

# MRV Blueprints for Transport NAMAs

## Blueprint Template

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On behalf of:



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## Disclaimer

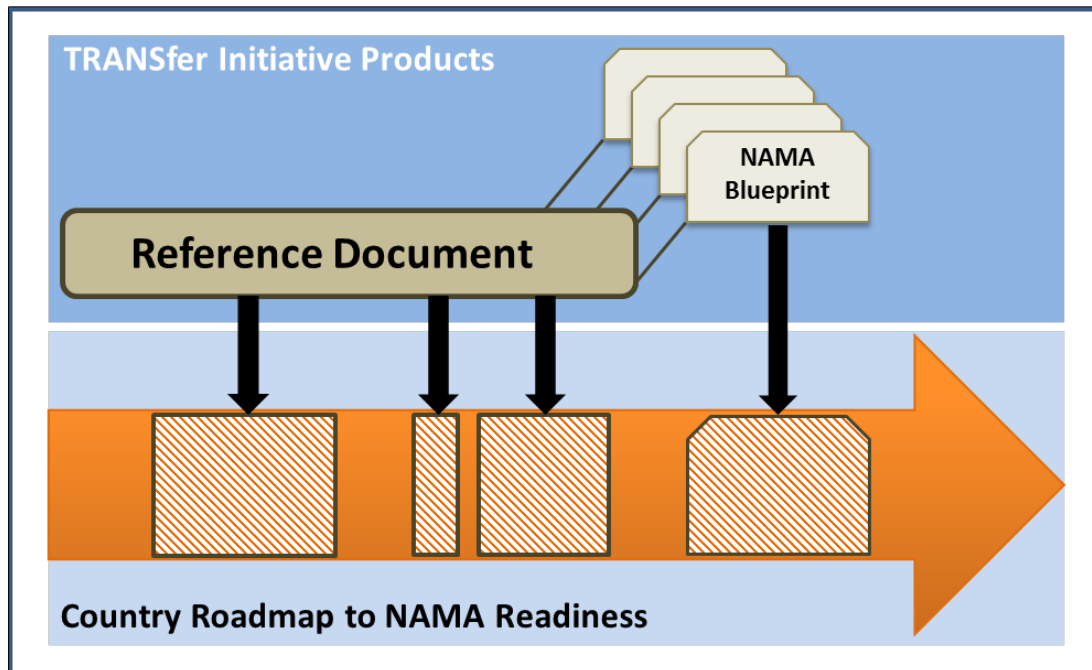
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## Background

The TRANSfer Initiative of GIZ seeks to foster MRV of transport sector mitigation actions by inter alia developing a reference document for transport sector MRV (GIZ, 2014b) that supports host countries in the development of country roadmaps toward MRV readiness and drafting of MRV blueprints for a number of mitigation measure case studies. Countries that wish to develop their own national appropriate mitigation action (NAMA) roadmap in the transport sector can draw elements from the reference document where suitable and apply concrete blueprints to foster the implementation of planned activities. Based on this, the initiative should provide means for a country to enhance its transport NAMA readiness (Figure 1).



**Figure 1:** Contribution from TRANSfer reference document and blueprints to country roadmap for NAMA readiness. The orange arrow depicts the country roadmap to NAMA readiness. Source: INFRAS.

A blueprint is the comprehensive step-by-step documentation of a MRV methodology for a specific transport NAMA that consist of one or multiple mitigation activities such as projects, programs or activities that are sector/policy/regulation based. The blueprint also comprises the description of the development process of how an appropriate methodological approach is chosen.

Each blueprint will be exemplified in a related case study. One blueprint will cover a range of similar mitigation measures that can be covered by the same MRV methodology. However, NAMAs may consist of many activities and multiple blueprints may be required to MRV an entire NAMA. Furthermore the development of blueprints is not restricted to NAMAS developed by GIZ and but extends to other initiatives and projects.

