Output factsheet: Software tool N.1

Version 1

Project index number and acronym	CE946 REEF 2W
Lead partner	ENEA – Italian National Agency for New Technologies, Energy and Sustainable Economic Development
Output number and title	O.T1.1 Tools for measurement of EE&RES improvements and urban compatibility assessment for the new plants
Responsible partner (PP name and number)	PP06 Universität für Bodenkultur Wien
Project website	https://www.interreg-central.eu/Content.Node/REEF-2W.html
Delivery date	03.2018

Summary description of the key features of the tool (developed and/or implemented)

The scope of software tool N.1 is to provide a first evaluation on the benefits of applying innovative technological processes at WWTPs concerning waste and wastewater treatment. Together with software tool N.2 it is merged into one Excel. However, key features of software tool N.1 include energy efficiency (EE) evaluations and potential implementation of renewable energy sources (RES). Software tool N.1 evaluates:

- the wastewater treatment process (essential parameters include sludge composition, and other substrates regarding the share of C, H, O, N, Ash, Volatile Matter and Fixed Carbon)
- the energy efficiency (EE) at the WWTP (essential parameters include daily wastewater flow, COD concentration, digestion tower temperature, air temperature, electric energy consumption etc.)
- the potential of applying renewable energy sources (RES) like solar power (including parameters like surface area and electrical/thermal efficiency), hydro power (usable height and turbine efficiency) and energy from biogas at the WWTP (e.g. share that is fed into the grid)

On top of these assessments, economic (including e.g. prices for electricity, natural gas and heat or energy subsidies for RES, biomethane and heat) and ecological evaluations (Life Cycle Analysis with respect to acetic acid, methanol, ferric chloride, sludge use, offgas treatment etc.) are carried out and merged in one single Excel, together with software tool N.2. In the “report” section of the tool a detailed comparison of input and output parameters is presented. Thus, the user can compare different scenarios and derive potential strategic decisions for the utility under consideration.

NUTS region(s) where the tool has been developed and/or implemented (relevant NUTS level)

The tool has been developed and/or implemented in NUTS level 0 including:

- Austria
- Germany
- Italy
- Czech Republic and
- Croatia.

Expected impact and benefits of the tool for the concerned territories and target groups

Using software tool N.1 enables WWTP operators and decision-makers on the municipal level to specifically evaluate the wastewater treatment process. Based on the detailed evaluations the overall energy efficiency (EE) of the utility is evaluated and can consequently be improved. Renewable Energy Sources (RES) like solar power, hydro power or energy from biogas are included in the calculations and allows users to assess benefits of RES applications. On top of that economic evaluations are carried out, on which many decisions of potential users are based upon. The included Life Cycle Assessment offers users a first glimpse on the ecological consequences of their decisions. Concerned territories can benefit from the tool applications, as it shows potentials to provide surplus energy to the settlements close to the WWTP (also see software tool N.2).

Sustainability of the tool and its transferability to other territories and stakeholders

Software tool N.1 can be used for a first step to assess EE and RES potentials on a WWTP. The holistic approach of the tool – due to the Integrated Sustainability Assessment (ISA) and its strategic character – make it easily transferable and applicable in multiple countries. Besides national values (Austria, Croatia, Czech Republic, Germany, Italy) also European values are included and used for the calculations. Main target group of the tool are WWTP operators. However, the goal is that also decision makers on the municipal level can use the tool to initiate strategic planning activities on how to integrate WWTPs into energy concepts etc. Sustainability is fully given, since the ISA approach, on which the tool is based on, integrates multiple levels of sustainability (also see D.T1.5.1 and D.T1.5.4).

Lessons learned from the development/implementation process of the tool and added value of transnational cooperation

