



BUTK
Bottom Up to Kyoto

BERLINER **nergie** AGENTUR

**Project „Bottom up to Kyoto – ButK“
EIE/06/010/SI2.443504**

***WP 2: Street lighting system in Slovenska Bistrica -
data collection and potential analysis (diagnosis)***

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Data collecting, data entry form

inspection of data availability of the lighting systems, data collecting

- Acquisition of the data base, completion of data entry form (forms distributed by BEA)
- Following data should be collected by municip. Partners (street and/or indoor lighting):
 - General data (list of objects/systems, type of streets, number of installations, contact address)
 - Specific data (number of luminaires, type of lamps, wattage, ballast, periods of usage; street lighting: additional service time h/a, exchange cycle/a)
 - Detailed data of utilisation with planned changes (e.g. extensions/reduction of installations)
 - Energy consumption and cost data of last 3 years
 - Electricity meters
 - Control and special use (e.g. depending on daylight, movement sensors)
 - Operating and monitoring systems
 - Standards
 - Total lengths of street lighting network, distance from nearest medium voltage station (also of the buildings for indoor lighting)
 - Power factor ($\cos\phi$) only for indoor lighting

Data collecting, data entry form

Example for specific street lighting data:

Luminaire

- Number: 34 (e.g. in one street), year of construction: 1980, description: IP 65, aluminium reflector

➤ Ballast

- Number: 34, type: KVG (conventional), power loss: 5 W

➤ Lamp

- Number: 34, type: HME (high pressure mercury vapour), power: 80 W, service time: 4000 h/a, nominal life time: 8000 h, exchange cycle: 0,5/a

Example for standards of street lighting:

- Road safety may not be negatively affected by saving measures
- The predefined intervals of maintenance and the quality criteria according e.g. to national maintenance standard have to be followed
- EC Directive 200/55/EG (En. Efficiency requirements for ballast for fluorescent lamps)

Results data collecting Dej (RO)

Slovenska Bistrica (*complete data entry forms were sent to BEA 10.10.07, additional information was given during PMC Berlin 24.01.08*)

- Length of street lighting network 129,8 km
- Ownership: Slovenska Bistrica municipality
- Number of connected light points in total: 2.209
- Street lighting: 328 kW luminaire wattage, 2.459 luminaires
 - most of them with high pressure mercury lamps: 1.311
 - 622 higher efficient high pressure sodium vapour lamps
 - some are fluorescent lamps with lower efficiency than modern efficient lamps)
- year of construction between 1960 and 2005 (most frequent 1980), therefore it seemed that most of reflectors/pillars aren't in good current status
- Total electric work 1.378.004 kWh (calculated for operation time 3.950 h/a)



Bottom up to Kyoto – activities WP 2

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Potential analysis, pre-selection of lighting systems

Preliminary audit: based on results of data collection the potential analysis including preliminary audits were conducted (parallel/together with drafts of feasibility studies in WP 3)

Steps of preliminary audit

step 1: first survey of lighting system and collected data

Step 2: key figure formation, comparison with actual specific consumption and specific values from other municipalities and standards (first analysis)

Step 3: For determination of the potential savings: suggestion of energy efficiency measures, calculation of new electric work and cost savings

Preliminary Audit Slovenska Bistrica (1)

Step 2: specific indicators street lighting

	lights / inhabitant	lights / km	kWh / lamp / a	kWh / km	kWh / inhabitant	inhabitants
small city (A)	0,16	24	263	6.400	41	9.300
Graz (A)	0,10	30	350	10.500	35	240.000
AGES	0,11	-	436	25.000	42	2.000 - 48.000

City of Graz (240.000 inhabitants), a smaller municipality from Styria, Austria (9.300 inhabitants – completely renewed street lighting by an ESCO) and a publication from German company AGES on some smaller German municipalities

Slov. Bistrica (22.893 inhabitants):

- Luminaire/inhabitant: **0,11**
- lights/km lighted street: **18,9**
- Electricity consumption per spot of light: **550 kWh/luminaire** and year
- Electricity consumption/km lighted street: **10.410 kWh/km** and year
- Electricity consumption for street lighting per inhabitant: **60 kWh/inhabitant** and year

Preliminary Audit Slovenska Bistrica (2)

Step 3: energy efficiency measures

Following energy efficiency measures are suggested:

- exchange of the high pressure mercury vapour lamps with efficient high pressure sodium vapour lamps

Possible savings

New total sum of luminaire wattage (as system) (kW)	Total electric work savings (kWh/a)	Percentage of electric work savings (%)	Cost savings (electric work and power) (€/a)	Percentage of cost savings for electric work and power (%)
246	363.945	25	37.04343	25