Installation guide and user's guide LCCByg version 2.2

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INSTALLATION GUIDE AND USER'S GUIDE LCCBYG VERSION 2.2

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Installation Guide and User's Guide
LCCbyg version 2.2

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Preface

The tool LCCbyg is developed by the Danish Building Research Institute (SBi), Aalborg University with financial support from the Danish Transport, Construction and Housing Agency.

LCCbyg is developed by:
- Senior Researcher, PhD Kim Haugbølle, who has been project manager and responsible for the professional content.
- Senior Researcher, PhD Nils Lykke Sørensen, who has been responsible for developing data model and documentation.
- Software architect Peter Scheutz, Scheutz & Clementsen Design, who has been responsible for data model development and programming.

The steering group for the development project consisted of:
- Deputy Morten Buus, Traffic, Construction and Housing Agency.
- Research Director Søren Aggerholm, SBi, Aalborg University.
- Senior Researcher Kim Haugbølle, SBi, Aalborg University.

The project group wishes to thank the reference group, which has contributed actively and constructively to the development of LCCbyg.

The project group also wishes to thank the people who tested a preliminary version of LCCbyg. The beta test provided many valuable and concrete inputs and suggestions for further work on developing LCCbyg.

Danish Building Research Institute, Aalborg University
Department of Building Engineering and Process
December 2017

Ruut Peuhkuri
Head of Research Department

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About life-cycle cost (LCC)

LCCbyg is a tool that calculates the lifecycle costs for either an entire building or individual building components. LCCbyg helps decision-makers to compare two or more alternatives that have different cost profiles over time.

It is difficult to assess whether a solution with high construction costs and low maintenance costs is cheaper in the longer run compared to a solution with low construction costs and higher maintenance costs. The tool solves this challenge by calculating the net present value for each of the alternatives based on the types of costs that the decision-maker has chosen to include in the calculation. These net present values or annuity costs can now be compared, and the cheapest long-term solution can thus be found.

LCCbyg makes the work easier by automating calculations since the tool includes a number of default settings and values that caters for most needs. LCCbyg also gives the user the ability to tailor calculations to own purposes by changing a number of parameters, if the default values are not appropriate. The default values of the application rest on various reliable sources, including the Ministry of Finance's instructions from 2013 for the discounting rates, the SBi report 2013: 30 for the lifetime table, the Energy Agency's estimations of future prices, Molio price databases and DGNB manuals.

Get started

In order to simplify the use of LCCbyg, a number of supporting videos have been recorded, which describe the installation of the application and introduce its features. The videos are can be found at:
https://lccbyg.dk/help/v2/getstarted/

Please note, that the videos were recorded for version 2.0. Hence, there will be a number of deviations with regard to version 2.2.

Please also note that some of the screen shoots used in this guide is identical to the illustrations used in the Danish version of the installation and user guide. Hence, they will be in Danish. We apologise for any inconvenience.

Installation guide

General information about installation

The installation guide pilots the user through the installation of LCCbyg. The guide describes step by step how the application is installed in order to be ready to use. The installation is demonstrated using Windows 7 Enterprise and Windows 8/ 8.1 operating systems and by using the Internet Explorer version 11 browser. However, it is not required to use the same version of the operation system or browser to download the application. The application is programmed for the Windows operating system, hence this operating system is recommended. Generally, Windows applications can also run on Mac through, for instance, Parallels® Desktop or Apple's own Boot Camp, which is integrated into the OS X operating system. The application can be downloaded using other browsers.

The application is available at https://lccbyg.dk/download/. The download options are illustrated in Figure 1. The most recently released version is displayed at the top, while older versions are available further down.

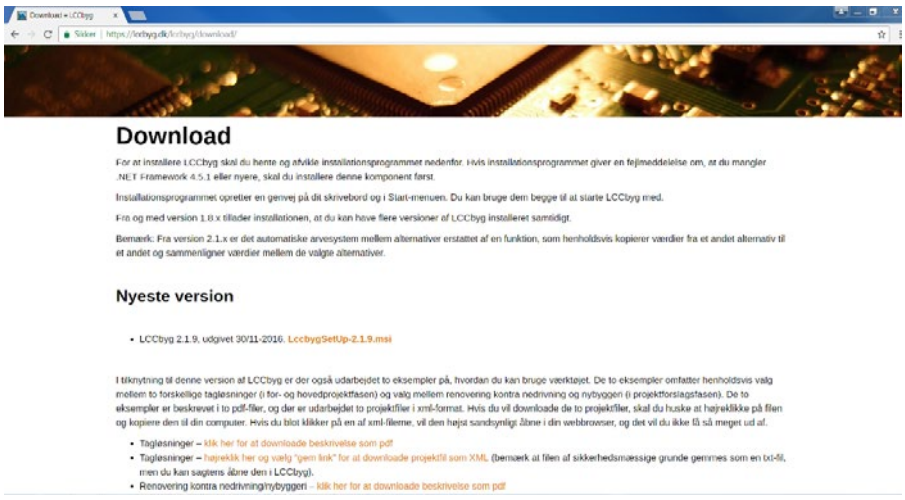

Figure 1. Download from the homepage of LCCbyg.

For downloading the application, serial number or password are not required. Download the application in your computer, by clicking on the link to the installation file called 'LCCbygSetUp.msi'.

Once the computer has downloaded the installation file, click on the installation file to start the installation.

Installation guide: Windows 7 and 10

Installing the application

Note that the step illustrated (Figure 2) is retrieved from Windows 7. The browser asks if you want to run the file or cancel the installation. To install the application, press 'Run' ('Kør').

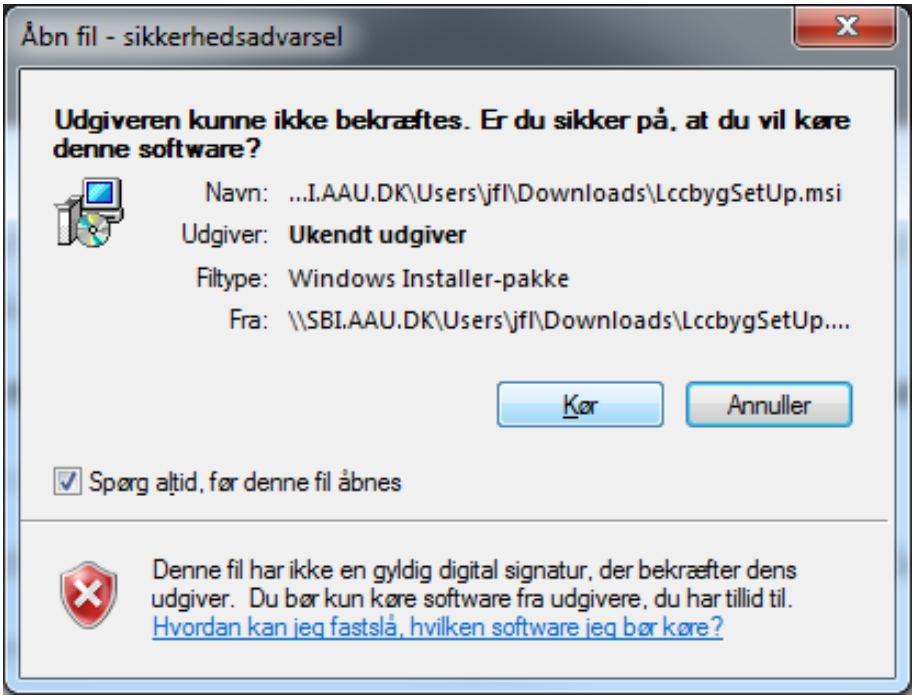

Figure 2. Screen to start the installation process.

Alternatively, you will face another screen (Figure 3), where you press 'Run' ('Kør').

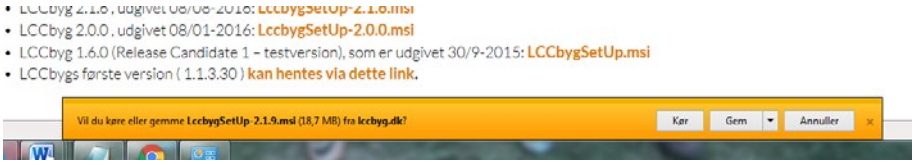

Figure 3. Screen for starting the installation process.

Then, a dialog box that initiates the installation will appear, where you press 'Next' ('Næste') in order to continue with the installation (Figure 4).

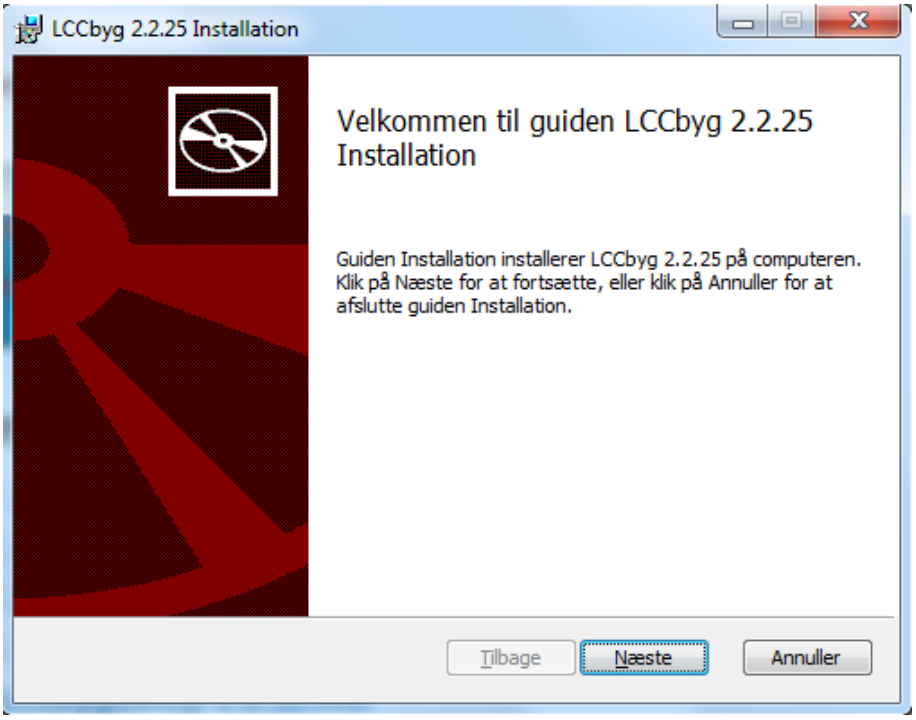

Figure 4. Screen for continuing the installation.

Then another dialog box with an end user license agreement (EULA) appears (Figure 5). First you have to tick the ‘I accept the terms of the end user license agreement’ (‘Jeg accepterer vilkårene i licensaftalen’) and then press ’Next’ (‘Næste’).

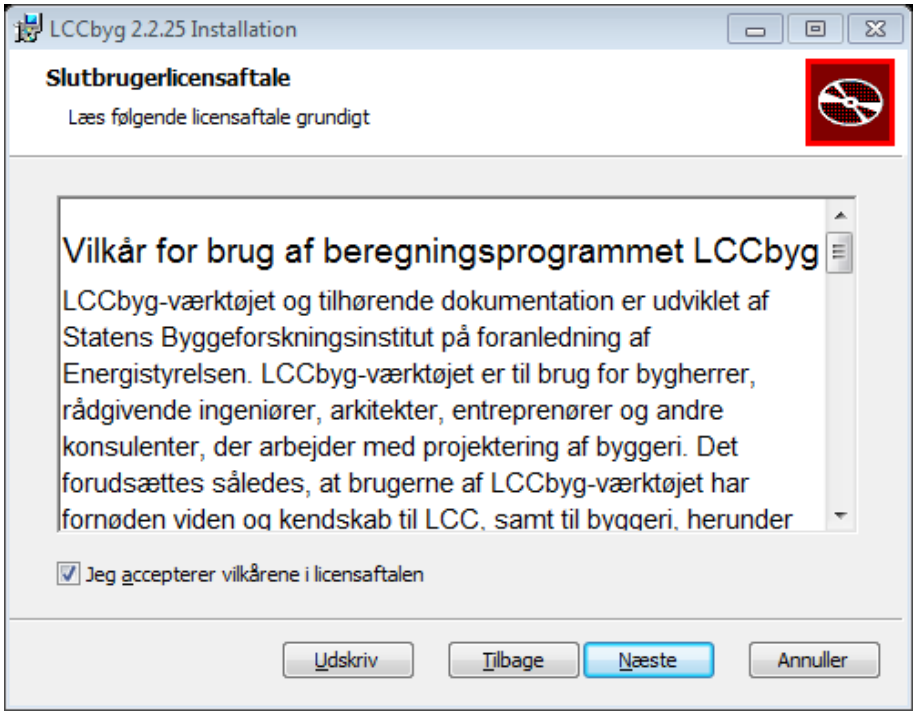

Figure 5. Screen for end user license agreement.

