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SOFTWARE



By Mehdizadeh

1400



مفاهیم مدل سازی و شبیه سازی

مدلسازی

توصیف ماهیت سیستم تولید (موازنه های جرم و انرژی) در قالب معادلات ریاضی این معادلات عموماً غیر خطی و به شکل معادلات جبری ، دیفرانسیلی و یا مخلوط آنهاست که این معادلات همگی به صورت اطلاعات کتابخانه ای در نرم افزارهای شبیه سازی ذخیره شده اند که از کنار هم قرار دادن این معادلات ، مدلی از فرآیند ساخته می شود.

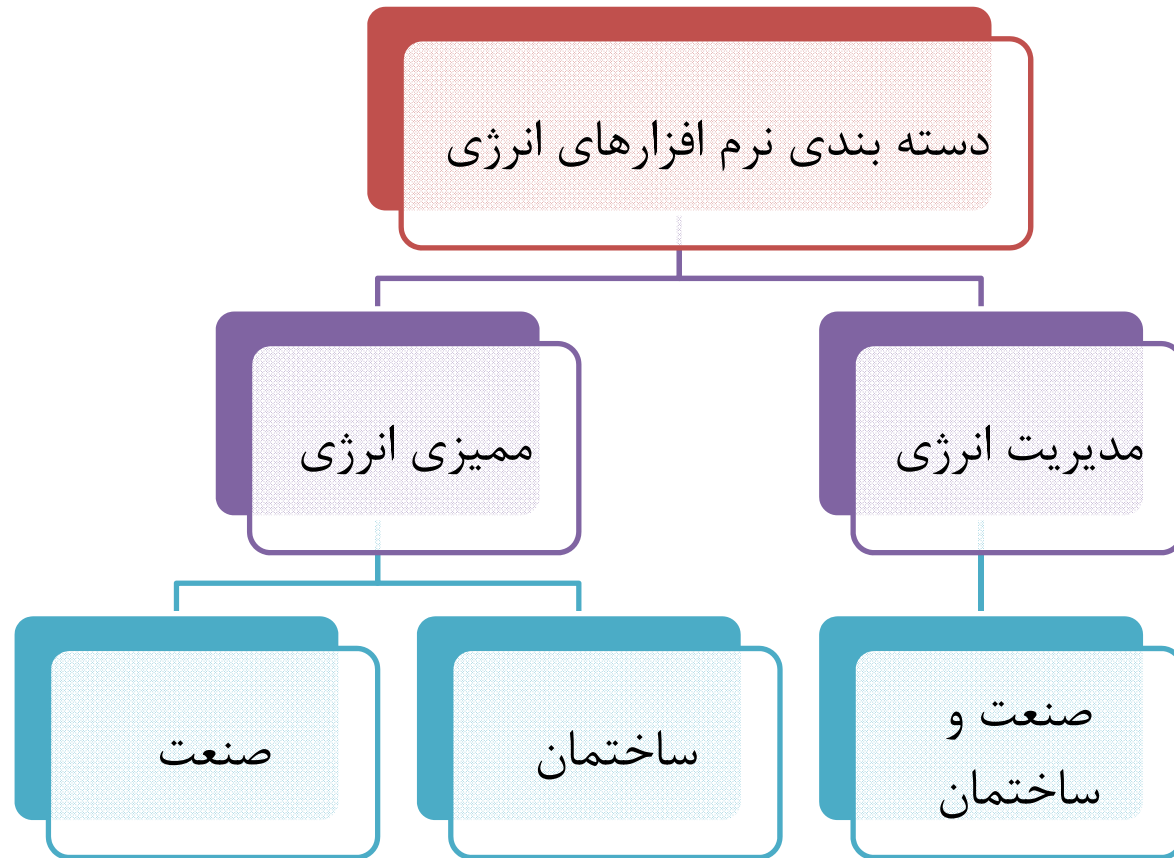
شبیه سازی

بدست آوردن اطلاعات خروجی (به طور مثال مشخصات محصول) از طریق حل مدل های فوق بر اساس اطلاعات ورودی (به طور مثال مشخصات خوراک) و اطلاعات مربوط به مشخصات دستگاه های فرآیندی (که بخشی از آنها توسط کاربر به نرم افزار داده می شود) ، است.



کاربردهای نرم افزارها

- ۱- بررسی گزینه های مختلف با هدف طراحی و ساخت واحد با کمترین **هزینه** و **زمان**
- ۲- جلوگیری از اشتباهات پر خرج در طراحی و ساخت واحد
- ۳- تحلیل شرایط طراحی و بهره برداری و تعیین نقطه بهینه عملکرد
- ۴- پیش بینی عملکرد فرآیند در شرایط مختلف عملیاتی
- ۵- استفاده از اطلاعات کتابخانه ای (خواص ترمودینامیکی مواد، شرایط آب و هوایی مناطق، هزینه های خرید تجهیزات، اطلاعات طراحی تجهیزات شناخته شده و ...)
- ۶- تبادل اطلاعات با نرم افزارهای دیگر به صورت دوطرفه





| نام نرم افزار | کاربرد |
|---|----------------|
| Aspen | صنعت |
| Themoflow | |
| PHAST | |
| Motor Master | |
| PSAT & FSAT (Pump and fan System Assessment Tool) | |
| PumpSave & FanSave | |
| EES | |
| Ret Screen | صنعت و ساختمان |
| Design Builder | ساختمان |
| Trnsys | |
| Revit energy | |
| carrier | |
| Etapro (General Physics) | مدیریت انرژی |
| Efficiency Map (General Electric) | |
| Optimax Performance Monitoring (ABB) | |
| Pmax, (Scientec Inc.) | |
| EnergyAnalyzing(SamanEnergy) | |
| Enerit(energy action every day) | |
| AVRReporter(KONsys International) | |
| DigitalEnergy(Schneider Electric) | |
| SENS3(FACHWELT VERLAG) | |
| Carbon Systems | |
| M & T(Monitoring & Targeting) | |
| SEEMS(SamanEnergy) | |
| SIEM(SamanEnergy) | |
| Excell | |



نرم افزارهای کاربردی ممیزی انرژی

| نام نرم افزار | کاربرد | |
|---|----------------|----------------|
| Aspen | صنعت | ممیزی انرژی |
| Themoflow | | |
| PHAST | | |
| Motor Master | | |
| PSAT & FSAT (Pump and fan System Assessment Tool) | | |
| PumpSave & FanSave | | |
| EES | صنعت و ساختمان | |
| Ret Screen | | |
| Design Builder | ساختمان | |
| Trnsys | | |
| Revit energy | | |
| carrier | | |
| EQuest | | |



Aspentech

The image shows a Windows desktop environment. The Start menu is open, displaying a list of folders and applications. The 'AspenTech' folder is highlighted in blue. The Start menu also shows the user's name 'Safoura Ramezani' and various system options like 'Documents', 'Pictures', 'Computer', 'Network', 'Connect To', 'Control Panel', 'Default Programs', and 'Help and Support'. To the right of the Start menu is a video player window titled 'Product Tour Video'. The video player displays the AspenTech logo and the text 'Welcome to Aspen Technology Product Registration'. Below this text, it says 'Watch the video to learn about all the advantages of having a support account'. At the bottom of the video player, there are two blue buttons: 'Start Video' and 'Register Now'.



Aspentech modules

- شبیه‌سازی و بهینه‌سازی فرآیندهای نفت، گاز و پتروشیمی با **ASPEN Plus**
- شبیه‌سازی و کنترل دینامیک با **Aspen Plus Dynamics**
- مرجع کامل شبیه‌سازی فرایندهای پایا با **ASPEN HYSYS**
- شبیه‌سازی دینامیک و کنترل فرآیندها با **ASPEN HYSYS DYNAMICS**
- طراحی مبدل‌های حرارتی با **ASPEN B – JAC** ، **ASPEN HTFS** ، **ASPEN EDR**
- طراحی و برآورد اقتصادی پروژه‌های صنایع شیمیایی با **ICARUS ASPEN**
- طراحی شبکه بخار با **ASPEN UTILITIES**
- شبیه‌سازی فرایندهای پلیمری با **POLYMER ASPEN**
- طراحی و شبیه‌سازی خطوط لوله با **PIPEPHASE PIPESYS**
- فرایند جذب سطحی و شبیه‌سازی آن با **ADSIM ASPEN**



Aspen HYSYS

Source Databank: HYSYS

Select: **Pure Components** Filter: **All Families**

Search for: **Pure Components**
Hypothetical
Hypothetical Solid Search by: **Full Name/Synonym**

| Simulation Name | Full Name / Synonym | Formula |
|-----------------|---------------------|---------|
| Methane | C1 | CH4 |
| Ethane | C2 | C2H6 |
| Propane | C3 | C3H8 |
| i-Butane | i-C4 | C4H10 |
| n-Butane | n-C4 | C4H10 |
| i-Pentane | i-C5 | C5H12 |
| n-Pentane | n-C5 | C5H12 |
| n-Hexane | C6 | C6H14 |
| n-Heptane | C7 | C7H16 |
| n-Octane | C8 | C8H18 |
| n-Nonane | C9 | C9H20 |
| n-Decane | C10 | C10H22 |
| n-C11 | C11 | C11H24 |
| n-C12 | C12 | C12H26 |
| n-C13 | C13 | C13H28 |

Status: **Empty component list**

Messages

- Required Info : Fluid Packages -- Select property package
- Required Info : Master Component List -- Empty component list
- Required Info : Component List - 1 [HYSYS Databanks] -- Empty component list
- Required Info : Components -- Empty component list



Aspen HYSYS

Properties

Set Up Binary Coeffs StabTest Phase Order Tabular Notes

Package Type: HYSYS Component List Selection: Component List - 1 [HYSYS Databanks] View

Property Package Selection

- ASME Steam
- Braun K10
- BWRS
- Chao Seader
- Chien Null
- Clean Fuels Pkg
- CPA
- Esso Tabular
- Extended NRTL
- GCEOS
- General NRTL
- Glycol Package
- Grayson Streed
- Kabadi-Danner
- Lee-Kesler-Plöcker
- MBWR
- NBS Steam
- NRTL
- Peng-Robinson
- PR-Twu
- PRSV
- Sour SRK
- Sour PR
- SRK
- SRK-Twu
- Sulsim (Sulfur Recovery)

Options

| | |
|--------------------------|-----------------------------|
| Enthalpy | Property Package EOS |
| Density | Costald |
| Modify Tc, Pc for H2, He | Modify Tc, Pc for H2, He |
| Indexed Viscosity | HYSYS Viscosity |
| Peng-Robinson Options | HYSYS |
| EOS Solution Methods | Cubic EOS Analytical Method |
| Phase Identification | Default |
| Surface Tension Method | HYSYS Method |
| Thermal Conductivity | API 12A3.2-1 Method |

Parameters

Property Pkg: Empty component list

Messages

- Required Info : Master Component List -- Empty component list
- Required Info : Component List - 1 [HYSYS Databanks] -- Empty component list
- Required Info : Components -- Empty component list
- Required Info : Fluid Packages -- Select property package
- Required Info : Basis-1 -- Empty component list



Aspen HYSYS

The screenshot displays two configuration windows from the Aspen HYSYS software. The top window is for a pump unit named 'P-0301 A/B'. It features a central pump icon with an inlet stream labeled '1' and an outlet stream labeled '2'. The 'Energy' input is set to 'W' and the 'Fluid Package' is set to 'Basis-1'. The bottom window is for a compressor unit named 'C-401-des'. It features a central compressor icon with an inlet stream labeled '1-2' and an outlet stream labeled '2-2'. The 'Energy' input is set to 'eng' and the 'Fluid Package' is set to 'Basis-2'. Both windows include a 'Design' sidebar with options like 'Connections', 'Parameters', and 'Curves', and a bottom toolbar with 'Delete', 'OK', 'On', and 'Ignored' buttons.

نمونه ورودی های نرم افزار
جهت مدلسازی پمپ و کمپرسور



Aspen HYSYS

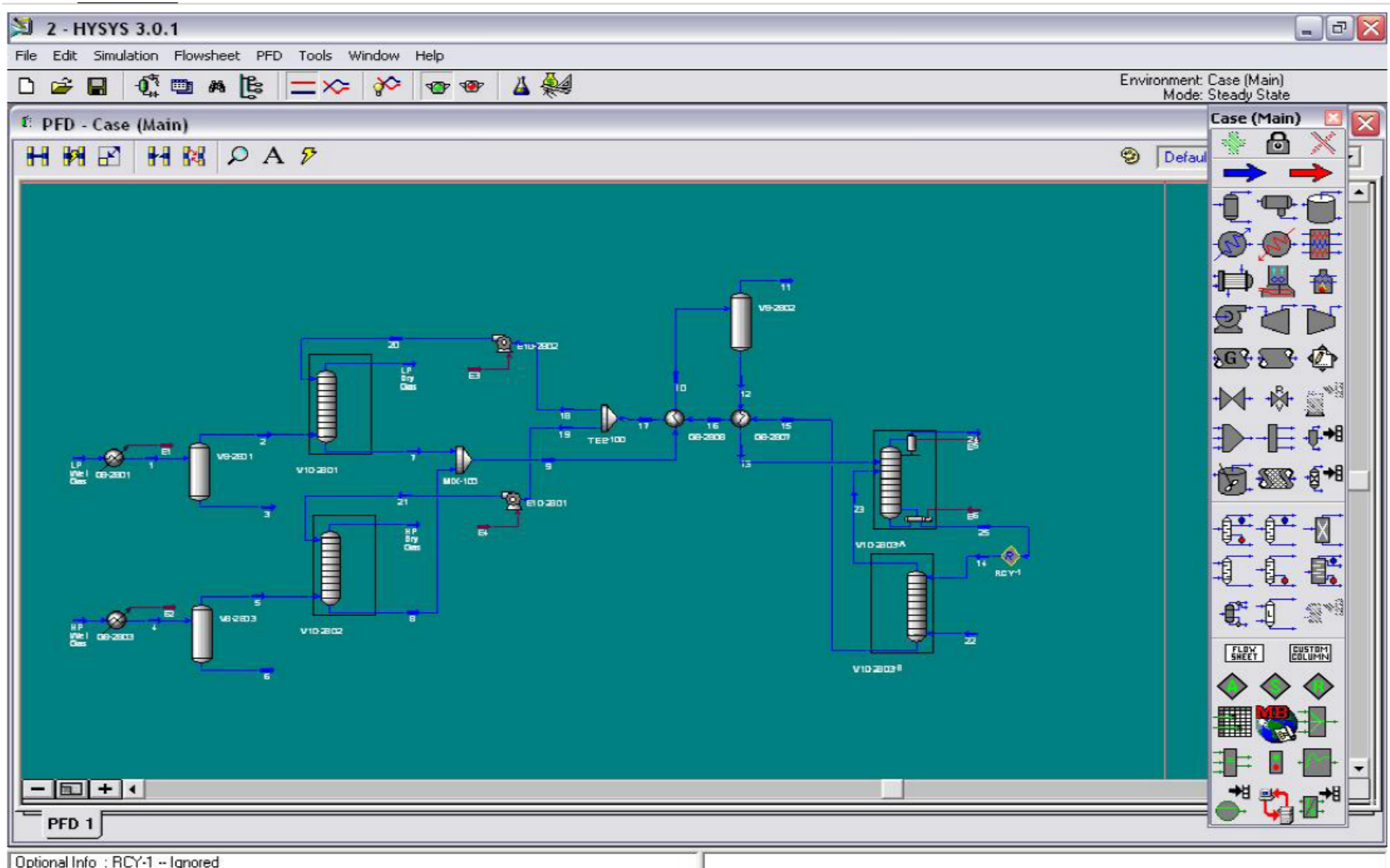
The screenshot displays the Aspen HYSYS V9 - aspenONE interface. The main window shows a detailed process flowsheet with the following components and connections:

- Inputs:** "oil feed" and "Fresh water".
- Distillation Columns:** V-04, V-05, V-06, V-07, V-08, V-09, V-10, V-11.
- Heat Exchangers:** HE-01/04, HE-06/08.
- Compressors:** C-101, C-102.
- Pumps:** P-201, P-202, P-203, P-204, P-206, P-207, P-210, P-301, P-302.
- Other Units:** T-11/10 (Tank), H-01, H-02 (Heaters).
- Streams:** Labeled with numbers 1 through 32.
- Output:** "To Storage Tank".

The interface includes a top menu bar (File, Home, Economics, Dynamics, View, Customize, Resources, Flowsheet/Modify, Format), a ribbon with various toolbars, and a status bar at the bottom showing "Solver (Main) - Ready" and a zoom level of 30%.



