	IEA ECBCS ANNEX 36: **Retrofitting in Educational Buildings – REDUCE** *Subtask C:* Software Development and Analysis Methods

Calculation Tools for the Energy Concept Adviser

Appendix B: KULU WINDOW Instructions

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Appendix B: KULU WINDOW Instructions

(by Jorma Pietilainen, VTT)

The Kulu window consists of three parts: READINGLIST, GRAPH and REPORT. In the readinglist there is shown data (dates, readings and consumptions) already entered into the database. You can scroll the list up and down with the scroll bar on the right side of the readinglist. The **row below the readinglist is for updating**: there you can enter a new date and reading (or consumption). By default monthly consumptions are shown in the graph and in the report.

Above the readinglist (beside the drop-symbol) there are two fields PROPERTY and METER. In the property-field the name and code of the property will be shown. By clicking the name (or the arrow) the list of all properties entered into the database will be displayed. In the meter field there is shown the name and number of the meter. By clicking the name (or the arrow) the list of the meters of the property in property field will be displayed. The active property and/or meter can be chosen by clicking from the lists mentioned.
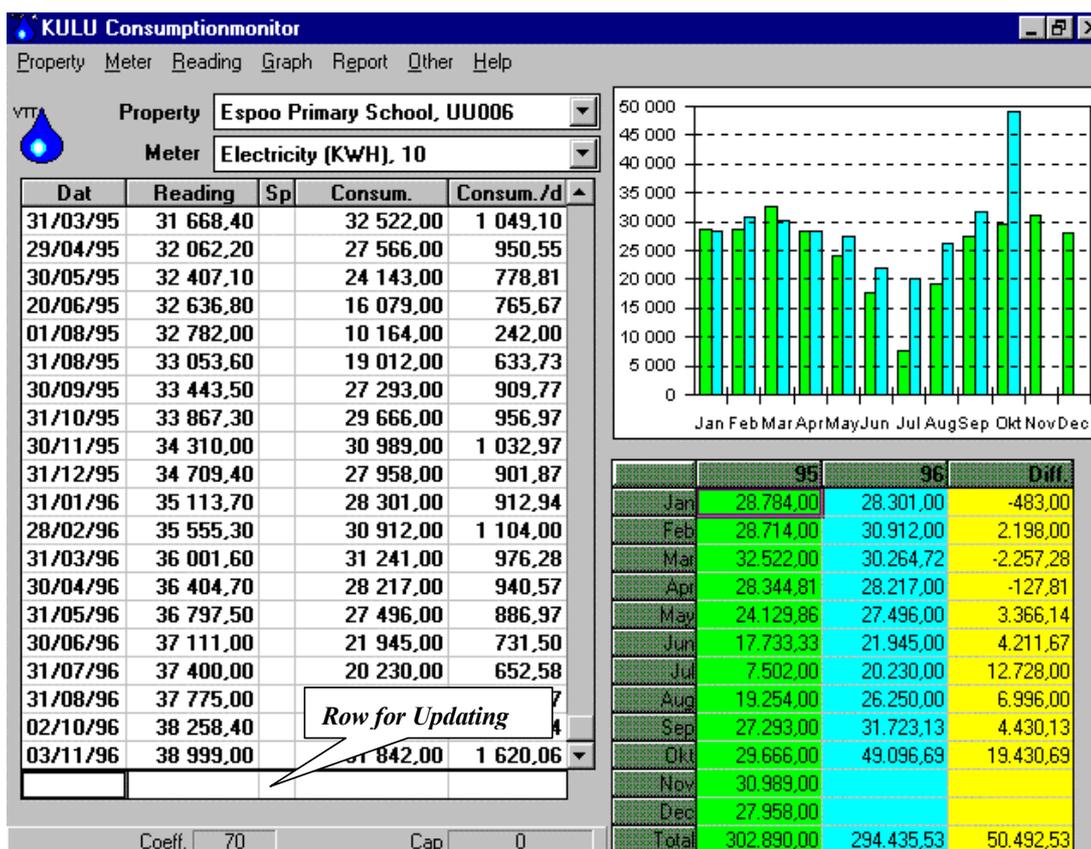
On the top of the Kulu window there are the following drop-down menus:

 'Property'   'Meter'   Reading' 'Graph'   'Report'   'Other' 'Help'

On the bottom of the Kulu window there is shown the coefficient and the capacity of the active (chosen) meter. Depending on the resolution of the display and the size of the Kulu window the graph will take less or more space and the readinglist and report will be scaled correspondingly.

