



**Meso-level eco-efficiency indicators to assess  
technologies and their uptake in water use sectors**

Collaborative project, Grant Agreement No: 282882

**Deliverable 5.3**  
**Functional design of the  
meso-scale eco-efficiency toolbox**

March 2013



## DOCUMENT INFORMATION

Project	
Project acronym:	EcoWater
Project full title:	Meso-level eco-efficiency indicators to assess technologies and their uptake in water use sectors
Grant agreement no.:	282882
Funding scheme:	Collaborative Project
Project start date:	01/11/2011
Project duration:	36 months
Call topic:	ENV.2011.3.1.9-2: Development of eco-efficiency meso-level indicators for technology assessment
Project web-site:	<a href="http://environ.chemeng.ntua.gr/ecowater">http://environ.chemeng.ntua.gr/ecowater</a>
Document	
Deliverable number:	5.3
Deliverable title:	Functional design of the meso-scale eco-efficiency toolbox
Due date of deliverable:	30/09/2012
Actual submission date:	11/03/2013
Editor(s):	Michiel Blind
Author(s):	Michiel Blind, George Arampatzis
Reviewer(s):	Dionysis Assimacopoulos, Irina Ribarova
Work Package no.:	5
Work Package title:	Integration and Synthesis
Work Package Leader:	National Technical University of Athens
Dissemination level:	Public
Version:	2.0
Draft/Final:	Final
No of pages (including cover):	58
Keywords:	Toolbox, meso-level, eco-efficiency assessment



## Abstract

Based on the developed methods and tools from EcoWater WP1, 'Framework and tools for meso-level ecoefficiency analysis and technology assessment', an integrated (suite of) on-line, web-based tools and resources will be built for the assessment of the eco-efficiency of innovative technologies. The purpose is amongst others to facilitate technology benchmarks in water systems. The suite of tools will thus provide a mechanism for developers of new technologies to demonstrate the effect of their technology on meso-level eco-efficiency and allow policy-makers to assess possible impacts of regulations..

Deliverable 5.3 provides the 'Functional design of the meso-level eco-efficiency toolbox'. The deliverable concerns the internal design and functionalities of the aforementioned web-based toolbox and its knowledge bases. The overall architecture of the toolbox is divided into three layers (the Web-Based Graphical User Interface, the data manipulation tools and the data storage) and the two stand-alone tools that have been developed (SEAT and EVAT). The report emphasizes the functionalities that can be included, providing numerous mock-ups of user screens and options. Functionalities of the different buttons are provided. Special attention is given to the various types of users of the system.



# Contents

## Contents

DOCUMENT INFORMATION .....	3
Abstract .....	5
Contents .....	7
List of Figures .....	9
List of Tables .....	10
1 Introduction .....	11
1.1 General introduction to the Task .....	11
1.2 Definitions of the user requirements document, functional design and technical design .....	12
1.3 SEAT and EVAT .....	12
1.4 Reading guide .....	12
2 User requirements .....	13
2.1 User groups .....	13
2.2 Permissions .....	14
3 Functionalities for each step of the Case Study development .....	18
4 Functional design specifications .....	20
4.1 Look and feel .....	20
4.2 Mock-up and functionality of the opening page .....	20
4.3 Tab 'home' .....	21
4.4 Tab 'Case Studies' .....	22
4.4.1 Left hand-tab Case Study 'X' .....	23
4.4.2 Linking Case Studies and other information sources .....	26
4.4.3 Analysis of SEAT and EVAT results .....	33
4.4.4 Scenario tools .....	36
4.4.5 Matching of Case Study development with the functionalities presented in Chapter 4.4 .....	38
4.5 Tab 'Technologies' .....	40
4.5.1 Left-hand tab 'Overview of technologies' .....	41
4.5.2 Button 'View details' (pop-up) .....	42
4.5.3 Button 'New technology' pop-up .....	43
4.6 Tab 'Indicators' .....	44
4.6.1 Left-hand tab 'Introduction to Indicators and parameters' .....	44
4.6.2 Left-hand tab 'Overview of indicators' .....	44
4.6.3 Button 'new/edit indicator' (Pop-up) .....	45
4.6.4 Left-hand tab 'Overview of parameters' .....	46
4.7 Tab 'Resources' .....	47
4.8 Tab 'Login' .....	48

4.8.1	Left hand tab 'Login' .....	48
4.8.2	Left hand tab 'Forgot username or password' .....	49
4.8.3	Left hand tab 'Change account details' .....	50
4.8.4	Left hand tab 'Register' .....	51
4.8.5	Left hand tab 'Request Authorisation' .....	52
4.8.6	Left hand tab 'Manage authorisations' .....	53
4.9	Tab 'About' .....	54
4.10	Tab 'Help' .....	54
5	Overall architecture .....	56
6	Conclusions and next steps .....	57
7	Literature .....	58



## List of Figures

Figure 1: Phases and steps in the Case Study development (Kourentzis, 2012) .....	18
Figure 2: Mock-up of the start up screen.....	20
Figure 3: Case Studies start screen.....	22
Figure 4: Opening screen of a Case Study .....	23
Figure 5: Editing information of a Case Study.....	24
Figure 6: Comment pop-up .....	25
Figure 7: View comments pop-up.....	25
Figure 8: Associate an indicator with a specific Case Study .....	26
Figure 9: Associate a parameter with a specific Case Study indicator.....	27
Figure 10: Associate a technology to a Case Study.....	28
Figure 11: Defining the actors of a Case Study.....	28
Figure 12: Normalisation of parameters .....	29
Figure 13: Parameter aggregation .....	30
Figure 14: Parameter combination .....	30
Figure 15: Case Study specificities of a technology.....	31
Figure 16: Importing SEAT and EVAT files .....	32
Figure 17: Exporting SEAT and EVAT files for local use .....	32
Figure 18: View content of SEAT and EVAT files .....	33
Figure 19: Environmental Performance Comparison .....	34
Figure 20: Resource Input and Emission Accounting .....	34
Figure 21: Financial Costs and Values of Products .....	34
Figure 22: Net Economic Output of Actors.....	35
Figure 23: Eco-efficiency comparison .....	35
Figure 24: The PESTEL table .....	36
Figure 25: Case Study-specific scenario narratives .....	37
Figure 26: Technology matching with drivers and barriers.....	38
Figure 27: Introduction to technologies .....	40
Figure 28: Overview of technologies .....	41
Figure 29: Detailed description of technologies .....	42
Figure 30: Adding and editing a technology .....	43
Figure 31: Introduction to indicators.....	44
Figure 32: Overview of indicators.....	44
Figure 33: Editing an indicator / creating a new indicator.....	45
Figure 34: Overview of parameters .....	46
Figure 35: Editing a parameter / create new parameter.....	46
Figure 36: Resources .....	47
Figure 37: Tab 'Login'.....	48
Figure 38: Left hand tab 'Forgot username or password' .....	49
Figure 39: Left-hand tab 'Change account settings' .....	50
Figure 40: Left-hand tab 'Register' .....	51
Figure 41: Left-hand tab 'Request authorisation'.....	52
Figure 42: Left-hand tab 'Manage authorisations' .....	53
Figure 43: Tab 'About' .....	54
Figure 44: Tab 'Help' .....	54
Figure 45: Overall architecture .....	56

## List of Tables

Table 1: The description of Task 5.3: Development of toolbox for meso-level eco-efficiency of systems/products (EcoWater Description of Work, 2011, Part A, p. 22).....	11
Table 2: System-wide user groups.....	13
Table 3: Case Study-specific user groups.....	13
Table 4: User permissions and requirements.....	14
Table 5: Preliminary list of functionalities that will be supported for each step of the Case Study development.....	19
Table 6: Overview of the various functions below the tabs .....	21

# 1 Introduction

## 1.1 General introduction to the Task

The overall aim of Work Package (WP) 5 is to integrate the developed analytical framework, indicators and Case Study results, into different outputs to ensure their application beyond the EcoWater Project, in terms of analysing the dynamics of water systems and sectors of water use. More specifically, WP5 is tasked amongst others with the development of a publicly available suite of tools and resources for meso-level eco-efficiency assessments in different systems, and technology benchmarking, providing access to an integrated environment for the undertaking of similar analyses. The main output from this WP will be an integrated, web-based toolbox, which will contain the resources and tools necessary for developing meso-scale eco-efficiency assessments of different technologies. In addition, the WP will produce consolidated, step-wise guidelines for future assessments, as well as policy recommendations, based on Case Study results and cross-case comparison (EcoWater Description of Work, 2011). Table 1 below provides information stated in the EcoWater Description of Work, with respect to the toolbox-task.

**Table 1: The description of Task 5.3: Development of toolbox for meso-level eco-efficiency of systems/products (EcoWater Description of Work, 2011, Part A, p. 22)**

Based on the developed methods and tools from WP1, an integrated (suite of) on-line, web-based tools and resources will be built for the assessment of the eco-efficiency of innovative technologies, to facilitate technology benchmarks in water systems.

The indicator computational tools will be fed amongst others by an information database on eco-efficiency of technologies and materials, as developed through the WP 1.2 Technology Inventory. The suite of tools will thus provide a mechanism for developers of new technologies to demonstrate the effect of their technology on eco-efficiency and allow policy-makers to assess impacts of regulations.

Where applicable, integration will be performed in such a way that potential extensions (post-EcoWater) to other systems and products are supported. The task will be based on a functional requirements analysis (all partners), followed by a technical design (Deltares, NTUA), preliminary integration of the tools developed within the framework of T1.3 (Deltares, NTUA), followed by testing by all participants. Two testing iterations and subsequent improvements of the toolbox will be carried out. Guidelines for use and future adaptation will also be developed.

The development of the Toolbox will start in parallel to the activities of T1.3-2 and T1.3-3, with the definition of its functional design. Throughout the course of the Project, the Toolbox will be constantly fed with information, data and resources from T1.2 and from the Case Studies of WPs 2, 3 and 4, and will be tested and adapted according to feedback received (in addition to the two “formal” testing processes foreseen). The final version, including guidelines for use, will be released in M30.

This report concerns the Deliverable 5.3 (Functional design of the meso-scale eco-efficiency toolbox) and will provide a description of the internal design and functionalities of the web-based toolbox and its knowledge bases.

## 1.2 Definitions of the user requirements document, functional design and technical design

The **user requirement(s) document** (URD) or **user requirement(s) specification** is a document, usually used in software engineering, which specifies the requirements the user expects from software to be constructed in a software project. Once the required information is completely gathered, it is documented in a URD, which is meant to spell out exactly what the software must do and becomes part of the contractual agreement.

In this document, the functional design is synonymous to a first deepening of user requirements into mock-ups and narrative functions. The technical design will further detail the functional specifications and requirements, such that implementation becomes straightforward.

## 1.3 SEAT and EVAT

In the development of the proposal, a few key decisions were taken, which provide boundary conditions for the design. The most important decision was that two stand-alone tools would provide key functionalities required to calculate eco-efficiency indicators. The tools are the SEAT (Systemic Environmental Analysis Tool) and EVAT (Economic Value chain Analysis Tool). This document does not include the design of these tools. However, it will concern the interaction of the toolbox with the tools.

## 1.4 Reading guide

Chapter 2 (User requirements) focuses on the User Groups and the corresponding permissions for each group. Chapter 3 provides preliminary information on functionalities that may be included in the toolbox for each distinct step of the Case Study development. Finally, Chapter 4 contains some first screen mock-ups and narrative text on the functional design.

## 2 User requirements

### 2.1 User groups

User groups are used by the toolbox to control the access to the functionalities provided. There are six **system-wide** user groups, presented in Table 2, and three **Case Study-specific** user groups, presented in Table 3.

**Table 2: System-wide user groups**

User Group	Description / Role
Public (all users)	All users that visit the web site. They are able to view basic information about the web-based toolbox and request registration to the system.
Registered Users	The users that have been registered and logged into the system. They are able to view general as well as Case Study-specific information. They are not allowed to enter any information other than comments.
System Administrators	The users who are responsible for setting up and maintaining the system. They are responsible for managing user accounts and authorizing users to enter/edit information to the system.
Case Study Providers	The users that have the right to create a new Case Study. After creating a Case Study, the user is characterised as the “creator” of the Case Study and has full control on it.
Technology Providers	The users that have the right to create a new technology. After creating a technology, the user is characterised as the “creator” of the technology and has full control on it.
Indicator Providers	The users that have the right to create a new indicator. After creating an indicator, the user is characterised as the “creator” of the indicator and has full control on it.

**Table 3: Case Study-specific user groups**

User Group	Description / Role
Case Study Stakeholders	The users that are allowed to view all (public and private) Case Study-specific information.
Case Study Collaborators	The users able to enter and edit Case Study-specific information.
Case Study Administrators	The users responsible for authorizing users to enter/edit Case Study-specific information.

## 2.2 Permissions

Table 4 below provides mainly user permissions and requirements. Some system functionalities are also listed, as this helps understanding. An 'x' indicates that a user has some rights to take an action. The 'x' marks are indicative, as detailed use-cases with all actor interaction go beyond the scope of this document. In chapter 4 'Functional design specifications' a bold A implies that the user type will be able to view more information.

**Table 4: User permissions and requirements<sup>1</sup>**

Item	Description	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
<b>1</b>	<b>General access</b>									
1.1	The toolbox will be accessed via PC-based browsers (IE, Firefox, Safari)	x								
1.2	Information can be viewed and exported in printable and storable form		x							
1.3	The Providers can enter new information to the system			x	x	x				
<b>2</b>	<b>User registration management</b>									
2.1	Public Users shall be able to request a registration to the system	x								
2.2	The Registered Users shall be able to unregister themselves (delete account)		x							
2.3	The System Administrators shall be able to accept a request for registration									x
2.4	The System Administrators shall be able to delete accounts of other Users									x
<b>3</b>	<b>Access to technology database</b>									
3.1	There shall be a technology database that contains information on technologies. The repository will follow the "Excel" design provided within the Task 1.2.									
3.2	The registered users may request to add a technology		x							
3.3	The System Administrators shall be able to accept or deny requests for adding a technology									x

<sup>1</sup> If x is between brackets, i.e. '(x)', this implies that the functionality is available if special rights have been granted.