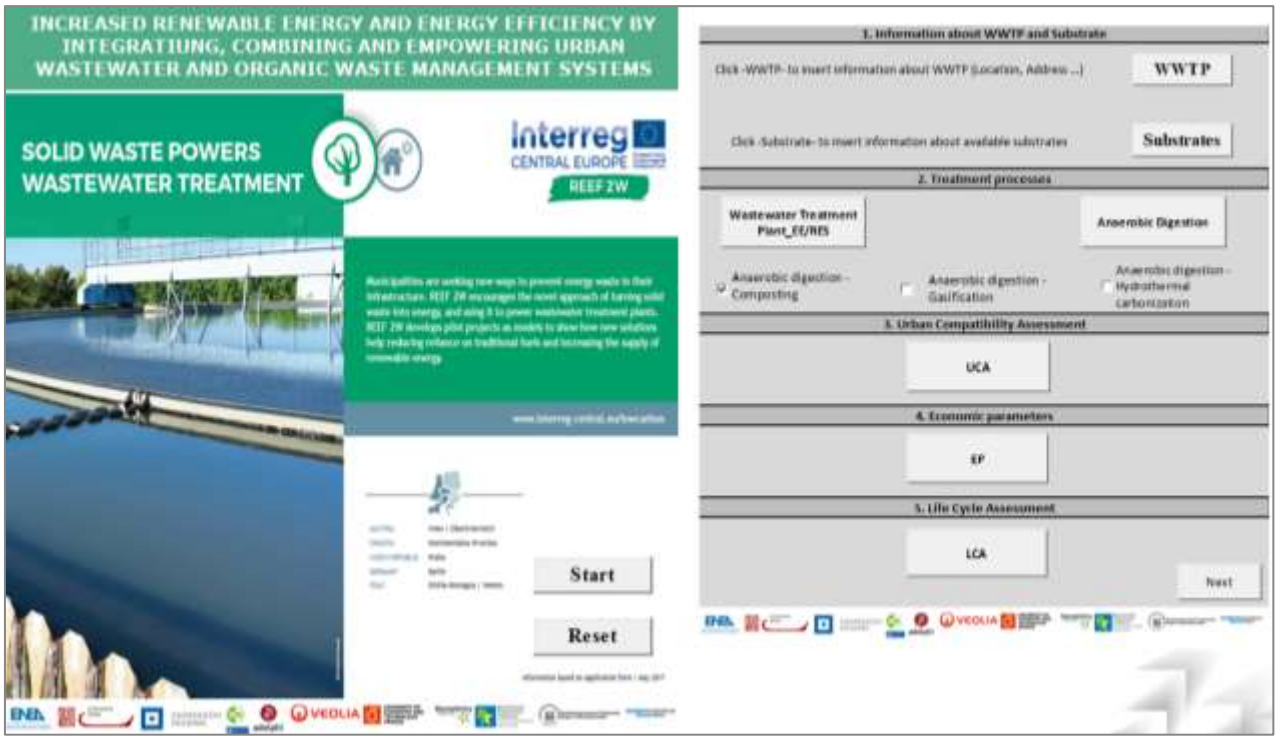
Software tool N.1 is currently still at an early stage of development. However, first feedback was collected and the overall approach of the REEF 2W project, including the Integrated Sustainability Assessment, were generally well received. Concerning the tool development, the single parts of the tool (tool N.1 and tool N.2) have to be connected more consequently in order to gain more realistic results that can accordingly be used for deriving planning decisions in practice. The specially deployed tool developer workshops during the project proved to be essential in order to develop a tool that is applicable across Central Europe and incorporates aspects across different disciplines.

References to relevant deliverables and web-links
If applicable, pictures or images to be provided as annex