TYPICAL PHASES IN THE USE OF KULU :

1. CREATING PROPERTIES   (drop-down menu 'Property'/'Add')
2.   ”   METERS   (”   'Meter'/'Add')
3. ENTERING CONSUMPTION DATA   (add-row of the readinglist)
4.   ”   WEATHER DATA (drop-down menu   'Other/Weather information')
5. GRAPHS AND REPORTS   (drop-down menus 'Graph` and 'Report')
6. BACKUP OF DATABASES   (drop-down menu   'Other'/'Backup')

KULU Consumptionmonitor

Property   Meter   Reading   Graph   Report   Other   Help

VTT

Property Espoo Primary School, UU006

Meter Electricity (KWH), 10

Dat	Reading	Sp	Consum.	Consum./d
31/03/95	31 668,40		32 522,00	1 049,10
29/04/95	32 062,20		27 566,00	950,55
30/05/95	32 407,10		24 143,00	778,81
20/06/95	32 636,80		16 079,00	765,67
01/08/95	32 782,00		10 164,00	242,00
31/08/95	33 053,60		19 012,00	633,73
30/09/95	33 443,50		27 293,00	909,77
31/10/95	33 867,30		29 666,00	956,97
30/11/95	34 310,00		30 989,00	1 032,97
31/12/95	34 709,40		27 958,00	901,87
31/01/96	35 113,70		28 301,00	912,94
28/02/96	35 555,30		30 912,00	1 104,00
31/03/96	36 001,60		31 241,00	976,28
30/04/96	36 404,70		28 217,00	940,57
31/05/96	36 797,50		27 496,00	886,97
30/06/96	37 111,00		21 945,00	731,50
31/07/96	37 400,00		20 230,00	652,58
31/08/96	37 775,00			
02/10/96	38 258,40			
03/11/96	38 999,00		842,00	1 620,06

Row for Updating

Coeff. 70   Cap 0

	95	96	Diff.
Jan	28.784,00	28.301,00	-483,00
Feb	28.714,00	30.912,00	2.198,00
Mar	32.522,00	30.264,72	-2.257,28
Apr	28.344,81	28.217,00	-127,81
May	24.129,86	27.496,00	3.366,14
Jun	17.733,33	21.945,00	4.211,67
Jul	7.502,00	20.230,00	12.728,00
Aug	19.254,00	26.250,00	6.996,00
Sep	27.293,00	31.723,13	4.430,13
Okt	29.666,00	49.096,69	19.430,69
Nov	30.989,00		
Dec	27.958,00		
Total	302.890,00	294.435,53	50.492,53

(Graph: monthly consumption bars Jan Feb Mar Apr May Jun Jul Aug Sep Okt Nov Dec, scale 0 to 50 000)

1. CREATING PROPERTIES

Before entering consumption data you have to set up the properties and their meters. A property can be created in a form which you will get by clicking 'Add' on the drop-down menu 'Property'.

(ATTENTION ! While creating properties put upper case '**CAPS LOCK' ON**)

1.1 'PROPERTY' / 'ADD'

Click Add on the 'Property' menu to indicate that you want to add a new property into the database, a new form will be displayed with the information of the property in the property field of Kulu-window. Cursor is ready in property code field of the form. You can enter information of a new property without deleting old ones. When you have entered the first character the existing data will disappear.

When creating a new property the following data is essential and must be entered:

PROPERTY CODE and PROPERTY NAME *(and WEATHER AREA to get weather corrections done) .*

Other information for the property can be added later on when needed by clicking Change on 'Property' menu.

PROPERTY CODE is the most essential key-information in the program. Almost all the data in the database will be arranged according to this code. Therefore it is important to note the following rules when forming the code:

- Each property code must be unique within the file (database).

- The code is 5 character long, numbers and/or letters can both be used. Blank characters are not permitted.

- Write code with upper case (**CAPS LOCK ON**).

- You cannot easily change the code later, that's why it is important to plan the principles of the code beforehand.

 - When having a great number of properties it is easier to use Kulu, if the code is formed logically.

The most simple way to form the code is to number properties running from 00001. More advanced way is to reserve the first 2-3 characters of the code for classifying the properties according to the needs of the user (type, administration, area/region, etc.) and to use the rest of the code for numbering.

PROPERTY NAME contains essential information for the user and will be used eg in the headings of the reports. Name can have max. 40 characters. Properties will be sorted alphabetically in the list of properties. In the long list the certain one can be found rapidly by clicking the first letter of the property name.

WEATHER AREA of a property is 3 characters long code. Weather database includes the same code. The application will use this code to join the property to the weather database when calculating weather corrections for the heating energy consumption. This code can be added later when corresponding weather data is available.

