. CSO. (2016/17). ALCS

With growing income, penetration of electricity-consuming appliances in households will increase, and existing low-efficiency appliances will retain a major share of the market. Awareness of energy efficiency and energy conservation measure and technologies will remain low among household owners.

Responsible organizations will assume regulatory duties; necessary regulations and instructions will be developed and enforced. Energy pricing policy will reflect costs and subsidies will be limited to lower-income groups.

The following table presents the expected fuel demand composition in household and commercial sector and was used to generate GHG emissions from the sector. The NST should use this table in line with the above assumptions and based on the existing surveys (Socio-Demographic and Economic Survey (SDES))[25] illustrating the mix of fuels used by the households.

Table 2.3. Baseline Scenario fuel demand composition in the household and commercial sector

Type of fuel	Energy demand composition in the Household sector %			
	2015 - 2020	2020 - 2025	2025 - 2030	2030 - 2035
LPG	5.0	8.0	12.0	15.0
Kerosene	7.0	12.0	20.0	25.0
Diesel	2.0	4.0	8.0	8.0
Coal	7.0	5.0	3.0	2.0
Wood & biomass	79.0	71.0	57.0	50.0
Total	100	100	100	100

These percentages reflect the adopted growth rate in petroleum demand used in baseline emissions calculations.

2.6.3. Manufacturing Industries and Construction

To date, most SMEs are operating on diesel, owing to uncertain grid power and poor quality of power, especially in sustaining three-phase loads (440 volts and more)[26]. This trend will slow down with the improvement of the national grid reliability, but large mining projects (copper, iron) envisaged in development plans will necessarily build their own thermal power plants.

Making commercial fuels and electricity accessible in rural areas will lead to the establishment of small farm-level businesses that will contribute to increased disposable income and at the same time to increased demand for fuels.

The double-digit economic growth rate will necessarily witness increased activity in the construction sector; this will generate appreciable demand for building material (cement and iron), which will encourage new investment in producing these materials. For the purpose of this study, it is assumed that the existing cement factory will upgrade its operations by 2019 to produce an additional 100,000 tonnes of cement and a new cement factory will be constructed by 2025 with a production

25. CSO. (2016). SDES

26. NEPA. (2014). ACCSAP

capacity of 1,000,000 tonnes of cement. Also, one iron factory with a capacity of 1,000,000 tonnes will be constructed by 2025. These additions will generate new GHG emissions both from energy consumption and industrial processes.

The overall demand for fossil fuels will increase by an estimated 4% in the baseline scenario for the 1.A.2 - Manufacturing Industries and Construction IPCC Category[27]as a result of increased demand for industrial products accompanied with expanded small and medium new industries.

Table 2.4. Industrial Processes and Product Use Baseline Scenario

Industrial Sector additions			
New Industry added	YEAR of startup	Type of fuel(s) consumed	Quantity of fuel(s) Tj
Cement upgrading	2019	Coal	4.47
Cement New	2025	Coal	44.71
Iron New	2025	Natural Gas	1288.07

Based on economic growth expectations, the industrial sector will experience a two-fold increase in production first through improving efficiency and maximizing use of existing production capacity, and second through new investments in new production capacity. For the purpose of this scenario, only large-scale new investments are considered as additions, while other additions in small and medium activities are reflected through the annual growth rate assumed (4%).

The construction sector will be one of the first sectors to reflect the positive developments expected in the economy through increased demand for building materials. Cement and iron production in Afghanistan is low by current and future measures. Therefore, new additions in cement and steel production were considered.

2.6.4. Domestic Solid Waste Sector

Current practices cause pollution problems leading to serious health hazards. The GoIRA recognizes the intensity of the problem, and developments at the municipality level are envisaged to bring the issue under control.

The first step in this direction is to improve the collection process and to apply sanitary landfill practices. Methane generation under current predominantly aerobic conditions is low.

In the baseline scenario, a modest growth rate (1.0–1.2%) is considered for the increase of total solid waste generated (and methane produced) until 2025, although more sanitary managed, anaerobic landfills are considered to be used starting in 2020. The effect on methane generation rates will only be significant after some years as degradation of biomass takes place over long periods.

Starting from 2026, a growth rate of 3% is assumed for methane generation due to the adoption of managed anaerobic landfills. In the baseline, the collection of generated methane for incineration or use for power generation is not considered; these activities are part of the conditional mitigation actions.

27. 2006 IPCC Guidelines Vol. 2 Chapter 2.

2.7. Sectoral Emission Trends

Table 2.5 and Figure 2.1 summarize the sectoral emission trends in the baseline scenario, excluding the FOLU sector.

Table 2.5. Baseline sectoral emission trends in Gg CO_2e

Total CO_2 Gg	GHG Emission				
	2015	2020	2025	2030	2035
1.A.1.a.i - Electricity Generation Total GHG	794.55	1963.18	3490.70	5577.75	6158.29
1.A.2 - Manufacturing Industries and Construction Total GHG	1673.15	2036.102	2553.86	3107.16	3780.34
1.A.3.b - Road Transportation Total CO_2	2278.41	2772.04	3372.61	4103.30	4992.29
1.A.4.a - Commercial/ Institutional Total CO_2	1025.13	1308.36	1669.83	2131.18	2719.99
1.A.4.b - Residential Total CO_2	748.47	955.26	1219.18	1556.02	1985.92
2 - Industrial Processes and Product Use	149.56	220.21595	1279.58	1483.39	1719.66
Methane Emissions from livestock Gg CO_2e	12301	12947.68	13662.12	14451.67	15324.68
Methane Emissions from Solid Waste disposal Gg CO_2e	933	982.04	1036.23	1201.28	1392.61
Total emissions in Gg CO_2e	19903.27	23184.87	28284.11	33611.75	38073.78

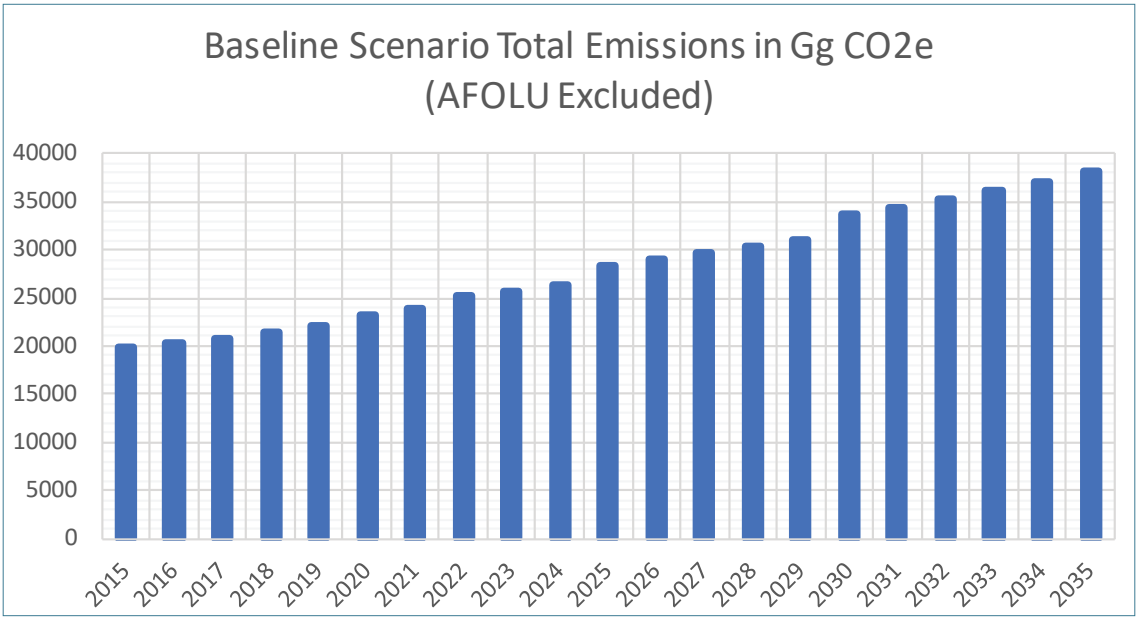

Figure 2.1. Baseline Scenario Emissions in Gg CO_2e

III. Mitigation Scenario

3.1. Introduction

The Afghanistan National Development Strategy (ANDS) 2008 – 2013 which "*reflects Afghanistan's long-term goals*" tackles climate change issues under pillar (iii) Economic and Social Development where energy, water, transport, urban development, agriculture and rural development are the major components.

The ANDS strategic objective for the energy sector strategy is an energy sector that provides reliable, affordable energy increasingly based on market-based private sector investment and public sector oversight. The immediate task of the ANDS strategy, with assistance from the donor community, is to expand energy availability at a price that covers the cost (for all but the poorest members of society) and to do so in the most cost-effective manner.

On the sectoral level, other policies and programmes tackle the development goals. The Afghanistan Climate Change Strategy and Action Plan provides a Low Emission Development Strategy (LEDS) to achieve development goals "while keeping GHG emissions lower than what they would have been in the scenario without the interventions aimed at enabling the economic growth to progress on a low emissions"[28] trajectory.

More so, the relevant National Priority Programme (NPP), the NESP[29] accompanied by the PSMP for Afghanistan, discusses ways to achieve the self-sufficiency targeted in the ANDS.

The Energy Sector Strategy of Afghanistan identifies *"The number one priority in the energy sector must be on operating efficiency: commercialization of* DABS, *investments in transmission and distribution to reduce losses, and, repair and maintenance of all power assets"*[30].

Components within this NPP envisage the deployment of renewable energy technologies, discuss the need for a Rural Energy Master Plan for Afghanistan (finalized in May 2013) and identify energy efficiency as a focus area. PSMP also emphasizes the importance of undertaking Demand Side Management and Energy Efficiency measures to lower the demand for electricity growth rate.

28.NEPA. (2014). ACCSAP

29. ADB. (2013). PSMP

30. GoIRA. (2007). ANDS

The energy and water sectors are the main areas in which climate change mitigation and adaptation efforts best serve the national development goals.

3.2. Afghanistan's NAMAs

According to the NAMA development process[31] (see Figure 3.1), NAMA categories listed in Afghanistan's NAMAs report and other actions identified in existing relevant strategies and policies should be looked at as part of the concept phase.

The concept phase brings the initial NAMA idea to its first presentation as a comprehensive concept paper. The concept phase also identifies and prioritizes areas of national or sectoral development plans or policies in which GHG emissions reduction is feasible and desirable. It also describes possible policy instruments or measures required. It identifies probable stakeholders, establishes baseline and mitigation emissions scenarios (as performed in this study) and describes the NAMA's primary benefits and co-benefits.

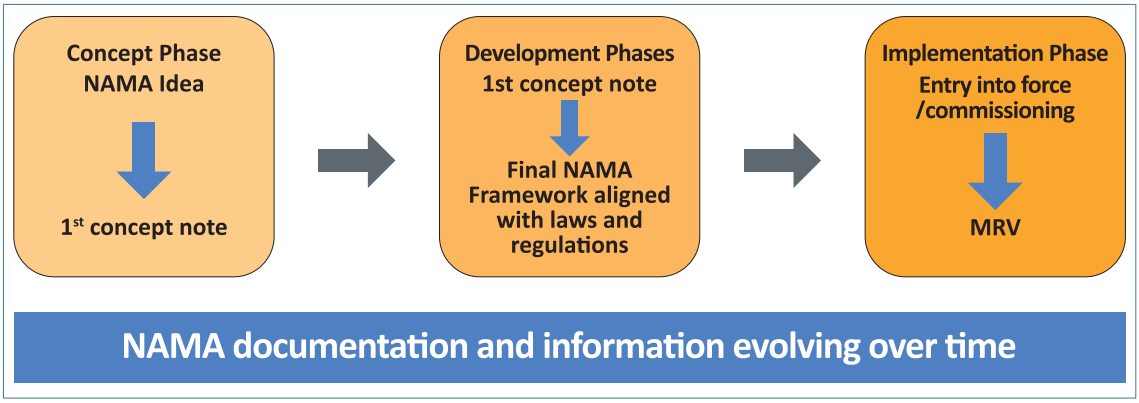

Figure 3.1. NAMA documentation and information evolving over time

In that context, programmes and projects identified in this study represent part of the Development Phase where the ideas in the NAMA proposal are aligned with political, economic, social and technical realities.

In its submitted NAMA report[32], the GoIRA states that "*Low Emission Development Strategies (LEDS) and Nationally Appropriate Mitigation Actions (NAMA) are two of the key components through which participating countries seek to address the impacts of climate change and reduce greenhouse gas (GHG) emissions.*"

The report also identifies the priority areas for Low Emissions Development (LED) which include:

- Renewable Energy
- Energy Efficiency
- Efficient Transportation
- Waste Management

In this report mitigation programmes and projects are identified in all these areas either under NAMA or CDM/PoA projects. Table 3.1 lists the NAMA categories identified and adopted by the GoIRA.

31. UNEP. (2012). Risø
32. NEPA. (2016). NAMA

Table 3.1. Afghanistan's NAMAs Categorization[33]

NAMA Category	Scope	Intervention Title	Institutional Stakeholder	NAMA Description
Policy	Support for National Policy and Guideline Development	Supporting Energy Efficiency Policymaking for Afghanistan	Lead: Ministry of Energy and Water Other: National Environmental Protection Agency	Currently, there is no focus on Energy Efficiency. Proposed NAMA will set up policy goals and framework in this area. Focus on efficient mining, SMEs and other sectors. Especially in the industrial sector, brick industries, household appliance, energy efficiency awareness and policy need to be developed. The baseline needs to be established.
Policy / Programme / Project	Sustainable Urban Infrastructure Development	Guidelines on sustainable urban habitat, covering waste management, efficient building design, and programmes.	Lead: Ministry of Urban Development, Kabul Municipality Other: National Environmental Protection Agency, Ministry of Energy and Water	Sustainable urban living could greatly reduce both GHG emissions and local pollutants. Policy directives could be aimed at the use of solar water heaters for hot water supply, use of efficient (star rated) appliances and devices, etc. Interventions could also be directed at sustainable housing guidelines in terms of choice of building materials.
Project	Project design for waste management with a focus on energy recovery	Sustainable Waste Management for Urban Centres in Afghanistan	Lead: Ministry of Urban Development, Municipalities of host cities Other: National Environmental Protection Agency, Da Afghanistan Breshna Sherkat (DABS)	A framework design for efficient waste collection and management for major cities such as Kabul, Herat, Kandahar, Jalalabad and Mazar-e-Sharif. Special focus on energy recovery from organic waste, so as to facilitate energy generation to meet captive urban loads.
Policy / Programme / Project	Low emission mass transportation network for Kabul and Kandahar, along with improved traffic management and monitoring of vehicular pollution	Design for Mass Rapid Transit System and Improved Traffic / Vehicle Management.	Lead: Ministry of Transport and Civil Aviation Other: National Environmental Protection Agency	Based on guidelines and regulation established, design of Mass Rapid Transit System for Kabul and Kandahar based on reintroduction of Public Bus system (Millie Buses), metro trains and Bus Rapid Transit Corridors (BRT). Along with traffic management with the use of IT, and monitoring of vehicular emissions.

33. Idem

Project	Develop a plan of action to re-vegetate deforested and wastelands and put them to productive uses	Re-vegetation of deforested and degraded lands for economic development	Lead: Ministry of Agriculture, Irrigation and Livestock Other: National Environmental Protection Agency	Explore a variety of options for regeneration of forests and vegetation of degraded lands, with the twin objectives of addressing land degradation as well as resource recovery by harvesting the produce grown, especially with the use of biofuels such as oilseeds.
Project	Enhanced Energy Efficiency in households	Energy Efficient Domestic Lighting	Lead: National Environmental Protection Agency and Ministry of Energy and Water Other: DABS	Potential for replacement of CFL and other lights with LED bulbs and tubes and solar lighting for significant energy savings and resource conservation.

3.3. Afghanistan's NDC

Afghanistan's conditional NDC[34] identifies the target and relevant sectors as follows:

- **Target:** There will be a 13.6% reduction in GHG emissions by 2030 (6.2 Gg CO_2e) compared to a BAU scenario, conditional on external support (based on a baseline scenario and mitigation options generated by GACMO using the ADB Afghanistan Greenhouse Gas Inventory Report).
- **Sectors:** Energy, natural resource management, agriculture, waste management and mining
- **Financial Needs:** Total: USD 17.405 billion; Adaptation: USD 10.785 billion; Mitigation: USD 6.62 billion (2020-2030).

The NDC report briefly mentions mitigation actions. However, no details are provided to enable project-level evaluations. The contribution is envisaged to result from actions in all sectors of the economy and according to the report[35]: "*Primarily focused on sustainable process and development initiatives based on the outcomes of 2015 national consultation on LEDS and NAMA*".

Actually, in the case of Afghanistan, all mitigation efforts are conditional. High dependence on foreign aid and donors for social and economic development leaves no room for selective development approaches. Many actions that in different circumstances might be classified as mitigation options fall in the case of Afghanistan under the category of must-do options, and are dictated by vital national development needs. For example, it will be extremely costly to extend the national electricity grid to cover all rural areas in the short and medium terms, so renewable energy alternatives represent a must-do category of development projects to achieve immediate and vital goals.

34. NEPA. (2015). INDC

35. Idem

3.4. Mitigation Options

Mitigation opportunities identified by previous research are presented here in more or less general terms; this is as expected in the concept phase. In this study, which represents a step towards the implementation phase, mitigation programmes and projects are formulated in a more precise and definite manner.

The mitigation activities selected must be feasible, meaning that objectives can be realistically achieved within the constraints of the operating environment and the capabilities of the implementing agencies. More complex and demanding alternatives should be delayed for the future. Benefits generated by the mitigation activities must be sustainable, meaning that continuous monitoring, servicing and upgrading is permissible. Furthermore, the mitigation activities should respect and contribute to the overarching policy objectives of the GoIRA such as respect of human rights, poverty reduction, health and cross-cutting issues.

The programmes and projects considered in this study are identified within the scope of the listed NAMA options adopted by the GoIRA. Opportunities are presented in two parts, the first representing opportunities not eligible for development under CDM ("soft programmes"), and the second representing opportunities that are eligible for development under CDM. Figure 3.2 illustrates the logical sequence of determining GHG mitigation starting from the existing policies, strategies and plans developed and adopted by the GoIRA.

Sheghnan District, Badakhshan, Afghanistan © UNEP/M.Haris Sherzad

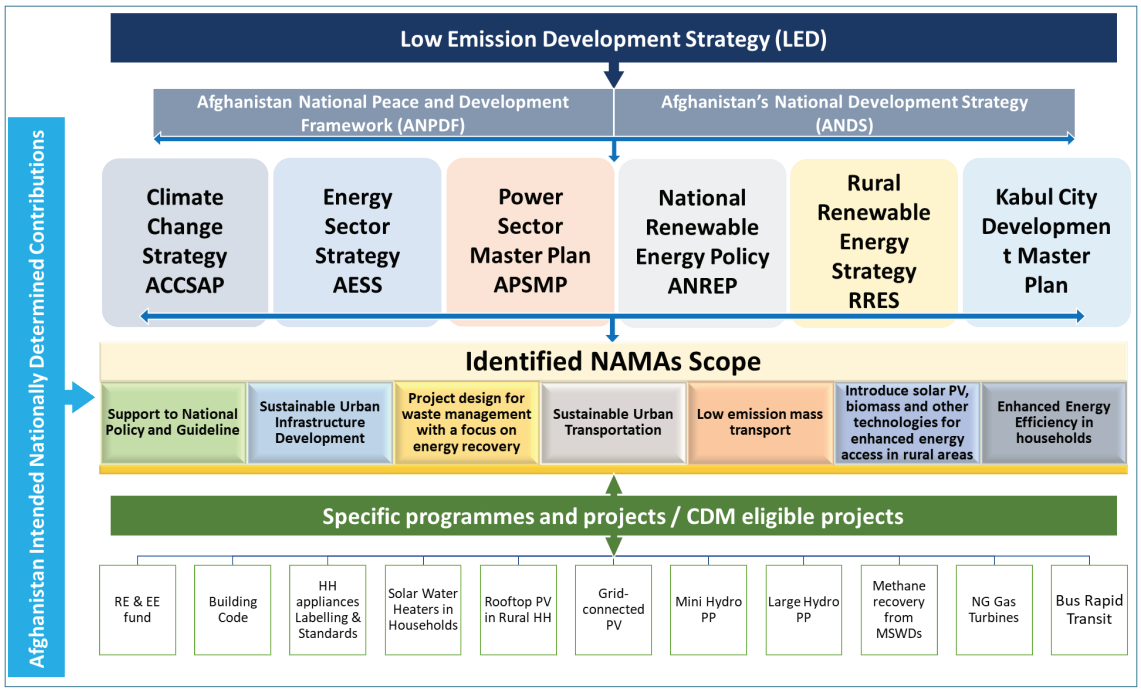

Figure 3.2. Logical sequence of determining GHG mitigation, starting from LEDs.

