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## **BESS - Benchmarking and Energy management Schemes in SMEs**

# **Description of the BESS Web based monitoring and benchmarking**

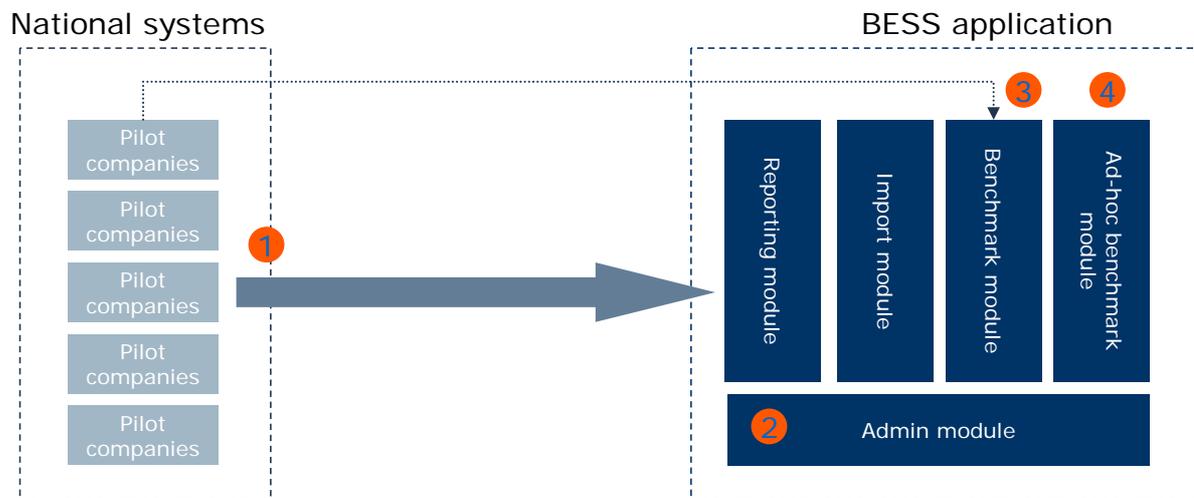
21. May 2008

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## BESS - Web based monitoring & benchmarking

A web-based tool for international benchmarking of key indicators for selected sectors within Europe is developed. The tool which is currently tested by pilot companies from the dairy, bakery and meat industries within the BESS project builds upon the Norwegian benchmarking system. As a part of the ExBESS-project the database will now be expanded with data from small breweries, laundries and textile industry. The benchmarking tool has strong links to the e-learning module, and the benchmarking data-input will be one e-learning activity during the pilot phase.

The web-application system is designed to enable yearly benchmarking of energy data in Europe based on national data gathered by national systems. The illustration below describes how pilot companies, national systems (for energy reporting) and the BESS web application will interact.



1. Registered pilot companies reports energy data in to the BESS application. An identification key (GUID-code), distributed by the national administrator, is necessary to store the data into the database.  
Alternatively blocks of data from several companies can be imported directly by a global administrator in the import module.
2. Quality assurance of reported data is done by the national administrator. As soon as the data are approved the benchmark results will be available in the benchmark module. Configuration and set up of benchmark classes is done by a global administrator.
3. Registered pilot companies access BESS-application by their identification key and benchmark their own energy use with other companies in the same benchmark-class (industry sector).
4. Non-registered users can use an ad-hoc/demo benchmark module to compare energy performance against actual data in the database. These data are not stored in the system and cannot be used or seen by others.

The access to the BESS benchmarking application has several provisions to ensure access to correct data and to safeguard confidentiality of the data to be provided by the pilot companies.

The application has options for four different kinds of adjustment; boiler efficiency, climate, production utilization and production mix. The users have the possibility to choose, whether or not to use adjustment factors. A description of the methodology for the different adjustments is available at the web site.

In order to be able to do these adjustments, some additional data has to be reported. These data are optional, the companies do not have to report them, but it would be of great interest if as many as possible could report also these data, since the benchmarking will gain a lot in quality by that.

For some sectors there has been worked out additional spreadsheets to do pre-calculation and adjustments that not can be configured into the web-application. These fixed-input spreadsheets can be downloaded in the benchmark-section on <http://www.bess-project.info>. If you are going to use these spreadsheets then send the completed spreadsheet to your national administrator and he/her will import your data into the database.