Next, specify where the LCCbyg application is going to be saved to your computer (Figure 6). If you accept the proposed destination folder, press ’Next’ (*Næste’), otherwise select a new folder by pressing ‘Shift’ (’Skift’), and then press ’Next’ (‘Næste’).

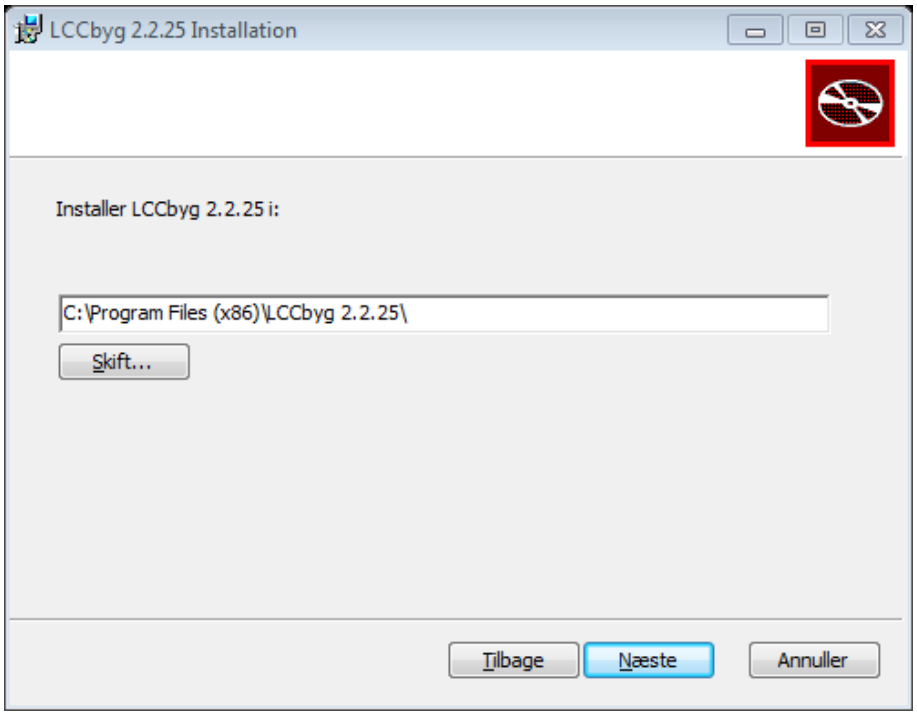

Figure 6. Screen for selecting destination folder.

In the next dialog box, press ‘Install’ (’Installér’) to finalise the installation of the application (Figure 7).

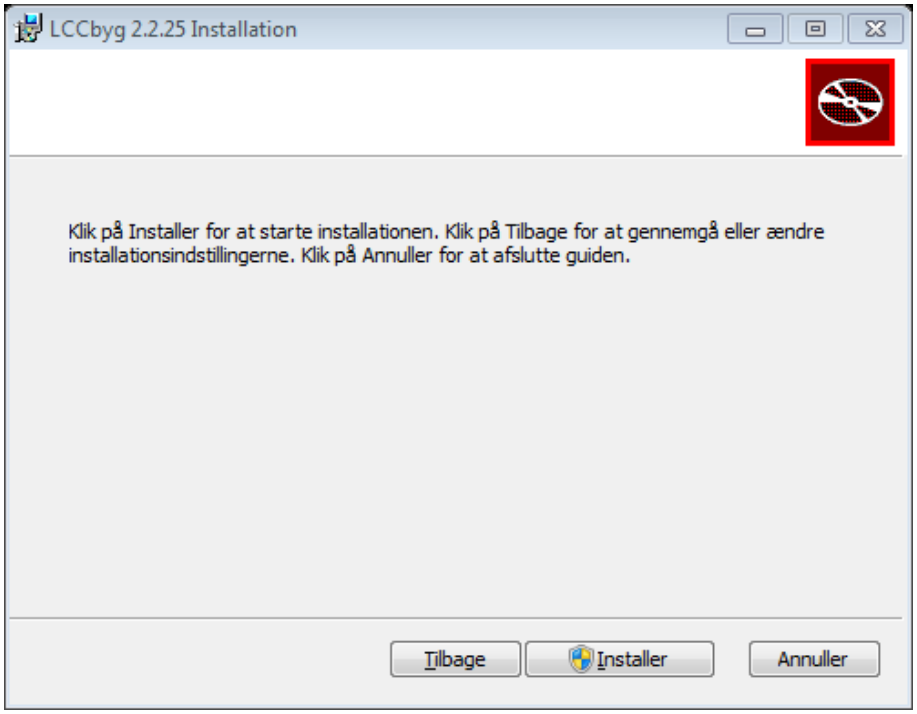

Figure 7. Screen for final confirmation of installation of LCCbyg.

Finally, press ‘Finish’ (’Udfør’) to the last dialog box that appears (Figure 8).

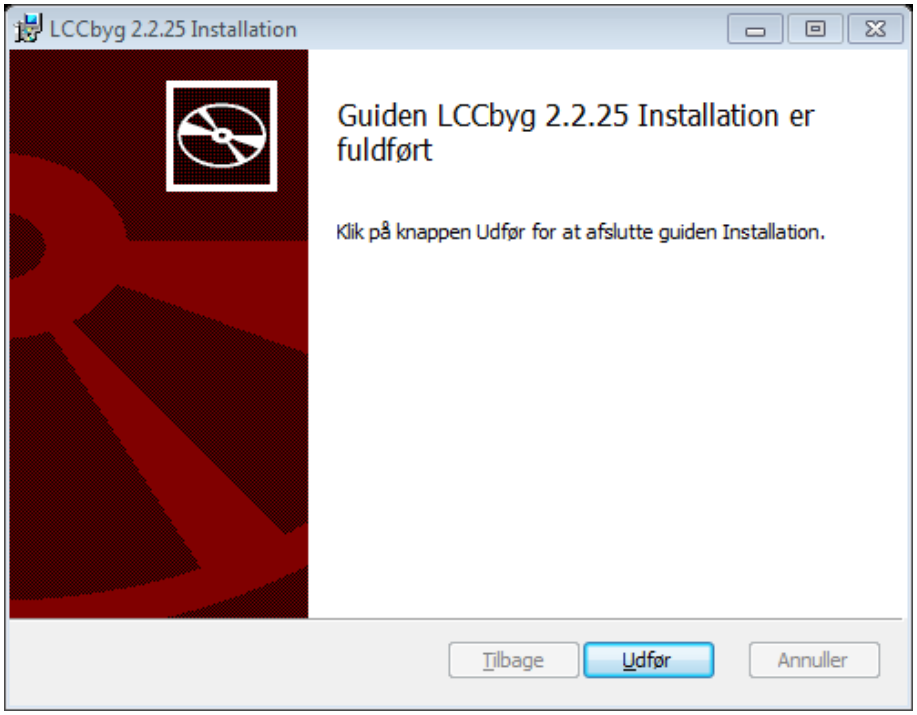

Figure 8. Screen for confirmation of completed installation.

After installation, the LCCbyg application can be launched, and a window appears as the one illustrated in Figure 9. The application is now installed and ready for use. To create a new project, select by clicking at any one of the Danish default templates, the DGNB template for office buildings, or the template in English. In order to open an existing project, press ‘Files’ (’Filer’) and ‘Open’ (’Åbn’) or use the Ctrl+O shortcut key.

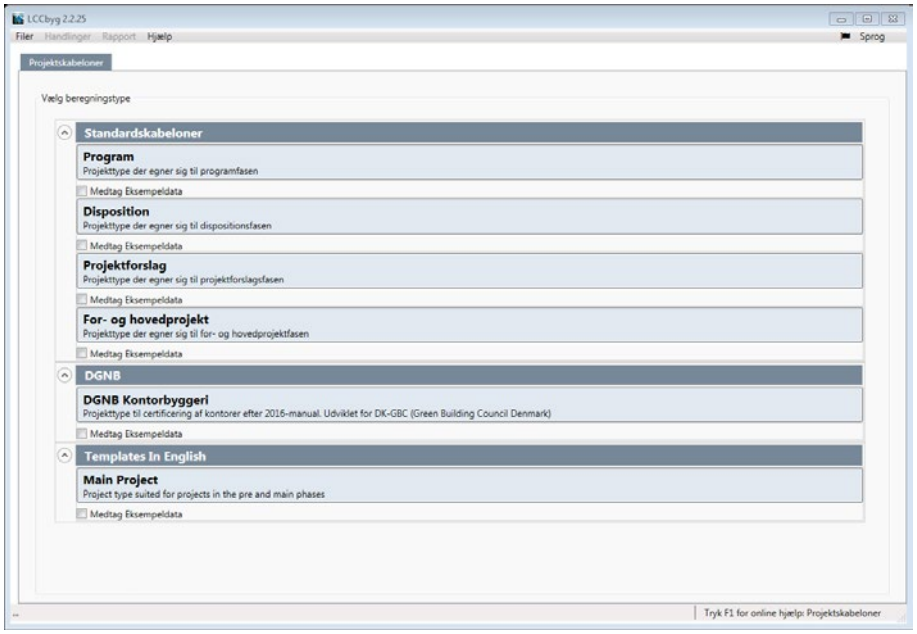

Figure 9. Choose among different templates at the ‘Start page’.

Deleting the application

If you want to delete LCCbyg, you have to follow the same procedure as with other applications. Click ’Start’ and select ’Control Panel’ (‘Kontrolpanel’). If the ’Control Panel’ is not visible in the Start menu, you can open the Windows Explorer or the ‘Search Programs and Files’ function and type ‘Control Panel’ in the search box (Figure 10).

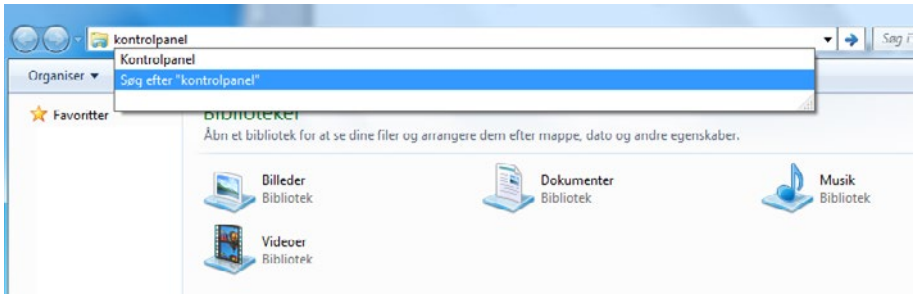

Figure 10. Searching for the ‘Control panel’.

Once you have found the ‘Control panel’, you either select 'Delete a program' or 'Programs and features' depending on whether you have selected a category view or a view in the form of icons. Find LCCbyg on the list and press ‘Delete/Edit' and uninstall the application (Figure 11).

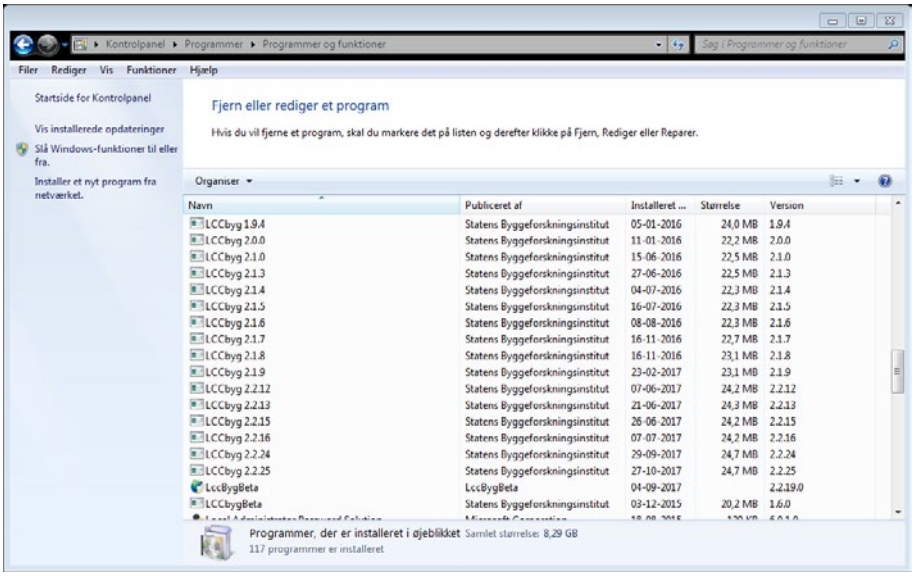

Figure 11. 'Programs and Features' used for deleting LCCbyg.