Item	Description	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
3.4	Technology Providers shall be able to create a new technology			x						
3.5	The System Administrators and the creator of a technology entry may delete the item			x						x
3.6	The System Administrators and the creator of a technology entry may alter the technology information			x						x
3.7	The Registered Users shall be able to view the technology information		x							
3.8	The Registered Users can propose alterations to technologies via 'commenting'		x							
3.9	The System Administrators, the creator of a technology entry and the commenter (previous point) can delete a comment			x						x
<b>4 Access to indicator database</b>										
4.1	There shall be an indicator database that contains definitions of indicators, associated parameters, and generic examples to combine parameters to indicators, and indicators to calculate indices.									
4.2	The Registered Users may request to add an indicator		x							
4.3	The System Administrators shall be able to accept or deny requests for adding an indicator									x
4.4	Indicator providers shall be able to create a new indicator				x					
4.5	The System Administrators and the creator of an indicator entry may delete the item				x					x
4.6	The System Administrators and the creator of an indicator entry may alter the indicator information				x					x
4.7	The Registered Users shall be able to view the indicator information		x							
4.8	The Registered Users can propose alterations to indicators via 'commenting'		x							
4.9	The System Administrators, the creator of an indicator entry and the commenter (previous point) can delete a comment				x					x
<b>5 Access to general information</b>										
5.1	These Users shall be able to access a variety of the following documents									
5.1.1	EcoWater public Deliverables	x								
5.1.2	Case Study public reports	x								

Item	Description	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
5.1.3	Guidelines for assessing eco-efficiency	x								
5.1.4	Links to external initiatives	x								
5.1.5	Case Study private reports and information						x	x	x	x
<b>6</b>	<b>Access to SEAT and EVAT</b>									
6.1	The tools (SEAT, EVAT and the toolbox) are developed in such a way that IDs of nodes and processes are stable (they should be consistent in all tools). They should not change if the system changes; only new nodes and processes should get new IDs. IDs of deleted items should not be re-used.									
6.2	The Users shall be able to download SEAT and EVAT	x								
6.3	The Users shall be able to download SEAT and EVAT manuals	x								
<b>7</b>	<b>Case Study authorization</b>									
7.1	The Registered Users may request to add a Case Study		x							
7.2	The System Administrators shall be able to accept / deny requests for adding a Case Study									x
7.3	The Case Study Providers are allowed to start a Case Study					x				
7.4	The Case Study Administrator and the creator of the Case Study may invite others to contribute								x	
7.5	The Case Study Administrators and the creator of the Case Study can withdraw rights from the Case Study Collaborators								x	
7.6	The Case Study Administrators and the creator of the Case Study can publish parts of the Case Study to be viewed by all registered users								x	
7.7	(Upon request of the Case Study Administrators) the System Administrators are able to archive the Case Study, making it inaccessible to all users									x
7.8	(Upon request of the Case Study Administrators) the System Administrators are able to restore an archived the Case Study, making it accessible to all users									x



Item	Description	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
<b>8</b>	<b>Interactions with EVAT and SEAT</b>									
8.1	Case Study Collaborators can upload and visualize a Case Study model developed in SEAT and EVAT							x	(x)	
8.2	The system will provide version numbering									
8.3	The system will allow only one model to be the baseline technology scenario									
8.4	The system will allow to upload 'alternative' technology scenarios, e.g. altered models due to the implementation of measures							x	(x)	
8.5	Numerical results of EVAT and SEAT runs can be easily uploaded into the tool							x	(x)	
8.6	Values within the toolbox that should be used within SEAT and or EVAT will be made available in such a way that manual transfer is supported.									
<b>9</b>	<b>Exporting Case Studies and results</b>									
9.1	Selected text can be exported							x	(x)	
9.2	Selected numbers can be exported in appropriate format							x	(x)	
9.3	Figures can be exported							x	(x)	
<b>10</b>	<b>Development of scenarios</b>									
10.1	For the local Case Study, a PESTEL analysis can be carried out							x	(x)	
10.2	Scenarios can be created, stored, retrieved, altered, copied and deleted							x	(x)	
<b>11</b>	<b>Indicator calculation and visualisation tool</b>									
11.1	There shall be an indicator calculation and visualisation tool									
11.2	Case Study Collaborators can select indicators and parameter description and aggregation methods from the indicator database							x	(x)	
11.3	Case Study Collaborators can use the tools							x	(x)	
11.4	Case Study Collaborators can alter selected aggregation parameters to meet Case Study demands							x	(x)	

### 3 Functionalities for each step of the Case Study development

The development of the EcoWater Case Studies has been divided into seventeen distinct steps, grouped into four Phases (Figure 1). Table 5 provides information on indicative functionalities that may be supported for each step. It should be highlighted that all these functionalities will be available only for the Case Study Collaborators.

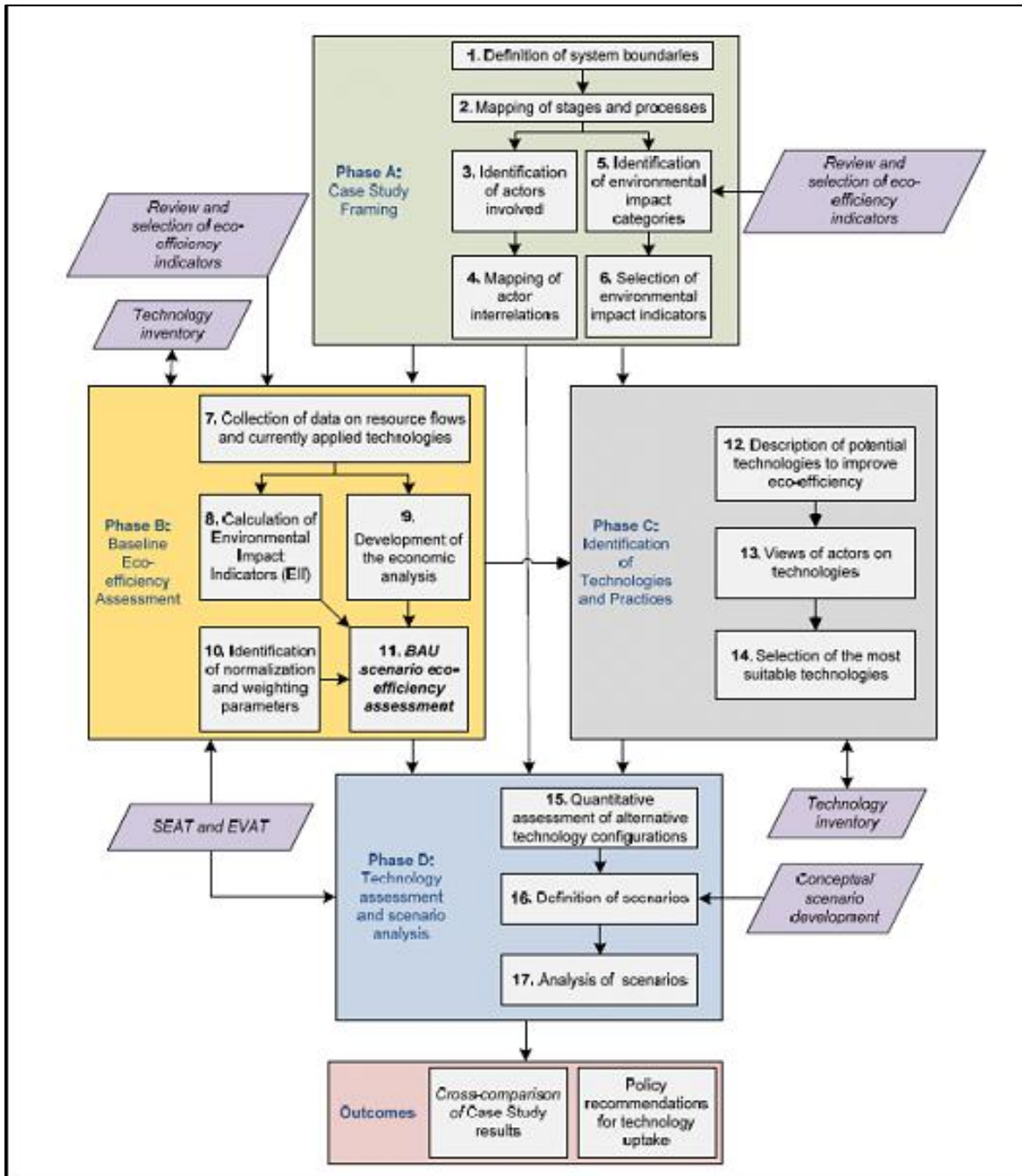


Figure 1: Phases and steps in the Case Study development (Kourentzis, 2012)

**Table 5: Preliminary list of functionalities that will be supported for each step of the Case Study development**

Step	Indicative functionalities
<b>GENERAL</b>	
Text formatting of narrative input should be possible (bold, underlined, hyperlinks).	
Copy and paste of text developed externally should be possible.	
Attaching / detaching documents shall be possible.	
The system will provide to the Case Study Administrators and Collaborators support to carry out the different steps as described in Task 1.5 (see Figure 1).	
<b>PHASE A: CASE STUDY FRAMING</b>	
Step 1	The user can upload narrative text on system boundaries.
	The user can upload narrative text on actors.
	The user can upload narrative text on technologies.
Step 2	The user can graphically map stages and processes.
	The user is able to associate distinct processes, corresponding to the input and output requirements, with each process and stage. These processes should be identified and characterized, as potential improvements will be based on the identification, implementation and evaluation of the performance of different technologies applicable to these processes.
Step 3	The toolbox can support the identification of directly and indirectly involved actors.
Step 4	The toolbox can support the mapping of the interactions of all actors involved.
Step 5	The toolbox can support the identification of the environmental impact categories, with both technology and actor relevance. The system allows the definition of parameters underlying the indicators and the methods to calculate an indicator from parameters.
Step 6	The toolbox can support the selection of environmental impact indicators, with both technology and actor relevance (see also van Vliet <i>et. al.</i> , 2012).
<b>PHASE B: BASELINE ECO-EFFICIENCY ASSESSMENT</b>	
Step 7	Data on resource flows can be inserted in a Case Study-specific database. The database will allow time relevant variation (daily, seasonal, annual)
	Data / information on currently applied technologies can be inserted in a Case Study-specific database.
Step 8	The user will be able to access a tool to calculate Environmental Impact Indicators (EIs). This tool is SEAT (Systemic Environmental Analysis Tool).
Step 9	The user will be able to access a tool to develop the economic analysis. This tool is EVAT (Economic Value chain Analysis Tool).
	Specific data required for the calculation of the Total Value Added (TVA) can be inserted in a Case Study-specific database. If appropriate, the database will allow time relevant variations (daily, seasonal, annual).
Step 10	The toolbox shall support the “definition of weighting and normalization parameters”.
Step 11	The user can develop and store the eco-efficiency assessment of the baseline technology scenario.
<b>PHASE C: IDENTIFICATION OF TECHNOLOGIES AND PRACTICES</b>	
Step 12	The user is able to reuse descriptions of potential technologies, originating from the technology database, and tailor them to the local situation, in order to improve the eco-efficiency of a Case Study.
Step 13	The user is able to store views of actors on technologies. This includes: i) The applicability and usefulness of the identified technologies; ii) Prospects for their implementation and uptake; iii) Suggestions on additional technologies that could be assessed through the Project.
Step 14	The user is able to label a selection of the most suitable technologies.
<b>PHASE D: TECHNOLOGY ASSESSMENT AND SCENARIO ANALYSIS</b>	
Step 15	The user is able to carry out a quantitative assessment of alternative technology scenarios in SEAT and EVAT.
	The user is able to import the derived numerical results into the toolbox.
	The user is able to compare different technology scenarios, e.g. via spider diagrams.
Step 16	The user is able to define future scenarios by carrying out a PESTEL analysis.
Step 17	Analysis of future scenarios.

## 4 Functional design specifications

The requirements in the previous sections have been detailed to a level almost reaching functional specifications. In this section, first mock-ups of functionalities are provided. It should be noted that purple squares indicate buttons that can be clicked. In addition, a bold 'X' highlights the focus user, whereas a bold 'A' implies that this user will be able to view more information.

### 4.1 Look and feel

The mock-ups in this document are not an indication of the look and feel (colours, location of buttons) of the final version of the toolbox. While SEAT and EVAT are more or less independent tools, it is recommended to use the tools' look and feel and the EcoWater website's look and feel as the basis for the toolbox.

### 4.2 Mock-up and functionality of the opening page

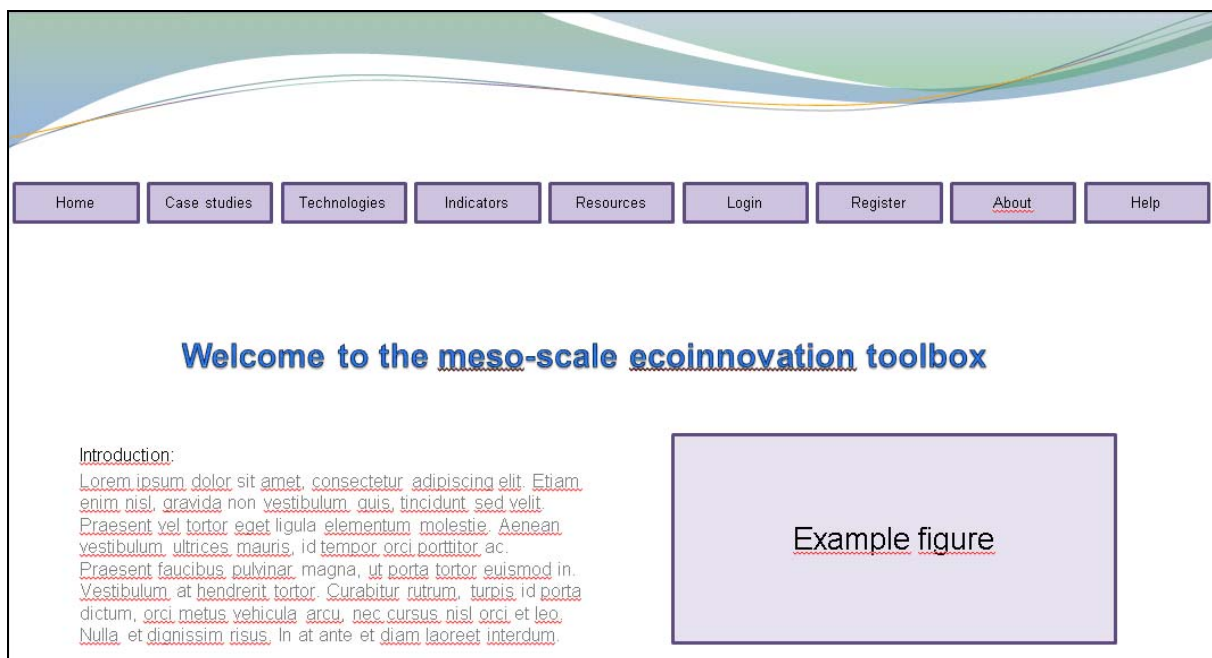


Figure 2: Mock-up of the start up screen

Purpose	<p>The purpose of the opening screen of the web-based toolbox is to provide the users with:</p> <ul style="list-style-type: none"> <li>❖ Some basic information about the toolbox (not about the Project), including the purpose and an explanation of the use of the website.</li> <li>❖ An inviting picture.</li> <li>❖ The main navigation tools.</li> </ul>								
Functionality	<p>The main functionality of this page concerns the tabs in the top. Hovering over the tabs will provide a small text on what to find when clicking on the tab. Clicking on the tab will lead the user to other pages / tools.</p> <p>As a general principle, the horizontal navigation tool will remain stable in content and position on all pages of the tool. The tab of the active page should be highlighted or otherwise a connection between the tab and the main body of the page should be established.</p> <p>When scrolling, the header tables should remain visible at all times.</p>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
	<b>X</b>	X	X	X	X	X	X	X	X

Table 6 provides an overview of the various functionalities below the tabs.