## 1. Registration of pilot companies

All pilot companies that want to enter company data into the database need an identification key (GUID). This unique identification key ensures access to correct data and anonymity. Company name are not stored in the database and will not be displayed in the web-application. National administrators generate, administrate and distribute the identification key so pilot companies can directly access their company specific web-page by an URL on the following format:

<http://bess.bekk.no/bess/default.aspx?id=xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxxx>

Where xxxxxxxx-xxxx-xxxx-xxxx-xxxxxxxxxxxxx is the GUID-code. Each x can be a character in the range A-F or 0-9 (A hexadecimal number). There is  $16^{32}$  different combinations of this ID, so no matter where the GUID is generated is supposed (or guaranteed) to be globally unique.

The link between company name and GUID is only known by the national administrator. This connection is essential due to the quality assurance of data. Company name are not stored in the database.



## 2. Registered users

As registered pilot company you will have access to the unique company specific web-page that allows you to register data and see benchmark results.

### 2.1 Introduction

This page is the first page you will see as a registered company. If you get the following message; “The supplied ID is not a registered GUID in the database”, then please check your identification key or contact your national administrator.

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Introduction | Specific Energy Consumption | % Improvement | Historical progress | Qualitative score

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### Welcome To Your Unique BESS-Homepage For Energy Benchmarking

This is your unique BESS-homepage (URL based on a GUID). It is only you and your national administrator that have this unique URL-codestring for direct access to your homepage. This pilot web-based benchmark application developed within the BESS-project (www.bess-project.info) make it possible to benchmark energy performance against other European pilot companies in your industry sector. Push next to see your benchmark results.

The module is under construction and in first phase you will find data for participating pilot companies within the food and drink sector (dairies, meat industry and bakeries). The application is flexible regard establishment of new benchmark-classes and new indicators. The application has options for adjustment regard external differences like climate (heating and cooling), capacity utilization, production mix and boiler efficiency. For more information about the adjustment factors see link at the bottom of this page.

Benchmark results are based on information that you have reported to your national administrator. If you find that benchmark figures for your company are wrong please contact your national administrator.

[Adjustment factors](#)

[Information for meat industry](#)

[Information for bakeries](#)

[Information for dairies](#)

[Information for laundries](#)

[Information for textile industry](#)

[Information for breweries](#)

#### Industry Bakery industry

Countries included in benchmark

- Netherlands  Belgium
- Ireland  Greece
- Spain  Czech Republic
- Norway  Sweden
- Finland  Austria
- Italy  Latvia
- Lithuania  Poland
- Portugal  Romania
- Bulgaria  Slovakia
- Slovenia

Energy report unit:

Joule

Wh

Adjustment factors

- Production mix with equivalents
- Boiler efficiency
- Utilization of capacity
- Climatic corrigitations

[Register data in adhoc module](#)

[Go to benchmark](#)

In the top of the page there is a menu that acts as a wizard. You can only navigate to previous pages. To advance to the next page you have to click the “Next button”. When navigating to a previous step the data you entered earlier will be remembered and shown.

Below the text there is a set of links. The user can click these to attain files which contain more information on adjustment factors, specific industries and contact persons. These documents are pdf-files, and the user must therefore have Acrobat Reader installed.

On the right hand side there is a filter that sets different parameters to how each report is calculated. The filter is also present on each report and the parameter values selected by the user will be remembered when navigating to a new report. On some of the reports parameters may be disabled where they do not have impact on the calculation result.

The “Register data in ad hoc module” button in the right corner lets the user edit data which is not yet approved by an administrator. Only approved data will be shown in the benchmarks.

The “Go to benchmark” button causes the same action as if the user had chosen the “Specific energy consumption” item from the top menu. This button is not visible first time you enter the web-page since you don’t have any benchmark-results to illustrate.

## 2.2 Information about the company

After you have selected “Register data in ad hoc module” you get access to enter data.

