

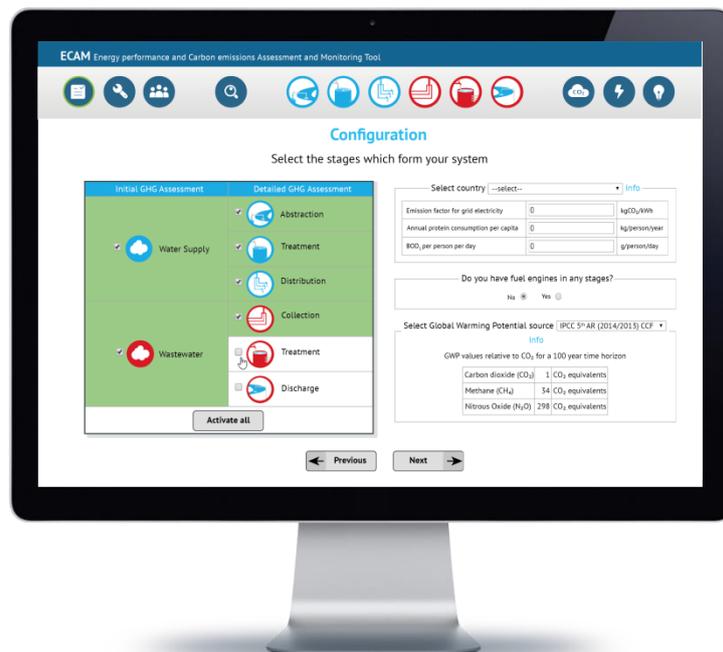


# ECAM 2.0

## Energy Performance and Carbon Emissions Assessment and Monitoring Tool

# FAQs

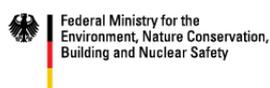
## Frequently Asked Questions



Version: August 2017

The Water and Wastewater Companies for Climate Mitigation (WaCCliM) project, is a joint initiative between the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the International Water Association (IWA). This project is part of the International Climate Initiative (IKI). The German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) supports this initiative on the basis of a decision adopted by the German Bundestag.

On behalf of:



of the Federal Republic of Germany

Implemented by:



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## General

### What is required to use ECAM?

Only a web browser with an internet connection is needed. ECAM is optimized for Google Chrome, but most browsers based on Chromium work well. Offline use can also be set up.

### Do I need to register or pay in order to use ECAM?

ECAM is for free and can be accessed by anybody without the need for registration.

### What happens with my data?

The input and output data are only stored temporarily in your local browser cache. You can also save the data in a .json file on your hard disk.

### Where can I get more information?

On the ECAM help-page, detailed documentation can be found, including a methodology guide.

### What is new in ECAM V2?

The improved version of the ECAM tool V2 includes two major additional components that were not included in version 1 (ECAM V1) namely the assessment of 1/water efficiency and 2/sludge management. Furthermore, there are improvements made on the content, user interface, and graphics based on users' feedback.

### Who can use this tool?

ECAM is meant for water utility managers, technicians, consultants, climate change experts, academics and policy makers working on drinking water and/or wastewater, climate change and environment. The tool may also be used by anyone interested in assessing energy performance and greenhouse gas (GHG) emissions in the urban water cycle, and would like to identify areas of improvement.

### How does ECAM relate to other available software/tools?

ECAM purposefully targets utilities of Low and Middle Income Countries. The tool aims at requesting minimal data which utilities typically will have available, for determining performance indicators. Depending on the specific areas of interest and data availability, users can tailor their assessment further by providing additional detailed information step-by-step.

It is advised to use ECAM in conjunction with other available tools on aspects that may not be covered in the tool. In fact, this is highly encouraged because it makes ECAM and other tools more powerful - you can do more with both. One example is linking water distribution system models to ECAM by using the models to calculate energy consumption for various scenarios and using the calculated energy consumption [kWh] as an input for ECAM, providing insights on the impact of the entire system.