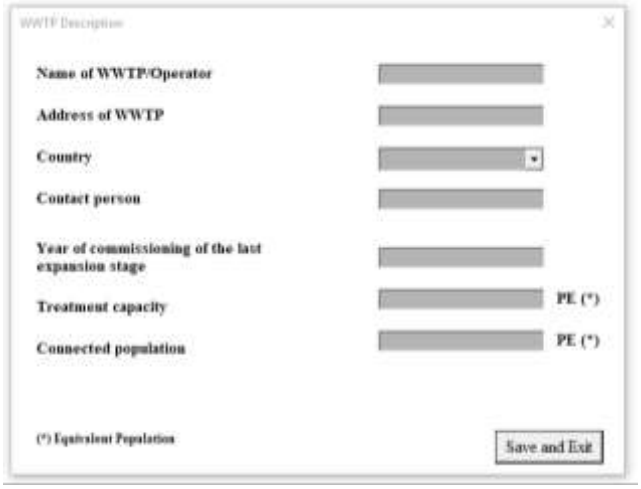
DT.1.4.3

See Annex 1

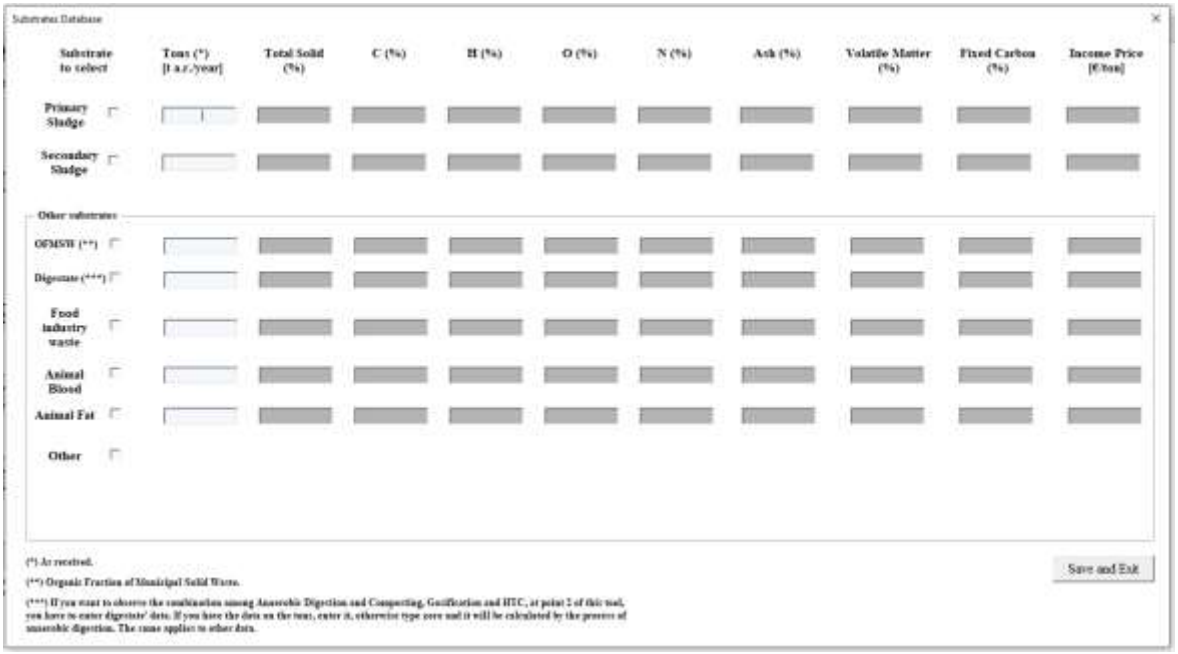
Annex 1: Home Screen and Front Screen of the REEF 2W Excel-Tool