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### Information About The Company

Country: Netherlands

Industry: Meat industry

**Weighting factors:**

(in %)	2003	2004	2005
Relative Heating Degree Days:	0	0	0
Heating Dependent Share:	0	0	0
Production capacity utilization:	100	100	100
Basic energy consumption:	0	0	0

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In the second page you can enter information about your company; which country you are located in, the industry and information about climate and utilization of capacity. More information about adjustment factors is available on the introduction page.

Entering illegal values will result in a popup message that tells you what to correct.

## 2.3 Input of energy use



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### Input Of Energy Use

Report In:

kJ   
  kWh

EnergyCarrier	2003		2004		2005	
	Energy use	Efficiency	Energy use	Efficiency	Energy use	Efficiency
Coal	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>
Bio energy	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>
Light fuel oil	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>
Medium density fuel oil	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>
Heavy fuel oil	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>
LPG (propane, butane)	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>
Electricity (firm power)	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>
Electricity boiler	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>
Natural gas	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>
District heat	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>
Other energy	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>	<input type="text" value="0"/>	<input type="text" value="100"/>

In the third page you can enter the energy usage for different energy carriers. You can choose whether to report in kJ, kWh, GJ or GWh by checking the corresponding radio button in the top.

Entering illegal values will result in a popup message that tells you what to correct.

## 2.4 Input of Production



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### Input Of Production

Product	Unit	2003	2004	2005
Produced cured meat	kg <input type="text" value="v"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Slaughtered bovine animals	kg <input type="text" value="v"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Slaughtered swine	kg <input type="text" value="v"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Produced cooked/fried meat	kg <input type="text" value="v"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Other preparations of meat	kg <input type="text" value="v"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Slaughtered other animals	kg <input type="text" value="v"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>
Frozen volume	kg <input type="text" value="v"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>

In the fourth page you can enter values for your production. There is one row for each product belonging to your industry. For each product you may choose between the units that are allowed for the particular product, set in the Industry/Product Conversions part in the Administration module.

Entering illegal values will result in a popup message that tells you what to correct.

## 2.5 Results



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### Summary

**Company Information**  
Country: Belgium  
Industry: Bakery industry

(in %)	2003	2005	2006
Heating Degree Days	0	0	0
Heating Dependent Share	0	0	0
Product utilization	0	0	0
Basic energy consumption	0	0	0

**Energy use**

Product	Unit	2003		2005		2006	
		Energy use	Efficiency	Energy use	Efficiency	Energy use	Efficiency
Electricity (firm power)	kJ	7E+08	100	1.23E+07	100	0	100
Electricity boiler	kJ	0	100	0	100	0	100
Light fuel oil	kJ	0	100	0	100	0	100
Medium density fuel oil	kJ	0	100	0	100	0	100
Heavy fuel oil	kJ	0	100	0	100	0	100
Natural gas	kJ	0	100	0	100	0	100
LPG (propane, butane)	kJ	0	100	0	100	0	100
Coal	kJ	0	100	0	100	0	100
Bio energy	kJ	0	100	0	100	0	100
District heat	kJ	0	100	0	100	0	100
Other energy	kJ	0	100	0	100	0	100

**Production**

Product	Unit	2003	2005	2006
Grain mill products	ton	1000	900	0
Bread	ton	0	0	0

[Lock data for approval](#)

[View Benchmark](#)

The last page shows a summary for all the data you have entered.

When clicking the “View Benchmark” button you are transferred to the Benchmark module.

“Lock data for approval” is used for signalling to the National Administrator that the data is not incomplete, but are ready for approval to be imported into the data set for the application. Before this button is clicked, the user can access the application with the supplied link several times to edit data. After the data are locked the user can still however edit the data, but this is not recommended.

