ENERWATER

Standard method and online tool for assessing and improving the energy efficiency of waste water treatment plants

D3.6: Online method v2

Acknowledgements & Disclaimer:
The ENERWATER project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 649819. Although the project's information is considered accurate, no responsibility will be accepted for any subsequent use thereof. The EC accepts no responsibility or liability whatsoever with regard to the presented material, and the work hereby presented does not anticipate the Commission's future policy in this area.

Due date of deliverable: 31st May 2018
Actual submission date: 31st July 2018
Organisation name of lead contractor for this deliverable: WSC

Version 1

Dissemination Level

PU	Public	X
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the consortium (including the Commission Services)	

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1 Scope of the document

The objective of this document is to provide a basic user´s guide of the ENERWATER ONLINE TOOL, so it contains instructions on how to:

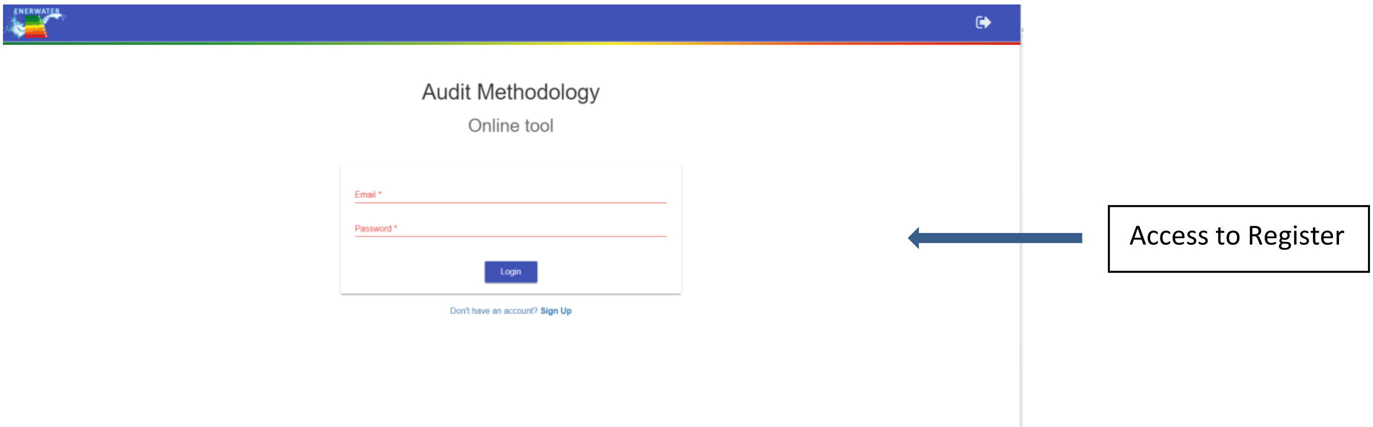
- Register to the ENERWATER Web Application
- Login to the ENERWATER Web Application
- Carry out an energy analysis using the Rapid Audit and Decision Support ENERWATER Methodology[1]
- Obtain a final report

2 Online Application User's Guide

This brief guide is provided to help applicants understand the steps of the online methodology tool, so you can use it on any computer with web access for the energy efficiency analysis of a wastewater treatment plant.
Start on the website of the online tool: https://enerwater-h2020.wtelecom.es/

2.1 Register to the ENERWATER Web Application

The first time you enter, a new account needs to be created to access the tool.

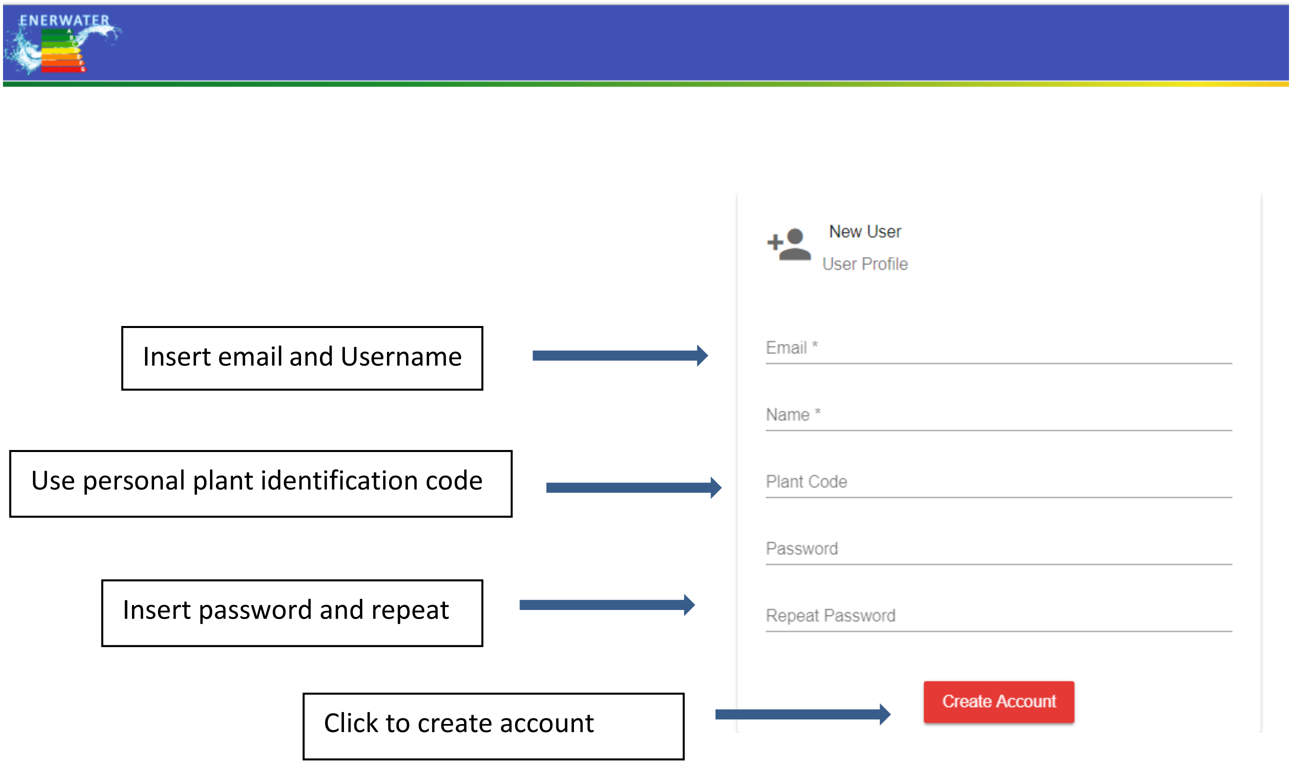


Create Your Account

To create an account, enter any Username and Password that you will remember but are not easy for others to guess. We recommend you write your Username and Password down and keep it in a safe place.

