



# .....PríME

EIE-2003-056

Private Investments Move Ecopower

## List of Spreadsheets (Collection of Calculation Tools) (Work Package 3, Tool 2)

Intelligent Energy  Europe

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Date of completion: 5 January 2007



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## 1. Overview on tools for cost assessment and cost-benefit analysis of building measures available for PRIME projects

Once a building has been selected, the initiator of a PRIME project has to calculate exactly which measure will bring which financial gain. In order to estimate the costs of the investment and calculate the returns, a very detailed analysis of the measures has to be conducted. Either the initiator of a PRIME project will be able to provide the expertise in making such calculations or contract an expert to conduct the study. Below are listed more or less detailed spreadsheets that have been developed for similar projects. These spreadsheets can be requested from the Wuppertal Institute or downloaded for free from the internet (cf. [http://www.prime-ecopower.net/prime\\_tools.html](http://www.prime-ecopower.net/prime_tools.html)). They are intended as support tools, which can be used by experts in the context of a sound expert analysis, either as part of this analysis, to improve the expert's own spreadsheets or in addition to the expert analysis. Please note that at least some of the spreadsheets are specific to a particular context and the spreadsheets will only be helpful if the PRIME project is very similar or the assumptions within the spreadsheet are adapted to the specific context in order to support an already existing process of calculation.

First of all, there is a **complete spreadsheet** in German by Dieter Seifried (Ö-quadrat, Freiburg/Germany) that includes the calculation of measures implemented in one of the **Solar&Save projects** of the Wuppertal Institute. This covers energy efficiency measures as well as PV and CHP measures. Furthermore, it estimates the total benefits and costs for the whole contract period for the Solar&Save project. This can be translated into English upon request.

Moreover, we have listed the following **further tools** in our Tool 2 toolbox. The PRIME project invites the readers to suggest further recommendable tools to be added to this list:

- Spreadsheets by the Wuppertal Institute and other experts for specific energy efficiency technologies / fields of application, which could be used separately or in addition to the spreadsheet by Dieter Seifried
- Tools for calculation of renewable energy measures
- Tools for calculation of CHP measures.
- ENSI key number tool for quick energy calculations in existing and new buildings

Finally, there is an **overview by the Energy Agency of North Rhine-Westphalia**, which lists further energy management and other energy software available in Germany.

Tools not directly connected to cost assessment and benefit-cost analysis of building measures, but of general importance for public administrations, are **energy bookkeeping tools** like the one listed at the end of this overview.



## 2. Solar&Save spreadsheet by Dieter Seifried (Ö-quadrat)

The spreadsheet by Dieter Seifried (Ö-quadrat, Freiburg/Germany) includes the calculation of measures implemented in one of the **Solar&Save projects** of the Wuppertal Institute. It consists of the following tables:

- Definition of baseline (average of energy and water consumption of the previous two years)
- Prices for energy and water consumed and for feed-in of energy
- Lighting: starting point and refurbishment, calculation of profitability
- Key data of PV plant: calculation of profitability
- Key data of CHP plant
- Other measures: calculation of profitability
- Financing of measures
- Forecast of important economic figures (success of the project) over the lifetime of the measures
- Emissions balance
- Overall result of the project

In addition, the Wuppertal Institute has developed spreadsheets in German for the analysis of energy efficiency measures in the following areas:

- Optimization of heating system / energy-efficient circulation pumps
- Refurbishment of ventilation and air conditioning systems

These spreadsheets could be translated into English upon request by PRIME project partners, too. In principle, they could be linked to Dieter Seifried's spreadsheet.



### 3. List of further tools available

#### 3.1. German tool for the calculation of PV and solar thermal systems

There are several spreadsheets / economic calculation tools available in different countries, most of them in the US taking into account national prices and tax law.

<http://www.solarserver.de/service/wirtschaftlichkeit.html>

This webpage offers tools by the Munich Environmental Institute (Umweltinstitut München e.V.). The tools are German tools, and have been translated in English for the PRIME project partners during the testing-phase of the tools. Based on the current renewable energy law in Germany the three tools allow to calculate the economic benefits and costs of PV and of solar thermal systems as follows:

- "solarstrom.xls" is for single private PV installations considering effects of individual credits and individual taxes,
- "solarwärme.xls" is for solar thermal systems,
- "solarpark.xls" is for private PV installations owned by several individuals or firms. It is assumed that a separate company will be founded for the construction and operation of this plant.

#### 3.2. Small-scale cogeneration support tools

<http://www.cogen.org/cogen-challenge/support/overview.htm>

This webpage is part of the European information campaign on small-scale cogeneration (CHP). It provides, among others, general guidance on small-scale cogeneration and a suite of tools and materials for small-scale project development.

