

Calculation and reporting of CO2 emissions and savings attributable to lighting

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|---------------------|--------------|
| Municipality | Raciechowice |
| Country | Poland |
| Population | 5,950 |

Electricity Data

| | |
|--------------|--------------|
| Municipality | Raciechowice |
| Country | Poland |
| Population | 5,950 |

Office lighting

Existing situation

| No of lamps (Estimation) | Lamps | | Ballast | | Total | Service time | Service time | Energy consumption |
|-----------------------------|---------------|-----------------|-----------------|--------------------|---------------|--------------|--------------|--------------------|
| | Type of lamps | Wattage (kW) | Type of ballast | Power loss (kW) | Power (kW) | (hours/day) | (h/a) | (kWh) |
| | | | | | 0.00 | | 0 | 0 |
| | | | | | 0.00 | | 0 | 0 |
| | | | | | 0.00 | | 0 | 0 |
| | | | | | 0.00 | | 0 | 0 |
| | | | | | 0.00 | | 0 | 0 |
| | | | | | 0.00 | | 0 | 0 |
| | | 0 | | 0 | 0 | | | 0.00 |

Post investment

| No of lamps (Estimation) | Lamps | | Ballast | | Total | Service time | Service time | Energy consumption |
|-----------------------------|---------------|-----------------|-----------------|--------------------|---------------|--------------|--------------|--------------------|
| | Type of lamps | Wattage (kW) | Type of ballast | Power loss (kW) | Power (kW) | (hours/day) | (h/a) | (kWh) |
| | | | | | 0.00 | | 0 | 0 |
| | | | | | 0.00 | | 0 | 0 |
| | | | | | 0.00 | | 0 | 0 |
| | | | | | 0.00 | | 0 | 0 |
| | | | | | 0.00 | | 0 | 0 |
| | | | | | 0.00 | | 0 | 0 |
| | | 0 | | 0 | 0 | | | 0.00 |

| | |
|---------------------|--|
| Voltage (Volt) | |
| Power factor (cosφ) | |

Electricity Data

Street lighting

Total length of lighting network (km)

Existing situation

| No of lamps | Lamps | | Ballast | | Total | Service time (hours/day) | Service time(*) (h) | Energy consumption (kWh) | cosφ | Total Energy consumption (KWh) |
|-------------|----------------------|-----------------|-----------------|--------------------|---------------|-----------------------------|------------------------|-----------------------------|------------|--------------------------------------|
| | Type of lamps | Wattage (kW) | Type of ballast | Power loss (kW) | Power (kW) | | | | | |
| 9 | FILAMNET FITTINGS | 0.1 | | 0 | 0.90 | | 3285 | 2956.50 | | |
| 113 | QUICKSILVER FITTINGS | 0.125 | | | 14.55 | | 3285 | 47792.64 | | |
| 125 | QUICKSILVER FITTINGS | 0.25 | | | 32.19 | | 3285 | 105735.94 | | |
| 5 | QUICKSILVER FITTINGS | 0.4 | | | 2.06 | | 3285 | 6767.10 | | |
| 50 | SODIUM FITTINGS | 0.07 | | | 4.17 | | 3285 | 13682.03 | | |
| 44 | SODIUM FITTINGS | 0.07 | | | 3.67 | | 3285 | 12040.18 | | |
| 5 | SODIUM FITTINGS | 0.15 | | | 0.89 | | 3285 | 2931.86 | | |
| 1 | SODIUM FITTINGS | 0.25 | | | 0.30 | | 3285 | 977.29 | | |
| 1 | SODIUM FITTINGS | 0.4 | | | 0.48 | | 3285 | 1563.66 | | |
| | | | | | 0.00 | | 0 | 0.00 | | |
| | | | | | 0.00 | | 0 | 0.00 | | |
| | | | | | 0.00 | | 0 | 0.00 | | |
| 353 | | | | | 59.19 | | | 194,447.20 | 0.9 | 216,052 |

(*) provided

Post investment

| No of lamps | Lamps | | Ballast | | Total | Service time (*) (h) | Energy consumption (kWh) | cosφ | Total Energy consumption (KWh) |
|-------------|-----------------------------|-----------------|-----------------|--------------------|---------------|-------------------------|-----------------------------|------------|--------------------------------------|
| | Type of lamps | Wattage (kW) | Type of ballast | Power loss (kW) | Power (kW) | | | | |
| 289 | SODIUM FITTINGS | 0.07 | | | 24.07 | 3285 | 79082.10 | | |
| 36 | SODIUM FITTINGS | 0.1 | | | 4.28 | 3285 | 14072.94 | | |
| 13 | SODIUM FITTINGS | 0.15 | | | 2.32 | 3285 | 7622.84 | | |
| 14 | SODIUM FITTINGS (extension) | 0.07 | | | 1.17 | 3285 | 3830.97 | | |
| 1 | SODIUM FITTINGS (extension) | 0.1 | | | 0.12 | 3285 | 390.92 | | |
| | | | | | 0.00 | | 0.00 | | |
| | | | | | 0.00 | | 0.00 | | |
| | | | | | 0.00 | | 0.00 | | |
| 353 | | | | | 31.96 | | 104,999.77 | 0.9 | 116,666 |

| | |
|---|-------|
| Voltage in transmission lines (kVolt): | 20 |
| Low voltage (kVolt) | 0.4 |
| Distribution losses | 0.254 |
| Distance to the nearest medium voltage distribution station (km): | 5 |