A new property with all given information will be added into the database by clicking 'Add' on the 'Property' menu.

1.2 'PROPERTY' / 'CHANGE'

By clicking Change on 'Property' menu you can update/change existing data of the property (not the code however). The changes will be added into the database by clicking the change button.

1.3 'PROPERTY' / 'DELETE'

By clicking Delete on 'Property' menu you can delete the chosen property. Be careful however because when deleting a property all the existing data including meter readings, consumptions etc. will disappear.

2. CREATING METERS

When creating a meter you must choose the property from the list of properties. Then you can create a meter for this property in a form, which you will get by clicking 'Add' on the 'Meter' drop-down menu.

(ATTENTION !   While creating meters put upper case **'CAPS LOCK' ON**)

2.1 'METER' / 'ADD'

You can click Add on 'Meter' menu to indicate that you want to add a new meter into the database for the chosen property and a new form will be displayed.

You must always enter the following essential data when creating a new meter:

METER NUMBER,   METER   NAME,   CONSUMPTION TYPE,   UNIT   and COEFFICIENT.

Other information of a meter can be added later on when needed. For the existing meters the data can be added or changed by clicking Change on 'Meter' menu.

METER NUMBER is important "key" information for the meter and has to be unique within the property. The field is numeric and 2 digits long. Therefore there can be maximum 99 meters in each property. You can number meters free, but it can be useful to reserve for each consumption type its own decade, for example for heating meters/numbers 1-9, for electricity 10-19, for water 20-29 etc. Meter number must **not be left blank!**

METER NAME is essential information for the user. Meters will be sorted alphabetically in the list of meters and that's why the names should be suitable. The name can be max. 20 characters long. Typically meter name specifies the consumption type and can give some additional information as well. (For example: heating, electricity day, electricity night, electricity for cooling, water 1, water of kitchen, etc.)

CONSUMPTION TYPE and UNIT can be chosen from the list, which is displayed by clicking the arrow on the right side of the field. Also, other codes than those in the list can be used. However apply the following rules when entering consumption type:

- Consumption type code is maximum 2 characters long.

- First character in the code defines the main consumption type in the following way:
   L=heating, S=electricity, V=water, H=hot water, J=district heating water, K=users/persons

- Kulu will use the first characters mentioned when calculating eg the Total property consumption in the Report menu (= sum of the consumption of all the meters having the same main consumption type as the active/chosen one)

- Kulu will make weather corrections only for the meters, which have the code of consumption type beginning with character 'L' (=heating).

- Consumption type code for the energy meter of district heating must be 'LK' and unit 'MWH'.

- Code for other consumption types can be chosen from the characters mentioned above. The second character in the code can be used for different kind of other purposes if needed (eg to identify certain type of consumption, for advanced reporting, analyses etc.).

- User can define his own consumption types and codes as well. Only the code will be updated into the Kulu´s database. Using Windows/Notepad new codes and names for consumption types can be added into the file **Mikulutl.dat** located in the same folder as where Kulu is installed (usually C:\Kulu)

COEFFICIENT is by default 1, unless some other value will be entered by user. Especially coefficients of electricity meters are usually higher than 1 depending on the type of the meter. When a meter will be changed, remember to check the possible change of the coefficient too. If the coefficient will be changed, enter the date of the change in the Change date field - then the new/changed coefficient will be used only for the readings after this date (not working in this version yet). Normally when creating a meter, leave the Change date field blank. While using Kulu the value of coefficient is shown at the bottom of the Kulu window.

CAPACITY is needed to calculate consumptions when meter readings "rotate around" and start again from 0 (see also entering consumptions special character 'Y'). Data for Capacity can be entered when readings reach this phase - before that moment the value of capacity will be not used. While using Kulu the value of capacity will be shown at the bottom of the Kulu window next to the coefficient.

Enter letter 'A' in '**Sub meter**' field, if the meter is a submeter (= the consumption has been already measured by another meter of the property), otherwise leave it blank. The consumptions of submeters will be not summed up when Kulu calculates eg the Total property consumption.

The new meter with its information will be added into the database by clicking the add button.

2.2 'METER' / 'CHANGE'

By choosing Change on 'Meter' menu you can update information of an existing meter (not the meter number however). Changes will be added into the database by clicking the change button.

2.3 'METER' / 'DELETE'

By choosing Delete on 'Meter' menu you can delete the meter with all the data (including readings etc.) of it. Before deleting a meter be sure you will not need its data anymore!