The following sections provide a template for transport sector MRV blueprints that may be followed to document methodological approaches to estimate mitigation outcomes ex-post in a concise, comprehensive and coherent way. The approach is flexible and users of the template are free to modify and extend the template according to their needs. The template at hand may play the role of a good practice document but is by no means meant as a mandatory standard reference. Its use is flexible and may be adapted to local circumstances and project types.

The main objective of this template is to provide authors with a guidance on how to structure and design respective blueprints for ex-post estimation of mitigation outcomes. This makes the approaches comparable, transparent and replicable. Furthermore the template ensures consistency between the various blueprints. This will facilitate the comparison of different blueprints and foster the common use of tools, approaches or methods developed to assess envisaged activities.

The MRV blueprints for transport NAMAs are intended to be applicable ex-post to mitigation activities on different levels:

- Investment projects (e.g. measures similar to CDM projects)
- Policies and programmes (e.g. regulations and taxes or investment programmes on national/aggregated scale)
- Sector strategies and sector targets

Although the focus of the blueprint is on estimating GHG emissions mitigation outcomes, in some activities the analysis in chapter 2 and the methodology in chapter 3 may focus more on the selection and calculation of adequate performance indicators. Performance indicators include processes induced from the activity as well as outputs from them. Examples for performance indicators could be the number of inhabitants that benefit from low carbon planning, number of stakeholder meetings conducted or the length of new railway tracks built.

The structure and approaches provided in the present template are based on existing guidance documents for emission reduction activities such as the comprehensive body of UNFCCC CDM regulation including the new baseline and monitoring methodology form for CDM projects (UNFCCC, 2014a) as well as on the WRI and GHG Protocol policy and action standard (WRI and GHG- Protocol, 2014a) and the related Road Transport Sector Guidance (WRI and GHG Protocol, 2014a). The latter in particular provides the necessary approaches and methodological toolbox to tackle methodological issues of mitigation activities in the transport sector on a more aggregated level, such as programmes, policies etc. With this, the present blueprint seek be consistent and to build on synergies with these existing frameworks. In contrast to this guidance however, the present blueprint is mitigation activity specific and complementary to e.g. existing GHG inventories (Figure 2Figure 2). Finally, the template is open to a flexible handling and application of its structure and content as requirements might vary according to type of mitigation activity or national circumstances. The authors welcome any suggestions for further improvement of the template in the future.

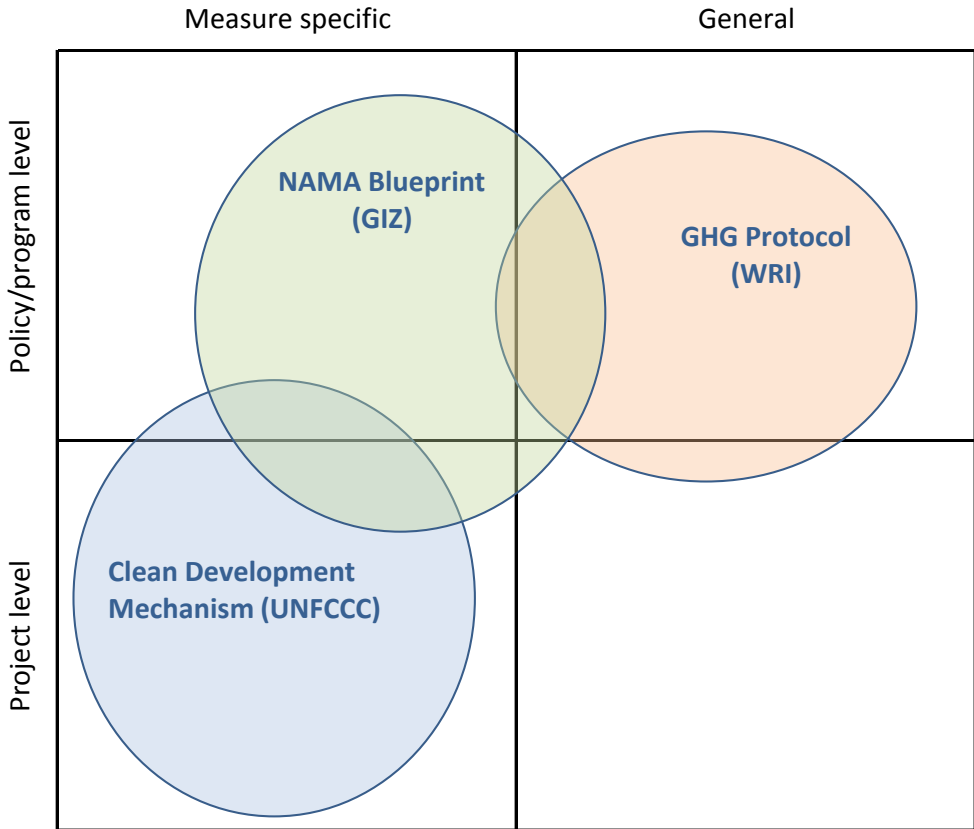
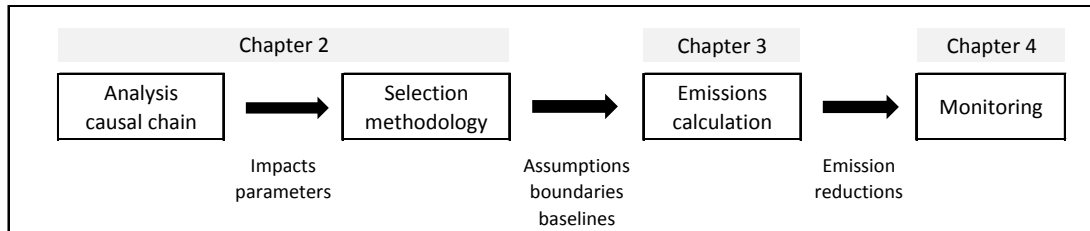