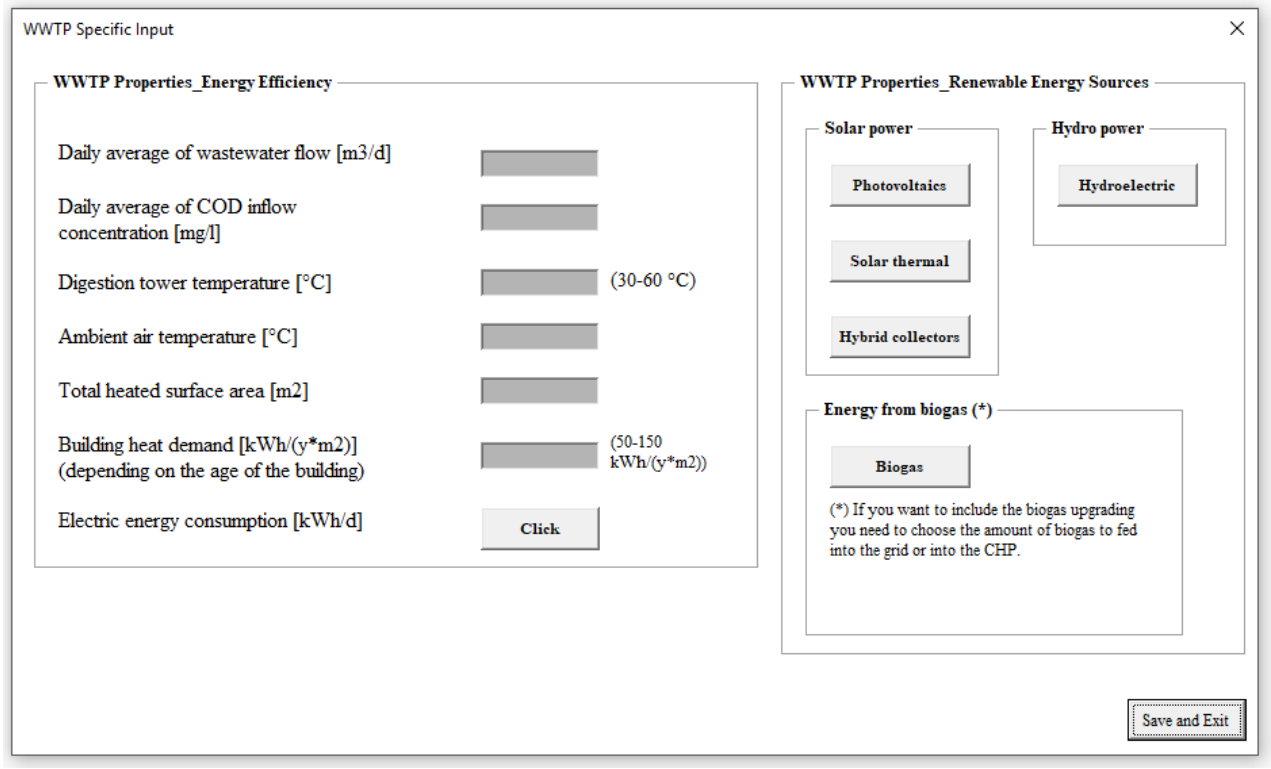
Annex2: Data-input WWTP Description



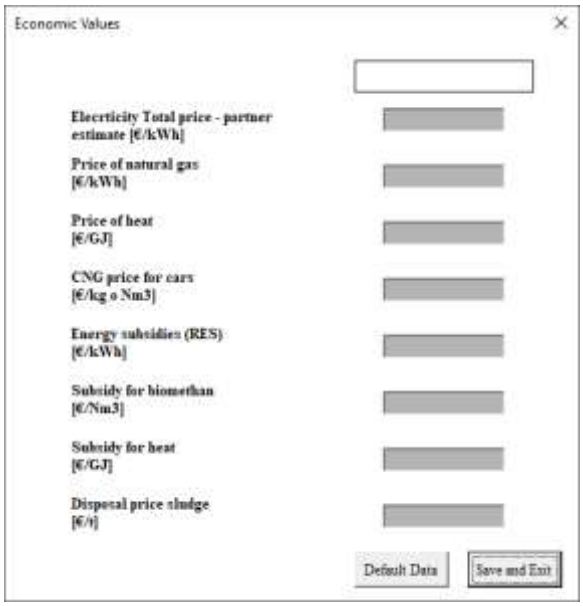
Annex 3: Data-input Substrates



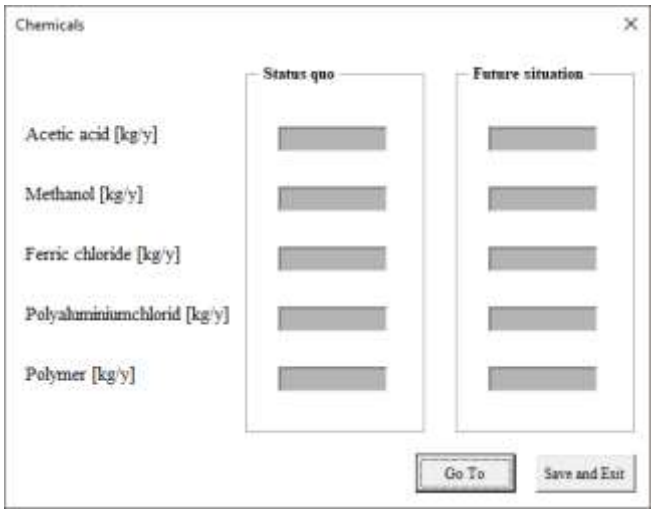
Annex 4: Data-input Energy Efficiency and Renewable Energy Sources



