Documentation of the Green Energy Cockpit

The Green Energy Cockpit is a Web-Service that offers the analysis, planning, controlling and simulation of a company's energy consumption. It therefore provides managers on the one hand as well as employees with a user-friendly UI and enables them to analyse, plan, control and simulate the needed energy of their production processes according to different parameters in a well-arranged way, without having to know detailed technical background.

Our vision is to create a product that is easily understandable and user friendly, and allows customization in the analysis with an attractive UI. We want to provide a clear tool that is intuitive to use and therefore eases energy controlling in production firms for managers and employees.

1. General

Login

Before using the Green Energy Cockpit, the user has to login. A user can only login, if he is already registered (please refer to Register). In order to login, the user needs to insert his user name into the "Name" free text field (1) and his password into the "Password" free text field (2).

After hitting the "Login" Button (3), the user is forwarded to the Green Energy Cockpit starting page.

Register

If the user is not registered yet, he can do this through clicking on the "Not yet registered" - field on the starting page (Please refer to Login). He then gets forwarded to the registration page. In order to register, the user needs to add his favoured user name and a password into the corresponding free text fields. Afterwards he has to hit the "Register" button. He is now registered in the database and can from now on login with his user name and password.

AMOS PROJECT

Green Energy Cockpit

In order to get access to this site you need to be registred.

Create a new Account.

Name:

Password:

Confirm Password:

Register   Back

2. Data Upload/Setup

To get to the Data upload/Setup section, „Setup" is to be selected.

After selecting the section the user may choose between two options:

- setup plants
- setup products

In the first tab ("setup plants") it's possible to add a new plant (2) into the database or just modify an existing one (1, 3 and 4).

Adding a new plant into the database (2)

In the "Setup" section there exists an input text field (2) in which you just need to register the name of the new plant; afterwards click on the "Add plant" - button to confirm.

Modifying an existing plant (1, 3 and 4)

The "setup products" tab shows a table below containing three columns:

- Product (10) - showing all products existing
- Shortname (11) - for the improved clearness
- equivalent pieces to 1 TNF (12) - TNF is an unit and means "thousand of normal format"

Adding a new product into the database (2)

To add a new product , the product name , its shortname and its equivalent pieces to 1 TNF is needed.

To end the procedure you have to click on the button "Add product" and so to save the new product in the database.

3. Energy-Analysis

There are three different energy analysis charts available in the GEC:

- Time
- Location-Format
- Format-Location

Time-Chart

Using the time chart, it is possible to display the energy consumption of different plants/machines for different timeframes.

Using the dropdown menus in (1) the user can select between:

- the used granularity, where he can choose between day, month, year (chosen in the illustrated case) and years:
    - day (result: energy consumption of the selected day from 00:00 to 24:00),
    - month (result: energy consumption of the selected month from 1st to last day of the month),
    - year (result: energy consumption of the selected year from january to december) and
    - years (result: comparison of several years).
- According to the chosen granularity the user can choose between the exact date (d/m/y), month (m/y), year (y) and the years (from y to y)
- Also the user can select, whether he wants to display the total energy-consumption in kWh, or the energy consumption kWh/TNF (normalized measure). This is a general step which is repeated in every diagram type (refer to Location-Format and Format-Location-Chart).

The checkboxes in (2) let the user specify, which plants/machines he wants to compare. He can name the dataset in a textfield and afterwards select the data. He can either chose a whole plant or only certain machines. He can add unlimited data-sets