3.4.1. Mitigation Actions Not Eligible for Development Under CDM and PoA (Soft Programmes)

3.4.1.1. Greenhouse Gases Inventory National Information System

An NIS should incorporate all the elements necessary to estimate GHG emissions and removals based on approved calculation tools and methodologies. The NIS aims to generate transparent, consistent, comparable, complete and accurate inventories and standard quality results. The NIS should also facilitate the MRV report issuance needed for NAMAs and related mitigation activities.

The initial system should be as transparent and straightforward as possible. In the future, when the system is well-established, further automation may be introduced to replace human interventions in operations.

As a first step, data requirements, stakeholders mandated with specific data collection duties (data sources) and inventory methodologies, procedures and tools should be identified and decided upon in line with IPCC sector and sub-sector definitions. NIS inputs and outputs will be designed accordingly and customized for each stakeholder.

The United States Environmental Protection Agency's approach to Greenhouse Gas Inventory Capacity Building[36] provides technical assistance on methods, activity data collection, and documentation complementing the development of NIS.

36. U.S. EPA. 2011. EPA-430-K-11-005

Proposed GHGNIS structure

The 2006 IPCC Software should form the electronic core of NIS. Though default emission factors are built into the models, the software provides users with the flexibility to introduce country- and plant-specific emission factors as well.

Around this core, functions related to database administration, quality control, data management and reporting should be structured interactively to facilitate the process of reporting of emissions and removals, as well as the management of data and documentation. This should establish a clear and consistent process for inventory compilation and offer a uniform data management system for multi-year inventories.

Proposed National GHG Inventory Team

The following recommended team structure and assigned activities represent the minimum requirements for establishment of such a system.

Table 3.2. Proposed National GHG Inventory System Team Composition

NIS Team names	Position	Responsibility	Institution
	NIS Director	Overall supervision of system & macro statistics, Review & approve sector reports	NEPA, NSIA
	Energy sector Director	Supervise/ implement energy sector related activities: Generating data templates, distributing templates to stakeholders, collecting filled template, apply Quality Control measures, saving data and generating required reports (inventory, follow-up, MRV) according to approved formats. Target stakeholders in key categories. Generating the final sector report.	NEPA, MEW
	IPPU sector Director	Same as above for IPPU sector	NEPA, MoCI
	Waste sector Director	Same as above for Waste sector	NEPA, IDLG-DMMA, Kabul Municipality
	AFOLU sector Director	Same as above for AFOLU sector	NEPA, MAIL
	IT Specialist	Maintain the NIS, assist other team members in IT matters	

Note: Depending on the workload in each sector, other persons may be added to the team to facilitate the work.

Data templates serving the IPCC 2006 software requirements are presented in Annex 2.

3.4.1.2. Renewable Energy and Energy Efficiency Fund

Afghanistan is embarking on a rapid growth rate path for which securing energy supply is a crucial and vital requirement. To achieve the required levels of energy security, Afghanistan needs significant investments across both the public and private sectors.

The Renewable Energy and Energy Efficiency Fund's (REEEF) primary goal shall be supporting the implementation of projects and activities that lead to maximizing the share of renewable energy production and energy efficiency savings in the national energy balance, achieving thereby low- or even negative-cost GHG emission reduction. More specifically, the fund will finance activities implemented by the private sector and other entities that promote sustainable use of Afghanistan's natural resources and help achieve environmental objectives, including GHG mitigation goals. The core function of the REEEF is thus to extend financial assistance to activities and projects that strengthen the energy supply system and improve environmental conditions at the same time.

The above indicates clearly that the fund is coherent with and complementary to efforts towards achieving the national development goals stated in various national policy documents[37]. Moreover, the REEEF meets other evaluation criteria listed in Table 3.4. Projects supported by the fund would be CDM eligible, which will support the fund's financial cycle.

The REEEF should adopt a sound and systematic approach to the identification, preparation, appraisal, selection, implementation and subsequent evaluation of projects receiving its support. This series of steps constitutes the Project Cycle; managing this cycle is the REEEF's most critical process.

The REEEF should operate through several windows:

- Renewable Energy Subsidy Window
- RE and EE Interest Subsidy Window
- RE and EE Loan Guarantee Window
- Studies and Technical Cooperation Window
- Equity Financing Window

Expected sources of revenues include:

- general budget allocation by the Government
- donations from international donors
- fees and penalties raised on violations of environmental law
- CDM revenues and interest on loans

The REEEF is technically, financially and socially feasible with the proper level of training. No major obstacles are foreseen.

37. GoIRA. (2007) ANDS: "The energy sector will provide essential power supplies needed for private sector development, job creation and poverty reduction" and "enable the private sector to lead Afghanistan's development within a competitive market-based economy (Component 2: Expand opportunities for the private investment in infrastructure and natural resources development)"
RE Roadmap: "To increase the supply of energy by domestic resources",
Energy Sector Strategy: "The attraction of private investment in the energy sector" and development of indigenous resources for power and energy use

MRV for Renewable Energy and Energy Efficiency Fund

MRV should cover the entire project cycle, starting from conceptualization and appraisal through to implementation and operation. Table 3.3 summarizes the suggested indicators/milestones to be covered by MRV in case of the REEEF. Reporting should be periodic based on the timeframes approved for the relevant projects. These reports will also be part of BURs submitted by the government of Afghanistan.

3.4.1.3. Buildings Energy Codes

Building codes are sets of regulations governing the design, construction, alteration and maintenance of structures. They specify the minimum requirements to adequately safeguard the health, safety and welfare of building occupants. The building code has four functions as described below[38].

1. **Legal function:** A building code is a regulatory document by which to specify and judge compliance. It is concerned with the legal status of building codes and regulations
2. **Administrative function:** A building code is an administrative document which has a mechanism to describe compatibility achievement. It belongs to the building code organizations in the country with main functions of issuing permits, reviewing plans, and conducting inspections
3. **Technical function:** A building code is a technical document that provides information to building practitioners about what should be done by experts (requirements for energy conservation among others).
4. **Social function:** A building code is a social document that specifies the society's minimum requirements for public health, safety and general welfare.

As part of a building code, energy efficiency requirements in new and existing buildings can be listed as provisions. Observing these provisions becomes mandatory for issuing licences and permits for new buildings and refurbishment of existing ones. Building energy codes ensure the efficient use of energy in buildings over their lifetimes.

The Building Energy Code Programme should perform the following tasks:

- Assess the savings impacts of model energy codes, calculating energy cost and carbon savings,
- Coordinate with key stakeholders including architects, engineers, builders, code officials, and a variety of other energy professionals to improve model energy codes,
- Track the status of energy code adoption across the country and provide technical assistance for implementing the code,
- Provide a variety of educational and training resources and assist practitioners to measure and improve code compliance,
- Administer a Help Desk to assist individual code users with questions about energy codes.

38. Loughborough University Institutional Repository. Reform of building codes, regulations, administration and enforcement in Kuwait: within the legal, administrative, technical & social framework.

The GoIRA should initiate the work on establishing the regulatory and institutional framework needed to introduce the Building Energy Code as a tool towards energy efficiency.

Feasibility

Establishing a Building Energy Code in Afghanistan is technically and financially feasible with the proper level of training. Socially it is anticipated that there will be difficulties in enforcing the code since applying these codes in practice may entail extra costs for owners.

MRV for Buildings Energy Codes

Table 3.3 summarizes the indicators to be monitored and reported during the project cycle.

3.4.1.4. Household Appliances Labelling and Standards

The obligation on manufacturers and importers of equipment to label goods or to meet specified standards is a policy measure introduced to overcome the market failure caused by asymmetric information. Potential users of equipment, faced with a choice of designs, may not have the skills and knowledge to understand the consequences of their choice. They may be tempted to choose low-cost equipment with high energy consumption in preference to higher priced options that perform better. Manufacturers may not have an incentive to provide this information if they think that their comparative market advantages do not include greater efficiency than competitors. Labelling and standards are not exclusive; goods can be obliged to meet a certain minimum standard and then labelled according to their performance when it exceeds the norm. Labelling and standards both require testing facilities and protocols, and both require rigorous and competent enforcement.

Energy efficiency technologies generally require higher initial investment costs, while the financial benefit (through lower energy costs) only comes in later. Even when the pay-back period is just a few years, the higher initial investment might make people choose the cheaper (less efficient) technology.

Apart from lighting, setting of energy efficiency targets for domestic electric appliances is generally limited to more energy intensive items such as refrigerators, washing machines and air-conditioning systems.

In the case of Afghanistan, with current levels of household income, the penetration degree of such appliances is expected to be low. With the low level of household electricity consumption ranging from as low as 178 kWh/capita to 551 kWh/capita[39], no absolute reduction in demand is expected but rather a rationalization of future demand.

Nevertheless, in the announced development plans, with a double-digit growth rate of future GDP, the penetration rate of appliances would accelerate in the household sector, so preparing the market (both manufacturers and importers) for the anticipated demand in the long term is a valid target.

39. CSO. (2016/17). ALCS

As a start, and for the short to medium term, standards for efficient biomass-consuming appliances can be introduced to consumer manufacturers (in parallel to technology transfer and vocational training). This will positively affect deforestation rates, the indoor environment and particularly indoor pollution, and the effort and time consumed in gathering biomass fuels.

The aim of this mitigation action transcends lowering GHG emissions from household use to include imposing minimum performance requirements, providing consumers with relevant information on the energy efficiency of common household appliances, and avoiding Afghanistan becoming a dumping ground for inefficient appliances.

MRV for Household Appliances Labelling and Standards

As part of the activities to be implemented under Enhanced EE in households and SME NAMA Table 3.3 provides the elements/indicators that should be monitored and reported.

Table 3.3. Summary and MRV Guidelines for Soft Programmes Mitigation Activities

Soft Programme	NAMA Scope	Host Agency	Required Support	Indicators to Monitor & Report in ech Phase		
				Conceptualization & Appraisal	Implementation	Operation
Establishment of National Information System	Support for National Policy and Guideline Development	The suggested agency is NEPA	Training on 2006 IPCC Guidelines and Software, QC tools & procedures	Project proposal, policy framework, Institutional setup, implementation and resource scheduling, Stakeholders identification/ participation, training progress	Official endorsement, Donors identification & agreements, financing flow, Resolutions and decrees by Govt., staffing,	Standardized Data templates design, issuance & distribution, Liaison officers identification, data collection, QC, Direct & Indirect Impact.
Establishment of Renewable Energy and Energy Efficiency Fund	Support for National Policy and Guideline Development	The suggest-ed agency is MEW, CFU	Green financing mechanism, RE & EE Planning and Management	Project proposal, policy framework, Institutional setup, implementation and resource scheduling, Stakeholders identification/ participation, training progress	Official endorsement, Donors identification & agreements, financing flow, Resolutions and decrees by Govt., staffing	Standardized Financing modules, financing conditions & procedures determination, announcing & publicizing the fund, proposals received, approved, rejected, signing contracts, implementation progress, Direct & Indirect Impact.

Energy Building Codes	Sustainable Urban Infrastructure Development. Enhanced EE in households & SME	The suggested agency is Municipalities	Technical training on energy in buildings, legal & administrative training	Project proposal, policy framework, Institutional setup, implementation and resource scheduling, Stakeholders identification/ participation, training progress	Official endorsement, Legal & Institutional setting Resolutions and decrees by Govt., staffing,	Announcing & publicizing the fund, Awareness raising, Request for permits standardized forms, number of received requests, approved, rejected, monitoring implementation, Direct & Indirect Impact.
Household appliances Labelling & Standards	Enhanced EE in households & SME	The suggested agency is the Ministry of Industry and Trade and Custom Department	Technical training on energy efficient appliance, Laboratories for testing appliances, legal & administrative training	Project proposal, policy framework, Institutional setup, implementation and resource scheduling, Stakeholders identification/ participation, training progress	Official endorsement, Donors identification & agreements, financing flow, Legal & Institutional setting, laboratory establishment Resolutions and decrees by Govt., staffing,	Request for permits standardized forms, number of received requests, approved, rejected, monitoring market development, Direct & Indirect Impact.

3.4.2. Mitigation Actions Eligible for Development Under CDM and PoA

Introduction to CDM and PoA[40]

CDM: The CDM allows emission-reduction projects in developing countries to earn certified emission reduction (CER) credits, each equivalent to one ton of CO_2. These CERs can be traded and sold, and used by industrialized countries to meet a part of their emission reduction targets under the Kyoto Protocol.

CDM Project Cycle: The project participant prepares the project design document and secures a letter of approval from the Party DNA, after which the project design document is validated by the accredited designated operational entity or private third-party certifier. Registration is the formal acceptance by the Executive Board of a validated project as a CDM project activity. The project participant is responsible for monitoring actual emissions according to the approved methodology. Verification, certification and CER issuance is the responsibility of the CDM Executive Board.

PoA: Under a PoA, it is possible to register the coordinated implementation of a policy, measure or goal that leads to emission reduction. Once a PoA is registered, an unlimited number of Component Project Activities (CPAs) can be added without undergoing the complete CDM project cycle. Compared to regular CDM project activities, this programmatic approach has many benefits, particularly for less developed countries or regions.

The main benefits of a PoA are:

- Transaction costs, investment risks and uncertainties for individual CPA participants are reduced,
- PoAs are managed on a regional level which speeds up the approval process,

40. http://cdm.unfccc.int/

- Access to the CDM is extended to smaller projects which would not be viable as stand-alone projects,
- Direct engagement of individual project developers in the CDM process is not required.
- Emission reductions can be continuously scaled up after PoA registration since an unlimited number of CPAs can be added at a later stage,
- Many technologies with high co-benefits, e.g. on the household level, are supported by PoA,
- Specific regional policy goals can be effectively supported by accessing carbon finance through PoA,
- Monitoring and verification can be undertaken on a collective basis by utilizing a sampling approach,
- No registration fee is due for each CPA included after registration. Registration fees are based on the expected average emission reductions of the "actual case" CPAs submitted at the PoA registration,

In order to prepare a PoA for validation and registration, the applicable PoA-DD (Design Document) and CPA-DDs are to be submitted to a Designated Operating Entity (DOE) according to the requirements outlined in the:

- CDM Project Standard
- CDM Project Cycle Procedure
- Standard for demonstration of additionality, development of eligibility criteria and application of multiple methodologies for a programme of activities
- Standard for sampling and surveys for CDM project activities and programme of activities

A Project Idea Note (PIN)[41]:

- Provides summary information of a proposed carbon project typically 5-10 pages long;
- Is not an official document of the CDM, but virtually all funds and brokers have a PIN template;
- Is a communication tool used by project developers and investors early on in the process; and
- Aids in the conceptualization, marketing, financing and screening/ evaluation of projects.

PIN Key Elements:

- A clear description of project activities and technologies employed
- Identification of project participants and arrangements for implementation
- An eligibility outline: additionality and baseline scenario (Why the project should not happen on its own? Sources of GHG emission reductions and total emission reduction volume)
- Local, national, and global benefits

Annex 3 contains the World Bank Project Idea Note Template. National teams should (after proper training) fill the template based on the keynotes and guidelines provided for each CDM-PoA action identified in this study.

41. UNEP-RISO. (2009)

Table 3.4. General Overview of the Mitigation Options for Afghanistan

Mitigation Options											
Evaluation Criteria	RE & EE Fund	Building Code	Household Appliances Labelling & Standards	Solar Water Heaters in Households	Electrification of Rural Communities using Renewable Energy	Grid-connected PV	Mini Hydropower Plants	Improved Cookstove Programme	Methane Gas Recovery from MSWDs	Natural Gas Combined Cycle	Bus Rapid Transit
Category	Programme	Programme	Programme	Programme	Programme	Programme/ project	Programme/ project	Programme/ project	Programme/ project	Programme/ project	Programme/ project
Scope NAMA	Enhanced EE in households & SME Enhanced energy access in rural areas	Sustainable Urban Infrastructure Development. Enhanced EE in households & SME	Enhanced EE in households & SME	Sustainable Urban Infrastructure Development Enhanced EE in households & SME	Enhanced energy access in rural areas	Sustainable Urban Infrastructure Development	Enhanced energy access in rural areas	Enhanced energy access in rural areas	Sustainable Urban Infrastructure Development	Sustainable Urban Infrastructure Development	Sustainable Urban Infrastructure Development
Clean Development Mechanism eligibility	NA	NA	NA	Eligible PoA	Eligible PoA	Eligible PoA	Eligible PoA	Eligible PoA	Eligible CDM or PoA	Eligible CDM or PoA	Eligible CDM or PoA
Alignment with national developmental priorities and strategies	ANDS: "Expand opportunities for the private investment in infrastructure and natural resources development. ANDS strategic objective for the energy sector strategy is an energy sector that provides reliable, affordable energy. The ANDS strategic goal for the transport sector is to have a safe, integrated transportation network that ensures connectivity and that enables low-cost and reliable movement of people and goods. The ANDS strategic objectives for urban development are to improve urban infrastructure and services, reduce urban poverty and allow urban residents to live safe, healthy and productive lives." NES: "Restructured sector governance and cost-recoverable operations. Rehabilitation and expansion of the public power grid. The attraction of private investment in the energy sector, Improved rural energy access." RRES: "Preparation of a financial framework for rural and renewable energy investments, Foster energy efficiency techniques in generation and use of renewable energy in rural and urban areas, Promote an enabling environment for private sector participation."										
ANDS SDG-NPP	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong

Mitigation Options											
	RE & EE Fund	Building Code	Household Appliances Labelling & Standards	Solar Water Heaters in Households	Electrification of Rural Communities using Renewable Energy	Grid-connected PV	Mini Hydropower Plants	Improved Cookstove Programme	Methane Gas Recovery from MSWDs	Natural Gas Combined Cycle	Bus Rapid Transit
National Energy Strategy	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong
RRES Rural RE Strategy	Strong	medium	weak	weak	strong	strong	strong	strong	weak	weak	weak
Mitigation potential Gg CO_2e	High	Medium	Medium	Medium	High	High	High	low	High	High	Medium
Direct cost $/t CO_2	Low	Low	Low	Medium	Medium	Medium	Medium	Low	Medium	Medium	High
Indirect cost employment	Positive	Positive	-	Positive	Positive	Positive	Positive	Positive	Positive	Positive	Positive
Environment goals (pollution benefits)	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong
Data availability	-	-	-	Good	Good	Good	Good	Weak	Medium	Good	weak
Data quality	-	-		Good	Good	Good	Good	Weak	Medium	Good	Weak
Feasibility (technical, financial, social)	Feasible	Partially Feasible (enforcement problems)	Partially Feasible (enforcement problems)	Feasible (low cost, simple technology, social acceptance)	Partially feasible (relatively high cost, weak sustainability)	Feasible	Feasible	Feasible	Feasible with a high initial cost	Feasible with a high initial cost	Partially feasible (high uncertainty with high initial cost)

The following projects are also eligible for Gold Standard certification[42]

3.4.2.1. Solar Water Heaters PoA in Households

The following are guidelines for filling the PIN by the national team:

Methodology to be applied: AMS-I.J. (Small-scale Methodology: Solar Water Heating System)

Purpose and general description of the PoA: Afghanistan has a population of approximately 29 million[43] inhabitants that is rapidly growing and becoming increasingly urban (25 % live in urban areas). Energy needs are growing. The primary energy needs of households in Afghanistan are for cooking, water heating, lighting and space heating. Solar water heaters (SWH) provide access to renewable energy to meet at least part of this demand.

The SDES reveals huge discrepancies in the number of households by province using piped water. A SWH programme should be implemented in regions where the number of such households is high (for example, about 40.7% of households in Herat province drew water from piped water into compounds and dwellings)[44].

The GHG emissions reduction is determined based on the energy mix used in the targeted households for water heating. A representative sample of targeted households should be surveyed to get an estimate of the total emission reductions in advance for the programme appraisal and development stage. Actual emission reductions will be calculated according to the applicable approved CDM Methodology (AMS-I.J. Small-scale Methodology: Solar water heating systems, Sectoral scope(s): 01 Latest Version).

The purpose of the PoA is to install SWHs in residential as well as commercial buildings throughout the country. The PoA saves fossil fuel and wood fuel (depending on the mix used to heat water) by using renewable energy to meet hot water requirements and will result in the reduction of CO_2 emissions and reduced deforestation.