Aspen HYSYS





Aspen HYSYS

Workbook - Case (Main)

| Name | LP Wet Gas | HP Wet Gas | 1 | 2 | 3 |
|---------------------------------|-------------|-------------|-------------|-------------|-------------|
| Vapour Fraction | 0.9992 | 0.9999 | 0.9886 | 1.0000 | 0.0000 |
| Temperature [F] | 135.0 | 135.0 | 100.7 | 100.7 | 100.7 |
| Pressure [psia] | 151.0 | 585.0 | 149.0 | 149.0 | 149.0 |
| Molar Flow [lbmole/hr] | 3513 | 9900 | 3513 | 3473 | 40.16 |
| Mass Flow [lb/hr] | 1.006e+005 | 1.904e+005 | 1.006e+005 | 9.985e+004 | 723.4 |
| Liquid Volume Flow [barrel/day] | 1.705e+004 | 3.954e+004 | 1.705e+004 | 1.700e+004 | 49.64 |
| Heat Flow [Btu/hr] | -1.359e+008 | -3.342e+008 | -1.383e+008 | -1.334e+008 | -4.910e+006 |

| Name | 4 | 5 | 6 | 20 | LP Dry Gas |
|---------------------------------|------------|------------|--------|------------|------------|
| Vapour Fraction | 0.9960 | 1.0000 | 0.0000 | 0.0000 | 1.0000 |
| Temperature [F] | 80.07 | 80.07 | 80.07 | 149.5 | 114.9 |
| Pressure [psia] | 583.0 | 583.0 | 583.0 | 148.0 | 148.0 |
| Molar Flow [lbmole/hr] | 9900 | 9860 | 39.81 | 72.30 | 3449 |
| Mass Flow [lb/hr] | 1.904e+005 | 1.897e+005 | 717.2 | 1.074e+004 | 9.941e+004 |
| Liquid Volume Flow [barrel/day] | 3.954e+004 | 3.949e+004 | 49.21 | 652.0 | 1.696e+004 |

Material Streams | Compositions | Energy Streams | Unit Ops

FeederBlock_LP Wet Gas
G8-2801

Include Sub-Flowsheets
 Show Name Only
Number of Hidden Objects: 0



Aspen Pinch

- ابزاری راه گشا برای بهینه سازی مصرف انرژی در فرایندهای شیمیایی
- ابزاری است که به مهندسين طراح، جهت بهینه سازی موازنه ارزش کل و انرژی، جهت کاهش هزینه ها کمک می کند.
- برای حداقل کردن هزینه های طراحی در واحدهای شیمیایی، پالایشگاه ها و نیروگاه ها
- ذخیره هزینه های انرژی با کاهش انرژی و نیازمندی های تجهیزات

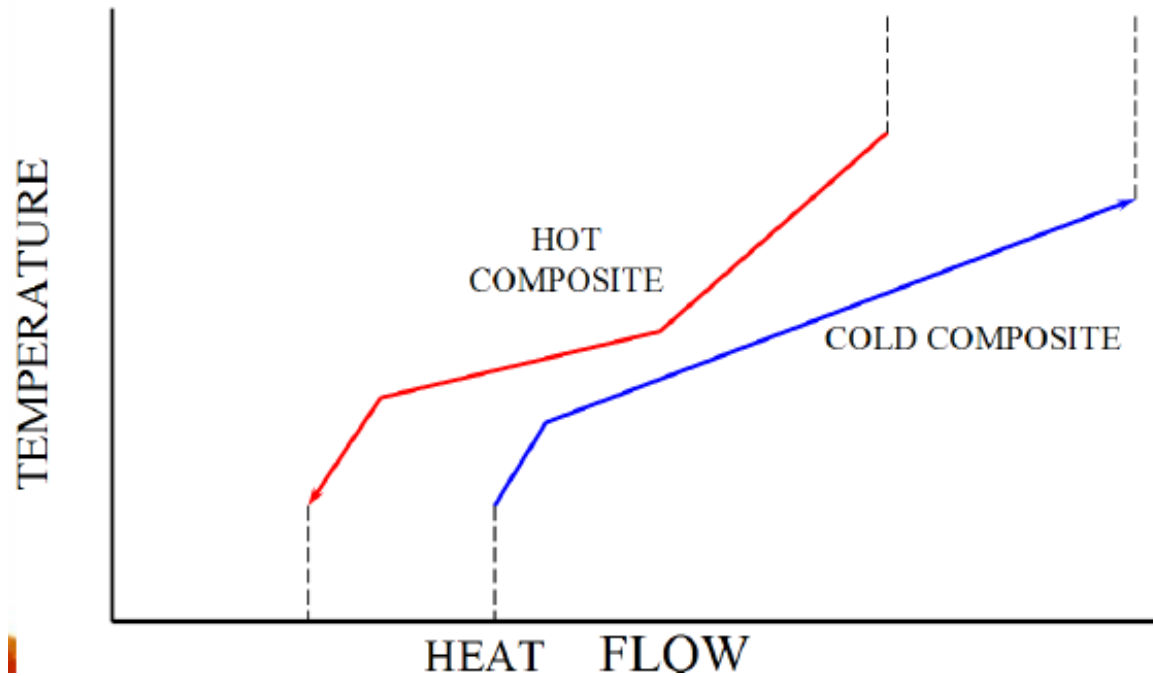


Aspen Pinch

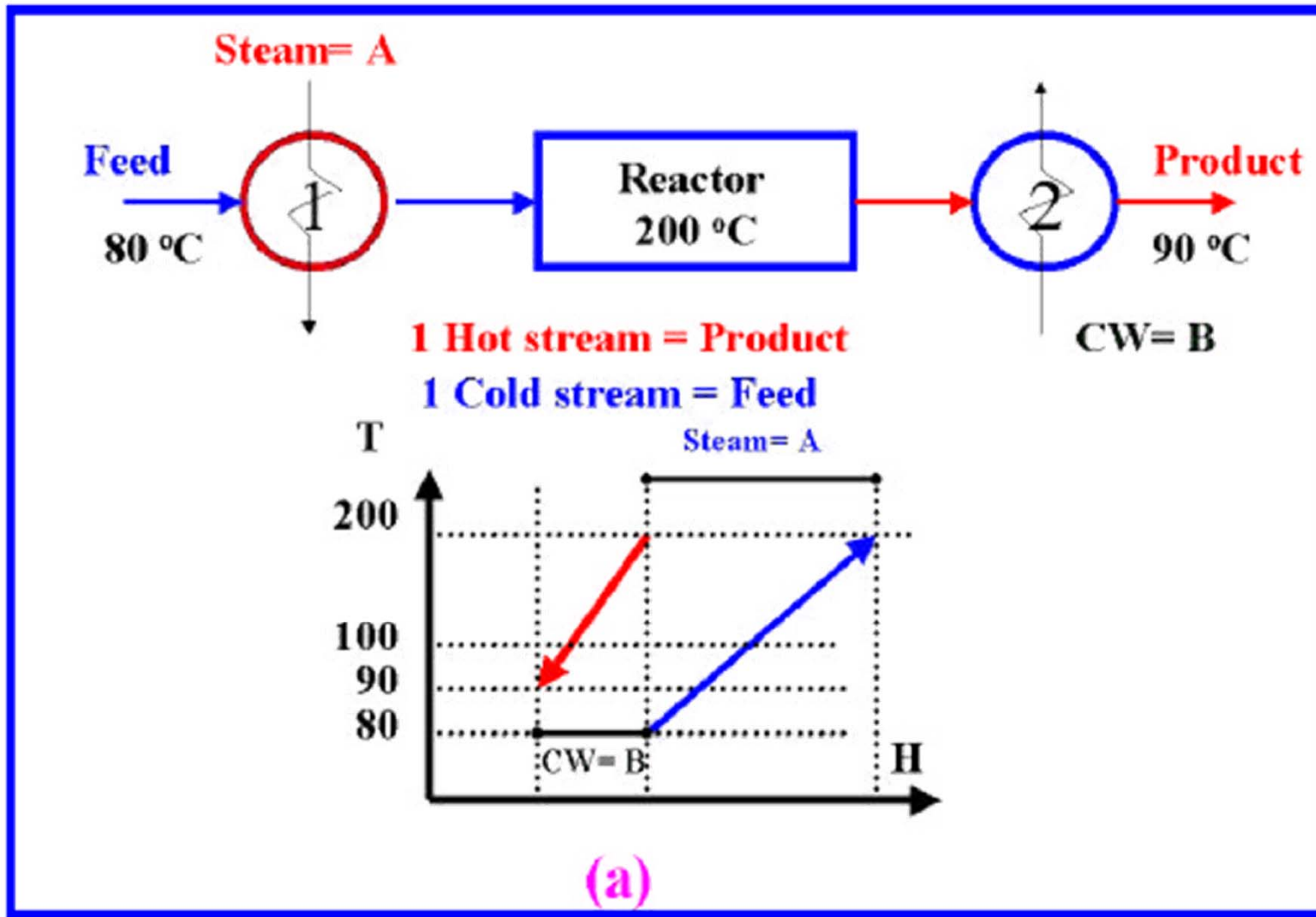
Pinch Analysis

Hot and Cold Composites Combined

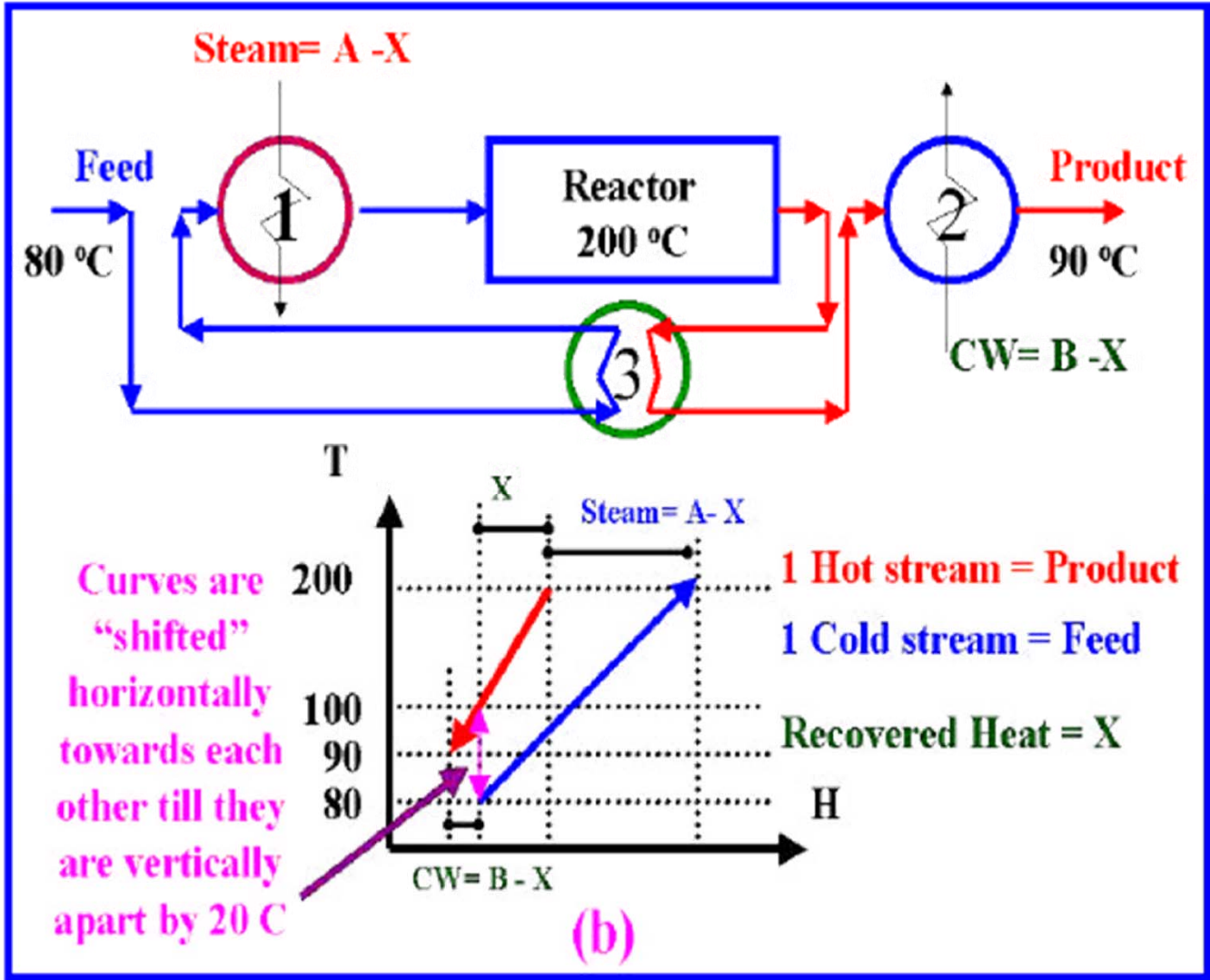
Heat recovery is possible where the hot composite is hotter than cold composite



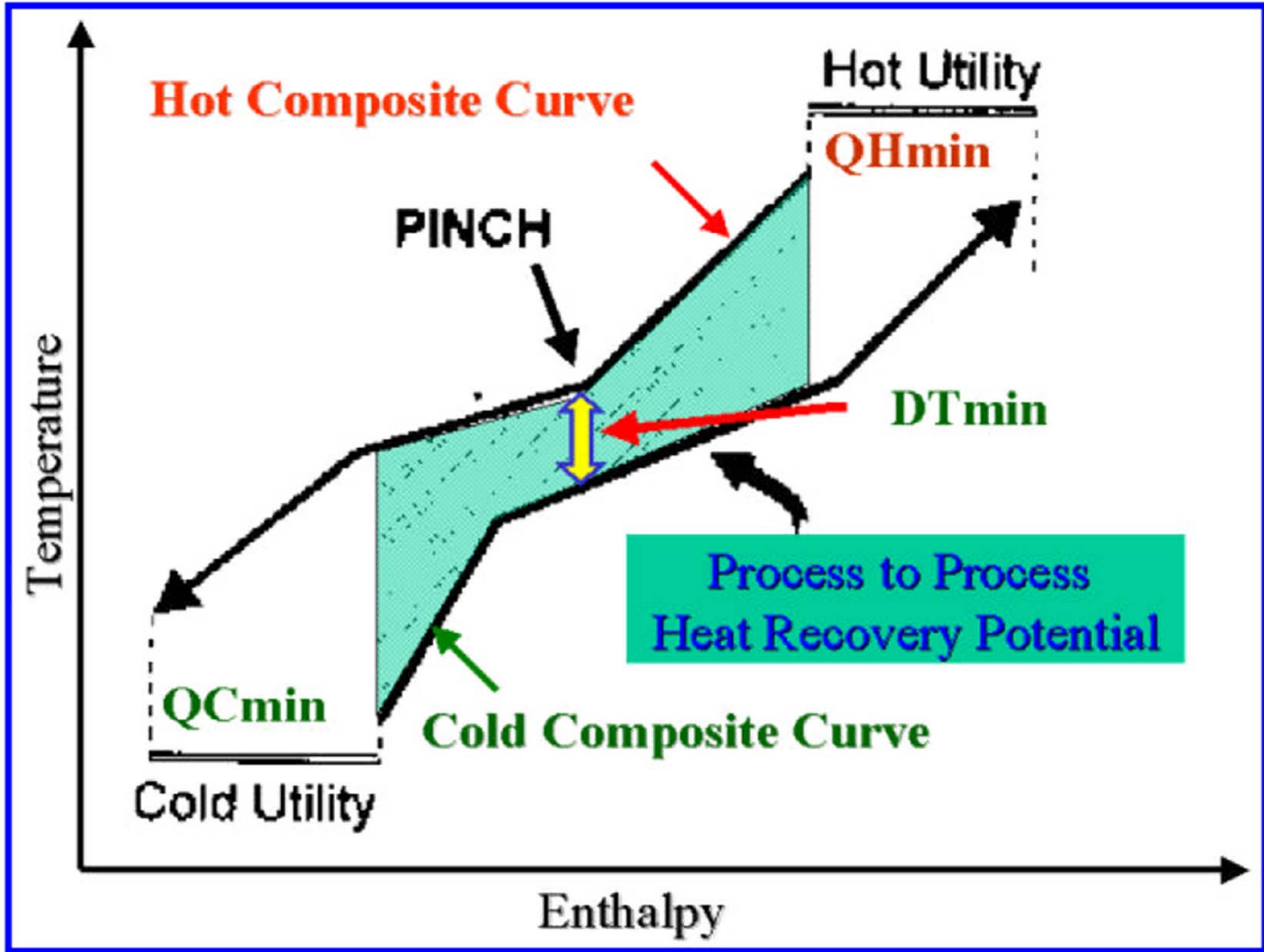
Aspen Pinch



Aspen Pinch



Aspen Pinch





Aspen Pinch

HI Case: Case 1

| Name | Inlet T [C] | Outlet T [C] | MCp [kJ/C-h] | Enthalpy [kJ/h] | Segm. | HTC [kJ/h-m2-C] | Flowrate [kg/h] | Effective Cp [kJ/kg-C] | DT Cont. [C] |
|--------------------|-------------|--------------|--------------|-----------------|-------|-----------------|-----------------|------------------------|--------------|
| lubecut | 60.0 | 75.0 | 3.522e+004 | 5.283e+005 | | 1415.1 | 1.718e+00 | 2.050 | Global |
| Rif mix | 105.0 | 205.0 | 3.128e+004 | 3.128e+006 | | 836.2 | 1.360e+00 | 2.300 | Global |
| fnsh raff | 165.0 | 73.0 | 2.371e+004 | 2.182e+006 | | 836.2 | 1.054e+00 | 2.250 | Global |
| psuedo raff | 56.0 | 86.0 | 1.067e+00E | 3.200e+006 | | 836.2 | 4.848e+00 | 2.200 | Global |
| ext mix 1 | 56.0 | 160.0 | 7.676e+004 | 7.983e+006 | | 720.0 | 4.040e+00 | 1.900 | Global |
| ext mix 2 | 169.0 | 230.0 | 5.953e+004 | 3.631e+006 | | 897.4 | 3.022e+00 | 1.970 | Global |
| extract | 150.0 | 110.0 | 1.479e+004 | 5.917e+005 | | 720.0 | 6460 | 2.290 | Global |
| pure FF | 155.0 | 125.0 | 7.515e+004 | 2.255e+006 | | 2142.1 | 3.894e+00 | 1.930 | Global |
| c1303-2 | 204.0 | 170.0 | 1.704e+004 | 5.795e+005 | | 897.4 | 1.186e+00 | 1.437 | Global |
| Solvet+vapor mix 1 | 140.0 | 60.0 | 2.525e+00E | 2.020e+007 | | 2628.1 | 5531 | 45.66 | Global |
| Solvet+vapor mix 2 | 95.0 | 60.0 | 1.871e+00E | 6.548e+006 | | 897.4 | 9013 | 20.76 | Global |
| c1303-3 | 145.0 | 145.1 | 4.939e+007 | 4.939e+006 | | 720.0 | 1.063e+00 | 4645 | Global |
| **New** | | | | | | | | | |