The email address is also used in case you forget your login information.

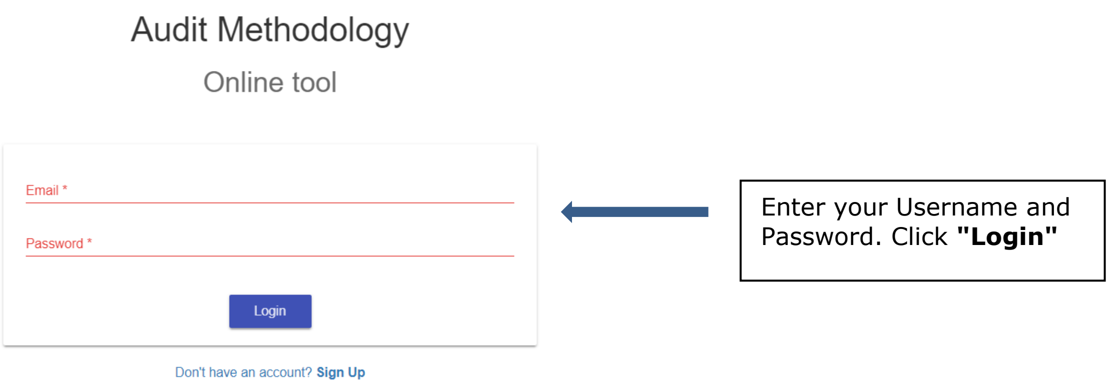
[1] The user is referred to the final of version of D3.4 (www.enerwater.eu/download-documentation/) for a detailed description of the ENERWATER Methodology



2.2 Login to the ENERWATER Web Application

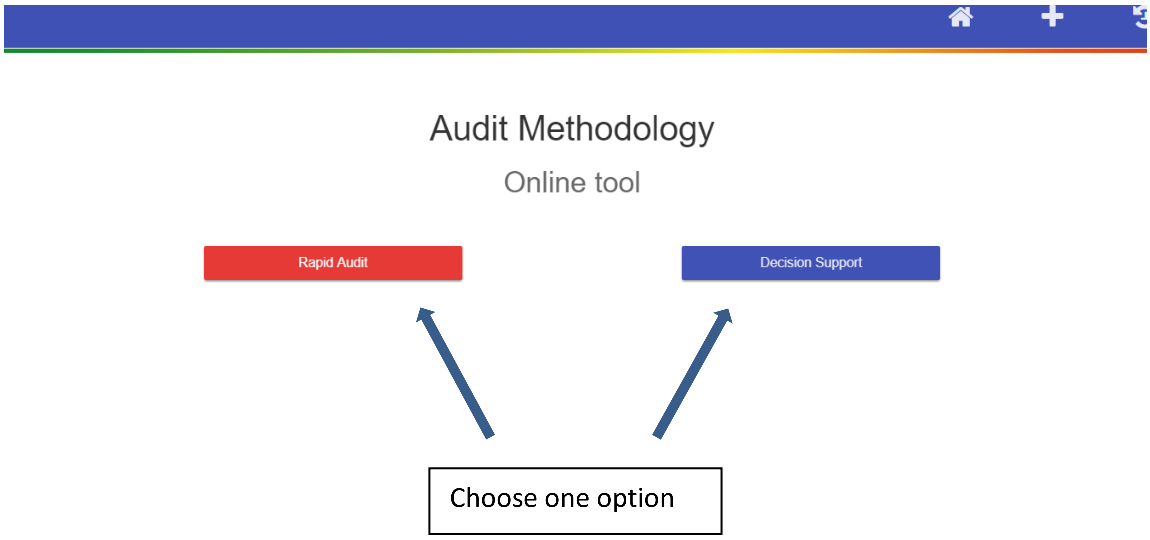
The Login Screen

You can now login and create your case study.



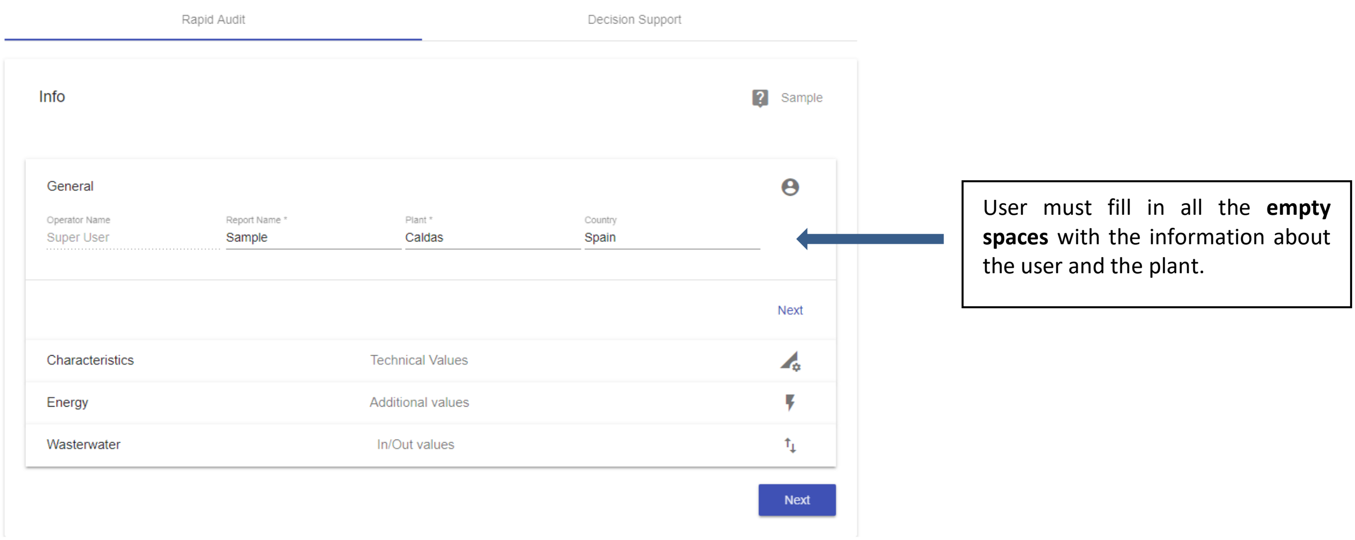
2.3 Carry out an energy analysis using the Rapid Audit and Decision Support ENERWATER Methodology