Installation Guide Windows 8 and 8.1

Installing the application

By clicking on the installation file ’LCCbygSetUp.msi’, the installation of the application begins (Figure 12).

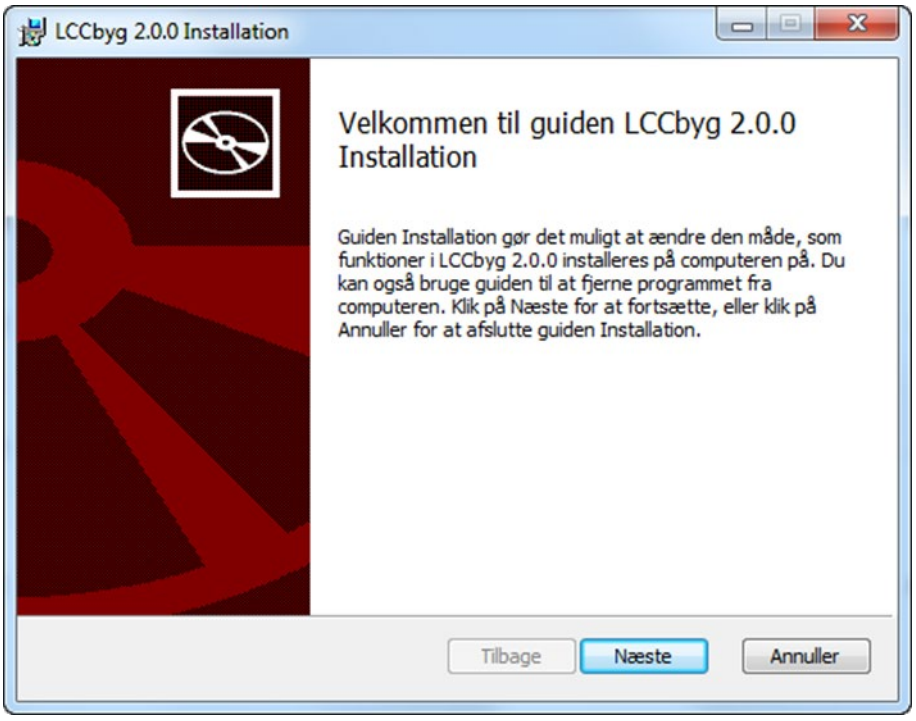

Figure 12. Screen for starting the installation process.

As the system is probably not familiar with the publisher of the application, an error message will appear (Figure 13). To continue the installation, press ’Run’ (‘Kør’). In case that the operating system Windows or anti-virus applications provide further restrictions, contact your system administrator.

Figure 13. The browser indicates that the provider is unknown.

To continue the installation, click 'More Information' ('Flere oplysninger') as in Figure 13. Then the message in Figure 14 will appear. Click 'Run' ('Kør') or 'Run anyway' ('Kør alligevel') depending on your version of Windows to continue the installation.

Figure 14. Press 'Run' or 'Run Anyway' to continue the installation.

When the message in the next screen (Figure 15) appears, you press 'Install' ('Installer') to complete the installation.

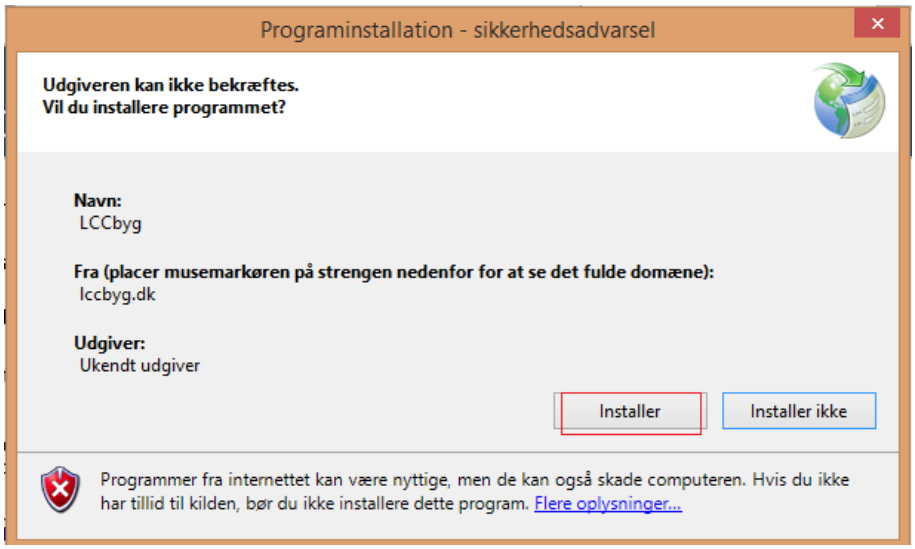

Figure 15. Press 'Install' to complete the installation.

After installing LCCByg the application will open and the start page appears (Figure 16). The application is now installed and ready for use. To create a new project, select by clicking the desired Danish default template, DGNB template or the template in English. In order to open an existing project, press 'Files' ('Filer') and 'Open' ('Åbn') or use the Ctrl+O shortcut key.

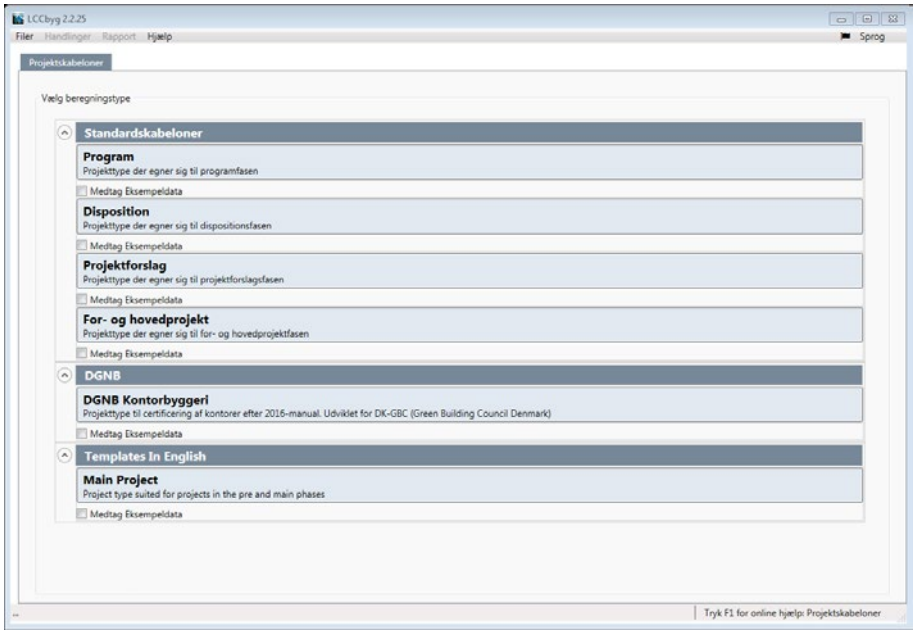

Figure 16. The 'Start page' shows the different templates.

Locating the application on your computer

To retrieve the location of the application, you can press 'Start' in the main taskbar (Figure 17).

Figure 17. Locating the application under the Start menu.

Click the arrow in the left bottom in the 'Start menu' to open the list of 'Apps and programs' (Figure 18). LCCbyg can be found in the list of programs.

Figure 18. Touch the arrow to open 'Apps and programs'.

In case that the application cannot be found here, you can search for its placement. Move the cursor over the top right corner of the desktop to display the search function. In the search box you can type in 'LCCbyg' to search for LCCbyg. If you want to easily access the program again, you can right-click the program and choose 'Attach to taskbar' or 'Attach to Start' (Figure 19).

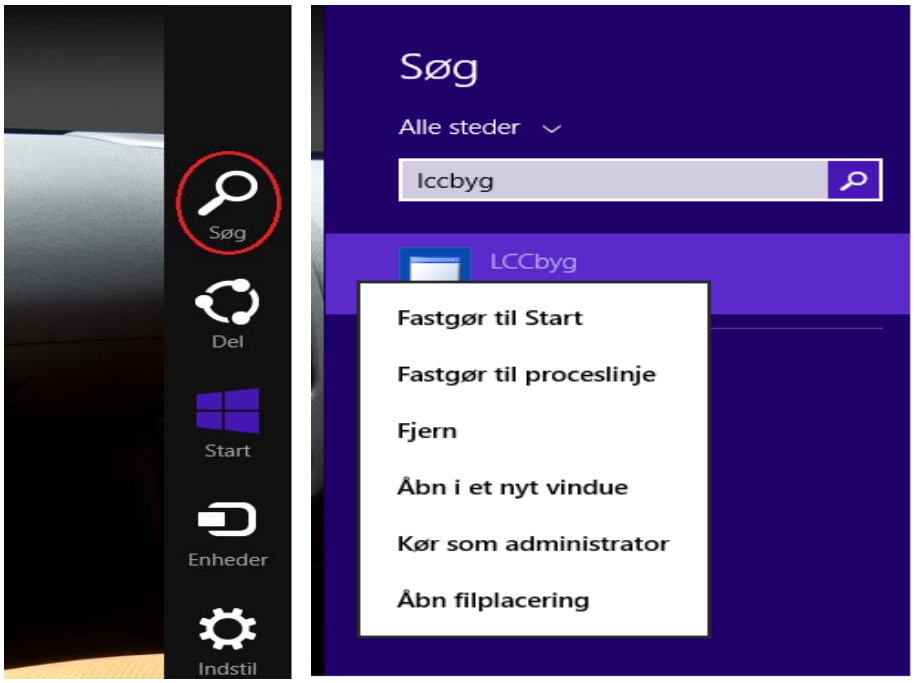

Figure 19. Finding the application using the search function.

Deleting the application

If you want to delete the application, you have to follow the same procedure as with other applications. Right-click on the 'Start' menu as shown in Figure 20 and select 'Programs and Features'. You can also search for it by typing 'Control Panel' in the search box (Figure 20), or by moving the cursor to the top right side of the desktop screen and then click 'Set'.

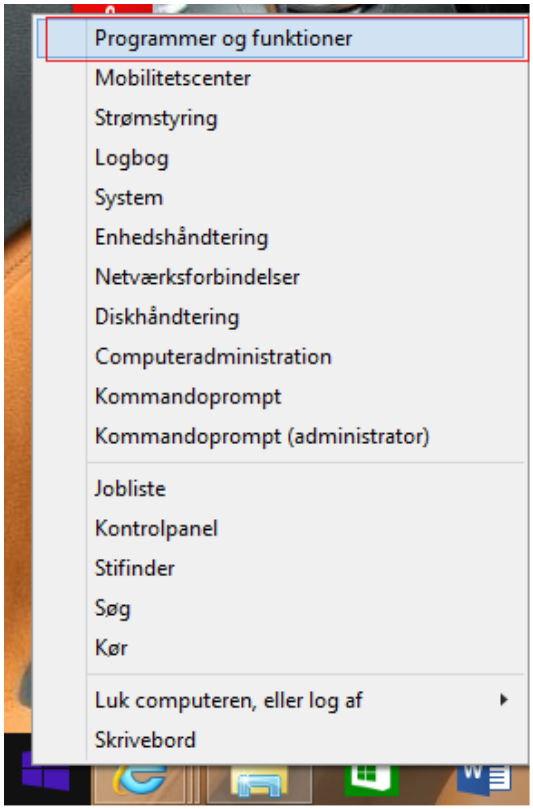

Figure 20. Searching for 'Programs and functions'.

Find LCCbyg on the list and press 'Remove / Edit' and uninstall the program (Figure 21).

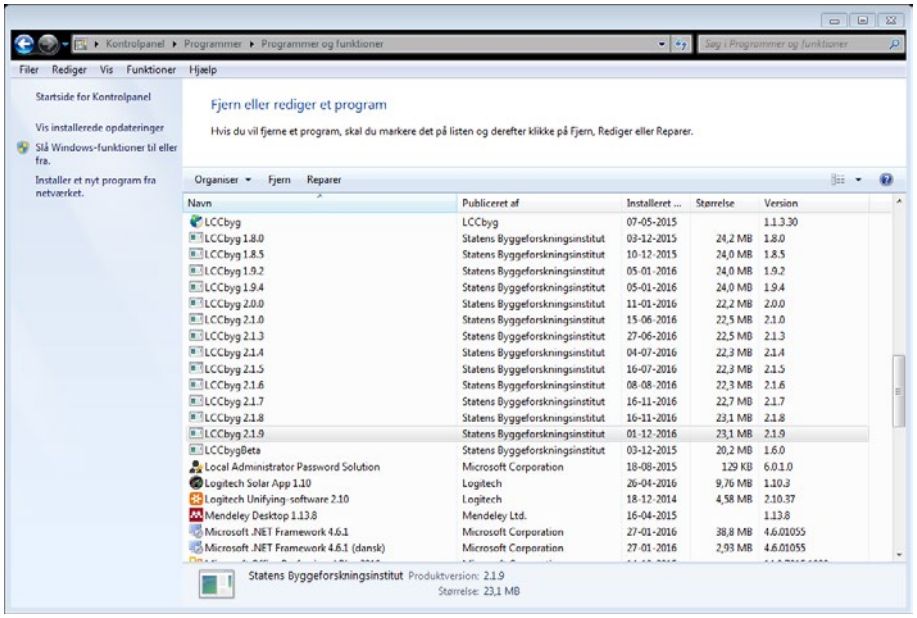

Figure 21. The list of 'Programs and functions'.