Process Streams | Utility Streams | Economics | Options | Notes



Aspen Pinch

| Energy Targets | | Area Targets | | Pinch Temperatures | |
|-------------------------|------------|-----------------------|------------|--------------------|---------|
| Heating [kJ/h] | 1.320e+007 | Counter Current [m2] | 886.9 | Hot | Cold |
| Cooling [kJ/h] | 2.215e+007 | 1-2 Shell & Tube [m2] | 1078.1 | 250.0 C | 218.0 C |
| | | | | 150.0 C | 118.0 C |
| Number of Units Targets | | Cost Index Targets | | | |
| Total Minimum | 14 | Capital [Cost] | 5.069e+005 | | |
| Minimum for MER | 17 | Operating [Cost/s] | 1.124e-002 | | |
| Shells | 17 | Total Annual [Cost/s] | 1.642e-002 | | |

Summary | Utility Targets | Range Targets | Plots/Tables

ΔT_{min} Heating Sufficient Cooling Sufficient

Aspen FIHR



ورودی های نرم افزار جهت مدلسازی کوره

Design H-7701.FHI (H-7701 : 3344) - Aspen FIHR 2006 - AspenONE - [HTFS Data Browser]

File Edit View Diagrams Input Run Output Toolbar Window Help

HTFS Data Browser

Stream 1 S.I. Units

Stream Name and Type
Name: Stream 1
Type: Hydrocarbon

Stream Configuration
Stream Data Source: <Not Set Here>, <Direct Input>, <Air (NEL40)>, <Water (NEL40)>
Stream Composition: Mole Fraction

Pressure Levels
1, 2, 3 bar

Properties - Pressure Level 1 of 3
Molecular Weight: 272

| | Point 1 | Point 2 | Point 3 | Point 4 | Point 5 | Point 6 |
|-----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Temperature | 240.00 | 246.00 | 253.00 | 259.00 | 266.00 | 272.00 |
| Liquid Density | 774.0245 | 771.2866 | 768.0204 | 765.1572 | 761.7403 | 758.744 |
| Liquid Specific Heat | 2.30929 | 2.328909 | 2.351511 | 2.370651 | 2.392721 | 2.411426 |
| Liquid Viscosity | 0.5849904 | 0.560172 | 0.533116 | 0.5114127 | 0.4876736 | 0.4685694 |
| Liquid Thermal Conductivity | 0.1453203 | 0.1440534 | 0.1425663 | 0.1412838 | 0.139778 | 0.1384789 |
| Surface Tension | 21.04942 | 20.62408 | 20.12986 | 19.70799 | 19.21789 | 18.79959 |
| Specific Enthalpy | 274.69 | 288.604 | 304.986 | 319.153 | 335.825 | 350.237 |
| Quality | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Vapour Density | | | | | | |
| Vapour Specific Heat | | | | | | |
| Vapour Viscosity | | | | | | |
| Vapour Thermal Conductivity | | | | | | |

For help, press F1 Cylind.Firebox+Banks 117:1



Aspen FIHR

خروجی های نرم افزار بالانس انرژی کوره

Design H-7701.FHI (H-7701 : 3344) - Aspen FIHR 2006 - AspenONE - [D:\bistoon petrochemical\NAHAY\Total phase3\Heater.HotOil.rev1\HotOil-1...

File Edit View Input Run Output Toolbar Window Help

[Echo of Input](#) [Messages Output](#) [Temperatures](#)
[Fuel Oxidant and Flue Gas](#) [Heat Balance](#) [Detailed Process Fluid Data Tables](#)
[Performance of the Firebox](#) [Performance of the Convection Bank](#) [Flue System](#)
[Detailed Gas Side Pressure Change Table](#) [API Sheet 1](#) [Firebox Configuration](#)
[Details of the Firebox Tubes](#) [Convection Section](#) [Process Fluids](#)
[Detailed Pressure Drop Tables](#) [Summary of Results](#) [Total Pressure Drops](#)
[Total Exchange Areas](#) [Heat Fluxes](#)

SEE REFERENCE MANUAL FOR COPYRIGHT AND DISCLAIMER NOTICES

30-JUN-2012 14:40 INPUT FILE: D:\...\Design H-7701.FHI
SIMULATION MODE:

THE FOLLOWING INPUT DATA CARDS WERE SUPPLIED

Echo of Input

| START | FIHR2 | FIX | B | SIMU | CYL+B | | | |
|-------|-------|--------|------|------|--------|---|------|---|
| 5) | 001 | OPTS | S | | | | | 0 |
| 6) | 002 | H-7701 | 3344 | | | | | |
| 7) | 010 | | 1 | | 2 | 1 | 2100 | |
| 8) | 011 | | 0 | | 0 | 0 | 0 | 0 |
| 9) | 012 | | 1 | | 1 | | | |
| 10) | 016 | | 2 | | * | * | | |
| 11) | 101 | GEOM | S | | | | | |
| 12) | 102 | | 1 | | 2 | 1 | 25 | * |
| 13) | 103 | | * | | 1 | * | * | * |
| 14) | 105 | | 20 | | * | * | * | * |
| 15) | 107 | | * | | 0.2214 | | | |
| 16) | 110 | | 1 | | | | | |

For help, press F1 Cylind.Firebox+Banks



Aspen FIHR

خروجی های نرم افزار بالانس انرژی کوره

```

=====
HEAT BALANCE - FIREBOX

Ambient temperature = 15.00 deg C

Number of fireboxes = 1
Number of burners per firebox = 3

Total heat inputs (to 1 firebox , 3 burners)
Heat input from fuel (calorific value only) = 2327.8 kW
Heat input from fuel + oxidant (from 25 deg C ref.) = 2317.3 kW
Heat input from fuel + oxidant (from ambient) = 2327.8 kW
Heat input from atomising steam (ref. 25 deg C, vapour) = 0.0 kW
Fuel preheat requirement (from ambient) = 0.0 kW
Oxidant preheat requirement (from ambient) = 0.0 kW

Heat loss to walls (kW) Total Total Radiative Convective
                    per firebox per firebox per firebox
Heat loss to walls (kW) 57.657 57.657 -194.4 252.1
Heat transfer to roof tubes (kW) 0.0 0.0 0.0 0.0
Heat transfer to main tubes (kW) 1545.4 1545.4 947.8 597.7
Heat loss to flue (kW) 716.5 716.5 213.1 503.5

Heat transferred to tubes and walls, Qf = 1816.2 kW
Combustion gas heat loss, Qe = m*cp*(Tfg-Tfe) = 0.0 kW
from gas mixed temperature, Tfg = -273.15 deg C
to bridge-wall (firebox exit) temperature, Tfe = -273.15 deg C
Hottel bridge-wall parameter, Qe/Qf = 0.00

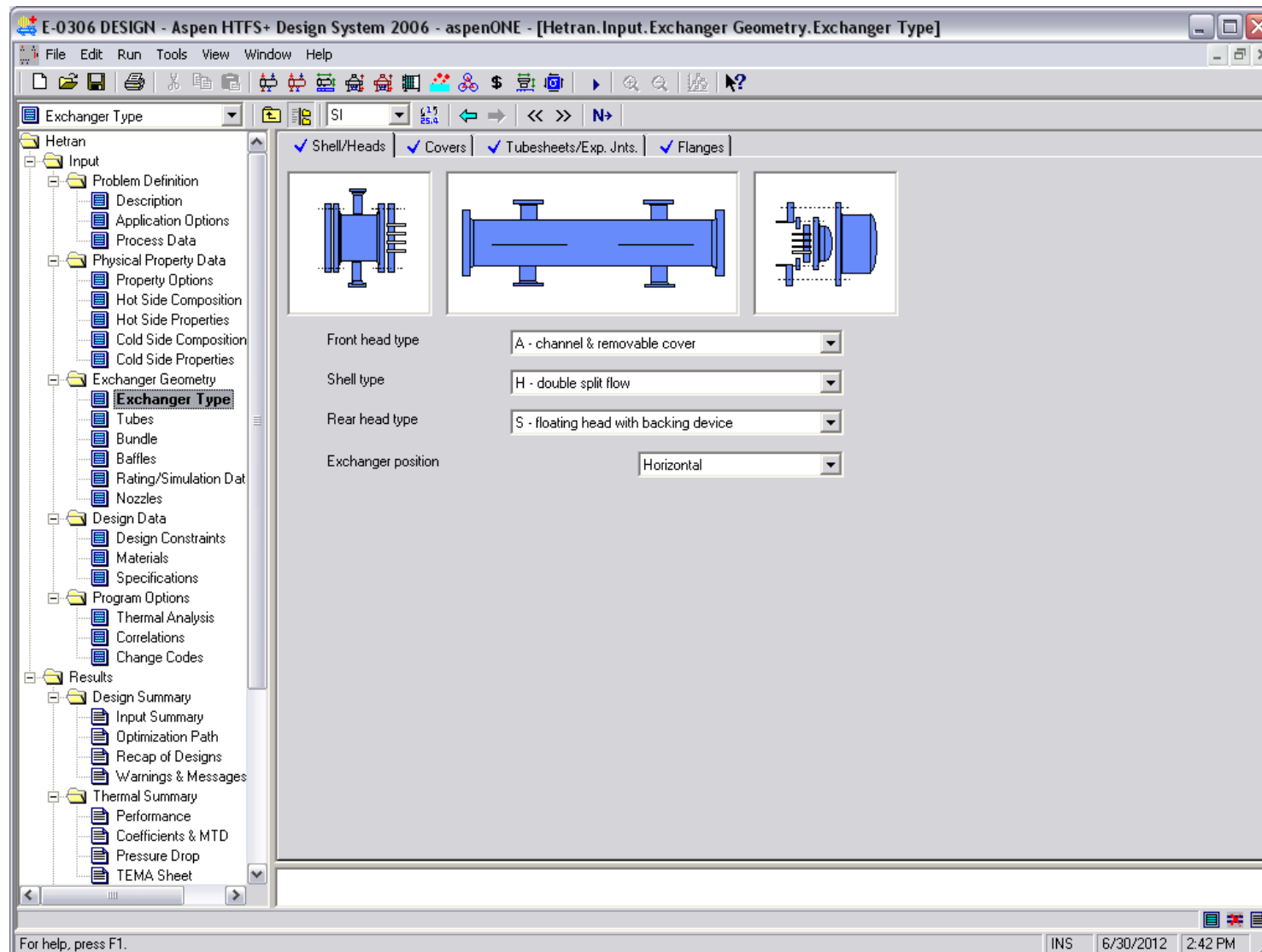
Radiation wall loss = 2.49 %
Firebox efficiency = 66.69 % (heat transfer to tubes/heat input)
Solution error in heat balance = -0.10 %
=====

```



Aspen B-JAC

ورودی های نرم افزار جهت مدل سازی مبدل





Aspen B-JAC

E-0306 Design Specification Sheet

| | | | | | | |
|----|---|-------------------------|-------------|----------------------------|------------------------------|---------------------|
| 1 | Company: BISOTOON PETROCHEMICAL COMPANY | | | | | |
| 2 | Location: KERMANSHAH | | | | | |
| 3 | Service of Unit: DESORBENT HEATER/RAFFINATE COLUMN BOTTOM EXCHANGER | | | | | |
| 4 | Item No.: E-0302 Design Specification | | | | | |
| 5 | Date:1389/10/18 Rev No.:0 | | | | | |
| 6 | Size | 815 / 6096 mm | Type | AHS hor | Connected in | 1 parallel 1 series |
| 7 | Surf/unit(eff.) | 228.6 m2 | Shells/unit | 1 | Surf/shell (eff.) | 228.6 m2 |
| 8 | PERFORMANCE OF ONE UNIT | | | | | |
| 9 | Fluid allocation | Shell Side | | Tube Side | | |
| 10 | Fluid name | HC | | Hot Oil | | |
| 11 | Fluid quantity, Total | kg/h 172597 | | 207968 | | |
| 12 | Vapor (In/Out) | kg/h 43154 | | | | |
| 13 | Liquid | kg/h 172597 129443 | | 207968 207968 | | |
| 14 | Noncondensable | kg/s | | | | |
| 15 | | | | | | |
| 16 | Temperature (In/Out) | C 255.6 | 257.2 | 300 | 277.46 | |
| 17 | Dew / Bubble point | C 257.1 | | | | |
| 18 | Density | kg/m3 597.2 14 | | 826.74 844.54 | | |
| 19 | Viscosity | cp 0.13 0.009 | | 0.452 0.525 | | |
| 20 | Molecular wt, Vap | | | | | |
| 21 | Molecular wt, NC | | | | | |
| 22 | Specific heat | kJ/(kg*K) 2.928 2.497 | | 2.493 2.415 | | |
| 23 | Thermal conductivity | W/(m*K) 0.086 0.027 | | 0.111 0.113 | | |
| 24 | Latent heat | kJ/kg 247.8 247.8 | | | | |
| 25 | Pressure | bar 3.4 | | 7.5 | | |
| 26 | Velocity | m/s 1.82 | | 1.25 | | |
| 27 | Pressure drop, allow ./calc. | bar 0.13097 0.06211 | | 0.7 0.22504 | | |
| 28 | Fouling resist. (min) | m2*K/W 0.00035 | | 0.00034 | | |
| 29 | Heat exchanged | 3194.7 kW | | MTD corrected 30.32 C | | |
| 30 | Transfer rate, Service | 460.9 Dirty | | 488.2 Clean 794.1 W/(m2*K) | | |
| 31 | CONSTRUCTION OF ONE SHELL | | | Sketch | | |
| 32 | | Shell Side | | Tube Side | | |
| 33 | Design/Test pressure | bar 9.7 / Code | | 14 / Code | | |
| 34 | Design temperature | C 272 | | 370 | | |
| 35 | Number passes per shell | 1 | | 2 | | |
| 36 | Corrosion allowance | mm 3 | | 3 | | |
| 37 | Connections | In 10 / 150 ANSI | | 10 / 300 ANSI | | |
| 38 | Size/rating | Out 16 / 150 ANSI | | 10 / 300 ANSI | | |
| 39 | in | Intermediate / 150 ANSI | | / 300 ANSI | | |
| 40 | Tube No. | 640 | OD 19.05 | 2.11 mm | Length 6096 mm Pitch 25.4 mm | |
| 41 | Tube type | Plain | | Material | CS Tube pattern 90 | |