Location-Format-Chart

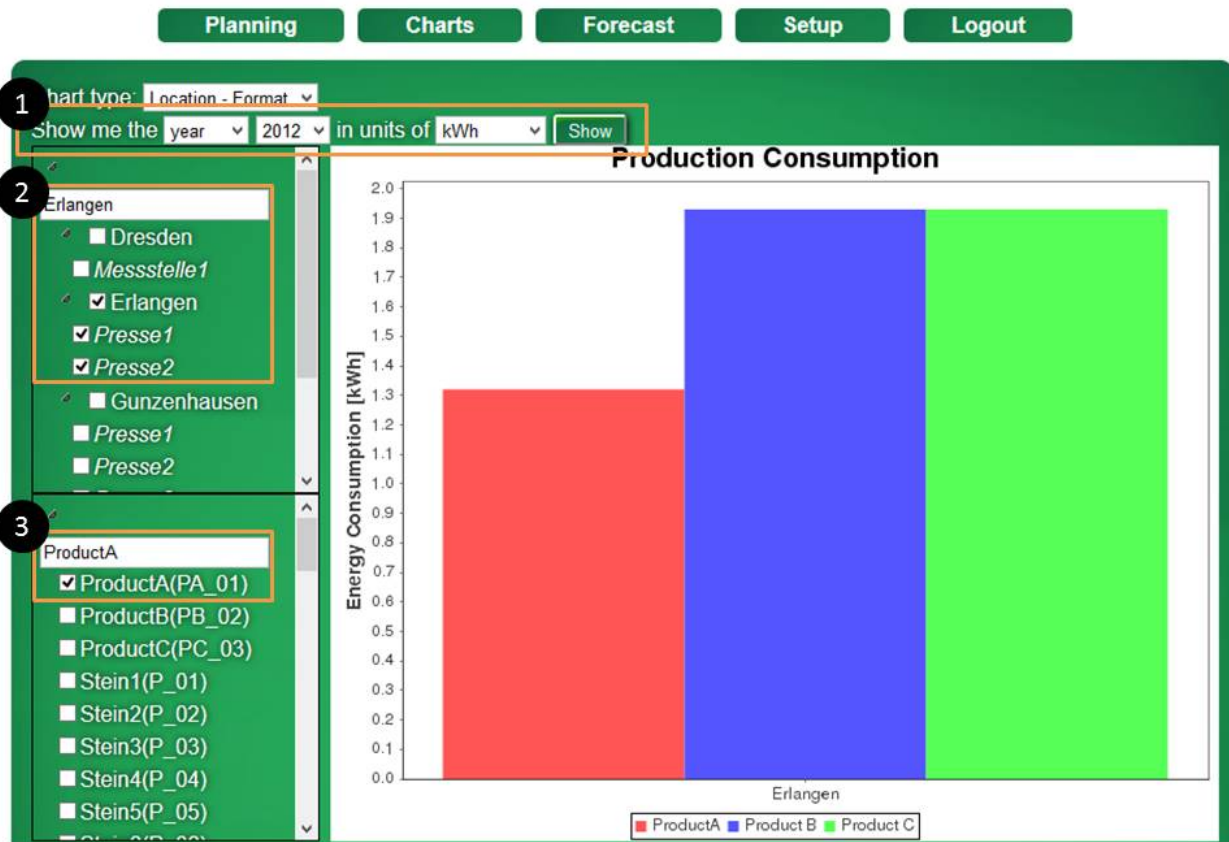The Location-Format-Chart displays the energy consumption at one or more locations for specific products.

For the first (1) step please refer to the chapter Time-Chart. However, in this diagram the user can choose whether the energy consumpton shall be displayed in kwH, kwH/TNF or TNF.

After having chosen the requested timeframe the user can define the requested location(s) (2):

- In the free text field the user can enter the name for the first location (the name is later displayed on the x-axis in the diagram)

- Via checkbox he can afterwards check either the whole location or only one or more presses

- If the user wants to compare more one (or more) locations to the first one he has to scroll down and click on the "Add Group" - button at the bottom. Afterwards the first two steps can be repeated for a different location

Now the products can be set (3):

- ● This works exactly like choosing the location (please refer to step 2) only now the products are chosen instead of the locations. Again the user can add as many products as he likes.


The Format-Location-Chart

When the energy consumption for specific formats in different locations is requested, the Format-Location-Chart can be used. This diagram is related to the Location-Format-Chart, but in this diagrams only whole locations can be chosen (whereas in the Location-Format-Chart presses in the locations can be chosen).

For the first (1) step please refer to the chapter Time-Chart. However, in this diagram the user can choose whether the energy consumpton shall be displayed in kwH, kwH/TNF or TNF.