User Interface

Start page

Choose a template – several different types

You can start a new project by selecting the appropriate calculation type among the four standard templates following the phase model, the DGNB Office Building template or the English template. You simply click once on the desired template and then you are ready to start calculations (Figure 22).

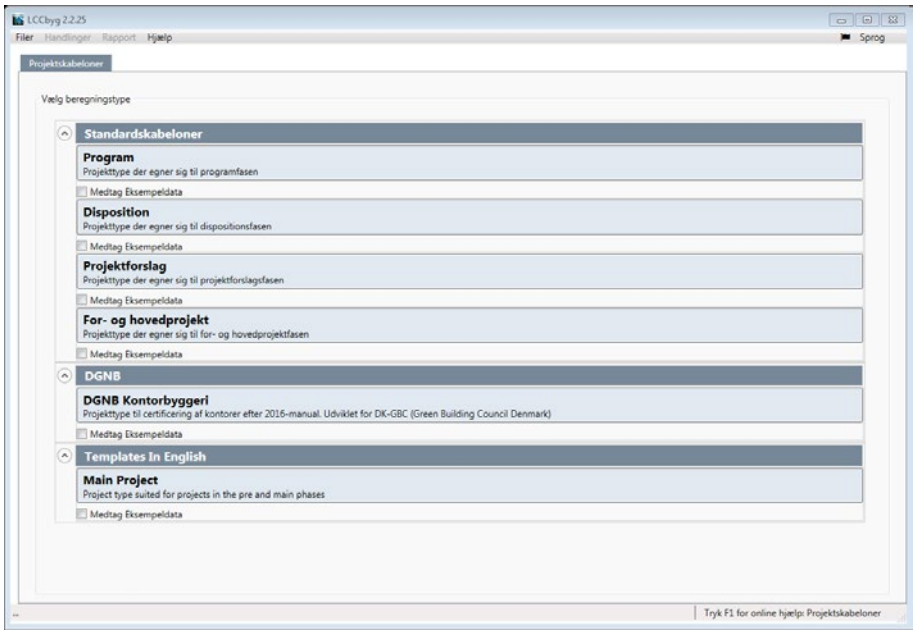

Figure 22. The available templates.

The user can find templates for each of the current phases of FRI and Danske ARK's standard description of services, which are the program phase, the conceptual design phase, the project proposal and the main project phase. The various project templates (Program, Disposition, etc.) can be accessed either from the Start page or from the 'Filer' menu (Files menu). The differences between the templates are mainly the degree of detail of inputs and calculations as well as whether the application offers default values or not.

Initially, it is not possible to continue working with the same analysis from, for example, the program phase in the templates for subsequent phases without having to start a new template and update it because the application cannot know what subdivision of costs you want to continue working with.

When you open a new template, the project will be empty except for default values and be ready for entering project-specific data. The selection of an empty project is preferable if you want to make a new lifecycle cost calculation.

You can also choose to open the DGNB Office Building Template ('DGNB Kontorbyggeri'). It is based on the default template for 'Main project' ('For-

og hovedprojekt'), but contains a number of locked values for calculation assumptions, lifetimes, etc. that meet the requirements of the DGNB certification. It requires a code to unlock these values.
Finally, you can open the English template Templates in English. This template corresponds to the Danish template for 'Main project'. If you open the English template, the language of the application will automatically switch to English and vice versa with Danish templates.

Include sample data

It is also possible to include data from an example project as a starting point by checking the 'Include sample data' ('Medtag eksempeldata') field.

Figure 23. Include sample data.

The sample data in the example project illustrates the features of the application with data entered in advance. The purpose of the example project is to give the user an impression of the possibilities offered by LCCbyg and should not be used as a basis for a lifecycle costing analysis or in comparison with other lifecycle costing calculations.

Language version – Danish or English

You can choose which language version you want to work with. If you click the flag in the upper right corner, a menu appears where you can select language. There is pt. two options, namely Danish and English (Figure 24).

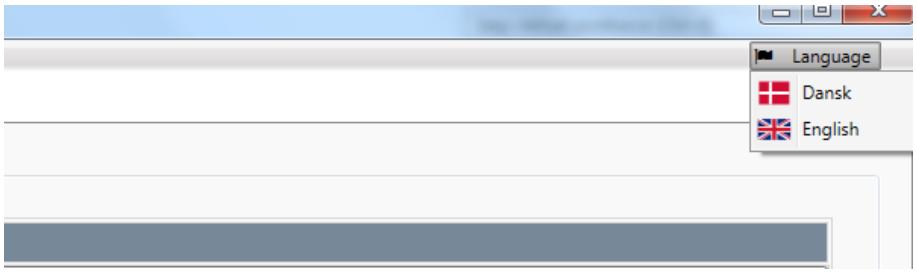

Figure 24. Selecting language version.

The general rule for language versioning is that the chosen template controls the language. Danish templates will therefore open in Danish, and the English template will open in English. If you later open a Danish project file or English project file, it will display in Danish and English. In other words, you cannot expect Danish content to be translated into English and vice versa by simply changing languages.

Main menu bar – 'Files', 'Actions', 'Report' and 'Help'

On the 'Start Page', only some features are active. 'Actions' and 'Report' as well as some functions under 'Files' will be active only when a project file is open. These features are described elsewhere, where they are active and thus relevant. Here, only the features active on the 'Start Page' are described.

Open a project file
You can open a project file by clicking ‘Open’ (‘Åbn’) from the ‘Files’ ('Filer') menu bar if you have already saved one or more project files on your computer or in the cloud. You can also use the Ctrl+O shortcut key (Figure 25).

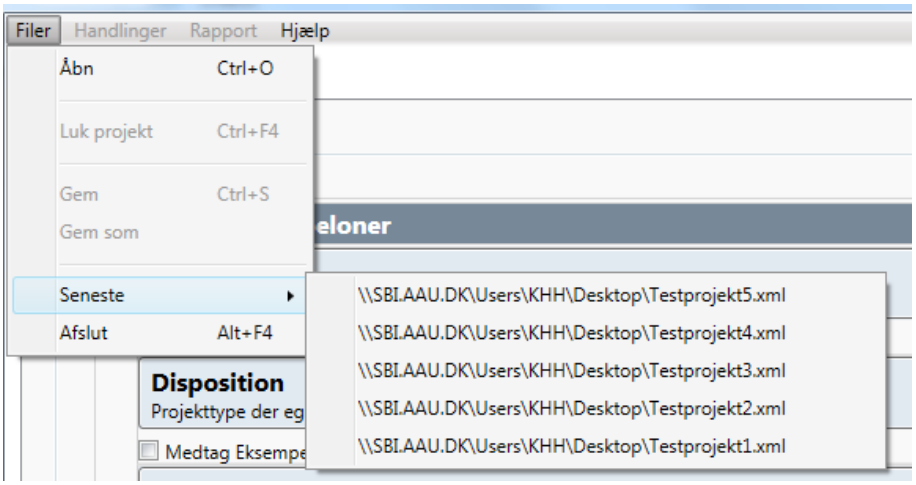

Figure 25. Shortcut keys in the menu bar 'Files' on the 'Start Page'.

When you load an old project file from a previous version of LCCbyg, there will be a warning that you load an old project file and in which version of LCCbyg the project file was created. However, this does not apply to project files made in the first version of LCCbyg.

In case that you want two project files open at the same time, you can open the application twice and open a project file in each of the two open applications.

Close the project file
When you want to get back in to the ‘Start Page’, you can select ‘Close project’ (’Luk projekt’) under ‘Files’ (’Filer’) in the menu bar. Remember to save all changes before closing the project. You can also use the shortcut key Ctrl+F4 (Figure 25).

Quit
You can close the application with the Alt+F4 shortcut key or via the menu bar 'Files / Exit' ('Filer/Afslut').

Help
You can get help either by pressing F1 anywhere in the application or under the ‘Help’ (’Hjælp’) function in the menu bar (Figure 26). Moreover, an offline version of the User Guide can be downloaded via the website https://lccbyg.dk/hjaelp/, which you can use if you are offline, for example, in a train or plane. Be sure to check that the application version and user guide are compatible.

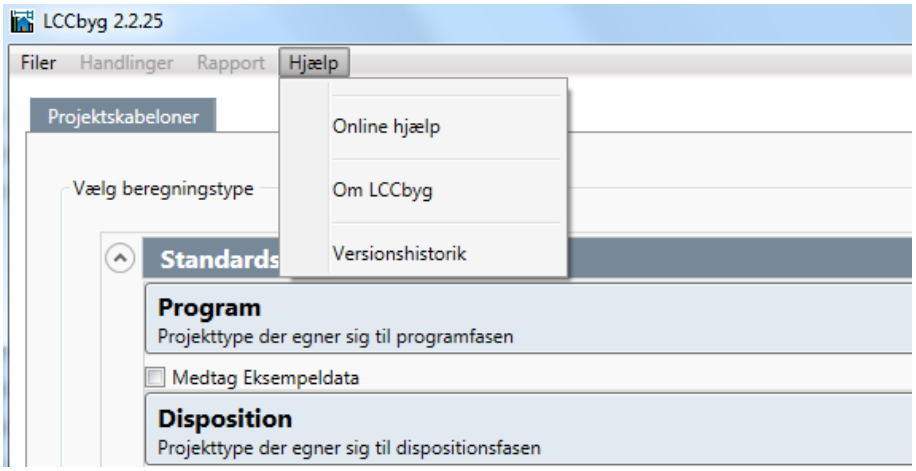

Figure 26. The 'Help' function.

Online help

Under the 'Help' ('Online hjælp') feature in the menu bar, there is direct access to the actual user guide under 'Online Help'. The help function is directly associated with the actual version of the application. The help function is following this outline:

- About lifecycle costing.
- Get started.
- User interface.
  - Start page.
  - Main menu.
  - Project information.
  - Assumptions.
  - Account plans – structure.
  - Account plans – update.
  - Conclusion.
  - Account plan results.
  - Report section.

About LCCbyg

'About LCCbyg' ('Om LCCbyg') provides an overview of contributors to LCCbyg, describes the license terms for using LCCbyg, and specifies which open external libraries and licenses the application uses.

Version history

Finally, this feature also includes 'Version History' ('Versionshistorik'), which provides a brief overview of the most important changes for each version of the application.

Main menu in an open project file

The main menu bar consists of four parts: 'Files', 'Actions', 'Report' and 'Help'. When a project file is open, all functions in the main menu bar will be active.

Files

LCCbyg saves data as text files in the xml file format. The format makes the files relatively small and can easily be exchanged via mail. Note, however, that insertion of images or logos can cause the project file to grow significantly.

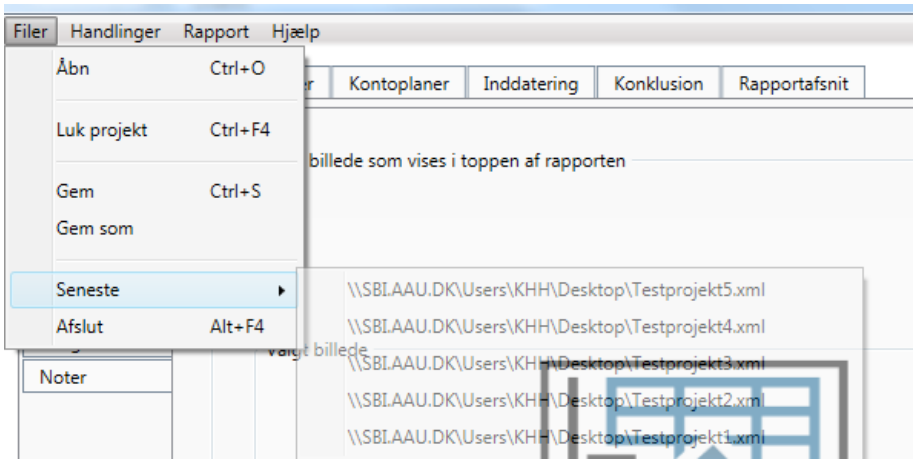

Figure 27. Functions and shortcut keys under 'Files'.