خروجی های نرم افزار در

مدلسازی مبدل

| | Shell Side | | Tube Side | |
|------------------------------|------------|-----------------|--------------|----------------------|
| Gases (in/out) | kg/h | 43154 | | |
| Liquids (in/out) | kg/h | 172597 | 129443 | 207968 207968 |
| Temperature (in/out) | °C | 255.6 | 257.2 | 300 277.46 |
| Dew point or bubble point | °C | | 257.1 | |
| Film coefficient | W/(m2 K) | 2096.2 | | 1748.7 |
| Fouling resistance | m2 K/W | 0.00035 | | 0.00034 |
| Velocity | m/s | 1.82 | | 1.25 |
| Pressure drop (allow./calc.) | bar | 0.13097/0.06211 | | 0.7 / 0.22504 |
| Total heat exchanged | kW | 3194.7 | Type AHS hor | 1 ser 1 par |
| Overall coef. - dirty | W/(m2 K) | 488.2 | Shell size | 815—6096 mm |
| Effective surface area | m2 | 228.6 | Tube No-OD | 640—19.05 mm |
| MTD corrected | °C | 30.32 | Baffles | single seg 20 % vert |
| MTD Ft correction factor | | 1 | Tube passes | 2 |



Thermoflow

GT PRO 18.0

File View Options Navigator Window Excel Link Compare Files Help

Navigator

- New Session
- Start Design
- Plant Criteria
- GT Selection
- GT Inputs
- ST-HRSG
- HRSG Inputs
- Water Circuits
- HRSG Layout
- Cooling System
- ST Inputs
- Environment
- Other PEACE
- Economics
- Gasification
- Desalination
- Compute
- Text Output
- Graphics Output
- PEACE Output
- Multiple Designs
- Off Design

New Design

- Setup wizard & start visual design
- Setup wizard & start classic design
- Plant Design Expert
- Standard defaults

Existing File

- File list

Most recent file - GTPRO.GTP

Mode

- GT PRO only
- GT PRO & PEACE
- Demonstration

Approximate Plant Output

- Up to 15 MW
- 50 to 200 MW
- 10 to 50 MW
- Above 200 MW

Cost / Efficiency Balance

- Design for lower cost
- Design for higher efficiency

Primary Gas Turbine Fuel

CH4

Sulphur weight % = 0

General Plant Configuration

- GT Only
- GT & HRSG only (no ST)
- GT, HRSG, and non-condensing ST
- GT, HRSG, and condensing non-reheat ST
- GT, HRSG, and condensing reheat ST

Include gasification (IGCC)

Desalination System: None

Methodology

- 1. User's thermodynamic assumptions prevail over automatic hardware / engineering results
- 2. User's assumptions prevail in GT PRO, but hardware / engineering results prevail in GT MASTER
- 3. Hardware / engineering details prevail over user's assumptions

Diagram:

Left sketch is for illustration only. Steam turbine may have bleeds and additions. HRSG evaporator count and heat exchanger sequence may be modified. Various process streams may be established from ST and/or HRSG.



Thermoflow

GT PRO 18.0

File View Options Navigator Window Excel Link Compare Files Help

Navigator

- New Session
- Start Design
- Plant Criteria
- GT Selection
- HRSG Inlet
- ST-HRSG
- HRSG Inputs
- Water Circuits
- HRSG Layout
- Cooling System
- ST Inputs
- Environment
- Other PEACE
- Economics
- Gasification
- Desalination
- Compute
- Text Output
- Graphics Output
- PEACE Output
- Multiple Designs
- Off Design

Visual Method | Classic Method

Number of HRSG Evaporator Pressures

1-P 2-P 3-P 4-P None

Lowest Pressure Evaporator

- is connected to steam turbine
- feeds the deaerator
- feeds both process and deaerator

Cycle Type Options

- IP connected to ST
- IP not connected to ST

Internal Calculation Procedure

This selection is for advanced users only.

Alternative 1 / 2: (Cycle Type 6, Subtype 3)
Recommended

Click for alternatives

Change cycle type using classic method



Thermoflow modules

HRSG Layout | **General Plant Configuration**

Cooling System | GT Only

ST Inputs | GT & HRSG only (no ST)

Environment | GT, HRSG, and non-condensing ST

Other PEACE | GT, HRSG, and condensing non-re

Left sketch is for illustration only. Steam turbine may have bleeds and additions. HRSG evaporator count and heat exchanger sequence may be modified. Various process streams may be established from ST and/or HRSG.

PowerISO
SharePoint
Startup
Thermoflow 23
GT MASTER 23
GT PRO 23
GT TEMPLATE 23
GTPM File Comparison
GTTRAN 23
HASP Device Driver Installation
New Version Downloader
PDE 23
QT PRO Unit Conversion
QT PRO
RE-MASTER 23
STEAM MASTER 23
STEAM PRO 23
THERMOFLEX 23
Thermoflow Configuration Report
Thermoflow MACRO 23
VMware
WinRAR

Soheila Mehdizadeh
Documents
Pictures
Computer
Network
Connect To
Control Panel
Default Programs
Help and Support

ic hardware / engineering results
engineering results prevail in GT MASTER
ptions

Back

| Search programs and files | Shut down



Thermoflow modules

Gt pro : شبیه سازی واحدهای گازی و بر پایه گاز (سیکل ترکیبی ، تولید همزمان ، آب شیرین کن و...در شرایط طراحی

GT MASTER : شبیه سازی واحدهای گازی و بر پایه گاز (سیکل ترکیبی، تولید همزمان، آب شیرین و ... در شرایط خارج از طراحی

ST PRO : شبیه سازی واحدهای بخار (نیروگاه حرارتی) در شرایط طراحی

ST MASTER : شبیه سازی واحدهای بخار (نیروگاه حرارتی) در شرایط خارج از طراحی

Re master : برای شبیه سازی واحدهای بازتوانی



Thermoflow modules

GT TEMPLAT : افزودن توربین گاز به کتابخانه نرم افزار

QT PRO : جداول ترمودینامیکی

THERMO FLEX : برای شبیه سازی هر واحدی در هرگونه شرایطی

THERMOFLOW MACRO : تأثیر شرایط مختلف بر یک نیروگاه

PDE: PLANT DESIGN EXPERT با چند سوال کلی یک نیروگاه پیشنهاد می دهد.

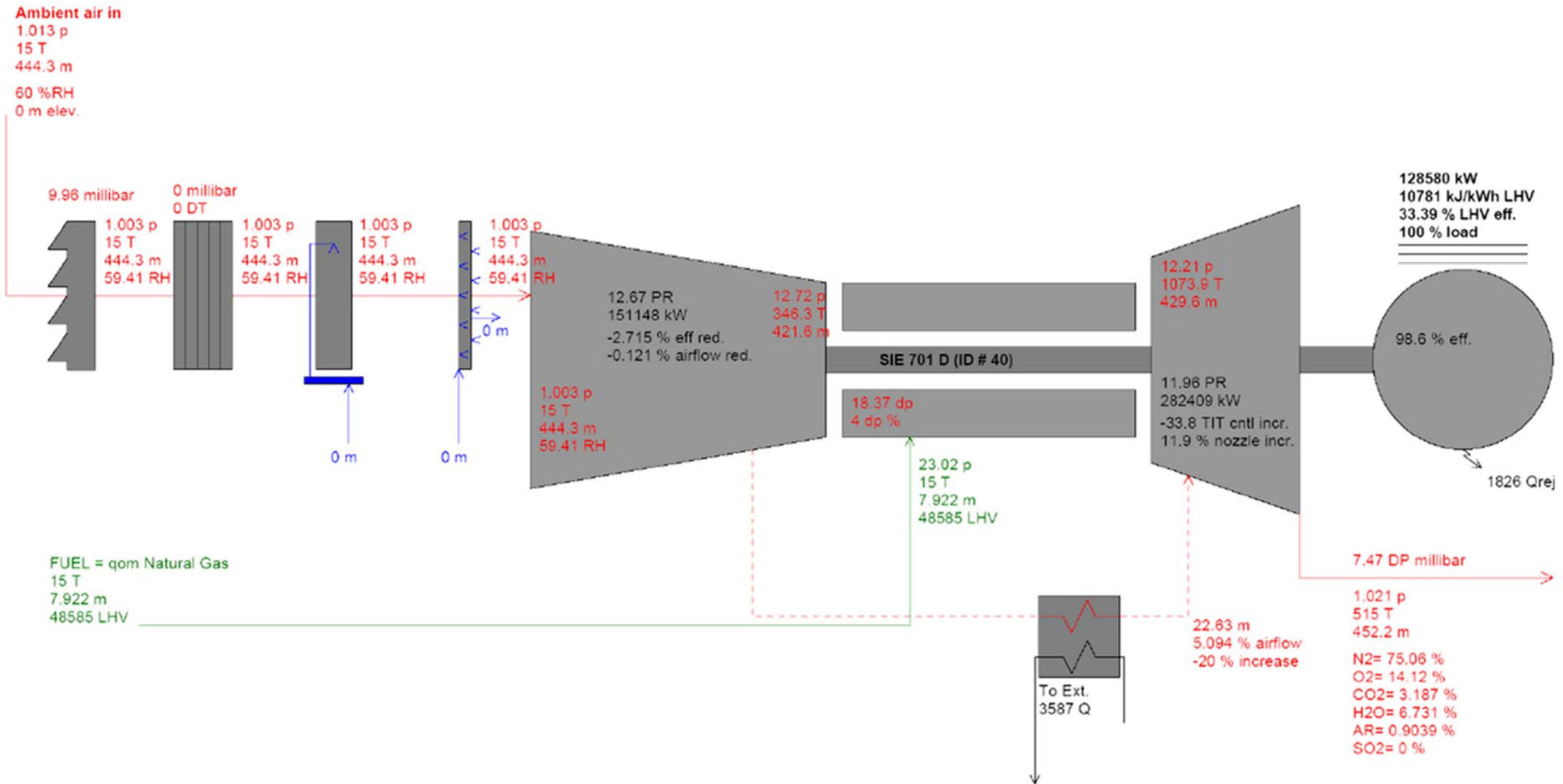
PEACE: Plant Engineering And Construction Estimate

این قسمت محاسبات مهندسی و اقتصادی برای ساخت نیروگاه مثل زمان برگشت سرمایه،

حجم بتن ریزی، جنس مواد و ... انجام می دهد.

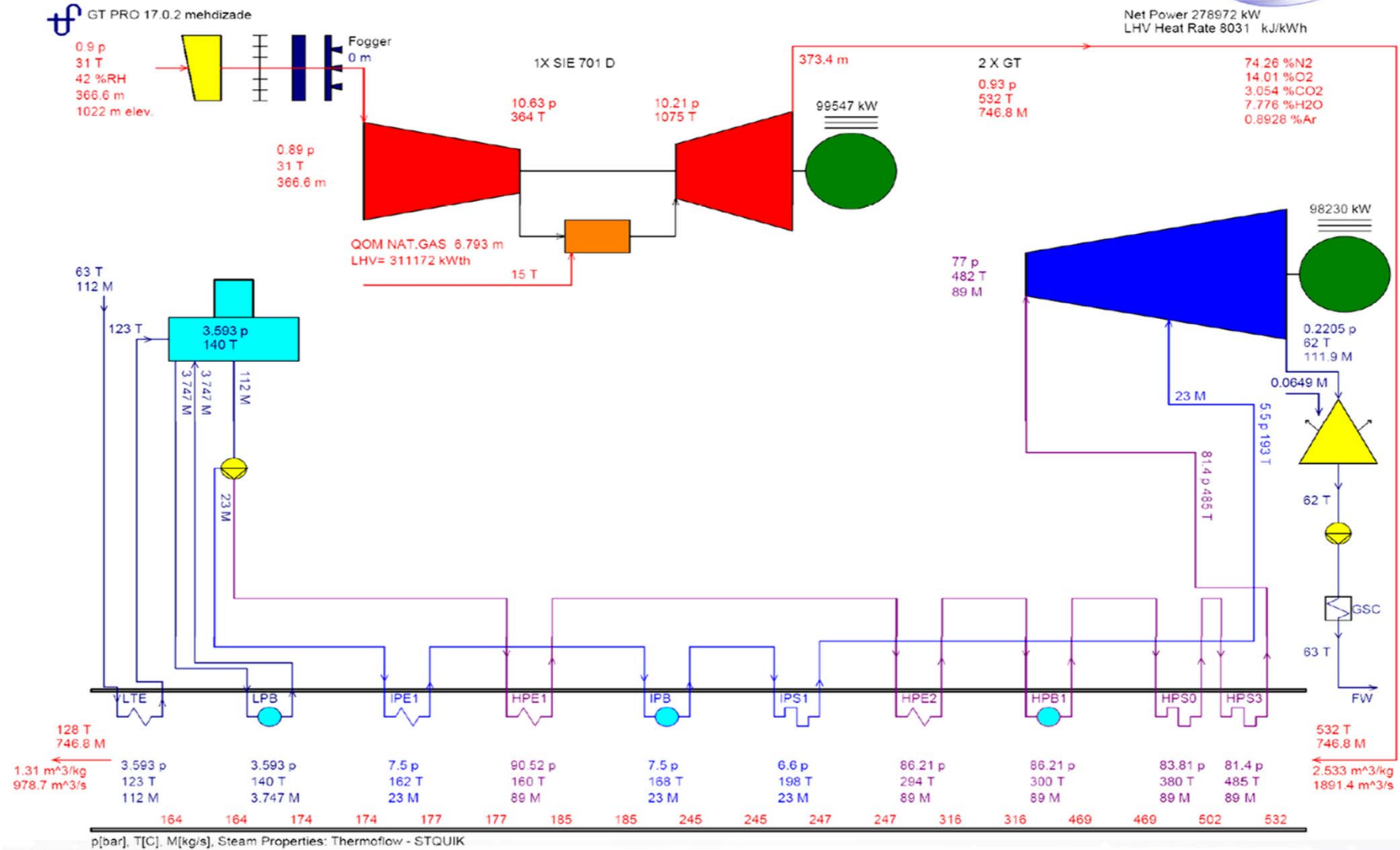


Thermoflow Outputs



شکل ۱-۲. شماتیک مدل واحدهای گازی نیروگاه قم در شرایط ایزو با سوخت گاز طبیعی با تنظیم شرایط مدل W701D

