



energyPRO

energyPRO Software

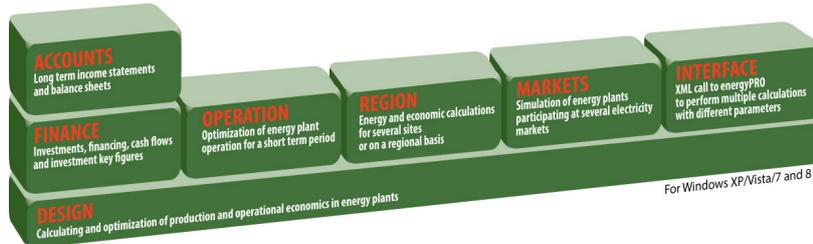
PRODUCT DESCRIPTION



EMD International A/S
www.emd.dk



energyPRO Introduction

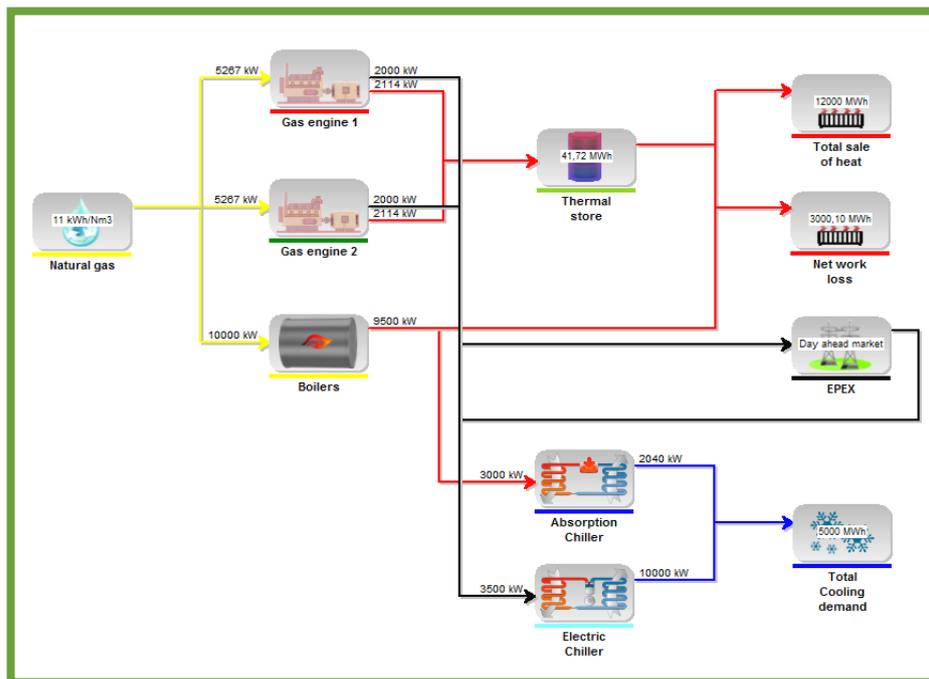


energyPRO is a modelling software used primarily in relation to district heating projects to carry out an integrated detailed technical and financial analysis of both existing and new energy projects in a very user-friendly interface providing the user with a clear overview of the project.

energyPRO can be used in a variety of projects such as district heating cogeneration plants with gas engines combined with boilers and thermal storage, industrial cogeneration plants supplying both electricity, steam and hot water to a site,

cogeneration plants with absorption chilling (trigeneration), biogas fuelled CHP plants with a biogas store, biomass cogeneration plants as well as other types of projects. The calculations are made under due consideration to any conditions specified in the project offering precise results in a printable format accepted by the World Bank and other major international investment banks.

The software is based on a modular structure which allows the user to carry out different analyses.





energyPRO

**THE MOST ADVANCED AND FLEXIBLE
MODELLING SOFTWARE PACKAGE FOR
COMBINED TECHNO-ECONOMIC ANALYSES
AND OPTIMISATION OF BOTH COGENERATION
AND TRIGENERATION PROJECTS**





Modules

DESIGN

The DESIGN module is the basic module in energyPRO and used to calculate the optimal energy conversions for heat, cooling and electricity for a one-year period based typically on hourly values though other time resolutions are also possible.

Flexibility and capacity are keywords for this module as it is possible to enter an unlimited number of heat, cooling or electricity demands into the module as well as an unlimited number of different energy units covering both conventional as well as newer technologies.

The DESIGN module furthermore makes it easy to analyse the use of different types of energy storages, e.g. thermal energy storage in connection to cogeneration and/or trigeneration projects, fuel storage in connection to biogas projects as well as independent projects based on ice storage, compressed air storage, hydro pumping storage or batteries.

For projects with a multiple price tariff structure for the electricity sale or based on historical electricity prices, energyPRO is able to prioritize the electricity production of the plant to the best paid periods under due consideration of fulfilling any heat or cooling demands specified.

The DESIGN module also includes access to different time series data and an online data server with weather data hosted by EMD International A/S.