Figure 2 Types and level of existing MRV guidelines and standards initiatives

The blueprint template is structured as follows:

In chapter 1 a description of the planned activity (-ies) is provided, followed by an analysis in chapter 2 on how the activity performance needs to be assessed, how GHG emissions reductions are considered and how the activity interacts with other activities in the transport sector. The analysis in chapter 2 concludes with an outline of the chosen methodological approach. Chapter 3 provides a detailed methodology on how to calculate GHG emission reductions, based on the analysis in chapter 2 and complemented by a related monitoring plan in chapter 4.



**Figure 3:** Overview of MRV blueprint structure

### Background Information on the TRANSfer Project

The TRANSfer project is run by GIZ and funded by the International Climate Initiative of the German Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB). Its objective is to support developing countries to develop and implement climate change mitigation strategies in the transport sector as „Nationally Appropriate Mitigation Actions“ (NAMAs). The project follows a multi-level approach:

- At country level, TRANSfer supports selected partner countries in developing and implementing NAMAs in the transport sector. The NAMAs supported by the project cover a broad variety of approaches in the partner countries Indonesia, South Africa, Peru and Colombia.
- At international level and closely linked to the UNFCCC process, the project helps accelerate the learning process on transport NAMAs with a comprehensive set of measures (events, trainings, facilitation of expert groups, documents with guidance and lessons learned such as the transport NAMA handbook and a database, which is an interactive wiki-based portal that provides access to transport NAMAs).

Activities at country and international level are closely linked and designed in a mutually beneficial way. While specific country experience is brought to the international stage (bottom-up) to facilitate appropriate consideration of transport sector specifics in the climate change regime, recent developments in the climate change discussions are fed into the work in the partner countries (top-down). For more information see: <http://www.transferproject.org>

# 1 Scope and Objectives of Activity

*This section specifies the planned transport sector activity that is used as case study for the development of the blueprint. A more detailed description of the case study including the application of the blueprint methodology is then documented in the NAMA proposal in Annex 1. Table 5.2 in the WRI GHG Protocol Sector Guidance on Road Transport (WRI and GHG Protocol, 2014b) provides a comprehensive table with all relevant background information and respective description that should be provided here.*

## 1.1 Background Information on NAMA

*Here the basic background information about the activity, be it a project, programme, policy or strategy will be described. This includes information about:*