After login, the user will have to choose between the Rapid Audit(RA) and the Decision Support(DS) options of the ENERWATER Methodology.

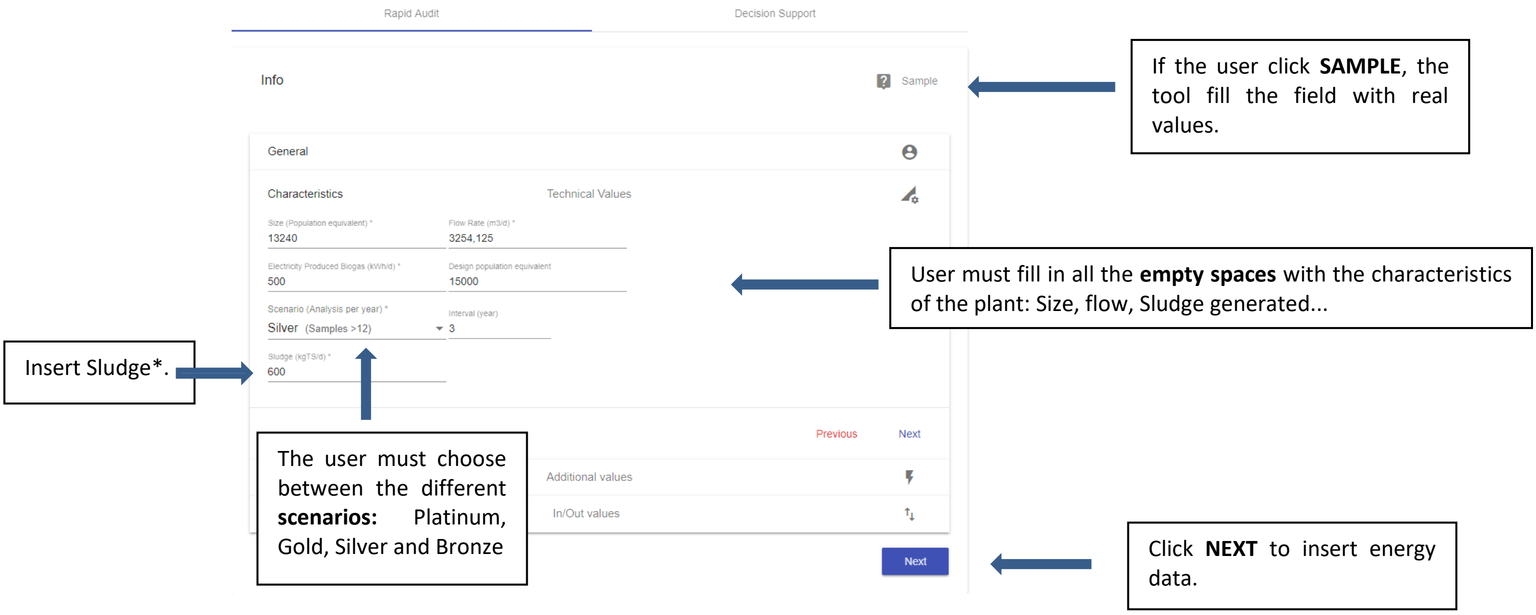


2.3.1 Rapid Audit

2.3.1.1 1st Step: General Information



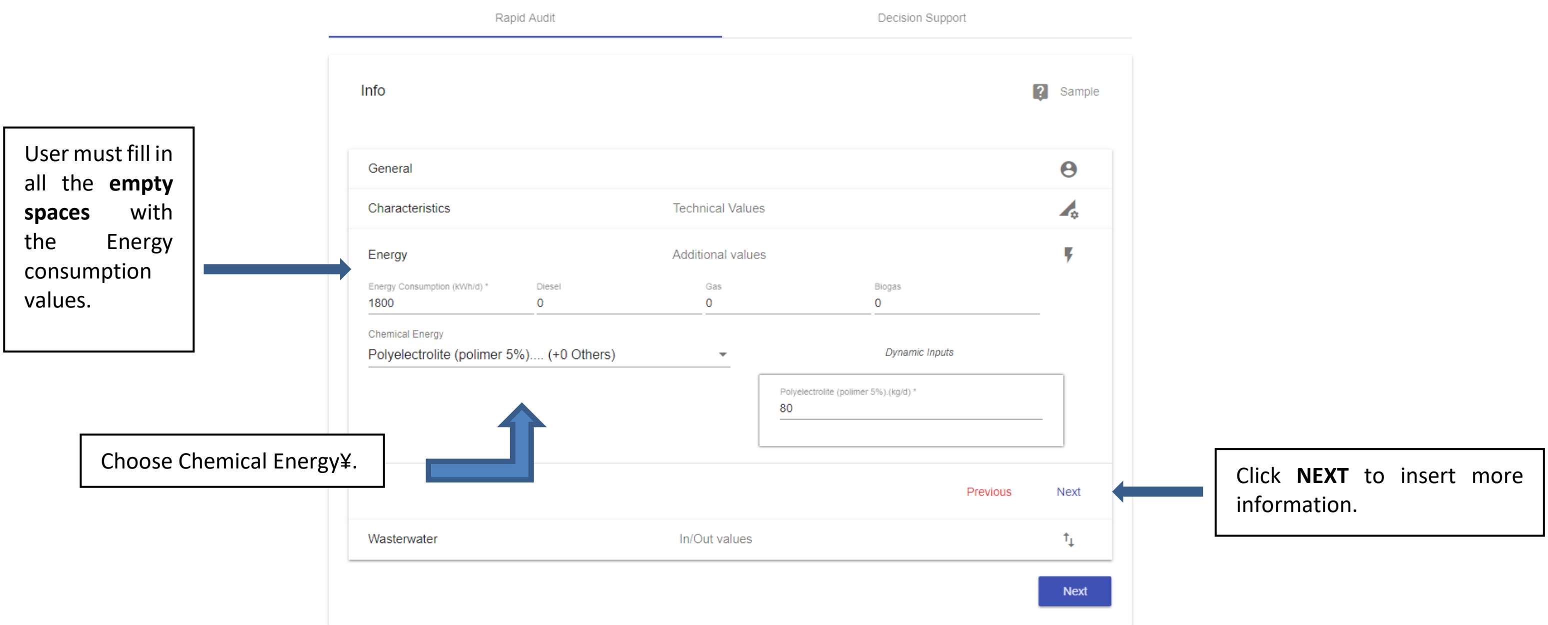
2.3.1.2 2nd Step: Characteristics



In case of absence of sludge treatment/dewatering the user should leave blank the box sludge*.

For tutorial purposes, one example is included and the related information is available for the user by clicking on SAMPLE.

2.3.1.3 3rd Step: Energy Consumption



¥Chemical energy consumption

The use of chemicals and respective amounts can impact on the pollutants removal efficiency of WWTPs and replace, to a certain extent, the use of other sources of energy. In order to account for the use of chemicals on the