MEW-RED will be the coordinating/managing entity (CME) for this PoA. Its responsibility is to communicate with the CDM Executive Board and coordinate the work relating to validation, verification, registration and issuance of carbon credits generated by the PoA. MEW-RED will act as the CDM Programme Activity Implementer (CPAI) of the first CPA. MEW-RED may be the CPAI of subsequent CPAs, but other manufacturers and distributors of SWH will also be incorporated in the later stages of the programme as implementers of additional CPAs.

Contribution of the project activity to sustainable development:

Economic wellbeing : SWHs utilize solar radiation as a source of energy, which is a renewable source available free of cost. The activity results in savings in fuel cost by avoiding the use of electricity and other fuels (some households do use electric water heaters). Reducing electricity use also provides scarce electricity to other

42. https://www.goldstandard.org/

43. NSIA. (2019). SYB 2017/18

44. CSO. (2016). SOCIO-DEMOGRAPHIC AND ECONOMIC SURVEY. HERAT

users/applications. Introducing SWHs use will help to end poverty, improve health conditions by improving the indoor environment and improve gender equality by saving time spent on wood collection by women and children.

Environmental wellbeing: The PoA reduces energy consumption in general and thereby reduces the emission of greenhouse gasses produced by fossil fuel combustion. Expectations are that Afghanistan will continue to meet most of the projected growth in household energy demand with wood. By reducing energy demand, the programme reduces the emission of greenhouse gasses but also of other pollutants such as CO, SO_x, NO_x, thus improving the indoor environment as well.

Social wellbeing: The PoA will contribute to social development through income and employment generation. It will employ people for SWH manufacturing, distribution, installation and maintenance.

Technological wellbeing: The PoA demonstrates a replicable renewable technology and enhances the commercialization of renewable energy technology on the level of households and SMEs. As such, the PoA brings low carbon solutions within reach of the people of Afghanistan.

Geographical Boundary: Nationwide

Technologies/measures: The PoA will consist of CPAs, each with a maximum number of installations up to 64,000 m^2 collector area. Therefore, respecting the limits for small-scale CDM activities as defined by the "Analysis and explanation of the conversion factor for solar thermal collectors" from the Small Scale Working Group18[45].

Table 3.5. Estimated Reduction of the GHG Emsission from Solar Water Heaters PoA

Assumptions	Value
HW/DWELLING LITER/DAY	158.800
NUMBER OF DAYS/YEAR	300.000
INLET TEMP C	20.000
OUTLET TEMP C	60.000
ENERGY CONSUMED KJ/DAY/DWELLING	26,551.360
ENERGY CONSUMED KJ/YEAR/DWELLING	7,965,408.000
ENERGY CONSUMED GJ/YEAR/DWELLING	7.965
FUEL HEAT VALUE GJ/T	43.000
TERMAL HEATER EFFICEINCY	100.000%
FUEL SAVED/DWELLING TON	0.185
FLAT SWH AREA SqM/DWELLING	3.000
TOTAL AREA PER CPA SqM	64,000.000
NUMBER OF DWELLINGS/CPA	21,333.333
TOTAL ENERGY SAVED/CPA TON	3,951.830

45. Value obtained from Annex 3 of the Small Scale Working Group (SSC WG) Meeting 07.

EMISSION FACTOR KG GHG/GJ	72.000
EMISSIONS SAVED /CPA Gg	12.235
EMISSIONS SAVED FROM 4 MILLION DWELLINGS	2,294.038

The full PoA is expected to be installed over 15 years, starting in 2020.

3.4.2.2. Electrification of Rural Communities using Renewable Energy PoA (Rooftop PV Units)

The following are guidelines for filling in the PIN by the national team.

Methodology: Each CPA will apply: either (1) only AMS-I.F or (2) only AMD-I.D or (3) a combination of both methodologies.

Purpose and general description of the PoA: The objective of this programme is to boost the use of renewable energy (rooftop PV units) by domestic consumers and private companies. A typical CPA under this PoA is either:

Type 1: The group of the independent activities under the predetermined province of Afghanistan, each of which is no larger than 0.15 MW installed capacity; or

Type 2: The identified independent activity or a group of identified independent activities of any capacity which taken together do not exceed 15 MW.

The programme satisfies all sustainable development criteria identified by the GoIRA.

Contribution of the project activity to sustainable development:

Economic wellbeing: PV utilizes solar radiation as a source of energy, which is a renewable source available free of cost. The activity results in savings in fuel cost by avoiding the use of electricity and other fuels. Reducing electricity use also provides scarce electricity to other users/applications.

Environmental wellbeing: The PoA reduces energy consumption in general and thereby reduces the amount of greenhouse gasses produced by fossil fuel combustion in the power sector. Expectations are that Afghanistan will continue to meet most of the projected growth in household cooking and heating energy demand with wood. By reducing energy demand, the programme reduces the emission of greenhouse gasses but also of other pollutants such as CO, SO_x, NO_x, thus improving the indoor environment as well.

Social wellbeing: The PoA will contribute to social development through income and employment generation. It will employ people for PV components manufacturing, distribution, installation and maintenance.

Technological wellbeing: The PoA demonstrates a replicable renewable technology and enhances the commercialization of renewable energy technology on the level of households and SMEs. As such, the PoA brings low carbon solutions within reach of the people of Afghanistan. Development of renewable energy projects in the country will thus contribute materially to achieving the established energy target from renewable energy as well as the established GHG mitigation target of getting a deviation below the current emissions baseline of around 13%.

Feasibility: To be effective, PV units should be backed with a DC/AC inverter and an electricity storage system to cover at least part of demand hours with no sunshine. The cost of PV itself is declining, but battery storage systems are still expensive. It will reflect negatively on the feasibility of the PoA where PV units are installed as isolated standalones. One major disadvantage, at least in the case of Afghanistan, is that such units installed in remote areas may be out of service soon after installation[46]. Unless these installations are provided with proper follow-up and maintenance services, the sustainability of the project will be low.

Table 3.6. Estimated Reduction of the GHG from Rooftop PV Units PoA

Assumptions	Value
PV with battery backup	
Installed capacity /unit KW	1.000
Maximum installed capacity/CPA MW	15.000
Hours	
Capacity factor hrs.	1,600.000
Generated power/unit/year KWh	1,600.000
Total generated/CPA MWh	24,000.000
Emission factor from fossil fuel generation T/MWh	0.800
Emission reduction by CPA Gg	19.200
Rate of Project implementation CPA/Year	3

The full PoA is expected to be installed over 15 years, starting in 2020.

3.4.2.3. Grid-connected PV Power Plant PoA

The following are guidelines for filling in the Project PIN by the national team

Methodology to be applied: AMS I.D and its applicability to an SSC-CPA under the Proposed PoA are demonstrable.

Purpose and general description of the PoA: The objective of "Programmatic CDM for Promotion of Solar Power Generation in Afghanistan" is to develop small-scale grid-connected solar power projects in the country. The GoIRA is considering twelve such projects in different provinces, CDM-PoA WILL significantly facilitate the realization of these projects.

Stated goals of this PoA:

- Reduce future dependence on fossil fuel based electricity generation in Afghanistan
- Provide electricity to un-served demand and increase the number of grid-connected customers
- Generate short term employment during construction in general as well as long term job opportunities during operations, thereby contributing to the sustainable development of Afghanistan

46. ADB. (2013). PSMP

The electricity generated under this PoA shall be supplied to the regional grid or to an identified consumer facility via the national/local grid. It will help displace equivalent generation from grid-connected thermal (future or existing) power plants, thereby contributing towards the reduction in greenhouse gas emission from electricity generation in Afghanistan.

Contribution of the project activity to sustainable development: The project contributes to the general wellbeing of the country and is in line with the sustainable development policies of the host country.

Social wellbeing: The project activity will lead to employment generation during installation as well as operational phase of the project activity.

Economic wellbeing: The project implementation will help in increasing economic activity in the country. Direct and indirect employment will be generated in the plant for the project implementationand management.

Environmental wellbeing: The renewable energy project would contribute to the mitigation of climate change. Also, unlike fossil fuel based power plants, the project will lead to less air pollution.

Technological wellbeing: The project activity will generate replication opportunities for clean energy technologies in the country.

Geographical boundary: The political boundary of Afghanistan has been chosen as the country/ geographical boundary for this PoA. All CPAs included in the PoA will be implemented within the geographical boundary of Afghanistan.

Description of Project: The proposed small-scale CPAs under the PoA will consist of small-scale solar power plants located across Afghanistan with an installed capacity below or equal to 15 MW. The cumulative capacity of all units under each CPA shall not exceed 15 MW.

Kabul, Afghanistan © UNEP/Z.Khodadadi

Table 3.7. Estimated Reduction of the GHG Emission from Grid-Connected PV Power Plants PoA

Assumptions	Value
Size of CPA Wp	15
Annual capacity factor hours	1,800
Energy produced MWh/year	2,700
Grid Emission Factor Ton CO_2/MWh	0.8
Total number of CPAs	12
Number of CPA installed/year	1
CO_2 Emission reduction Ton Gg CO_2/CPA/Year	21.6

The full PoA is expected to be executed over twelve years starting 2020 (one CPA/Year).

3.4.2.4. Mini Hydropower Plants PoA

The following are guidelines for filling the Project PIN by the national team

Applied Methodology: AMS-I.D. (grid-connected renewable electricity generation)

Purpose and general description of the PoA: Afghanistan has substantial hydropower resources providing excellent opportunities for mini, small, and large hydropower plants installation. The potential for hydropower development in Afghanistan is estimated at 23,310 MW[47]. Exploiting these resources will replace imported energy and improve energy supply security.

Afghanistan is in a position where all sectors of the economy are starved for electricity, only 30.9 per cent of Afghans have access to grid-connected electricity[48]. The power system is under development and requires substantial financial sources to provide electricity to potential consumers through the national grid. Extending the national grid all over the area with potential demand is a costly endeavour and will exacerbate the financing problems. Afghanistan, on the other hand, has tremendous potential for generating energy from water resources ranging from large to small and micro scales. Developing small hydropower sources demands fewer finances and presents a lesser degree of risk to financing agencies. At the same time, these options have the advantage of not necessarily requiring connection to the main grid. Instead, specific consumer or a group of small consumers can be served through an isolated mini-grid.

Stated goal of the PoA: The objective of the Small Hydropower PoA in Afghanistan is to overcome institutional and financial hurdles and promote the implementation of small-scale renewable energy production projects in the country. The PoA will help reduce the CDM project development cost and reduce the timeline to monetize CDM revenue compared to a standalone CDM project activity.

47. NEPA. (2019). SNC
48. NSIA. (2018). ALCS

Framework for the implementation of the proposed PoA: Each small-scale CPA under this PoA will comprise one or more power plants such that their combined installed capacity does not exceed the threshold for small-scale renewable energy CDM projects (15 MW). Priority shall be given to CPAs with power less than 5 MW to ensure automatic additionality based on the approved recommendations of Afghanistan DNA's to UNFCCC for additionality of micro-scale renewable energy technologies.

In case CPAs of power rating in the range 5 to 15 MW are included, the recommended methodological tool to demonstrate additionality will be used.

Social wellbeing: The project activity will lead to employment generation during installation as well as the operational phase of the project activity.

Economic wellbeing: The project implementation will help to increase economic activity in the country. Direct and indirect employment will be generated in the plant for the project implementation and management.

Environmental wellbeing: The renewable energy project would contribute to the mitigation of climate change. Also, unlike fossil fuel-based power plants, the project will lead to less air pollution.

Technological wellbeing: The project activity will generate replication opportunities for clean energy technologies in the country.

Geographical boundary: The political boundary of Afghanistan has been chosen as the country/ geographical boundary of the SSC-PoA. All CPAs included in the PoA will be implemented within the geographical boundary of Afghanistan.

Table 3.8. Estimated Reduction of the GHG Emission from Mini Hydropower Plants PoA

Assumptions	Value
Size of CPA Wp	5
Annual capacity factor hours	6,000
Energy produced MWh/CPA/year	30,000
Grid Emission Factor Ton CO_2/MWh	0.8
Total number of CPAs	20
Number of CPA installed/year	2
Energy produced MWh/year	60,000
Emission factor from fossil fuel generation T/MWh	0.8
EMISSIONS SAVED /Year Gg	48

3.4.2.5. Improved Cooking Stove PoA

The following are guidelines for filling the Project PIN by the national team.

Applied Methodology: Methodology: AMS.II.G (Energy efficiency measures in thermal application of non-renewable biomass)

Purpose and general description of the PoA: A significant part of deforestation in Afghanistan is caused due to the use of wood as fuel for heating and cooking. Raising fuelwood use efficiency may reduce the rate of deforestation. The main objective of this PoA is to promote the dissemination of Improved Cooking Stoves (ICS) with the replacement of existing Traditional Cooking Stoves (TCS) in Afghanistan.

According to the Energy Efficiency Policy of Afghanistan, more than 97% of the rural population use solid fuels (i.e. firewood, dung cakes, crop residues) for combustion to meet their cooking and space heating needs, usually in inefficient devices[49]. Improving the efficiency of cooking stoves will result in less demand for wood, therefore saving time for wood collection while also improving the indoor environment and thus residents' health.

The proposed PoA will introduce activities that improve efficiency over the existing TCS, which will save non-renewable biomass in the baseline scenario.

The ICS will be sold by pre-qualified companies for metallic ICS and are either sold or built-on-site by the stove masters in case of mud ICS.

Social wellbeing: The project activity will contribute towards improving livelihoods of rural households through improved access to energy services from the ICS.

Social and Environmental wellbeing: The use of fuel-efficient ICS would lead to less consumption of fuelwood which would then contribute towards reducing deforestation and also improvement in the quality of life of the targeted group through reduction of drudgery, time and money spent on fuelwood collection and through the improvement of the indoor environment.

Technologies/measures: Many of the existing traditional stoves used in Afghanistan are simple structures made from clay or having stone or metal tripods. These stoves are very inefficient because they have poor air flow and insulation. The proposed PoA will introduce activities that improve efficiency over the existing TCS, which will save non-renewable biomass in the baseline scenario. Several mud and metallic ICS were developed and applied successfully in countries with similar conditions, no extra efforts are required for research and development of such ICS. The metallic stoves have the advantage of allowing use for space heating as well. The PoA will adopt this form of stoves unless otherwise stated.

49. MEW. (2015). AEEP

Table 3.9. Estimated Reducion of the GHG Emission from Improved Cooking Stove PoA

Assumptions	Value
Number of stoves per CPA	30,000
Quantity of woody biomass used in the absence of the project activity tons/year	3.07
Old efficiency %	10
New efficiency %	20
Number of CPA installed/year	7
Total Number of CPA	112
Net calorific value of the non-renewable woody biomass that is substituted TJ/tonne	0.015
Emission factor for the substitution of nonrenewable woody biomass by similar consumers tCO_2/TJ	81.6
EMISSIONS SAVED /Year/CPA Gg	11.27304

3.4.2.6. Methane Gas Recovery from MSWDs PoA

The following are guidelines for filling in the PIN by the national team

Applied Methodology: Methodology ACM0001 (Flaring or use of landfill gas)

Purpose and general description of the PoA: Only 25–48% of MSW generated in Afghanistan is collected and disposed of in open dumps. This quantity produces 42.6 Gg of methane gas (in project start year 2026); the more waste is collected and disposed of in managed dump sites, the more methane gas could be recovered and used. Applied practices cause pollution problems leading to a serious health hazard. GoIRA realizes the intensity of the problem and developments at the municipality level are envisaged to bring the issue under control. The main goal of the PoA is to establish a CDM framework in which landfill gas utilization projects can be added as CPAs to promote the recovery and utilization of this renewable resource over the country. The baseline scenario contemplates the conversion to sanitary managed and anaerobic disposal system starting in 2020. For the purpose of this study, three CPAs are envisaged to be installed one in every five years.

The proposed installations by the PoA are technologically proven and have been widely used over decades in other regions. Hence, technological and operational risks associated with technology risks in the PoA are negligible.

Economic wellbeing:

- Contribute to sustainable development within Afghanistan;
- Expand the use of renewable energy technologies in Afghanistan;
- Recover renewable energy and displacing fossil fuels; and
- Provide the economy with a much needed cheap source of renewable energy.

Social and Environmental wellbeing:

- Each CPA will enable local building companies to sustain and even grow employment ratios on all professional, skilled and unskilled levels.

- Reduce GHG emissions from fossil fuels.
- Reduce other potentially adverse environmental effects of uncontrolled Land Fill Gas (LFG) emissions. The LFG collection system will improve the local environment by the collection of potentially odorous and hazardous LFG, and the global environment by the combustion of the greenhouse gas with energy recovery.
- For emission reduction calculations, methane from LFG and CO2 from electricity displaced are considered starting 2026 (year of using LFG for electricity generation).

Table 3.10. Estimated Reduction of the GHG Emission from Landfill Gas Capture and Use PoA

Assumptions	Value
Amount of Methane Generated Gg	42.69
Oxidized part (OX factor)	0.1
Combusted amount Gg	38.42
Cubic feet/KWh	12
Cubic feet/ton	46,000
Electricity generated MWh	147,290.87
Grid emission factor	0.8
Emission reduction from methane incineration Gg CO_2e	960.59
Emission reduction from fuel for electricity substitution Gg CO_2e	117.83
Total emission reduction Gg CO_2e	1,078.42

3.4.2.7. Natural Gas Combined Cycle Power Plant

The following are guidelines for filling in the PIN by the national team

Methodology: AMS.III.AL. (Conversion from single cycle to combined cycle power generation)

Purpose and general description of the PoA: The PoA aims at recovering waste heat from Natural Gas based power plant by using the waste heat energy of the flue gases from one or several of existing gas turbines. In the pre-project scenario, power is produced using a single-cycle power plant (gas generators) and waste heat is released to the atmosphere. In the project scenario, the existing single-cycle power plant is converted to a combined-cycle power plant with cogeneration of power and heat. The waste heat of flue gases from all the gas turbines is recovered, and steam generated in Heat Recovery Steam Generators (HRSGs) is used to generate additional electricity.

Social well-being: The project activity will result in increased employment during the construction and implementation phases.

Economic well-being: The project activity would result in additional investment contributing to the country's overall economy.

Environmental well-being: The project activity will result in reduction of GHG emissions by using waste heat to generate power and thereby reducing overall emissions to the atmosphere.

Technological well-being: The technology stated for use in the project activity represents environmentally safe and sound technology for the application and is envisaged to promote the implementation of less energy-intensive technology.

Table 3.11. Estimated Reducion of the GHG Emission from Natural Gas Combined Cycle PoA

Assumptions	Value
New Power generation added MW	15
Annual capacity factor Hours	6,000
Additional Power generated MWh/Year	90,000
Grid Emission Factor TCO_2/MWh	0.8
Emission reductions Gg CO_2/Year	72

3.4.2.8. Bus Rapid Transit in Kabul CDM Project

The following are guidelines for filling in the PIN by the national team.

Methodology to be applied: AM0031 (Bus rapid transit projects)

Purpose and general description of the PoA: The objective of Bus Rapid Transit (BRT) in Kabul is to establish an efficient, safe, rapid, convenient, comfortable and effective modern mass transit system based on a BRT system. Alike most other Afghan cities, Kabul is experiencing a rapid rate of motorization with increasing numbers of private vehicles. The project envisages four exclusive BRT bus lanes of Kabul plus their feeder lines. The project will partially substitute the existing Compressed Natural Gas (CNG) buses, diesel buses, gasoline buses and gasoline taxis, gasoline passenger cars, and Non-Motorized Transport (NMT) for transit purposes. The PoA will cover total of 100 km length.

Environmental wellbeing: Improved environment through less GHG and other air pollutant emissions, specifically particulate matter, NO_x and sulphur dioxide.

Social wellbeing: Improved social welfare as a result of less time lost in congestion, less respiratory diseases due to less particulate matter pollution, less noise pollution and fewer accidents per passenger transported.

Economic wellbeing: Economic benefits are mainly on a macroeconomic level. Kabul can improve its competitive position by offering an attractive and modern transit system, also reducing the economic costs of congestion.

Recommended Bus Technology: Euro III diesel units buses are new articulated 18m units with a capacity of 160 persons with platform-level access, including room for disabled persons. Buses on supporting routes are new Euro II and Euro III 12 m diesel units with a capacity of around 80 passengers.

GHG Emission Reductions from BRT Project: The calculation procedure is very complicated and requires a vast number of variables to be determined; therefore we

assume for the purpose of this study a range of GHG reductions similar to the existing projects worldwide for which data is published (UNFCCC monitoring reports).