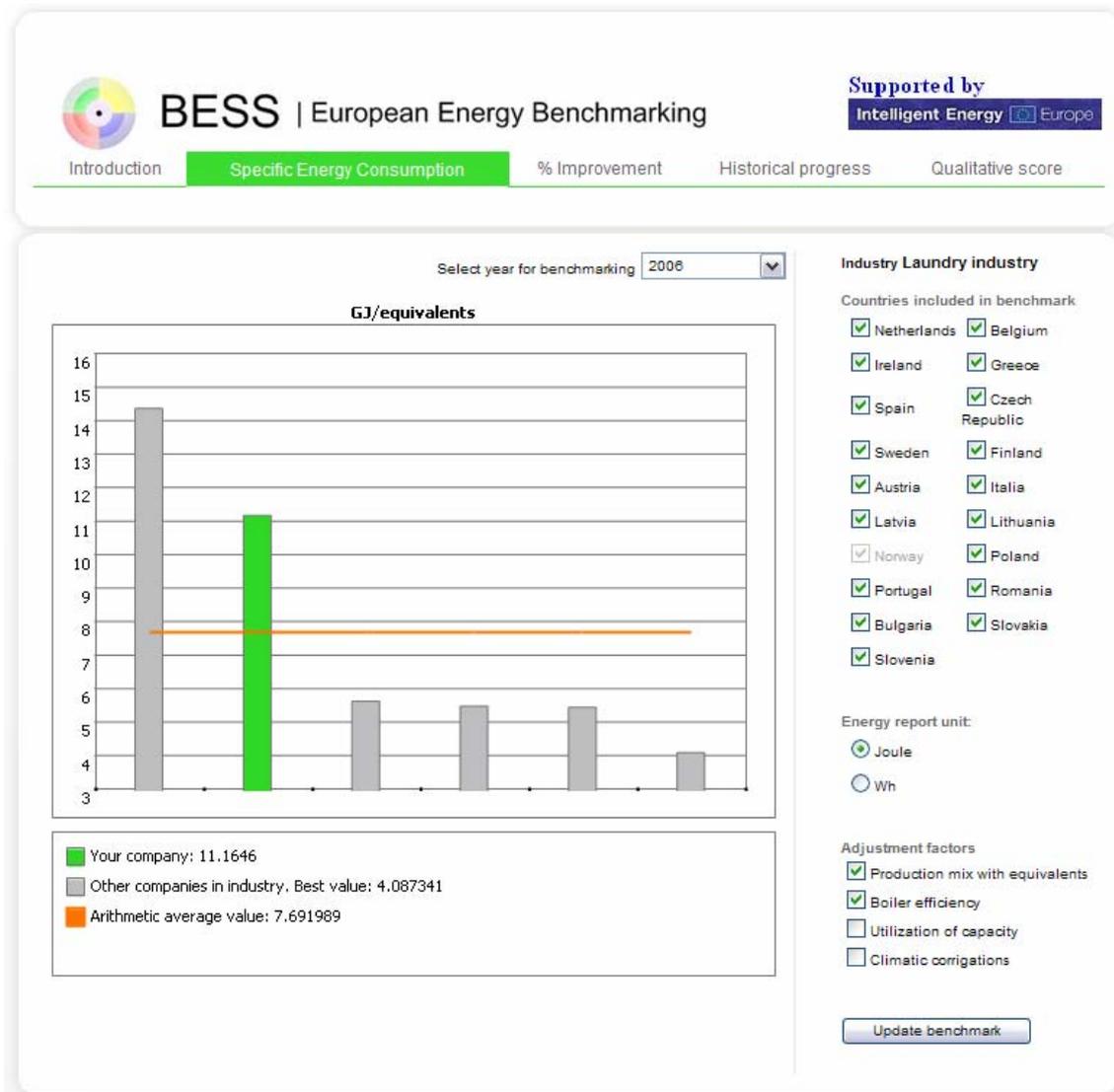
When your data has been approved by your national administrator data for approved years can not any longer be edited. These years will not be displayed on the screen. However you can still edit and lock data for years that not has been approved.

### 3. Benchmarking

The benchmark reports for an Ad-Hoc/demo (not registered user) is mainly the same as for a normal benchmark user, but in addition to the stored data, the reported data from the Ad-Hoc part is also calculated.

Not registered user (Ad-Hoc/demo) does not have access to the Qualitative Score report.

#### 3.1 Specific Energy Consumption



The Specific Energy Consumption report shows a column chart where each company in the selection scope is represented with a column. The column that represents the user is marked with a green colour.

The values that are reported are Specific Energy Consumption (SEC) which is the total energy consumption divided by the total production.

In addition there is a line for the arithmetic average value.

On top of the chart there is a dropdown list where you can choose the year for which you want to generate the report.