Thermoflow Outputs

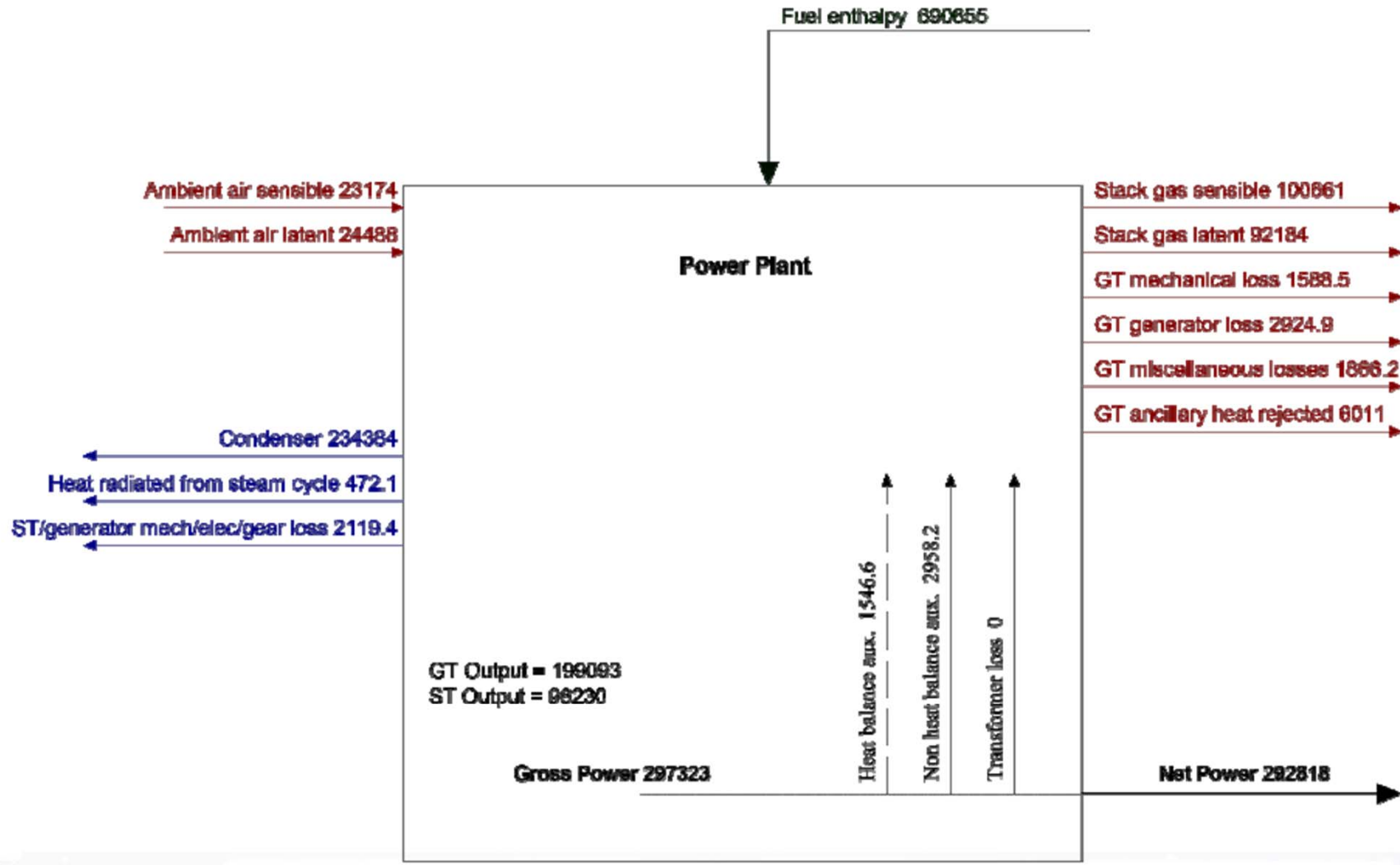


Thermoflow Outputs



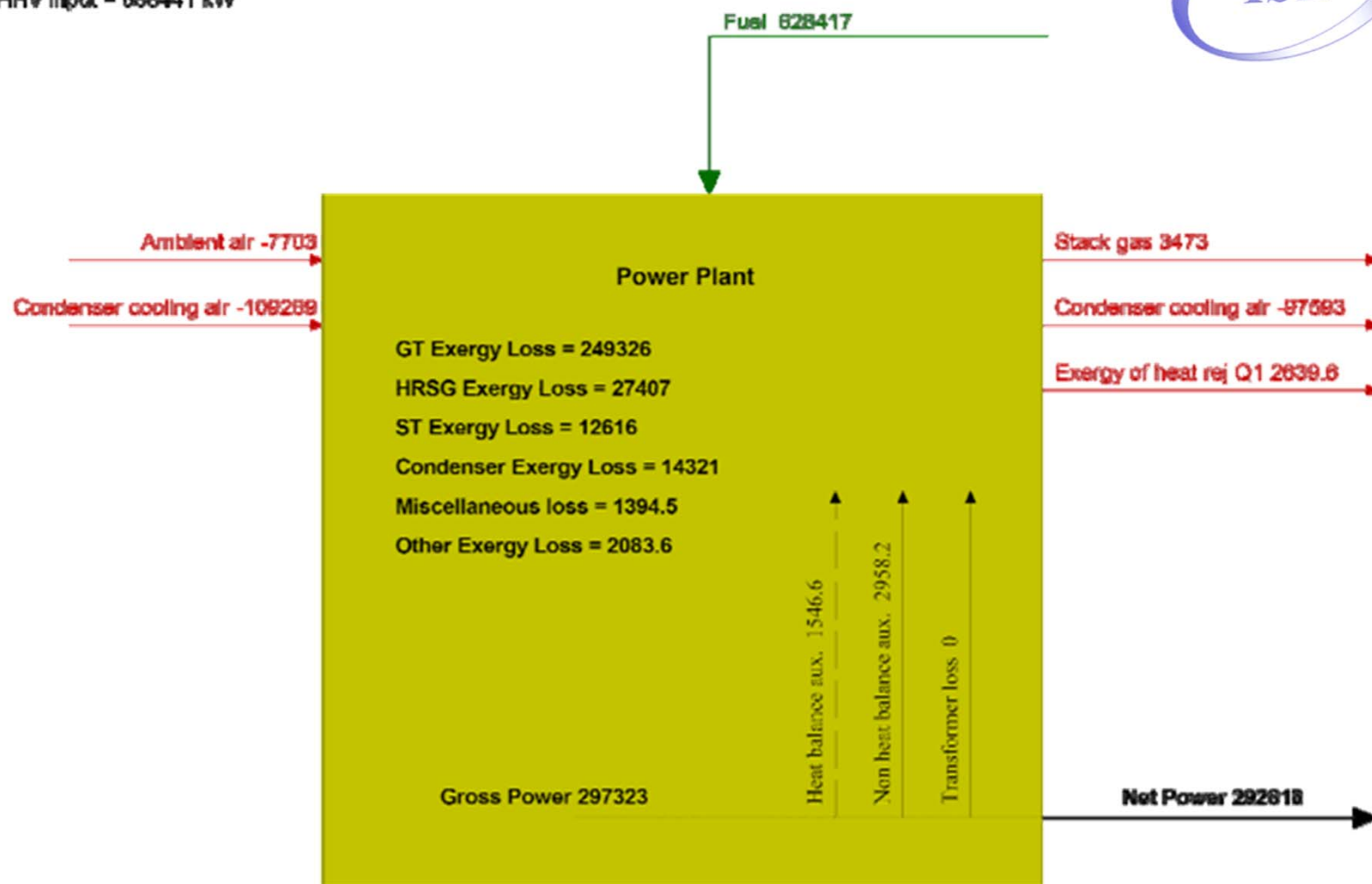
chemical LHV Input = 622345 kW
 chemical HHV Input = 688441 kW

Power Plant Energy Flow Schematic [kW]



Fuel exergy input = 628417 kW
 Fuel chemical LHV input = 622345 kW
 Fuel chemical HHV input = 688441 kW

Power Plant Exergy Flow Schematic [kW]



Reference: 1.013 bar, 25 C, water as vapor.



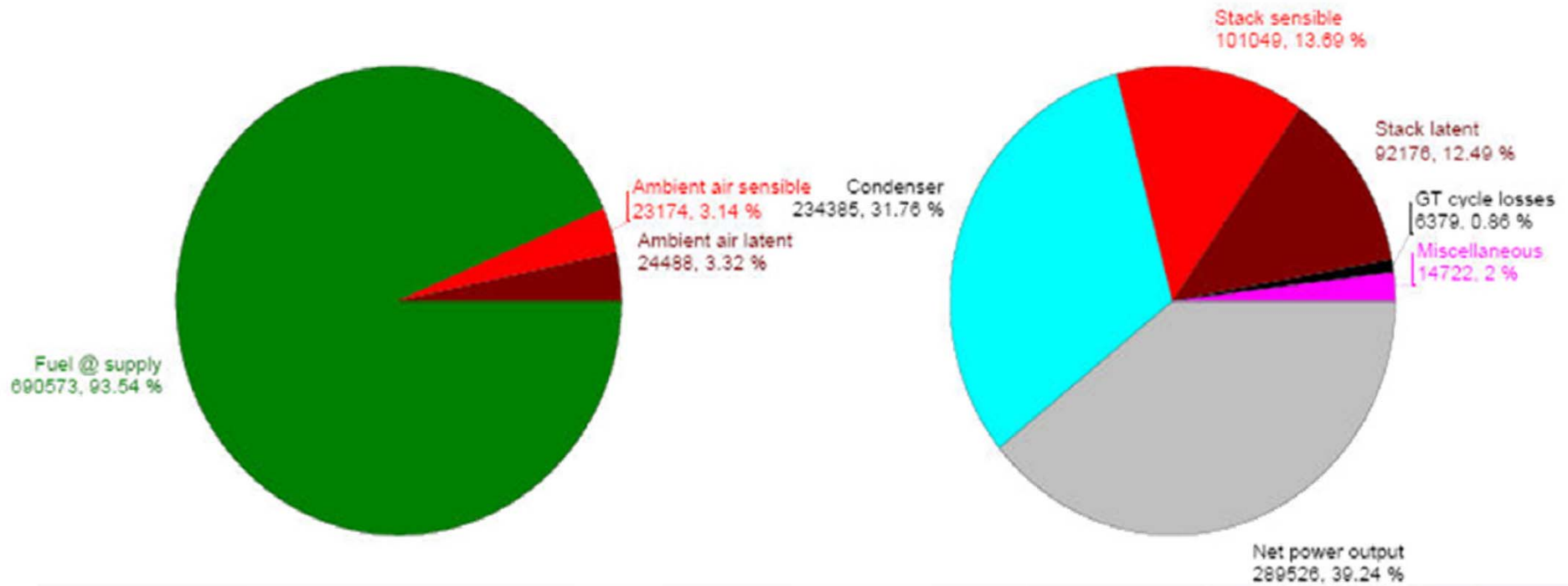
Thermoflow Outputs

Plant Energy In [kW]

Plant energy in = 738235 kW
Plant fuel chemical LHV input = 622271 kW, HHV = 698359 kW
Plant net LHV elec. eff. = 48.53 % (100% * 289525 / 622271), Net HHV elec. eff. = 42.08 %

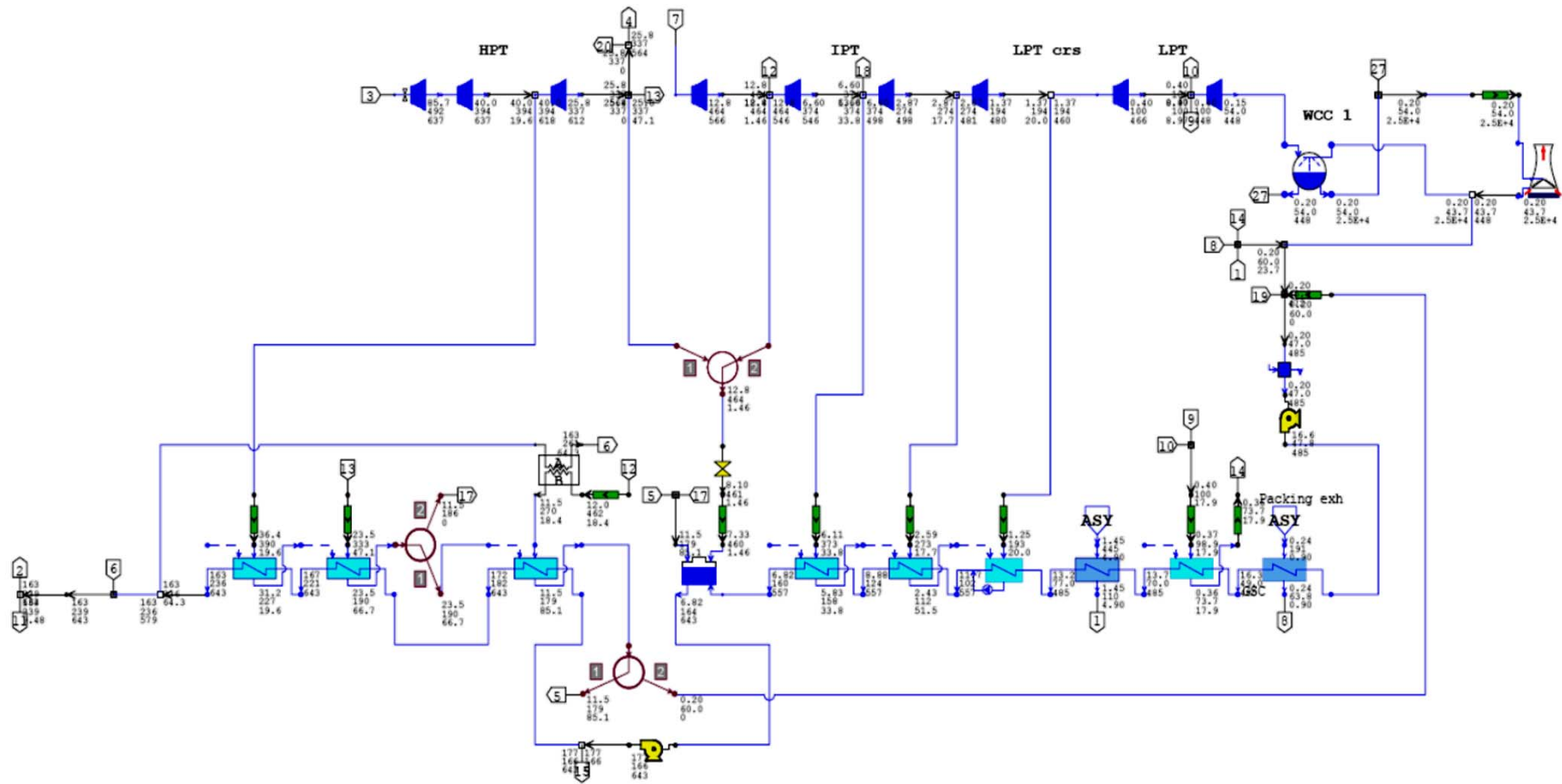
Plant Energy Out [kW]