**Table 6: Overview of the various functions below the tabs**

Tab	Main functions	Other functions
Home	Introduction to the toolbox	-
Case Studies	<ul style="list-style-type: none"> <li>❖ Create, edit and view Case Studies</li> <li>❖ Comment</li> </ul>	<ul style="list-style-type: none"> <li>❖ Import data to the Case Study from: <ul style="list-style-type: none"> <li>➢ Technology database</li> <li>➢ Indicator database</li> <li>➢ SEAT</li> <li>➢ EVAT</li> </ul> </li> <li>❖ Create / edit PESTEL analysis</li> <li>❖ Print</li> </ul>
Technologies	<ul style="list-style-type: none"> <li>❖ Create, edit and view generic technology information</li> </ul>	<ul style="list-style-type: none"> <li>❖ Print</li> </ul>
Indicators	<ul style="list-style-type: none"> <li>❖ Create, edit and view indicators</li> <li>❖ Create, edit and view parameters</li> </ul>	<ul style="list-style-type: none"> <li>❖ Print</li> </ul>
Resources	<ul style="list-style-type: none"> <li>❖ Links to (other) tools and resources</li> </ul>	<ul style="list-style-type: none"> <li>❖ Print</li> </ul>
Login	<ul style="list-style-type: none"> <li>❖ Login</li> </ul>	<ul style="list-style-type: none"> <li>❖</li> </ul>
Register	<ul style="list-style-type: none"> <li>❖ Register</li> <li>❖ Authorisations</li> </ul>	<ul style="list-style-type: none"> <li>❖</li> </ul>
Help	<ul style="list-style-type: none"> <li>❖ Help</li> </ul>	<ul style="list-style-type: none"> <li>❖ Print</li> </ul>

### 4.3 Tab 'home'

Purpose	The purpose of the tab is to go back to the opening screen (4.2)								
Functionality	<ul style="list-style-type: none"> <li>❖ On 'Click', the opening screen reappears.</li> <li>❖ In case of leaving a page with forms, the user will be prompted to save the data</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
	X	X	X	X	X	X	X	X	X

## 4.4 Tab 'Case Studies'

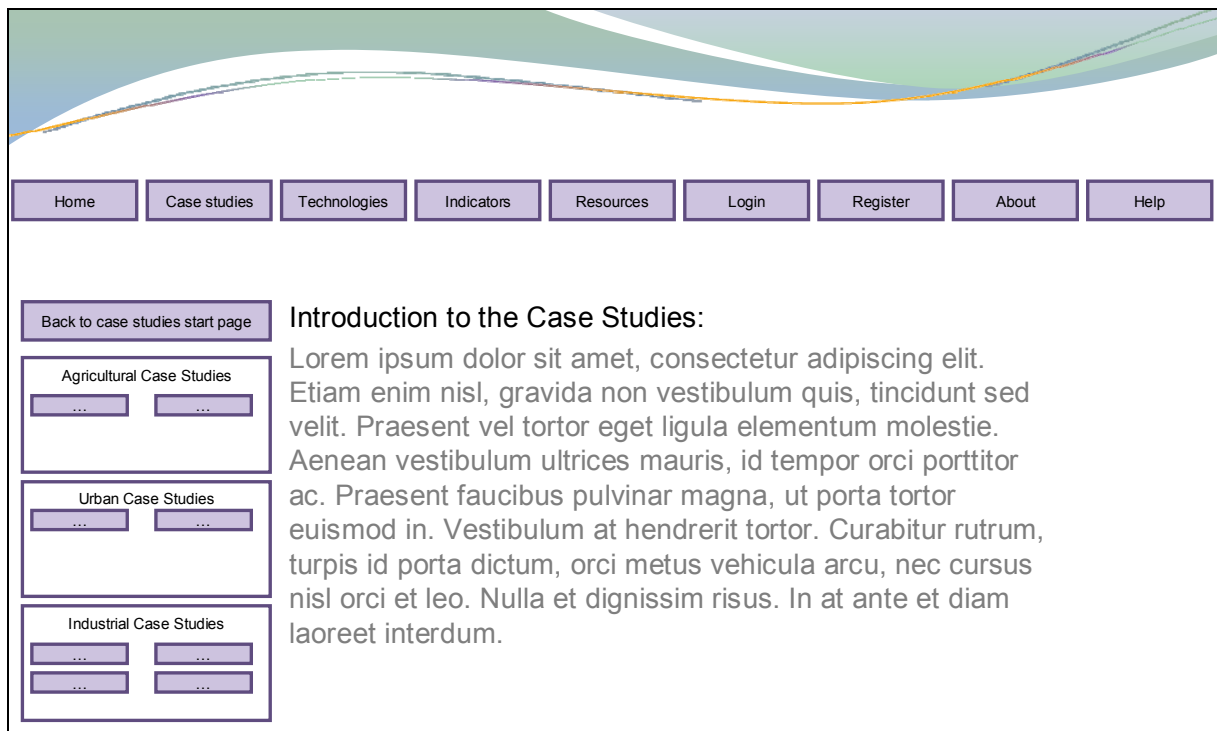


Figure 3: Case Studies start screen

Purpose	<p>The purpose of the Case Studies' welcoming screen is to provide a first introduction to the Case Studies.</p> <p>In the left hand navigation bar, clusters of Case Studies are presented, which can be selected to see more information about the corresponding Case Studies.</p>								
Functionality	<ul style="list-style-type: none"> <li>❖ On 'Click' on a Case Study, more information on the Case Study appears. Depending on the rights and login status, this follow-up may be limited.</li> <li>❖ The clustering of the Case Studies should be automated, and new Case Studies (beyond EcoWater) should be visible. In case of leaving a page with forms, the user will be prompted to save the data.</li> <li>❖ The button 'Back to Case Studies start page' should do what it says. Alternatively, the use of breadcrumbs may be very useful.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
		X	X	X	X	X	X	X	X

#### 4.4.1 Left hand-tab Case Study 'X'

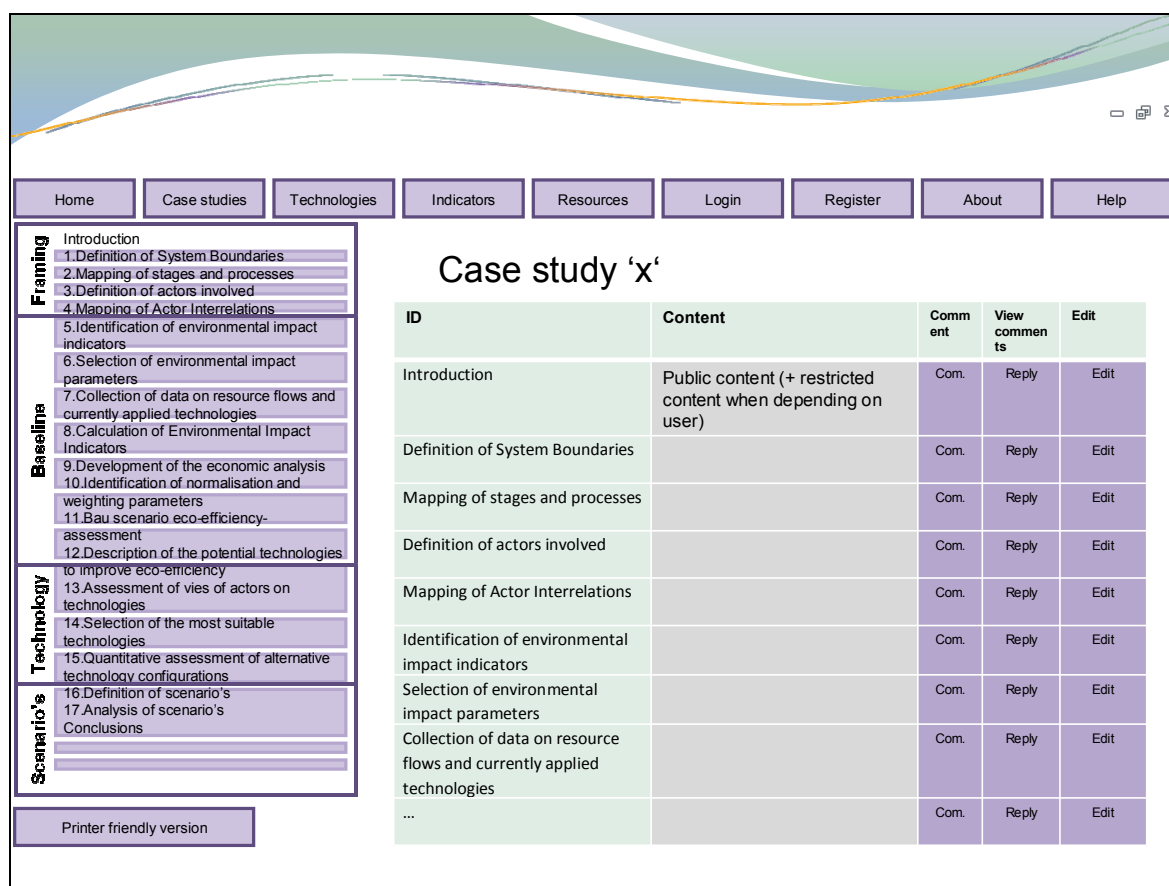


Figure 4: Opening screen of a Case Study

Purpose	The purpose of this screen is to provide an overview of the available information on a Case Study. In the left hand navigation bar, the different chapters or steps are presented which, when completed, should lead to the conclusions.								
Functionality	<ul style="list-style-type: none"> <li>❖ On 'Click' on a step in the left hand navigation panel, the user jumps to the relevant section. The left hand navigation panel remains visible at all times – the user should not need to go back.</li> <li>❖ What is visible depends on the login status and access rights of the user.</li> <li>❖ On 'Click' on printer friendly version a printer friendly report is created.</li> <li>❖ The button 'edit' will open an editor window.</li> <li>❖ The button 'comment' will allow commenting (depending on authorisation).</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>A</b>	<b>A</b>	<b>A</b>	<b>X</b>

##### 4.4.1.1 Button 'Printer friendly version' (pop-up)

Purpose	The purpose this button is to create a printer friendly version of the Case Study.								
Functionality	<ul style="list-style-type: none"> <li>❖ On 'Click', a printer friendly version should appear (e.g. either a pdf or an html file) in a formatting appropriate for printing.</li> <li>❖ Optionally, relevant sections desired for printing could be selected.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>



#### 4.4.1.2 Button “edit” (pop-up)

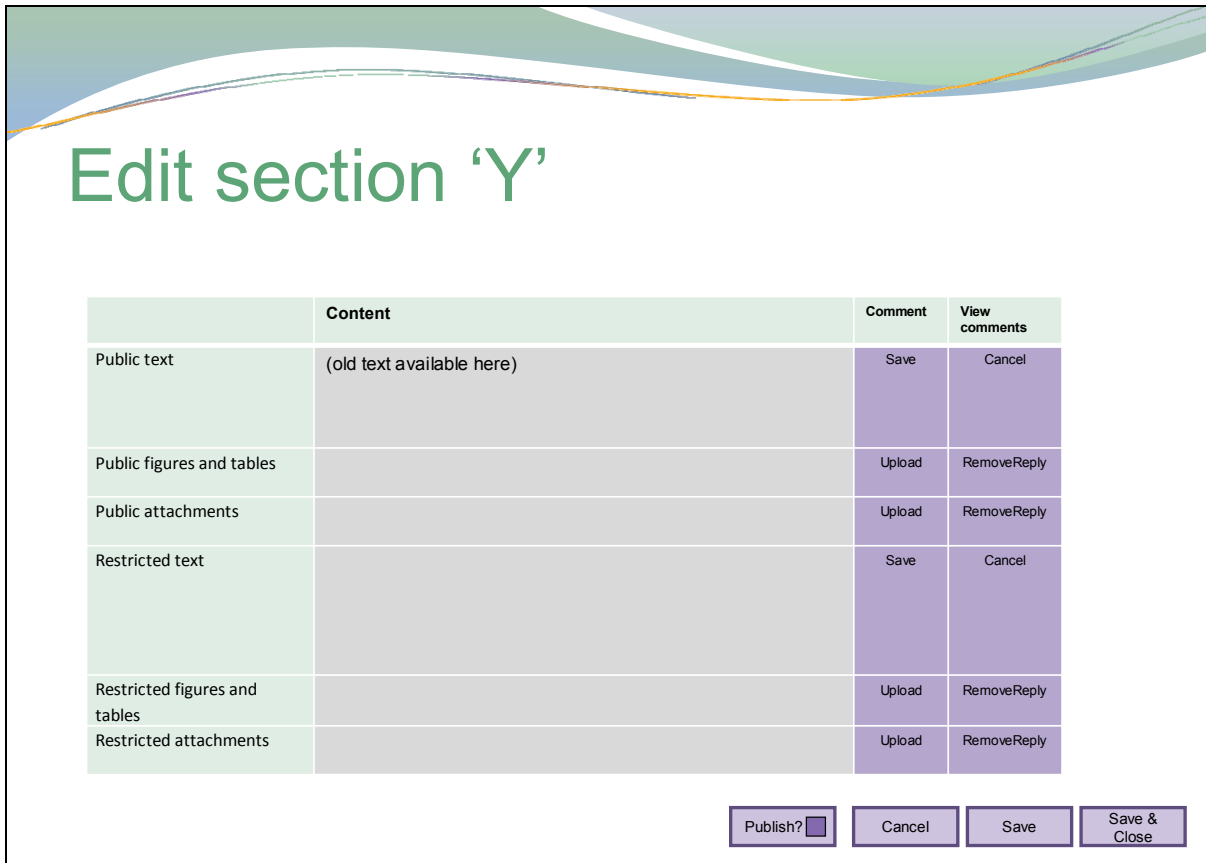


Figure 5: Editing information of a Case Study

Purpose	When the edit button is pressed the above editor appears ('Y' stands for a specific field). It allows changing both public and private information. At this stage differentiation should be included to shield information or draft text from the public.								
Functionality	<ul style="list-style-type: none"> <li>❖ In the large grey fields plain text can be edited.</li> <li>❖ Optionally, advanced formatting can be allowed.</li> <li>❖ In the smaller grey fields, a list of uploaded files will be presented.</li> <li>❖ The purple button 'Publish' enquires if the information should be indeed published. It should be the Case Study Administrators prerogative to publish the information.</li> </ul>								
Intend- ed Us- ers	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
							<b>X</b>	<b>X</b>	<b>X</b>



#### 4.4.1.3 Button 'comment' (pop-up)

Figure 6: Comment pop-up

Purpose	The purpose of this pop-up is to comment to specific sections.								
Functionality	<ul style="list-style-type: none"> <li>❖ In the large grey fields plain text can be edited.</li> <li>❖ Optionally advanced formatting can be allowed.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
		<b>X</b>	X	X	X	X	X	X	X

#### 4.4.1.4 Button 'view comments' (pop-up)

ID	Date and time	Username	Comment	Remove	Reply
(auto)	(auto)	(auto)		Remove	Reply
				Remove	Reply
				Remove	Reply
				Remove	Reply

Figure 7: View comments pop-up

Purpose	The purpose of this pop-up is to view the comments. Optionally, replying to comments may be allowed.								
Functionality	<ul style="list-style-type: none"> <li>❖ A table with comments.</li> <li>❖ It may be possible for the Case Study Administrators to remove comments.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
		<b>X</b>	X	X	X	X	X	X	X

#### 4.4.2 Linking Case Studies and other information sources

Case Study Collaborators will need to insert knowledge from the indicator, parameter and technology databases into certain steps of the Case Study development. In the next section, the functionality of this insertion is visualized.

It is important that, once information is imported, changes in the indicators, parameters and technologies will not affect the information within the Case Studies.

##### 4.4.2.1 Button 'Associate indicator to Case Study' (pop-up)



Figure 8: Associate an indicator with a specific Case Study

Purpose	The purpose of the page is to select indicators to be added to the Case Study documentation. In a Case Study, generic information of an indicator of interest can be stored. Once stored, the information does not change when the information in the parent indicator database changes.								
Functionality	<ul style="list-style-type: none"> <li>❖ In the grey fields, information is displayed (non-editable).</li> <li>❖ Turning the checkbox will select the indicator to be added to the Case Study.</li> <li>❖ Save and close will lead to the actual adding of the indicator to the Case Study.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
							X	X	X

#### 4.4.2.2 Button 'Associate parameter to Case Study indicator' (pop-up)

**Associate parameter to case study indicator 'I'**

ID	Name	Definition / Short Description of the parameter	unit	Yes/No
1				checkbox
2				checkbox
...				checkbox

Search / Filter by name

(?name?)