Now the user can define the requested location(s) (2):

- In the free text field the user can enter the name for the first location (the name is later displayed on the x-axis in the diagram)

- He then has to check the required location via checkbox

- If the user wants to compare more one (or more) locations to the first one he has to scroll down and click on the "Add Group" - button at the bottom. Afterwards the first two steps can be repeated for a different location

Please refer to Location-Format-Chart in order to set the products (3).
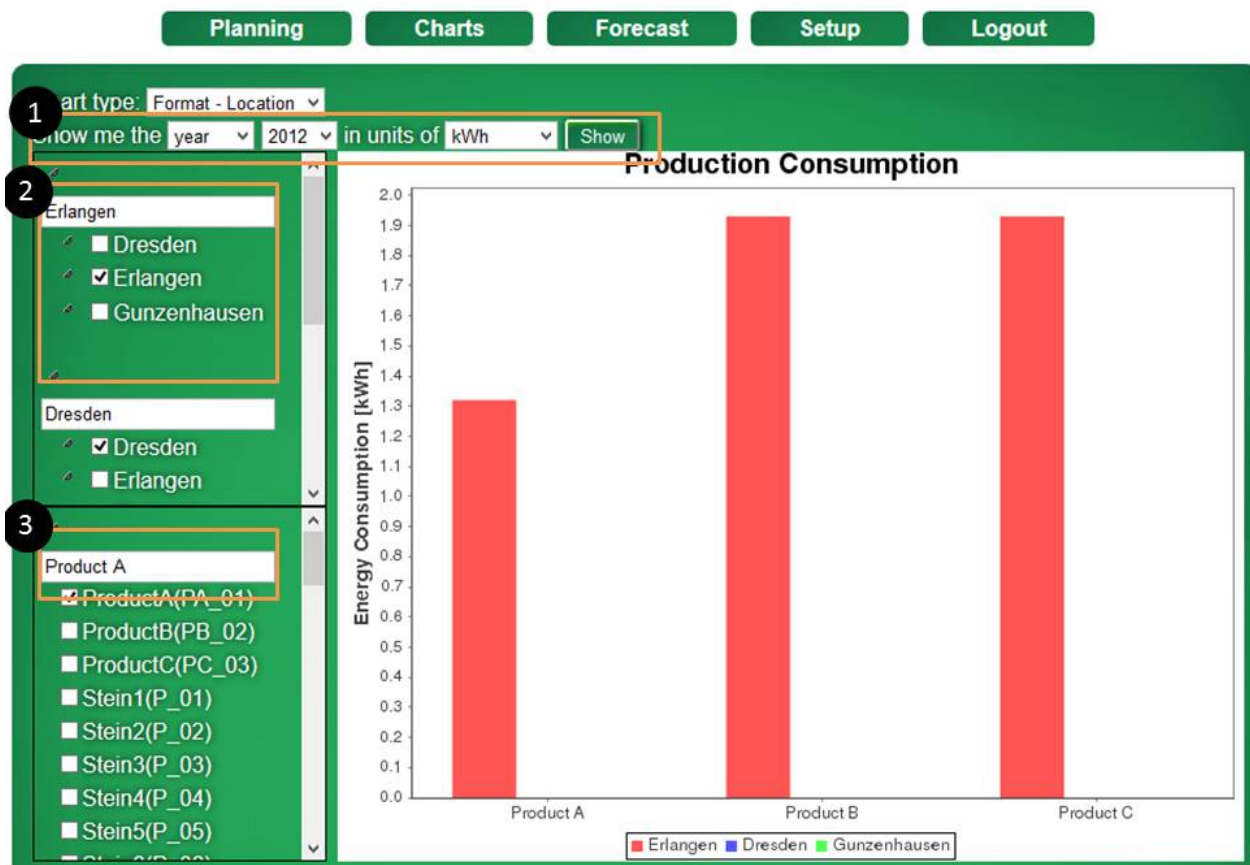
4. Energy-Planning

1. Start

To get to the planning section, „Planning" is to be selected.

The User must select year and plant that the planning is supposed to be done for. All actions have to be completed by hitting button "Show".

In case somebody already saved the planning for the selected year and plant, it will be displayed in the "Saved Planning Data"-box.

The website will now display planning values from previous year. Only products will be displayed where planning values are available from previous year.