3. ENTERING CONSUMPTION DATA

Before you can enter meter readings (or consumptions etc.) you must choose the property and the meter from the lists, which will open when clicking the Property or Meter fields (or arrows) in the Kulu window. The existing consumption data for the chosen property and meter will be shown in the reading list if there is any. The dates (and readings) in the list are sorted according the latest as the lowest. You can scroll the list up and down with the scroll bar on the right side of the list.

3.1 ADDING READINGS AND CONSUMPTIONS

You can enter new consumption data in the add-row below the reading list. The add-row is separated from the reading list with a stronger line. The readinglist and the add-row consist of the following fields:

> ***DAT   READING   SP   CONSUM.   CONSUM./D***
> (date) (meter reading) (special character) (consumption) (consumption per day)

There are two ways to enter consumption data :

1. Most typical is to update meter readings. They will be entered in the reading field, then Kulu will calculate consumption by subtracting from the reading entered the previous one and by multiplying the result with the coefficient of the meter

2. Another way is to enter consumptions directly. They will be entered into the consumption field. In this case the reading field will be left blank and the character '**K**' will be entered in the 'Sp' field. So it is also possible to monitor and control other than typical meters like heating, electricity and water. For example users, clients, units of production, hours of use, costs etc. can have their own meters of daily, weekly, monthly or yearly data entered directly as consumption. When you start to enter readings or consumptions for a meter, you must enter the date and (for the first/starting reading) '**A**' -letter into the Sp-field. For the first day the consumption-field will be left blank (and the consumption cannot be calculated).

- Entering DATE

You can enter one reading for each date for each meter. There are no other restrictions and the reading period can be a day, a week, a month, a year or whatever intermediate time is required. The period can also change during the monitoring. Dates will be normally entered in ascending date order, but it is also possible (but not recommended) to add a new date and reading between old ones. The explanation of how to enter dates will be explained in the following:

-   Activate the date field on the add-row by clicking it (line around the field will become stronger).

-   Enter the date in the field in format **ddmmyyyy** (for example. 31012000). Date separators will be written automatically (and can be changed in the Windows Control Panel).

- The latest date entered will be stored in the memory and for the next readings you can get the date into the date field by pressing the **F12-key**. When entering the date for the first time in a session the F12-key will obtain the current date directly from the computer's clock/calendar. So if you enter readings (or consumptions) on the same day as the meters have been read, you will get the date **simply by pressing the F12-key**. When using the F12- key you do not need to activate the date field. By triple clicking the date field the **calendar** will pop out and you can choose the date there as well.

- Entering READING

- Move the cursor from the date field to the reading field by pressing the **TAB-key** or by clicking the mouse.

- Enter the reading. The reading can have a maximum of 10 digits. Two of these digits are for decimals. If you enter a decimal, you have to use comma (',' not a decimal point) to separate the decimals.

- If the reading entered was the start reading move the cursor to the next field ('sp'-field) and enter 'A'- character in that field. (See next description about 'special character'.)

- Add data into the database by pressing the *Enter*-key.

- After that, the data entered will be moved automatically to its own place in the readinglist. Simultaneously Kulu will calculate values for the consumption and consumption/day except for the first reading. Also the graph and the report will be updated according to the data entered.

  NOTE: CONSUMPTIONS IN THE READINGLIST ARE CONSUMPTIONS BETWEEN TWO SEQUENTIAL DATES, BUT CONSUMPIONS IN THE REPORT AND GRAPH ARE MONTHLY CONSUMPTIONS CALCULATED FROM THE DAILY CONSUMPTIONS OF READING PERIODS.

**- The *SPECIAL CHARACTER*-field is one character long and can be used for the following
  purposes:

  (ATTENTION! All Sp. Characters must be entered with **capital letters**)

- Blank (no character). **Usually** the field will be left **empty** when entering a reading. There are however some situations where you must enter the following character in the Sp Field:

- -character **A**, when you give the first reading or a start date when entering consumptions.

  The 'special character' must be 'A' in the following cases:

                    - the first reading of a meter or a start date with consumption.

                    - when you enter the first reading after a meter change.

- when you have entered consumptions and after that you will enter first reading.

- Always when you start a new reading series.

- -character **K**, when you enter consumptions. Consumption will be entered in the consumption field and the reading field will be left blank.

- -character **Y**, when you update readings for a meter, which has rotated around beginning again from 0. Only with 'Y' in the sp. field will Kulu accept a reading, which is smaller than the previous one. **Also** the value of **capacity** in the meter data must be updated in this phase (otherwise Kulu cannot calculate the right value for the consumption).