- Name of NAMA activity and country/region/city (where does activity takes place?)
- Current situation in the transport sector before any activity is undertaken and identification of existing needs for improvement e.g. by a gap and barrier analysis.
- Description of activities conducted so far to address the problem and what knowledge or experience exists in the attempts to address the problem
- Discussion of what other transport sector mitigation activities are also planned or currently under implementation: which of them and how would they impact the proposed activity? How is the NAMA activity aligned with national priorities?
- Short listing of stakeholders and main actors involved in the development of activity

## 1.2 Mitigation activity

*In this section, the strategy, policy or activity that will be assessed<sup>1</sup> is defined.*

- Planned NAMA: description of the specific activities and related processes included in the NAMA. Is there a prioritisation of or interdependence between these activities?
  - Conception of activity: is the activity a strategy, policy, programme, project or a mix of them? Type of measure: fiscal, technical, information, regulation, planning, other? Mode of transport: freight or passenger transport on road, water or rail etc?
  - Determination whether an individual activity or a package of activities is assessed. Table 5.6 in the Sector Guidance on Road Transport (WRI and GHG Protocol, 2014b) provides criteria to consider for determining whether to assess an individual policy/activity or a package of policies/activity.
  - Tentative timeframe of activities (start, implementation, milestones, finalization)
  - Stakeholders involved: target group, host country, donors, involved actors, institutions, partners and who coordinates activities

## 1.3 Objectives

- Description of objectives and all targeted outputs/outcomes and positive/negative side-effects of the envisaged activities. What performance is expected from these activities?
- Scope of activity results: (i) national level GHG inventory, (ii) estimation of individual NAMA outcome or (iii) activity for national/international crediting.

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<sup>1</sup> For examples of possible activities see Table 5.1 of the GHG Protocol Policy and Action Standard for Road Transport (GHG Protocol, 2014b) and the fact sheets annexed to the NAMA handbook (GIZ, 2014)

## 2 Analysis of performance indicators and GHG mitigation impact

This section analyses what relevant performance indicators could be determined for the activity assessment and how the planned activities reduce GHG emissions. From this, it derives an optimum methodological approach (ex-post) for the considered context in terms of NAMA type, data availability, and requirements on stringency of methodological approach.

### 2.1 Causal chains from NAMA to emissions

- Identification of potential direct and indirect GHG effects or of the performance resulting from the activity. Information can be based on literature resources, professional judgment, expert opinion and consultations
- Describe or map GHG effects and/or performances from the activity in a causal chain (e.g. specify direction of impact with arrows). This may be further differentiated e.g. into in-jurisdiction and out-of-jurisdiction, intended/unintended or into short- and long-term effects. From this the indicative boundaries of the NAMA can be sketched (see chapter 3.5).
- Type of impact: how does the activity impact GHG emissions (e.g. avoid, shift/modal change, improve, fuel) or how does performance from the activity manifest otherwise? Impacts can take place on various levels (e.g. project, sector and policy level) and affect multiple scopes (e.g. traffic density and air pollution).
- Existing overall types of impacts are categorised by the ASIF model already. These categories can serve as a checklist for identifying the specific causal chains of respective NAMA.

