

Preliminary version

Step 4

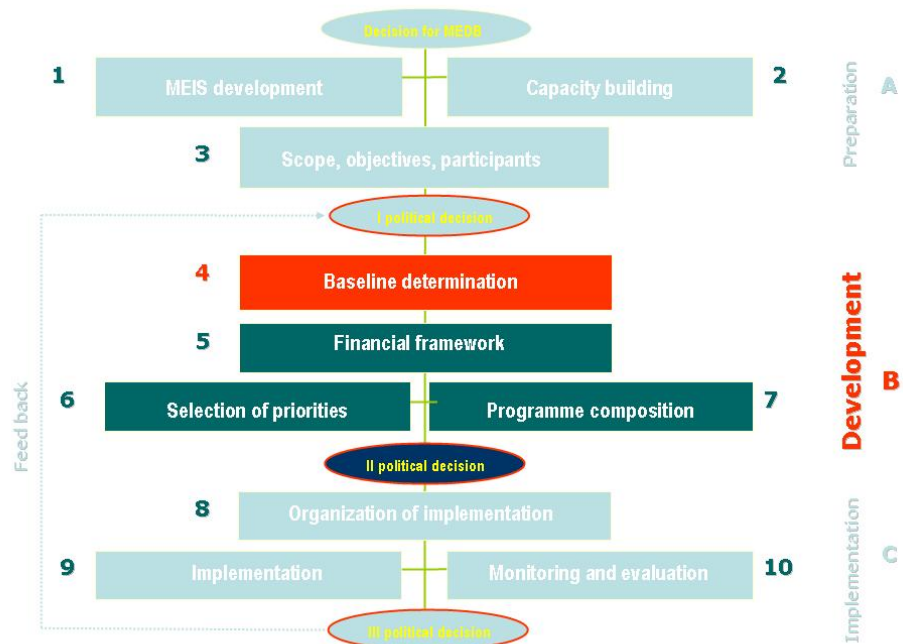
Baseline Determination

Introduction

The activities under this step are based on the data about the individual sites. When the municipality has a database about energy production, energy consumption and the status of the sites, the determination of the baseline takes relatively short time. If, however, the information database is not in place, it will be necessary to conduct the preliminary work (see Instruction 1).

In the course of this step the available information about the situation of the sites prior to the implementation of the programme (initial status) is summarized.

MEP process



Why do we need a baseline?

The baseline is a set of data that describes the status before the municipal energy programme implementation. The baseline serves as the starting point for evaluation of the outcomes and the impact of the programme implementation, which are equal to the difference between the initial status (the baseline) and the status after the programme completion.

What does the baseline consist of?

Technical data

Technical data show the produced and consumed energy, as well as the status of the systems for production and consumption, the potential for energy efficiency and the available RES on the territory of the municipality. Data if needed for:

- Energy generation / supply
- Energy demand / consumption
- Technical / physical status of the sites
- utilization / living comfort.

Non-technical data



Non-technical data characterizes the possible limitations in the development and implementation of the municipal energy programme of regulatory-legislative nature as well as the level of qualification of specialists and awareness of the municipal institutions. It is necessary to have information for:

- Regulatory framework;
- institutional capacity;
- financial frames and opportunities;
- social climate and affordability.

Baseline Scenarios

The full characteristic of the baseline should contain:

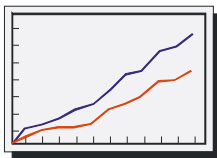
(a) a "snapshot" (initial status) of the municipality (including of its sites) prior to the start of the programme implementation and

(b) a forecast about the development of this initial status for the duration of the programme.