### [How can I get support on running ECAM?](#)

On the ECAM help-page, detailed documentation on the tool can be found. The ‘user manual’ helps users get started, by providing information on the main characteristics and different functionalities of the tool. The ECAM Methodology guide sheds light on the background of the tool. It describes the main assumptions, equations and reference values. It also provides suggestions on how to use the tool for the development of scenarios for specific system lay-outs. In the annex, an overview of all inputs and outputs is given which can be used to look up specific details of variables and performance indicators in the tool.

Users that may not find an answer to their question may also connect to the ECAM helpdesk, please contact [info@wacclim.org](mailto:info@wacclim.org).

### [Where do I find information on specific input variables and outputs?](#)

Detailed information on specific variables and performance indicators can be found by clicking on the ‘code’ or description of the respective variable. A new window will open which provides further information on related equations, constants and benchmark values. Users may also consult the “ECAM Methodology” document and annex for specific information.

### [Where can I find more information on WaCCliM project?](#)

ECAM has been developed as part of the Water and Wastewater Companies for Climate Mitigation (WaCCliM) project. WaCCliM guides water and wastewater utilities on a journey to energy and carbon neutrality. Please visit [www.wacclim.org](http://www.wacclim.org) for more information on the project.

## What is the WaCCliM Expert Pool and how could I get involved?

ECAM has been developed with the support of the WaCCliM Expert pool. The Expert Pool is a group of experienced professionals in the field of water management, energy, and climate change

adaptation and mitigation. Members act as a knowledge base for WaCCliM project, providing feedback and suggestions on its development and advancement e.g. on tools like ECAM. If you are interested in being considered for the Expert Pool, please get in touch with the WaCCliM team at this email address [info@wacclim.org](mailto:info@wacclim.org).

## Population

### What is the difference between resident population and serviced population?

#### Water supply

**Resident population:** number of permanent residents within the water utility area of service

**Serviced population:** serviced population is referred to the number of inhabitants, within the area of service managed by the utility, that are connected to the distribution system and are receiving the service.

#### Wastewater treatment

**Resident population:** Number of permanent residents within the area of service for wastewater services managed by the undertaking (whether they are connected or not), at the reference date.

**Serviced population:** Serviced population is referred to the number of inhabitants (or inhabitant equivalents), within the area of service managed by the utility, which are connected to a sewer system and which wastewater is receiving treatment in a WWTP.

#### Water supply

### What is the volume of authorized consumption? What is non-revenue water (NRW)?

The following definitions of system inputs are utilized in the ECAM tool:

**System Input Volume:** the input to a defined part of the water supply system

**Authorised Consumption:** the volume of metered and/or non-metered water taken by registered customers, the water supplier and others implicitly or explicitly authorised to do so. It includes water exported, and leaks and overflows after the point of customer metering.

**Non-Revenue Water (NRW):** the difference between System Input Volume and Billed Authorised Consumption. NRW consists of Billed un-metered consumption, Unbilled Authorised Consumption and Water Losses

**Water Losses:** the difference between System Input Volume and Authorised Consumption, consisting of Apparent Losses and Real Losses

**Apparent Losses:** consists of Unauthorised Consumption and metering inaccuracies

**Real Losses:** the annual volumes lost through all types of leaks, bursts and overflows on mains, service reservoirs and service connections, up to the point of customer metering.

In the table below you can see the definition for system input volume

<b>System Input Volume</b>	<b>Authorized consumption</b>	Billed Authorized Consumption	Billed metered Consumption	Revenue Water
			Billed un-metered Consumption	
		Un-Billed Authorized Consumption	Un-Billed metered Consumption	<b>Non - Revenue Water (NRW)</b>
			Un-Billed un-metered Consumption	
	<b>Water Losses</b>	Apparent Loss (Commercial Losses)	Unauthorized consumption	
			Customer Meter Inaccuracies and Data handling errors	
		Real Losses (Physical Losses)	Leakage in transmission and distribution mains	
			Storage leaks and overflow from water storage tanks	

			Service connections leak up to the meter	
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## Wastewater

### Which 'Nitrogen' is asked for in ECAM?

In the GHG assessment under wastewater you will be asked for the Total Nitrogen. In the IPCC methodology, which the ECAM-tool follows, the emission factor is related to the Total Nitrogen, associated with the population.