Plant energy out = 737907 kW



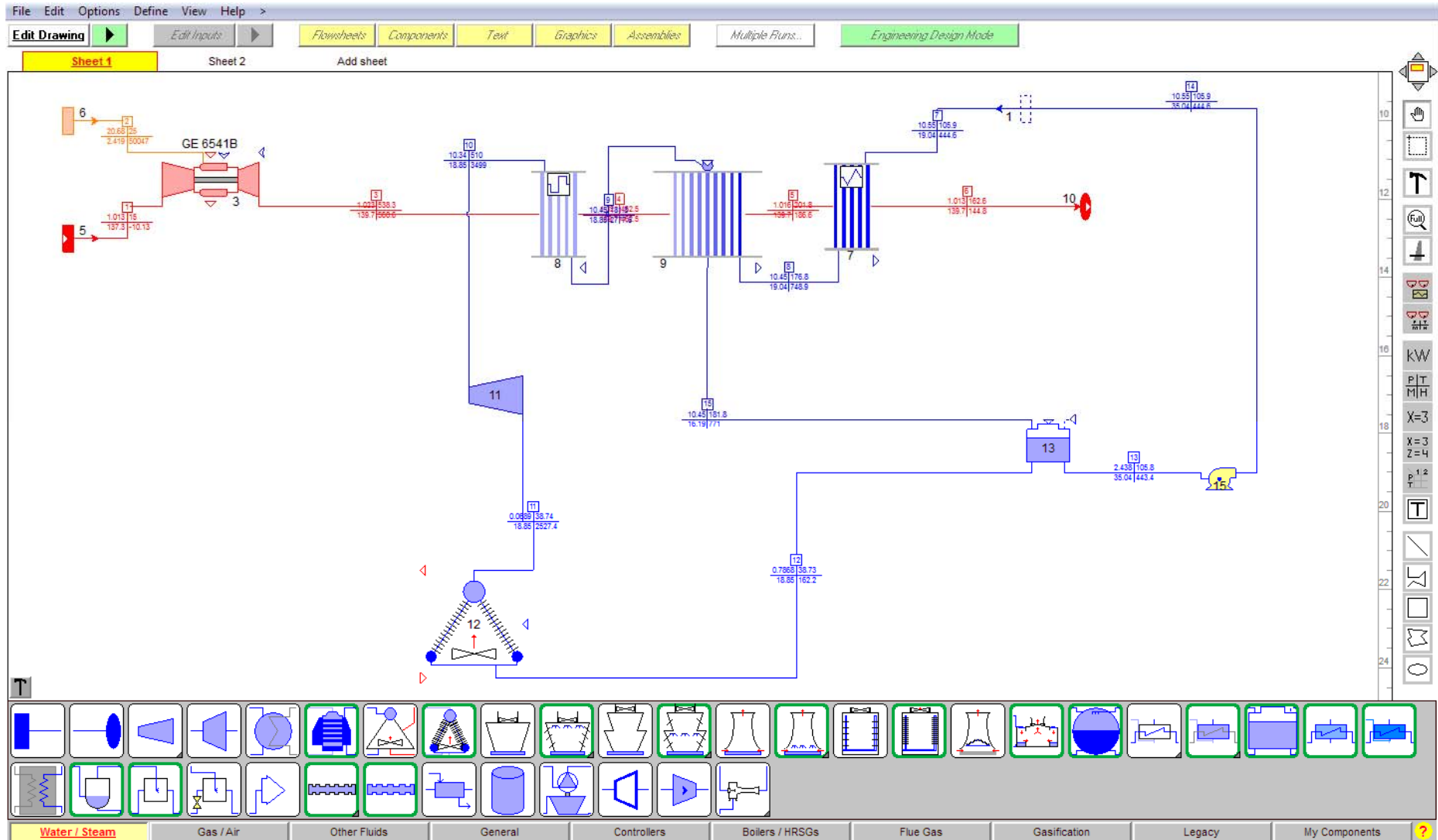


Thermoflex Outputs



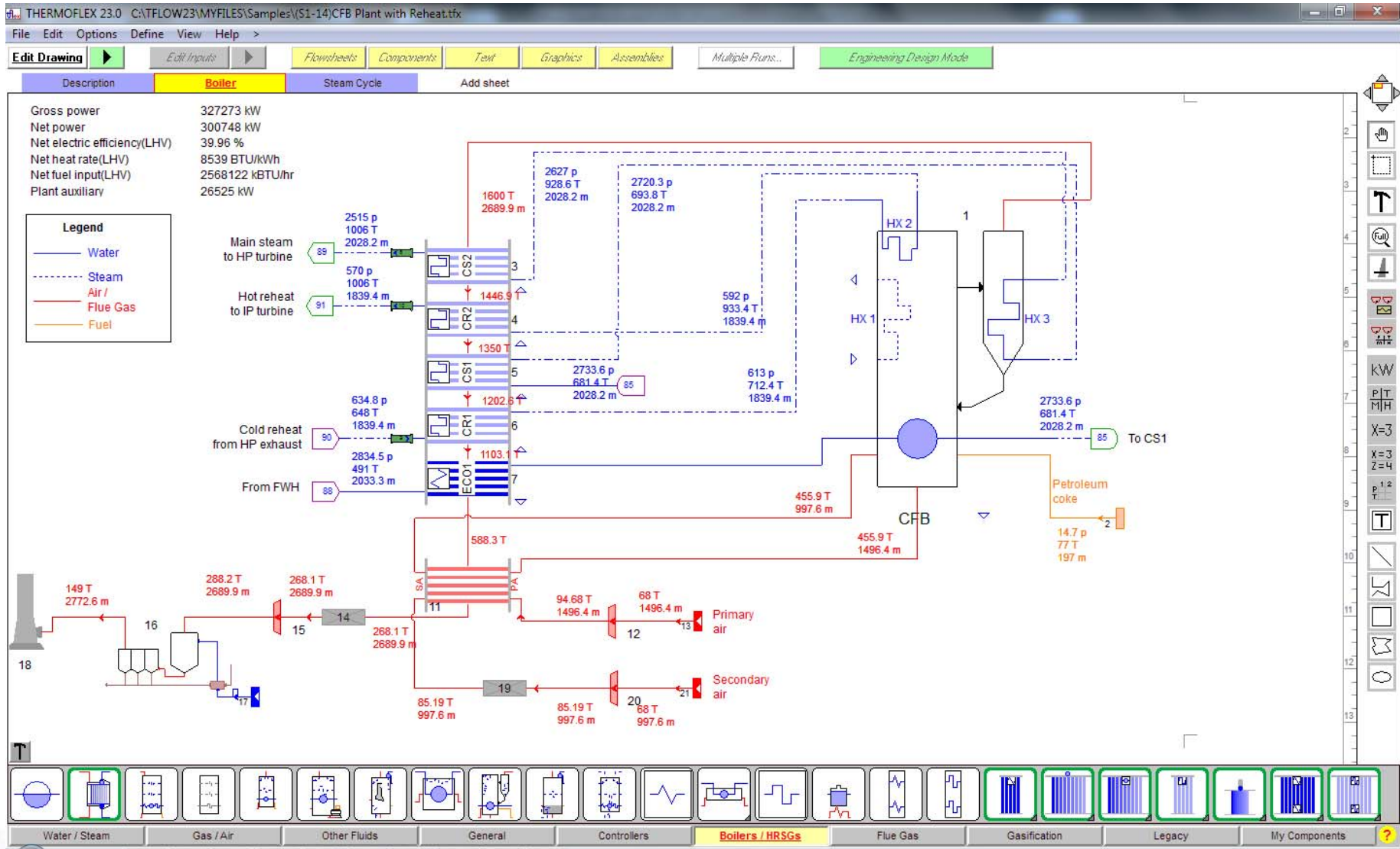


Thermoflex Outputs





Thermoflex Outputs





Thermoflex Outputs

Text Output D:\bistoon petrochemical\NAHAY\Total phase3\Boilers.rev1\simulation\Boiler, 50% design.tfx

File System Summary Component Results Stream Table

*** STREAM TABLE ***
Steam Property Formulation - Thermoflex STQUIK

H* is the program enthalpy based on 77F (25C) & vapor H2O.

Gas/Air Streams:

| No. | P [bar] | T [C] | H* [kJ/kg] | Mgas [t/h] | Mash [t/h] | V [m ³ /s] | M.W. | Mole Composition % | | | | | | |
|-----|---------|--------|------------|------------|------------|-----------------------|--------|--------------------|--------|-------|---------|---------|-------|-------|
| | | | | | | | | N2 | O2 | CO2 | H2O vap | H2O liq | Ar | SO2 |
| 15 | 0.8776 | 37.77 | 13.13 | 5.935 | 0.000 | 1.7 | 28.568 | 75.236 | 20.186 | 0.029 | 3.643 | 0.000 | 0.906 | 0.000 |
| 16 | 0.8776 | 131.74 | 119.90 | 6.241 | 0.000 | 2.4 | 27.582 | 69.081 | 1.852 | 8.530 | 19.706 | 0.000 | 0.832 | 0.000 |

Gas/Air Psychrometric Properties (T <= 500 F/260 C)

| No. | P [bar] | T [C] | Dew Point [C] | Wet Bulb [C] | RH [%] |
|-----|---------|--------|---------------|--------------|--------|
| 15 | 0.8776 | 37.77 | 25.16 | 27.88 | 48.86 |
| 16 | 0.8776 | 131.74 | 56.98 | 60.90 | 6.08 |

Water/Steam Streams:

| No. | P [bar] | T [C] | H* [kJ/kg] | H [kJ/kg] | M [t/h] | Quality | Sup/Sub (-) |
|-----|---------|--------|------------|-----------|---------|---------|-------------|
| 1 | 17.28 | 205.11 | -1671.65 | 875.84 | 0.144 | | 0.00 |
| 17 | 16.78 | 230.00 | 317.64 | 2865.13 | 6.000 | | 26.33 |
| 19 | 17.80 | 118.00 | -2051.06 | 496.43 | 6.124 | | -88.56 |

Fuel Streams: (G=gaseous L=liquid S=solid P=liquefied gas)

| No. | P [bar] | T [C] | H* [kJ/kg] | M [t/h] | M.W. | Ash % | H2O % | Atomic % | | | | | LHV [kJ/kg] | HHV [kJ/kg] | |
|------|---------|-------|------------|---------|-------|-------|-------|----------|-------|------|------|------|-------------|-------------|----------|
| | | | | | | | | C | H | O | N | S | Ar | | |
| 14 G | 0.9997 | 37.77 | 49701.68 | 0.306 | 17.19 | 0.00 | 0.00 | 20.63 | 79.37 | 0.00 | 0.00 | 0.00 | 0.00 | 49674.34 | 55003.00 |

Fuel Streams: Additional Properties

Stream 14 Gaseous fuel defined by mole percent

| Methane | CH4 | 93.1 | % |
|---------|-----|------|---|
|---------|-----|------|---|

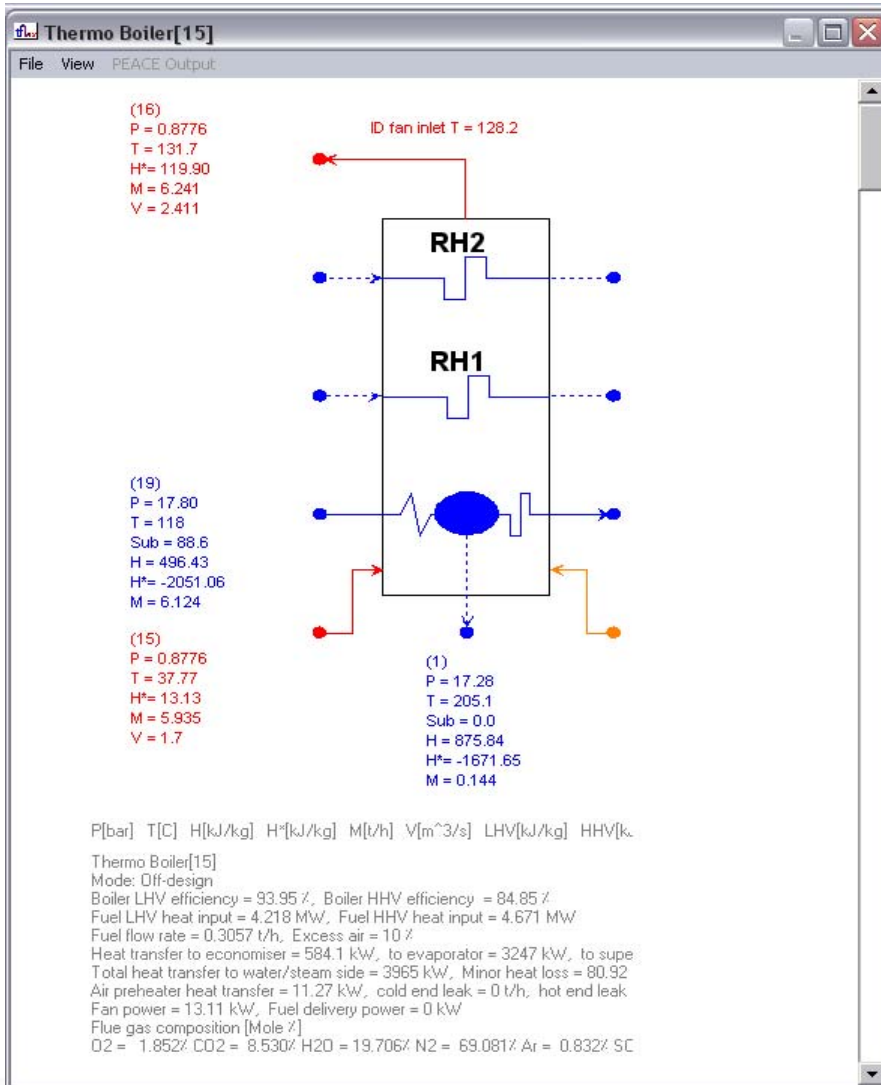
خروجی مدلسازی بویلر

در نرم افزار

Thermoflex



Thermoflex Outputs










خروجی مدلسازی بویلر
در نرم افزار
Thermoflex



PHAST



Process Heating Assessment and Survey Tool (PHAST)

 **U.S. Department of Energy**
Energy Efficiency and Renewable Energy *Bringing you a prosperous future where energy is clean, abundant, reliable and affordable*

| | | |
|--|--|--|
|  Calculators |  Plant/Equipment Information |  Furnace Analysis - Heat Balance |
|  Reports |  Import Plant Information |  Export Plant Information |

Click on the appropriate button for further information

[Exit Application](#)

  This Application is developed by E3M Inc. with support from the Department of Energy and Oak Ridge National Laboratory in cooperation with Industrial Heating Equipment Association (IHEA). A subcommittee consisting of members from major industries and equipment suppliers acted as advisor for the application development.



PHAST

PHAST(Process Heating Assessment and Survey Tool)

Furnace Data

File Help

U.S. Department of Energy
Energy Efficiency and Renewable Energy
Bringing you a prosperous future where energy is clean, abundant, reliable and affordable

Plant Name: 1111 Furnace Name: Electric Arc Furnace

Other Losses Flue Gas Losses/Heating System Efficiency Heat Storage

Water - Cooling Losses Wall Losses Opening Losses

Load/Charge Material Fixtures, Trays, Baskets etc. Losses Atmosphere Losses

Select Type: Solid Liquid Gas

| Type of Material | Current | Modified |
|----------------------------------|----------------|------------------|
| Charge (wet)-Feed Rate (kg/hr) | 20000 | 20000 |
| Water Content as Charged (%) | 1 | 0 |
| Water Content as Discharged (%) | 0 | 0 |
| Initial Temp. (Celsius) | 30 | 315 |
| Water Discharge Temp. (Celsius) | 560 | 560 |
| Discharge Temp. (Celsius) | 1640 | 1640 |
| Charge Melted (% of Charge) | 100 | 100 |
| Charge Reacted (% of Dry) | 0 | 0 |
| Heat of Reaction (kJ/kg) | 60 Endothermic | 1000 Endothermic |
| Additional Heat Required (kJ/hr) | 0 | 0 |
| Heat Required (kJ/hr) | 42,567,628 | 36,371,315 |