Within the DESIGN module, it is possible to define and enter revenues and operating costs for a project. The user defines which revenues and operating costs shall be included by creating the structure of the report (totals/subtotals) and filling in unit prices for the different revenue and cost items.

For application of other energyPRO modules access to the DESIGN module is a requisition.

FINANCE

With the FINANCE module the user can expand the energy and economic calculations to also cover the projected lifetime of a project.

By adding information about the investments and finance arrangements, the user is able to calculate both cash flows on a monthly basis for the entire lifetime of the project as well as a number of investment key figures such as payback time, internal rate of return and net present value.

The FINANCE module is very suited for detailed investment analyses of proposed energy project or to compare different project options.

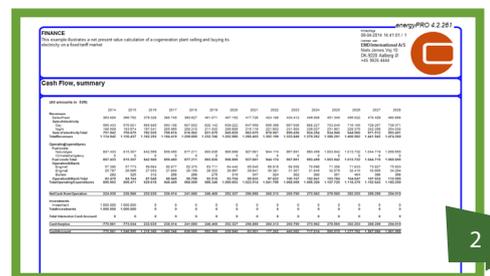
ACCOUNTS

The ACCOUNTS module requires access to the FINANCE module and allows the user to generate income statements (profit & loss accounts), balance sheets for each year in a defined project period as well as taxation models.

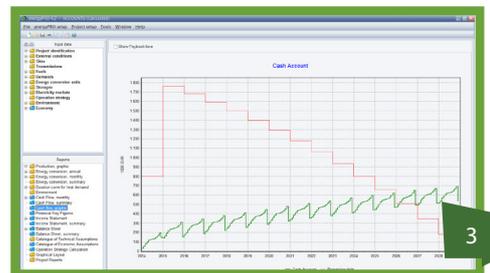
By using the ACCOUNTS module together with the DESIGN and FINANCE module, it is possible to produce a complete "business plan" documenting all technical and economic aspects of a proposed energy project.



1 - DESIGN Module

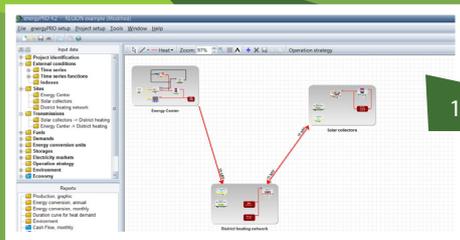


2 - FINANCE Module

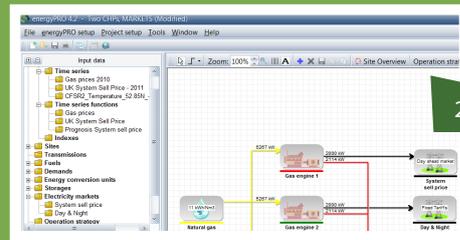


3 - ACCOUNTS Module





1 - REGION Module



2 - MARKETS Module

OPERATION

The OPERATION module is typically used to plan the optimal production for an energy plant for days or weeks ahead.

With the OPERATION module the user can indicate the period for the optimization down to minutes with a detailed production plan.

Inputs for the optimization are typically parameters such as content of stored energy at the beginning of the optimization period, expected energy demands within the period as well as expected electricity prices.

REGION

The REGION module includes facilities to define multiple sites within a region in which demands and production units are geographically separated.

For each demand and production unit the user points out to which site they belong and when selecting a site in the graphical window the demands and production units present at this site can be seen. It is also possible to model transmission of heat, process heat or cooling between sites.

The REGION module is a superior tool if energyPRO is to be used for regional energy planning analysis or to calculate the techno-economic consequences of combining several geographically separated energy plants within the same scheme.

MARKETS

With the MARKETS module it is possible to analyse and optimize CHP plants with simultaneous participation in different electricity markets (e.g. day ahead, reserve and balancing markets). When using the MARKETS module it is possible to model CHP units participating simultaneously in both a day ahead market and a balancing power market while still maintaining the delivery of heat and/or cooling.

The MARKETS module is very flexible and allows setup of any electricity market, hereunder time of trading, type of electricity market, prices, etc. and use this input in your calculations.

INTERFACE

With the INTERFACE module it is possible to specify changes in several energyPRO projects without having to do it in each of the individual files as the changes are made in a XML-file.

By using the INTERFACE module investigation of e.g. the impact of installation of a solar collector in different configurations or changes in existing time series, demands, prices, taxes etc. can simply be made.

As the user only has to make changes in a single project file and perform a new set of calculations using the INTERFACE module this module is very convenient and time-saving when having a large number of energyPRO project files or wanting to simulate numerous scenarios.



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energyPRO is a flexible modelling software package for combined techno-economic analyses and optimisation of complex energy projects with nearly 25 years of experience, offering both precise calculations and a graphical output in a very user friendly interface.

energyPRO is recognized and accepted worldwide by several district heating companies, consulting firms, educational institutions as well as local planning authorities.

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