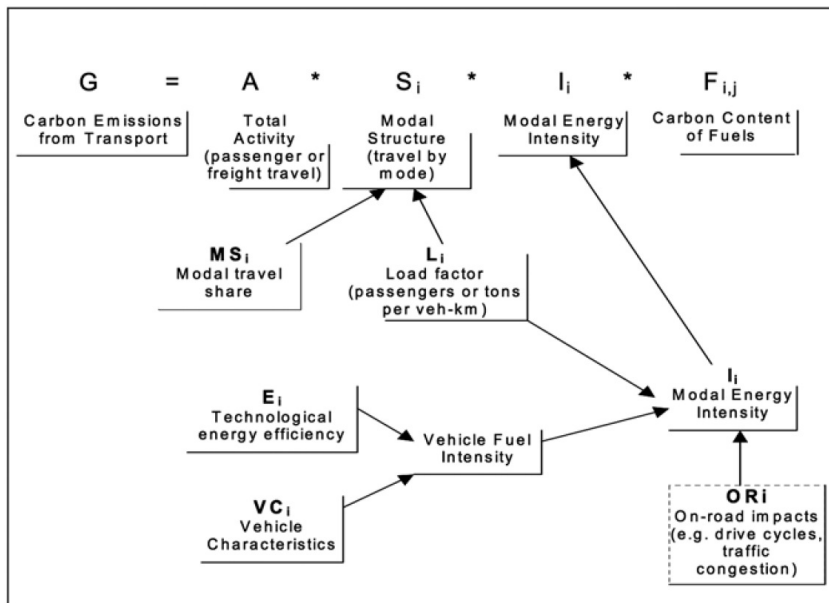


Figure 4: Example for aggregated causal chain structured according to ASIF model (Schipper et al. 2007)

- Decide which branches of the causal chains have to be considered and which may be neglected. If necessary, baseline emission sources may be neglected for simplification reasons since this leads to more conservative emission estimates in the baseline scenario.
- For each identified impact in the causal chain, determine and describe in a table the parameters that are required for measuring respective impacts.

Example Activity	Parameter
Bus Rapid Transport (BRT)	Average traveling time
	Number of trips done in BRT
	Number of trips done in public transport
	Emission factors from public transportation (BRT, buses)
Car pooling	Index of passengers per kilometer
	Vehicle-kilometer traveled
	Modal distribution
Road improvement	Km of road improved
	Km of sidewalks improved
	Road accidents

Figure 5: Example for parameters of activity impacts from NAMA (WRI and GHG Protocol, 2014b)

## 2.2 Potential interaction with other transport sector activities

*In this section the potential overlaps and interactions with other transport sector activities need to be identified and discussed. The following information would be required:*

- List of other activities currently implemented targeting the same emission sources (activities targeting the same emission sources and same geographic location)
- Description of the type of interaction (e.g. reinforcing, overlapping, reverse effects)
- Degree of interaction (e.g. by classifying into “minor, moderate, major”) and potential consequences in terms of synergies or conflicts of effects.
- Table B.1 in the Sector Guidance on Road Transport (WRI and GHG Protocol, 2014b) provides an example how a policy interaction matrix could be drafted.
- Decide based on this analysis which branches overlap and which interactions with other transport sector activities need to be considered or could be neglected. Document your decision.

## 2.3 Data availability

*Here the data availability is discussed and how this matches with the data needs of potential methodological approaches. This needs to be done for all relevant parameters based on the causal chain results including activity data and respective emission factors.*

- A comprehensive analysis is particularly important, because the data availability often directly determines what methodological approach to MRV is feasible.
- The analysis comprises not only the check for GHG related data, but also for other type of data required. This includes:
  - Performance indicators of activities
  - Efficiency indicators, including GHG intensity, air pollution
  - Investment indicators, including amount of infrastructure actually built
  - Top-down vs. bottom-up in inventory/monitoring
- If availability is restricted, further discussions of potential complementary methods (modelling, sampling, set of assumptions etc.) should be provided. One option could be using initial default values (e.g. from literature) first and adjusted/corrected values after monitoring.
- Data type (e.g. emission factors, activity data), categories (e.g. sectoral classification) and sources identified should be consistent with other GHG related activities (e.g. the national GHG inventory).



- Based on the analysis, document limitations for the methodological approaches to MRV that are feasible in the specific context. Sketch methodological solutions (depending on the type of activity (policy, program or project), different levels of detail might be required).

## 2.4 Potential co-benefits

*This section discusses which (non-GHG-related) co-benefits may be expected from the activity type and which of them should be considered.*

- Based on the analysis of the causal chains identification of potential related co-benefits: which indicators from the causal chain implicitly represent what co-benefits?
- Determination which co-benefits should be considered and which not
- Discuss how to determine co-benefits based. Other methodological elements that are required to determine the full range of co-benefits.