### How does water reuse effect emissions?

Wastewater consists of 99.5% water; this is why it is a useful water resource.

This question cannot be answered with a simple yes or no. There are many different reuse types:

- Potable reuse direct/ indirect for drinking water purposes
- Unplanned potable reuse
- Non-potable reuse for groundwater recharge
- Agricultural reuse for food crops or non-food crops
- Industrial reuse
- Urban reuse for unrestricted or restricted area irrigation
- Non-potable domestic reuse such as toilet flushing, car washing etc

Potable reuse requires a higher water quality than for example agricultural reuse. The higher the desired quality, the more energy the treatment will consume. Concentrating on potable reuse with an advanced treatment, tertiary treatment typically is associated to higher energy consumption. In

case, the same amount of water is abstracted from a source and transported over a long distance to the end-user, this might consume the same amount of energy as a tertiary treatment. However, irrigation water does not have to be high quality water; a secondary treatment of wastewater might reach the required quality standard. Reusing the water that is already in the loop saves energy for abstracting fresh water.

### What is a Normalized cubic meter?

When applied to natural gas, a normalized cubic meter expresses the quantity of gas at a temperature of 0°C degrees Celsius and a pressure of 14.7psia (1.01325 bar) that occupies a volume of 1 cubic meter. (Natural Gas Measurement Handbook by James E. Gallagher)

### Why is BOD employed in the tool instead of COD?

ECAM is modelled according to the guidelines proposed by IPCC, which consistently refers to BOD throughout its reports. There exist other methods that are based on COD values.

## GHG/Energy

### What is the Global Warming Potential (GWP)?

Greenhouse gases have different potentials of absorbing heat. A dedicated measurement has been established which reflects this, the so-called global warming potential (GWP). The foundation for this is the potential of carbon dioxide to absorb heat, this is standardized to the value “1”, and the other gases are compared to carbon dioxide. Values differ for each IPCC report. Users may select in ECAM which GWPs are applied.

### What is Biogas valorisation?

Biogas consists primarily of methane (CH<sub>4</sub>) (typically between 50-75%) and carbon dioxide (CO<sub>2</sub>). These gases are produced during anaerobic digestion; the formula below shows the chemical reaction that takes place in an anaerobic digester.



The released gases can be used as fuel. With gas engines the biogas can be converted to electricity and heat, so that the wastewater treatment plant can produce their own energy supply. This process is called biogas valorisation; it is the transformation of biomass to valuable materials and energy.

Throughout this process it is possible to create energy neutral or even energy friendly water treatment facilities.

### Do all energy sources result in carbon emissions?

No. Renewable sources of electricity such as hydropower, wind, solar and even nuclear, are carbon-free. The grid electricity GHG emission factor measures the kilograms (kg) of carbon dioxide (CO<sub>2</sub>) emitted per kWh of electricity generated from fossil fuels per IPCC guideline (2006). The emission factors for electricity delivered to customers from a mix of generation sources usually takes into account the average annual contribution of the different sources (from fossil fuels and renewables).

### Why is the effect of CO<sub>2</sub> released from wastewater treatment not included?

These can be emitted directly from the activated sludge process as a by-product of microbial breakdown of organic matter in aeration tanks. IPCC considers this source to be biogenic in nature, hence not a contributor to increased CO<sub>2</sub> concentrations in the atmosphere. For consistency with IPCC, this source is not included in ECAM

### How are the default values for the Emission Factors (EF) calculated?

In ECAM, users can apply the mix factor (kg CO<sub>2</sub>/kWh) based on, when available, local data provided by the municipalities for electricity used. If this information is not available, the yearly average country factor can be selected from the configuration page in the ECAM tool.