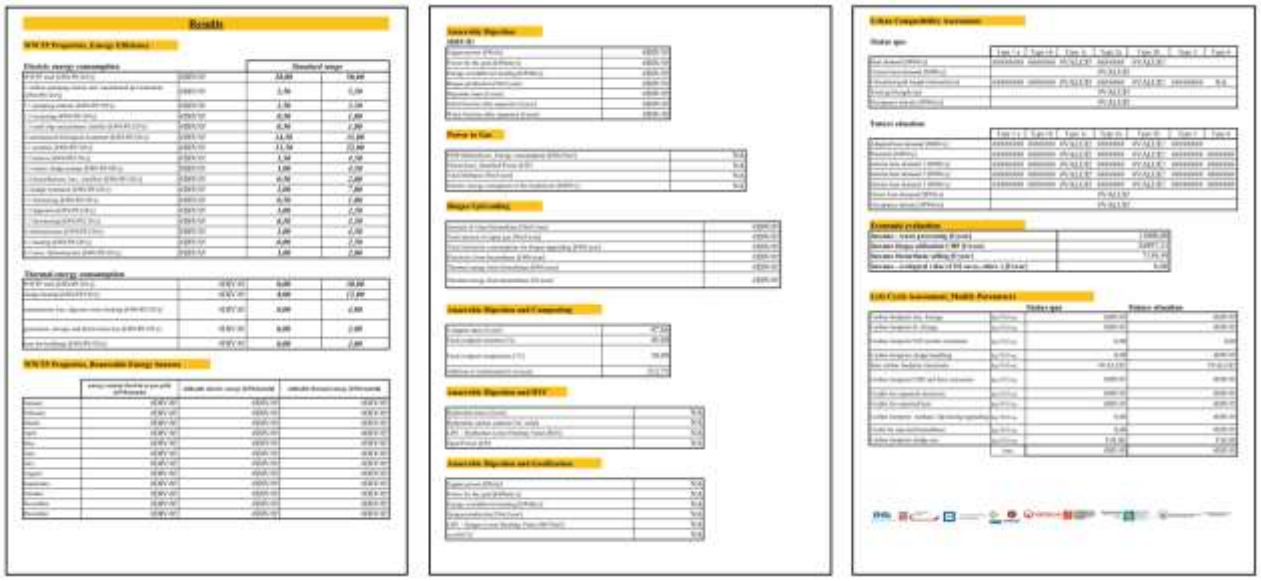
Annex 5: Data-input Economic parameters



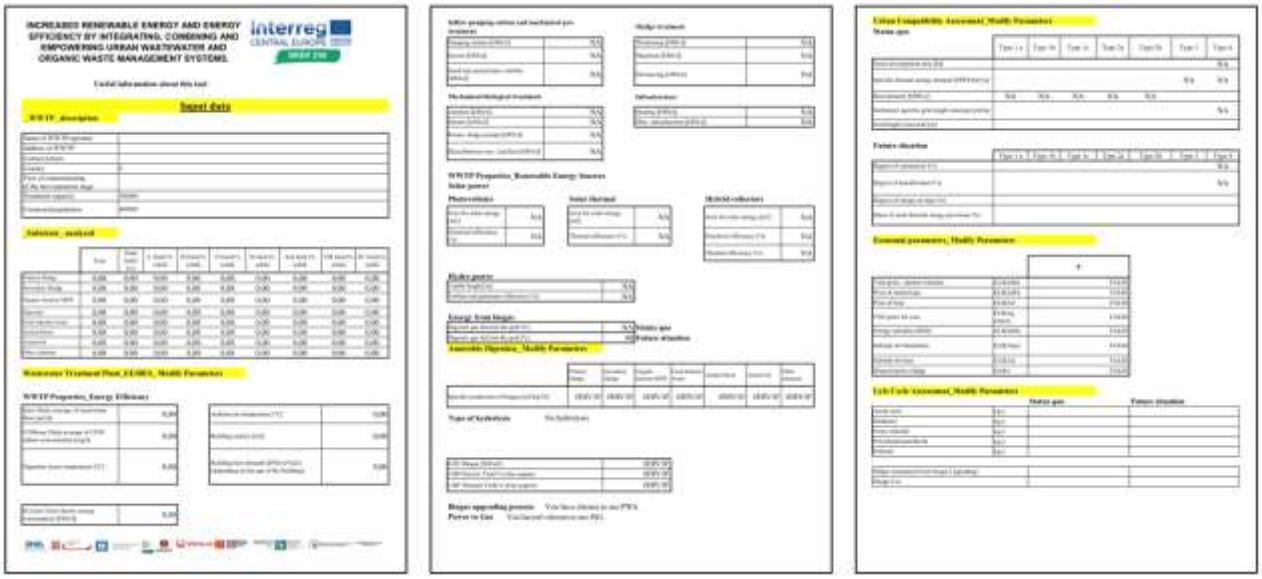
Annex 6: Data input Life Cycle Assessment



Annex 7: Report section of the tool – Input parameters



Annex 8: Report section of the tool – Output parameters



Output factsheet: Software tool N.2

Version 1

Project index number and acronym	CE946 REEF 2W
Lead partner	ENEA – Italian National Agency for New Technologies, Energy and Sustainable Economic Development
Output number and title	O.T1.1 Tools for measurement of EE&RES improvements and urban compatibility assessment for the new plants
Responsible partner (PP name and number)	PP 06 Universität für Bodenkultur Wien
Project website	https://www.interreg-central.eu/Content.Node/REEF-2W.html
Delivery date	03.2018

Summary description of the key features of the tool (developed and/or implemented)

The scope of software tool N.2 is to provide a first evaluation on the benefits of providing surplus energy to the WWTP surroundings. Together with software tool N.1 it is merged into one Excel. Split into different sections software tool N.2 includes evaluations regarding

- the thermal energy demand in the WWTP surroundings by evaluating spatial structures (e.g. village centres, small and medium sized town centres, settlements consisting of multi-store buildings, industrial/commerce areas and agricultural sites)
- the grid lengths of a potential district heating network to supply areas close to the WWTP
- future energy supply scenarios including variations in the number of connected heat consumers, potential spatial densifications and energy savings as well as renewable energy provision in the WWTP surroundings

The potential energy demand in the WWTP surroundings are compared to the potential energy provision of the WWTP. On top of these assessments, economic (including e.g. prices for electricity, natural gas and heat or energy subsidies for RES, biomethane and heat) and ecological evaluations (Life Cycle Analysis with respect to acetic acid, methanol, ferric chloride, sludge use, offgas treatment etc.) are carried out and merged in one single Excel, together with software tool N.1. In the “report” section of the tool a detailed comparison of input and output parameters is carried out. Thus, the user can compare different scenarios and derive potential strategical decisions for the utility under consideration.