Example: the Sector Guidance on Road Transport (WRI and GHG Protocol, 2014b) lists the following examples for Non-GHG effects (or co-benefits) that may be relevant:

Co-benefits	Relevant (Y/N)
Emissions of criteria pollutants avoided (improves air quality and health).	
Travel time savings (Improves quality of life)	
Savings in fuel consumption and vehicle operating costs (energy security)	
Savings in traffic crash costs (improvement in road safety)	
Cost savings to transit agency	
Increase in economic investment in an area with improved access	
Accessibility	
Gender/social justice/wealth distribution issues	

Further co-benefits could also be noise reduction, liveability, land take or equity.

## 2.5 Approach to MRV methodology blueprint

*Here a summary conclusion based on the analysis in sections 2.1 to 2.4 should be provided: a) the most promising methodological approach for MRV is chosen and sketched and b) key performance indicators are identified.*

- Outline of MRV methodological blueprint and/or identification of key performance indicators.

*The information from chapter 2.5 serves as the base for the development of the methodology in chapters 3.*

# 3 Assessment Methodology (ex-post)

*This section provides further guidance on how assessment of performance indicators could be further refined, based on the methodological outline developed in chapter 2. Furthermore chapters 3.8 to 3.11 provide information how to calculate GHG-emission reductions for the planned activity ex-post.*

*The methodological approach is described in detail. For each section the user may assess the need for the proposed steps and simplify the approach as needed.*

## 3.1 Applicability

*Here the applicability conditions of the blueprint are specified. The criteria are derived from the limits that the methodology, data availability situation etc. set. Following aspects could be considered (see also CDM Guidelines (UNFCCC, 2014a):*

- List of categories of activities to which the blueprint may apply.
- List of conditions that the proposed activity should satisfy in order for the methodology to be applicable (e.g. NAMA technology, sectoral circumstances, region).
- The blueprint should explain how the applicability condition can be satisfied and how it will be reported.

## 3.2 Definition of key terms

*Provide definitions of key terms that are used in the proposed blueprint. Consider also definitions from other blueprints (and the GIZ reference document for MRV in NAMAS (GIZ, 2014b)) if applicable to ensure consistency.*

For the purpose of this methodology, the following definitions apply:

- E.g.: urban rapid rail system
- Etc.

## 3.3 Assumptions

- List of assumptions made about parameters, factors, circumstances etc.
- If applicable provide background information on how assumptions were developed or use similar assumption as in other blueprints.
- If applicable for the envisaged activity, discussion of rebound effects, leakage, induced traffic, etc. (see also impacts identifies in the causal chain in chapter 2.1): make assumptions of rebound effect through literature review, stakeholder consultation and expert judgment. Also refer to the analysis of potential interaction with other activities (see chapter 2.2). The Sector Guidance on Road Transport (WRI and GHG Protocol, 2014b) provides options and examples how to approach this discussion.

## 3.4 Consistency

*Demonstrate how consistency of the chosen approach with other approaches is ensured. For this approach you may conduct a thorough comparison between the data sources comparing key aspects such as data (default factors used, measurements vs. modelling) or conception of terms and parameters.*

- Consistency of data sets and activity data used
- Consistency with the national GHG inventory
- Consistency with models
- Consistent use of default factors and EFs within the blueprint and with existing standards
- Etc.

## 3.5 Define system boundaries

*The identification of the causal chain has already set the corner stone for the limitation of the system boundaries. In case where performance indicators of the activity are at the centre of assessment, describe here what spatial (e.g. installation, region or entire country) and temporal extend the envisaged performance indicators to implement the activity will have.*

*Also all significant emission sources, gases and effects in the assessment boundary for both the baseline and the NAMA activity should be identified here respectively.*

*To determine which (GHG-) effects are significant (and thus need to be considered) chapter 7 in the Sector Guidance on Road Transport (WRI and GHG Protocol, 2014b) provides a comprehensive approach how to estimate the likelihood and relative magnitude of effects.*