Open project file
You can open a project file from the 'Files' menu bar if you have already saved one or more project files on your computer or in the cloud. You can also use the Ctrl+O shortcut key (Figure 27).

If you load an old project file from a previous version of LCCbyg, there will be a warning that you load an old project file and in which version of LCCbyg that the project file has been created. However, this does not apply to project files made in the first version of LCCbyg.

If you want to open two project files at the same time, open the application twice and open a project file in each of the two open applications.

Close project
If you want to get back to the ‘Start Page’, you can select 'Close project' under 'File' in the menu bar. Remember to save all changes before closing the project. You can also use the shortcut key Ctrl+F4 (Figure 27).

Save and Save as
You can save files in two ways – ‘Save’ (‘Gem’) and ‘Save as’ (‘Gem som’) known from most common office applications (Figure 27). If you use ‘Save’, the file will be saved to the drive location in which the computer is generally set up. If you use ‘Save As’ – which is recommended – you can decide where to save the file.

Most recent
The 'Files \ Recent' feature provides an overview of the most recently opened files (Figure 27). The function works as a shortcut where you can open the most recently opened files by clicking on it.

Quit
You can close the application using the Alt+F4 shortcut key or via the menu 'Files \ Exit' (Figure 27).

Actions

Under 'Actions' are the following features:
- Undo.
- Restore.
- Delete all data entries.
- Select project for comparison.
- Stop project comparison.
- Export:
  - Spreadsheet with results.

– Spreadsheet with key figures.
– KeyValues2HTML.
– LCCbyg2PortableXML.

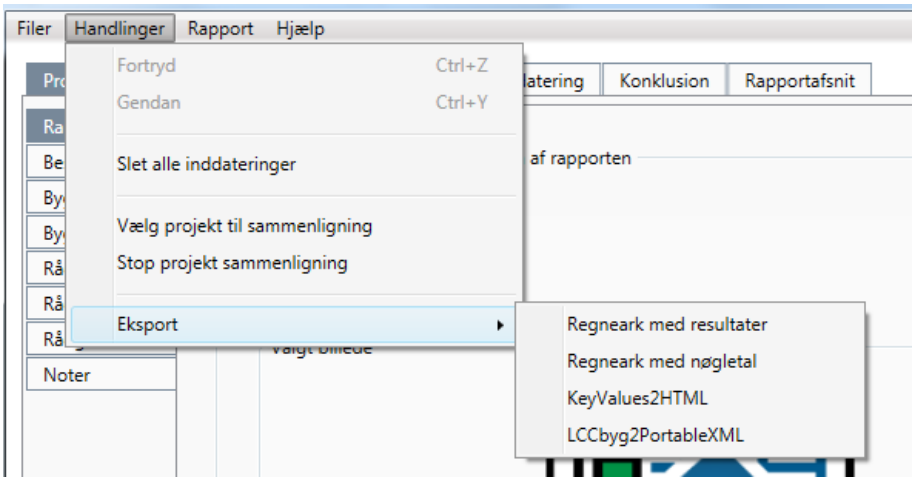

Figure 28. Overview of 'Actions'

'Undo' and 'Redo'
The 'Undo' ('Fortryd') and 'Redo' ('Gendan') features are highlighted in light gray color because they are only active if data has been entered or changes made (Figure 28). The functions can also be activated using the shortcut keys Ctrl+Z and Ctrl+Y.

As long as the project has not been saved, both functions are delimited within each tab. This means that you have to go back to another tab if you want to undo or redo something in this tab. The application therefore remembers all your changes within each tab, but not across tabs.

'Delete all data entries'
The 'Delete all data entries' ('Slet alle inddateringer') feature deletes all data entries, meaning all input values and leave the project with the default values selected alone (Figure 28). The function is, among other things, useful if you want to make a template in the event that some characteristics works across multiple projects. Creation of templates makes it possible to tailor the structure of the calculation schemas and save them for future use. Once you have deleted all the entries, you can then delete, rename, and add new rows, subgroups and main groups as appropriate. The revised project can then be saved as a new project file on a common drive in the organisation under an appropriate name, for example, 'Template_facades.xml' or similar.

'Select project for comparison'
The 'Select project for comparison' ('Vælg projekt til sammenligning') feature can be used to load a different project file that you want to compare the new project with (Figure 28). The application will show in green colour where the similarities between the two project files are and thus you can quickly identify the items where the project files are different with respect to the base data for example maintenance rates, life times and replacement rates.

'Stop project comparison'
The associated function 'Stop project comparison' ('Stop projekt sammenligning') stops the ongoing comparison of projects (Figure 28).

Export in different formats
Under 'Actions', it is possible to make four different types of data export (Figure 28):
– Spreadsheet with results.

– Spreadsheet with key figures.
– KeyValues2HTML.
– LCCbyg2PortableXML.

The first export type is 'Results to spreadsheet' (‘Regneark med resultater’), which sends all input and calculated values for the specific project into a spreadsheet that can be opened and edited in both MS Excel and Open Document Format.

The other export type is ‘Key figures to spreadsheet' (‘Regneark med nøgleal’), which sends all default values to a spreadsheet, which can also be opened and edited in MS Excel and Open Document Format.

The third type ’KeyValues2HTML' exports key figures to an html file, which can subsequently be placed on a website where it opens and displays in a browser.

The fourth export type 'LCCbyg2PortableXML' is designed for developers who want to export data to an XML file, which can subsequently be opened in other types of applications, including spreadsheets as XML tables.

Report

In the ‘Report’ (‘Rapport’) tab, a PDF version of the selected report sections can be saved (Figure 29). The selection of the report sections can be managed in the ‘Report section’ ('Reporting') tab. This pdf file will contain the data entered in ‘Project Information’ (‘Projektinformation’) as well as the display of inputs and results.

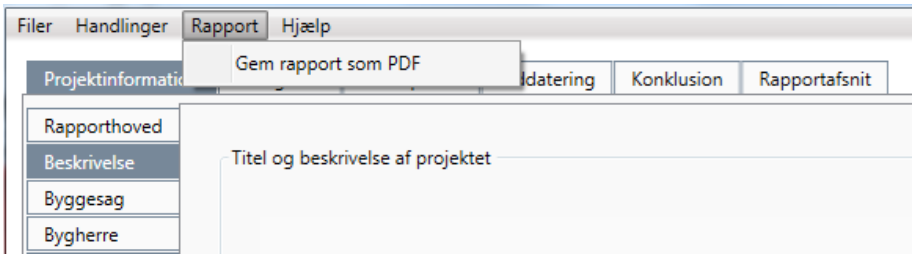

Figure 29. Overview of ’Report’.

Help

You can get help either by pressing F1 anywhere in the application or under the ‘Help’ (’Hjælp’) function in the menu bar (Figure 30). Moreover, an offline version of the User Guide can be downloaded via the website https://lccbyg.dk/hjaelp/, which you can use if you are offline, for example, in a train or plane. Be sure to check that the application version and user guide are compatible.

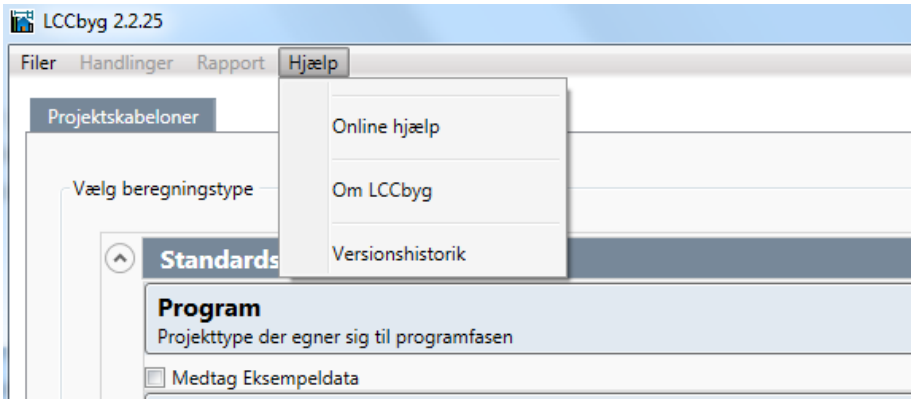

Figure 30. The ’Help’ function.

Online help
Under the 'Help' (‘Online hjælp’) feature in the menu bar, there is direct access to the actual user guide under 'Online Help'. The help function is directly associated with the actual version of the application. The help function is following this outline:

- About lifecycle costing.
- Get started.
- User interface.
  - Start page.
  - Main menu.
  - Project information.
  - Assumptions.
  - Account plans – structure.
  - Account plans – update.
  - Conclusion.
  - Account plan results.
  - Report section.

About LCCbyg
'About LCCbyg' (‘Om LCCbyg’) provides an overview of contributors to LCCbyg, describes the license terms for using LCCbyg, and specifies which open external libraries and licenses the application uses.

Version history
Finally, this feature also includes 'Version History' (‘Versionshistorik’), which provides a brief overview of the most important changes for each version of the application.

Project Information

In ’Project Information’ (’Projektinformation’), you can enter a number of master information about the project, the client and the consultants as well as a description of the project and/or the purpose of the analysis (Figure 31).

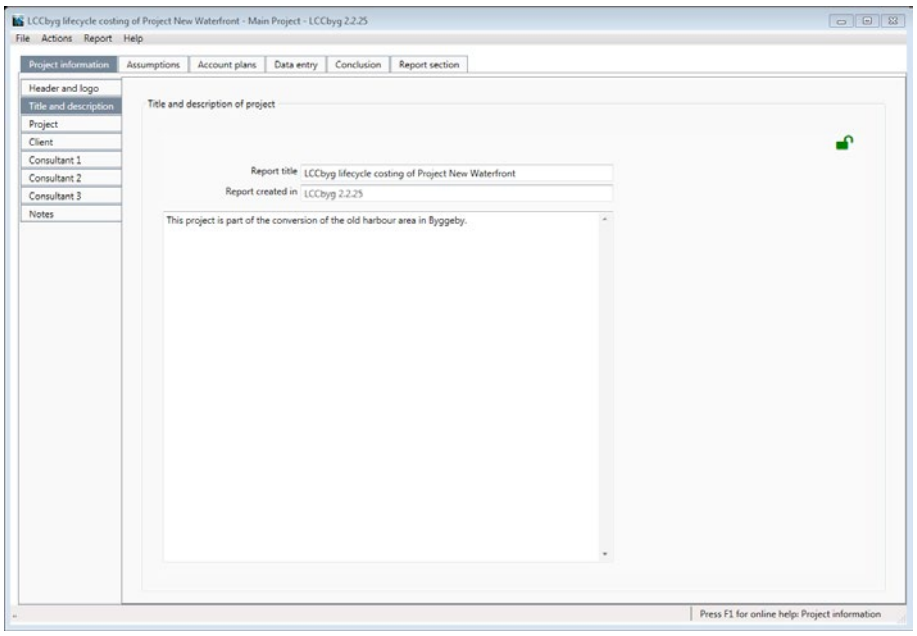

Figure 31. The report's title is included in the application's title bar.

'Report heading’
‘Report heading’ ('Rapporthoved') allows you to insert a logo or image into the report by clicking the 'Select Image' box (‘Vælg billede’). The image can

be deleted again by pressing the 'X' ticker. An image file can be very large, so the application automatically reduces the image. You may consider reducing the size of the image file yourself before you insert it. This avoids making the project file unnecessarily large.

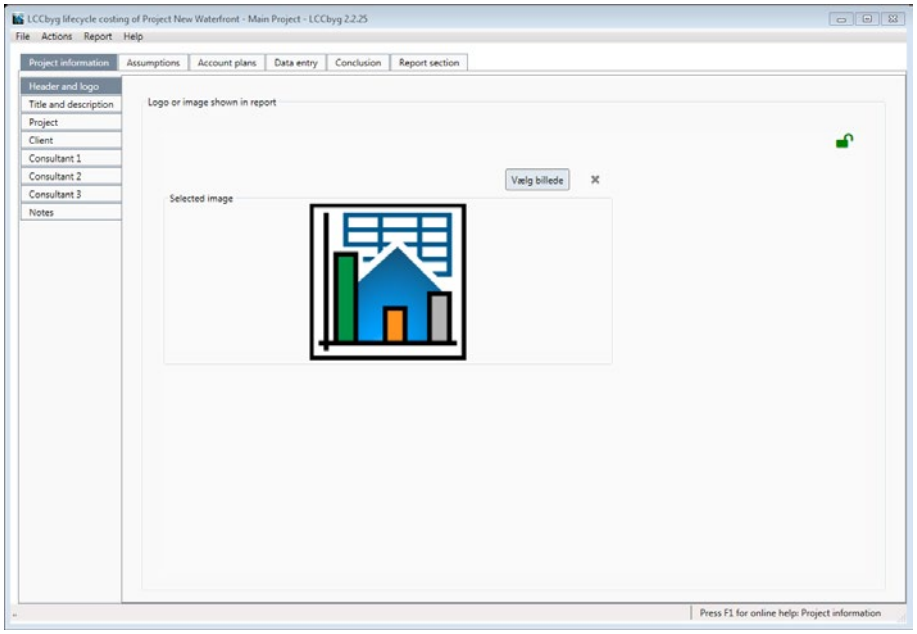

Figure 32. Insert logo or image.