ENERWATER methodology, we use the Cumulative Energy Demand (CED) method developed by Frischknecht et al. (2007).2 The CED is used to indicate the equivalent of primary energy consumption in the chain of a product or the energy consumed in a certain system over its entire lifecycle, from the extraction of raw materials to the end of life of the product or system. Examples of CED conversion factors are reported in D3.4 ENERWATER methodology3.

To take into account for the use of chemicals in the WWTP, it is required to insert the amount (in kg) of the chemical used in the plant and the tool will convert this amount to embedded energy.

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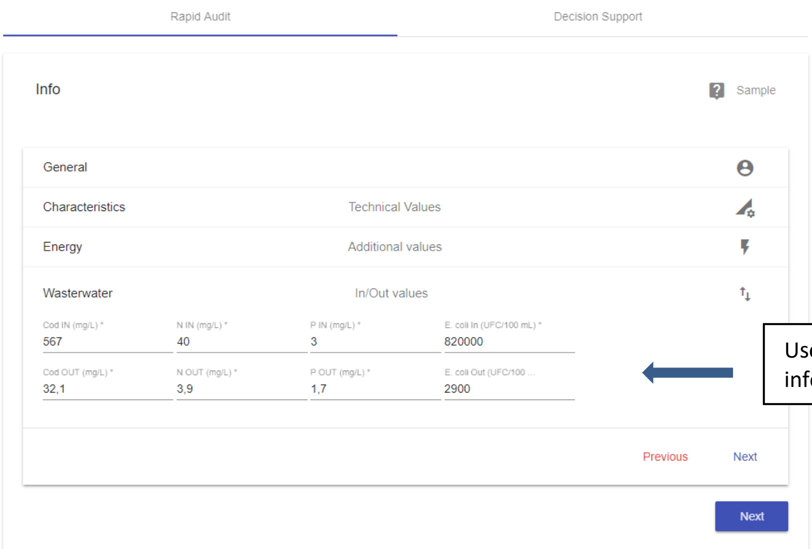
2.3.1.4 Wastewater



User must fill in all the **empty spaces** with necessary information.