	January [TNF]	February [TNF]	March [TNF]	April [TNF]	May [TNF]	June [TNF]	July [TNF]	August [TNF]	September [TNF]	October [TNF]	November [TNF]	December [TNF]	Total [TNF]	AVG [TNF/kWh]	Energy [kWh]
ProductA	0.1	0.0	0.0	0.4	0.5	0.6	0.7	0.6	0.5	0.4	0.0	0.0	3.8	0.4	1.5
ProductB	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.6	0.5	0.4	0.3	0.2	4.8	0.5	2.4
ProductC	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.6	0.5	0.4	0.3	0.2	4.8	0.5	2.4
Sum	0.3	0.4	0.6	1.2	1.5	1.8	2.1	1.8	1.5	1.2	0.6	0.4	13.4		6.3

2. Changes to display and value of planning data

There are several options that can be performed to modify the display and value of the planning data. Note that button "Show" has to be clicked before changes are applied.

- Percentage change
- Precision
- Input Fields
- Show All Formats Button
- Reset Button

Percentage Change

- all values from previous year will be modified by a certain percentage factor.
- in case this function is used, all values will be orange-colored and a note about the percentage change will be added to each product in the first column of the table.
- Note: the percentage change is only applied, if the value hasn't been modified manually by user (through input fields)

Precision

- sets the number of maximum displayed digits (accuracy).
- in case a negative value is applied, a unit change will be performed from "TNF" to "MNF".

Input Fields

- manual changes of each value through input fields.
- if value is accepted, it will turn yellow.
- Note: once values have been changed through input fields, global percentage change will no longer apply to them

Show All Formats Button

- table will display all formats, even if no production data from previous year for this plant exists

Reset Button

- Clears all data that was inserted into the input fields
- sets global percentage Change to 0.

3. Saving and loading of planning data

The planning section provides the opportunity to save the user's modifications. There are three actions that can be performed:

- Save data
- Load data
- Delete data

The following information will be saved:

- when was data saved
- who saved data (user)
- selected year and plant
- planning values that were inserted into the input fields by user
- global percentage change value

Save data

- Information will be committed and loaded into the database by using button "Save Planning Data".
- the save will appear in section "Saved Planning Data".
- Note: already existing saves that are displayed will be overwritten.

Load data

- the displayed table is to be resetted before loading data (button "Reset").
- planning data will be retrieved by selecting the respective save and clicking on button "Load".
- saved data will now be inserted into the input fields.
- Note: to get a visual distinguishment between previous-year-values and modified values, hit the "Show" button after loading the data.

Delete data

- saved data can be deleted by hitting button "Delete".

5. Energy-Forecast

To get to the forecast section, „Forecast" is to be selected.

This function has been initiated to have a nearly imagination about the energy consumption in the near future and to afford an opportunity of intervention in the present production for improving the profitability.