'Description'
'Description' (‘Beskrivelse’) includes the text field ‘Report title’ (‘Rapporttitel’) and a display of which version of the application the report is in. Both information is included with the name of the project template in the application's title bar. The report's title is named first in order to make it easier to select the desired project when you have multiple project files open at the same time.

'Building project', 'Client', ‘Consultant 1', 'Consultant 2' and 'Consultant 3'
Under each of these headings, you can add a variety of master information about the ‘Building project' (‘Byggesag’) and its participants 'Client' (‘Bygherre’), ‘Consultant 1' (‘Rådgiver 1’), 'Consultant 2' (‘Rådgiver 2’) and 'Consultant 3' (‘Rådgiver 3’), including file numbers, names, addresses, contact details, etc.

'Notes'
'Notes' (‘Noter’) can be used to explain the current background for the analysis and describe which alternatives are to be compared. In particular, it may be useful to exchange notes among project participants, keep a logbook, etc. when more people work on the same project. Beware that 'Notes' are not included in 'Report Sections' and therefore cannot be seen by others who do not have access to the project file in XML format.

Assumptions

’Assumptions’ (’Antagelser’) defines a number of general assumptions on calculation period, calculation principle, discount rate and price development rates for different cost groups (Figure 33).

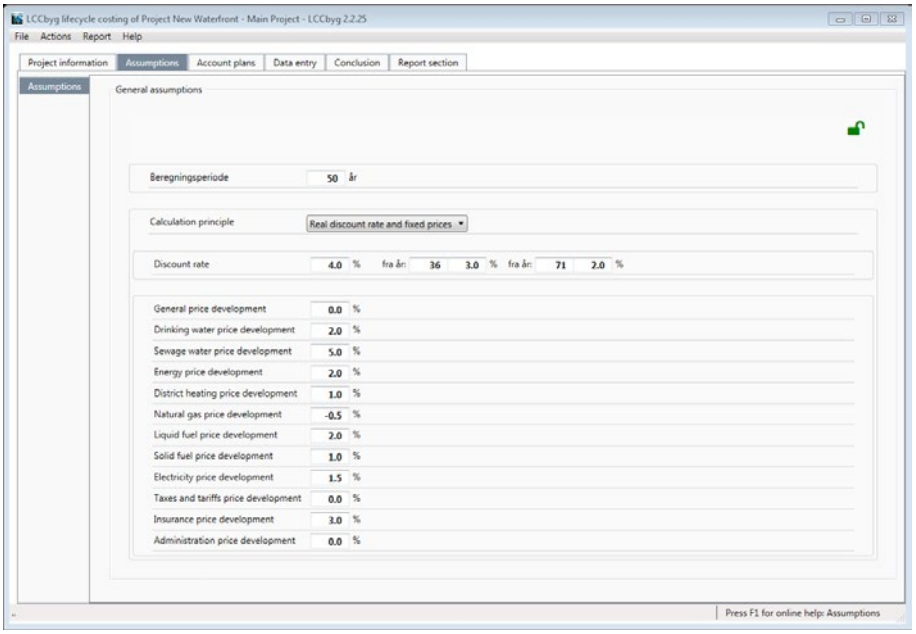

Figure 33. General calculation assumptions.

Calculation period

In the ’Calculation period’ ('Beregningsperiode') tab, the calculation period throughout the years is stated. LCCbyg calculates the annual costs for this calculation period. The calculation period is by default set at 50 years, but can be changed to a value between 0 and 120 years if desired. It is recommended to choose a calculation period that is longer than 25 years, as many building elements have a lifespan of about 25 years. Thus, a calculation period of less than 25 years will not show the effect of replacement or restoration of building components for the total present value. If the calculation period is set to 0 years, the application will only calculate the acquisition costs.

Calculation principle

The user of LCCbyg must pay special attention to the different types of price developments and the discount rate that is used and, if necessary, adjust their values. When you are working with current prices, a nominal calculation rate must be used. When you are working with fixed prices, you should use a real discount rate where inflation is deducted.

The ’Calculation principle’ ('Beregningsprincip') can be chosen between calculating with either 1) a real calculation rate and fixed prices, or 2) a nominal calculation period and current prices. The calculation principle will automatically change the values below for ‘Discount rate’ ('Kalkulationsrente') and ‘Price developments’ ('Prisudvikling') (Figure 34).

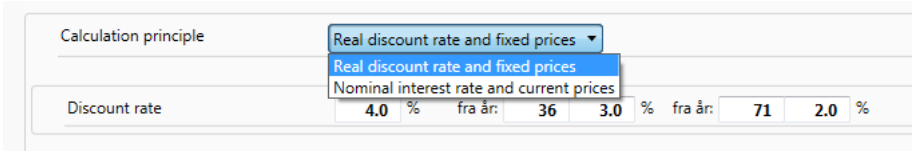

Figure 34. Definition of calculation principle.

Discount rate

In LCCbyg, the user can work with either a uniform or different discount rates over time.

It is possible to split the calculation period into three periods and apply different discount rates for each period. The value in the first box indicates the calculated discount rate from the start date of the calculations. The term

‘From year’ (‘Fra år’) marks the start time of consideration of the next value of the discount rate, and the same with the last period. You can change the values for both start times and discount rates.

The public construction sector is obliged to follow declining interest rate in accordance with the Ministry of Finance's budget guidelines. The default setting shows the declining interest rate mandatory for public clients. Further, LCCbyg is set up for use with real discount rates and fixed prices. If you want to work with a nominal calculation rate and current prices, be sure to change the option to 'Nominal interest rates and current prices' ('Nominel rente og løbende priser').

Price development

There are two different ways to work with price development in LCCbyg: with fixed or current prices. When you are working with fixed prices, the amount will remain the same year after year. In this case, for example, a value of DKK100 in the first year will remain DKK100 as well as in all subsequent years. If you are working with current prices, the value will change year by year corresponding to the price development for that particular type of cost. At an annual price increase of 2 per cent, the absolute value of DKK100 will increase to DKK102 in year 1, DKK122 in year 10 and DKK269 in year 50.

The user of LCCbyg should pay special attention to whether there are types of costs expected to rise or fall more than the average price development. If so, the default values of price development of those costs can be overwritten. Note that the value of the price development of a cost has to be added to the general price development value. For example, if you want to use a 6 per cent price development on a cost and the general price development is set at 2 per cent in the application, you will need to write 4 per cent for the price development of that cost.

Account plans – structure

'Account plans' comprise six elements that will be explained below (Figure 35):

- 1. Use of account plans.
- 2. Select cost types and price developments.
- 3. Default values.
- 4. Calculation method and posting.
- 5. Locking of account plans.
- 6. Template groups.

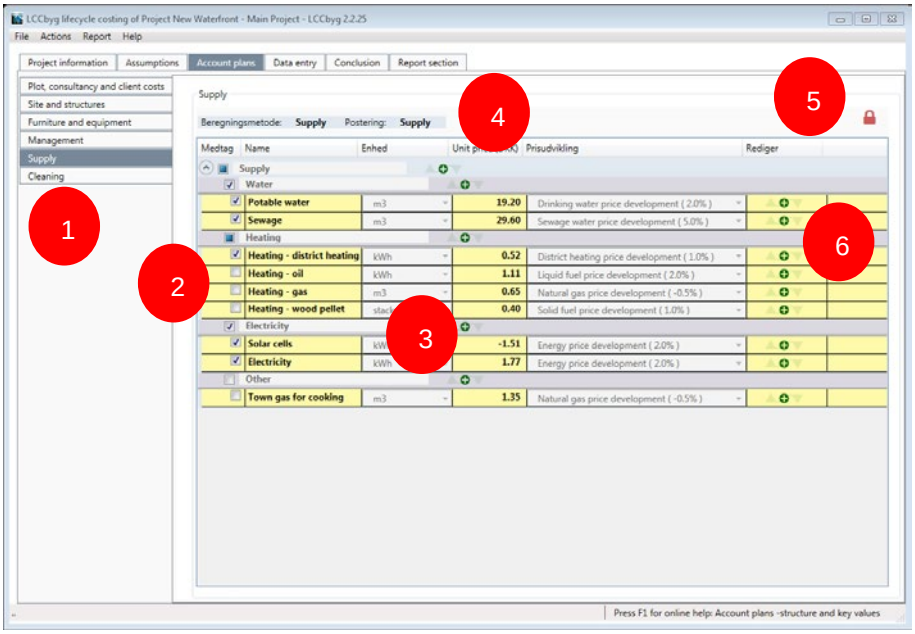

Figure 35. Overview of elements in 'Account plans'.

Using account plans

'Account Plans' are used for composing and customising your calculations for the actual needs. An LCCbyg project template typically consists of six account plans, which are found in the list on the left (Figure 35, item 1):

– Plot, consultancy and client costs ('Grund, rådgivning og bygherre').
– Site and structures ('Terræn og bygning').
– Furniture and equipment ('Inventar og udstyr').
– Management ('Forvaltning').
– Supply ('Forsyning').
– Cleaning ('Renhold').

The six account plans are replicated across the templates, but the detailing degree, etc. is different from template to template. The calculation methods for the six accounting plans also vary from calculating acquisition costs to calculating operating costs in different varieties and further to a combination of both acquisition and operating costs, including replacement.

Choose cost types and price developments

For each account plan, choose which cost types (rows) will be included in the actual calculation. You select/deselect cost types by clicking once in the small square to the left of the cost type. Once you have chosen cost types, they will appear under 'Data entry' where the specific values can be updated. Note that any updates are deleted when you deselect a cost type (Figure 35, item 2).

You can freely create your own classification or structure by renaming names, adding new or deleting existing cost types and groups:

– Add new rows by pressing the green '+'. If you put the cursor a little to the right or a little left of the green plus, a green arrow will pop up or down. This means that you can insert the new row above or below the row in question. The corresponding principle also applies to subgroups and main groups.
– Delete rows by pressing the red 'X'.
– Rename by typing on the name and overwriting it. The known keyboard buttons 'Delete' and 'Backspace' also work here.

You can add as many cost types as you like. However, there must always be at least one main group with the corresponding subgroup and row below

each account plan. However, they do not have to be enabled as part of the calculation.

Sometimes there is no red tick for a group, subgroup or row, LCCbyg automatically keeps track of whether the group/row is locked or is the last main group, subgroup or row in an account plan. These cannot be deleted.

Please note that you cannot undo your selection if you delete a row. If you add a new cost type, it will appear with the name "Unlisted row" (or subgroup or group) until you rename it. If you insert more rows or groups, they will be numbered in consecutive order 'Unnamed row1', 'Unnamed row2', etc. A new row (or subgroup or group) will by default be enabled.

For most accounting plans, the price development is defined in advance by the application to be equal to the general price development. In other cases, such as the 'Management' and 'Supply' accounts plan, there will be a dropdown menu at the row or group level, where you select the relevant price development.

All main groups can be folded together or folded out using the dark blue arrow in the circle on the left next to the name of a main group. In particular, it may be useful for the ‘Site and structures’ account plan and the ‘Cleaning’ account plan, as they will often contain so many rows that they become confusing (Figure 36).

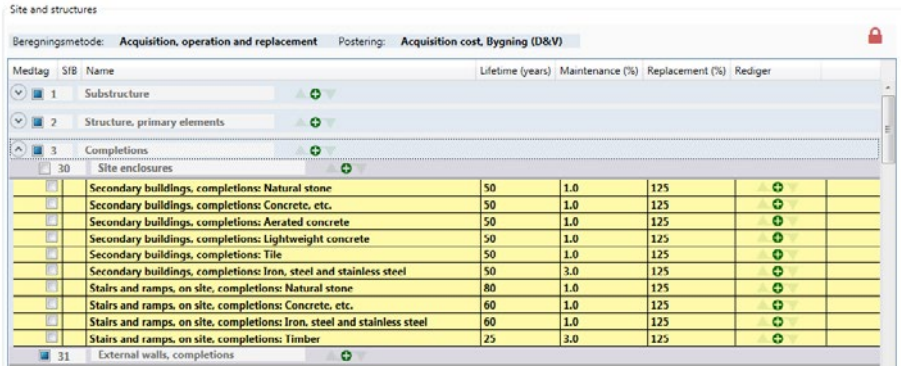

Figure 36. Folding main groups in/out to maintain overview.