NUTS region(s) where the tool has been developed and/or implemented (relevant NUTS level)

The tool has been developed and/or implemented in NUTS level 0 including:

- Austria
- Germany
- Italy
- Czech Republic and
- Croatia.

Expected impact and benefits of the tool for the concerned territories and target groups

Using software tool N.2 enables WWTP operators and decision-makers on the municipal level to derive strategic decisions concerning potential energy consumers in the surroundings of the WWTP. In that sense WWTPs are regional energy cells having the potential to offer surplus energy (e.g. thermal energy, gas and electricity). The potential energy demand in the WWTP surroundings, that is calculated with software tool N.2, are compared to the surplus energy provision of the WWTP (see software tool N.1). The tool offers an integrated assessment, additionally including scenario calculations. Users gain information about the thermal energy demand, potential grid lengths (e.g. for district heating networks) and can also apply scenario calculations. Especially the integrated approach in combination with software tool N.1 offers multiple benefits for target groups and concerned territories in Central Europe. On top of that economic evaluations are carried out, on which many decisions of potential users are based upon. The included Life Cycle Assessment offers users a first glimpse on the ecological consequences of their decisions.

Sustainability of the tool and its transferability to other territories and stakeholders

Software tool N.2 can be used for a first step to gain information about the spatial context of the territory in question and for further spatial and energy planning (also referring to integrated spatial and energy planning). The holistic approach of the tool – due to the Integrated Sustainability Assessment (ISA) and its strategic character – make it easily transferable and applicable in multiple countries. Besides national values (Austria, Croatia, Czech Republic, Germany, Italy) also European values are included and used for the calculations. Main target group of the tool are WWTP operators. However, the goal is that also decision makers on the municipal level can use the tool to initiate strategic planning activities on how to integrate WWTPs into energy concepts etc. Sustainability is fully given, since the ISA approach, on which the tool is based on, integrates multiple levels of sustainability (also see D.T1.5.1 and D.T1.5.4).

Lessons learned from the development/implementation process of the tool and added value of transnational cooperation

Software tool N.2 is currently still at an early stage of development. However, first feedback was collected and the overall approach of the REEF 2W project, including the Integrated Sustainability Assessment, were generally well received. Concerning the tool development, the single parts of the tool (tool N.1 and tool N.2) have to be connected more consequently in order to gain more realistic results that can accordingly be used for deriving planning decisions in practice. The specially deployed tool developer workshops during the project proved to be essential in order to develop a tool that is applicable across Central Europe and incorporates aspects across different disciplines.