**Actual
baseline
scenario**

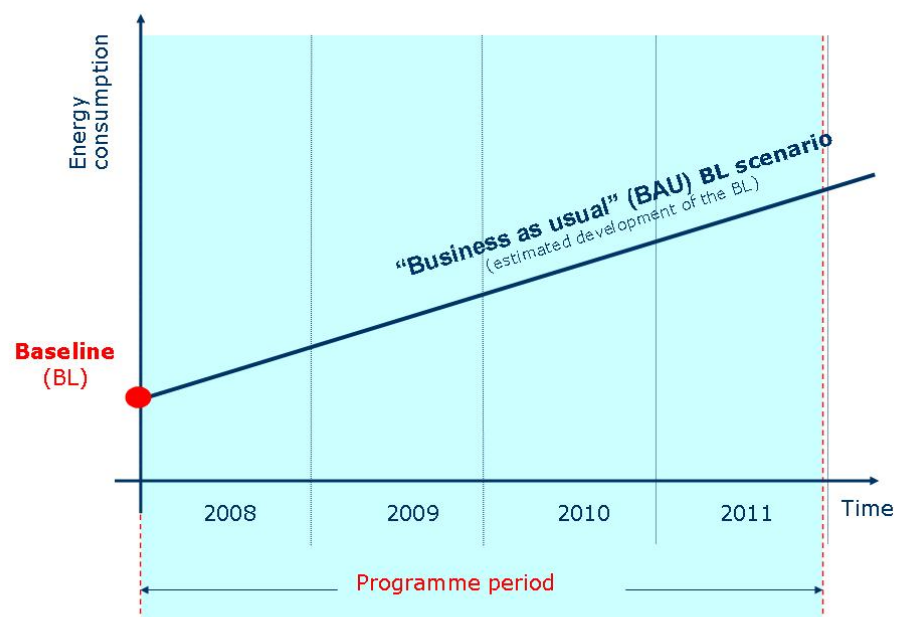
It is very important to take into account the expected changes in the sources of energy supply and in the energy end-use. Possible trends of the development of the initial status in case there is not an energy programme show the baseline scenario.

The established tendencies towards increase or drop of energy production and consumption should reflect in the baseline scenarios. As far as they are based on a set of assumptions, various types of baseline scenarios could be determined – low, medium or high. These types correspond to various forecasts about the changes of the levels of energy consumption for the programme period. Sometimes, baseline scenarios are characterized as optimistic, medium or pessimistic. Ironically, low (optimistic) baseline scenario would cause less energy savings, while the high (pessimistic) baseline scenario is a base for higher energy savings.

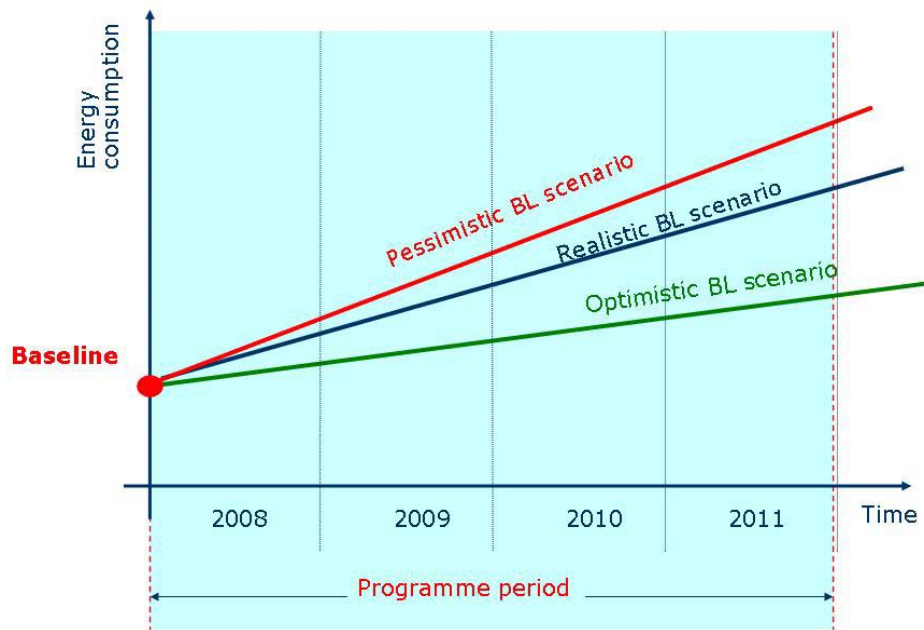


The baseline scenario is usually considered as “business as usual” (BAU) scenario, because it shows how the initial status would change in case if there will be no municipal energy programme.