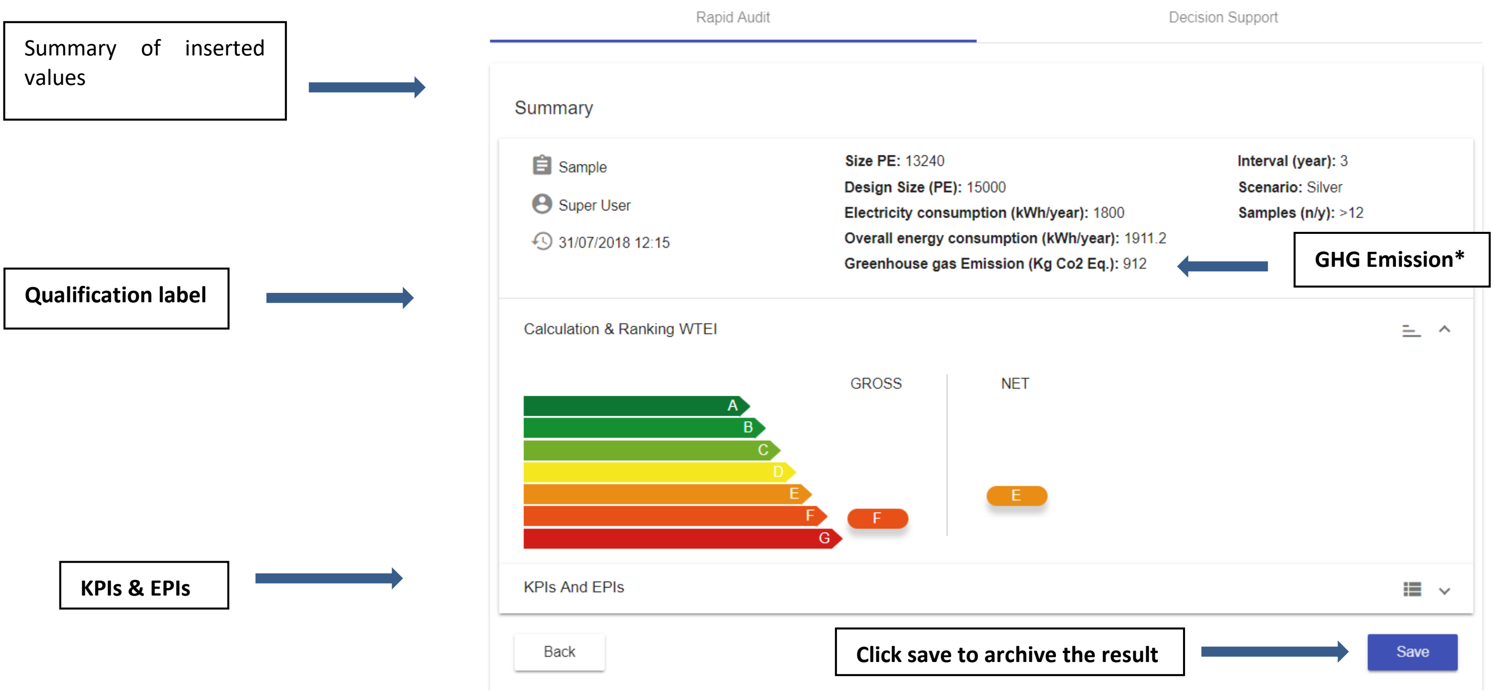
To obtain the result of the methodology click **NEXT**.

NOTE: In case of absence of disinfection, the user should leave blank the box "E. coli In" and "E. coli Out".

[2] Frischknecht, R., et al. (2007) Implementation of Life Cycle Impact Assessment Methods: Data v2.0. ecoinvent report No. 3, Swiss centre for Life Cycle Inventories, Dübendorf, Switzerland.

[3] http://www.enerwater.eu/download-documentation/

2.3.1.5 Result of the ENERWATER Rapid Audit Methodology



***Greenhouse gas (GHG) calculation**

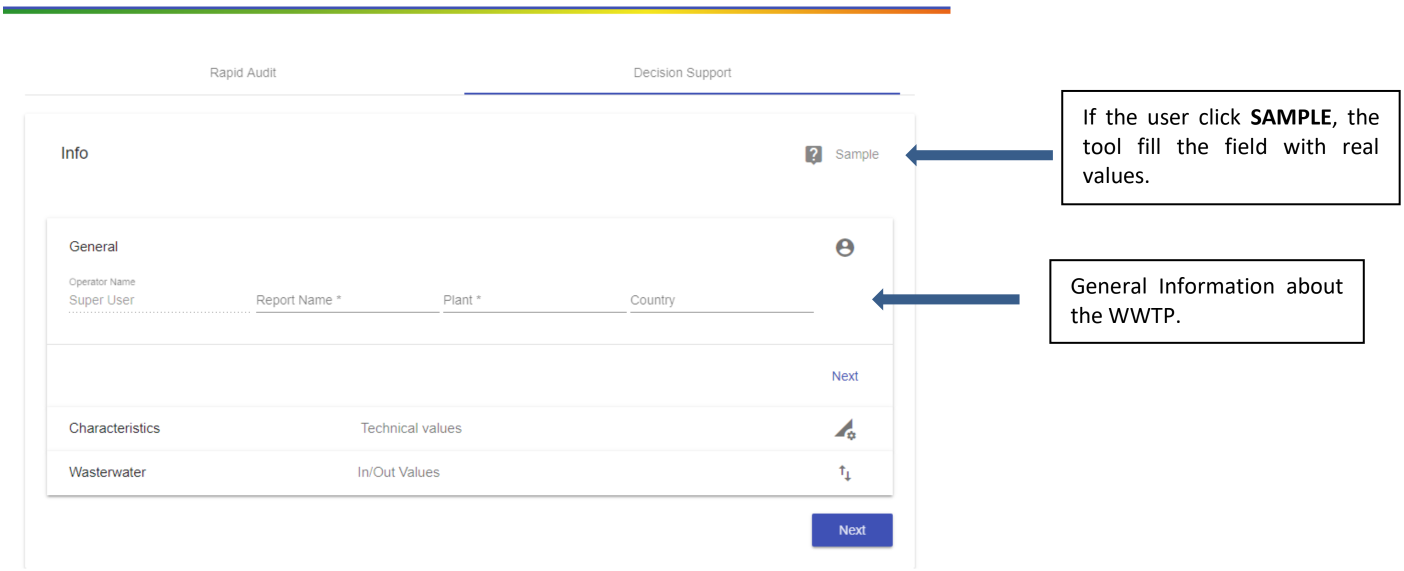
Greenhouse gas (GHG) conversion factors are used to calculate the amount of greenhouse gas emissions caused by energy use. They are measured in units of kg carbon dioxide equivalent. In order to convert 'energy consumed in kWh' to 'kg of carbon dioxide equivalent', the energy use is multiplied by a conversion factor that is country-specific depending on the energy mix. European CO2 conversion factors of electricity consumed at low volt can be found in Moro and Lonza (2017)4.

To convert energy to kgCO2e emissions, select the country where the plant is located and the tool will convert this amount to kgCO2e emissions. If the country is not present in the list the user has the possibility to manually insert the conversion factor.