- CONSUMPTION

If you enter readings, Kulu calculates the consumption automatically. Another way is to enter directly the consumption in the consumption field. In this case the reading field will be left blank and the character 'K' will be entered in the 'Sp' field. Daily consumption between the given and previous dates will be calculated when pressing the **Enter key**. Simultaneously monthly consumptions in the graph and report will be updated (if the period is long enough).

- CONSUMPTION / D(ay)

Kulu will calculate the consumption/day automatically. In the add-row this field will be always left blank (untouched).

When updating readings (or consumptions directly) Kulu calculates into the database the consumption for a period of sequential dates/readings, the daily consumption for this period and the monthly consumption (shown in the report and graph). The monthly consumption will be calculated when the reading period is long enough ie, there are consumptions for (at least) twenty days of the month. If there are no consumptions for the rest of the days, at the end of the month corrections will be made when the new data (next reading) is entered.

3.2 CHANGING READINGS

Although all new readings will be given via the add-row, you can change an existing reading in the reading list (or consumption if entered) in the following way:

- Activate the reading by clicking it with the mouse.

- Enter the new reading . (You don't need to delete the existing reading, it will disappear automatically.)

- Update changes into the database by pressing the *Enter*-key **TWICE**.

3.3 DELETING DATES (READINGS)

The date with the reading and all consumption data (the whole row in the form) can be deleted in the following way:

- Activate the date you want to delete by clicking the date field

- Choose 'Delete' on Reading menu (or just push Delete button)

You can clear the add-row in the same way but choose 'Empty add-row'' on Reading menu (or just push Delete button after activating the date field in the add-row).

You can not change dates in the readinglist. (The only way is to delete the date first and then add the new one in the add-row.)

If there are some problems/errors when entering a date or reading, just simply delete the whole row and then add a new one (with the correct data) via the add-row.

4. ENTERING WEATHER DATA AND CALCULATING WEATHERCORRECTIONS

When calculating the monthly consumption Kulu can make also so called weather corrections for the heating energy. This presupposes that monthly heating degree days are updated into the weather database and right the weather area is chosen in the property data. Based on the monthly degree days weather corrected monthly consumption of heating energy will be calculated for meters which have the consumption type beginning with letter L (look the meter data). Whether degreedays are updated or not Kulu calculates anyhow monthly consumptions for all meters of the property. So the weather correction can be seen just as an additional option for heating (cooling) energy meters. Because needs and practices of weather correction, statistics, etc. vary from country to country this option must be developed further in collaboration with the users. At the moment Kulu offers however some tools for recording the very basic monthly weather data, which then will be used for some calculations as described below.

4.1 ENTERING WEATHER DATA

You can update some weather data in the form, in which you will get by choosing 'Weather information' on 'Other' menu.

Data already entered into the database is shown in the form. You can scroll the list up and down with the scroll bar on the right hand side of the list. At the top of the form there is the field 'weather area'. Weather data of a certain area (weather station) is joined with the help of this code to the weather code included in the property information. By clicking the field the list of weather areas entered into the database will be displayed. By clicking some code in the list you can change the weather area (station). Basically there is no limit to the number of weather areas (stations) but because the current version is developed originally for Finnish circumstances no routines for creating new areas are included yet and new codes (weather stations) can not be added by the user. For most users the existing number of codes is enough and can be used if the weather data are updated.

You can enter new weather data in the add-row below the list separated with a stronger line. The list and the add-row consist of the following fields:

Mon	Avg. temp.	Grade day
(month)	(average temperature)	(Degree day)

Weather data will be entered in the following way:

- Choose weather area from the list you will get by clicking the field weather area.

- Activate 'Mon' field in the add-row (the line around the field will became stronger).

- Enter month in format yymm (for example 9901).

- Move cursor to the next field (Avg. temp.) by mouse click or by pressing the *TAB* key.

  - Enter the outdoor average temperature. (At the moment Kulu does not use average temperature so you can also leave this field blank)

  - Move cursor to the next field 'Grade day'.

  - Enter the value of monthly degree days.

  - Add the data into the database by pressing the *Enter* key. After that the data entered will be moved automatically to its own place in the list.

A month with weather data can be deleted in the following way:

  - Choose the weather area.

  - Activate the month to be deleted in the list by clicking it.

  - Delete the month by clicking the 'Delete' button at the bottom of the form.

  Quit the form by clicking the 'Exit' button at the bottom of the form.

4.2 CALCULATING WEATHER CORRECTION

If the values for the monthly heating degree days are entered before updating a reading/consumption, Kulu calculates the weather corrected value for heating consumption simultaneously with the monthly consumption. Usually however the weather data (degree days) will be updated later on and in this case weather corrections can be calculated in the following way:

- Choose the property and the meter for heating.