A similar project would reduce 120 Gg CO_2e/ year at the start of the project (initial phase) and reach 230 Gg CO_2e/year when all phases are completed. Assuming the project will start in 2020 and be completed in 2030, the following table presents the emissions:

Table 3.12. Estimated Reduction of the GHG Emission from BRT PoA

Year	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
ER CO_2e Gg/y	120	127	134	142	149	156	164	171	178	185	192	200	207	214	222	230

3.4.3. Mitigation Results

Mitigation Goal Assessment: The mitigation target period considered is 2016–2035, the mitigation activities should start in the first few years and continue over the whole period depending on the multiplicity of activity component. For example, activities executed under CDM-PoA will witness additions of new CPAs over different periods of years depending on the programme. No specific target emission reduction is considered in this study. For example, no particular year's emission level is targeted nor a specific emission intensity (e.g. tCO_2/GDP).

The officially announced target of 13.6% reduction by 203050 was scrutinized and used as a guideline in preparing the mitigation options. This study which resulted in emission reductions of 17.4% in 2035 (17.34% in 2030) is in close conformity with the announced target. It should be noted that the announced goal of 13.6% is relative to emissions in BAU that include emissions from FOLU while in this study, the 17.4% is relative to (lower) BAU emissions excluding FOLU emissions[51]. The methodology adopted and underlying assumptions dictate the difference in emissions boundary definition[52].

Mitigation Activities Evaluation: As a general conclusion from the evaluation process, all mitigation options considered are feasible. Some of the obstacles facing the options are unavailability of data (e.g. BRT activity). A high initial cost translates into a financing risk issue in case of Afghanistan.

One major concern with mitigation activities that are of a geographically dispersed nature (e.g. rural PV), is *weak sustainability* where the technical installations may be abused, neglected or unable to receive the needed services.

50. NEPA. (2015). INDC

51. According to Afghanistan's SNC these emissions represent around 18.8% of total BAU emissions.

52. WRI Green House Gas Protocol, Mitigation Goal Standard: "For users that treat the land sector as an offset and apply a forward-looking baseline accounting method: • Net baseline scenario land sector emissions in the target year(s)" P. 135

The part of mitigation activities presented under "Soft Programmes" are high priority since such programmes will catalyze and facilitate the so-called "hard" mitigation activities by providing the critical basic requirements to develop the projects. The list of soft activities presented here is inconclusive, and other programmes can be part of the list, for example, training programmes (discussed in Part 2 of this report), awareness raising and private sector participation are but a few activities that should be considered and pursued.

By their nature, outputs of Soft Programmes are not measurable by quantitative emission reductions indicator, but their impact can be appreciated and approximated into a quantitative measure. In our case and based on consultations, discussions and expert opinion, the impact is approximated to 2% reduction from total annual emissions.

Table 3.13. Commulative Results of the Mitigation Actions

Year	Baseline Scenario Emissions CO_2e Gg	Mitigation Scenario emissions CO_2e Gg	GHG emission Reductions CO_2e Gg	GHG Emission Reductions %
2015	19,903.30	19,903.30	0.00	0
2016	20,304.08	20,304.08	0.00	0.00%
2017	20,718.76	20,718.76	0.00	0.00%
2018	21,429.18	21,429.18	0.00	0.00%
2019	22,200.40	22,200.40	0.00	0.00%
2020	23,184.91	21,300.08	1,884.83	8.13%
2021	23,948.04	21,890.24	2,057.80	8.59%
2022	25,223.72	22,982.70	2,241.02	8.88%
2023	25,778.51	23,367.69	2,410.83	9.35%
2025	28,284.16	24,429.38	3,854.78	13.63%
2027	29,652.31	25,453.75	4,198.56	14.16%
2028	30,372.15	26,001.49	4,370.66	14.39%
2029	31,117.08	26,573.81	4,543.27	14.60%
2030	33,611.79	27,782.49	5,829.30	17.34%
2031	34,444.31	28,439.65	6,004.66	17.43%
2032	35,305.63	29,147.64	6,157.99	17.44%
2033	36,196.87	29,884.95	6,311.92	17.44%
2034	37,119.20	30,651.72	6,467.48	17.42%
2035	38,073.82	31,450.14	6,623.68	17.40%

Table 3.14. Summary of the Estimated Emission Reduction from the Proposed Mitigation Actions

Mitigation Actions	GHG Reductions (Gg CO2e) Over 16 Years				
	2020	2025	2030	2035	Accumulated reductions over 16 years of project life
Soft programs NIS, REEF, Energy Building Codes, Labeling & Standards Total Impact 2% reduction	463.70	565.68	672.24	761.48	9752.43
Grid Connected PV Power Plants	21.60	129.60	237.60	259.20	2721.60
Roof top PV Units	57.60	345.60	633.60	921.60	7833.60
Solar Water Heaters PoA	12.23	73.41	134.58	195.76	1663.94
Mini Hydro power plants PoA	48.00	288.00	528.00	768.00	6528.00
Improved cooking Stove PoA	11.27	67.64	124.00	180.37	1533.13
Natural Gas Combined Cycle	72.00	72.00	72.00	72.00	1152.00
Landfill Gas Capture and use PoA	1078.43	2156.85	3235.28	3235.28	35588.04
Emission reductions from BRT	120.00	156.00	192.00	230.00	2791.00
Total GHG Emission Reductions	1884.83	3854.78	5829.30	6623.68	69563.74

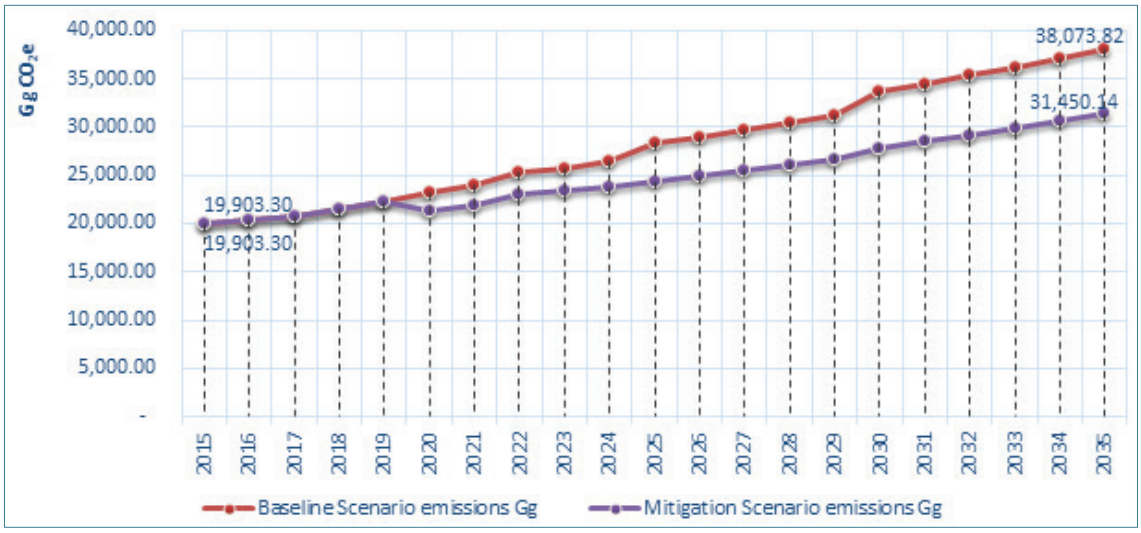

Figure 3.3. GHG Mitigation Results

ANNEXES

Mazar-e Sharif, Afghanistan © Z.Khodadadi

Annexes

Annex (1) Baseline Scenario Tool

This tool provides guidance to the NSTs on compiling and collecting baseline data for assessing GHG mitigation options for key socio-economic sectors.

Since NEPA currently does not have a standardise tool to build and evaluate different scenarios (cf. the Long-range Energy Alternatives Planning [LEAP] model53), the tool outlined here provides a simplified alternative for this process. The corresponding Excel spreadsheet tool provides a streamlined calculation method to assess emissions in the baseline and mitigation scenarios; the spreadsheet also contains guidelines and directions of use.

Once the baseline assumptions are outlined and the baseline scenario constructed accordingly, the tool will calculate the emissions expected. Emissions in the mitigation scenario are also calculated by the spreadsheet and presented side-by-side with the baseline results.

The calculation method reflects the *reasonable* assumptions adopted by the NST based on the following guidelines:

Baseline scenario: A baseline or Business-As-Usual (BAU) scenario is a plausible and consistent description of how a system might evolve in the future in the absence of new, explicit GHG mitigation policies. Baseline scenarios are the counterfactual situations against which mitigation policies and measures will be evaluated. Baselines should not be a simple extrapolation of current trends since in the case of Afghanistan "*continuing to operate on a business as usual basis is unsustainable*"[54], but should instead consider the likely future evolution of activities that affect GHG sources and sinks. Some of these activities may be considered as mitigation options; therefore, the construction of the baseline scenario should carefully distinguish between actions dictated totally or partly by environmental considerations compared to actions undertaken not based on environmental concerns.

Certain development goals and objectives that are based on conditional programmes and projects will only be pursued if specific conditions are fulfilled, e.g. obtaining financing assistance in the form of grants, soft loans and direct foreign investment for GHG mitigation activities. Other activities are foreseen to be implemented by

53. https://www.sei.org/projects-and-tools/tools/leap-long-range-energy-alternatives-planning-system/

54. GIRoA. (2007). ANDS: Energy Sector Strategy (2008 – 2013)

the national private sector, which are subject to conditions that may not be fulfilled. Such activities should be carefully evaluated before inclusion in BAU scenario. Only "must-do", committed, and highly probable activities should be considered in the BAU scenario.

Building a scenario should be driven by the requirement of *consistency*. A scenario is not expected to be *correct*, especially in the long term, but must be internally and externally consistent. Scenarios in a given sector should not be based on assumptions contradicting those adopted in another sector, e.g. assuming coal is available in the power sector while at the same time imposing limitations on coal in the primary energy supply sector.

Constructing BAU scenarios is a collaborative effort; representatives of all key sectors must participate in this endeavour to obtain the best insights.

The data required concerning activities that produce GHG emissions should be collected from sources identified through literature review. Data sources include periodic reports issued by concerned institutions, specialized sectoral and sub-sectoral studies, surveys, relevant technical papers and domestic and international standards and specifications. Development of scenarios requires a projection from some current levels to future levels for each type of activity. This should draw on assumptions made about population growth, GDP, and other macro variables, which can be obtained from official institutions such as Afghanistan's NSIA.

In the medium to long term, Afghanistan's economy will undergo significant structural changes to meet its ambitious development goals. Such fundamental changes make scenario development more difficult and limit the opportunity to extrapolate BAU activities into the future. The expected trajectories for such fundamental changes should be drived from national and sectoral policies and strategies; any baseline scenario, therefore, should include these expected trajectories.

A mitigation goal assessment will be easier to carry out if systems to collect data and apply the relevant methods are already in place. For example, the assessment will require various data inputs, including a complete GHG inventory for the base year and the baseline scenario emissions, at a minimum. Afghanistan is facing serious problems regarding data availability, quality, collection and processing. Consequently, establishing a reliable and functional GHG NIS will be critical for future climate change-related activities, particularly those pertaining to climate change mitigation.

It is recommended that the 2006 IPCC Guidelines for National Greenhouse Gas Inventories be used as a starting point for generating the base year and baseline emissions to ensure consistency with the inventory methodology. The NSTs build the baseline scenario starting from the base year and according to nationally approved assumptions. In this study, 2035 is the final target year. In this study, emissions for the base year (2015) are calculated and provided in the corresponding spreadsheet using the 2006 IPCC Guidelines. The latest Global Warming Potentials from the IPCC Fourth Assessment Report were applied in converting CH_4 and N_2O emissions to CO_2e, namely 25 for CH_4 and 298 for N_2O.

Key Categories: A Key Category is a category that is prioritized within the national inventory system because its estimate has a significant influence on the country's total inventory of GHGs in terms of the absolute level, the trend, or the uncertainty inflected in total emissions and removals calculation.

In this study, for the Key Category Analysis, the following were identified as Key Categories:

IPCC Category Code	IPCC Category
1.A.3 -	Transport
1.A.4 -	Other Sectors (Household & Commercial)
1.A.2 -	Manufacturing Industries and Construction
1.A.1 -	Energy Industries

For more information on categories definitions please consult the IPCC 2006 Guidelines.

Sector-specific baseline assumptions: Only key category sectors that will host mitigation actions are to be considered, other categories are irrelevant to the estimation of the NDCs.

The assumptions are to be introduced in a quantified form in the associated spreadsheet to facilitate baseline emission calculations.

Sectors are currently considered to be functioning below their maximum capacity, so growth in energy demand and activity, in general, is possible without major investment.

Power Sector baseline scenario: The NESP, in line with the PSMP, aims at supplying sufficient electricity to support economic growth at a rate of about 10% per annum. The NST shall consult these and other relevant reports to decide on the mix of power plants to be added to the sector during the 2018-2035 period. Fuel type and the amount for each plant should be determined and introduced in the spreadsheet. During the years in which no new power plants are added, the NST should estimate a base growth rate representing load increase in existing plants (see directions in the spreadsheet).

Fossil fuel-fired new power plants should be identified considering future activities in the oil, natural gas and coal exploration and production plans. Natural gas coming from the TAPI Pipeline and any other future pipeline projects as well as fuel imports should also be considered. The NST should consult the relevant strategies and projects in this sector adopted by the various government agencies.

As a result, the NST should produce the following table:

Plant name	Fuel type	Year of Plant commissioning	Type of plant	Capacity factor hours	Installed capacity MW	Total Production MWh(Capacity factor X Installed capacity)	Fuel consumption TJ

The resulting fuel consumption should be introduced into the spreadsheet under the commissioning year for each type of fuel (see spreadsheet instructions).

Household and commercial sector: As a result of anticipated economic developments and improvement in living conditions, household consumption will increase manifold. According to a recent survey[55], the proportion of the population with primary reliance on clean fuels and technology for cooking is 25.2% and for heating 4.2% only.

A major contribution to deforestation in Afghanistan is the use of wood as fuel for heating and cooking. Raising fuelwood use efficiency (e.g. efficient wood stoves) may reduce the rate of deforestation, but the only real feasible substitute that can stop forest degradation is the introduction of commercial fuels (especially liquid fuels) in the market in an easily accessible and affordable way. The Energy Sector Strategy emphasized the importance of developing the petroleum products sub-sector.

Rural households which depend on biomass sources for more than 90% of their energy needs will shift from traditional fuels (wood, dung) to commercial fuels at a slower rate than urban households. These rates should be determined based on expected future developments in the economy, fuel pricing policy and projects in the energy sector. Plans and strategies adopted by the relevant governmental agencies should be consulted to reach reasonable rates of demand growth for commercial fuels and decline in biomass demand. Electricity from the grid or standalone renewable sources is a perfect substitute only for lighting. The potential for electricity to substitute traditional fuel for cooking and heating is limited; increasing electricity consumption per household from a low range (lighting and basic use) to a high range (cooking and heating) is a costly option on both the supply and demand sides.

As a result of these determinations, the NST should produce the following table:

Type of fuel	Energy demand composition in Household and Commercial Sector %			
	2015 - 2020	2020 - 2025	2025 - 2030	2030 - 2035
LPG				
Kerosene				
Diesel				
Coal				
Wood & biomass				
Total				

The resulting fuel consumption should be introduced into the spreadsheet under the commissioning year for each type of fuel (see spreadsheet instructions).

Manufacturing Industries and Construction: As previously described, Afghanistan is on the verge of profound structural changes in its economy, and this is mostly expected in the industrial sector. For example, Afghanistan has a meager capacity for cement productions (87 kt per year) while the double-digit growth rate

55. CSO. (2017). ALCS

planned by the government can accommodate a production capacity of millions of tons. The same is true for the iron and steel industries and other construction materials. These major changes should be anticipated and introduced in the baseline scenario based on close collaboration and consultation between stakeholders.

To date, most SMEs use diesel-fueled electricity generation, owing to uncertain grid power and poor quality of power, especially in sustaining three phase loads (440 volts and more)[56]. This trend will slow down with the improvement of the national grid reliability, but large mining projects (copper, iron) envisaged in the development plans will necessarily build their own thermal power plants.

Making commercial fuels and electricity accessible in rural areas will lead to the establishment of small farm-level businesses that will contribute to increased disposable income and at the same time increased demand for fuels.

The NST should consult relevant plans and strategies related to the sector to reflect the growth in demand resulting from both normal growths of existing industrial production and new industries.

A reasonable growth rate for fossil fuel demand in the sector should be assumed and introduced into the spreadsheet (see spreadsheet instructions).

As a result, the NST should produce the following table:

New Industry added	YEAR of startup	Type of FUEL(S) consumed	Quantity of fuel(s) Tj

Domestic Solid Waste Sector: Only 25–48% of MSW generated in Afghanistan is collected and disposed of in open dumps[57]. Currently applied practices cause pollution problems leading to serious health hazards. The GoIRA realizes the intensity of the problem and developments at the municipal level are envisaged to bring the issue under control.

Emissions from MSW disposal sites depend on the following factors: quantity of MSW generated (bulk data or specific per capita generation rate), the composition of the waste, the accumulated amount of waste at the disposing site (time series) and the type of MSW disposal method (managed/unmanaged, aerobic/anaerobic).

The NST should consult the plans and strategies adopted by the relevant agencies (municipalities) to reach a reasonable estimate for the growth rate of the emissions. When major change is expected in one year (shifting from aerobic to anaerobic), this should be reflected in growth rates in the following years. The factors mentioned above should be discussed and analyzed over the 2018-2035 period and expected changes reflected as growth rates into the spreadsheet (see spreadsheet instructions).

As a result, the NST should produce the following table:

56. NEPA. (2014). ACCAP

57. NOORI, Hameedullah. (2017)

Factor	Expected Change			
	2015 - 2020	2020 - 2025	2025 - 2030	2030 - 2035
Quantity of SW generated (specific per capita generation rate)				
composition of waste				
MSW Disposal method				
Resulting emissions growth rate				

Livestock Emissions: Choose a simple growth rate based on expected developments in the sector

Annex (2) Data Templates according to 2006 IPCC Guidelines and Software *(Years for which data is requested are optional and depend on assignment)*

Annex (2.1)

Data Request Template

Energy-1A1. Energy Industries

To be filled by Inventory Officer			
Country			
Sector	1. Energy		
Category	1A. Fuel combustion activities (Stationary)		
Subcategory	1A1. Energy Industries		
Specify Activity	☐1A1a1. Electricity Generation ☐1A1aii. Combined Heat and Power Generation CHP ☐1A1aiii. Heat Plants		
	☐1A1b. Petroleum Refining (includes fuels consumed for electricity generation)		
Key category?	☐Yes ☐No		
Important Instructions	1. *Emissions from the intentional oxidation of materials within an apparatus that is designed to raise heat and provide it either as heat or as mechanical work to a process or for use away from the apparatus.* 2. *For more information/clarifications please call (**Insert name and contact information**)*		
Sub-category specific instructions:			
To be filled by Facility Owner			
Facility Name			
The person in charge of providing Information	Name		
	Position		
	Email		
	Phone No.		
Facility Description	Location, technologies, capacities, production, other relevant.		
Yearly consumption (Unit) Total by fuel	2013	2014	2015
Add Fuel Types as necessary			

Annex (2.2)

Data Request Template

Energy-1A2. Manufacturing Industries and Construction

To be filled by Inventory Officer			
Country			
Sector	1. Energy		
Category	1A. Fuel combustion activities (Stationary)		
Subcategory	1A2. Manufacturing Industries and Construction		
Specify Activity	☐1A2a. Iron and Steel ☐1A2b. Non-Ferrous Metals ☐1A2c. Chemicals ☐1A2d. Pulp, Paper and Print ☐1A2e. Food Processing, Beverages and Tobacco ☐1A2f. Non-Metallic Mineral ☐1A2g. Transport Equipment ☐1A2h. Machinery ☐1A2i. Mining and Quarrying ☐1A2k. Wood & Wood Products ☐1A2l. Textile and Leather ☐1A2m. Non-specified Industry		
Key category?	☐Yes ☐No		
Important Instructions	1. *Emissions from the combustion of fuels in industry. Also includes combustion for the generation of electricity and heat for own use in these industries.* 2. *Sub-categories correspond to the International Standard Industrial Classification of all Economic Activities (ISIC).* 3. *Energy used for transport by industry should not be reported here.* 4. *Emissions arising from off road and other mobile machinery in industry should, **if possible**, be broken out as a separate subcategory (see off road transport data request template)* 5. *For more information/clarifications please call **(Insert name and contact information)***		
Sub-category specific instructions:			
To be filled by Facility Owner			
Facility Name			
Person in charge of providing Information	Name		
	Position		
	Email		
	Phone No.		
Facility Description	Location, technologies, capacities, raw material consumption, production, other relevant.		
Yearly consumption (Unit) by type of fuel	2013	2014	2015
Add Fuel Types as necessary			
Please use the following notations: **NA**: Not Available **M**: Measured **C**: Calculated			