References to relevant deliverables and web-links
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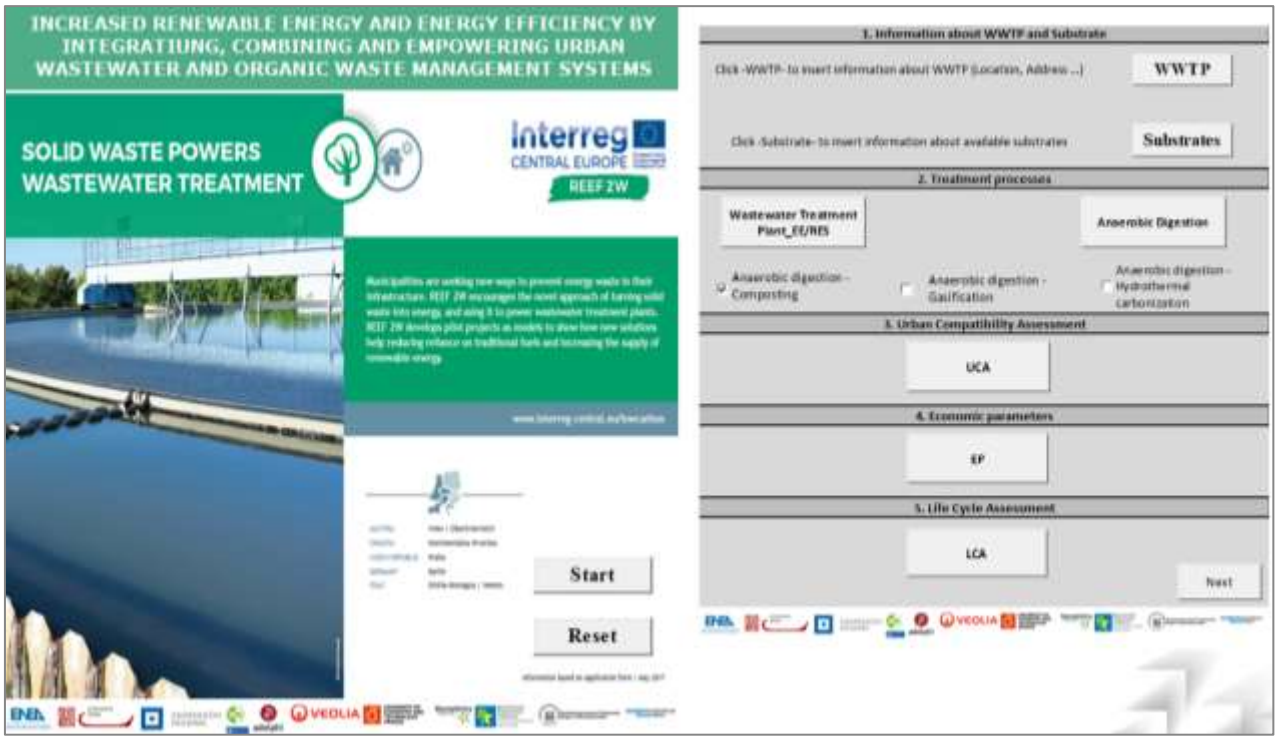
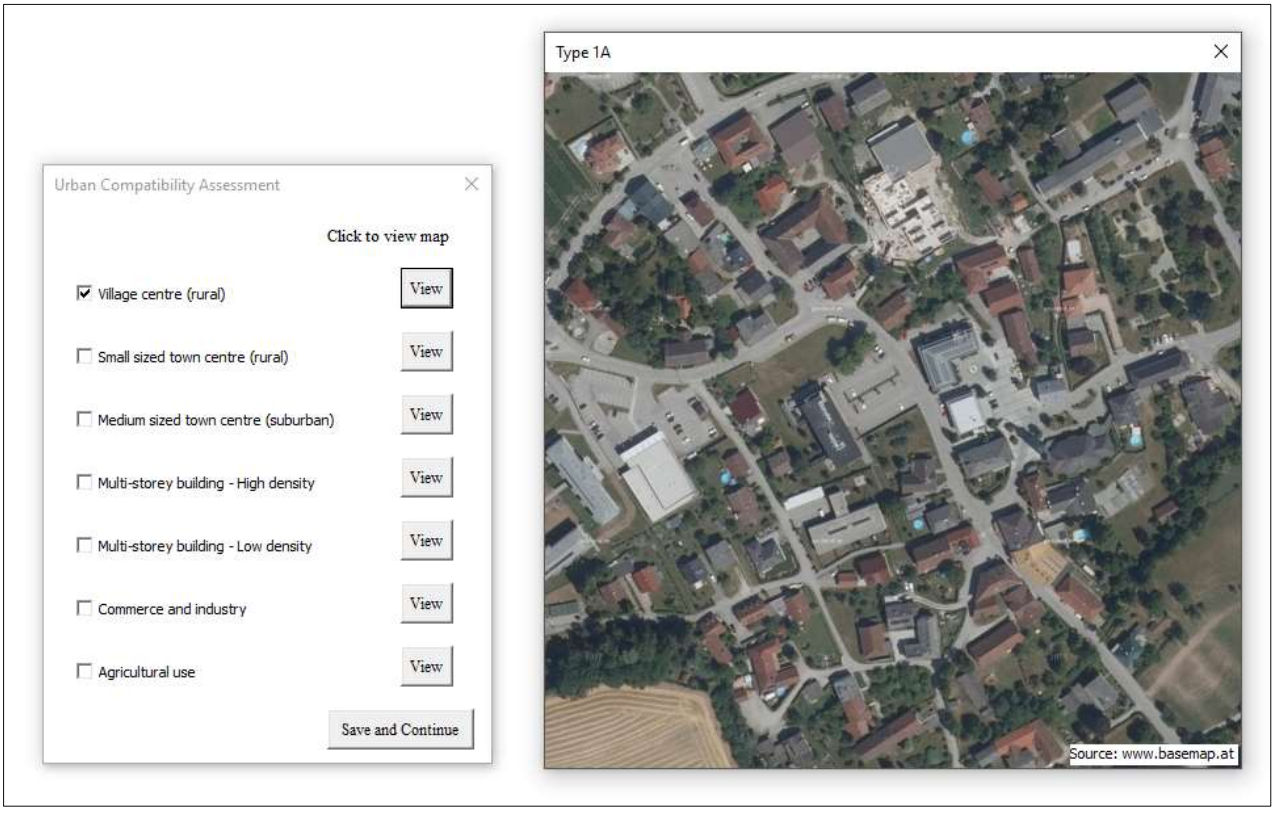
DT.1.4.3