Current Net Heat Required (kJ/hr): **47,448,985**

Modified Net Heat Required (kJ/hr): **41,252,672**

Furnace Summary Enter/Edit Modified Data

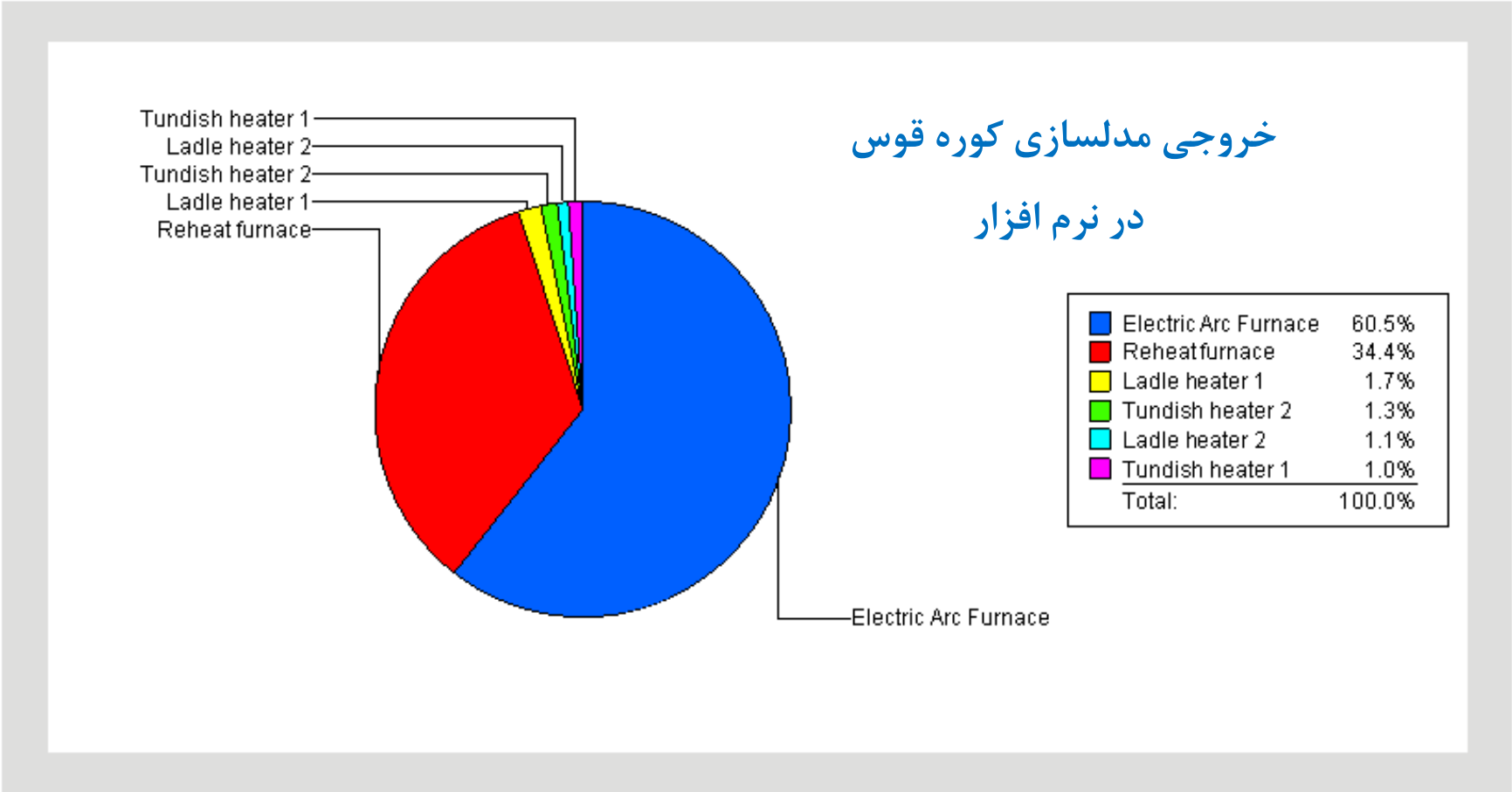
Report Close

ورودی های مدلسازی کوره قوس
در نرم افزار



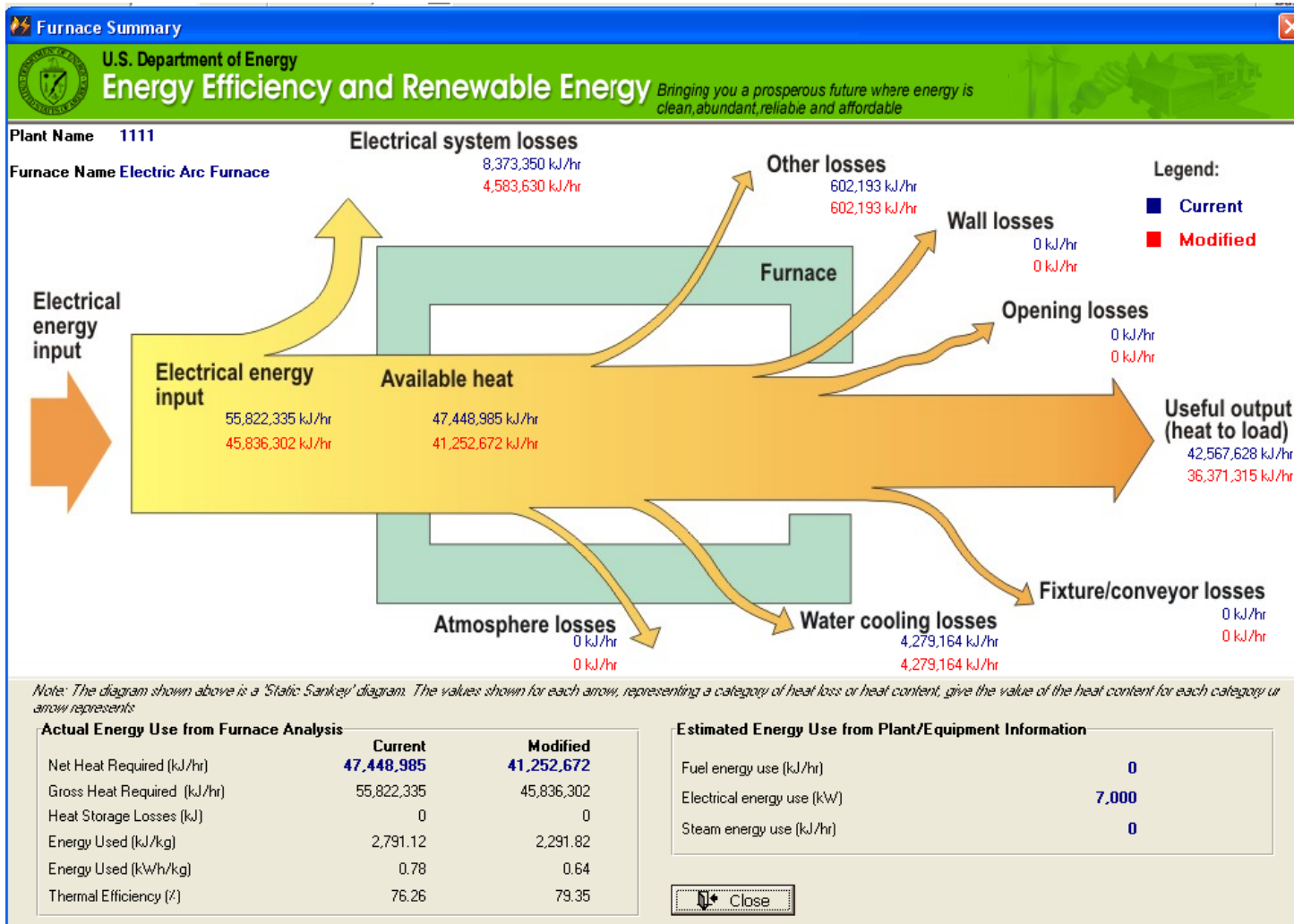
PHAST

Process Heating Equipment - Energy Cost Distribution





PHAST



خروجی مدلسازی
 کوره قوس در نرم افزار
 (سانکی دیاگرام)



Motor Master

بررسی عملکرد در حال کار الکتروموتورها و پیشنهاد موتور
ورودی های نرم افزار

Motor Selector

Search Select Clear Detail Reset Cols Print Help Close

Query Parameters

Motor type: IEC Design N Rebate program: <None>

Size: 18.5 kW Frame size: <All>

Speed/Poles: 3000 (2) RPM C-face:

Degree of protection: IP55 Vertical shaft:

Voltage: 400

Definite purpose: <All - purpose motor>

Manufacturers (2) All

- ARCELIK AS
- Baldor UK
- BESEL S.A.
- BROOK & CROMPTON
- CEG Srl
- CELMA S.A.

EFF1 - High Efficiency

Query Results

| Manufacturer | Model | Catalog | kW | Encl | Eff FL IEE |
|----------------------------|-----------------------------|---------|------|------|------------|
| SIEMENS | 1LA9 166-2KA.. | M 11 | 18.5 | IP55 | |
| EFF1 - High Efficiency | CEMEP Efficiency Labeling S | | 18.5 | | |
| SIEMENS | 1LA6 166-2AA.. | M 11 | 18.5 | IP55 | |
| SIEMENS | 1LA7 166-2AA.. | M 11 | 18.5 | IP55 | |
| EFF2 - Improved Efficiency | CEMEP Efficiency Labeling S | | 18.5 | | |
| | | | | | |
| | | | | | |

3 motors found



Motor Master

خروجی نرم افزار

Motor Savings Analysis

Scenario: **Replace Existing** | Savings | Best Available | Print | Help | Close

Motor Characteristics

Existing Motor

Description: <Default EFF3 motor>

Size (kW) / Speed (RPM) (Poles): 18.5 | 3000 (2)

Degree of protection / Voltage (Volts): IP55 | 400

Load (%): 15.0

Efficiency (%): 65.4

Full load RPM: | Centrifugal load

Old Motor Efficiency Loss (%): 0.0

Costs/Use

EFF1 High Efficiency Motor

Description: <Default EFF1 motor>

Size (kW) / Speed (RPM) (Poles): 18.5 | 3000 (2)

Degree of protection / Voltage (Volts): IP55 | 400

Load (%): 15.0

Efficiency (%): 81.3

Full load RPM: 0

Select Motor

Lifecycle

Savings

| | Existing Motor | EFF1 High Efficiency Motor |
|------------------------|----------------|----------------------------|
| Differential cost (₹): | | 1,549 |
| Energy use (kWh/yr): | 16,974 | 13,647 |
| Energy cost (₹/yr): | 679 | 546 |
| Demand charge (₹/yr): | 255 | 205 |

Energy Savings

Energy (kWh/yr): 3,328

Demand (kW): 0.8

Energy savings (₹/yr): 133

Demand savings (₹/yr): 50

Greenhouse Gas Emissions Reduction

State: New York | tonnes CO2/yr: 1.3

Total savings (₹/yr): 183

Simple payback (yrs): 8.46



PSAT & FSAT

Fan System Assessment Tool & Pump System Assessment Tool

ورودی نرم افزار

خروجی نرم افزار

| | Condition A | | | Condition B | | |
|--------------------|-------------|---------|--------|-------------|---------|--------|
| | Existing | Optimal | Units | Existing | Optimal | Units |
| Pump efficiency | 72.6 | 84.8 | % | 72.5 | 85.0 | % |
| Motor rated power | 200 | 200 | hp | 145 | 132 | kW |
| Motor shaft power | 192.4 | 164.8 | hp | 143.9 | 122.7 | kW |
| Pump shaft power | 192.4 | 164.8 | hp | 143.9 | 122.7 | kW |
| Motor efficiency | 95.7 | 95.8 | % | 95.8 | 95.6 | % |
| Motor power factor | 86.7 | 85.7 | % | 86.4 | 86.4 | % |
| Motor current | 217.1 | 188.2 | amps | 264.0 | 225.7 | amps |
| Motor power | 150.0 | 128.4 | kW | 150.2 | 128.3 | kW |
| Annual energy | 1314.0 | 1125.1 | MWh | 1315.5 | 1124.1 | MWh |
| Annual cost | 65.7 | 56.3 | \$1000 | 65.8 | 56.2 | \$1000 |

Annual savings potential, \$1,000: 9.4 (Condition A), 9.6 (Condition B)
 Optimization rating, %: 85.6 (Condition A), 85.4 (Condition B)

بررسی عملکرد

الکتروپمپ و الکتروفن



PumpSave & FanSave

بررسی نصب درایو بر روی الکتروپمپ و الکتروفن

ورودی های نرم افزار

خروجی نرم افزار

PumpSave 4.4 Energy saving calculator for pumps Language: English

System Data

Liquid density: 1,000 kg/m³ Static head: 1 m

Pump Data

Nominal volume flow: 1100 m³/h => 305.6 l/s Efficiency: 88%

Nominal head: 33 m Max head: 44 m

Existing Flow Control

Throttling control

Motor and Supply Data

Supply voltage: 115 V (1-ph) 115 V 1-ph
Required motor power: 123.6 kW including 10% safety margin

Motor power: 132 kW

Motor efficiency: 95.0 %

Operating Profile

Annual running time: 8,760 h

| | | | |
|-----|---|--------|--------------|
| 5% | = | 438 h | at nom. flow |
| 10% | = | 876 h | at 90% flow |
| 15% | = | 1314 h | at 80% flow |
| 20% | = | 1752 h | at 70% flow |
| 20% | = | 1752 h | at 60% flow |
| 15% | = | 1314 h | at half flow |
| 10% | = | 876 h | at 40% flow |
| 5% | = | 438 h | at 30% flow |
| 0% | = | 0 h | at 20% flow |

100

Measurement Units

Metric US

Calculated by:
Calculated for:
Pump ID:

Improved Flow Control by ABB Drive series:

ACS550

No suitable type found.

Results

Saving percentage: **54.0 %**

Annual energy consumption:
with existing control method: **850 MWh**
with improved control method: **391 MWh**

Annual energy saving: **460 MWh**

Annual CO2 reduction: **230 t**

CO2 emission/unit: **0.5 kg/kWh**

Economic Data

Currency unit: **EUR**

Energy price: **0.1 EUR/kWh**

Investment cost: **7,000 EUR**

Interest rate: **4%**

Service life: **10 years**

Energy Consumption

Power (kW)

Economic Results

Annual saving: **45,964 EUR**

Payback period: **0.2 years**

Net present value: **365,808 EUR**

Buttons: Auto-adjust screen size, Save calculation, Send to default printer, Close program, **ABB**



Building Simulation Softwares

Meteonorm

- Standard
- Meteo
- Standard minute
- Humidity
- Science
- Spectral / UV
- Standard opt.

Building simulation

- TRNSYS
- CH Meteo
- HELIOS-PC
- DOE
- Suncode
- Match
- sia 380/1
- LESOSAI
- EnergyPlus (.epw)
- DYNBIL
- WaVE/PHPP/WPP
- PHPP 8
- Pleiades/Comfie
- sia 2028
- WUFI / WAC
- PHLuft
- IDA ICE
- IBK-CCM
- VIP-Energy

PV

- Polysun
- PVSOL
- PVSyst
- PVS
- Meteo matrix (TISO)
- PVScout
- Solinvest

Solar thermal

- Polysun
- TSOL
- Solar-Ripp



RETScreen

The screenshot shows the RETScreen Expert software interface. At the top, there is a menu bar with options: File, Location, Facility, Energy, Cost, Emission, Finance, Risk, Data, Analytics, Report. Below the menu bar, there is a header with the RETScreen Expert logo and the text "Clean Energy Management Software". The main interface is divided into several sections:

- Left Sidebar:** Contains navigation options: Home, Open, Close, Settings, Help, Subscribe, Save, Save As, and Exit.
- Top Left Panel:** Lists analysis types: Virtual energy analyzer, Analysis type - Worksheets, Benchmark, Feasibility, Performance, All, My files, My templates, Case studies/Templates, and My portfolio.
- Central Diagram:** A circular diagram with four quadrants: Performance Tracker (top-left), Virtual Energy Analyzer (top-right), Financial Risk Assessor (bottom-left), and Smart Project Identifier (bottom-right). The quadrants are connected by arrows labeled with various metrics: Performance, Data, Analytics, Report, Location, Benchmark, Facility, Energy, Cost, Emission, Finance, and Risk.
- Right Panel:** Lists facility types: Power plants, Buildings and factories, Industrial, Commercial/Institutional, Residential, Agricultural, User-defined, Individual measure, New, and Existing.

At the bottom of the interface, there is a footer with the following information:

- RETScreen Expert - Professional - 6.0.7.67
- © Minister of Natural Resources Canada 1997-2017.
- NRCan/CanmetENERGY/Varenes



RETScreen

RETScreen Expert

File Location Facility Energy Cost Emission Finance Risk Data Analytics Report Language Share Subscribe

Select climate data location... Virtual energy analyzer... Open Show map Show data Show graph Show notes Workflow... Colour coding... Zoom Satellite Help

Step 1 - Site reference conditions Options

RETScreen - Location Subscriber: TEAM FFF 2016

Site reference conditions

Climate data location: Canada - Quebec - Varennes Facility location: Canada - QC - Varennes

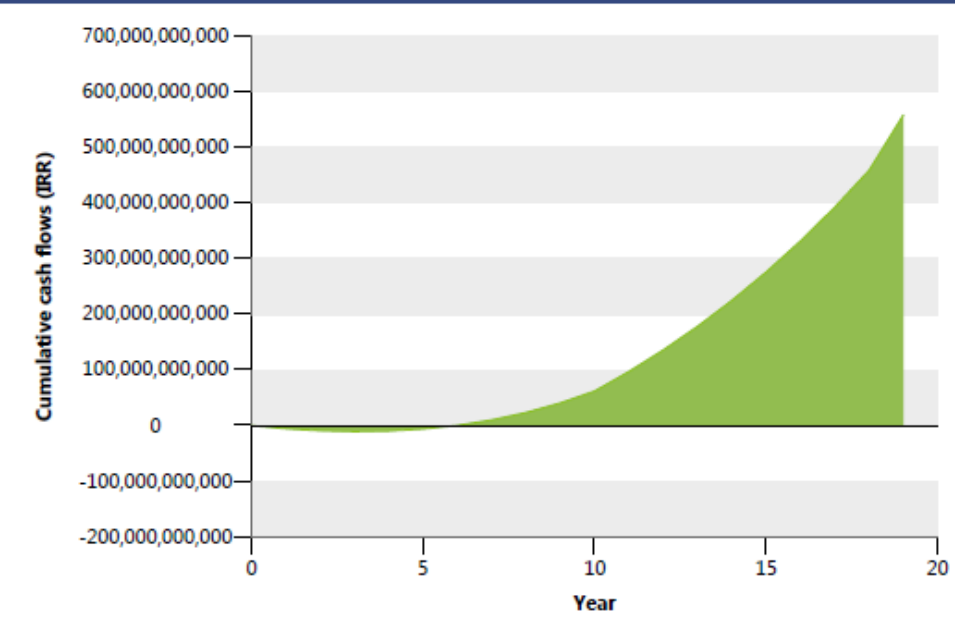
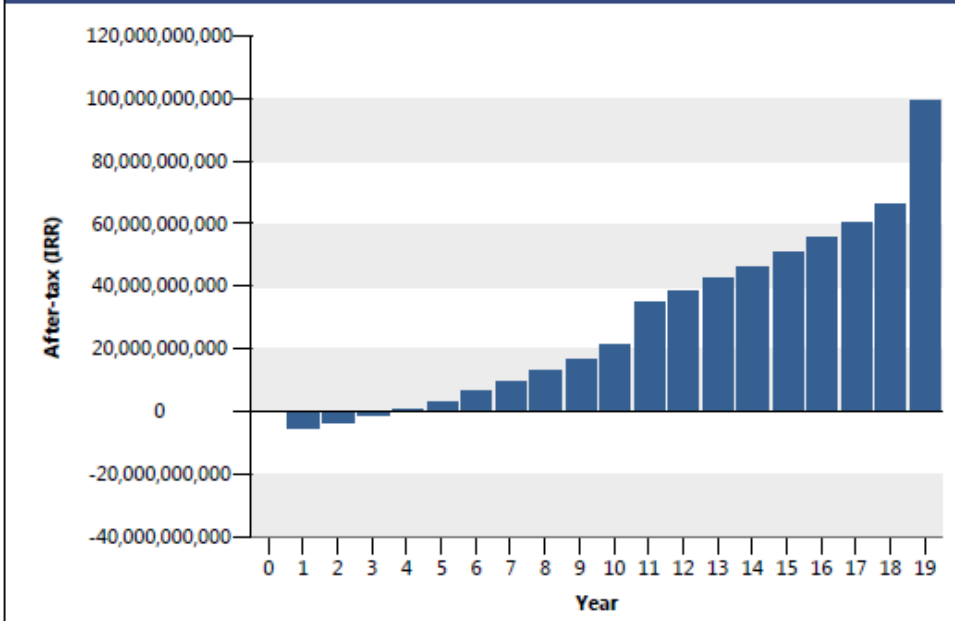
Legend

- Facility location
- Climate data location

| Unit | Climate data location | Facility location | Source |
|----------------------------|-----------------------|-------------------|-----------------|
| Latitude | 45.7 | 45.6 | Ground+NASA |
| Longitude | -73.4 | -73.4 | |
| Climate zone | 6A - Cold - Humid | | Ground - Ground |
| Elevation | 18 | 23 | |
| Heating design temperature | -21.4 | | Ground |
| Cooling design temperature | 28.7 | | Ground |