**“Business as
usual”
scenario**



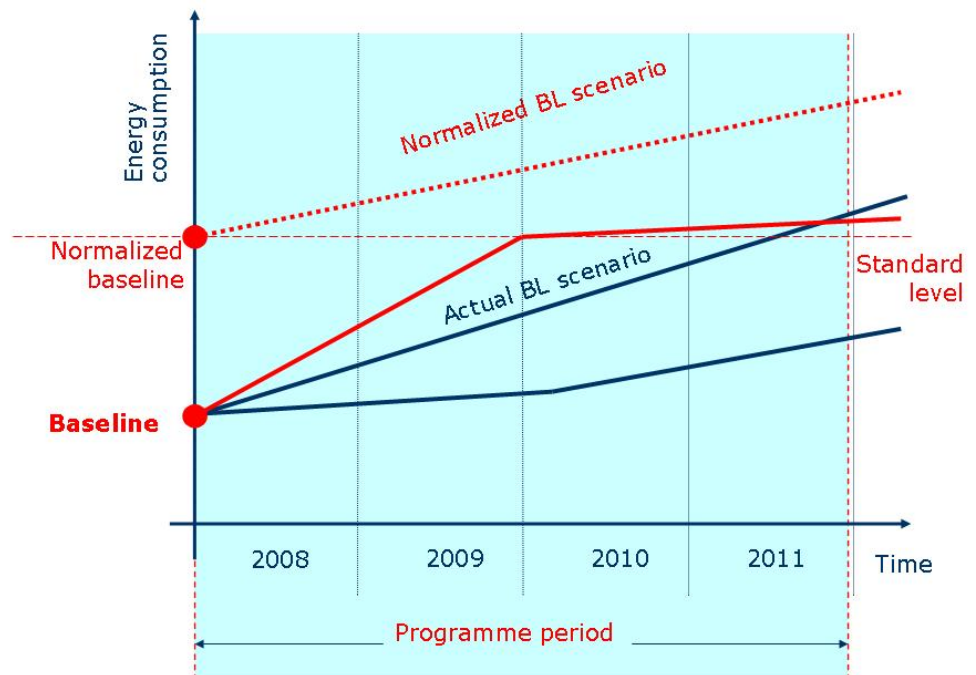
High
(pessimistic),
medium
(realistic) and
low (optimistic)
scenarios



**Normalized
baseline
scenario**

In some cases the low energy consumption might be measured because the premises in a given building are heated below the hygienic norm levels. This could be also found out, when the streets, public areas or the classrooms in the schools are underlit. In this way costs savings are achieved for the expense of the quality of energy services.