Search / Filter checkbox

yes/no

Save & Close

**Figure 9: Associate a parameter with a specific Case Study indicator**

Purpose	Similarly to the previous page, the purpose of this page is to select parameters to be added to the Case Study documentation. In a Case Study, generic information of parameters can be stored. Once stored, the information does not change when the information in the parent parameter database changes.								
Functionality	<ul style="list-style-type: none"> <li>❖ In the grey fields information is displayed (non-editable).</li> <li>❖ Turning the checkbox will select the parameter to be added to the Case Study.</li> <li>❖ Save and close will lead to actual adding of the parameter to the Case Study.</li> <li>❖ As the list of parameters can be quite long, filtering tools should be implemented.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
							X	X	X

#### 4.4.2.3 Button 'Associate technology to Case Study' (pop-up)



Figure 10: Associate a technology to a Case Study

Purpose	Similarly to the previous tab, the purpose of this page is to select technologies to be added to the Case Study documentation. In a Case Study, generic information about a technology can be stored. Once stored, the information does not change when the information in the parent technology database changes.								
Functionality	<ul style="list-style-type: none"> <li>❖ In the grey fields information is displayed (non-editable).</li> <li>❖ Using the check box a technology will (after using save) lead to adding the technology to a Case Study.</li> <li>❖ Save and close will lead to actual adding of the technology to the Case Study.</li> <li>❖ Optionally, filtering tools could be implemented, as the list of technology may be quite long.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
							X	X	X

#### 4.4.2.4 Button 'Case Study actors' (pop-up)

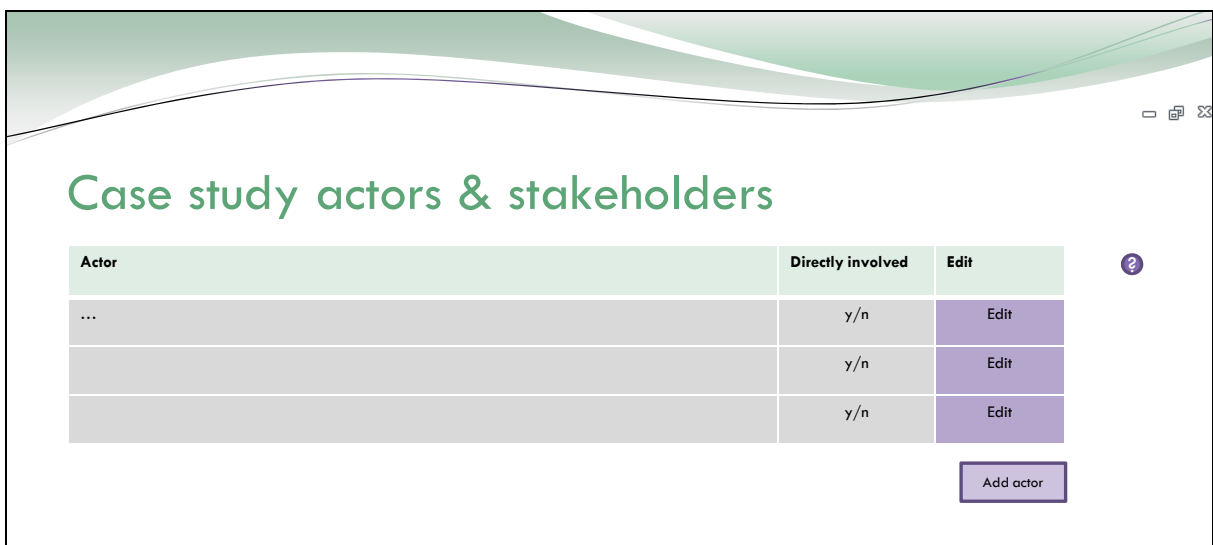


Figure 11: Defining the actors of a Case Study

Purpose	The purpose of this screen is to provide an overview and develop the Case Study actor analysis.								
Functionality	<ul style="list-style-type: none"> <li>❖ Edit will open an editor similar to the previously presented editors.</li> <li>❖ Adding an actor will add a new line to the table.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
						X	X	X	X

#### 4.4.2.5 Button 'Set parameter normalisation parameters' (pop-up)

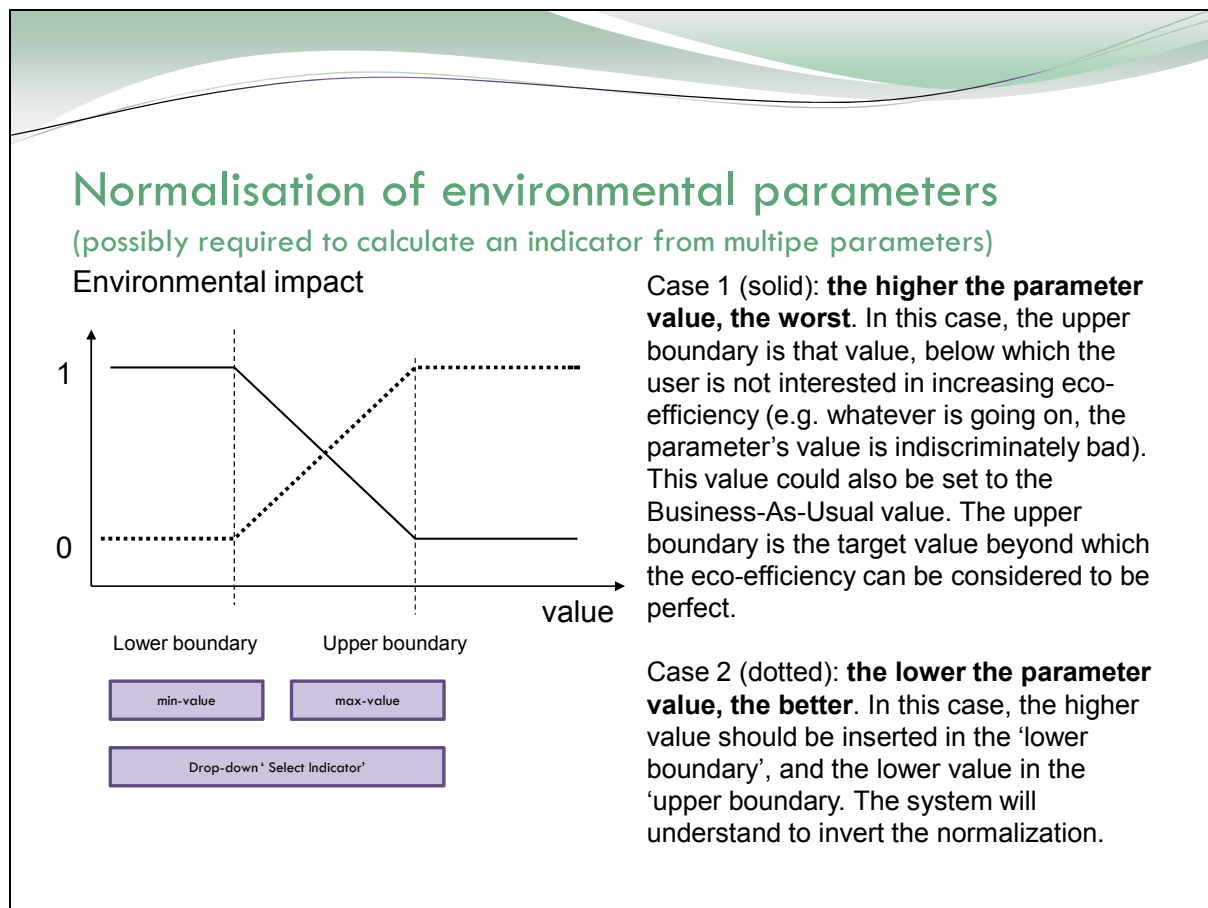


Figure 12: Normalisation of parameters

Purpose	In order to elicit a single environmental pressure value from multiple parameters, these parameters need to be combined. Various possibilities exist, one being normalisation per parameter, followed by aggregation over parameters. The mock-up screen above presents an example of a normalization method that may be used, which facilitates linear normalisation between two boundaries.								
Functionality	<ul style="list-style-type: none"> <li>❖ In the longer purple box, the user is prompted to select the parameter.</li> <li>❖ The user is then prompted to provide the relevant numbers.</li> <li>❖ The graph should adjust itself, based on the numbers, to immediately visualize the effect of the figures.</li> <li>❖ Note: This functionality may need to be extended to fit in the detailed process.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
							X	X	X

#### 4.4.2.6 Button 'Set parameter aggregation parameters' (pop-up)

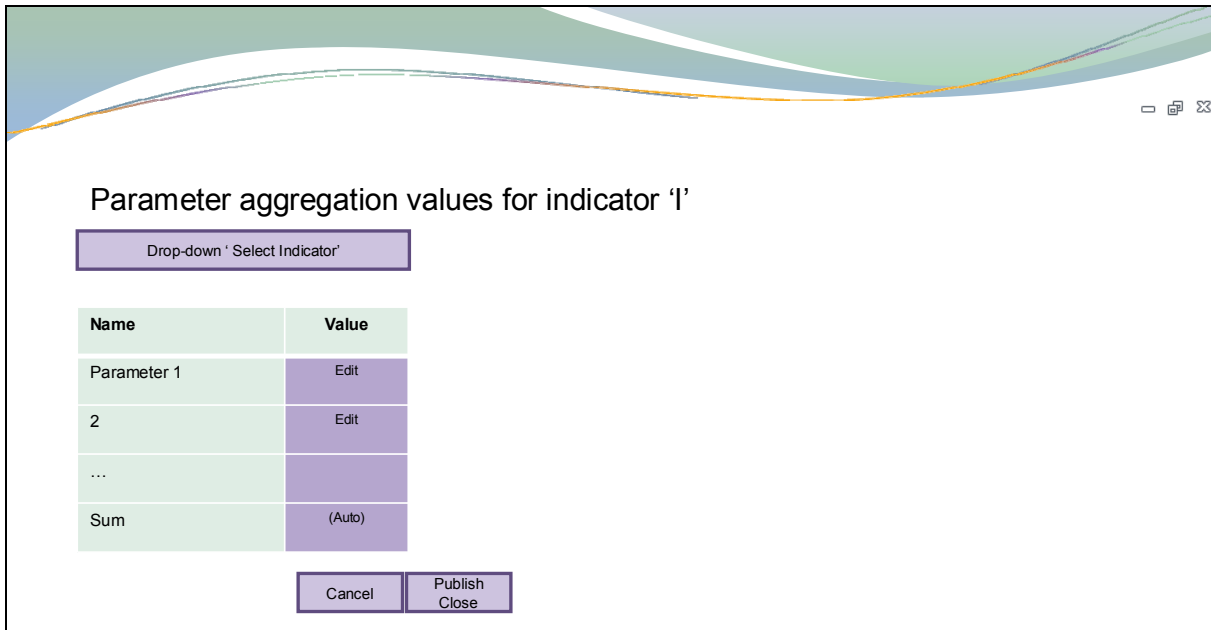


Figure 13: Parameter aggregation

Purpose	In order to elicit a single environmental pressure value from multiple parameters, these parameters need to be combined. Various possibilities exist, one being normalisation per parameter, followed by aggregation over parameters. The mock-up screen above presents an example of an aggregation method that may be used, which facilitates the aggregation over parameters.								
Functionality	<ul style="list-style-type: none"> <li>❖ In the purple box, the user is prompted to select the indicator.</li> <li>❖ The user is then prompted to provide the relevant numbers.</li> <li>❖ The sum should be equal to '1'; otherwise, the result cannot be published.</li> <li>❖ Note: This functionality may need to be extended to fit in the detailed process.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
							X	X	X

#### 4.4.2.7 Button 'Set parameter combination parameters' (pop-up)

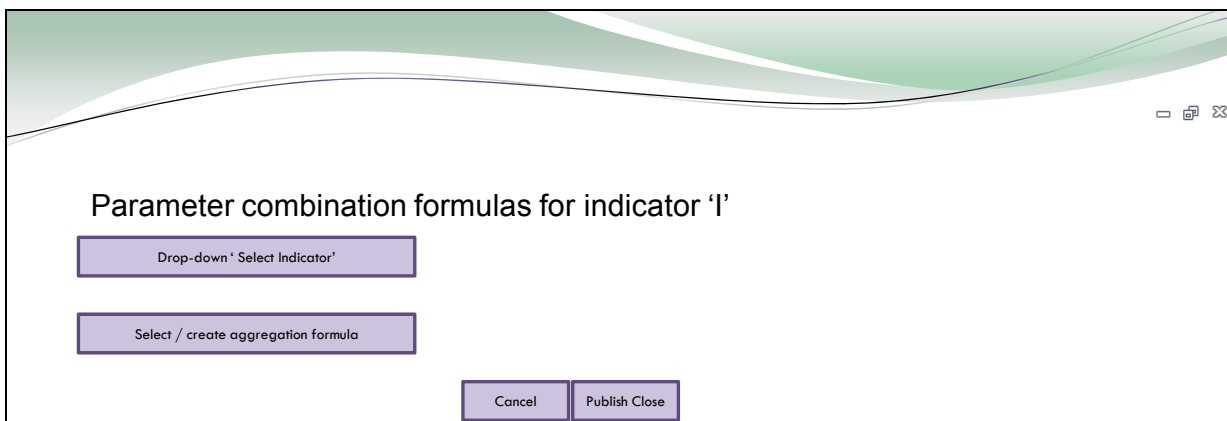


Figure 14: Parameter combination

Purpose	For some indicators, formulas to combine different parameters into a single value may have been developed. This button should launch a tool, which would allow developing or reusing such a formula.								
Functionality	<ul style="list-style-type: none"> <li>❖ In the purple box, the user is prompted to select the indicator.</li> <li>❖ The user is then prompted to provide the formula.</li> <li>❖ Note: This functionality may need to be extended to fit in the detailed process.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
							X	X	X

#### 4.4.2.8 Button 'Edit technology Case Study details' (pop-up)

**Edit case study specific details of technology 't'**

Item	Content	Edit	Save
Name	fixed		
Sector	fixed		
Category	fixed		
Description	Open for edit	Edit	Save
Field 1	Open for edit	Edit	Save
...	Open for edit	Edit	Save
Field N	Open for edit	Edit	Save
Local parameter 1	Open for edit	Edit	Save
Local parameter ....	Open for edit		
Attachments		Edit	Save

**Figure 15: Case Study specificities of a technology**

Purpose	The local technology application may need additional data, such as the node to which the technology is applied, specific (efficiency) parameters, etc. The mock-up screen above is an example that can be followed.								
Functionality	<ul style="list-style-type: none"> <li>❖ Edit / save buttons allow that action.</li> <li>❖ In some cases, validation rules may be required.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
							X	X	X

#### 4.4.2.9 Button 'Import SEAT, EVAT'

Figure 16: Importing SEAT and EVAT files

Purpose	The purpose of this screen is to be able to upload a new version of the EVAT and SEAT model of a Case Study, including the associated results. <i>Attention: The EVAT / SEAT sections may need to be adjusted to meet demands of the tools.</i>								
Functionality	<ul style="list-style-type: none"> <li>❖ The description should make clear what is different from an earlier version.</li> <li>❖ Time should be recorded automatically with the upload</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
							X	X	X

#### 4.4.2.10 Button 'Export SEAT and EVAT files'

ID	SEAT/EVAT	Date of upload	Description	Yes/No
1				export
2				export
...				export

Figure 17: Exporting SEAT and EVAT files for local use

Purpose	The purpose of this pop-up is to export the SEAT and EVAT files, to be used locally (SEAT and EVAT are stand-alone tools).
Functionality	<ul style="list-style-type: none"> <li>❖ In the grey box, the user will see the different versions of a Case Study.</li> <li>❖ Clicking export will allow exporting the files, such that the locally installed tools can use them without further actions of the user.</li> </ul>



Intend- ed Us- ers	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
							X	X	X