See Annex 1

Annex 1: Home Screen and Front Screen of the REEF 2W Excel-Tool

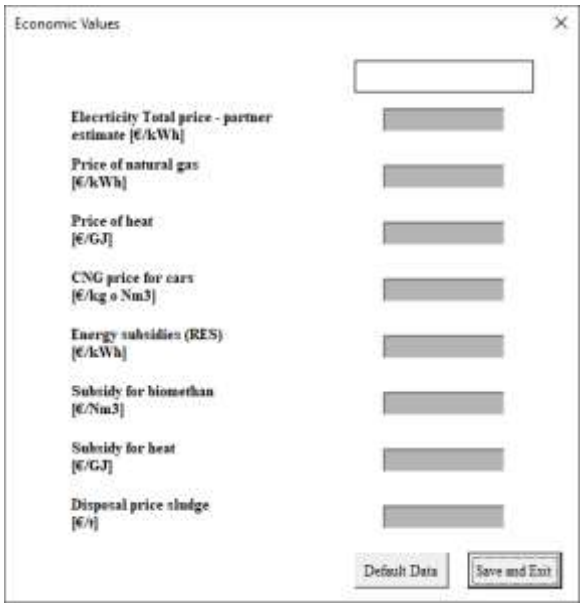


Annex2: : Overview settlement types

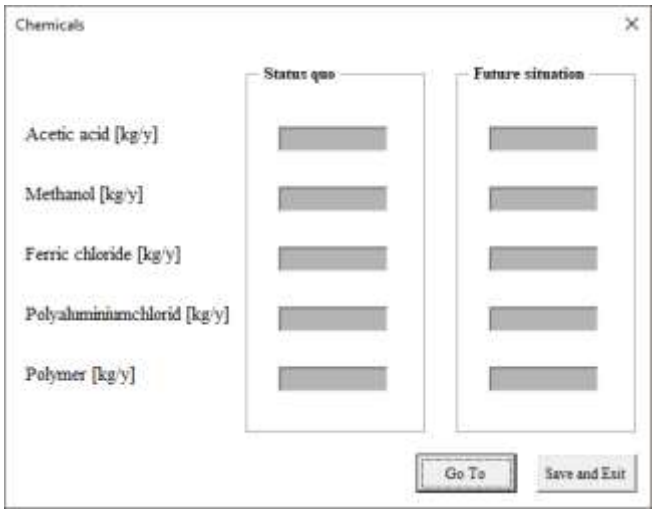


Annex 3: Data-input Urban compatibility Assessment

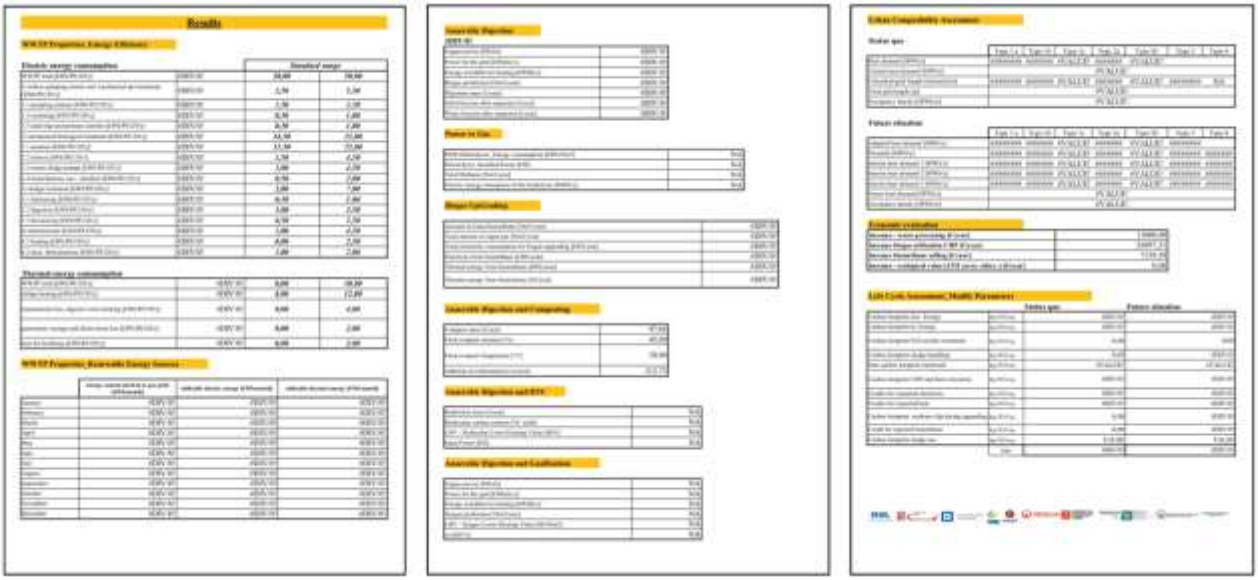
Annex 5: Data-input Economic parameters



Annex 6: Data input Life Cycle Assessment



Annex 7: Report section of the tool - Input parameters



Annex 8: Report section of the tool – Output parameters