



## How to use the new features of the tool

The new features of tool provide the opportunity to calculate the energy balance as will be resulted by the implementation of actions for the reduction of the CO<sub>2</sub> emissions for the target year of an examined scenario. The potential reduction of the CO<sub>2</sub> emissions can be achieved either by the implementation of energy efficiency interventions and the triggered energy savings or from fuel substitution with more environmentally friendly energy carriers and the energy production by RES.

**Step 1:** In the sheet “**1. Municipal buildings**”, the user should assess the results from the calculation of the final energy consumption so as to identify the potential interventions, which will be occurred until the target year (rows 44-46).

**Step 2:** In the sheet “**1. Municipal buildings**” the user should introduce specific energy efficiency interventions for each measure providing information about the degree of implementation and the expected savings, expressed in percentages (%) in relation to the total final energy consumption for each affected energy carrier separately. The calculation of the triggered energy savings is performed multiplying the final energy consumption of the targeted energy carrier, the degree of implementation and the expected savings. Moreover, the user should introduce (in column S:Z) additional information using the respective drop-down lists (where available) about the cost, the area of intervention, the policy instrument, the origin of the action, the responsible body, the implementation year and the status of implementation for the interventions, which will be occurred until the last year of the examined scenario (i.e. either for 2020 or 2030).

**Step 3:** Furthermore, In the sheet “**1. Municipal buildings**” the user should specify for each measure the degree of implementation for the targeted energy carrier, the potential fuel substitution for the examined measure by selecting the option YES in column C and the energy carrier, which will substitute the targeted energy carrier in columns D-R by selecting the option YES in the corresponding column. The substituted energy quantity will be calculated for the targeted energy carrier in the rows 70-76, while the energy supply of the energy carrier, which will substitute the targeted energy carrier, is calculated in the rows 79-85 taking into account the performance ratio for both the involved energy carriers.

**Step 4:** In the sheet “**1. Municipal buildings**” as a result from the previous steps, the calculation of the energy savings and the additional energy supply is performed automatically for each energy carrier accompanied by the estimation of the final energy savings, the CO<sub>2</sub>eq emission reduction, the RES production (MWh) and the Cost/Effectiveness Ratio so as to facilitate the comparative assessment of the examined scenarios.



The above steps are identical also for the case of: **2. Tertiary buildings, 3. Residential buildings, 5. Industry-Non ETS, 6. Industry-ETS, 7. Agriculture-Forestry-Fisheries.**



The screenshot shows a Microsoft Excel spreadsheet with the following tables:

- Calculations:** A table with columns for 'Final energy consumption (MWh)' and various energy carriers: Electricity, Heatwood, Natural gas, Liquid gas, Heating oil, Diesel, Gasoline, Lignite, Coal, Other fossil fuels, Plant oil, Biofuel, Other biomass, Solar thermal, and Geothermal.
- Calculations - Scenario:** A table with columns for 'Key actions' (Implementation, Savings), 'Energy savings', 'Cost (€)', 'Area of intervention', 'Policy instrument', 'Information' (Origin of the action, Responsible body, Implementation timeframe, Status of implementation), and 'Status of implementation'.
- Calculations energy savings (MWh):** A table with columns for 'Final energy savings (MWh)', 'CO2eq emission reduction (t)', and 'RE production (MWh)'. It lists measures 1 through 6.
- Calculations energy supply (MWh):** A table with columns for 'Final energy savings (MWh)', 'CO2eq emission reduction (t)', and 'RE production (MWh)'. It lists measures 1 through 6.
- Performance ratio:** A table with columns for 'Performance ratio' and various energy carriers, showing percentages for each.
- Calculations net energy savings (MWh):** A table with columns for 'Final energy savings (MWh)' and various energy carriers, showing values for each.

→ In the sheet "4. Public lighting" step 3 should be omitted.

The screenshot shows a Microsoft Excel spreadsheet with the following tables:

- Calculations:** A table with columns for 'Final energy consumption' and 'Electricity', showing a value of 0 MWh.
- Calculations - Scenario:** A table with columns for 'Key actions' (Implementation, Savings), 'Energy savings', 'Cost (€)', 'Area of intervention', 'Policy instrument', 'Information' (Origin of the action, Responsible body, Implementation timeframe, Status of implementation), and 'Status of implementation'. It lists measures 1 through 5.
- Calculations (MWh):** A table with columns for 'Final energy savings (MWh)', 'CO2eq emission reduction (t)', and 'Cost/Effectiveness Ratio (€/CO2eq)'. It lists measures 1 through 5.