- Corrections will be calculated for one year at a time. Activate some date in the year by clicking it in the readinglist. (Line around the field will became stronger.)

- Choose 'Calculate weather corrections for year.' on 'Other' menu. After that Kulu calculates weather corrections for the chosen meter and year.

The calculation of weather corrected (normalised) heating energy is made according to the common Finnish practice where heating degreedays, eg are based on the indoor temperature of 17 degrees centigrade. As discussed above, this option can be left without use too. How to look at the normalised values will be explained in the next chapter.

The function 'Calculate weather corrections for year ...' can be applied also for other than heating energy meters. In this case consumptions for all meter readings inside the selected year will be recalculated. This function must be used for instance when an existing reading in the reading list is deleted. Recalculation of consumption will produce the right value in the next row following the deleted one.

5. GRAPHS AND REPORTS

5.1 CHOICES OF GRAPHS AND REPORTS

In the Kulu window there are the graph and the report besides the readinglist. By default in the graph and in the report monthly consumptions (without weather corrections) of the two latest years will be shown. In the report also the difference between the years will be shown. You can control changes in the consumptions with the help of differences visualised also in the graphs.

You can change the content of the graph and the report by the following choices:

- Property

- Meter

- Year (Month in daily graph)

- Yearly / Monthly / Monthly accumulated / Daily / Daily accumulated

- Not weather corrected / weather corrected

-    Graph type

Property and meter

You can get into the graph and report consumptions of all the properties and meters in the database by changing the property and/or meter in the respective fields.

Year

By default in the graph and in the report **monthly** consumptions of the two latest years will be shown. You can change the year (or month in daily graph) by clicking the date in the readinglist.

Yearly / Monthly / Monthly accumulated / Daily / Daily accumulated

By clicking the menu bar item 'Graph' you will get a new menu including the choices:

Yearly

Monthly

Monthly accumulated

Daily

Daily accumulated

Daily graphs and reports are useful only if there are several readings/consumptions inside a month. When meter readings are updated eg on daily or weekly cycle these views can be used in order to visualise and control the development of consumption within a month.

Not weather corrected / Weather corrected

By default consumptions in the graph and in the report are the "normal" measured consumption. As discussed before you can get also weather corrected values for heating consumptions if degree days are entered into the database before entering readings or consumptions. If you update degree days later than consumption data, you can calculate weather corrections separately as explained in the section 4.2.

In the menu 'Graph' you can find items 'First series, contents' and 'Second series, contents'. **First series** means consumptions of **previous year** and **second series** consumptions of **active year**. The displayed years can be changed by clicking some date inside the desired year in the reading list.

By clicking item 'First series, contents' you will get a new menu including items 'Previous year, weather corrected', 'Previous year, not weather corrected' and 'Active year, weather corrected'. The choice Forecast (designed or estimated) is not yet supported in the current version of Kulu. By clicking the item 'second series, contents' you will get the new menu including items 'Active year, not weather corrected' and 'Active year, weather corrected'. By clicking those choices you can compare either weather corrected and/or measured values of heating energy consumption.

Graph type

By choosing the items 'Graph type, 1st column' or 'Graph type, 2nd column' on the 'Graph' menu you will get the new menu including items 'Bar', 'Area', 'Line', 'Pie' and 'Hide'. By clicking the choices you will get different graph types. When choosing the item 'Hide', only the consumptions of the current year will be shown in the graph. Especially when the yearly view is chosen the hide alternative can be useful.

5.2 PRINTING

The menu bar item 'Graph' includes items 'Print', 'Copy' and 'Copy to file'. By those choices you can print the graph, copy it to the clipboard or into a file.

You can also copy chosen figures from the readinglist or from the report to the clipboard. Activate the area by pressing the left mouse button and "paint" the desired values. The activated area will be copied to the clipboard by simultaneously pressing *Ctrl* and *Insert* keys (or Ctrl+C).

5.3 REPORTS

The report menu includes the following reports:

- Consumption report 12 months

- Meter reading form

- Print screen

- Total property consumption

- Costs of the meter

- Costs of the whole property

CONSUMPTION REPORT 12 MONTH includes monthly consumptions of all meters of the property chosen in the property field of Kulu window.

METER READING FORM is the form for collecting readings of all the meters of the property in the property field (or all properties in the database). You will be prompted to type the month for which you would like to produce the form. In the form also the previous date and reading from Kulu´s database will be shown. They will function as directions for the reader and help to avoid reading errors.