Annex (2.3)

Data Request Template

Energy-1A3. Transport,1A3a. Civil Aviation

To be filled by Inventory Officer				
Country				
Sector	1. Energy			
Category	1A. Fuel combustion activities (Mobile)			
Sub category	1A3a. Transport (Civil Aviation)			
Activity	☐1A3ai. International Aviation ☐1A3aii. Domestic Aviation			
Key category?	☐Yes ☐No			
Important Instructions	1. *International Aviation flights that depart in one country and arrive in a different country.* 2. *Domestic Aviation passenger and freight traffic that departs and arrives in the same country* 3. *For more information/clarifications please call (**Insert name and contact information**)*			
Sub-category specific instructions: Please document sources of data reported				
To be filled by Facility Owner				
Facility Name				
The person in charge of providing Information	Name			
	Position			
	Email			
	Phone No.			
Facility & Fleet Description	Type of business/activity, region or area covered by fleet, fleet composition and number and type of planes, fleet characterization by ownership and registration			
International Aviation				
Jet Kerosene	Yearly consumption (Unit)	2013	2014	2015
	Number of Takeoff/Landing Cycles			
Domestic Aviation				
	Yearly consumption (Unit)	2013	2014	2015
	Number of Takeoff/Landing Cycles			
Please use the following notations: **NA**: Not Available **M**: Measured **C**: Calculated **EJ**: Expert Judgement				

Annex (2.4)

Data Request Template

Energy-1A3. Transport,1A3b. Road transport

To be filled by Inventory Officer				
Country				
Sector	1. Energy			
Category	1A. Fuel combustion activities (Mobile)			
Sub category	1A3a. Transport			
Activity	☐1A3b. Road transport			
Key category?	☐Yes ☐No			
Important Instructions	*1. Cars are automobiles so designated in the vehicle registering country primarily for transport of persons and normally having a capacity of 12 persons or fewer..* *2. Light duty trucks are vehicles so designated in the vehicle registering country primarily for transportation of light-weight cargo or which are equipped with special features such as four-wheel drive for off-road operation. The gross vehicle weight normally ranges up to 3500-3900 kg or less.* *3. Heavy duty trucks and buses are vehicles so designated in the vehicle registering country. Normally the gross vehicle weight ranges from 3500-3900 kg or more for heavy duty trucks and the buses are rated to carry more than 12 persons.* *4. Motorcycles are any motor vehicle designed to travel with not more than three wheels in contact with the ground and weighing less than 680 kg.* *5. Do not include off road vehicles(vehicles operating within facility area such as forklifts, loader, construction vehicles)* *6. For more information/clarifications please call **(Insert name and contact information**)*			
Sub-category specific instructions: Please document sources of data reported				
To be filled by Facility Owner				
Facility Name				
The person in charge of providing Information	Name			
	Position			
	Email			
	Phone No.			
Facility & Fleet Description	Type of business/activity, region or area covered by fleet, fleet composition and number and type of planes, fleet characterization by ownership and registration			
Cars (if data for subcategories Passenger cars with 3-way catalysts and Passenger cars without 3-way catalysts are available, please report separately, otherwise report total car fleet)	Fuel Gasoline			
	Yearly consumption (Unit)	2013	2014	2015
	Number of cars			
	Number of vehicles			

Light duty trucks	Fuel Diesel			
	Yearly consumption (Unit)	2013	2014	2015
	Number of vehicles			
Heavy duty trucks and buses	Fuel Diesel			
	Yearly consumption (Unit)	2013	2014	2015
	Number of vehicles			
Motorcycles	Fuel gasoline			
	Yearly consumption (Unit)	2013	2014	2015
	Number of vehicles			
Please use the following notations: **NA**: Not Available **M**: Measured **C**: Calculated				

If disaggregated data is not available then collect total gasoline and Diesel consumption figures and percentage of Diesel consumed by transport

Annex (2.5)

Data Request Template

Energy-1A4. Other Sectors (Commercial/ Institutional)

To be filled by Inventory Officer		
Country		
Sector	1. Energy	
Category	1A. Fuel combustion activities (Stationary)	
Subcategory	1A4. Other Sectors	
Activity	☐1A4a. Commercial/ Institutional	
Key category?	☐Yes ☐No	
Important Instructions	1. *Emissions from combustion activities as described below, including combustion for the generation of electricity and heat(in premises) for own use in these sectors.* 2. *Fuel consumption for transport not included (see transport data request templates)* 3. *For more information/clarifications please call (**Insert name and contact information**)*	
Sub-category specific instructions:		
To be filled by Facility Owner		
Facility Name		
The person in charge of providing Information	Name	
	Position	
	Email	
	Phone No.	
Facility Description	List of buildings included in template, locations, technologies, capacities, other relevant.	

Fuel Type 1	EX. Natural Gas		
Yearly consumption (Unit)	2013	2014	2015
Fuel Type 2	Ex Heavy Fuel Oil		
Yearly consumption (Unit)	2013	2014	2015
Add Fuel Types as necessary	LPG, Kerosene, Diesel		
Please use the following notations: **NA**: Not Available **M**: Measured **C**: Calculated			

Annex (2.6)

Data Request Template

Energy-1B. Fugitive emissions from fuels, 1B2a. Oil Production

To be filled by Inventory Officer			
Country			
Sector	1. Energy		
Category	1B. Fugitive emissions from fuels		
Subcategory	1B2a. Oil Production		
Activity	☐1B2ai. Emissions from venting of associated gas and waste gas/vapour streams at oil production facilities ☐1B2aii Emissions from flaring of natural gas and waste gas/vapour streams at oil production facilities ☐1B2a iii1. Exploration ☐1B2iii2. Production and Upgrading ☐1B2iii3 Transport ☐1B2iii4 Refining		
Key category?	☐Yes ☐No		
Important Instructions	1. *Emissions from Fuel combustion for the production of useful heat or energy by stationary or mobile sources are excluded* 2. *Fugitive emissions that occur at industrial facilities other than oil and gas facilities are excluded* 3. *For more information/clarifications please call (**Insert name and contact information**)*		
Sub-category specific instructions:			
To be filled by Facility Owner			
Facility Name			
The person in charge of providing Information	Name		
	Position		
	Email		
	Phone No.		
Facility Description	Location, number of wells, technologies, production, other relevant.		
Yearly	2013	2014	2015

oil production/ processing (Unit)			
Gas/Oil ratio (unit)			
Number of wells drilled			
Number of wells serviced			
Number of wells tested			
Quantity of condensate transported			
Quantity of LNG transported			
Quantity of LPG transported			

Annex (2.7)

Data Request Template

Energy-1B. Fugitive emissions from fuels, 1B2a.Natural Gas

To be filled by Inventory Officer		
Country		
Sector	1. Energy	
Category	1B. Fugitive emissions from fuels	
Subcategory	1B2b. Natural Gas (associated and non-associated gas)	
Activity	☐1B2bi. Emissions from venting of gas and waste gas/vapour streams at gas facilities ☐1B2bii Emissions from flaring of natural gas and waste gas/vapour streams at gas facilities ☐1B2biii1. Exploration (well drilling) ☐1B2biii2. Production and Upgrading (Fugitive emissions excluding venting and flaring from gas well head to gas facilities) ☐1B2biii3 Gas processing (Fugitive emissions excluding venting and flaring from gas processing facilities) ☐1B2biii4 Transmission and Storage (Fugitive emissions from systems used to transport processed natural gas to market i.e., to industrial consumers and natural gas distribution systems) ☐ 1B2biii5 Distribution (Fugitive emissions excluding venting and flaring from the distribution of natural gas to end users)	
Key category?	☐Yes ☐No	
Important Instructions	1. *Emissions from Fuel combustion for the production of useful heat or energy by stationary or mobile sources are excluded* 2. *Fugitive emissions that occur at industrial facilities other than oil and gas facilities are excluded* 3. *For more information/clarifications please call (**Insert name and contact information**)*	
Sub-category specific instructions:		
To be filled by Facility Owner		
Facility Name		
The person in charge of providing Information	Name	
	Position	
	Email	
	Phone No.	

Facility Description	Location, number of wells, technologies, production, other relevant.		
Yearly	2013	2014	2015
Gas production/ processing (Unit)			
Number of wells drilled			
Number of wells serviced			
Number of wells tested			
Please use the following notations: **NA**: Not Available **M**: Measured **C**: Calculated			

Annex (2.8)

Data Request Template

2. IPPU, 2A1. Cement Production

To be filled by Inventory Officer			
Country			
Sector	2. INDUSTRIAL PROCESSES and PRODUCT USE IPPU		
Category	2A. Mineral Industry		
Subcategory	2A1. Cement Production		
Key category?	☐Yes ☐No		
Important Instructions	1. *Clinker production quantities do not include imports. Exports of produced clinker should be included* 2. *For more information/clarifications please call (**Insert name and contact information**)*		
To be filled by Facility Owner			
Facility Name			
The person in charge of providing Information	Name		
	Position		
	Email		
	Phone No.		
Facility Description	Location, technologies, capacities, raw material consumption, production, other relevant.		
Yearly Yield (Unit)	2013	2014	2015
Cement production Total			
Cement Type 1			
Cement Type 2			

Add rows for each type			
Clinker production (net of export/import)			
Clinker content in cement type 1			
Clinker content in cement type 2			
Please use the following notations: **NA**: Not Available **M**: Measured **C**: Calculated			

Annex (2.9)

Data Request Template

2. IPPU, 2A2. Lime Production

To be filled by Inventory Officer			
Country			
Sector	2. INDUSTRIAL PROCESSES and PRODUCT USE IPPU		
Category	2A. Mineral Industry		
Subcategory	2A2. Lime Production		
Key category?	☐Yes ☐No		
Important Instructions	1. *Lime production quantities do not include imports. Exports of produced clinker should be included* 2. *For more information/clarifications please call (**Insert name and contact information**)*		
To be filled by Facility Owner			
Facility Name			
The person in charge of providing Information	Name		
	Position		
	Email		
	Phone No.		
Facility Description	Location, technologies, capacities, raw material consumption, production, other relevant.		
Yearly Yield (Unit)	2013	2014	2015
Lime production (Total)			
high calcium lime			
dolomitic lime			
hydraulic lime			
Please use the following notations: **NA**: Not Available **M**: Measured **C**: Calculated			

Annex (3)

PROJECT IDEA NOTE (PIN)

Name of Project: _____

Date submitted: _____

Description of size and quality expected of a PIN

Basically a PIN will consist of approximately 5-10 pages providing indicative information on:

A. the type and size of the project
B. it's location
C. the anticipated total amount of greenhouse gas (GHG) reduction compared to the "business-as-usual" scenario (which will be elaborated in the baseline later on at Project Design Document (PDD) level)
D. the suggested crediting lifetime
E. the suggested Certified Emission Reductions (CERs)/Emission Reduction Units (ERUs)/Verified Emission Reduction (VERs) price in US$ or € /ton CO_2e reduced
F. the financial structuring (indicating which parties are expected to provide the project's financing)
G. the project's other socioeconomic or environmental effects/benefits

While every effort should be made to provide as complete and extensive information as possible, it is recognised that full information on every item listed in the template will not be available at all times for every project.

NOTE: For forestry projects, please use the PIN Template for LULUCF projects available at www.carbonfinance.org.

A. PROJECT DESCRIPTION, TYPE, LOCATION AND SCHEDULE

OBJECTIVE OF THE PROJECT *Describe in not more than five lines*	
PROJECT DESCRIPTION AND PROPOSED ACTIVITIES *About ½ page*	
TECHNOLOGY TO BE EMPLOYED[58] *Describe in not more than five lines*	
TYPE OF PROJECT	
Greenhouse gases targeted $CO_2/CH_4/N_2O$/HFCs/PFCs/SF_6 (*mention what is applicable*)	
Type of activities Abatement/CO_2 sequestration	
Field of activities (mention what is applicable) See annex 1 for examples	
LOCATION OF THE PROJECT	
Country	
City	
Brief description of the location of the project *No more than 3-5 lines*	
PROJECT PARTICIPANT	
Name of the Project Participant	
Role of the Project Participant	a. Project Operator b. Owner of the site or project c. Owner of the emission reductions d. Seller of the emission reductions e. Project advisor/consultant f. Project investor g. Other, please specify:_____
Organizational category	a. Government b. Government agency c. Municipality d. Private company e. Non-Governmental Organization f. Other, please specify: _____
Contact person	
Address	
Telephone/Fax	
E-mail and web address, if any	

58. Please note that support can only be provided to projects that employ commercially available technology. It would be useful to provide a few examples of where the proposed technology has been employed.

Main activities *Describe in not more than five lines*	
Summary of the financials *Summarize the financials (total assets, revenues, profit, etc.) in not more than five lines*	
Summary of the relevant experience of the Project Participant *Describe in not more than five lines*	
PROJECT PARTICIPANT	
Name of the Project Participant	
Role of the Project Participant	a. Project Operator b. Owner of the site or project c. Owner of the emission reductions d. Seller of the emission reductions e. Project advisor/consultant f. Project investor g. Other, please specify: _____
Organizational category	a. Government b. Government agency c. Municipality d. Private company e. Non-Governmental Organization f. Other, please specify: _____
Contact person	
Address	
Telephone/Fax	
E-mail and web address, if any	
Main activities *Describe in not more than five lines*	
Summary of the financials *Summarize the financials (total assets, revenues, profit, etc.) in not more than five lines*	
Summary of the relevant experience of the Project Participant *Describe in not more than five lines*	
Please insert information for additional Project Participants as necessary.	
EXPECTED SCHEDULE	
Earliest project start date *Year in which the plant/project activity will be operational*	
The estimate of the time required before becoming operational after approval of the PIN	The time required for financial commitments: __ months The time required for legal matters: __ months The time required for construction: __ months

Expected the first year of CER/ERU/ VERs delivery	
Project lifetime *Number of years*	
For CDM projects: Expected Crediting Period *7 years twice renewable or 10 years fixed* For JI projects: Period within which ERUs are to be earned *(up to and including 2012)*	
Current status or phase of the project *Identification and pre-selection phase/opportunity study finished/ pre-feasibility study finished/ feasibility study finished/ negotiations phase/contracting phase etc.* (mention what is applicable and *indicate the documentation)*	
Current status of acceptance of the Host Country *Letter of No Objection/Endorsement is available; Letter of No Objection/ Endorsement is under discussion or available; Letter of Approval is under discussion or available* *(mention what is applicable)*	
The position of the Host Country with regard to the Kyoto Protocol	Has the Host Country ratified/acceded to the Kyoto Protocol? NO / YES, YEAR Has the Host Country established a CDM Designated National Authority / JI Designated Focal Point? NO / YES, YEAR

B. Methodology and additionality

ESTIMATE OF GREENHOUSE GASES ABATED/ CO_2 SEQUESTERED *In metric tons of CO_2-equivalent, please attach calculations*	Annual (if varies annually, provide schedule): ___ tCO_2-equivalent Up to and including 2012: ___ tCO_2-equivalent Up to a period of 10 years: ___ tCO_2-equivalent Up to a period of 7 years: ___ tCO_2-equivalent
BASELINE SCENARIO CDM/JI projects must result in GHG emissions being lower than "business-as-usual" in the Host Country. At the PIN stage questions to be answered are at least: • Which emissions are being reduced by the proposed CDM/JI project? • What would the future look like without the proposed CDM/JI project? *About ¼ - ½ page*	

ADDITIONALITY Please explain which additionality arguments apply to the project: (i) there is no regulation or incentive scheme in place covering the project (ii) the project is financially weak or not the least cost option (iii) country risk, new technology for country, other barriers (iv) other	
SECTOR BACKGROUND Please describe the laws, regulations, policies and strategies of the Host Country that are of central relevance to the proposed project, as well as any other major trends in the relevant sector Please, in particular, explain if the project is running under a public incentive scheme (e.g. preferential tariffs, grants, Official Development Assistance) or is required by law. If the project is already in operation, please describe if CDM/JI revenues were considered in project planning.	
METHODOLOGY Please choose from the following options: For CDM projects: (i) project is covered by an existing Approved CDM Methodology or Approved CDM Small-Scale Methodology (ii) the project needs a new methodology (iii) projects need modification of existing Approved CDM Methodology For JI projects: (iv) project will use a baseline and monitoring plan in accordance with Appendix B of the JI Guidelines and further JISC guidance (V) project will use Approved CDM or CDM Small-Scale Methodology	

C. FINANCE

TOTAL CAPITAL COST ESTIMATE (PRE-OPERATIONAL)	
Development costs	___ US$ million (Feasibility studies, resource studies, etc.)
Installed costs	___ US$ million (Property plant, equipment, etc.)
Land	___ US$ million
Other costs (please specify)	___ US$ million (Legal, consulting, etc.)
Total project costs	___ US$ million
SOURCES OF FINANCE TO BE SOUGHT OR ALREADY IDENTIFIED	
Equity Name of the organizations, status of financing agreements and finance (in US$ million)	
Debt – Long-term Name of the organizations, status of financing agreements and finance (in US$ million)	

Debt – Short term Name of the organizations, status of financing agreements and finance (in US$ million)	
Carbon finance advance payments[59] sought from the World Bank carbon funds. (US$ million and a brief clarification, not more than 5 lines)	
SOURCES OF CARBON FINANCE Name of carbon financiers other than any of the World Bank carbon funds that you are contacting (if any)	
INDICATIVE CER/ERU/VER PRICE PER tCO_2e[60] *Price is subject to negotiation. Please indicate VER or CER preference if known.*[61]	
TOTAL EMISSION REDUCTION PURCHASE AGREEMENT (ERPA) VALUE	
A period until 2012 (end of the first commitment period)	___ US$ / €
A period of 10 years	___ US$ / €
A period of 7 years	___ US$ / €
Please provide financial analysis for the proposed CDM/JI activity, including the forecast financial internal rate of return for the project with and without the Emission Reduction revenues. Provide the financial rate of return at the Emission Reduction price indicated in the section "Indicative CER/ERU/VER Price". DO NOT assume any up-front payment from the Carbon Finance Unit at the World Bank in the financial analysis that includes World Bank carbon revenue stream. Provide a spreadsheet to support these calculations. The PIN Financial Analysis Model available at www.carbonfinance.org is recommended.	

D. EXPECTED ENVIRONMENTAL AND SOCIAL BENEFITS

LOCAL BENEFITS E.g. impacts on local air, water and other pollution.	
GLOBAL BENEFITS Describe if other global benefits than greenhouse gas emission reductions can be attributed to the project.	
SOCIO-ECONOMIC ASPECTS	
What social and economic effects can be attributed to the project and which would not have occurred in a comparable situation without that project? Indicate the communities and the number of people that will benefit from this project. *About ¼ page*	

59. Advance payment subject to appropriate guarantees may be considered.

60. Please also use this figure as the carbon price in the PIN Financial Analysis Model (cell C94).

61. The World Bank Carbon Finance Unit encourages the seller to make an informed decision based on sufficient understanding of the relative risks and price trade-offs of selling VERs vs. CERs. In VER contracts, buyers assume all carbon-specific risks described above, and payment is made once the ERs are verified by the UN-accredited verifier. In CER/ERU contracts, the seller usually assumes a larger component - if not all – of the carbon risks. In such contracts, payment is typically being made upon delivery of the CER/ERU. For more information about Pricing and Risk, see "Risk and Pricing in CDM/JI Market, and Implications on Bank Pricing Guidelines for Emission Reductions".

What are the possible direct effects (e.g. employment creation, provision of capital required, foreign exchange effects)? *About ¼ page*	
What are the possible other effects (e.g. training/ education associated with the introduction of new processes, technologies and products and/or the effects of a project on other industries)? *About ¼ page*	
ENVIRONMENTAL STRATEGY/ PRIORITIES OF THE HOST COUNTRY A brief description of the project's consistency with the environmental strategy and priorities of the Host Country *About ¼ page*	

Annex (4) Conversion Tables

Energy Conversion

Unit	Joule (J) = Nm	kilowatt-hour (kWh)	kilocalorie (kcal)	horsepower hours (metric)	British thermal unit (Btu)
J		2.778×10^{-7}	2.388×10^{-4}	3.777×10^{-7}	9.478×10^{-4}
kWh	3,600,000		859.8	1.360	3,412
kcal	4,187	0.0012		0.0016	3.968
hp-h (metric)	2,647,796	0.7355	632.4		2,510
Btu	1,055	2.931×10^{-4}	0.2520	3.985×10^{-4}	

Natural Gas

(i) For natural gas:

"Gas State" in conversion tables is assumed at Normal, N (0 oC, 1 atm)

1,100 Btu/scf (60 °F, 1 atm) = 1,163 Btu/cf (0 °C, 1 atm)

*Scf = Standard cubic feet. Standard means "(60 °F, 1 atm)"

(ii) For LNG

1 tonne LNG = 1,300 Nm^3 gas [*N: Normal. Normal means "(0 °C, 1 atm)"];

Density = 450 kg/m^3 LNG

(iii) For LPG,

An assumed 50/50 propane/butane mixture with (r) and (p) indicating that the LPG is either refrigerated or pressurised.