Total Actual Energy Demand

| | |
|-----------------------------------|---------|
| Wires' resistance (Ω /km) | 0.23 |
| Wires' resistance (Ω) | NO DATA |
| Consumption (%) | 25.40% |
| Length of transmission wires (km) | 0.00 |

OFFICE LIGHTING

| | |
|---|---------|
| Total energy demand in buildings for lighting (kwh) | NO DATA |
| Energy production required (kWh) | - |

STREET LIGHTING

| | |
|---|------------|
| Total energy demand for street lighting (kwh) | 216,052.44 |
| Energy production required (kWh) | 270,929.76 |

TOTAL

| | |
|---------------------------------|------------|
| TOTAL energy DEMAND (KWh) | 270,929.76 |
| TOTAL TRANSMISSION LOSSES (KWh) | 54,877.32 |

Total Post-investment Energy Demand

| | |
|-----------------------------------|---------|
| Wires' resistance (Ω /km) | 0.23 |
| Wires' resistance (Ω) | NO DATA |
| Consumption (%) | 25.40% |
| Length of transmission wires (km) | 0.00 |

OFFICE LIGHTING

| | |
|---|---------|
| Total energy demand in buildings for lighting (kwh) | NO DATA |
| Energy production required (kWh) | - |

STREET LIGHTING

| | |
|---|------------|
| Total energy demand for street lighting (kwh) | 116,666.41 |
| Energy production required (kWh) | 146,299.68 |

TOTAL

| | |
|---------------------------------|------------|
| TOTAL energy DEMAND (KWh) | 146,299.68 |
| TOTAL TRANSMISSION LOSSES (KWh) | 29,633.27 |

Actual CO2 emissions

Office lighting

CO2 emissions

| Type of fuel | Fuel Contribution * | Total electric energy demand (Kwh) | CO2 emissions per electric kWh produced (kg/kwh) ** | CO2 emissions per fuel (t) |
|--------------|---------------------|------------------------------------|---|----------------------------|
| Coal/Lignite | 91.90% | - | 0.959 | - |
| Oil | 1.60% | - | 0.8186 | - |
| Natural gas | 3.30% | - | 0.4475 | - |
| Nuclear | 0.00% | - | 0.004 | - |
| RES | 2.00% | - | 0 | - |
| Other | 1.00% | - | 0 | - |
| | 99.80% | 0.00 | | |

CO2 emissions (t/year)

0.00

Street lighting

CO2 emissions

| Type of fuel | Fuel Contribution * | Total electric energy demand (Kwh) | CO2 emissions per electric kWh produced (kg/kwh) ** | CO2 emissions per fuel (t) |
|--------------|---------------------|------------------------------------|---|----------------------------|
| Coal/Lignite | 91.90% | 248,984.45 | 0.959 | 238.78 |
| Oil | 1.60% | 4,334.88 | 0.8186 | 3.55 |
| Natural gas | 3.30% | 8,940.68 | 0.4475 | 4.00 |
| Nuclear | 0.00% | 0.00 | 0.004 | 0.00 |
| RES | 2.00% | 5,418.60 | 0 | 0.00 |
| Other | 1.00% | 2,709.30 | 0 | 0.00 |
| | 99.80% | | | |

CO2 emissions (t/year)

246.33

TOTAL CO2 emissions from lighting

CO2 emissions (t/year)

246.33

* Source: Eurostat (2004)

** Source: Fuel and Energy

Production Emission Factors, AEA
Technology

Post-investment CO2 emissions

Office lighting

CO2 emissions

| Type of fuel | Fuel Contribution * | Total electric energy demand (Kwh) | CO2 emissions per electric kWh produced (kg/kwh) ** | CO2 emissions per fuel (t) |
|--------------|---------------------|------------------------------------|---|----------------------------|
| Coal/Lignite | 91.90% | - | 0.959 | - |
| Oil | 1.60% | - | 0.8186 | - |
| Natural gas | 3.30% | - | 0.4475 | - |
| Nuclear | 0.00% | - | 0.004 | - |
| RES | 2.00% | - | 0 | - |
| Other | 1.00% | - | 0 | - |
| | 99.80% | 0.00 | | |

CO2 emissions (t/year)

0.00

Street lighting

CO2 emissions

| Type of fuel | Fuel Contribution * | Total electric energy demand (Kwh) | CO2 emissions per electric kWh produced (kg/kwh) ** | CO2 emissions per fuel (t) |
|--------------|---------------------|------------------------------------|---|----------------------------|
| Coal/Lignite | 91.90% | 134,449.40 | 0.959 | 128.94 |
| Oil | 1.60% | 2,340.79 | 0.8186 | 1.92 |
| Natural gas | 3.30% | 4,827.89 | 0.4475 | 2.16 |
| Nuclear | 0.00% | 0.00 | 0.004 | 0.00 |
| RES | 2.00% | 2,925.99 | 0 | 0.00 |
| Other | 1.00% | 1,463.00 | 0 | 0.00 |
| | 99.80% | | | |

CO2 emissions (t/year)

133.01

TOTAL CO2 emissions from lighting

CO2 emissions (t/year)

133.01

CO2 reduction (t/y)

113.31

46.0%

Electricity savings (kWh/y)

124,630

Percentage of lamps changed:

98.9%

* Source: Eurostat (2004)

** Source: Fuel and Energy

Production Emission Factors, AEA

Technology