Default values

LCCbyg contains default values that can be used across projects (Figure 35, item 3). Default values can be found in four account plans under the standard template of ‘Main Project’: 'Site and structures’, 'Furniture and Equipment', 'Supply' and 'Cleaning'. The values can either be born in the system (fields are coloured pink) or are entered as examples (fields are white).

Similarly, the template 'DGNB Office Building' is born with a number of standard values as defined in DGNB's manual.

An example of a default value can be the lifetime of a building component. Often, the lifetime of a building component will be the same for several analyses. For example, a lifetime of 120 years for an outer wall of brick can be used in several analyses. If there is set no value for lifetime, the application will calculate a lifetime of 0 years corresponding to the calculation of purchase costs only. These are the default values stored in a template (read more under the section ‘Start page'). On the other hand, the volume and unit price for the outer wall will vary from project to project.

The default values can be overwritten under 'Data entry’ (read more below in the section 'Data entry').

Calculation method and posting

At the top of the screen you will find a blue field indicating 'Calculation method' and 'Posting' (Figure 35, item 4). The calculation method refers to the method used by the application for the calculations. For example, under 'Site and structures', you will see that the method is listed as 'Acquisition, Operation, and Replacement'. This means that this accounting plan calculates acquisition costs, running costs and the replacement costs. 'Posting' refers to where costs will be entered. For example, under 'Site and structures' you will find that the item is entered as 'Acquisition, Bygning (D & V)'. This means that costs are entered under the main cost groups 'Acquisition' for acquisition costs and 'Bygning (D & V)' for operating costs and replacement costs (Figure 35, item 4).

Calculation Method: 'Acquisition, Operation, and Replacement'

The plans 'Site and structures' and 'Fixtures and Equipment' use this calculation method. Both accounting plans use three types of input:

– Lifetime (entered in year).
– Maintenance (entered in per cent).
– Replacement (specified in per cent of new purchase).

Under 'Data entry', quantities and unit prices must be entered for each building component, while maintenance and replacement are calculated automatically by the application. For both maintenance and replacement, values are calculated and displayed under 'Data entry' as current costs, ie. the cost it would be if it should be paid today. LCCbyg ensures calculating the cost of a present value for the year in which the cost is due.

For 'Fixtures and equipment', it is enough to enter an acquisition cost for each piece of fixture or equipment, while operation and replacement costs are calculated automatically by the application.

Calculation method: 'Acquisition'

The account plan 'Plot, consultancy and client costs' uses the calculation method 'Acquisition'.

Under 'Data entry', you must enter the acquision cost for each of the cost types you have selected.

Calculation method: 'Operation'

The calculation method 'Operation' is used in the 'Management' account plan in the templates 'Main project' and 'DGNB Office buildings' as well as in the conglomerates 'Management', 'Supply' and 'Cleaning' in the three standard templates for 'Program', 'Disposition' and 'Project proposal'.

Under 'Data entry', enter the total annual operating costs for each of the cost types you have chosen.

Calculation method: 'Supply'

The calculation method 'Supply' is used solely in the templates for 'Main project' and 'DGNB Office buildings'. In the templates for the other phases, the simpler calculation method 'Operation' is used. Costs are calculated per year. Note that there is no direct link between, for example, the two account plans for 'Supply' and 'Site and structures'. This means that, for example, energy consumption is not automatically correlated with the choice of e.g. facade solution, but must be calculated separately, e.g. in an energy calculation program like Be15.

The calculation method includes costs for water, heating, electricity and other supplies in the calculation based on proposals for unit prices in the application. Unit prices can be overwritten with own values, e.g. from the local utility company. The default values can be overwritten if necessary under 'Data entry'.

In 'Data entry', enter the total amount of energy requirements, calculated in kWh. These quantities will usually appear from the mandatory energy calculations or energy labels.

Unit prices are calculated uniformly in kWh. Conversion of energy calculations in kWh regardless of the energy form and the usual settlement pricing principles for different types of fuels have been carried out as follows:
- Wood pellet: Caloric value 5 kWh/kg, efficiency approx. 80 per cent, price 1,600 DKK/ton excluding VAT = 0.40 DKK/kWh.
- Oil: Caloric value 10 kWh/l, efficiency 85 per cent, price 9.47 DKK/l excluding VAT = 1.11 DKK/kWh.
- Gas: Caloric value 11 kWh/m^3, efficiency 100 per cent, price 7.14 DKK/m^3 excluding VAT = 0.65 DKK/kWh.

Calculation method: 'Cleaning'
The calculation method 'Cleaning' is used only in the templates for ‘Main project' and 'DGNB Office buildings'. In the templates for other phases, the simpler calculation method 'Operation' is used for cleaning costs.

The calculation method includes costs for different types of cleaning in the calculation based on the default values for frequency and unit prices determined by the DGNB manual based on experiences from Germany and the Danish Molio Price database:
- Frequency, ie. how many times per year should the cleaning be done (entered in number/year). A frequency of 4 means that the space must be cleaned 4 times a year. A frequency of 0.25, on the other hand, means that the space must be cleaned every four years.
- Unit price, ie. costs for cleaning staff including overhead costs (calculated in DKK/m^2 or DKK/unit).

Under 'Data entry', you will only need to enter quantities. However, you can overwrite the default values under 'Data entry' if necessary.

Locking the account plans

The user can lock the structure of the account plan and default values. This will be relevant when the user wants to create a template to be used by colleagues or sent to external partners, such as an external consultant. The lock is activated using the green padlock that turns red when the account plan is locked (Figure 35, item 5).

Some account plans are locked with a code, because the user is not allowed to unlock them. These are typically account plans with common default values.

Template groups

Template groups (‘Skabelongruppe’) is a special feature that is useful when you want to create your own templates. Template groups are subgroups that automatically copy all their rows into a new subgroup (Figure 35, item 6).

The function can only be accessed when the account plan is unlocked, allowing you to select a subgroup for the template group. Then you lock the account plan again. When the account plan is locked, the template group is

copied with all its rows when you insert a new subset above or below it using the up/down arrows next to the green '+'.

If the account plan is not locked, the application will as usual insert a new subgroup with the corresponding row above or below the existing group when clicking the up/down arrows next to the green '+'.

Pay special attention to the fact that when an account plan is unlocked, all subgroups based on the same template group will be deleted, except one.

The added subgroups (or originals) can be deleted, *except for the last copy*, which then forms the template.

Data entry

Overview

The 'Data entry' ('Inddatering') tab includes four parts (Figure 37):

- A. Selection of the relevant accounting plan, which is described in more detail under 'Account plans - structure'.
- B. 'Results from this account plan' described in more detail under 'Account Results'.
- C. Presentation of alternatives, described in more detail under 'Options'.
- D. Entry fields for the current account plan, which is described below.

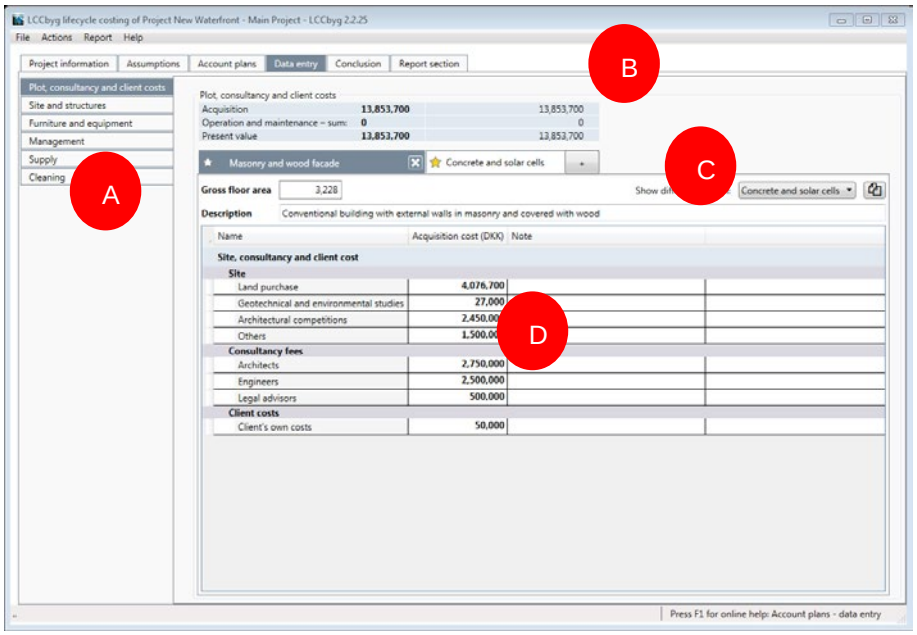

Figure 37. The four different parts of the 'Data entry' screen.

The entry fields for each account plan are used to set the values that LCCbyg needs to calculate the present value. The input values vary for each account plans, but generally include acquisition costs, quantities, unit prices and annual maintenance costs.

The entry field also includes 'Note' ('Bemærkninger'). This field may be useful, for example, to make references to the source of a cost (e.g. calculating through Molio Price Data), the source of quantities (e.g. calculation made in the Be15 energy application) or the need for help from a colleague (e.g. "Susanne: Please check the window scheme for quantities"). Notes in the 'Remarks' ('Bemærkninger') field are not included in the report (PDF format), but will be available in the project file (XML format).

Account results

In the 'Data Entry' ('Inddatering') field, the results for the current account plan are updated and displayed continuously (Figure 37, item B). The results that are shown correspond only to the calculation of the selected account plan, but all of the active alternatives. It allows for an immediate comparison of results across the alternatives within the applicable accounting plan. In addition, the results of the calculations are shown in three main groups:

1 Acquisition costs for the examined account plan.
2 Present value of total operating and maintenance costs for the examined account plan.
3 The total present value of the examined account plan.

Alternatives

Name and description

LCCbyg provides the possibility to work with up to five alternatives in the same project. Alternative options are created and edited in any account plan under 'Data Entry'. You only need to create and edit an option in one account plan, since any correction is applied in all the account plans.

Names and descriptions of alternatives are as follow (Figure 38):

– LCCbyg will always include at least one alternative and can include up to maximum five alternatives.
– Alternatives are named continuously as 'Alternative 1', 'Alternative 2' etc., but they can be named freely by setting themselves in the namespace field and typing a new name.
– A description can be added for each alternative.
– A gross area is required for each alternative.
– The actual alternative, in which you work, is highlighted in blue colour.
– A new alternative can be created by tapping the tab with a '+'.
– An alternative can be deleted by pressing 'X' next to the name of that alternative.

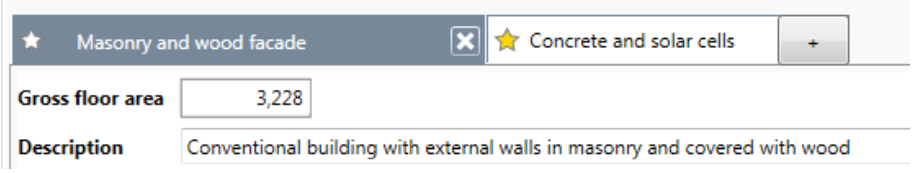

Figure 38. Names, descriptions and add/delete alternatives.

Copy values from the one alternative to another

In the earlier versions of LCCbyg an automatic inheritance system was used, where values from an alternative were automatically inherited by the next alternate. This principle is now abandoned. Instead, it has become possible to copy values from one alternative to another. If you press the icon with the two "sides" at the far right (Figure 39), a dialog box appears, where you can select the alternative from which you want to copy values from the drop-down menu. The copy will include all data and structure from that alternative except for the name of the alternative and description.

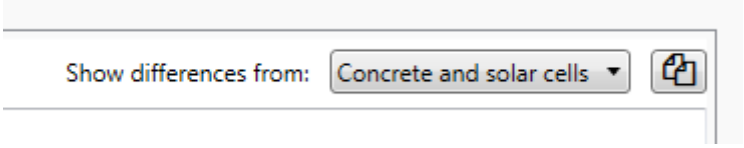

Figure 39. Copying values from one alternative to another.

Comparison of two alternatives
It is possible to compare two alternatives with each other using the 'Show differences from:' ('Vis forskelle fra:') feature and then choose an option for comparison in the drop-down menu (Figure 39). The function is useful if you need to find the differences between two alternatives. The differences are marked with a thin red underline under the different fields. Comparison is made for quantities, unit price, estimated cost of maintenance and estimated cost of replacement.