TOTAL PROPERTY CONSUMPTION shows in the graph and report the total consumption of certain consumption type in a chosen property. Normally in the Kulu window there are shown the graph and the report of one chosen meter. If in a property there are several meters for some consumption type (eg energy for day and night time), total property consumption shows the sum (total) consumption of those meters (having the same consumption type in meter data). Consumption of sub meters is however excluded. In the demo building (included in the Kulu installation) there are two meters for electricity which can be used to test this report.

COSTS OF THE METER and COSTS OF THE WHOLE PROPERTY show in the graph and report cost information for the chosen property. Costs of meter, shows the costs of consumption for the chosen meter. Costs of the whole property, contains total costs of all consumption types of the property. Costs will be based on so called default tariffs. By choosing 'Updating tariffs' on 'Other' menu you can start Windows Notepad and open the file **kutariff.dat**) containing information on tariffs. In the file there is under heading *default tariff* between quotation marks consumption type of default tariff. You can change default tariffs and add your own ones. Type of consumption joins the default tariff with the consumption type of a meter. When you use default tariff, you do not need to enter tariff code into the meter data. Under heading *tariff* there are on the rows beginning with quotation mark other than default tariffs. You can change them or add new ones following the given examples. If you want to use those tariffs in cost calculations (reports) you must enter the same tariff-code into the meter data. NOTE: **don't use Tab-key when adding new tariffs**.

6. BACKUP OF KULU DATABASES

You can take backup copies of databases by choosing 'Backup' on 'Other' menu. In Kulu application there are three databases: *Kurakulu.foc, Kurakiin.foc and Kurasaat.foc*. First one contains consumption data, another one some property information, and third one weather data. Backup will copy databases into two diskettes. Kurakulu.foc will be copied into the first one and the other databases into the second one. When the size of *Kurakulu.foc* exceeds the capacity of a diskette,

use the commands of Windows (or some other software) to make backup copies. If you have a connection to the network the most practical way is to make copies of the Kulu databases (files mentioned before) into some network drive. It's recommended to make backups every time you have added new data into the KULU databases.

7. LANGUAGES

After installing Kulu you can choose the language of Kulu in the drop down menu "Muut/Övrigt/Other /Altro/Andere". Texts in the Kulu window and in menus and reports will change accordingly. You can make corrections or even new language versions by editing with Windows Notepad the file **Kutransl.dat** locating in the same folder where Kulu was installed (usually C:\Kulu). In the file Kutransl.dat you can see in each row words between quotation marks in Finnish, Swedish, English, Italian and German. You can for example replace the Swedish words with your own and after saving the file you will have a new language version. Note: Don't change any other marks in the file Kutransl.dat. At the moment the Help file is however in Finnish only and translation of it will require a bit more work. However the instruction manual in English is available as a separate file.

8. DEMO DATABASES

When installing Kulu you will also get a small demo database containing an example building (school) and some meters for energy, water, etc. You can use the data of this building as an instruction (model) when creating your own properties and meters. Of course you can add new readings for the meters of the demo building too. When you don't need the demo data any more you can delete it by choosing first the demo property and then Delete in the Property menu.

9. ADDITIONAL INSTRUCTIONS

Instructions for using and further information are available from the Kulu web-site: **http://www.vtt.fi/kulu**. Look especially at the section on the standard version. In the future there might be possibilities to upload the consumption data(base) via the internet into Kulu´s webserver and to produce benchmarking etc, information based on the data of numerous users. However, at the moment this is just in the planning phase.

At the end of this manual there is a picture describing the main steps needed in the normal use of Kulu. Once you have defined the objects to be monitored (properties and meters) you need only a few steps to keep track of the consumptions and to visualise their yearly, monthly or daily development.

10. COPYRIGHTS

The programme is (c) Copyright VTT Building and Transport. Kulu is **not** a shareware or public domain product. If you want to use it for anything else than for testing or for purposes agreed with VTT please contact us by phone, fax or email. Reproduction under licence.

11. Responsibilities

No warranties are expressed or implied. VTT will not accept any liability for loss or damage possibly caused in using Kulu software.

More information:

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The normal use of KULU (choose the language from Other-menu, more information: http://www.vtt.fi/kulu)

1. Choose the object of monitoring
(Building, Group of Buildings, Factory etc.)

Open the list of objects by clicking the field. Choose the object from the list. If needed scroll the list of objects.

