Thermoflow

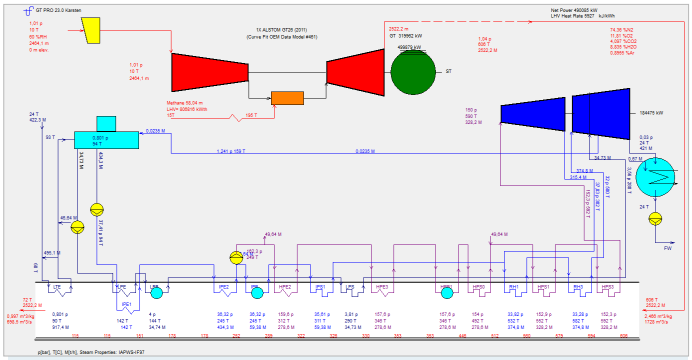
GT PRO, GT MASTER & PEACE®

GT COMBINED CYCLE DESIGN, SIMULATION, AND COST ESTIMATION

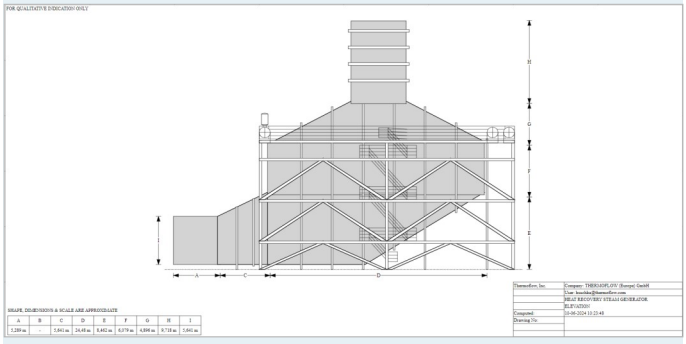
GT PRO is an EXPERT PROGRAM and automates the process of designing a gas turbine or recip. engine based power or cogeneration plant. It is particularly effective for creating new designs and finding their optimal configuration and design parameters considering technical performance and total plant cost (**techno-economic optimization)**.

The user inputs design criteria and assumptions and the program computes heat and mass balance, system performance, and equipment sizing. The scope and level of detail in GT PRO has been continuously growing since 1988, to the point that the latest version has over 4,000 user-adjustable inputs. Most key inputs are automatically created by intelligent design procedures that help the user identify the best design with minimal time and effort, while allowing the flexibility to make any changes or user-adjustments.

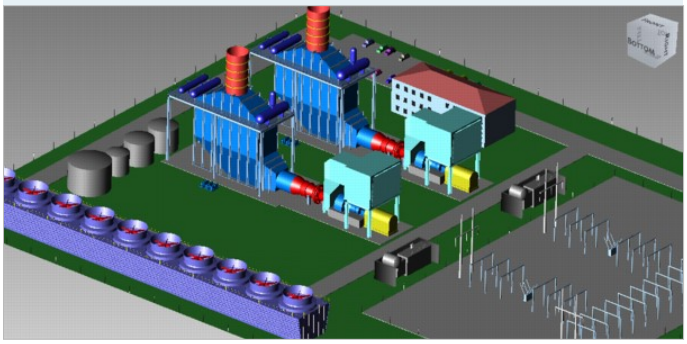
GT PRO is truly easy to use, typically requiring only a few minutes to create a new plant design. It computes a heat balance and simultaneously designs the required equipment and site infrastructure (BOP).
GT MASTER is the Off-Design Simulation companion to GT PRO. It computes (steady-state and **transient**) performance for varying ambient conditions, fuel selection, equipment loading, process steam/water flows, hardware degradation levels, etc.
The **TIME** feature (**T**ime **I**ntegrated **M**odeling **E**conomics) computes the project's NPV considering cold/warm starts and shutdowns, various loads and ambient conditions throughout the year.



FLOWSHEET



2D EQUIPMENT LAYOUT
AND 3D SITE LAYOUT

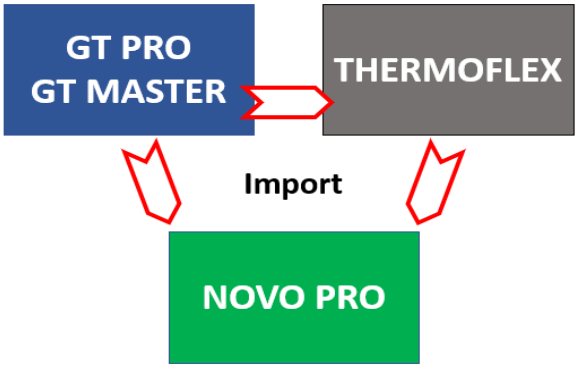


THERMOFLOW INC. - 4601 Touchton Road E, Bldg 300, Suite 3280, Jacksonville FL 32246, USA - +1 904-744-1170 - info@thermoflow.com

When run in conjunction with the optional ***PEACE*** (**P**lant **E**ngineering **A**nd **C**ost **E**stimator) module, the programs provide extensive engineering and **hardware specifications** such as weight and dimensions, plant and equipment **cost estimation**, and site details.

