# MEASUREMENT & VERIFICATION

## Street lighting

July, 2016

EU4Energy

Covenant of Mayors for Climate & Energy

Demonstration Projects Eastern Partnership

# 1 General

1. All projects are obliged to prepare and submit monitoring and verification data
2. The monitoring and verification data shall be prepared for each subproject.

# 2 Calculation of savings

The savings of each subproject have to be calculated by comparing the energy consumption before and after the project implementation. BUT the situation before is often not comparable with the situation after the project (no lighting, different light intensity, etc.) → establishment of a "**baseline"** is needed to have comparable conditions before and after the project implementation. The baseline usually represents the calculated (theoretical) energy consumption before the project implementation considering the same service level as after the project implementation (i.e. same light intensity).

It is recommended to prepare the following table after finalization of the technical design of the project.

| **Parameter** | **Unit** | **Baseline** | **After implementation** | **Savings** |
|---|---|---|---|---|
| **Electricity consumption per year** | MWh/a | | | |
| **Electricity costs per year** | Euro | | | |
| **Operation time of the street lighting system** | h | | | |
| **CO2 emission per year**[1] | tCO2/a | | | |

Please attach the basic calculation steps in a separate document.

# 3 Ongoing monitoring after completion of the subproject (actual measurements)

The PT has to ensure that the following meters/measurement equipment are installed and data will be recorded.

- Electronic electricity meters incl. internal data storage

It is recommended to continuously measure and record the following values after the project implementation for the entire system. The monitoring data shall be submitted to the ST after completion of the project on a monthly basis.

[1] Emission factor natural gas: 0,2 tCO2/MWh; Ukraine: Emission factor electricity: 1,058 tCO2/MWh

| Value | Measurement device | Measurement interval | Unit |
|---|---|---|---|
| Total electricity consumption | Electricity meter | weekly | kWh |
| **Additional parameters to monitor:** | | | |
| Number of light points | - | - | - |
| Length of streets in m | - | - | m |
| Installed capacity in kW | - | - | kW |
| Illumination intensity in lx (in average) | luxmeter | 1 x per year | lx |
| **Calculated energy performance criteria:** | | | |
| Electricity consumption per light point | | monthly | Kwh/point |
| Electricity consumption per m street | | monthly | kWh/m |
| Electricity consumption per installed kW | | monthly | kWh/kW |