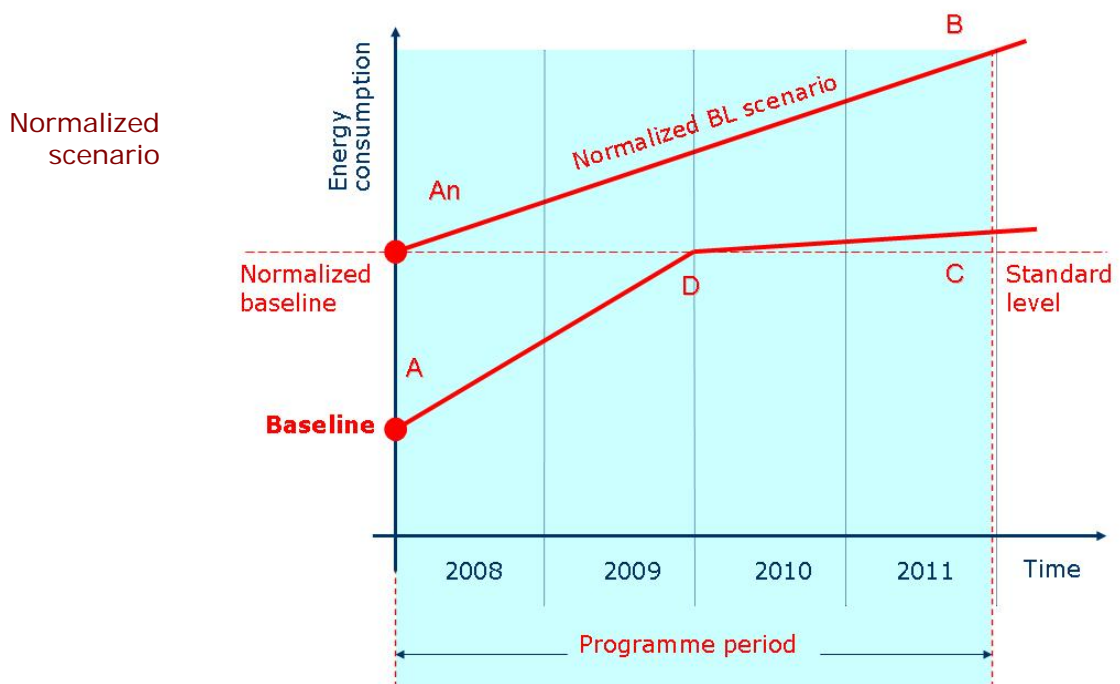
Normalized
scenario





The normalised baseline is expressed by the calculated energy consumption, which would provide the hygienic norm level of the energy services in the sites (most frequently applicable for lighting and space heating). Normalized baseline scenarios could also be calculated as low, medium or high. Normalized baseline also consists of:

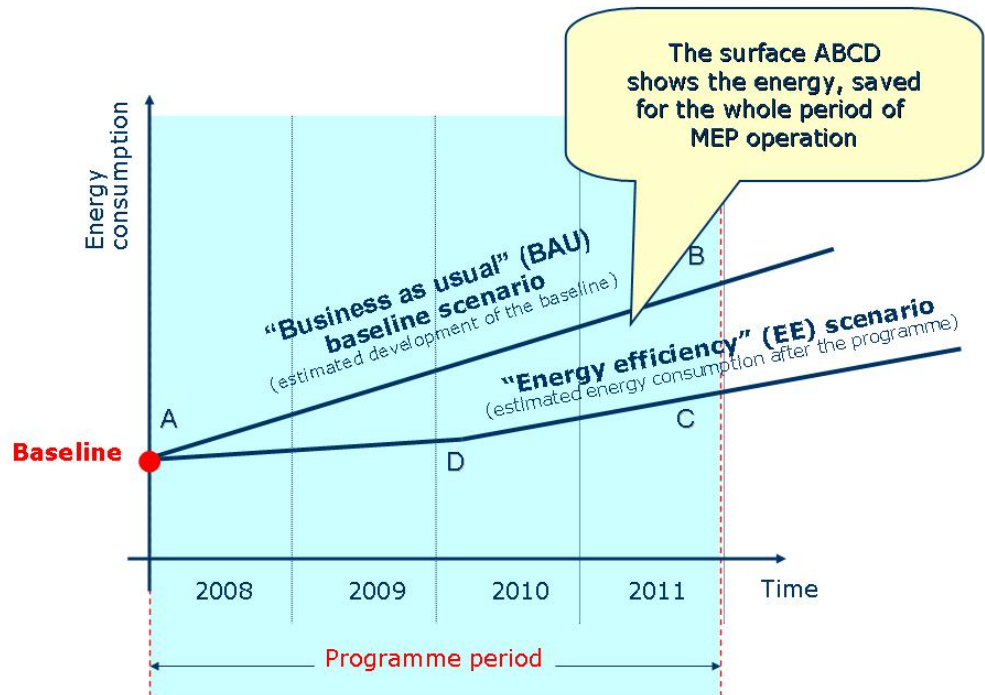
- (a) normalized initial status and
- (b) normalized baseline scenario.



“Energy efficiency” scenario

The “energy efficiency” scenario displays the predicted change in the baseline scenario and its changes as time passes in case that the energy program (project) is being successfully implemented. Under normal circumstances in result of the implementation of the energy programme (implemented energy efficiency measures, introduction of RES, etc.) the energy consumption will be reduced that will result in reduced energy bills. If the scenario of the reduced energy consumption is compared with the baseline scenario the amount of energy and economic savings will be determined as well the reduced GHG emissions will be calculated.

Energy savings



But in case the initial state and the baseline scenario should be normalized the situation could change considerably. When the living comfort standard has been underestimated for a long period of time the first energy and money savings that have been realized are usually directed to the improvement of comfort. This normally lasts till the set up comfort standards are reached and only then the owners of the sites (or the municipal administrations) are able to take advantage of the actual energy savings.