#### 4.4.3 Analysis of SEAT and EVAT results

##### 4.4.3.1 Button 'View content of SEAT and EVAT files'

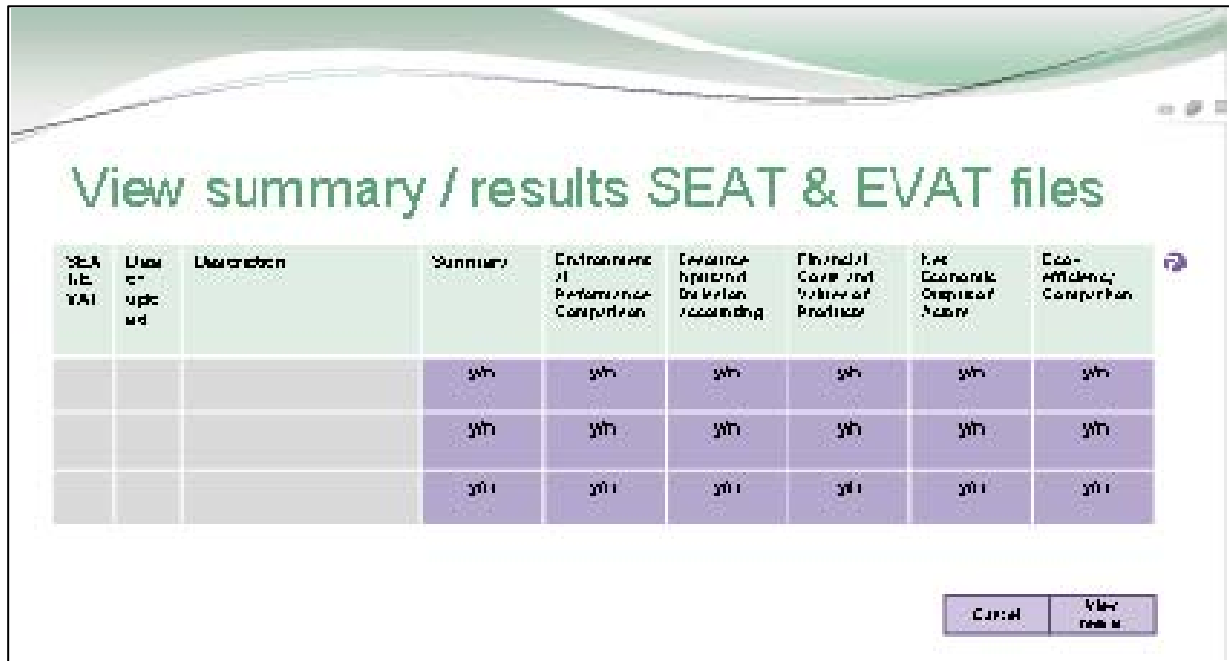


Figure 18: View content of SEAT and EVAT files

Purpose	The purpose of this pop-up is to view, and possibly export to a file, data and figures of a Case Study, including the corresponding results.								
Functionality	<ul style="list-style-type: none"> <li>❖ The user will be able to check in the purple fields what he/she would like to see. For example, in the case of 'summary', this may include: <ul style="list-style-type: none"> <li>➢ The system decomposition / boundaries;</li> <li>➢ Simple statistics (e.g. the number of nodes);</li> <li>➢ Results per node; and</li> <li>➢ Total results.</li> </ul> </li> <li>❖ Users will be able to generate Figures (Figure 19 to Figure 23, corresponding to 'Environmental Performance Comparison', 'Resource input and Emission Accounting', 'Financial Costs and values of products', 'Net Economic Output of Actors' and 'Eco-efficiency comparison', respectively).</li> <li>❖ 'Eco-efficiency Comparison' will only be possible if more than one results are selected. The user will be prompted, if the presentation is not possible.</li> <li>❖ Clicking 'View results' will generate the figures and summary results.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
						X	X	X	X

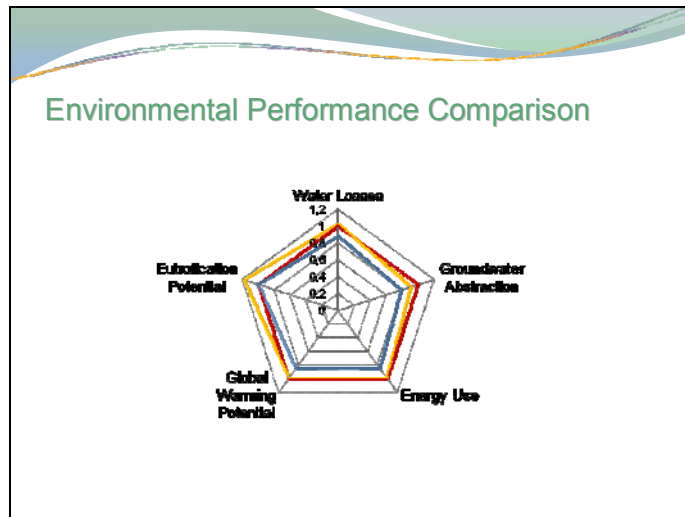


Figure 19: Environmental Performance Comparison

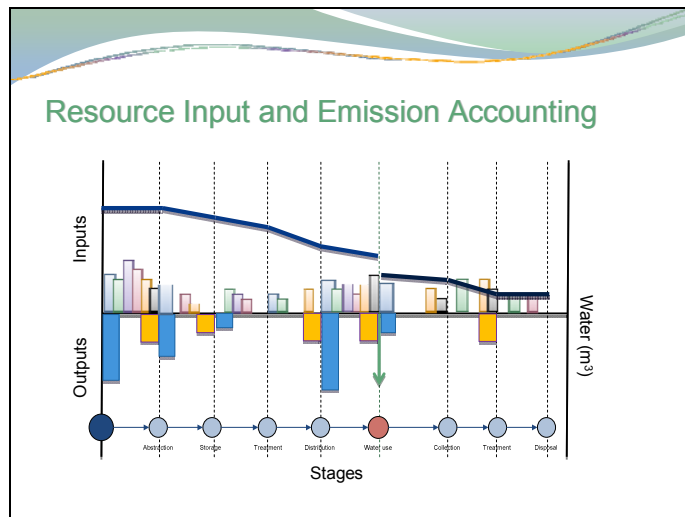


Figure 20: Resource Input and Emission Accounting

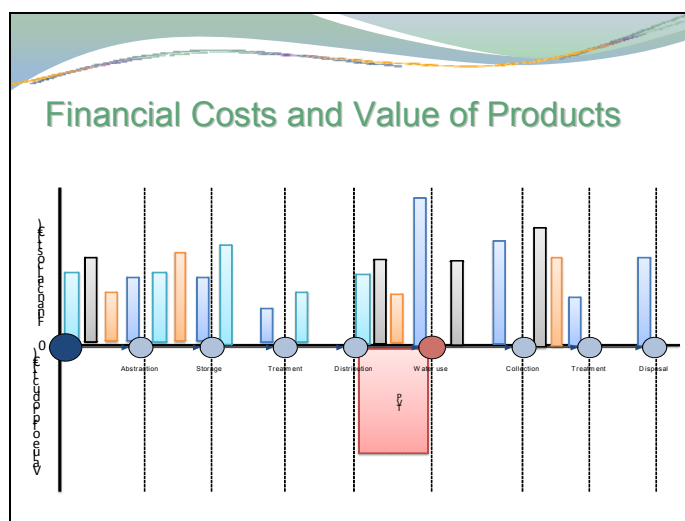


Figure 21: Financial Costs and Values of Products

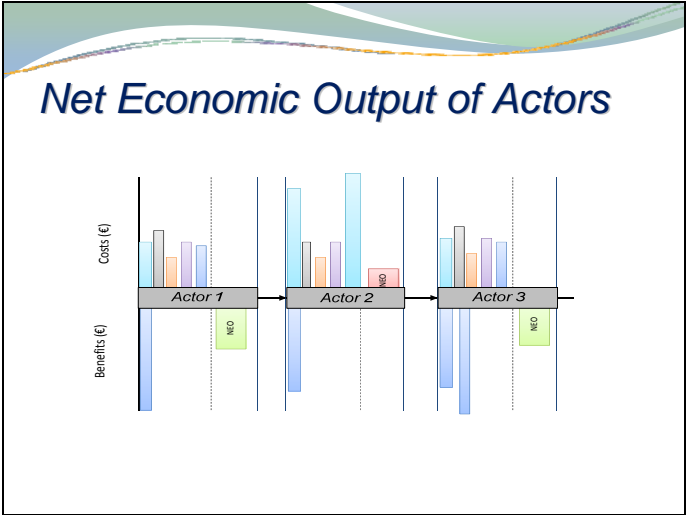


Figure 22: Net Economic Ouput of Actors

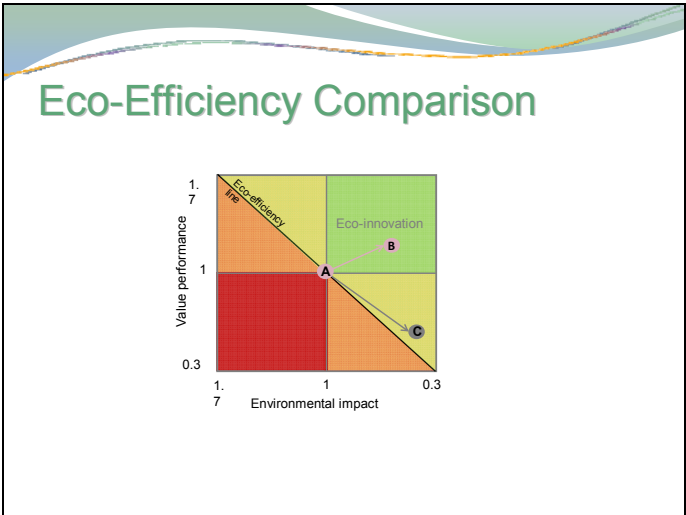


Figure 23: Eco-efficiency comparison



#### 4.4.4.2 Case specific scenario narratives

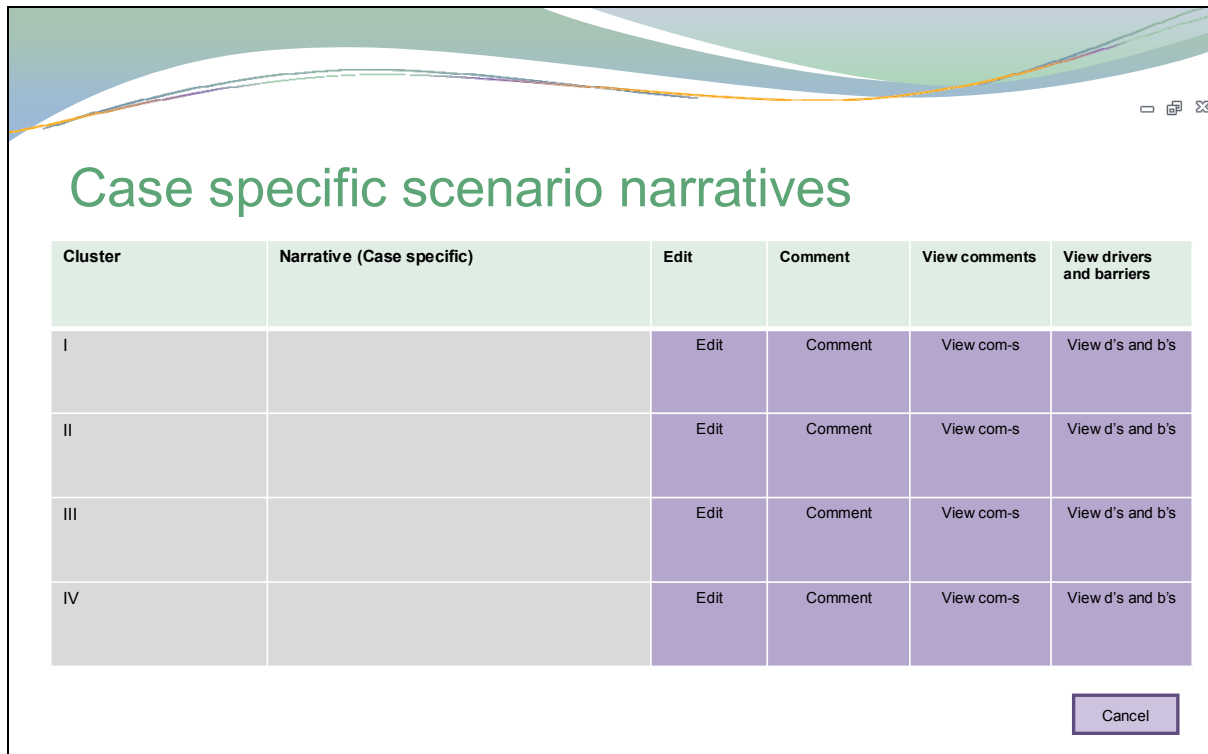


Figure 25: Case Study-specific scenario narratives

Purpose	Once the drivers and barriers are identified and clustered, it is useful to create an overall narrative of the future per cluster of drivers and barriers.								
Functionality	<ul style="list-style-type: none"> <li>❖ When clicking 'edit', the Case Study Administrators and Collaborators should be able to edit the text, and the expected development.</li> <li>❖ Case Study Stakeholders are able to comment.</li> <li>❖ All authorized Users are able to view the comments.</li> <li>❖ All authorized Users are able to view the drivers and barriers (a pop-up or hovering functionality).(Figure 7: View comments pop-up)</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
						X	X	X	X

#### 4.4.4.3 Technology matching with drivers and barriers

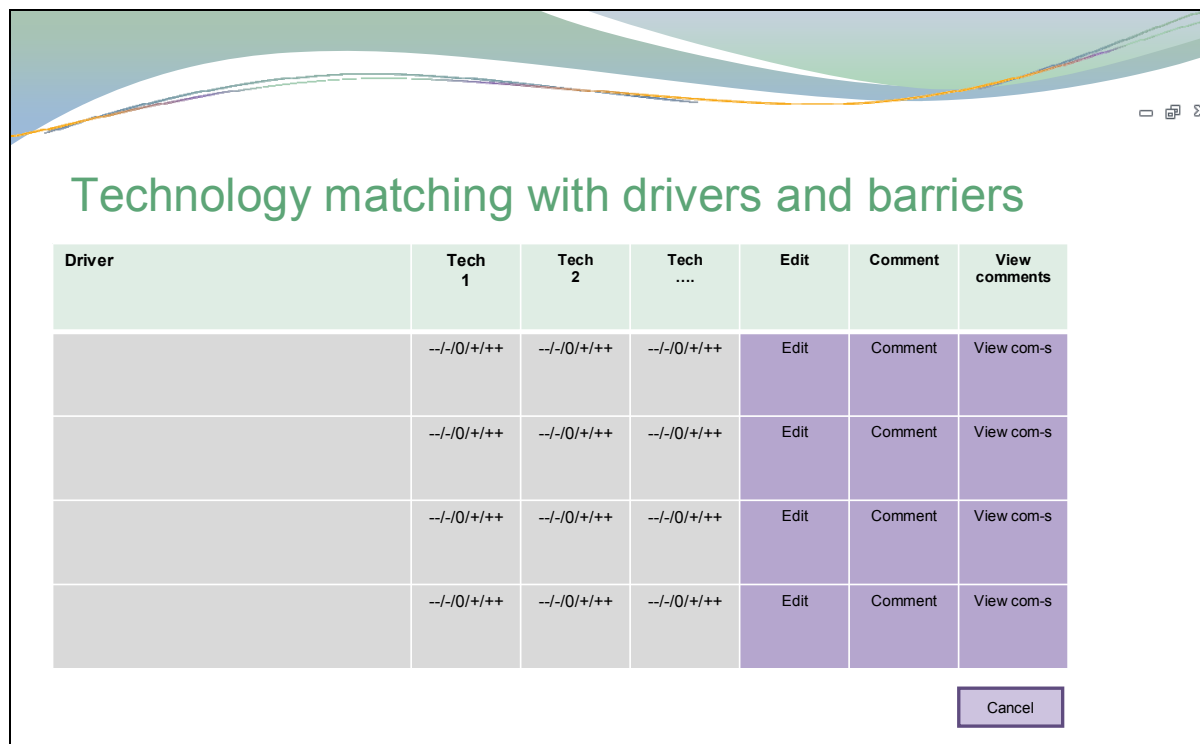


Figure 26: Technology matching with drivers and barriers

Purpose	Once the drivers and barriers are identified, it is useful to assess the effect of the individual drivers and barriers on the uptake of a technology.								
Functionality	<ul style="list-style-type: none"> <li>❖ The table is created based on the selected technologies and selected drivers and barriers.</li> <li>❖ When clicking 'edit', the Case Study Collaborators can edit the corresponding technologies.</li> <li>❖ Case Study Stakeholders are able to comment.</li> <li>❖ All authorized Users are able to view the comments. (Figure 7: View comments pop-up)</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
						X	X	X	X

#### 4.4.5 Matching of Case Study development with the functionalities presented in Chapter 4.4

Many functionalities have been described and visualized in the paragraphs above. The aim of this section is to provide an overview of the different functionalities within the framework of the Case Study development steps, as defined in the Deliverable 1.8 (Roadmap for Case Study Development).