On the right hand side there is a filter that sets different parameters to how each report is calculated.

The filter is made out of three sets of parameters:

- \* Countries included in benchmark
- \* Energy report unit
- \* Adjustment factors

The first part is a list of each country that is registered in the system. Here you can select which of the countries that will be included in the calculations.

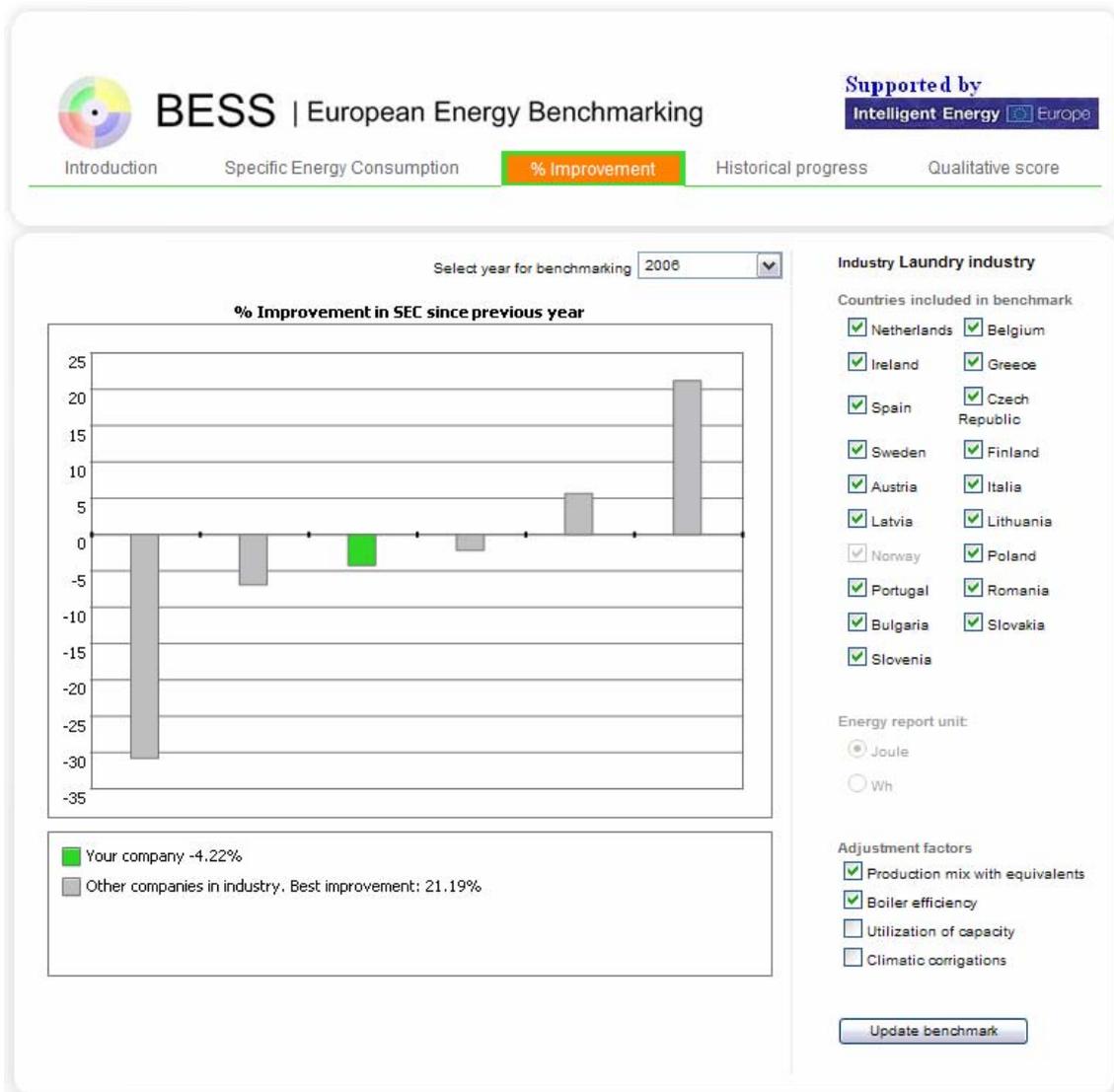
In the second part you can select if you want to generate the reports with the energy consumption calculated in Joule or Watt hours.