If the consumption after the programme implementation is compared to the actual baseline, it will be found out that savings have not been accomplished but even the energy consumption have increased. But this “over-expenditure” has led to the improvement of the energy service and to the insurance of normal conditions of habitation that correspond to the standards for comfort. Such improvements should be encouraged.

Which scenario should we use?

When we defend our energy efficiency projects and we are usually making use of comparisons of the scenarios for development and the baseline scenario (baseline scenarios or “business as usual”) and the scenario of

the reduced consumption in result of the implementation of the program (or of separate projects) – “energy efficiency” scenarios. A question that is often discussed which are the best scenarios that can successfully defend our projects.

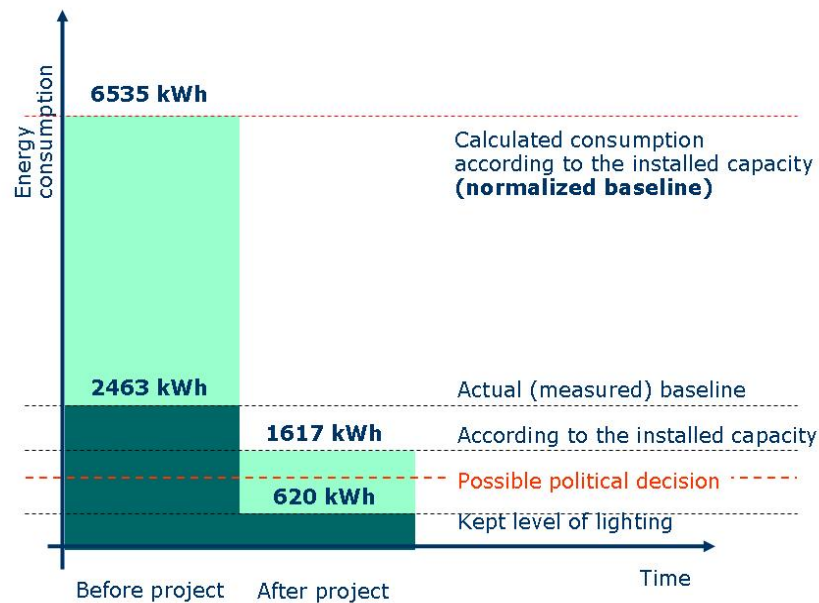
When this defense is done for the political management of the municipality the comparison with the actual initial status and the actual baseline scenario is correct. This comparison gives opportunity to present all effects of the programme - the savings of energy and money and the improvement of the quality of services. This defense is relevant also when the projects are presented in front of local and foreign donors whose priorities exceed the financial benefits – reduction of GHG emissions, improvement of the comfort of leaving and the servicing of population, etc.

But when big investment projects should be defended in front of trade banks additional arguments and guarantees are needed sometimes. If the actual baseline is considerably lower than the normalized one the bank could easily find out that the municipality will not realizes actual saving in the beginning of the programme implementation and will be able to take advantage of them to pay the credits received. This is why the municipality should afford sufficient additional guarantees for its solvency to be able to get the credits it needs.

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Example **Energy efficiency in street lighting**

While developing the baseline scenario for the street lighting system in the city (late 90-ies) the energy consumption by the operating luminaries was found to be significantly below the one envisaged in the project design and the lighting level quality much poorer. It was found out that of the total of 6,400 installed luminaries (designed and installed according the norms with an energy consumption calculated at the level of 6,535 kWh) hardly 31% were in operation. This meant that the actual initial status was at the level of 31% of the normalized level (measured 2,463 kWh).



An energy efficient project was developed, envisaging entire renovation of the system, including the replacement of all existing luminaries by new energy-efficient units. The measurements showed that when all the installed new more efficient luminaries were put in operation, savings to the amount of 846 MWh were achieved as compared to the actual energy consumption prior to project implementation (2,463 kWh). If compared with the normalized level (6,535 kWh) the achieved consumption accounted at about 25% of it or about 65% of the actual consumption before the projects.

The municipal administration gradually increased the level of comfort from the previous one. It started with energy consumption of about 25% of the actual one before the project implementation (620 kWh) or less than 10% of the normalized level (6,535 kWh). For several months they reached the full capacity (100% or 1,617 kWh), ensuring much better comfort and safety in streets and social approval.