Furthermore, there are some rules of thumb for the use of small-scale CHP. For example, according to the BHKW-Infozentrum a small CHP plant might be already profitable in Germany, if heat energy consumption exceeds 50,000 kWh/a (better > 150,000 kWh/a).

#### 3.3. RETScreen tools for the calculation of renewable energy, CHP and further measures

<http://www.etscreen.net/ang/menu.php>

The RETScreen models are designed to evaluate the energy production, life-cycle costs and greenhouse gas emissions reduction for renewable energy, CHP and further projects world-wide.

However, the first experiences of the Wuppertal Institute with one version of the calculation spreadsheet for solar water heating projects are mixed: on the one hand, all important data inputs and outputs are considered, on the other hand, the economic calculations can only partly be comprehended, reproduced and verified. Therefore, a plausibility check of the results is always needed.



### 3.4. ENSI – Key Number Software

This software is based on the ENSI Key Number Method for quick energy calculations in existing and new buildings. It requires information on building geometry, heating, ventilation and energy and power demand budget. With this information, it calculates the ECON measures that can be taken and what the specific savings will be. It has special relevance for projects undertaken in Bulgaria, the Czech Republic, Kazakhstan, Kyrgyzstan, Moldova, Norway, Russia and Slovakia.

You can find a short description on:

<http://www.ensi.no/software/keynumber.html>

The software can be downloaded at <http://www.ensi.no/software/software.html>

### 3.5. PICOLight

In the course of the PICOLight project by the Wuppertal Institute and its partners, a complex English tool for the economic calculation of energy-efficient lighting measures in public administrations was developed by the Italian Politecnico di Milano.

### 3.6. Borg & Co AB / STEM spreadsheets

The Swedish company Borg & Co AB, located in Stockholm, and its partners have developed several spreadsheets on behalf of the Swedish Energy Agency (STEM) which allow an easy life-cycle calculation of benefits and costs of energy efficiency measures. They are partly available in English only, but they can be translated into English upon request. Those are:

- „LCC simple“: the least complicated, generic for a number of needs.
- „LCC bilar:“ for cars (also quite simple)
- „Enkel LCC ny produkt“: simple spreadsheet for new products
- „Enkel LCC bef prod“: comparison for annual costs between existing and new products
- LCC spreadsheet for energy-efficient ventilation and insulation
- LCC spreadsheet for energy-efficient lighting.



#### 4. Overview on energy management and other energy software by the Energy Agency of North Rhine-Westphalia

The Energy Agency of North Rhine-Westphalia provides a good overview on energy management and other energy software at [http://www.ea-nrw.de/\\_infopool/info\\_details.asp?InfoID=1749](http://www.ea-nrw.de/_infopool/info_details.asp?InfoID=1749).

Unfortunately, this overview is in German only. However, if you are interested in some specific software and you do not be able to read German, Wuppertal Institute could check this overview and find out, if there is a software available, which might satisfy your needs.

The on-line overview lists

- Energy management software
- Software for
  - On-site energy advice
  - Optimisation of energy consumption in buildings (simulation of buildings, calculation of heat needed, calculation of insulations, daylight integration, ventilation, cooling)
  - Optimisation of energy supply (heat, cold, CHP, lighting, ventilation)
  - The Use of renewable energies
  - Energy aspects of urban planning
  - Data collection and analysis of energy consumption
  - Administration and evaluation of energy consumption
  - Data banks, further support
- Software for calculations according to the German building regulation (the German building standard EnEV).



## 5. Energy bookkeeping tools

Energy bookkeeping is one of the fundamentals of energy policy of public administrations. Without an effective overview over energy use and its related spending and cost in public buildings (offices, schools, kindergartens, ambulances, swimming pools etc.) neither strategic approach for reduction of this costs can be made nor new forms of private investments in public buildings (i.e. energy performance contracting, PRIME) can be introduced. Introduction of energy bookkeeping however requires standardized and reliable data and well defined obligations and responsibilities in providing of the data. On this basis the energy bookkeeping supported by suitable information technology can be not only user friendly but can provide comparison and controlling (benchmarking) of the use of fuels and energy in different buildings of the same purpose combining the following indicators: specific use per sq. meter, specific use per cubic meter, specific use per purpose and specific use per user (cf. <http://www.ljudmila.org/sef/stara/enknjigovodstvoeng.htm>).

There is a comparison of energy bookkeeping software available in Austria by the Austrian Energy Agency at <http://www.eva.ac.at/service/index.htm>.