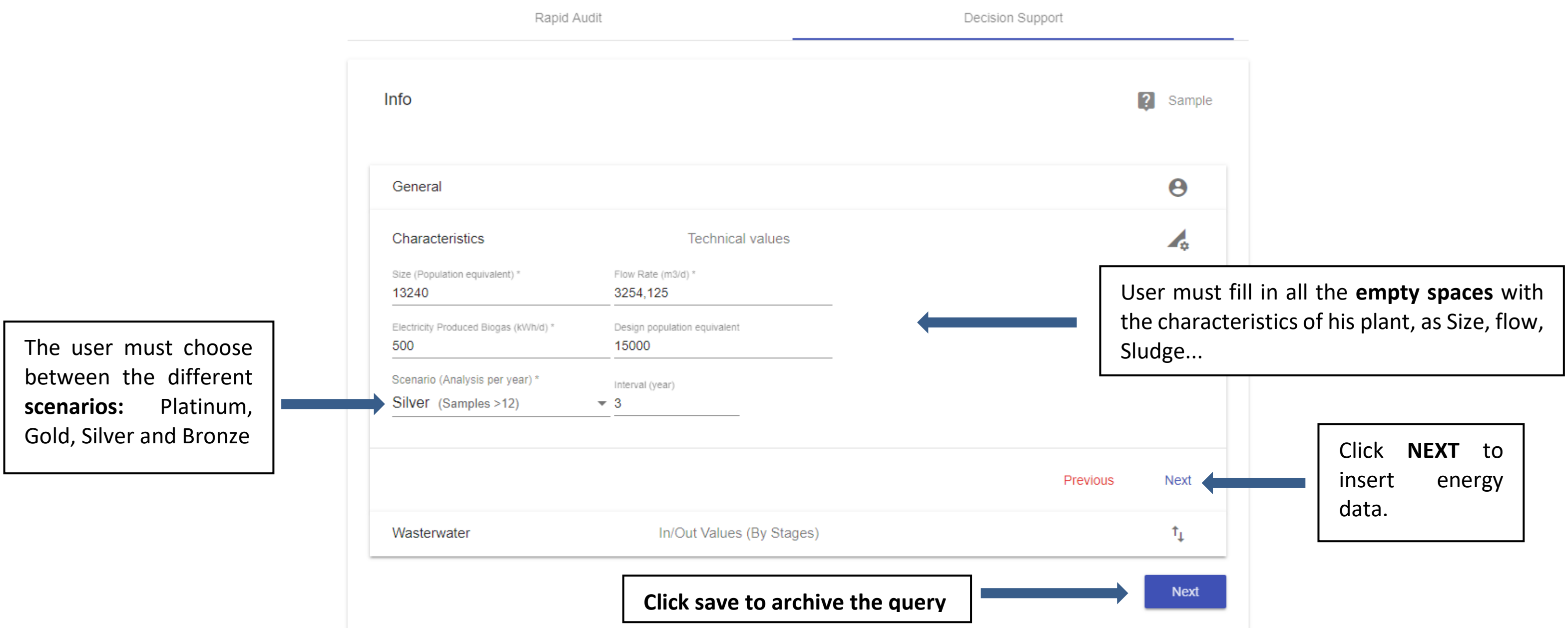
[4] Moro, A., & Lonza, L. (2017). Electricity carbon intensity in European Member States: Impacts on GHG emissions of electric vehicles. Transportation Research Part D: Transport and Environment.