- Define spatial extent of activity (describe and justify physical delineation of activities)
- Temporal extend (what time period should be considered for the performance indicators and/or GHG impact? Consider:
  - Crediting period(s) defined by regulatory setting or program standards
  - Lifetime of NAMA activity
  - “Lifetime of baseline”, i.e. time after which uncertainties in baseline scenario projections become higher than emission reductions.
- Time interval for ex-post MRV, e.g. annually, biannually, every four years etc. as needed.
- Emission sources and related greenhouse gases in/excluded (please use the table below)

Source (specification of emission source)		Gas	Inclusion (Yes/No)	Explanation (description why respective source/gas is in/excluded and relevant or not)
Baseline	Source 1	CO <sub>2</sub>		
		CH <sub>4</sub>		
		N <sub>2</sub> O		
	Source 2	CO <sub>2</sub>		
		CH <sub>4</sub>		
		N <sub>2</sub> O		
NAMA activity	Source 1	CO <sub>2</sub>		
		CH <sub>4</sub>		
		N <sub>2</sub> O		
	Source 2	CO <sub>2</sub>		
		CH <sub>4</sub>		
		N <sub>2</sub> O		

### 3.6 Identification of Baseline scenario

*This step refers to the analysis of methodological approaches and the selection of an approach in chapter 2. The following aspects are relevant for the identification of baseline scenario: models, assumptions, scenarios, emission factors, etc.:*

- Discussion of plausible scenarios for the activity (including the case where no activity takes place)
- Determination of the adequate baseline scenario and approach to determine emissions based on the approach outlined in section 2.5:
  - define emissions estimation method (e.g. bottom-up or top-down). Also elaborate on relevant equations, algorithms, models, etc.
  - Specify parameters, coefficients, variables for activity data and emission factors
  - Specify drivers and assumptions

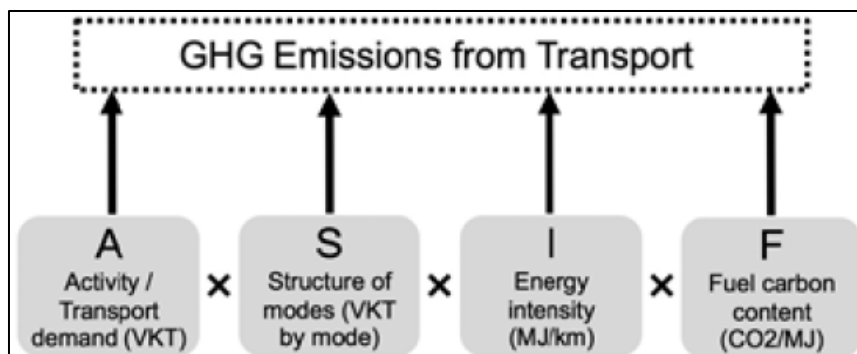
Box 10 of the UNFCCC CDM guidance (UNFCCC, 2014a) and Chapter 8 of the Sector Guidance on Road Transport (WRI and GHG Protocol, 2014b) provide further guidance and examples how the above mentioned elements can be determined.

### 3.7 Determination of performance impacts from activities

*The performance impacts from activities are determined by assessing ex-post the identified qualitative or quantitative performance indicators (chapter 2) and by applying the respective approach as chosen in chapter 2. This is then compared to the baseline scenario, where no NAMA activities would have been implemented. The difference of the indicators between the baseline- and activity scenario can then be considered the performance (output) of the project. This might be in the form of a quantitative data assessment or a qualitative description, depending on the type of indicators applied.*

### 3.8 Calculation of baseline emissions

*Here calculate or estimate the baseline emissions over the GHG assessment period from all relevant sources. Ensure consistency between elaboration of baseline scenario and emissions calculating procedures. If only performance based indicators are used for assessment of the activities, you might leave out this chapter.*



**Figure 6:** GHG emission calculation based on activity data and emission factors (Bongardt et. al. 2013).

Important information needed in order to estimate the baseline includes:

- Fleet data
- Determination of emission factors (consider e.g. fleet composition, technology applied)
- Determination of activity data (consider e.g. traffic models, activity census)
- Type of fuel
- Box 12 of the UNFCCC CDM guidance (UNFCCC, 2014a), the UNFCCC methodological tools 17 and 18 for baseline setting (2014b, 2014c) and Chapter 8 of the Sector Guidance on Road Transport (WRI and GHG Protocol, 2014b) provide further guidance and examples how the elements mentioned above can be determined.