In the third part you can select different calculation methods:

- “Production mix with equivalents” sets if you wish to take into energy cost of producing different products (i.e. beer and mineral water). If not set, the each product will count equally against the total production for a company.
  - When checked, the set of products will be those that are checked for “include in weighted calculations” in the Industry/Product Conversion part of the Administration module.
  - When unchecked the set of product will be those that are checked for “include in un-weighted calculations” in the Industry/Product Conversion part of the Administration module.
- “Boiler efficiency” sets if electrical energy carriers should be calculated with the Boiler efficiency factor or not.
- “Utilization of capacity” sets if *utilization of capacity* and *basic energy consumption* is a part of the calculation. When checked, only the companies with “Include Utilization” set to “1” in the import files are included in the result set.
- “Climatic corrections” sets if *Heating Degree Days* (HDD) and *Heating Dependent Share* (HDS) is included in the calculations. When checked, only the companies with “Include HDD” set to “1” in the import files are included in the result set.

After your have completed your selection in the filer-menu, then push the button “Update benchmark” to see the updated benchmark-results.

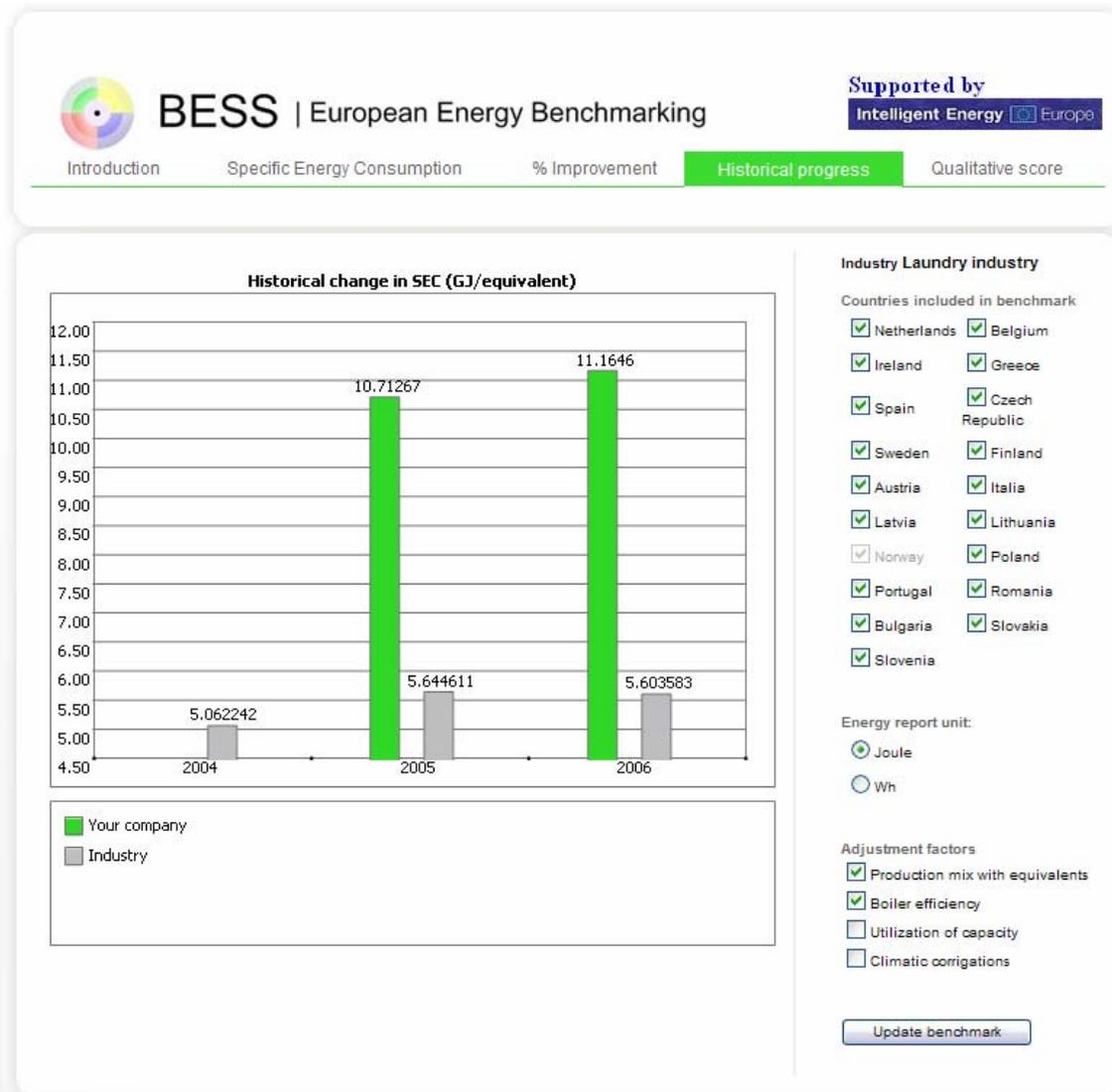
### 3.2 % Improvement in SEC since last year