2.3.2 Decision support

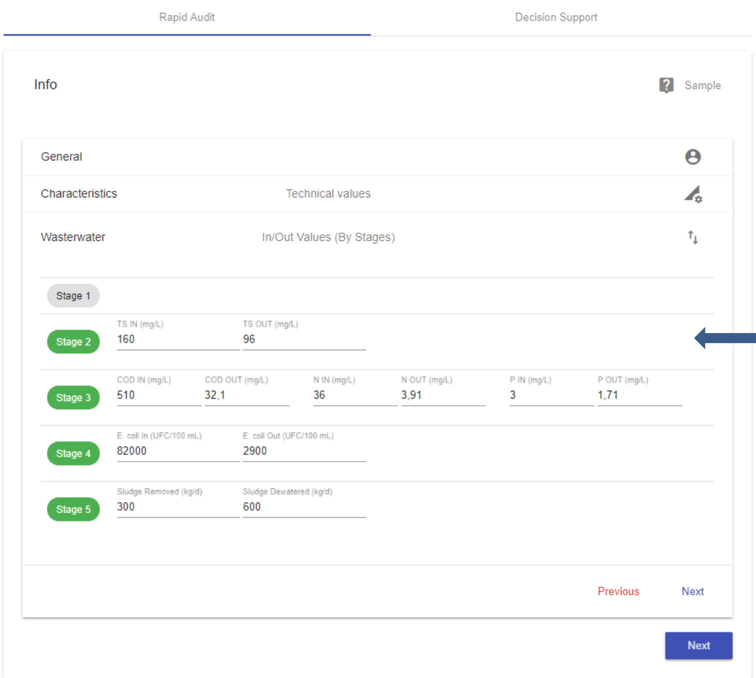
2.3.2.1 1st Step: General Information



2.3.2.2 2nd Step: Characteristics



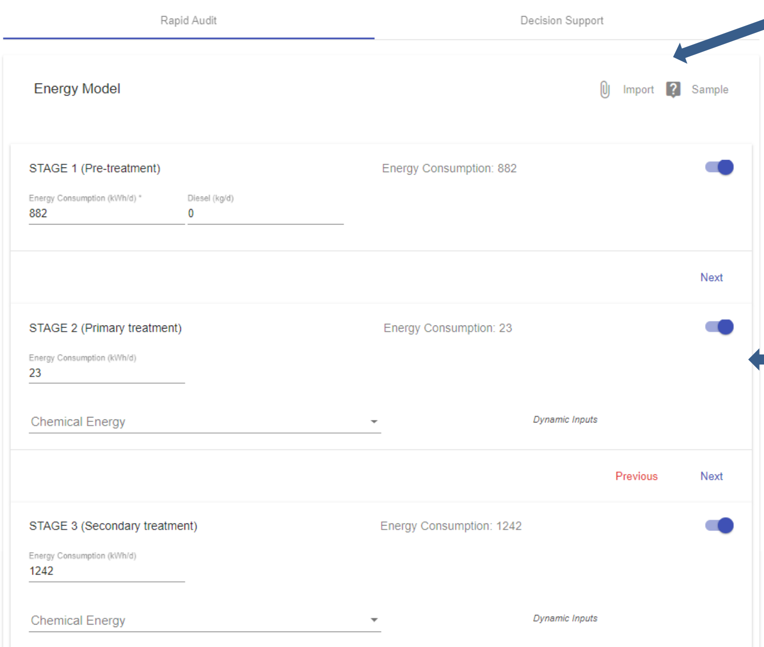
2.3.2.3 Wastewater



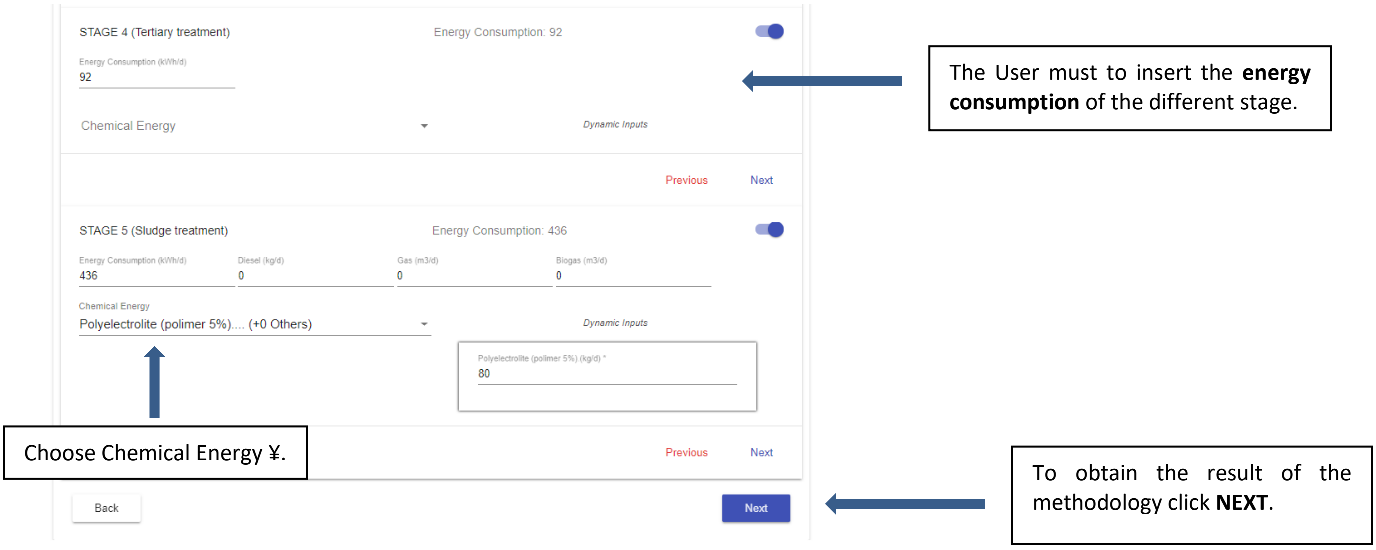
User must fill in all the **empty spaces** with the characteristics of his plant, as the example.

2.3.2.4 3rd Step: Energy Consumption

The button **"import"** only is available for the Enerwater´s users. This kind of user could import the energy report to the private platform*.



The User must to insert the **energy consumption** of the different stage.



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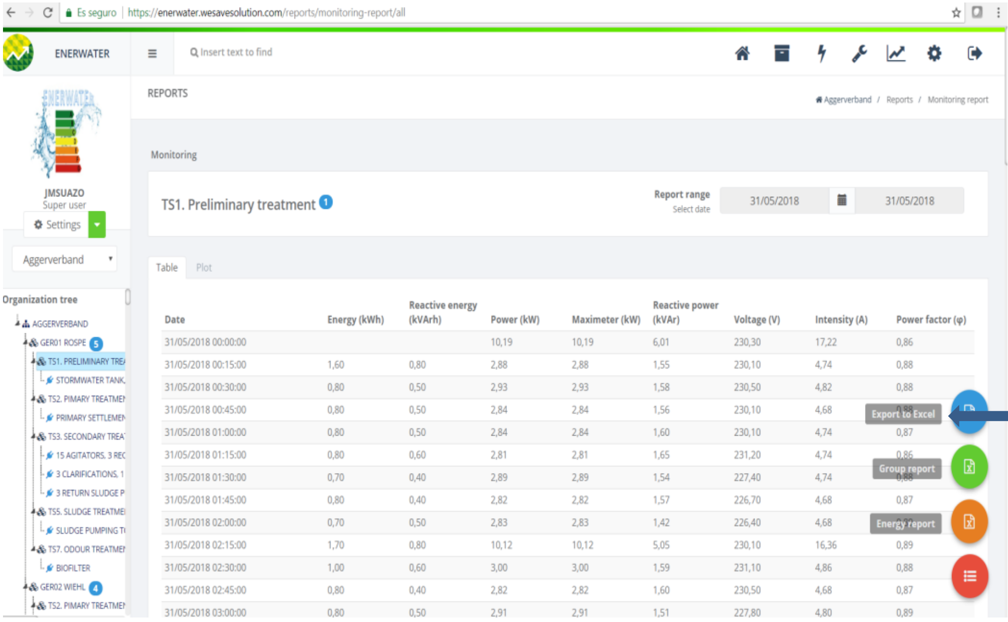
The members of Enerwater platform* can export their energy consumption total data into an excel file (press bottom “insert”) and we give them the advantage to read this file through the app and we print the result out at this module once the user imports the file.