GT PRO and GT MASTER include a built-in library of **over 860 gas turbine and reciprocating engine specifications**, Integrated Gasification Combined Cycles **(IGCC),** Desalination Plants **(RO, MSF, MED),** and chemical / physical **CO2 Capture and Sequestration (CCS)** plants.
ELINK, a bi-directional Link to MS-EXCEL, makes it easy to produce Thermal Heat Rate curves, integrated Annual Simulation results, etc.
A built-in **Scripting** language allows to add own logical blocks to models, or to call an external DLL/EXE, so GT PRO/GT MASTER models can run together with other programs.

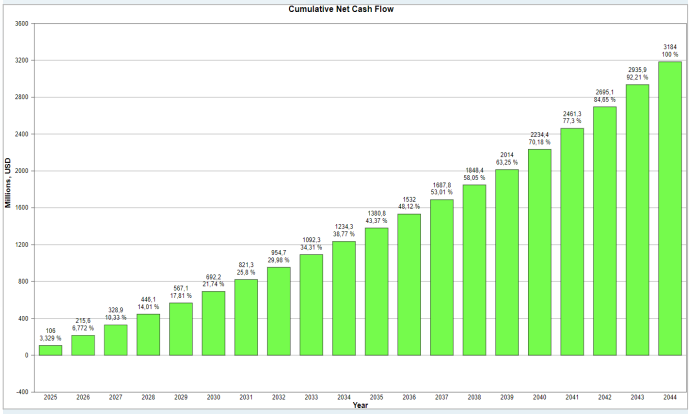
GT PRO/MASTER models can be exported to the fully-flexible modelling environment of Thermoflow´s THERMOFLEX® module.



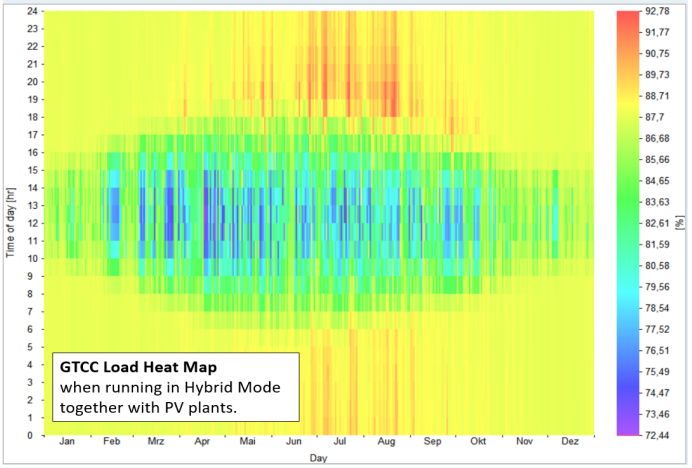
Furthermore, model(s) can be imported to the new ***NOVO PRO®*** module for **hourly grid simulation** in combination with renewables (Wind, PV) and/or storages and/or Hydrogen Production Plants.
This allows the user to create an optimized base load, peaker or backup GT / GTCC plant for an individual electrical grid.

Project Cost Summary	Reference Cost	Estimated Cost	
Power Plant:			
I Specialized Equipment	383.826.432	403.017.728	USD
II Other Equipment	21.684.390	22.768.610	USD
III Civil	52.994.248	60.268.716	USD
IV Mechanical	86.271.600	99.929.736	USD
V Electrical Assembly & Wiring	23.912.828	27.833.412	USD
VI Buildings & Structures	28.989.842	33.338.318	USD
VII Engineering & Plant Startup	39.883.620	39.953.012	USD
Gasification Plant	N/A	N/A	
Desalination Plant	N/A	N/A	
CO2 Capture Plant	N/A	N/A	
Subtotal - Contractor's Internal Cost	637.562.944	687.099.520	USD
VIII Contractor's Soft & Miscellaneous Costs	180.161.120	207.127.168	USD
Contractor's Price	817.724.032	894.226.688	USD
IX Owner's Soft & Miscellaneous Costs	73.595.160	80.480.400	USD
Battery Storage System	N/A	N/A	
Total - Owner's Cost (1 USD per US Dollar)	891.319.168	974.707.072	USD
Nameplate Net Plant Output	1135,6	1135,6	MW
Price per kW - Contractor's	720,1	787,5	USD per kW
Cost per kW - Owner's	784,9	858,3	USD per kW

GTCC COST BREAKDOWN & CASH-FLOW



GTCC + RENEWABLES + STORAGE



THERMOFLOW INC. - 4601 Touchton Road E, Bldg 300, Suite 3280, Jacksonville FL 32246, USA - +1 904-744-1170 - info@thermoflow.com