### 3.9 Calculation of NAMA emissions

*Here calculate or estimate the NAMA emissions from the activity over the GHG assessment period from all relevant sources. If only performance or process based indicators are used for assessment of the activities, you might leave out this chapter.*

- Calculation of emission factors
- Calculation of activity data
- Box 12 of the UNFCCC CDM guidance (UNFCCC, 2014a) and Chapter 11 of the Sector Guidance on Road Transport (WRI and GHG Protocol, 2014b) provide further guidance and examples how the elements mentioned above can be determined.

### 3.10 Calculation of potential leakage emissions

*Optional calculation step:*

*Leakage is the net change of anthropogenic emissions occurring outside the NAMA boundary that is measurable and attributable to the activity (UNFCCC, 2014a).*

*Example for leakage: as a consequence from a NAMA that triggers a technological shift to biodiesel technology, significant amounts of biodiesel are required for this measure. In case that the availability of biodiesel is restricted this could inhibit other (existing) initiatives and activities that also rely on biodiesel. Accordingly the latter will not achieve any emission reductions because of the implementation of the NAMA.*

*If only performance or process based indicators are used for assessment of the activities, you might leave out this chapter.*

Based on an analysis of the NAMA activities (including the analysis of causal chains in section 2.1) provide:

- Identification and description of relevant sources of leakage
- Calculation of leakage emissions

### 3.11 Calculation of emission reductions

Here specify the algorithms and formulae applicable to calculate the net emission reduction ( $ER_y$ ) from the envisaged activity taking into account the baseline emissions ( $BE_y$ ), the NAMA activity emissions ( $AE_y$ ), and the net leakage ( $LE_y$ ). If only performance or process based indicators are used for assessment of the activities, you might leave out this chapter.

$$ER_y = BE_y - AE_y - LE_y$$

### 3.12 Assessment of uncertainties involved

- Attribute absolute and relative uncertainties to relevant parameters and assess overall uncertainty of the mitigation outcome of the proposed MRV methodology.
- Demonstrate that the level of certainty achieved with the methodology is sufficient for the targeted scope of activity results (e.g. a methodology for the assessment of emission reductions for the purpose of international crediting may require a much higher level of certainty (resp. a lower level of uncertainty) than a methodology that is used for the estimation of the emission reduction that is merely used for information purposes).
- In case that leakage is not considered in the emission calculation, include the leakage aspect in the uncertainty assessment.

## 4 Monitoring

This section provides the list of parameters that are required to calculate emission reductions for the planned activity ex-post. The list comprises at least all parameters identified from the impact chain in chapter 2.1 and 2.5 based on the ASIF categorisation of potential impacts.

The blueprint should also provide guidance on how to design the monitoring process (including collection and archiving of data).

- Provide a list with a clear and unambiguous description of relevant indicators and the needed parameters to measure them (inputs, activities and GHG effects associated with the activity). This also comprises the monitoring of parameters that measure process- or performance based impacts or potential co-benefits.
- A step by step description of the implementation of the monitoring concept is provided for instance in box 17 and 18 of the CDM guidance (UNFCCC, 2014a).
- According to WRI and GHG Protocol (2014a) the performance can be monitored by measuring/estimating the activity, the impact of the activity or by direct measurement of performance
- Fill in the following table for each parameter:

Data / Parameter	Description
Data unit	
Description	
Source of data	
Measurement Procedures	
Comments	

## 5 Annexes

Annex 1: NAMA proposal, documents the application of the methodology (chapter 3) in the context of a specific case study.

Annex 2: Methodology for ex-ante assessment of GHG mitigation outcome, consistent with the blueprint.

Annex 3: Other documentation, including models, emission factors, survey designs, questionnaires, etc.

## 6 Bibliography

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[to be updated once published (check also references to chapters and sections in final version)]