**Step 5:** In the sheet "8. Municipal fleet" the user should introduce specific energy efficiency interventions for each measure providing information about the degree of implementation and the expected savings, expressed in percentages (%) in relation to the total final energy consumption for each affected energy carrier separately. The calculation of the triggered energy savings is performed multiplying the final energy consumption of the targeted energy carrier, the degree of implementation

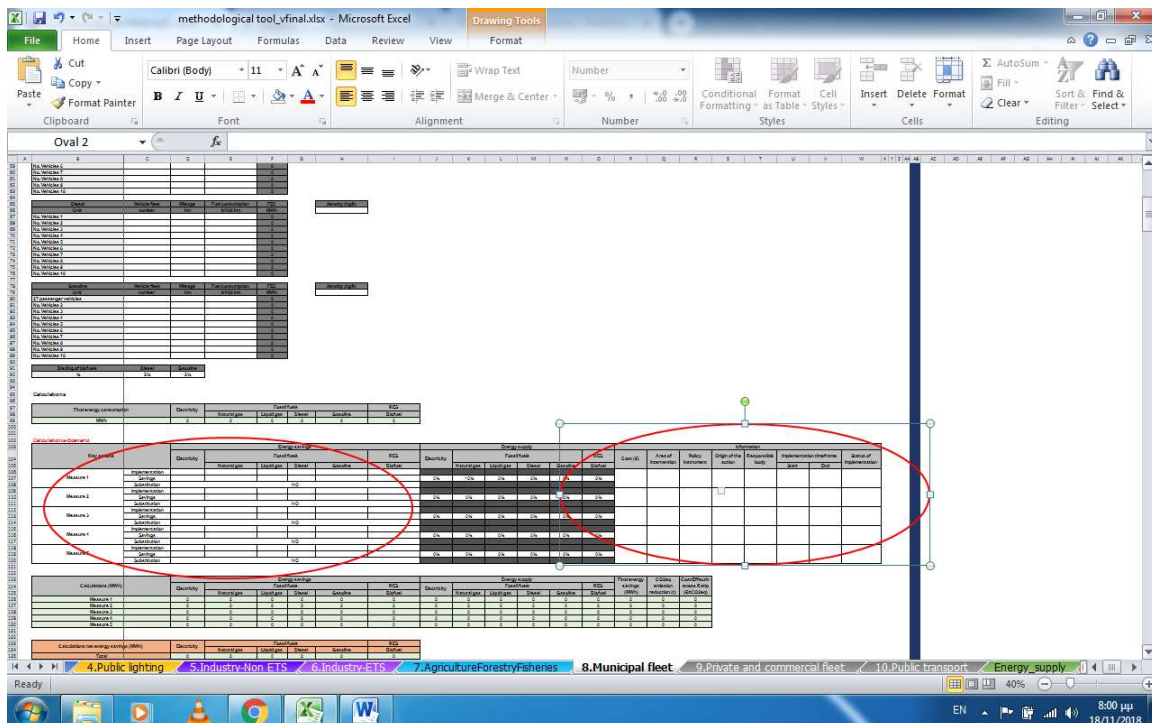
and the expected savings. It should be noted that the calculation will be performed only by selecting the option NO in column D-I for indicating the potential fuel substitution in the corresponding rows for each measure separately. Moreover, the user should introduce (in column S:Z) additional information using the respective drop-down lists about the cost, the area of intervention, the policy instrument, the origin of the action, the responsible body, the implementation year and the status of implementation for the interventions, which will be occurred until the last year of the examined scenario (i.e. either for 2020 or 2030).

**Step 6:** In the sheet “8. Municipal fleet” for the case of fuel substitution the user should select for each measure the option YES in column D-I for indicating the potential fuel substitution in the corresponding rows for each measure separately and specify both the degree of implementation for the targeted energy carrier and the energy carrier, which will substitute the targeted energy carrier in columns J-O as percentage to the total final energy consumption denoting the energy that is required for the fuel substitution of the targeted energy carrier.

**Step 7:** In the sheet “8. Municipal fleet” the calculation of the energy savings and the additional energy supply is performed automatically for each targeted energy carrier accompanied by the estimation of the final energy savings, the CO<sub>2</sub> emission reduction, the RES production (MWh) and the Cost/Effectiveness Ratio so as to facilitate the comparative assessment of the examined scenarios.