Step 1. Definition of system boundaries, requires:

- a. Several narrative fields;
- b. Attachments; and
- c. Importing of the Case Study schematisation.

Step 2. Mapping of stages and processes, requires:

- a. Several narrative fields;
- b. attachments; and

- c. Importing of the improved Case Study schematisation.
- Step 3. Identification of actors involved, requires:
  - a. Actor tool; and
  - b. Narrative fields.
- Step 4. Mapping of actor interrelations, requires:
  - a. Graphical tool (not yet foreseen); and
  - b. Narrative fields.
- Step 5. Identification of environmental impact indicators, requires:
  - a. The association of indicators to the Case Study tool (requires the existence of generic indicator database); and
  - b. Narrative fields.
- Step 6. Selection of environmental impact parameters, requires:
  - a. The association of parameters to the Case Study tool (requires the existence of generic parameter database); and
  - b. Narrative fields.
- Step 7. Collection of data on resource flows and currently applied technologies, requires (optionally):
  - a. Data-storage (primary data are mainly stored within SEAT and EVAT).
- Step 8. Calculation of Environmental Impact Indicators
  - a. Aggregation of parameters to the indicators tool.
- Step 9. Development of the economic analysis, requires:
  - a. Narrative fields; and
  - b. Importing of the EVAT results.
- Step 10. Identification of normalization and weighting parameters, requires (optionally):
  - a. The aggregation of the indicators to the index tool.
- Step 11. Baseline scenario eco-efficiency-assessment, requires:
  - a. Narrative fields; and
  - b. Importing of the SEAT/EVAT results.
- Step 12. Description of potential technologies to improve eco-efficiency, requires:
  - a. Associate indicator to the Case Study tool; and
  - b. Narrative fields.
- Step 13. Views of actors on technologies, requires:
  - a. Narrative fields.
- Step 14. Selection of the most suitable technologies, requires:
  - a. Narrative fields.
- Step 15. Quantitative assessment of alternative technology configurations, requires:
  - a. Narrative fields;
  - b. Importing of the SEAT/EVAT results; and
  - c. Various graphs.

Step 16. Definition of scenarios, requires:

- a. PESTLE tool; and
- b. Narrative fields.

Step 17. Analysis of scenarios, requires:

- a. Actor views; and
- b. Technology assessment with respect to scenarios.

The development of these steps is an evolving process and the order of activities may change. In addition, more functionalities than those presented in this coarse overview may be required. The reader may notice that not all the previous and following functionality screen shots are included in this table. The rest of the functionality examples are secondary to the required functionalities listed here.

#### 4.5 Tab 'Technologies'

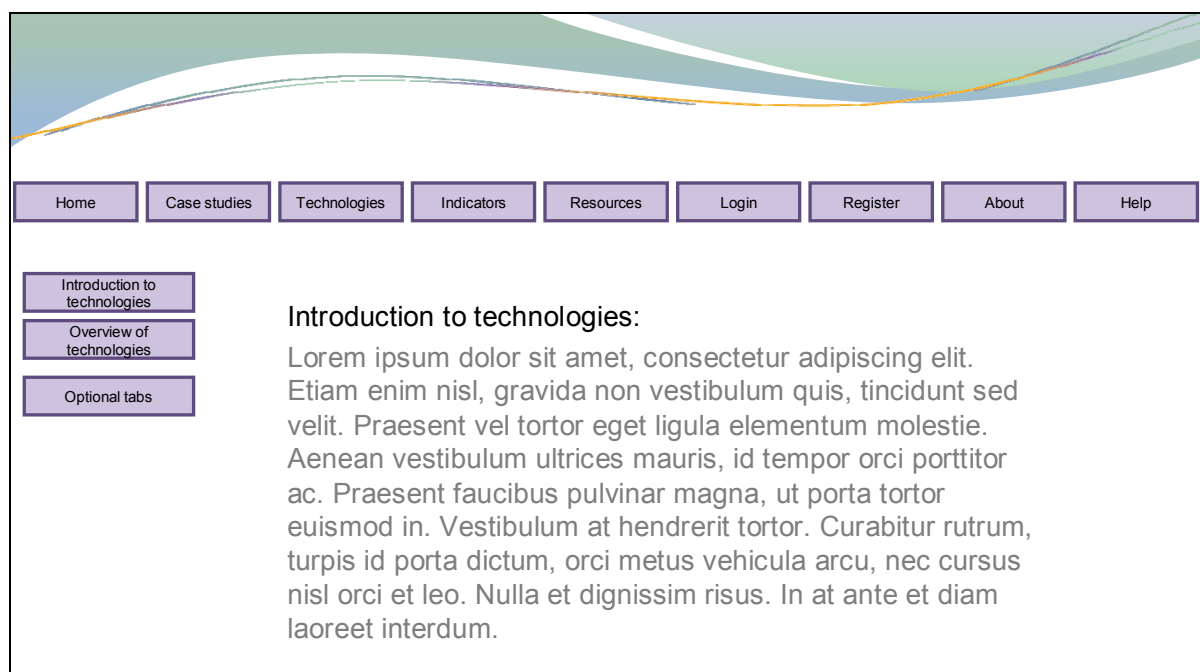


Figure 27: Introduction to technologies

Purpose	This tab concerns the opening screen of technologies.								
Function-ality	<ul style="list-style-type: none"> <li>❖ The user receives general information about the issue of technologies.</li> <li>❖ The user can view the technologies. (Figure 7: View comments pop-up)</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
	<b>X</b>	X	X	X	X	X	X	X	X



#### 4.5.1 Left-hand tab 'Overview of technologies'

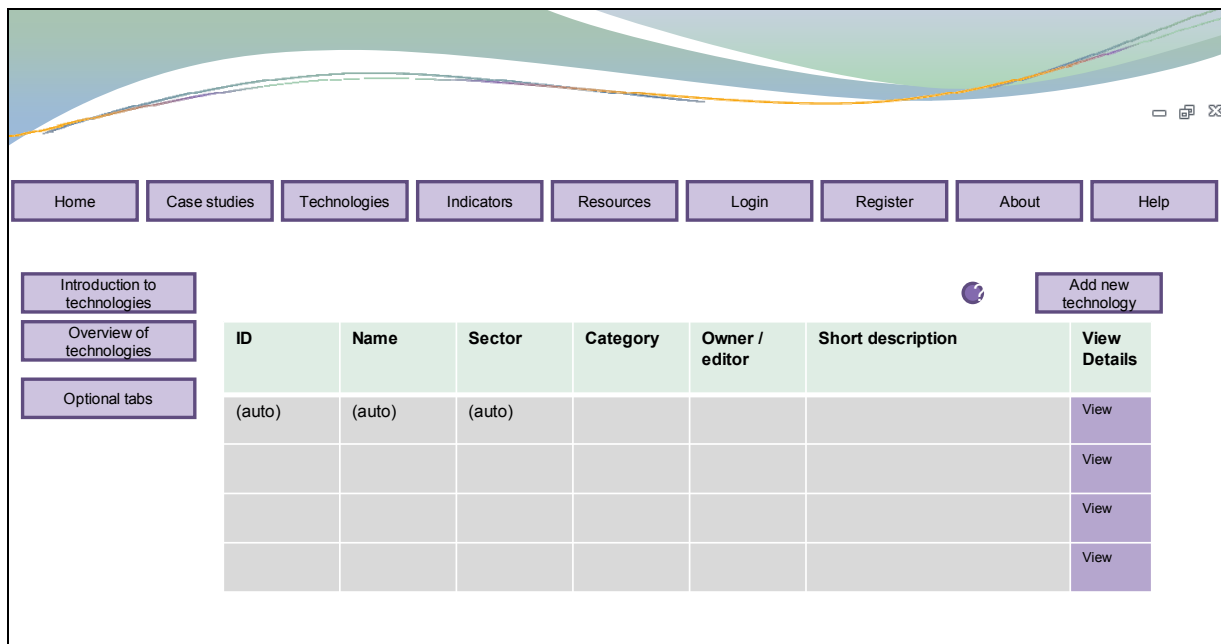


Figure 28: Overview of technologies

Purpose	The purpose of this page is to show the listed technologies.								
Functionality	<ul style="list-style-type: none"> <li>❖ A table with technologies.</li> <li>❖ The user should be able to sort the table by the green fields.</li> <li>❖ Clicking details will open a pop up window.</li> <li>❖ Technology Providers can add new technologies.</li> </ul>								
Intend- ed Us- ers	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
	X	X	X	X	X	X	X	X	X

#### 4.5.2 Button 'View details' (pop-up)

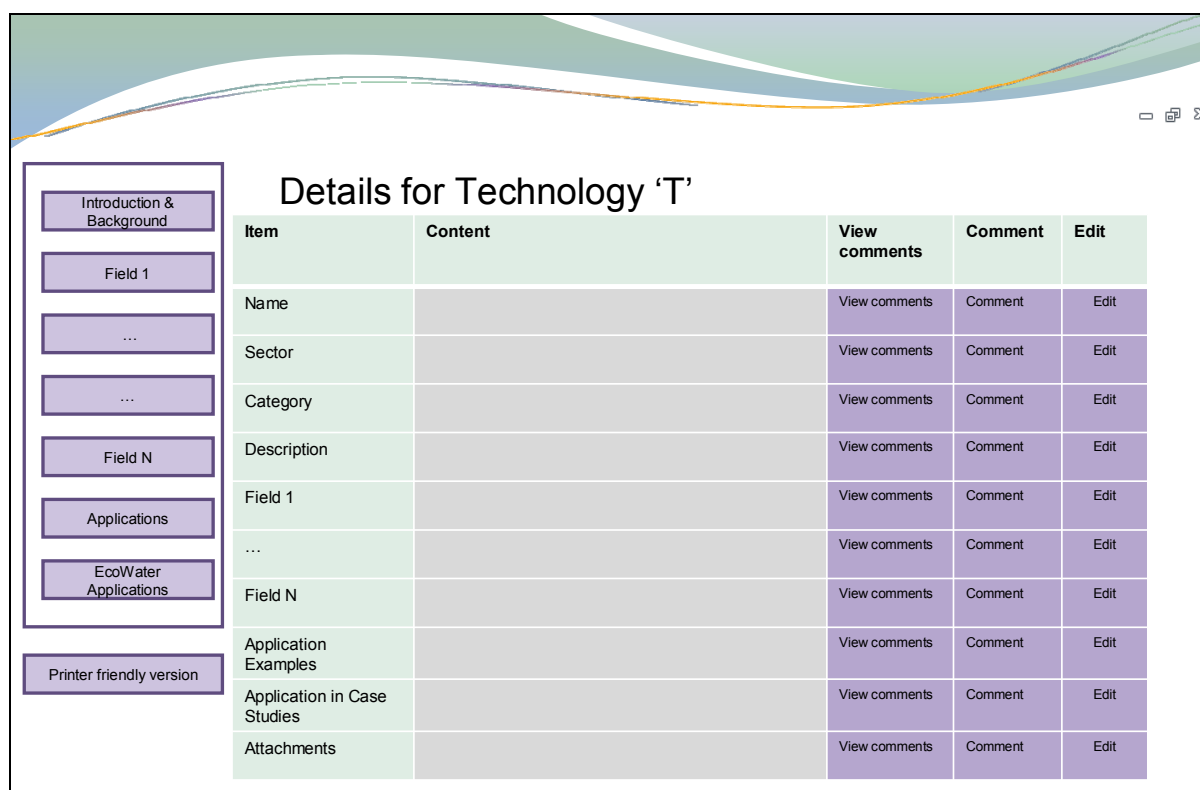


Figure 29: Detailed description of technologies

Purpose	The purpose of this screen is to provide an overview of the available information. The left hand navigation bar presents the different chapters or steps, which (when completed) should lead to the conclusions. The fields mentioned will be determined based on the outcome of the Task 1.2 (Technology inventory for eco-efficient water systems and use).								
Functionality	<ul style="list-style-type: none"> <li>❖ On 'Click' on a step in the left hand navigation panel, the user will jump to the corresponding section. The left hand navigation panel remains visible at all times (the user should not need to go back).</li> <li>❖ On 'Click' on the printer friendly version, a printer friendly report will be created.</li> <li>❖ The button 'edit' will open an editor window (only available to the technology creator).</li> <li>❖ The button 'comment' will allow commenting.</li> <li>❖ The button 'view comments' will allow viewing comments.</li> <li>❖ Links to the Case Studies where the technology has been implemented and to the relevant results may be provided in the 'Application in Case Studies' field.</li> </ul>								
Intend- ed Us- ers	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
	X	X	X	X	X	X	X	X	X

### 4.5.3 Button 'New technology' pop-up

Name		Edit	save
Sector		Edit	save
Category		Edit	save
Introduction & Background		Edit	save
Field 1		Edit	save
....		Edit	save
Field N		Edit	save
Application Examples		Edit	save
Applications in Case studies		Edit	save
Attachements		Edit	save

Figure 30: Adding and editing a technology

Purpose	The purpose of this pop-up is to enter a new technology. The fields will be determined based on the needs of the technology inventory. Adding and editing generic information on technologies is restricted to Technology Providers only. The grey area in the mock-up above will be filled with existing information, if the technology already exists. Otherwise, the user will fill in these fields.								
Functionality	<ul style="list-style-type: none"> <li>❖ On 'Edit', the user will be able to edit the corresponding field. This will likely be by using a pop-up window.</li> <li>❖ On 'Click' on printer friendly version a printer friendly report will be created.</li> <li>❖ The button 'edit' will open an editor window (only available to the technology creator).</li> <li>❖ The button 'comment' will allow commenting (depending on authorisation).</li> <li>❖ The button 'view comments' will allow viewing comments.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
			<b>X</b>						<b>X</b>