[5] Frischknecht, R., et al. (2007) Implementation of Life Cycle Impact Assessment Methods: Data v2.0. ecoinvent report No. 3, Swiss centre for Life Cycle Inventories, Dübendorf, Switzerland.
[6] http://www.enerwater.eu/download-documentation/



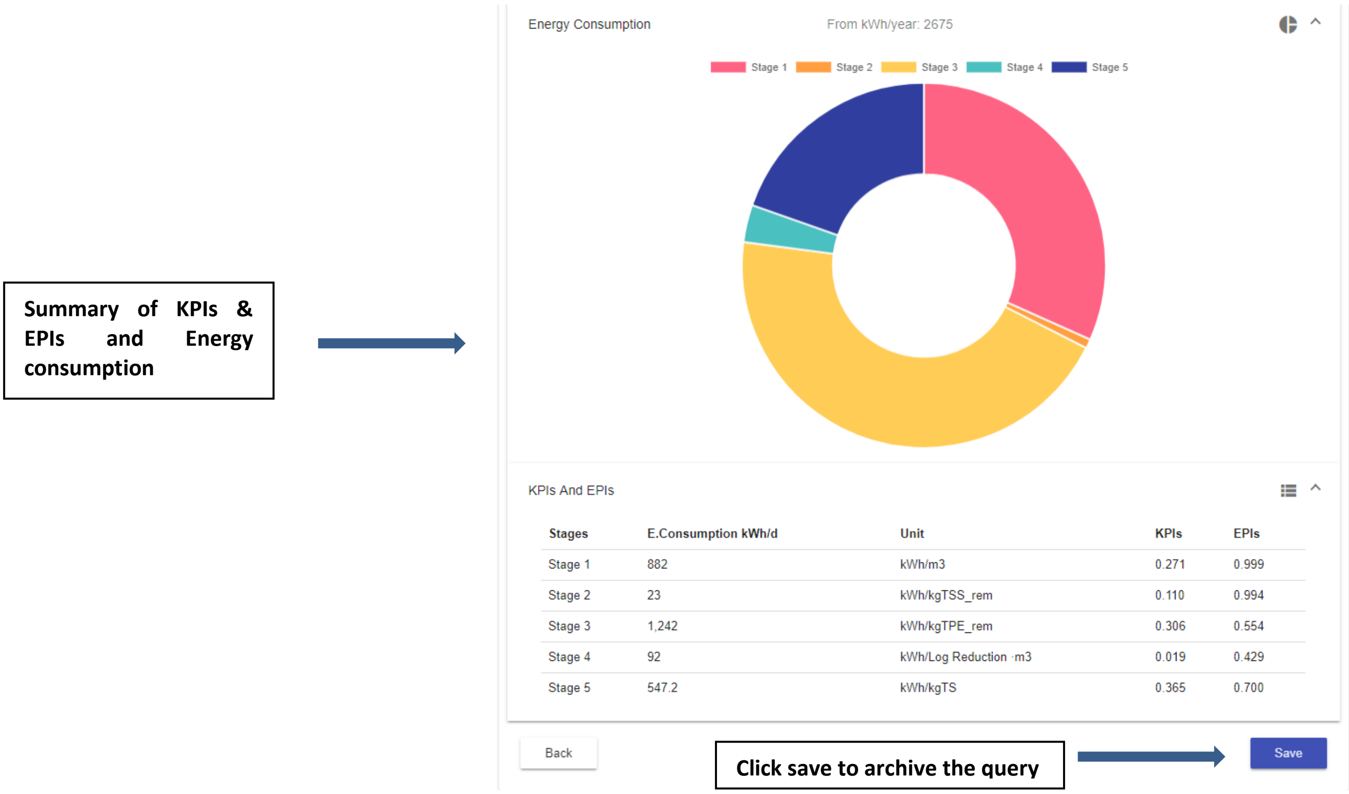
Export to Excel file* with the data consumption from the Enerwater platform.

2.3.2.5 Result of the Methodology Decision Support

Summary of inserted values

GHG Emissions*

Qualification label per Stages



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[7] Moro, A., & Lonza, L. (2017). Electricity carbon intensity in European Member States: Impacts on GHG emissions of electric vehicles. Transportation Research Part D: Transport and Environment.

3 Frequently asked questions

1. **Will the data about my WWTP be collected for future use by the ENERWATER consortium?**

No, confidentiality is guarantee and the data you include in the tool will be only available for you. If you want to share your data for increasing the database that ENERWATER has created and keeps updating, please contact the ENERWATER coordination for establishing the procedure for data transfer.

2. **What is the difference between Rapid Audit and Decision Support ENERWATER Methodology?**

The ENERWATER methodology is divided in 2 sub-methods that should be selected and followed according to following goals and data availability:

Rapid Audit - this is aimed at a rapid estimation of the WTEI of a particular WWTP using existing information. This method required historical data on energy consumption as well as the wastewater influent and effluent. The aim of the ENERWATER Rapid Audit methodology is to provide an WWTP energy benchmark, a rapid tool to identify energy efficiencies and inefficiencies so further actions can be planed, as well as evaluate the impact of WWTP retrofitting.

Decision Support - this is aimed at establishing the WTEI of a particular WWTP and providing information that can be used as decision support of an energy efficiency diagnosis. It requires online energy data obtained over extended periods of time as well as intensive wastewater sampling campaigns to establish KPIs for each individual treatment stage. This methodology can also be used as tool to identify energy efficiencies and inefficiencies so further actions can be planed and the impact can be measured and verified on-line. The ENERWATER Decision Support methodology can also be used as training tool as well as help water utilities to clearly communicate to operators, engineers and the general public how changes in operation and behaviour that can lead to energy efficiency and reduce energy consumption.

For further details on the two approaches, please refer to Deliverable 3.4.

3. **Can I use the Decision Support Methodology if I do not have infra-sectional influent/effluent data?**

Yes, it is possible to use the Decision Support Methodology if you haven't influent/effluent infra-sectional data by selecting the Bronze scenario. Using the Bronze scenario you need to include only influent/effluent data at plant level. The ENERWATER Online tool will automatically estimate pollutants removal in each stage.

4. **Which browsers are compatible with the ENERWATER Online tool?**

The ENERWATER Online tool is compatible with Chrome, Safari, Mozilla, Opera.