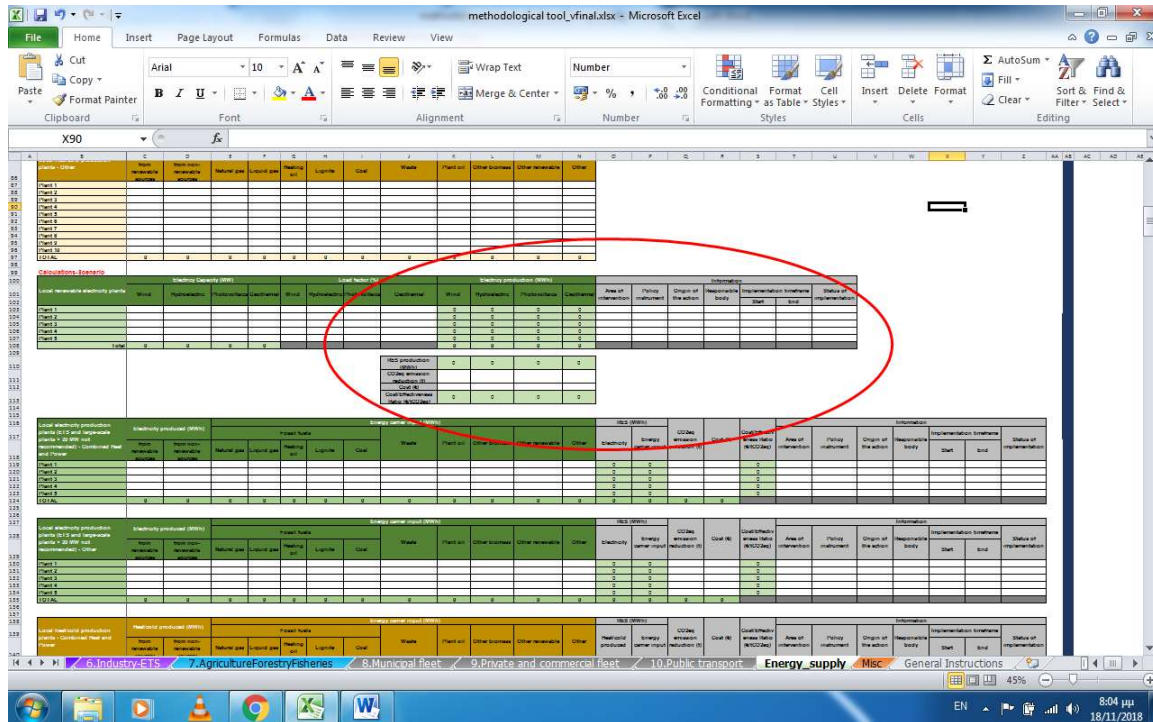
Steps 5-7 are identical also for the case of **9. Private and commercial fleet & 10. Public transport.**



**Step 8:** In the sheet “Energy\_supply” the user should specify the capacity and the load factor from the different categories of the foreseen local renewable electricity plants including the estimated

implementation cost (rows 99-107) for the last year of the examined scenario (i.e. either for 2020 or 2030).

**Step 9:** In the sheet “Energy\_supply” the calculation of the RES, local electricity, heat/cold energy production from the different categories of the foreseen local renewable electricity plants is performed automatically accompanied by the **estimation of the cost-effectiveness for each category** of the foreseen local renewable electricity plants for their comparative evaluation (columns C-Y, rows 99-113).



**Step 10:** In the sheet “Projected\_energy\_balance\_target” the compilation of the energy balance is performed automatically taking into account the results of examined measures within previous steps regarding the expected energy savings and the RES production for the last year of the examined scenario (i.e. either for 2020 or 2030) using the same format with the sheet “Energy balance baseline” (rows 6 and 25-28).

**Step 11:** In the sheet “Projected\_energy\_balance\_target” the user is able to insert assumptions about the potential increase of the demand in the various end-uses so as to be taken into account during the compilation of the energy balance (column A, rows 5-19) for the last year of the examined scenario (i.e. either for 2020 or 2030).



**Step 12:** The difference of the estimates of the sheets “Energy\_balance\_baseline” and “Projected\_energy\_balance\_target” can lead to the calculation of the projected reduction of the final energy consumption for the last year of the examined scenario (i.e. either for 2020 or 2030).

**Definitions:**

**Implementation:** The degree of implementation of each energy efficiency intervention.

Example:

Energy efficiency intervention: Building envelope insulation installed to public schools

Implementation: 50% of the electricity, which is consumed totally in the buildings of the tertiary sector

**Savings:** The reduction of total final energy consumption for an energy carrier expressed in percentage (%) by the energy efficiency intervention

Example:

Energy efficiency intervention: Building envelope insulation installed to public schools

Savings: 20% of electricity for space heating

**Substitution (Fuel/energy carrier):** Substituting existing energy carrier/fuel for another in order to achieve CO<sub>2</sub> emissions reduction. (i.e. heating oil → natural gas).

It should be noted that for the calculation of the CO<sub>2</sub> emission and the cost-effectiveness ratio is required the completion of the emission factors in the corresponding sheet.