The simulation software known as "Virtual Materials Group (VMG) Process Simulator" is used in the process. Other assumptions are as below:

Pressurised (p): temperature = 20 °C, Vapour Fraction (VapFrac) = 0

Refrigerated (r): temperature = each boiling point, Pressure = 0 kPa (g), g = gauge pressure

Corresponding boiling points -> Ethane : -88.7 oC

Propane : 42.2 °C

n-Butane : -0.6 °C

C3.C4 mix : -29.2 °C

(iv) Calorific values, mmBtu (gross)

Unit	mmBtu/tonne (gross)	mmBtu/bbl	mmBtu/m3
LNG	53.4	3.82	24.0
LPG (r)	47.3	4.52	28.5
LPG (p)	47.3	4.13	25.9
Oil	39.68	5.80	
Coal	27.3		

(v) 1 tonne of oil equivalent (toe) = 41.868 GJ = 39.68 mmBtu

(vi) 1 barrel of oil equivalent (boe) = 5,800,000 Btu = 5.8 mmBtu

Natural Gas Heat and Volume Conversions

Unit	cm = Nm3	cf = ft3	mmBtu	GJ	Mcal	kWh	boe
cm		35.31	0.0411	0.0433	10.35	12.03	0.0071
cf	0.0283		0.0012	0.0012	0.2930	0.3407	2.005×10^{-4}
mmBtu	24.36	860.1		1.055	252.0	293.1	0.1724
GJ	23.08	815.2	0.9478		238.8	277.8	0.1634
Mcal	0.0967	3.413	0.0040	0.0042		1.163	6.842×10^{-4}
kWh	0.0831	2.935	0.0034	0.0036	0.8598		5.883×10^{-4}
boe	141.3	4,989	5.8	6.119	1,462	1,700	

Gross Calorific Value < > Net Calorific Value (Natural Gas)

Variable	Gross	Net
Gross	1	0.9
Net	1.1	1

PART TWO

Capacity Building and National Information System Needs Assessment for Climate Change Mitigation in Afghanistantan

GHG Training, Kabul, Afghanistan ©/UNEP

I. National Climate Change Information System

1.1. Introduction

Afghanistan is affected by both the lack of data and information for monitoring compliance with the Rio Conventions as well as lack of a strategic plan for data management (including baseline data, clear monitoring indicators, standardised procedures for data analysis, and so on)[62].

Part One of this report presented in detail the mitigation options that serve Afghanistan's national development goals for mainstreaming climate change into sectoral plans and policies and the Nationally Appropriate Mitigation Actions (NAMAs) adopted by the Government of the Islamic Republic of Afghanistan (GIRoA). The options were assessed and selected based on a list of evaluation criteria (Part I. Table 3.4) covering alignment with national development objectives, potential greenhouse gas (GHG) reductions, cost, feasibility, and data availability and quality.

Part One of the report also proposes establishing a National Information System (NIS) for climate change. As part of the NIS, a database should be set to serve the measurement, reporting and verification (MRV) requirements of National Communications (NCs) and Biennial Update Reports (BURs) to the United Nations Framework Convention on Climate Change (UNFCCC). The requirements for Inventory, Mitigation, Adaptation and Support Received should be considered for the development of the NIS. The NIS incorporates all the elements necessary to estimate GHG emissions and removals, including institutional arrangements, calculation tools and methodologies. It is essential to set up the NIS for producing transparent, consistent, comparable, complete and accurate inventories, and standard quality results. Once completed, the NIS will provide support for Afghanistan in the compilation of their national GHG inventory and the preparation of their NCs and BURs.

The benefits of having an operational NIS are:

- It meets the country's UNFCCC obligations and participation in future GHG agreements and programmes,

62. NEPA, UNEP. (2009). NCSA and NAPA

- It is useful for environmental assessment, environmental management and can be used for economic development and planning,
- It sets a baseline and could assess progress towards limiting the increase in global temperatures and addressing climate change mitigation,
- It helps to avoid potential mistakes/inconsistencies in the inventory preparation and enhances transparency,
- It helps to save resources, in particular time,
- It facilitates the process of reporting of emissions and removals, as well as the management of data and documentation,
- It offers a uniform data management system for inventories from more than one year which is particularly useful in trend analyses, such as the Key Category Trend Analysis, and
- It establishes a clear and consistent process for inventory compilation.

Mitigation options identified as eligible for development under the Clean Development Mechanism (CDM) should be assessed during the conceptualisation and appraisal phase using the Project Idea Note (PIN) format (Part I. Annex 3). In the operation phase, the project should be measured, reported and verified as required by the relevant approved CDM methodology. These methodologies provide a rigorous systemized approach specific for each type of project. The "soft" programmes proposed in Part One of the report were accompanied by guidelines for establishing the MRV system (Part I. Table 3.3).

1.2. Basic Database Structure

The database is an integral part of the NIS and depends entirely in its content and structure on the remaining constituent parts of NIS. The electronic core of the NIS consists of software and calculation spreadsheets; in this case, the core comprises the 2006 Intergovernmental Panel on Climate Change (IPCC) Inventory Software, the Baseline and Mitigation Scenarios Emissions Calculation Spreadsheet enclosed with Part One and the relevant spreadsheets developed for CDM projects calculations. The NIS may not necessarily be fully automated as human intervention is needed in most of the operational stages.

Practical institutional arrangements are essential for the presentation of information in a consistent, transparent, complete and timely manner. Institutional arrangements will need to be adapted to the particular requirements of the national circumstances of Afghanistan and their level of support, and should build on existing institutional arrangements. NEPA should incorporate the NIS and associated database into existing institutional structures to effect the transition from what have often been temporary institutional arrangements for the preparation of NCs towards a more continuous, sustained process involving permanent national teams. Figure 1.1 below presents the basic NIS structure and components linkages.

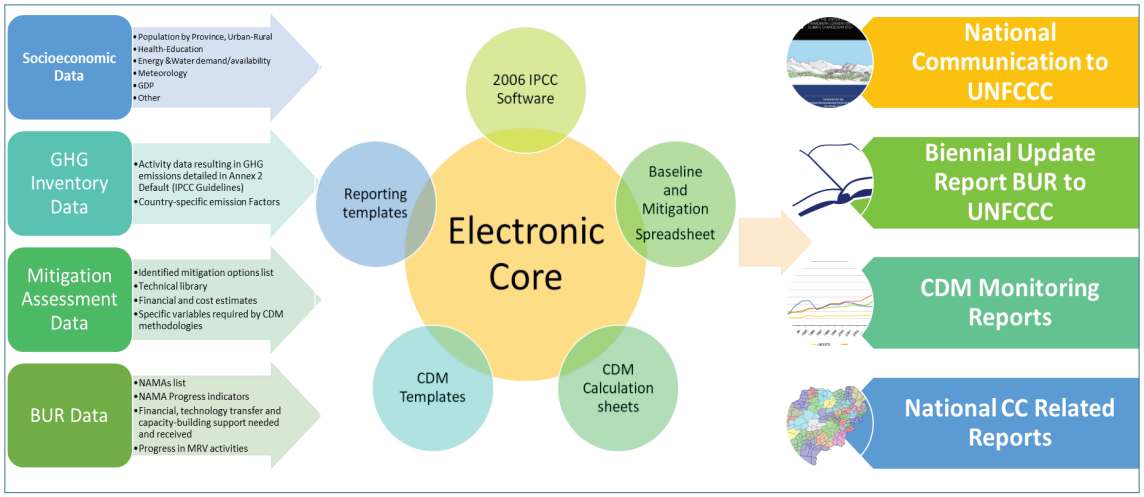

Figure 1.1. NIS structure and components linkages

The dicreption of the database is provided below.

1.2.1. Socio-economic Data

Because of their nature, climate change causes and effects should be tackled at a national level, as mitigation and adaptation activities cut across all sectors of the economy and society. Socio-economic data represent the cornerstone of any social, economic and/or environment development planning and implementation. Such socio-economic information includes geographic profile, population profile, climatic profile, government structure, building stock and urban/rural structure, economic and industry profile, energy, transport, agriculture, forestry and waste. Accurately characterising the national context allows plans, programmes and projects to be optimally designed to meet domestic needs by deploying existing resources while recognising barriers and constraints.

This part of the database should be built in close collaboration with the National Statistics and Information Authority (NSIA). Data available at NSIA should be adapted to the climate change activities needs and missing data should be collected in collaboration with the NSIA.

1.2.2. GHG Inventory Data

Compiling a national GHG inventory is an extensive data activity ranging from energy consumption by individual establishments to industrial activities, waste generation activities and agricultural and land-use activities. The 2006 IPCC Software provides a comprehensive list of the required activity data (reproduced in Annex 2). Emission factors are also a significant part of this database and are provided by the 2006 Inventory Guidelines as default emission factors. In the case where country-specific emission factors are not available, the default factors should be used.

Constructing and maintaining the NIS is a multi-disciplinary activity, especially in the case of GHG inventory data. Therefore, a National Inventory Core Team along with the NSIA should participate in creating and maintaining the inventory database. To support this, data request templates are presented in Annex 2 of Part

I of the report whereby the National Inventory Core Team and the NSIA can obtain data from relevant institutions.

The advantages of using these templates are as follows:

- Allows a focus on documenting essential information in a concise format and avoid wasting time in writing unnecessarily long reports,
- Standardises tasks, allowing countries within regions to share information and compare and contrast results,
- Ensures that roles and responsibilities are understood,
- Accommodates varying levels of national capacity,
- Provides an objective and efficient system for identifying priorities for future improvements,
- Serves as an instruction manual and starting point for future inventory teams in developing an inventory, and
- Helps countries apply IPCC Good Practice Guidelines and other UN guidance documents for preparing national inventories.

Another valuable tool for developing a National Greenhouse Gas Inventory System is using the Templates Workbook prepared by US EPA[63].

1.2.3. Mitigation Assessment Data

A mitigation assessment is essential to achieve the following objectives under the climate change management cycle (see Figure 1.2):

- To meet the principles and goals of the UNFCCC. Under Article 4 of the convention, all Parties are required to assess programmes and measures that are to mitigate climate change,
- To provide policymakers with an evaluation of technologies and practices that can mitigate climate change and also contribute to national development objectives,
- To understand the costs of avoiding climate disruption, and
- To identify potential projects/programmes investments.

A mitigation assessment database should include the information necessary to:

- Define the time frame (typically long-term),
- Define the scope (energy demand & supply, agriculture, land-use, forestry, solid waste),
- Define participants and key stakeholders (policymakers, the scientific community, NGOs),
- Define the desired results,
- Select methodologies consistent with data and expertise availability,
- Standardise key parameters (base year, end year, discount rate, etc.),
- Define project boundaries (consistent with the approach used to develop emissions inventories), and
- Define scenarios (typically at least two: baseline and mitigation).

63. www.epa.gov/climatechange/emissions/ghginventorycapacitybuilding

The information collected should cover all phases of mitigation activities namely Conceptualisation and Appraisal, Implementation and Operation. This component of the database should be established in future under a separate MRV undertaking. Another component of the system will cover the list of data and variables requested under the relevant climate change mitiagtion project.

Finally, the technical library and cost references included under this part of the database should be completed with the conclusion of the training activities under Pillar 3 (Technology needs assessment) identified as part of the Capacity Building and Technology Transfer Programme.

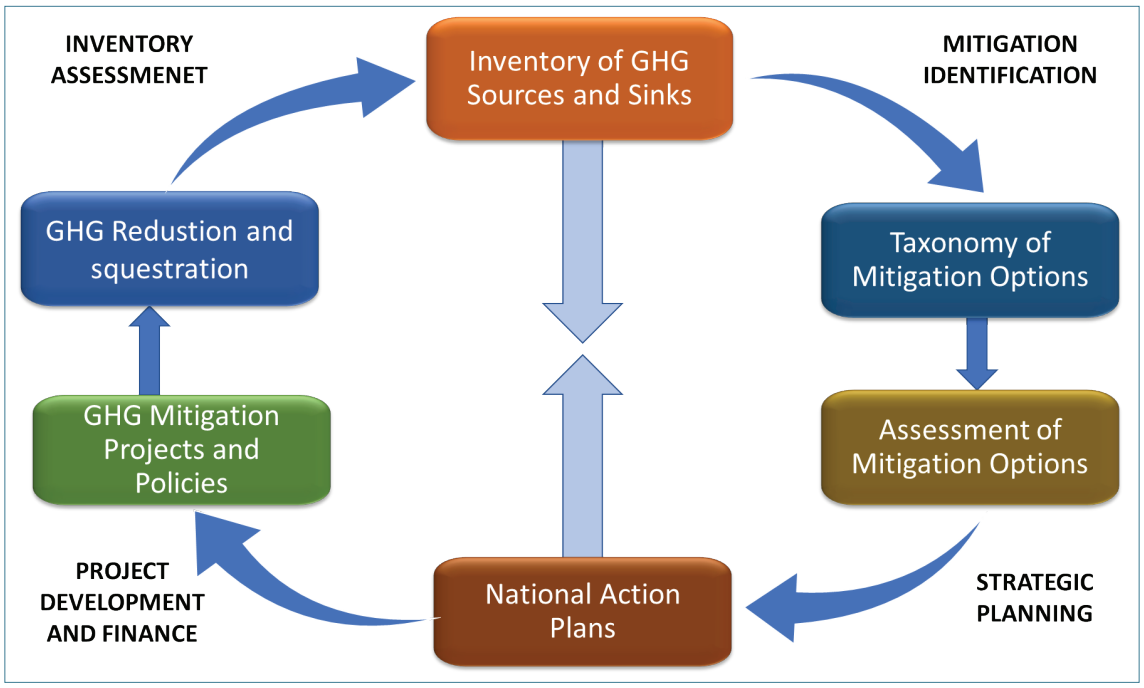

Figure 1.2. Mitigation in Climate Change Management Cycle

1.2.4. Data Required for National Reports (NCs and BURs)

The NIS will be expected to provide specific information on mitigation actions allowing national experts to prepare national reports such as NCs and BURs in accordance with the recommended guidelines.

The information needed for each mitigation action or groups of mitigation actions is represented in Annex 3. In Table 3.3 of Part One of the report, indicators to monitor and report on the "soft" programmes mitigation activities are listed and should be considered as an integral part of the national reports database. The database should also include information on international assistance received (funding, capacity building and technology transfer). Annex 4 provides a list of projects and programmes already implemented in Afghanistan; the national team should update this list and provide the required information on an ongoing basis.

The database should provide the information needed for national reports on the following:

- **Goals:** Actions that are framed as commitments; in the case of Afghanistan, the Nationally Determined Contribution (NDC),
- **Policies:** Actions that aim to reduce emissions through relevant national policies; this includes broad strategies as well as the full range of policy instruments such as regulations, taxes and incentive schemes, and
- **Projects and programmes:** Activities that are targeted at a specific investment or that are limited in scope, scale and duration; this include the installation of renewable power capacity, infrastructure investments as well as pilot projects and capacity-building initiatives.

This part of the database is aligned with Decision 2/CP.17, annex III, paragraph 12, which states that "developing country Parties shall provide the following information to the extent possible:

- Name and description of the mitigation action,
- Information on methodologies and assumptions,
- Objectives of the actions and steps taken or envisaged to achieve that action,
- Information on the progress of implementation of the mitigation actions and the underlying steps taken or contemplated, and the results achieved,
- Information on international market mechanisms".

Zebaak District, Badakhshan, Afghanistan © Z_Khodadadi/UNEP

II. Capacity Building and Technology Transfer Programme

2.1. Introduction

"Afghanistan is not short of policy documents that provide a framework to tackle issues related to climate change. What is most problematic is an overarching lack of capacity that limits progress when it comes to the actual application of policies and implementation of plans"[64].

"Afghanistan is affected by both a lack of data and information for monitoring compliance with the Rio Conventions, and similarly lacks a strategic plan (including baseline data, clear monitoring indicators, standardised procedures for data analysis, and so on) for data collection and analysis"[65].

Some of the main challenges to addressing climate change and achieving a reduction of GHG emissions in Afghanistan include inadequate capacity, lack of data, low coordination, limited awareness and insufficient funding. Moreover, the lack of a proper institutional framework results in a scattering of the effects of previous efforts made by national and international agencies in Afghanistan, thereby diminishing awareness levels and hindering the accumulation of experience in the form of institutional memory.

The following are some of the constraints facing Afghanistan in meeting its obligations under the UNFCCC identified by its National Capacity Needs Self-Assessment (NCSA)[66]:

- Low human resource capacity in meeting Article 4 (b) of the Convention requirements (formulate, implement, publish and update national programmes containing measures to mitigate climate change by addressing anthropogenic emissions),
- Low human resource capacity in meeting Article 4 (c) of the Convention requirements (development, application, diffusion, and transfer, of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases),

64. idem

65. NEPA, UNEP. (2009). NCSA and NAPA.

66. NEPA, UNEP. (2009). NCSA and NAPA: Table 3

- Low human resource capacity in meeting Article 4 (d) of the Convention requirements (sustainable management, and promote and cooperate in the conservation and enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases),
- Low levels of awareness amongst policy and decision makers concerning climate change,
- Low levels of knowledge concerning climate change and its potential impacts, both amongst technical persons and policy/decision makers,
- Lack of capacities to develop a baseline and then monitor the effects of climate change over time, and
- Few public awareness, training or educational programmes directly addressing climate change.

During the analysis and research performed in this study, the constraints mentioned above proved to have persisted since the publication of the NCSA. A questionnaire (Annex 1) was disseminated, and face to face meetings were held with most of the stakeholders to address the issues mentioned above. Feedback received from stakeholders confirmed the fact that the majority lacked proper knowledge and work experience in using the basic guidelines and tools necessary to identify needed data, generate and manage information, and conduct scientific assessments and research on various aspects of climate change. This includes base year and baseline inventory, uncertainty and key category analysis, and identifying and appraising mitigation options.

Despite ongoing efforts over the past two decades to mainstream climate change concerns into economic and social activities in Afghanistan, and the relative wealth in reports and studies performed at the policy and strategy levels, the country remains in a nascent state that is preventing a transition into the implementation phase. Past efforts have identified priority areas for intervention of which capacity building is principal. The training programmes described here focus on practical issues urgently needed to embark on the implementation of hard projects. It is envisaged that these training programmes will be combined with intervention actions in the institutional, regulatory and awareness-raising areas.

As mentioned above, the electronic core of the NIS includes the guidelines and tools that determine the structure and content of the database. Mastering these tools and guidelines will serve to clearly identify the required data, sources and format. This will also establish the framework necessary for collecting, generating and managing the information, and determining the content and structure of the database.

A complete, transparent, well-documented GHG inventory provides a solid foundation for developing future national inventories. GHG inventory capacity-building activities must thus be highly targeted, focusing on specific, measurable, and realistic outcomes with the ultimate goal of preparing a complete, transparent, accurate, consistent, and comparable national GHG inventory.

A comprehensive training programme is suggested below covering three main pillars to accomplish a successful Capacity Building and Technology Transfer Programme leading to the actual implementation of mitigation and adaptation actions. These pillars are:

1. Management Tools and Procedures under the UNFCCC,
2. Climate Financing, and
3. Technology Needs Assessment.

In the training programme recommended here, procedures and measures related to data management are emphasised. The training activities can serve as a basis to determine the scope of work and terms of reference for engaging experts.

The first pillar ensures that actions taken within the country are in line with UNFCCC and other international requirements and procedures. These actions facilitate meeting the country's obligations and the processes of benefitting from international support mechanisms (financing, know-how and technology transfer) to developing and least developed countries.

The second pillar enables Afghanistan to communicate its financing needs to the international financing community in a systemised, clear and convincing manner.

The third pillar is necessary for the national experts to enable them to decide on which globally available technologies are applicable in the context of Afghanistan.

The capacity building and technology transfer programme should lead to the creation of a centre of focus to attract and merge various scattered national efforts into one coherent national plan of action. It is recommended that the GIRoA adopts this training programme as one package considering the complementarity with other climate change-related activities under the National Climate Change Strategy and Action Plan. Figure II.1 illustrates the linkages between the suggested programme and a standard project cycle.