This chart shows the difference in Specific Energy Consumption (SEC) between the selected year and the year before. The values are shown as a percentage of improvement since the previous year.

Here you can also select for which year you want to show the report.

### 3.3 Historical Progress



This graph shows your company's SEC and the average of SEC for the industry, year by year.

### 3.4 Qualitative score



This graph shows your score in the qualitative questionnaire from the e-learning application. It is divided into each main segment; Basic, Implementation, Policy, Documentation and Evaluation. The average score for the industry is also shown in the grey columns.

## 4. Demo-user

The Ad Hoc/demo module is for users who want to make a temporary report with their own data, and compare it with the data stored in the application. The data the demo user enters into the application is not stored or added to the data pool that is available in the normal benchmark reports.

### 4.1 Introduction

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Intro Company Energy Production Results

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#### Welcome To Ad-Hoc Benchmarking

This pilot web-based benchmark application developed within the BESS-project ([www.bess-project.info](http://www.bess-project.info)) make it possible to benchmark energy performance against other European pilot companies. The module is under construction and in first phase you will find data for participating pilot companies within the food and drink sector (dairies, meat industry and bakeries). The application is flexible regard establishment of new benchmark-classes and new indicators. The application has options for adjustment regard external factors like climate (heating and cooling), capacity utilization, production mix and boiler efficiency.

This ad-hoc benchmarking is a demo-site for companies that not participate in the BESS-project. By submitting company data of energy and production into this application you can benchmark energy performance against the pilot companies. Data that you submit can not be seen by others and will not be stored in the database. Below you find a four steps description of how to proceed. Push "next" when you are ready for the next step.

**Step 1 (Company):** Here you select which country and sector you belongs to. If you want to take climate into consideration, then you have to submit geographic data for heating degree-days (HDD) and climate dependent share of the thermal energy consumption.

**Step 2 (Energy):** Here you report annual energy consumption and boiler efficiency for relevant energy carriers used in your company. You don't have to submit data for two years, but if you do the output (step 4) will be more useful. Remember to tick off the correct unit for your reported data (1 kWh = 3600 kJ). By moving your cursor around, you will find that some help text pop up on the screen

**Step 3 (Production):** Here you report annual production volume for your company. If external conditions (strike, fire etc) has cause reduced production it is possible to submit average production utilization for adjustment with reference to optimum production. For more information about adjustment factors see link below.

**Step 4 (Results):** Here you find the benchmark results. Go back to relevant page (step) if you want to make changes. Your submitted data are temporary stored until you quit the application – then all information will be deleted.

[Adjustment factors](#)

[Contact persons](#)

[Information for meat industry](#)

[Information for bakeries](#)

[Information for dairies](#)

[Information for laundries](#)

[Information for textile industry](#)

[Information for breweries](#)

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The Intro page tells the user about the Ad-Hoc module, how the data is entered but not permanently stored, and how the reports are calculated.

The benchmark report for an Ad-Hoc/demo (not registered user) is mainly the same as for a normal benchmark user, but in addition to the stored data, the reported data from the Ad-Hoc part is also calculated.

Not registered user (Ad-Hoc/demo) does not have access to the Qualitative Score report.