## 4.6 Tab 'Indicators'

### 4.6.1 Left-hand tab 'Introduction to Indicators and parameters'

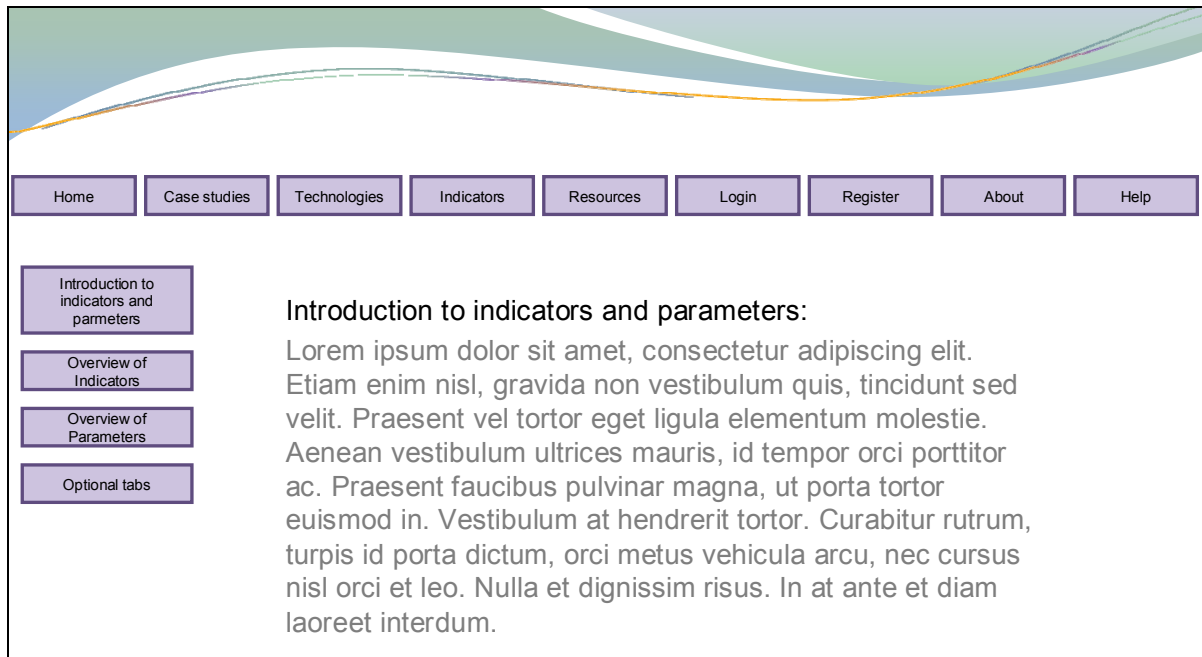


Figure 31: Introduction to indicators

Purpose	This tab concerns the opening screen of indicators.								
Functionality	<ul style="list-style-type: none"> <li>❖ The User receives general information on indicators.</li> <li>❖ The User can view the lists of indicators and parameters.</li> </ul>								
Intend- ed Us- ers	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
	X	X	X	X	X	X	X	X	X

### 4.6.2 Left-hand tab 'Overview of indicators'

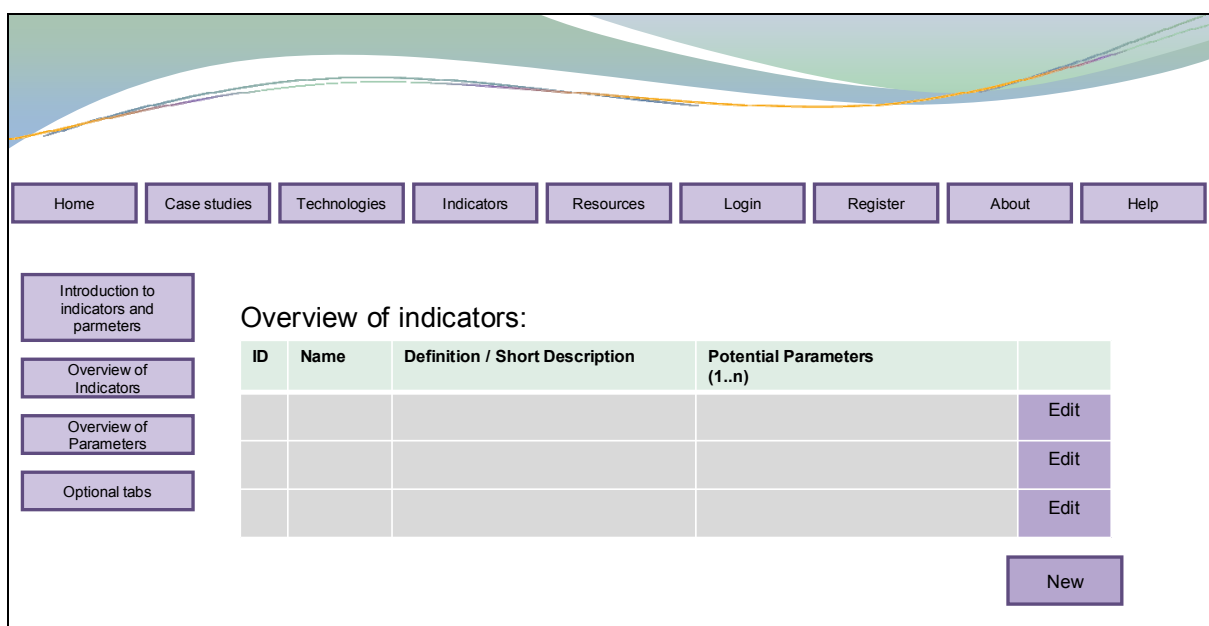


Figure 32: Overview of indicators

Purpose	The purpose of this page is to show the listed indicators and provide some insight in the typical underlying parameters.								
Functionality	<ul style="list-style-type: none"> <li>❖ A table with indicators.</li> <li>❖ The User should be able to sort the table by the green fields.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
	X	X	X	X	X	X	X	X	X

#### 4.6.3 Button 'new/edit indicator' (Pop-up)

New / Edit indicator

Item	Content	Edit	Save
ID	(autotext)	-	-
Name	(in case of 'edit', existing text should show in this column, in case of 'new' this column is empty)	Edit	Save
Definition / Short Description	dito	Edit	Save
Parameters	A narrative text on possible parameters. <b>(Parameters and indicators are only linked on the case study level)</b>		

Cancel Publish Close

Figure 33: Editing an indicator / creating a new indicator

Purpose	This screen provides an example, if 'edit' indicator or 'new indicator' is selected.								
Functionality	<ul style="list-style-type: none"> <li>❖ The screen allows editing existing information, if 'edit' has been selected. The existing information is then already visible.</li> <li>❖ The screen allows adding new information, if the entry point is 'add new indicator'.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
				X					X

#### 4.6.4 Left-hand tab 'Overview of parameters'

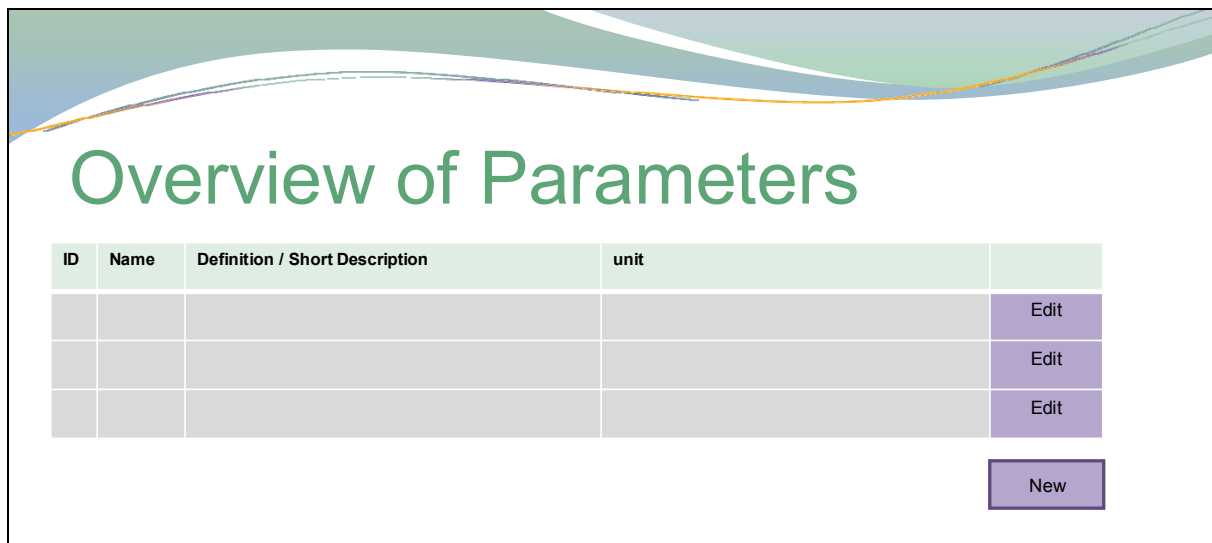


Figure 34: Overview of parameters

Purpose	This screen provides an overview of parameters (underlying indicators).								
Functionality	<ul style="list-style-type: none"> <li>❖ A table with indicators.</li> <li>❖ The User should be able to sort the table by the green fields.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
	X	X	X	X	X	X	X	X	X

##### 4.6.4.1 Button 'Add/edit parameters' (pop-up)

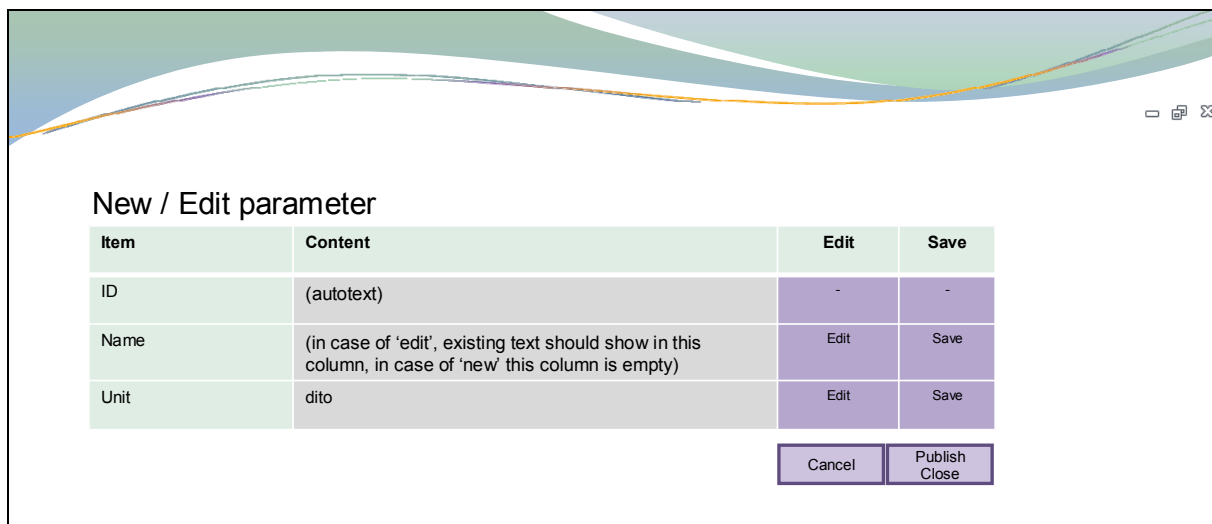


Figure 35: Editing a parameter / create new parameter

Purpose	This screen provides an example, if 'edit' indicator or 'new parameter' is selected.								
Functionality	<ul style="list-style-type: none"> <li>❖ The screen allows editing existing information, if 'edit' has been selected. The existing information is then already visible.</li> <li>❖ The screen allows adding new information, if the entry point is 'add new indicator'.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
				X					X

## 4.7 Tab 'Resources'

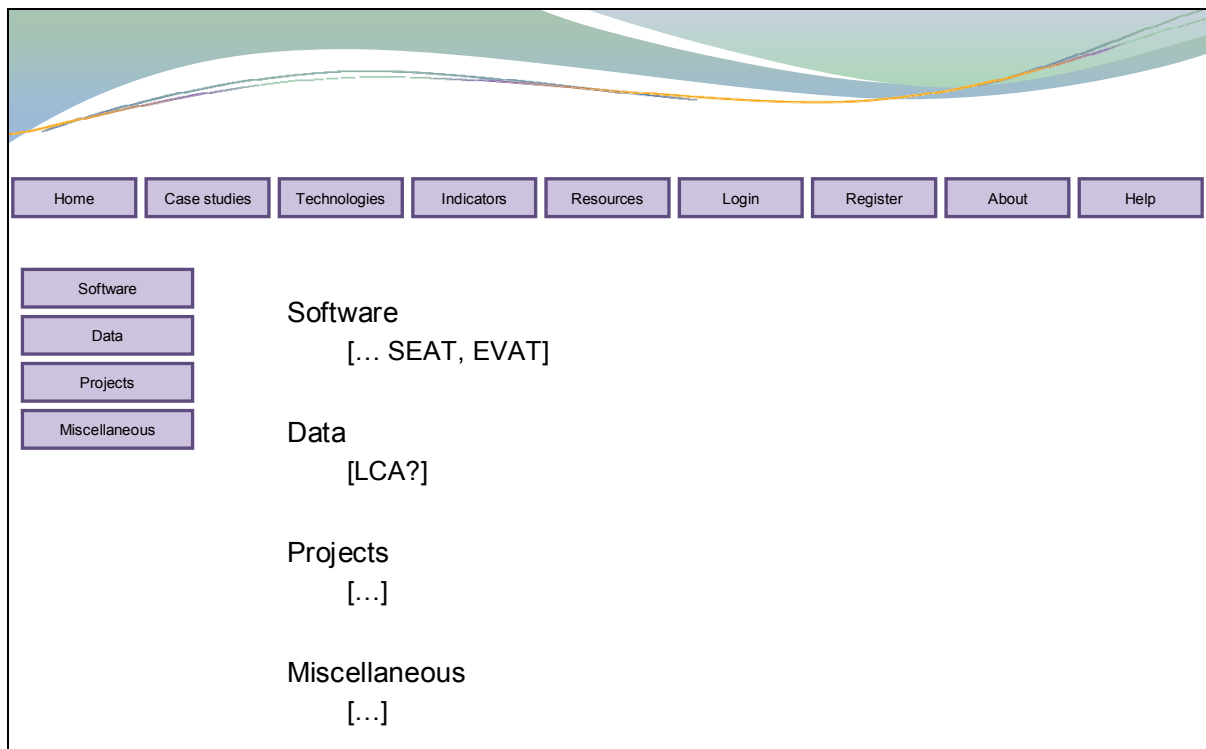


Figure 36: Resources

Purpose	This screen provides a view on the 'resources' tab. The 'resources' tab is a straightforward page listing (and linking to) other relevant tools and information repositories.								
Functionality	<ul style="list-style-type: none"> <li>❖ The buttons on the left-hand side allow jumping to the right section.</li> <li>❖ These buttons will always remain visible.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
	X	X	X	X	X	X	X	X	X

## 4.8 Tab 'Login'

Figure 37: Tab 'Login'

Purpose	This screen provides a view on the login screen.								
Functionality	<ul style="list-style-type: none"> <li>❖ The buttons on the left-hand side allow jumping to a specific right section.</li> <li>❖ These buttons will always remain visible.</li> <li>❖ The screen starts by default with the login fields.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
		X							

### 4.8.1 Left hand tab 'Login'

Figure 37 also applies to this section.