It's based on the values of the previous months/years (which are uploaded to the database) to get the most accurate result.
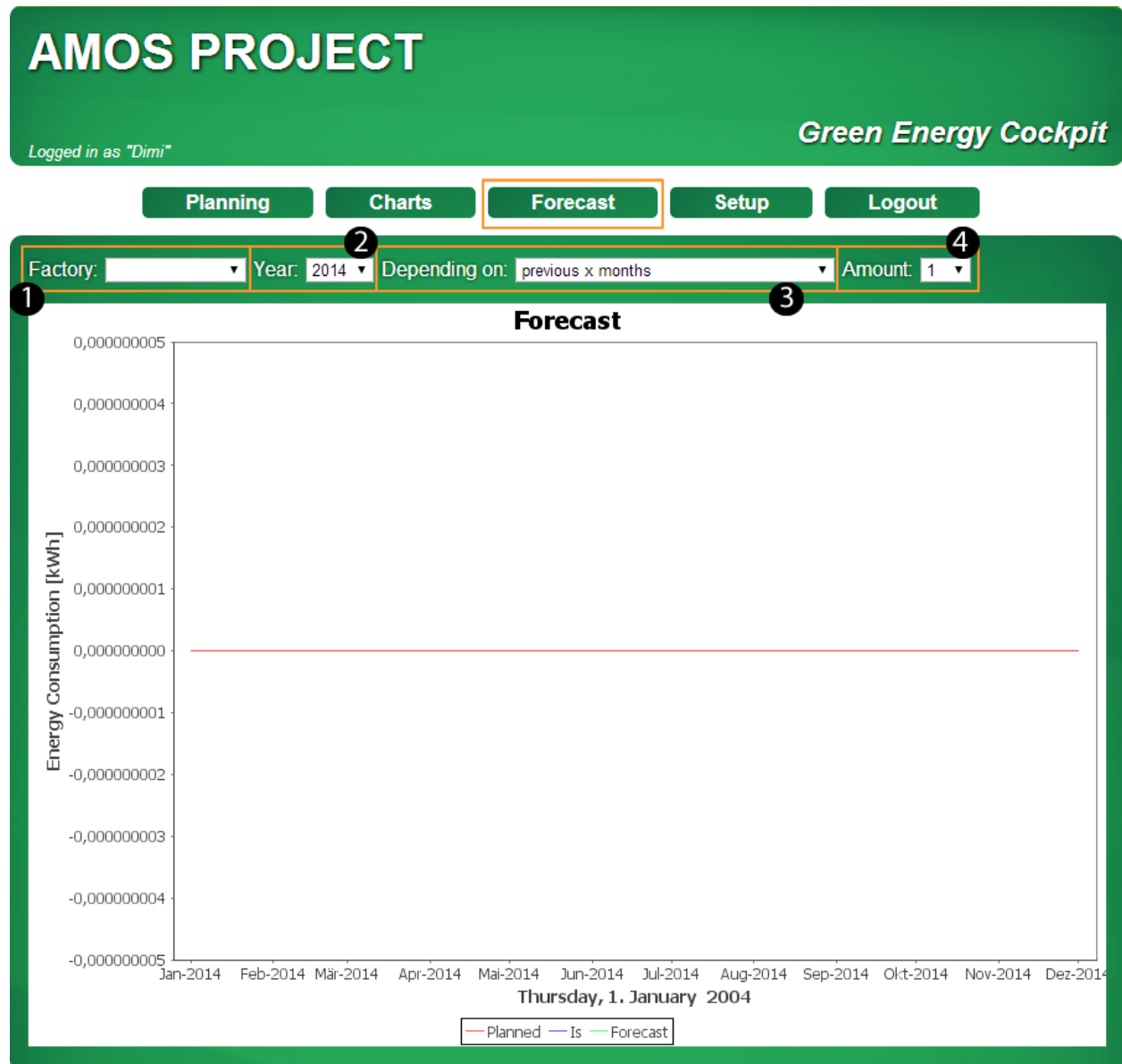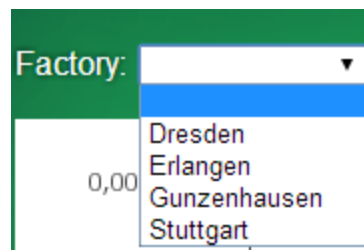
At the beginning of the forecast page there are several options to choose (1-4):
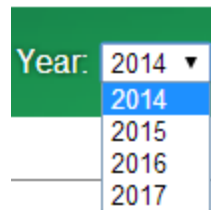
- Factory
- Year
- Depending on
- Amount

Factory (1)

- shows all available factories which are saved in the database (e.g. Dresden, Erlangen, ..)
- only in case the selected factory has got data from previous months saved, the diagram will show a forecast

Year (2)

- opportunity to choose which year you would like to see in a forecast
- possible for the remaining year , or the coming years

Depending on (3)