Kole Heshmat Khan, Kabul, Afghanistan © Z_Khodadadi

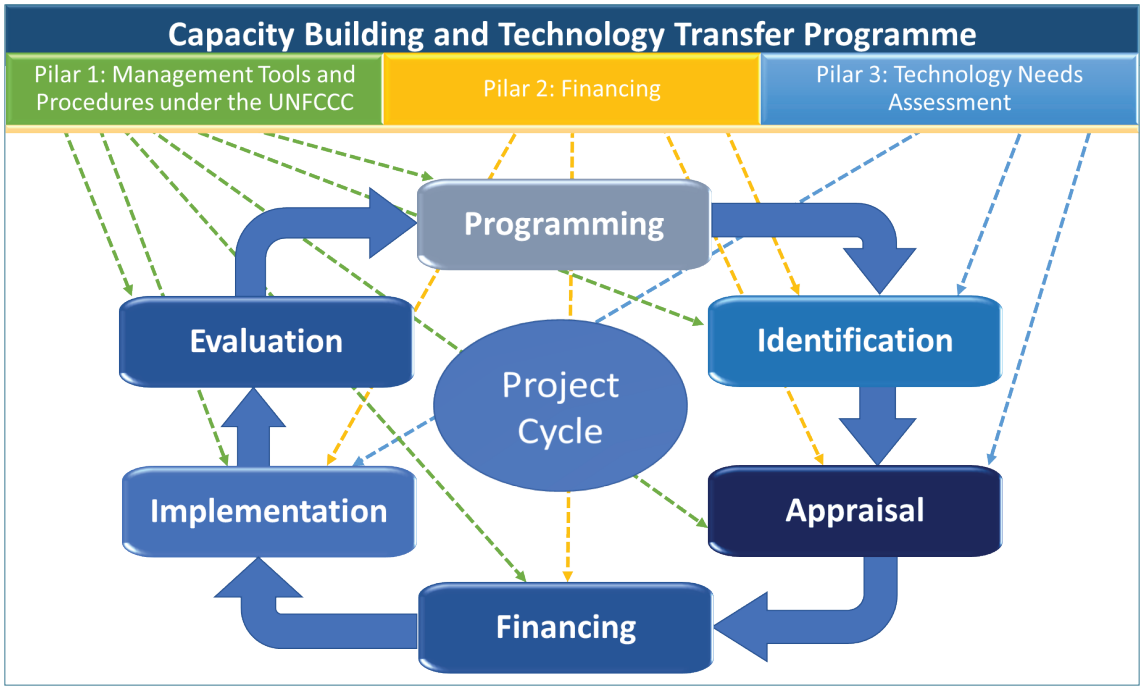

Figure 2.1. Linkage between the capacity building and technology transfer programme and standard project cycles

The training activities under each pillar are listed in Table II.1 below.

Table 2.1. List of training activities under the Capacity Building and Technology Transfer Programme.

#	Pillars	Topics to be covered
1	Training Activities under Pillar 1. Management tools and procedures under UNFCCC.	Introduction to Climate Change
		2006 IPCC Guidelines
		2006 IPCC Inventory Software
		EPA Template Workbook
		Mitigation Assessment
2	Training Activities under Pillar 2. Financing	Climate Finance
		Clean Development Mechanism CDM
		Economic Analysis Training Activity
3	Training Activities under Pillar 3. Technology needs assessment	Wind Energy
		Photovoltaic
		Small Hydropower

The logical chronological sequence of the training activities leading to the successful achievement of the programme's goals is presented in figure II.2 below.

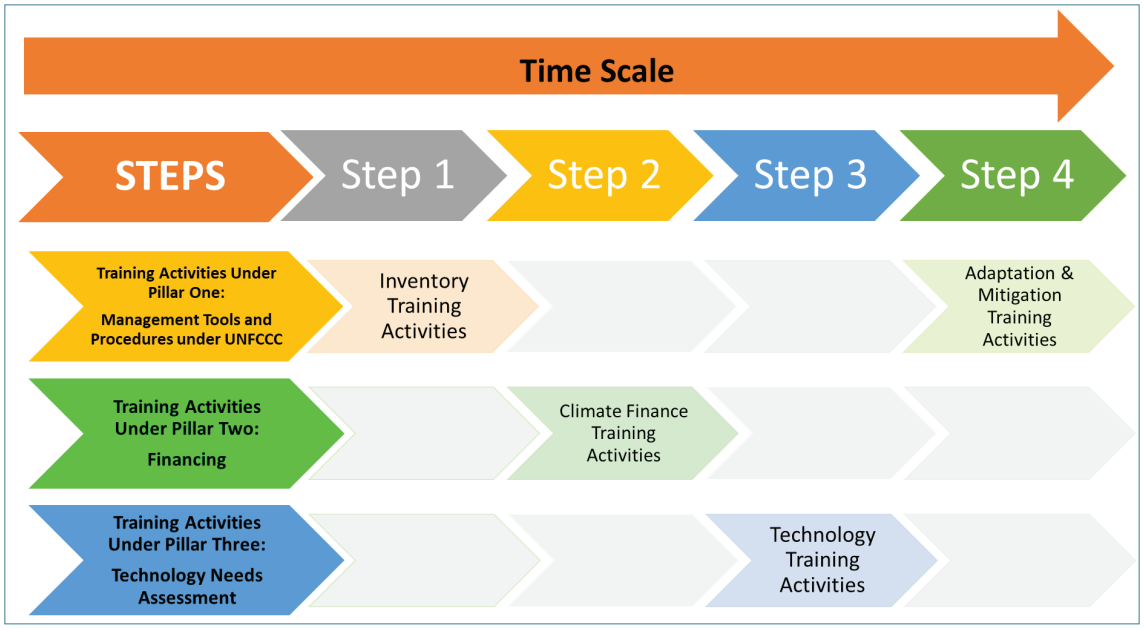

Figure 2.2 Chronological sequences of training activities under the capacity building and technology transfer programme

2.2 Training Activities under Pillar One (Management Tools and Procedures uner the UNFCCC)

2.2.1. Introduction to Climate Change

One of the most critical constraints affecting Afghanistan's compliance with the Rio Conventions is the limited technical and managerial capacity of related human resources. The staffing and facilities of those essential institutions are inadequate, particularly given the broad and complicated nature of the environmental issues addressed[67].

Based on the analysis performed under this study, it is evident that knowledge of climate change issues – whether technical or political – is confined with varying degrees of depth to limited circles. A lack of awareness among various stakeholders is a major impediment to having robust inter-institutional coordination mechanisms. Also, information and data exchange between key sectors responsible for climate change is weak and frequently results in interventions towards compliance with UNFCCC being isolated and short-term as they do not feed into a more extensive and comprehensive national programme of action.

This issue should receive high-level support and patronage to deliver the message to all stakeholders so that the GIRoA considers the consequences of climate change as a serious and national priority issue. A comprehensive media campaign should be undertaken to provide full coverage on the issue. If circumstances permit, training may be held as joint, regional activities with high-level participants from neighbouring countries.

67. NEPA, UNEP. (2009).

Table 2.2. Introduction to Climate Change Training Activity

Training Activity (UNFCCC)	Topics to be covered[68]	Target Participants
Introduction to Climate Change	**Understanding the climate system:** • The greenhouse effect • Greenhouse gases and aerosols • How will greenhouse gas levels change in the future? • How will the climate change? • Has climate change already begun? • The role of climate models • The evidence from past climate **Facing the consequences:** • Adapting to climate change impacts • Agriculture and food security • Sea levels, oceans and coastal areas • Biological diversity and ecosystems • Water resources • Human health • Human settlements, energy and industry • Climatic disasters and extreme events **Climate Change Governance:** • The international response to climate change • The Climate Change Convention • The Conference of the Parties (COP) • Sharing and reviewing critical information • The Kyoto Protocol • The Paris Agreement **Limiting greenhouse gas emissions:** • How human actions produce greenhouse gases • Limiting emissions The challenge for policymakers • Crafting cost-effective policies • New energy technologies and policies • New transportation technologies and policies • New approaches to forestry and agriculture • Financing action under the Convention • Global cooperation on technology	The targeted group should be as broad as feasible covering government entities, academia, NGO's and the private sector. The participants should be High-level decision-makers and executives. Climate Change Core team from NEPA in addition to supporting national team members from relevant institutions should actively participate in the sessions through presentations of national case studies revealing the sensitivity and vulnerability of Afghanistan to climate change. Case studies should be evaluated and approved by the professional body conducting the training workshop.

2.2.2. Training on 2006 IPCC Guidelines for National Greenhouse Gas Inventories

In preparing the Initial and Second NC reports, the National Study Teams (NSTs) adopted the 1996 Revised Guidelines owing to data and capacity constraints. To be comparable with other Parties to the convention and to meet the classifications adopted internationally, the NSTs should in the future use the latest guidelines which provide globally agreed methodologies that are intended for use by Parties to prepare their national greenhouse gas inventories. This will require training on both the 2006 IPCC Guidelines for National Greenhouse Gas Inventories as well as the 2006 IPCC Inventory Software (see Section 2.2.3); both training activities should be designed and delivered as one package.

68. Climate Change INFORMATION KIT

Table 2.3. Training on 2006 IPCC Guidelines for National Greenhouse Gas Inventories

Training Activity (Inventory)	Topics to be covered[69]	Target Participants
2006 IPCC Guidelines Note: Due to the diversity of topics covered by the guidelines, it is recommended that at least two instructors deliver the training, one of whom should have extensive experience in AFOLU, and the other(s) covering the rest of sectors.	**CONCEPTS:** • Anthropogenic emissions and removals • Inventory year and time series • Inventory reports • Greenhouse gases • Sectors and Categories • Estimation methods • Tiers • Default data **GOOD PRACTICE:** • Key Categories • Uncertainty • Quality Control & Quality Assurance (QC/QA) • Transparency, Completeness, Consistency, Comparability, Accuracy **ENERGY SECTOR:** • Source categories (fossil fuel stationary and mobile combustion, Fugitive emissions) • Methodological approaches • Data collection (Activity Data sources, Emission Factors) • Reference Approach • Non-energy use of fuels • Waste as a fuel **Industrial Processes and Product Use (IPPU) SECTOR:** • Source categories (Mineral Industry, Chemical Industry, Metal Industry, Product Uses as Substitutes for Ozone Depleting Substances) • Mass-balance and the emission-factor approaches • Industrial processes relevant to Afghanistan **Agriculture, Forestry and Other Land Use (AFOLU) SECTOR:** • Science background • Carbon pool definitions and non-CO2 gases • Land-use and management categories: • Tier definitions for methods in AFOLU • Identification of key categories • Steps in preparing inventory estimates • Generic methods for CO2 emissions and removals • Non-CO2 emissions **Emissions from Livestock and Manure Management:** • Categories and subcategories • Choice of method • Uncertainty assessment • Methane Emissions from Enteric Fermentation • Methane Emissions from Manure Management • N2O Emissions from Manure Management. **WASTE SECTOR:** • Categories (solid waste disposal, biological treatment of solid waste, Incineration and open burning of waste, wastewater treatment and discharge) • Waste Generation, Composition and Management Data (Municipal Solid Waste, Sludge, Industrial waste, Other waste) • Greenhouse gases	The core team from NEPA in addition to supporting other members of the NSTs from relevant institutions should actively participate in the sessions presenting background papers on their respective sectors identifying emission sources to be considered, data sources, data availability and discussing barriers faced in previous inventory activities.

69. 2006 IPCC Inventory Guidelines Vol. 1.

2.2.3. Training on 2006 IPCC Inventory Software

As outlined under Section 2.2.2, this training activity should be included in a single training package along with the 2006 IPCC Guidelines training activity.

The 2006 IPCC Software represents part of the electronic core of NIS and is connected to the database for inputs and outputs delivered in the reporting part of the NIS. Therefore, the training activity should include mastering the applications of the software, the design and maintenance of the required database (data templates, archiving, and communicating data among team members and with stakeholders) and inventory results reporting formats. Data request templates specific to the 2006 IPCC Software are provided as Annex 2 to Part One of the report. These templates should be presented, discussed and altered according to Afghanistan's circumstances.

The training activity should include real-time training and exercises building on the results of the training activity on the 2006 IPCC Guidelines. By the end of this training, the NSTs should be expected to be able to compile at least one full inventory using available actual data and dummy data. The inventory should be *bona fide* using actual data, with the instructor providing remote support and supervision.

Table 2.4. 2006 IPCC Inventory Software Training Activity

Training Activity (Inventory)	Topics to be covered[70]	Target Participants
2006 IPCC Inventory Software	• First run • Defining Users • Distribute Database • Main Menu Structure • Database menu • Inventory Year menu • Worksheets menu • Reports menu • Tools menu (emphasis on Reference Approach) • Data Export/Import • Working with the worksheets, practical real-time case studies • Special worksheets (AFOLU)	The core team from NEPA in addition to supporting the members of the NSTs from relevant institutions should actively participate in the sessions presenting background papers on their respective sectors identifying emission sources to be considered, data sources, data availability and discussing barriers faced in previous inventory activities. The national experts are expected to compile at least one full inventory by the end of the training sessions using available actual data and dummy data. The inventory to be bona fide using actual data, the instructor shall provide remote support and supervision (within two months). The expected duration is two weeks.
EPA Template Workbook: Developing a National Greenhouse Gas Inventory System	• Template 1: Institutional Arrangements Inventory Cycle • Template 2: Methods and Data Documentation • Template 3: Description of QA/QC Procedures QA/QC Plan, General (Tier 1) QC Procedures • Template 4: Description of Archiving System • Template 5: Key Category Analysis • Template 6: National Inventory Improvement Plan	The core team from NEPA in addition to supporting the members of the NSTs from relevant institutions. The expected duration is 1-2 days for EPA Templates and inventory management issues.

70. IPCC Inventory Software User Manual and EPA Template Workbook

2.2.4. Mitigation Assessment

A mitigation assessment involves a national-level analysis of the potential costs and impacts of various technologies and practices for mitigating climate change. An initial mitigation assessment should be followed by a more detailed evaluation of specific policies, programmes, or projects designed to encourage the implementation of selected technologies and practices.

The purpose of this training activity is to guide the national experts in designing and conducting national mitigation assessments. Its main objectives are to assist in:

- Deciding on the scope of the mitigation assessment and the methods to be applied,
- Identifying, screening, and characterising technologies and practices that have the potential to mitigate climate change and also meet national development objectives,
- Analysing the potential costs and impacts of various technical or policy measures on net GHG emissions,
- Analysing the socio-economic conditions and national environmental quality, and
- Identifying policies and programmes that have the potential to encourage adoption of attractive mitigation technologies and practices.

The training activity will also provide technical guidance to prepare and report information on mitigation actions and their effects in BURs based on the "UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention" contained in decision 2/CP.17, annex III, paragraphs 11–13. The training activity will provide an overview of mitigation under the UNFCCC as well as of different forms of mitigation actions that are expected to be reported within BURs by non-Annex I Parties.

Climate Change Mitigation Training, Kabul, Afghanistan © Z_Khodadadi/UNEP

Table 2.5. Mitigation Assessment Training Activit

Training Activity (Mitigation)	Topics to be covered[71]	Target Participants
Mitigation Assessment	**Introduction to Mitigation Under the UNFCCC:** • Definition and Scope of Mitigation Assessment • Interactions between mitigation and development • NAMAs and NDC • Baseline Scenario • Greenhouse Gas Mitigation Scenarios and Implications **Preparation of Biennial Update Reports BUR:** • The UNFCCC Context • Basis for reporting mitigation actions • Key elements to consider when reporting information on mitigation actions in the BUR • Measurement Reporting & Verification MRV arrangements **Mitigation Actions Evaluation Criteria:** • Technological and Economic Potential for GHG Emissions Reductions • Barriers, Opportunities, and Market Potential of Technologies and Practices **Mitigation Options:** • Industry • Buildings • Transport • Energy supply • Solid waste and wastewater • Land Use • Agriculture • Policies, Measures, and Instruments • Costing Methodologies **Mitigation Methods and Tools in the Energy Sector:** • Top-down methods and tools • Bottom-up methods and tools • Off-the-shelf models (LEAP) • Country-specific tools (Afghanistan Baseline and Mitigation Scenario Spreadsheet) • Grid Emission Factor Calculation **Mitigation Methods and Tools in the Agriculture Forestry and Other Land Use AFOLU Sector:** • Baseline Scenario • Mitigation Scenarios • Methods and tools	The core team from NEPA in addition to supporting the members of the NSTs from relevant institutions should actively participate in the sessions presenting background papers on their respective sectors identifying emission sources to be considered, data sources, data availability and discussing barriers faced in previous inventory activities. The national experts are expected to compile at least one full inventory by the end of the training sessions using available actual data. The expected duration is two weeks. At least two instructors should conduct the training, one for mitigation in the energy sector and the other for mitigation in agriculture and land use.

71. 1. CONSULTATIVE GROUP OF EXPERTS ON NATIONAL COMMUNICATIONS FROM PARTIES NOT INCLUDED IN ANNEX I TO THE CONVENTION: Training Handbook on Mitigation Assessment for Non-Annex I Parties.
2. TRAINING MATERIAL FOR THE PREPARATION OF BIENNIAL UPDATE REPORTS FROM NON-ANNEX I PARTIES: REPORTING MITIGATION ACTIONS AND THEIR EFFECTS

2.3. Training Activities under Pillar Two (Climate Finance)

Green finance is a key aspect of sustainable development. It highlights the leadership taken in diverse developing country contexts in advancing financial policies, regulations and fiscal measures that encourage financial market actors to take greater account of national priorities and sustainable development. Lessons from this leadership can be drawn upon from other developing and developed countries.

Afghanistan is at an early stage concerning sustainable finance. Thus, the initial focus should mainly be on 'market education' and on developing awareness and building capacity to take account of international developments including new financing mechanisms and specialised funds. The goal of this training activity is to enable the GIRoA to propose more transparent, risk-informed plans and budgets to boost investors' confidence and develop an effective approach toward the mobilisation, management and targeting of climate change finance.

National Climate Change Committee Meeting, Kabul, Afghanistan © Z_Khodadadi/UNEP

Table 2.6. Climate Finance Training Activity

Training Activity (Financing)	Topics to be covered[72,73]	Target Participants
Climate Finance	**Introduction to Climate Finance** **Climate Finance under UNFCCC:** • Article 4 of the convention • The Copenhagen Accord • Paris Agreement Articles 2.1 a,b,c **Green Climate Fund:** • The Readiness and Preparatory Support Programme • GCF Accredited Entities • The Project Preparation Facility • Project funding Proposal & Approval • Project implementation- Funded Activity Agreement **The Adaptation Fund:** • The accreditation process • How to Apply for Project Funding • Project Proposal Materials • Readiness Grant Funding • Project Formulation Assistance (PFA) Grants • Project Scale-up Grants **Least Developed Countries Fund** **Global Environment Facility:** • GEF Policy and Programme Cycle Norway-sponsored Amazon Fund World Bank-led Climate Investment Funds Multilateral Development Banks Official Development Aid International climate funds rules, practices, guidelines, and selection criteria Establishing a Climate Change Financing Framework for Afghanistan CCFF: • Definition (mobilisation, management and targeting of climate change finance) • Scope (support Sustainable Development Goals achievement, delivery of voluntary international commitments, Disaster Risk Reduction, support mitigation & adaptation) • Driving principles (Effectiveness, Efficiency, Equity) • CCFF Elements (Governance, Accountability, Institutional entry points, Definition of Climate Change activities, Costing of climate change response plan, Assessment and estimation of available resources) • Managing a Programme of CCFF Work • How to develop Funding Proposal (example GCF) Template)	The core team from NEPA in addition to supporting national team members and technical staff from relevant financing institutions responsible for project financing should actively participate in the sessions presenting background papers on their respective sectors identifying institutional, regulatory frameworks, explaining financing procedures applicable and barriers facing each institution. The participants will identify and develop at least one financing proposal in each key sector for farther development by the end of the training sessions using available actual data. The expected duration is two weeks.

72. UNDP. A Guidance Note on Climate Change Financing Frameworks. Available at: https://www.greenclimate.fund/
73. UNEP. GREEN FINANCE FOR DEVELOPING COUNTRIES: Needs, Concerns and Innovations. Available at: https://www.adaptation-fund.org/

2.3.1. Training on Clean Development Mechanism

The CDM was designed to meet a dual objective:

- To help developed countries fulfil their commitments to reduce emissions, and to assist developing countries in achieving sustainable development, and
- To create tradable, saleable certified emission reduction (CER) credits that can be used by industrialised countries to meet emission reduction targets under the Kyoto Protocol.