Purpose	Clicking this tab will lead the User back to Figure 37. It will thus do the same as if one would click on the login tab in the top level.								
Functionality	❖ Jump to the login screen.								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
		X							



#### 4.8.2 Left hand tab 'Forgot username or password'

Figure 38: Left hand tab 'Forgot username or password'

Purpose	Clicking this tab will lead to a screen where the user can request a new password.								
Functionality	<ul style="list-style-type: none"> <li>❖ Entry field for an email-address.</li> <li>❖ Further functionalities will depend on available security technologies, but could be: <ul style="list-style-type: none"> <li>➢ Setting of a new password and sending this new password.</li> <li>➢ Sending a temporary link.</li> </ul> </li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
		X							

### 4.8.3 Left hand tab 'Change account details'

Figure 39: Left-hand tab 'Change account settings'

Purpose	Clicking this tab will lead to a screen where the user can alter their registration details.								
Functionality	<ul style="list-style-type: none"> <li>❖ Existing information is presented.</li> <li>❖ Editing and saving existing information.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
		X							

#### 4.8.4 Left hand tab 'Register'

Figure 40: Left-hand tab 'Register'

Purpose	Clicking this tab will lead to a screen where the user can register.								
Functionality	❖ Inserting and saving user account information.								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
	X								

#### 4.8.5 Left hand tab 'Request Authorisation'

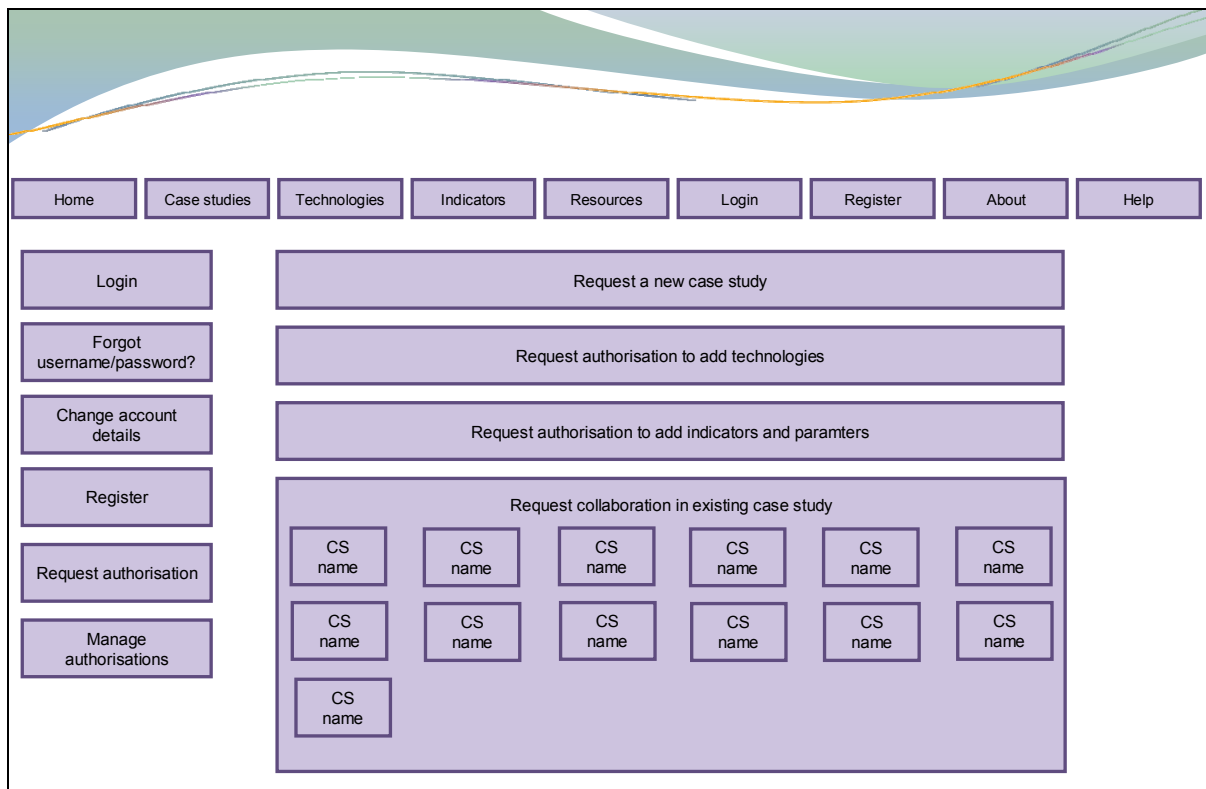


Figure 41: Left-hand tab 'Request authorisation'

Purpose	To keep the system easy to maintain from a User authorisation perspective, System and Case Study Administrators will be in charge of providing access. This screen provides buttons which will send notifications to the Case Study Administrators or, alternatively, to the System Administrators (add a Case Study, add a technology and add indicators).								
Functionality	❖ Provide access to specific functionalities.								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
		X							

#### 4.8.6 Left hand tab 'Manage authorisations'

Figure 42: Left-hand tab 'Manage authorisations'

Purpose	On this screen, the System Administrators and Case Study Administrators can set the authorisations.								
Functionality	<ul style="list-style-type: none"> <li>❖ Case Study Administrators will see only the section of their Case Study.</li> <li>❖ Yes / No (y/n) check boxes will toggle authorisations.</li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
								X	X

## 4.9 Tab 'About'

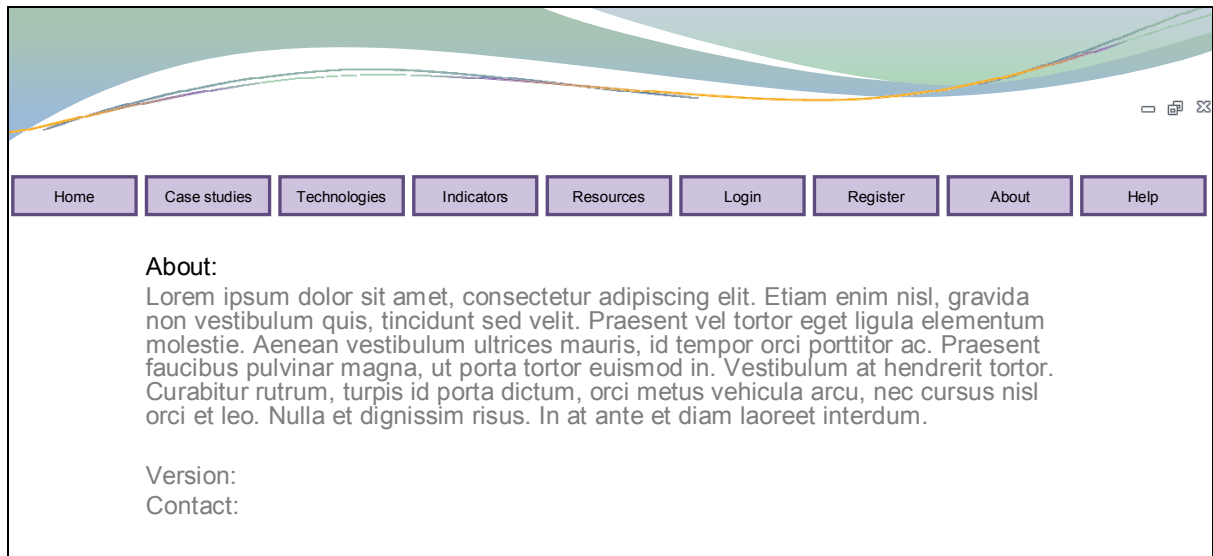


Figure 43: Tab 'About'

Purpose	The purpose of this screen is to provide Users with basic information.								
Functionality	❖ None, besides basic information.								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
	X								

## 4.10 Tab 'Help'

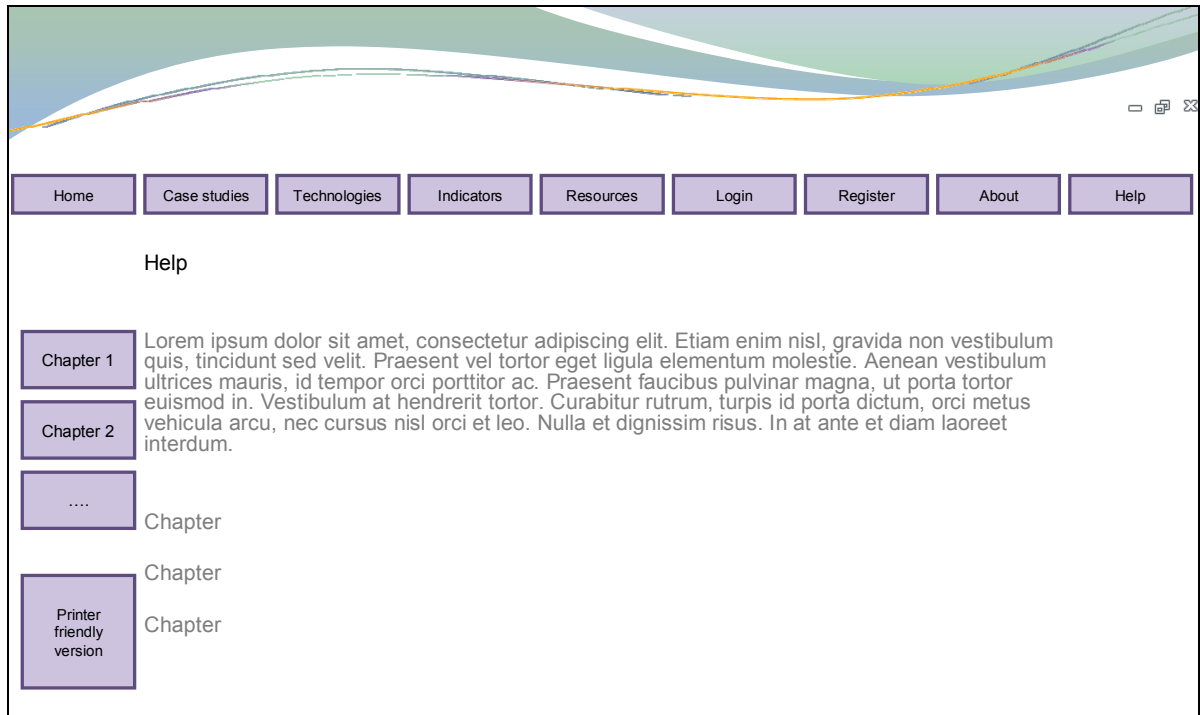


Figure 44: Tab 'Help'

Purpose	The purpose of this screen is to provide User with help.								
Functionality	<ul style="list-style-type: none"> <li>❖ On the left hand navigation tabs the user is guided through the different chapters.</li> <li>❖ The help document will be developed based on small chapters, which will be associated with different screens of the tools.</li> <li>❖ The help function should start with an introduction in which the following issues should be addressed (raised by the reviewers): <ul style="list-style-type: none"> <li>➢ How to make sure the software survives the Project?</li> <li>➢ What is the added value of this toolbox?</li> <li>➢ Who does the software target (both currently and after Project completion)?</li> <li>➢ Who will maintain and adapt the software effort in the future?</li> </ul> </li> </ul>								
Intended Users	Public	Registered Users	Technology Providers	Indicator Providers	Case Study Providers	Case Study Stakeholders	Case Study Collaborators	Case Study Admins	System Admins
	X								

## 5 Overall architecture

The overall architecture of the toolbox is depicted in Figure 45 below.

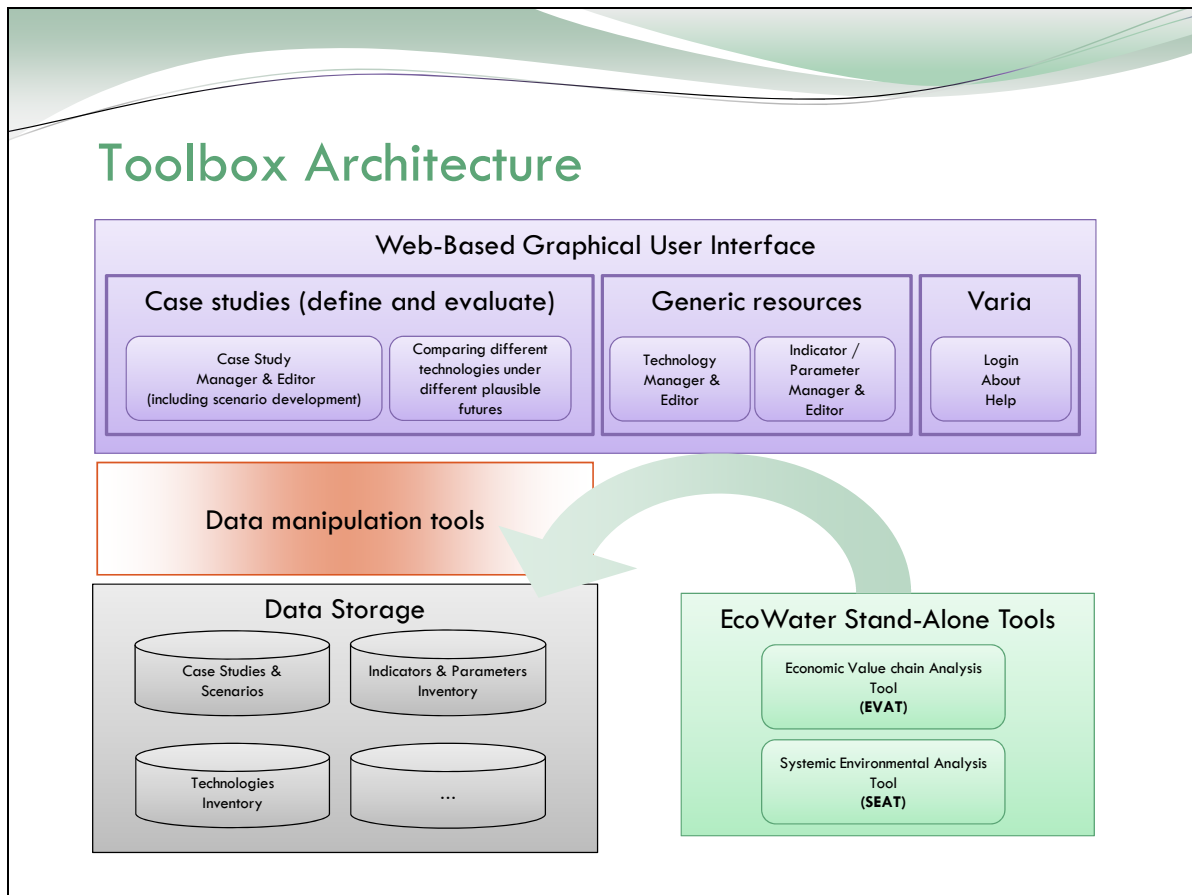


Figure 45: Overall architecture

The left hand part is a traditional three-tier architecture. The Web-Based Graphical User Interface is the part that the users see and work with. This layer is commonly referred to as GUI layer (or Presentation logic layer). From this layer, users are able to carry out a number of tasks. Many of those tasks require retrieval, manipulation and storing of information and data. The data manipulation layer is commonly referred to as object layer (or Business rules), whereas the database layer is also referred to as the Business data layer.

In the lower right hand section, the EVAT and SEAT are presented. These are stand-alone tools. In this functional design, two functionalities have been presented with respect to these tools:

1. Downloading the tools from the tab 'resources'; and
2. Importing models and results from the different tools. This is depicted by the arrow in the architecture. Data are imported via a command given in the graphical user interface. Results are stored in the database layer.



## 6 Conclusions and next steps

This functional design provides numerous example screens and example functionalities that are required to implement the software. The functional design heavily builds on the EcoWater Deliverable 1.8 (Roadmap for Case Study Development). Ongoing work, and hence new insight, may require alterations and additions to this design.

The functional design in this shape provides sufficient information for the next step, the development of the technical design, especially with regard to the design of the underlying databases and tool interrelationships. This functional design could be further extended to provide detailed information for incorporating further functionalities. During the implementation phase, this information may be added on demand.

## 7 Literature

EcoWater Description of Work, 2011, EcoWater Project, Meso-level eco-efficiency indicators to assess technologies and their uptake in water use sectors, 7th Framework Programme, Grant Agreement No: 282882 (restricted access).

Kourentzis, V., 2012, Roadmap for Case Study Development, Deliverable 1.8 of the EcoWater Project, Meso-level eco-efficiency indicators to assess technologies and their uptake in water use sectors, 7th Framework Programme, Grant Agreement No: 282882 (restricted access, available on demand).

Van Vliet, L., Levidow, L., Alongi Skenhall, S. and Blind, M., 2012, Review and selection of eco-efficiency indicators to be used in the EcoWater Case Studies, Deliverable 1.1 of the EcoWater Project, Meso-level eco-efficiency indicators to assess technologies and their uptake in water use sectors, 7th Framework Programme, Grant Agreement No: 282882.