2. Choose the meter

Open the list of meters and click the meter from the list.
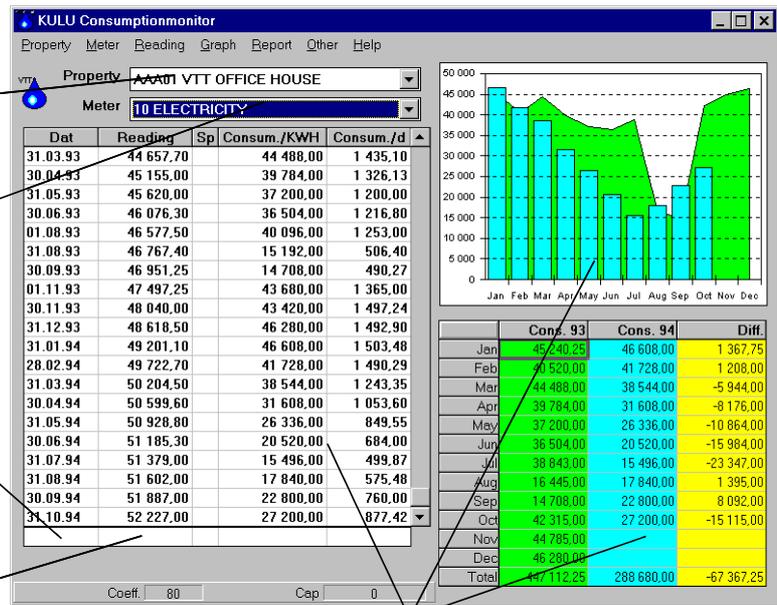
3. Give the date for reading

The **lowest row** in the form is for updating. Click the date field so that the frames will become dark. Give the date in the form dd.mm.yy. or use F12. It brings current date from PC's calendar or the date once given. Tripble clicking gives you the calendar.

4. Give the meter reading

Go by mouse or ⬅➡ -**key** to the next field and give the reading. Separate the decimals by the comma character (,).

You can also give directly the consumption (outputs, amount of users etc.). In this case leave the reading field empty and put into the Sp-field (Special) character **K**.

By clicking any date-field (row) in the form and pressing **CTRL+D** you can delete the whole row (wrong values for instance).

KULU Consumptionmonitor

Property Meter Reading Graph Report Other Help

Property AAA01 VTT OFFICE HOUSE

Meter 10 ELECTRICITY

Dat	Reading	Sp	Consum./KWH	Consum./d
31.03.93	44 657,70		44 488,00	1 435,10
30.04.93	45 155,00		39 784,00	1 326,13
31.05.93	45 620,00		37 200,00	1 200,00
30.06.93	46 076,30		36 504,00	1 216,80
01.08.93	46 577,50		40 096,00	1 253,00
31.08.93	46 767,40		15 192,00	506,40
30.09.93	46 951,25		14 708,00	490,27
01.11.93	47 497,25		43 680,00	1 365,00
30.11.93	48 040,00		43 420,00	1 497,24
31.12.93	48 618,50		46 280,00	1 492,90
31.01.94	49 201,10		46 608,00	1 503,48
28.02.94	49 722,70		41 728,00	1 490,29
31.03.94	50 204,50		38 544,00	1 243,35
30.04.94	50 599,60		31 608,00	1 053,60
31.05.94	50 928,80		26 336,00	849,55
30.06.94	51 185,30		20 520,00	684,00
31.07.94	51 379,00		15 496,00	499,87
31.08.94	51 602,00		17 840,00	575,48
30.09.94	51 887,00		22 800,00	760,00
31.10.94	52 227,00		27 200,00	877,42

Coeff. 80   Cap 0

	Cons. 93	Cons. 94	Diff.
Jan	45 240,25	46 608,00	1 367,75
Feb	40 520,00	41 728,00	1 208,00
Mar	44 488,00	38 544,00	-5 944,00
Apr	39 784,00	31 608,00	-8 176,00
May	37 200,00	26 336,00	-10 864,00
Jun	36 504,00	20 520,00	-15 984,00
Jul	38 843,00	15 496,00	-23 347,00
Aug	16 445,00	17 840,00	1 395,00
Sep	14 708,00	22 800,00	8 092,00
Oct	42 315,00	27 200,00	-15 115,00
Nov	44 785,00		
Dec	46 280,00		
Total	447 112,25	288 680,00	-67 367,25

---

5. Look at the results of monitoring (consumptions)

Push **Enter:** The programme puts the given data as a **new row in the form** and calculates the values for **absolute and daily consumption** (columns).

Based on the reading period **consumptions for the calendar months** will be calculated (icl. corrections) and displayed **in the table and graph**.

From the **Graph-menu** choose **yearly/monthly/daily and graphtype.** Compare consumptions with respective previous ones and clear the reasons for variations. Click the date in the form to move between years or months (in daily graphs). Copy and paste data to excel if needed.

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