Data entry fields

Rows and columns
The items, which appear in the main cost group in the report, are the items that have been selected under each account plan. If an item is missing or too many entries appears in the forms, the entries can be added or removed under 'Account Plans' (‘Kontoplaner’).

In order to make navigation easier, the data entry is structured as a grid system consisting of main groups followed by relevant subgroups that are filled with the selected rows.

You can change the order of columns by selecting a heading and drag it either to the right or left.

You can also make columns wider or narrower by dragging the edge of the column heading.

Selection of units
The ’Data Entry’ tab of the account plans ’Site and Structure’ (’Terræn og bygning’), ’Supply’ (’Forsyning’) and ’Cleaning’ (’Renhold’) include drop-down menus in order to choose the appropriate units for the quantities and unit prices. The selection of units from the dropdown menu does not affect the calculation. Whether you have selected a unit or not, the application uses the value in the column of quantities in the calculation. The dropdown menu is for your convenience only.

Colour code: black, green, and bold black
LCCbyg uses a colour code to visualize where data is coming from. The colour coding includes three different colours (Figure 40):
– a: Default values are indicated in black (e.g. maintenance rate).
– b: Estimated default values are indicated by green (e.g. annual maintenance cost).
– c: The user-entered values are indicated in bold black.

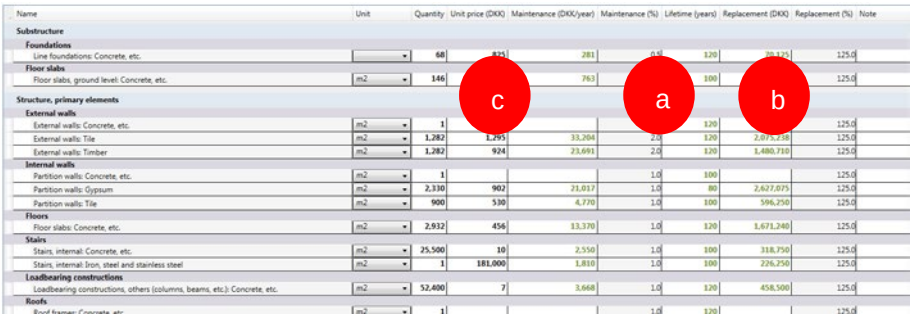

Figure 40. Colour code – black, green and bold black.

Both user-entered values in bold black and calculated values in green can be overwritten. Note, however, that if you, for example, overwrite a green estimated maintenance cost with an invalid value, then the number in the cell is

set to bold black and the default value of the neighbouring column will be re-calculated based on the user-updated value.

The alternatives are compared under 'Conclusion' (’Konklusion’).

Use only numeric values: Error messages
Only numeric values can be entered in the forms under 'Data entry' in LCCbyg. When letters or both numbers and letters are used as input, the field is marked with a red square and a small red exclamation mark is added to the left of that row. The red square indicates that the application cannot calculate the cost as long as letters are entered in the field. The user cannot do anything else in the forms until the value is replaced by a number.

In addition, numerical values in LCCbyg are formatted according to standard conventions for thousands separators. In the English template commas are used, while full stops are used in the Danish templates.

Numbers are rounded up to the nearest round figures.

Delete
Changing or deleting a value can be done by selecting the data field and overwriting the value or alternatively using 'Backspace' or 'Delete' on your keyboard.

Remember that you can also use the 'Undo' and 'Restore' functions, for example, using the keyboard shortcuts Ctrl+Z and Ctrl+Y.

In case you want to delete all the data entries, you can use ’Delete All’ (‘Slet alle inddatering’) under ‘Actions’ (‘Handlinger’) in the menu bar. This function deletes all entries in the data form in the file. So, note that is a good idea to save the project before deleting as all entries will be lost when ‘Delete all’ (‘Slet alle inddatering’) is selected.

Conclusion

In ’Conclusion’ (’Konklusion’), the user can identify which alternative is the most advantageous for the decision maker to choose. 'Conclusion' consists of three parts:
– 1. A text part with an analysis and conclusion written by the user.
– 2. A mark with a yellow star of the preferred alternative (‘Foretrukket alternativ’).
– 3. A summary of the calculations in table form (Figure 41).

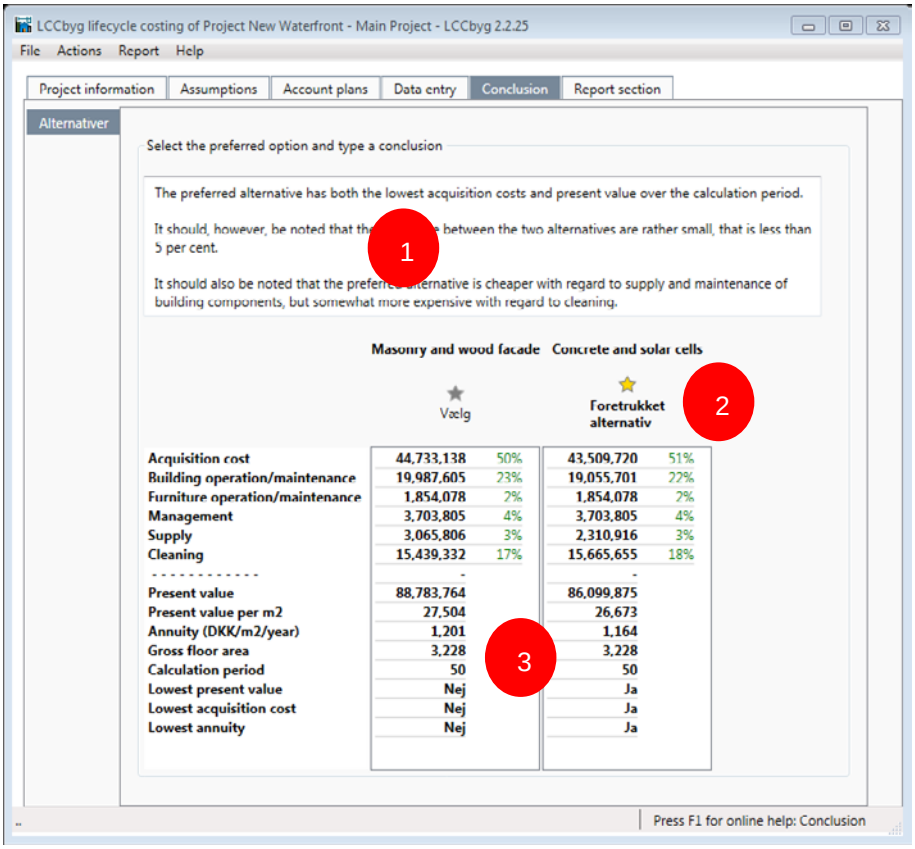

Figure 41. Overview of 'Conclusion'.

Text field for conclusion

At the top you will find a text box where you can write an explanation of why an alternative is preferred to others. The text field expands as you add text.

Selecting the preferred alternative

The analysed alternatives are shown below the text box. Over each alternative there is a star in grey and with the text 'Select' (‘Vælg’). If you click on the star, it will be highlighted in yellow colour and the text will change to 'Preferred Alternative' (‘Foretrukket alternativ’). If you click on the star again, the yellow mark will disappear. The option of 'Preferred Alternative’ also appears as a yellow star next to the option under 'Data entry' ('Inddatering').

Summary of calculations in table form

The bottom part of 'Conclusion' summarises the calculations in table form. The table gives an overview of the distribution of costs for main cost groups, by presenting both the absolute costs in DKK (in black) and relative percentages (in green).

The acquisition cost indicates the sum of the costs associated with the acquisition in 'Year zero'. The other main cost groups comprise operating costs over time.

The present value indicates the amount of acquisition costs and the annual present values for the selected cost groups distributed over the calculation period for each alternative. The present value is calculated as a sum and per square meter.

The annuity or annual cost per square meter is calculated by dividing the total present value with the gross area and then converting the value to an annuity.

In addition, 'Conclusion' summarizes the total economic analysis in three points:

– Which alternative has the lowest present value.
– Which alternative has the lowest acquisition costs.
– Which alternative has the lowest annuity, i.e. the lowest annual cost per square meter.

The application performs an automatic analysis and assessment of which alternatives are best viewed from lowest acquisition costs, present value or annuity. The best alternative is marked with a 'Yes' (‘Ja’) while the other alternatives are marked with 'No' (‘Nej’). If there are several alternatives with the lowest acquisition cost, present value or annuity, the application will mark all of them with a 'Yes'. As an example, alternatives 1, 2 and 5 may have the lowest present value of 77,729,127 kr. In that case, the conclusion will be: "The lowest present value is 77,729,127 kr. for Alternative 1, Alternative 2, Alternative 5."

Please note that the calculation is fully automated, i.e. even if there is only one DKK’s difference between two alternatives, then one alternative will be highlighted at the expense of the other. The automatic calculation must therefore be assessed critically in each case to avoid over-interpretation of the calculations and hence the conclusion.

Report section

In the ‘Report section’ you choose which sections you want to include in the final report. The different sections are shown on the left side of the screen. You can select a large number of report sections such as 'Logo or image' ('Logo eller billede'), 'Title and description' ('Titel og beskrivelse'), 'Main Cost Groups: Stacked column charts' ('Hovedomkostningsgrupper: Stavdiagram'), 'Conclusion' ('Konklusion'), and so on.

By clicking on the box that is located to the left of the name of each section, you can include the relevant section in the final report. A number of sections are pre-set to be included in the report, but you can change it as it suits you (Figure 42).

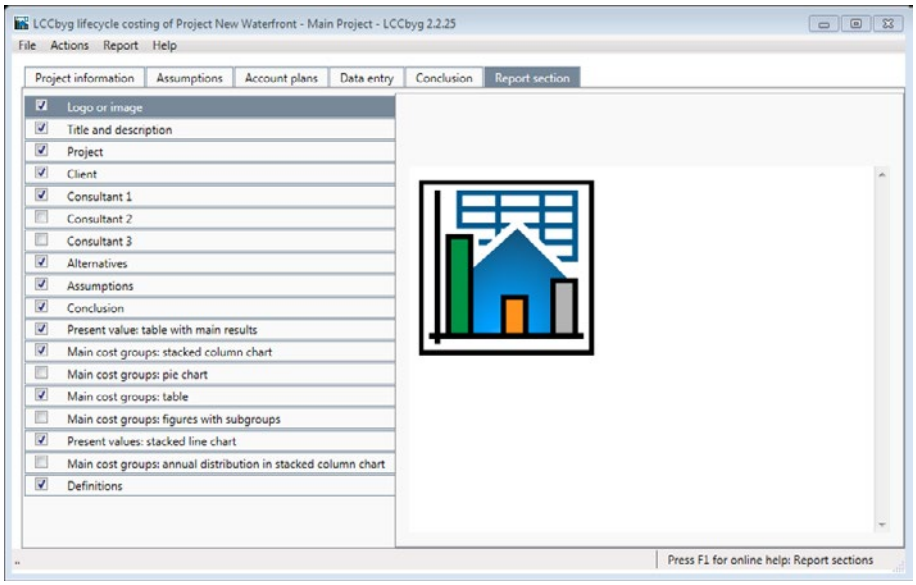

Figure 42. The 'Report Section'.

Once you're satisfied with your choices, you can generate a report by selecting 'Report' ('Rapport') in the top menu bar and clicking 'Save report as PDF' ('Gem rapport som PDF'). This opens a new screen where you choose where you want to save the report. Once the application has saved the project file, you will be prompted to open the saved file. Click 'Yes' ('Ja') if you want to see the report right away. Click 'No' ('Nej') if you want to wait to see the report, but remember where you have saved it.

The report is saved as a PDF document and can be sent for example to decision makers, who are only interested in reading the report. If the recipient should also be able to continue with the calculations, the project file saved in XML format must be sent to the recipient, who can re-load the project file into the application. You can do that by clicking 'File\Save As' ('Filer\Gem som') or using the Ctrl+S shortcut key. A third option is to use the 'Actions\Export\Spreadsheet with results' ('Handlinger\Eksport\Regneark med resultater') function, after which the saved spreadsheet can be forwarded to the recipient.

LCCbyg is a tool for calculating the lifecycle costs of buildings. LCCbyg produces a clear overview of the costs over the entire life of a building in terms of procurement, operation, maintenance, energy consumption, etc. LCCbyg can help decision makers compare two or more alternative solutions and choose the most economical solutions in a long-term perspective. This publication describes how to install LCCbyg version 2.2 on a computer depending on the operating system and how the various features of the application are used.

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