The benefits of CDM projects include investment in climate change mitigation projects in developing countries, transfer or diffusion of technology in the host countries, as well as improvement in the livelihood of communities through the creation of employment or increased economic activity.

In Part One of this study, eight CDM opportunities for Afghanistan were identified and briefly presented for further development. This training activity aims at building the national capacity needed to implement the proposed projects. By the end of the training activity, the national team should at least be capable of preparing PINs to be presented to potential project participants and financiers.

Table 2.7. Clean Development Mechanism Training Activity

Training Activity (Mitigation)	Topics to be covered[74]	Target Participants
Clean Development Mechanism CDM	**Introduction to CDM:** • The CDM and its origins – a brief overview **CDM Regulatory Framework** **Concepts and Definitions:** • Certified Emission Reductions CERs • CDM modalities and procedures • Project participants • Designated National Authority DNA • Designated Operational Entity DOE • CDM Project Cycle • Project Idea Note PIN • Project Design Document PDD • Baseline and Monitoring Methodologies • Additionality • Project Scale • Bundling • Baseline and Standardized Baseline • Barriers • Project Boundary • Leak **Programme of Activities:** • Benefits • Specific modalities and procedures • Programme of activities design document PoA-DD • Component project activities (CPAs-DD) • How does the CDM work in practice – an example.	The core team from NEPA in addition to supporting national team members and technical staff from relevant institutions responsible for project implementation should actively participate in the sessions presenting background papers on their respective sectors identifying emission sources and mitigation opportunities to be considered under CDM, data sources, and data availability. The participants will identify and develop at least one CDM Programme of activity in each key sector for farther development by the end of the training sessions using available actual data. The expected duration is two weeks.

74. http://cdm.unfccc.int/

2.3.2. Financial & Economic Analysis Training Activity

Accessing available resources at the global level has equally been affected by the inability of relevant sectors within Afghanistan to prepare the necessary proposals[75].

The objective of this training activity is to present a coherent, consistent approach to economic analysis of capital investments (energy-related or other). Adherence to the concepts and methods presented will lead to sound investment decisions with respect to the principles of the time value of money.

Table 2.8. Financial & Economic Analysis Training Activity

Training Activity (Mitigation)	Topics to be covered[76,77]	Target Participants
Financial & Economic	**Capital Investment Characteristics** **Capital Investment Cost Categories:** • Initial Cost, • Annual Expenses and Revenues, • Periodic Replacement and Maintenance, or • Salvage Value **Definitions and Concepts:** • Time Value of Money • Cash Flow Diagrams • SOURCES OF FUNDS • After Tax Cash Flows • Depreciation • Interest: Simple & Compound **Mathematics of Interest and Cash Flows:** • Single Sum Cash Flows • Series Cash Flows: Uniform, Gradient • Compounding time value of money factors **Project Measures of Worth:** • Present Worth • Annual Worth • Internal Rate of Return • Benefit Cost Ratio • Payback Period • Sensitivity Analysis and Risk Analysis **Economic aspects:** • True value to the economy • Externalities • Economic positive and negative impacts • Relevance to NDG	The core team from NEPA in addition to supporting national team members and technical staff from relevant financing institutions responsible for project financing should actively participate in the sessions presenting background papers on their respective sectors identifying institutional, regulatory frameworks, explaining financing procedures applicable and barriers facing each institution. The participants will identify and develop at least one financing proposal in each key sector for farther development by the end of the training sessions using available actual data. The expected duration is two weeks.

75. NEPA, UNEP. (2009). NCSA and NAPA
76. UNDP. A Guidance Note on Climate Change Financing Frameworks. Available at: https://www.greenclimate.fund/
77. UNEP. GREEN FINANCE FOR DEVELOPING COUNTRIES: Needs, Concerns and Innovations. Available at: https://www.adaptation-fund.org/

2.4. Training Activities under Pillar Three (Technology Needs)

Exposing operational and technical institutions to best practice mitigation-related technologies and familiarising technical staff with the opportunities to apply these technologies in their respective sectors represents a crucial step towards assessing technology needs for Afghanistan. Training proposed under this pillar will complement the training and capacity development under the first two pillars towards successful identification and implementation of mitigation activities. Besides, enhancing knowledge of mitigation technology and science will facilitate the establishment of a technological library as part of the NIS, which would greatly facilitate mitigation activities appraisal.

Another important outcome of this activity is improving the maintenance and operational capability of the relevant technical staff resulting thereby in greater sustainability. Technical staff from relevant institutions should actively participate in designing the workshops and determining the topics to be covered during the workshops, as well as undertaking assessments of future technology needs.

The three areas suggested here are considered necessary for initial stages of mitigation activity appraisal and implementation; institutions from different sectors can devise other training activities in the future as required.

GHG Inventory Training, Kabul, Afghanistan © Z_Khodadadi/UNEP

Table 2.9. Technology Related Training Activities

Training Activities under Pillar 3 Technology needs assessment	Topics to be covered[78,79]	Target Participants
Wind	Wind Turbine Basics **Wind Project Variables:** • Wind Speed • PPA Rate • Turbine Selection • Financing • Available land/scale • Community Support • Environment • Political Landscape • Interconnect/Transmission • Wind Products Market	The core team from NEPA in addition to supporting other members of the NSTs should actively participate in the sessions presenting project proposals in their respective sectors identifying technical opportunities, technology needs and barriers facing each institution in implementing the projects. The participants will identify and develop at least one project proposal in each key sector for farther development by the end of the training sessions using available actual data. The expected duration is two weeks. Expected duration: One week for each topic to be held in the premises of the sector leading institution.
Photovoltaic	**Utility Scale Solar Power Plants:** • Solar PV technology • The solar resource • Project development • Site selection • Energy yield prediction • Plant design • Permits and licensing • Construction • Commissioning • Operation and maintenance • Economics and financial • Modelling • Supply chain • Operator Training Manual	
Small Hydro Power	Overview of SHP Development **Planning, Implementation & Operation of SHP projects:** • Design of Sub Stations • Design of Small Hydro Power Stations • Small Hydro Power Development on Canal Falls & Irrigation Dams • Run-off river Small Hydro Development • SHP & Rural electrification • Use of modern techniques (GPS, GIS) for conducting investigations and assessment • SHP Market and new equipment • Operator Training Manual	

78. ESMAP. Renewable Energy Training Programme
79. JICA. Micro-hydropower Operator Training Manual

2.5 Proposed Action Plan

The majority of past efforts on climate change in Afghanistan have concentrated on the policy and strategy levels. This report endeavors to translate the actions outlined in the various policy and strategy documents into concrete, well-defined activities that are implementable in the prevailing circumstances of the country. The proposed activities are essential to move towards implementation practically and sensibly. The schematic representation provided here should be seen as a critical path mapping of activities representing an action plan for the short to medium term.

As illustrated in Figure III.1, once the trainings proposed under Pillars 1, 2 and 3 and other complementary actions have been undertaken by the GIRoA (as mapped by the blue arrows), the necessary climate change MRV systems will be in place and have the momentum needed to function continuously (as mapped by the yellow arrows).

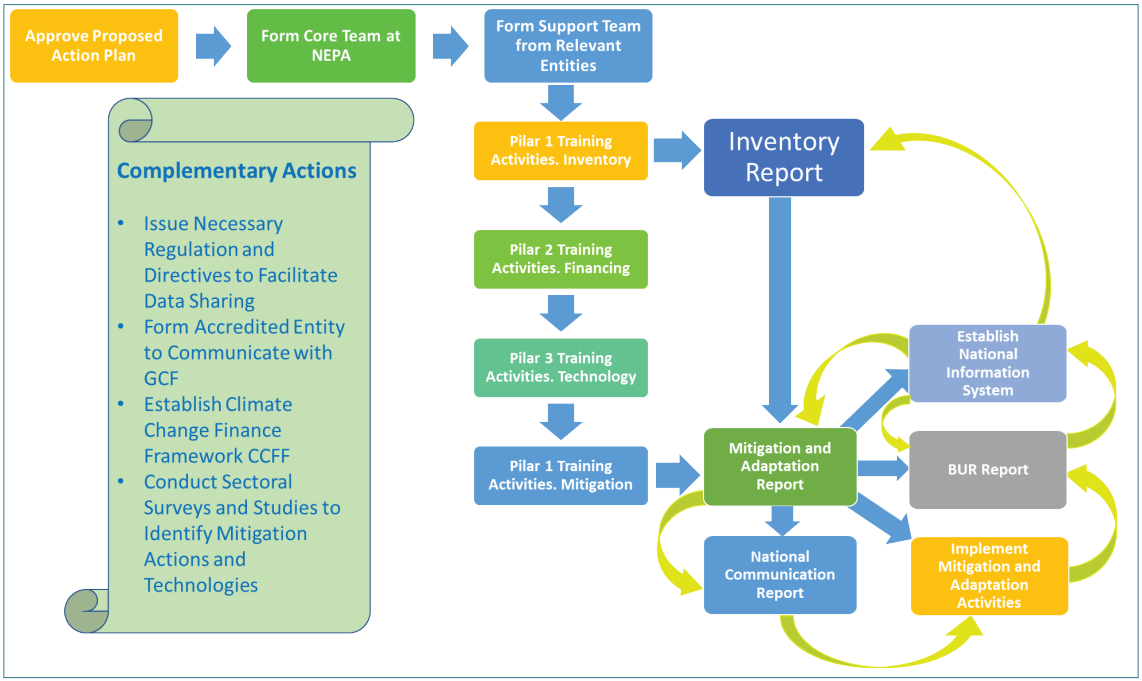

Figure 3.1. Critical Path of Proposed Activities.

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ANNEXES

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Annex (1) Capacity Building Needs Questionnaire

Methodological issues:	Name of persons familiar/experienced with the tool and their affiliation			Summary of previous use/ involvement	Other remarks
	Name (None if nobody)	Affiliation	Familiarity/ experience (low high)		
History and evolution of the UNFCCC					
2006 IPCC Guidelines					
2006 IPCC Software					
Greenhouse gas Abatement Cost MOdel GACMO					
(LEAP) Long-range Energy Alternatives Planning System					
Any other energy demand forecasting tool?					
CDM					
CDM PoA					
Feasibility studies					
Project appraisal/Project proposal					
Energy Audits (certified energy managers)					
Carbon Audits (certified carbon managers)					
Technical and operational guidelines for MHP power systems					
Technical and operational guidelines for photovoltaic power systems					
Previous experience in previous RE projects					
Green financing					
Technical issues (installation and or maintenance)					
Micro HP					
Rooftop PV					
Large grid-connected PV					
Large grid connected Wind					
Hybrid RE plant					
Efficient lighting					
Heat recovery					
Insulation					
Vehicle efficiency standards					
Landfill operations					
Biomass energy plants					

Annex (2) 2006 IPCC Software Activity Data Reequirements

The 2006 IPCC Inventory Guidelines cover all anthropogenic sources of GHG emissions from all sectors of the economy. These sectors are classified according to the IPCC as shown in the table presented here.

The more detailed the information used, the more accurate the results of calculations are. In case no aggregated data are available, please use assumptions to generate the data and archive the asumptions.

Qualitative information is also required, for example, the type of waste treatment. If such information exists in specialised surveys, please indicate the source for the Inventory Team. Whenever possible, please provide the data expressed in the original units before converting to other units.

Total National Emissions and Removals	Notes
1 - Energy	
1.A - Fuel Combustion Activities	
1.A.1 - Energy Industries	Includes electricity generation, petroleum refining, Heat generation for sale others
1.A.2 - Manufacturing Industries and Construction	Includes fuel consumption by each industry (if possible) by type of fuel
1.A.3 - Transport	Includes fuel consumption by type of vehicle (if possible) or total Diesel and Gasoline consumption, also includes fuel consumption by Aviation and Railroads
1.A.4 - Other Sectors	Other energy consuming sectors not covered
1.A.5 - Non-Specified	Special case consuming activity
1.B - Fugitive emissions from fuels	Includes information on oil, natural gas and coal production quantities and(if possible) information on gas recovery and flaring
1.B.1 - Solid Fuels	
1.B.2 - Oil and Natural Gas	
1.B.3 - Other emissions from Energy Production	

Bamyan, Afghanistan © M.Ali. Sheida

Total National Emissions and Removals	Notes
2 - Industrial Processes and Product Use	
2.A - Mineral Industry	Includes information on production and raw material consumption (other than fuels for combustion that are covered in (1.A.2 above) to calculate GHG emissions attributed to the process of manufacturing (not to energy consumption)
2.A.1 - Cement production	
2.A.2 - Lime production	
2.A.3 - Glass Production	
2.A.4 - Other Process Uses of Carbonates	
2.A.5 - Other (please specify)	
2.B - Chemical Industry	
2.B.1 - Ammonia Production	
2.B.2 - Nitric Acid Production	
2.B.3 - Adipic Acid Production	
2.B.4 - Caprolactam, Glyoxal and Glyoxylic Acid Production	
2.B.5 - Carbide Production	
2.B.6 - Titanium Dioxide Production	
2.B.7 - Soda Ash Production	
2.B.8 - Petrochemical and Carbon Black Production	
2.B.9 - Fluorochemical Production	
2.B.10 - Other (Please specify)	
2.C - Metal Industry	
2.C.1 - Iron and Steel Production	
2.C.2 - Ferroalloys Production	
2.C.3 - Aluminium production	
2.C.4 - Magnesium production	
2.C.5 - Lead Production	
2.C.6 - Zinc Production	
2.C.7 - Other (please specify)	
2.F - Product Uses as Substitutes for Ozone Depleting Substances	Information related to quantities imported, soled or consumed for each type of use (if possible or total amounts of each gas)
2.F.1 - Refrigeration and Air Conditioning	
2.F.2 - Foam Blowing Agents	
2.F.3 - Fire Protection	
2.F.4 - Aerosols	
2.F.5 - Solvents	
2.F.6 - Other Applications (please specify)	
2.G - Other Product Manufacture and Use	
2.G.1 - Electrical Equipment	
2.G.2 - SF6 and PFCs from Other Product Uses	
2.G.3 - N_2O from Product Uses	
2.G.4 - Other (Please specify)	

Total National Emissions and Removals	Notes
2.H - Other	Includes information on production and raw material consumption (other than fuels for combustion that are covered in (1.A.2 above) to calculate GHG emissions attributed to the process of manufacturing (not to energy consumption)
2.H.1 - Pulp and Paper Industry	
2.H.2 - Food and Beverages Industry	
2.H.3 - Other (please specify)	
3 - Agriculture, Forestry, and Other Land Use	
3.A - Livestock	Includes information on the number of each type of livestock, ways in which manure is managed
3.A.1 - Enteric Fermentation	
3.A.2 - Manure Management	
3.B - Land	Includes information about the land distribution and land change of use (areas transformed from one use to another)
3.B.1 - Forest land	
3.B.2 - Cropland	
3.B.3 - Grassland	
3.B.4 - Wetlands	
3.B.5 - Settlements	
3.B.6 - Other Land	
3.C - Aggregate sources and non-CO_2 emissions sources on land	
3.C.1 - Emissions from biomass burning	Self-explanatory
3.C.2 - Liming	Self-explanatory
3.C.3 - Urea application	Self-explanatory
3.C.4 - Direct N_2O Emissions from managed soils	Self-explanatory
3.C.5 - Indirect N_2O Emissions from managed soils	Self-explanatory
3.C.6 - Indirect N_2O Emissions from manure management	Self-explanatory
3.C.7 - Rice cultivations	Self-explanatory
3.C.8 - Other (please specify)	Self-explanatory
3.D - Other	Self-explanatory
3.D.1 - Harvested Wood Products	Self-explanatory
3.D.2 - Other (please specify)	Self-explanatory
4 - Waste	
4.A - Solid Waste Disposal	Includes information on bulk quantity of waste generated or, specific waste generation factor (kg/capita), the composition of the waste, type of disposal method (managed/unmanaged,)
4.B - Biological Treatment of Solid Waste	If applicable
4.C - Incineration and Open Burning of Waste	If applicable
4.D - Wastewater Treatment and Discharge	Includes the quantity of municipal and industrial wastewater quantities treated in treatment plants, BOD & COD for the incoming water streams
4.E - Other (please specify)	

Annex (3) Information to be Reported in BUR for Each Mitigation Action

Information to be reported in BURs for each mitigation action or group of mitigation actions include, as appropriate:

- **Name and description of the mitigation action:**
  - Information on the nature of the action and coverage (i.e. sectors and gases)
  - Quantitative goals
  - Progress indicators
- **Information on methodologies and assumptions:**
  - Methodologies
  - Assumptions
- **Objectives of the action and steps taken or envisaged to achieve that action:**
  - Objectives of the action
  - Steps taken or envisaged to accomplish that action
- **Information on the progress of implementation of the mitigation actions and the underlying steps taken or envisaged, and the results achieved, such as estimated outcomes (metrics depending on type of action) and estimated emission reductions, to the extent possible:**
  - Progress of implementation of the mitigation actions
  - Underlying steps taken or envisaged
  - Results achieved, such as expected outcomes (metrics depending on type of action) and estimated emission reductions, to the extent possible
- **Information on international market mechanisms**
- **Timeline (status of the mitigation action) conceptualisation, implementation, operation,**
- **Methodologies and assumptions**
  - Determine quantitative goals;
  - Estimate expected GHG impacts of mitigation actions (ex-ante);
  - Estimate achieved GHG impacts of mitigation actions (ex-post);
  - Estimate expected non-GHG effects of mitigation actions (including sustainable development effects and economic and social consequences of response measures);
  - Estimate achieved non-GHG impacts of mitigation actions
- **Objectives of the action and steps taken or envisaged to achieve that action**
- **Information on international market mechanisms (CDM)**

Annex (4) BUR Database: Information on International Support

The National Study Teams should update the table by including recent relevant programmes and projects.

Project / Programme Name	Implementing Agency(ies)	Status	Start – End Dates	Assistance Received (Funding, Capacity Building, Technology Transfer)	Assistance Source(s)	Assistance Amount/ level
Afghanistan Rural Enterprise Development Programmeme (AREDP)	MRRD					
Agromet	MAIL					
Building Adaptive Capacity and Resilience to Climate Change in Afghanistan (LDCF-1)	NEPA, MAIL					
Building the Resilience of Communities Living Around the Northern Pistachio Belt and Eastern Forest Complex of Afghanistan through and Ecosystem-based Adaptation Approach (LDCF-3)	NEPA					
Climate Technology Centre and Network (CTCN)	NEPA					
Comprehensive Agriculture and Rural Development-Facility (CARD-F)	MAIL, MRRD, MCN, MoF					
Developing Core Capacity for Decentralized MEA Implementation and Natural Resource Management in Afghanistan (MEA CCCD)	NEPA					
FEWS NET (early warnings of hazards, food insecurity, vulnerability to food insecurity, and famine)	MAIL					

Initial National Communication (INC) and Second National Communication (SNC)	NEPA					
National Adaptation Programmemes of Action for Climate Change (NAPA) and National Capacity Needs Self-assessment for Global Environmental Management (NCSA)	NEPA					
National Area-based Development Programme (NABDP)	MRRD					
National Biodiversity Strategy and Action Plan (NBSAP)	NEPA					
National Rural Access Programme (NRAP)	MRRD					
National Solidarity Programmeme (NSP)	MRRD					
Rural Water Supply, Sanitation and Irrigation Programmeme (Ru-WatSIP)	MRRD					
Strengthening the Resilience of Rural Livelihood Options for Afghan Communities in Panjshir, Balkh, Uruzgan, and Herat Provinces to Manage Climate Change Induced Disaster Risks (LDCF-2)	MAIL					
The National Environmental Action Plan (NEAP)	NEPA					
The National Environment Strategy (NES)	NEPA					
Low Emission Development Strategies (LEDS)	NEPA					
Nationally Appropriate Mitigation Actions (NAMA)	NEPA					
National Adaptation Programmeme of Action for Climate Change (NAPA)	NEPA					

Afghanistan's National Biodiversity Strategy and Action Plan (NBSAP)	NEPA					
Energy Sector Strategy	MEW					
Afghanistan National Renewable Energy Policy (ANREP)	MEW					
Rural Renewable Energy Policy (RREP)	MEW, MRRD					
Strategic National Action Plan for Disaster Risk Reduction (SNAP)	ANDMA					
Water Sector Strategy	MEW					
Renewable Energy Projects Completed & Under Construction*	MEW, MRRD, DABS					

*** RENEWABLE ENERGY ROADMAP FOR AFGHANISTAN RER2032 (about 5100 RE Projects have been jointly implement)**

a CASE STUDY on Climate Change Mitigation Options For Afghanistan

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UN environment programme