- most important option which allows to choose between three possibilities
  - previous x months
  - previous same months from last x years
  - previous x years
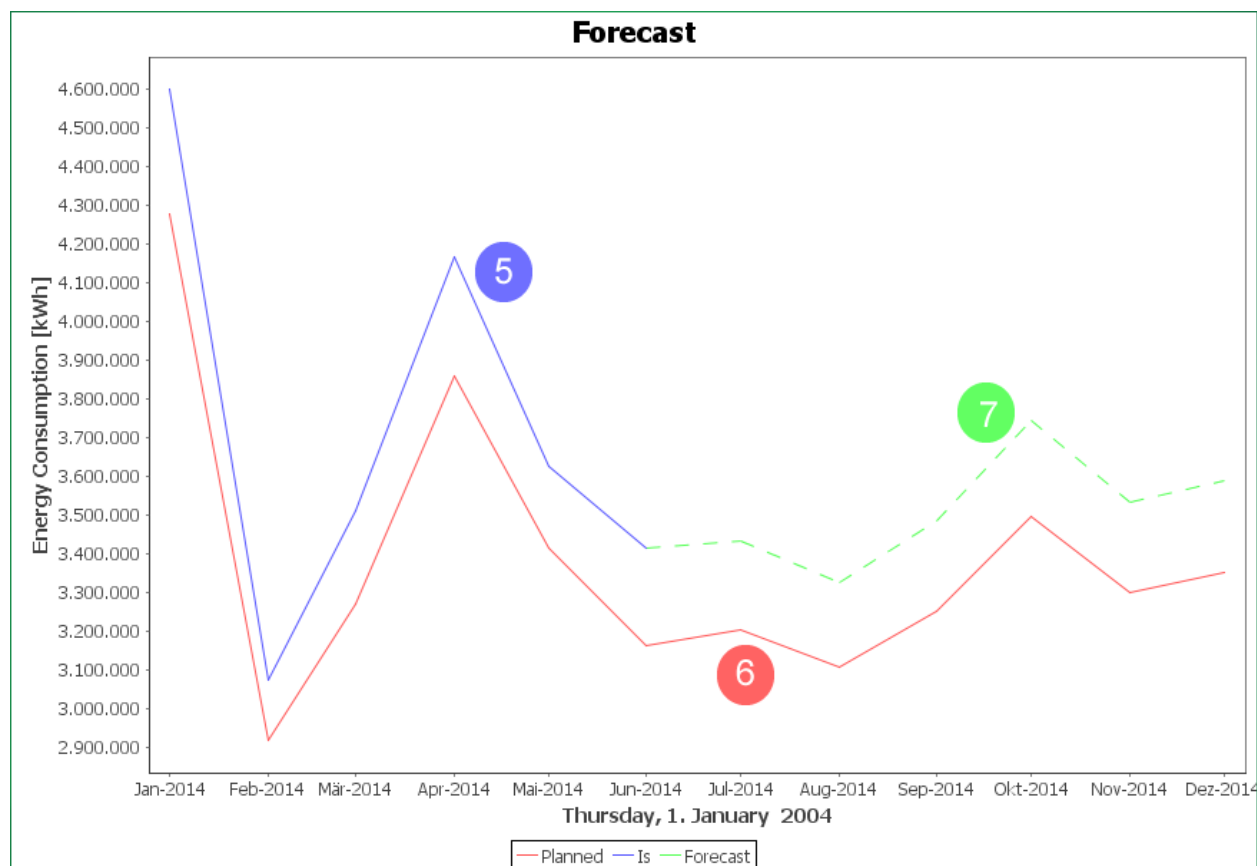- the option vary the forecast depending on previous months or years

Amount (4)

● according to the decision of the "depending on" option, it's the amount of months or years passed

Forecast Diagram

Depending on the chosen options, a diagram will apear with on the one hand the temporal axis and the "energy consumption in kWh" axis on the other.

The diagram shows every time the values of just one factory (which the user can choose for himself (1)) at once.

Including three different lines ("Planned", "Is" and "Forecast"), the line chart is very clear.

Starting with the "Is" line (5) there are shown the actual-values which got the blue color and proceed until a certain point; the last updated energy consumption values from this factory.

First of all a PostgreSQL query is requested which reads the data for the selected factory (1) and the selected year (2) from the database.

Further the read data is shown as month values in a line chart.

Next, the red line which represent the "planned" values for this year (6) depending on the planning (performed at the energy planning).

After reading them from the database, they will be pictured in the diagram.

The last and most important line is the "Forecast" line in green (7). It is built up by the previous months/years (it's essential what form is chosen at (3)) continuing the "Is" line and so to makes a prediction for the upcoming months.