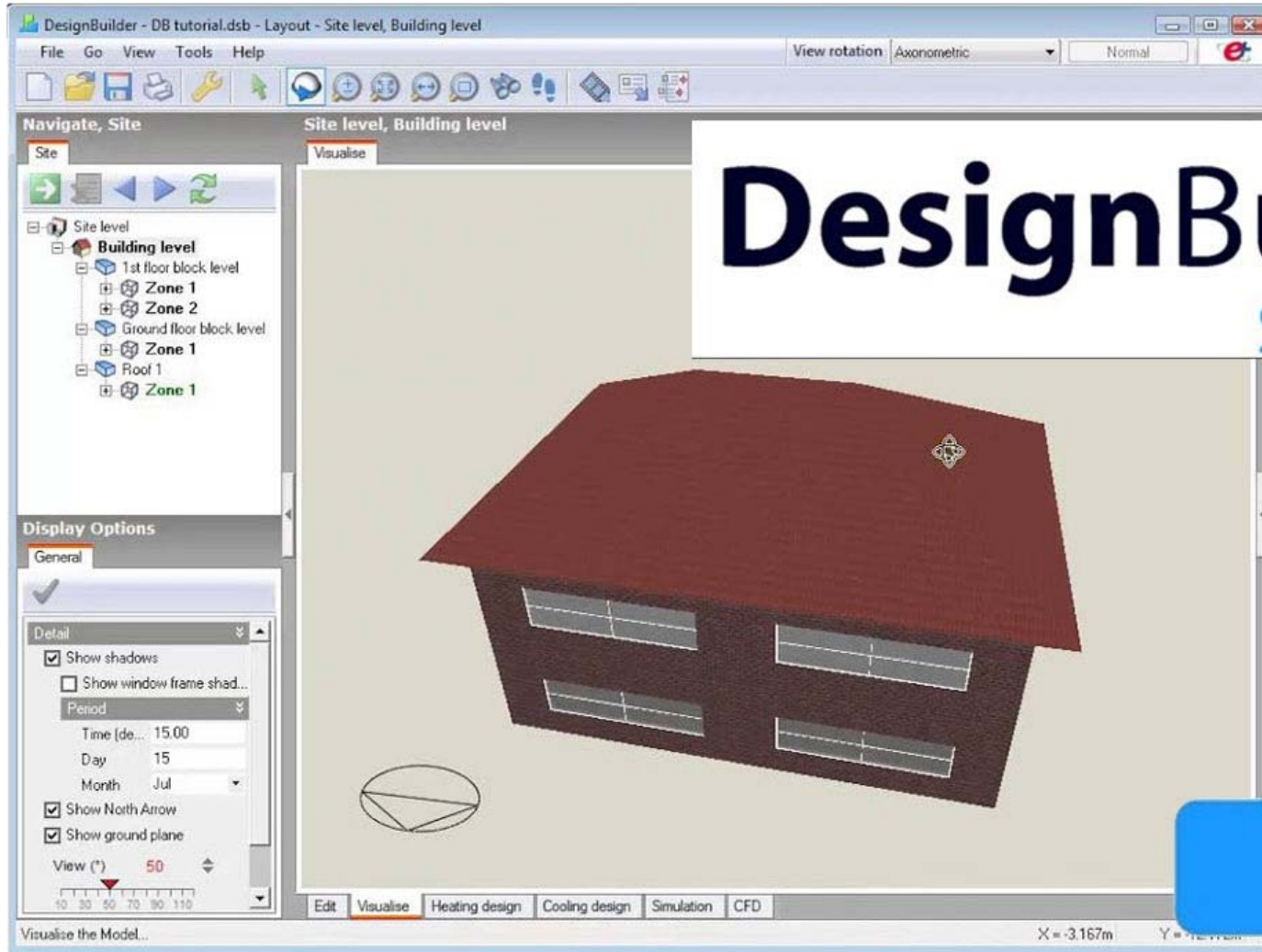
| | | | | | |
|---|----------------------|---|---------------------------|----------------------|----------------|
| Electricity exported to grid | kWh | 19,493,114 | Simple payback | yr | 10.8 |
| Electricity export rate | IRR/kWh | 892 | Equity payback | yr | Immediate |
| Electricity export revenue | IRR | 17,387,857,336 | Net Present Value (NPV) | IRR | 50,934,232,848 |
| Electricity export escalation rate | % | 12% | Annual life cycle savings | IRR/yr | 9,580,873,803 |
| GHG reduction revenue | | | Benefit-Cost (B-C) ratio | | |
| Net GHG reduction | tCO ₂ /yr | 9,367 | Debt service coverage | | 0.76 |
| Net GHG reduction - 19 yrs | tCO ₂ | 177,977 | GHG reduction cost | IRR/tCO ₂ | -1,022,812 |
| GHG reduction credit rate | IRR/tCO ₂ | 100 | Energy production cost | IRR/kWh | 1,351 |
| GHG reduction revenue | IRR | 936,719 | | | |
| GHG reduction credit duration | yr | | | | |
| Net GHG reduction - yrs | tCO ₂ | | | | |
| GHG reduction credit escalation rate | % | | | | |
| Other revenue (cost) <input type="checkbox"/> | | | | | |
| Clean Energy (CE) production revenue <input checked="" type="checkbox"/> | | | | | |
| CE production | | 0 | | | |
| | | Electricity exported to grid kWh | | | |
| Fuel type | | Clean energy | | | |
| Solar | 19,493,114 | No | | | |

Yearly cash flows





Design Builder



DesignBuilder

SOFTWARE



 www.samanenergy.ir

 info@samanenergy.ir

 0913-796-9262



(Engineering Equation Solver) EES

مدلسازی سیکل احیای مستقیم میدرکس ورودی نرم افزار

EES Professional: File Edit Search Options Calculate Tables Plots Windows Help Examples

Equations Window

Lookup Table

Input Data(Recuperator) | Input Data(Reformer) | Input Data(Furnace)

| Item | Enrichment NG-4 | Bleed to Bustel-25 | Bustel Gas-12 | Top Gas-13 | NG to Insitu-26 | CG to Fur-37 | |
|--------|----------------------------|--------------------|---------------|------------|-----------------|--------------|-------|
| Row 1 | Temperature (c) | 13.37 | 0 | 889.2 | 411.5 | 13.37 | 46.3 |
| Row 2 | Pressure (mbar) | 2095 | 0 | 1957 | 1032 | 2027 | 1959 |
| Row 3 | Flow (Nm ³ /hr) | 2549 | 0 | | | 2800 | 46240 |
| Row 4 | CO | | | 0.3487 | | | 0.036 |
| Row 5 | CO2 | | | 0.0373 | | | 0.011 |
| Row 6 | H2 | | | 0.568 | | | 0.201 |
| Row 7 | H2O | | | 0 | | | 0 |
| Row 8 | CH4 | | | 0.0407 | | | 0.692 |
| Row 9 | C2H6 | | | 0 | | | 0.028 |
| Row 10 | C3H8 | | | 0 | | | 0 |
| Row 11 | C4H10 | | | 0 | | | 0 |
| Row 12 | N2 | | | 0.0043 | | | 0.03 |
| Row 13 | O2 | | | 0.0003 | | | 0.002 |

Table

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
|------------------|-------------------|-------------------|-------------------|-------------------|---------|--------|--------|---------|--------|--------|--------|--------|-------|----|
| NO1 _i | NO10 _i | NO12 _i | NO13 _i | NO16 _i | | | | | | | | | | |
| 25 | 40 | 889.2 | 411.5 | 80 | 51.43 | 15 | 679.9 | 13.37 | 1071 | 614.6 | 499 | 316.4 | 0 | 0 |
| 2629 | 2027 | 1957 | 1032 | 2653 | 1300 | 1169 | 1165 | 2011 | 998 | 998 | 998 | 998 | 0 | 0 |
| 23907 | 6250 | 133028 | 130694 | 82315 | 36000 | 116200 | 116200 | 2407 | 150425 | 150425 | 150425 | 150425 | 0 | 0 |
| 0 | 0.3431 | 0.3313 | 0.1949 | 0.2095 | 0.229 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.036 | 0 |
| 0.00405 | 0.03973 | 0.03543 | 0.1593 | 0.1712 | 0.1872 | 0 | 0 | 0.00405 | 0.1339 | 0.1339 | 0.1339 | 0.1339 | 0.011 | 0 |
| 0 | 0.5594 | 0.5396 | 0.3666 | 0.394 | 0.4307 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.201 | 0 |
| 0 | 0.03642 | 0.05003 | 0.2356 | 0.1785 | 0.1019 | 0.0445 | 0.0445 | 0 | 0.2302 | 0.2302 | 0.2302 | 0.2302 | 0 | 0 |
| 0.928 | 0.01717 | 0.03866 | 0.03837 | 0.04124 | 0.04508 | 0 | 0 | 0.928 | 0 | 0 | 0 | 0 | 0.692 | 0 |
| 0.03864 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.03864 | 0 | 0 | 0 | 0 | 0.028 | 0 |
| 0.0174 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0174 | 0 | 0 | 0 | 0 | 0 | 0 |



(Engineering Equation Solver) EES

کدنویسی نرم افزار

```
EES Professional:
File Edit Search Options Calculate Tables Plots Windows Help Examples

N2_37=NO37[12];
O2_37=NO37[13];
EF_37=NO37[14];

{35=Cooling Gas Offtake}

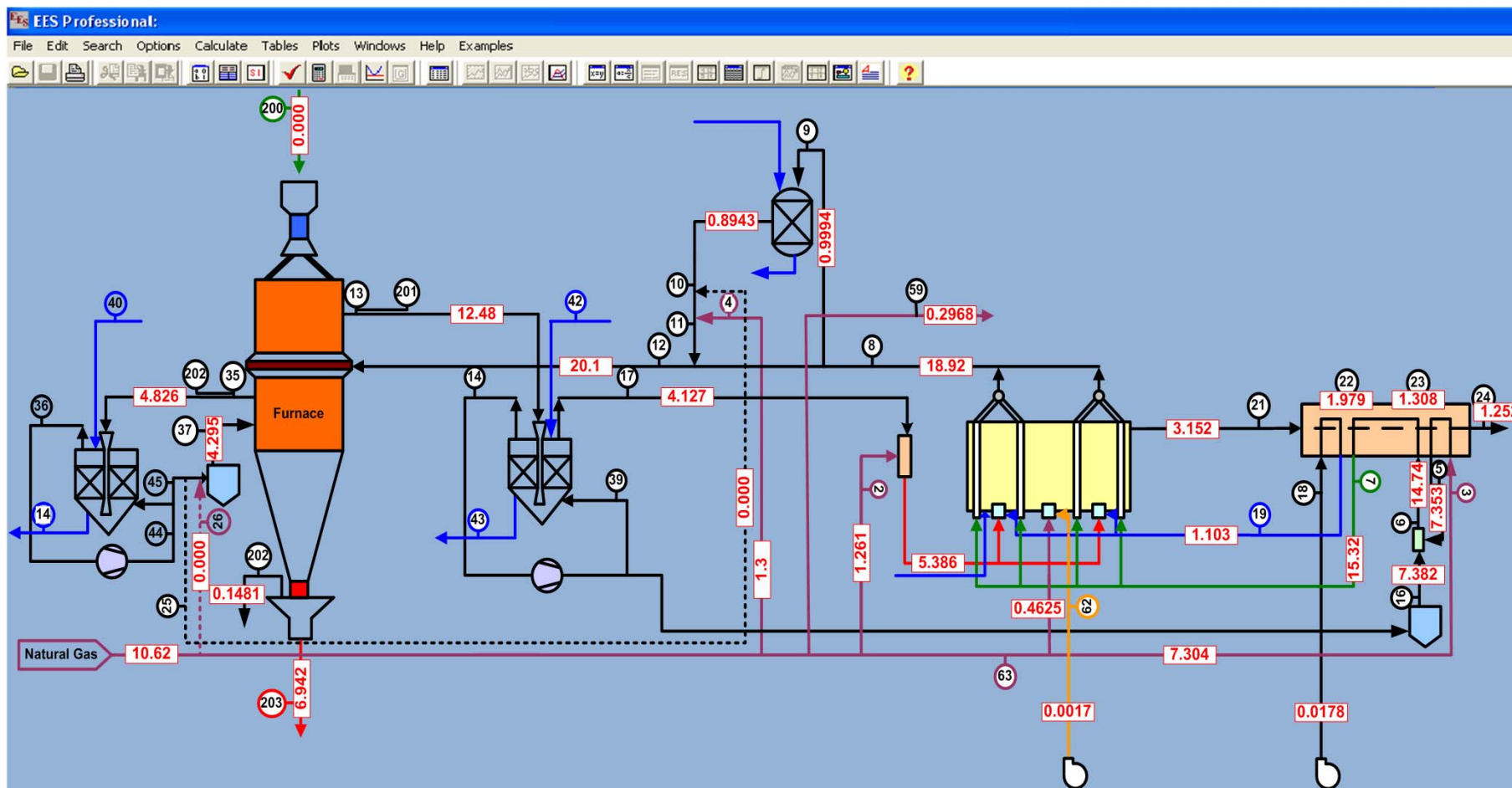
T_cg_35=lookup('Input Data(Furnace)',1.8)
P_cg_35=lookup('Input Data(Furnace)',2.8)

N_CO_35=N_CO_37-N_CO_26+N_CO_25;
N_CO2_35=N_CO2_37-N_CO2_26+N_CO2_25;
N_H2_35=N_H2_37-N_H2_26+N_H2_25;
N_H2O_35=N_H2O_37-N_H2O_26+N_H2O_25;
N_CH4_35=N_CH4_37-N_CH4_26+N_CH4_25;
N_C2H6_35=N_C2H6_37-N_C2H6_26+N_C2H6_25;
N_C3H8_35=N_C3H8_37-N_C3H8_26+N_C3H8_25;
N_C4H10_35=N_C4H10_37-N_C4H10_26+N_C4H10_25;
N_N2_35=N_N2_37-N_N2_26+N_N2_25;
N_O2_35=N_O2_37-N_O2_26+N_O2_25;
N_tot_35=N_CO_35+N_CO2_35+N_H2_35+N_H2O_35+N_CH4_35+N_C2H6_35+N_C3H8_35+N_C4H10_35+N_N2_35+N_O2_35
V_CO_35=N_CO_35*MOLARMASS(CO)/density(CO,T=T_normal,P=P_normal)
V_CO2_35=N_CO2_35*MOLARMASS(CO2)/density(CO2,T=T_normal,P=P_normal)
V_H2_35=N_H2_35*MOLARMASS(H2)/density(H2,T=T_normal,P=P_normal)
V_H2O_35=N_H2O_35*MOLARMASS(H2O)/density(H2O,T=T_normal,P=P_normal)
V_CH4_35=N_CH4_35*MOLARMASS(CH4)/density(CH4,T=T_normal,P=P_normal)
V_C2H6_35=N_C2H6_35*MOLARMASS(C2H6)/density(C2H6,T=T_normal,P=P_normal)
V_C3H8_35=N_C3H8_35*MOLARMASS(C3H8)/density(C3H8,T=T_normal,P=P_normal)
V_C4H10_35=N_C4H10_35*MOLARMASS(C4H10)/density(C4H10,T=T_normal,P=P_normal)
V_N2_35=N_N2_35*MOLARMASS(N2)/density(N2,T=T_normal,P=P_normal)
V_O2_35=N_O2_35*MOLARMASS(O2)/density(O2,T=T_normal,P=P_normal)
V_cg_35=V_CO_35+V_CO2_35+V_H2_35+V_H2O_35+V_CH4_35+V_C2H6_35+V_C3H8_35+V_C4H10_35+V_N2_35+V_O2_35
M_CO_35=N_CO_35*MOLARMASS(CO)
M_CO2_35=N_CO2_35*MOLARMASS(CO2)
```



(Engineering Equation Solver) EES

خروجی نرم افزار





نرم افزارهای کاربردی مدیریت انرژی

| نام نرم افزار | کاربرد |
|--------------------------------------|--------------|
| Etapro (General Physics) | مدیریت انرژی |
| Efficiency Map (General Electric) | |
| Optimax Performance Monitoring (ABB) | |
| Pmax, (Scientec Inc.) | |
| EnergyAnalyzing(SamanEnergy) | |
| Enerit(energy action every day) | |
| AVRReporter(KONsys International) | |
| DigitalEnergy(Schneider Electric) | |
| ECON SENS3(FACHWELT VERLAG) | |
| Carbon Systems | |
| M & T(Monitoring & Targeting) | |
| SEEMS(SamanEnergy) | |
| SIEM(SamanEnergy) | |
| Excell | |



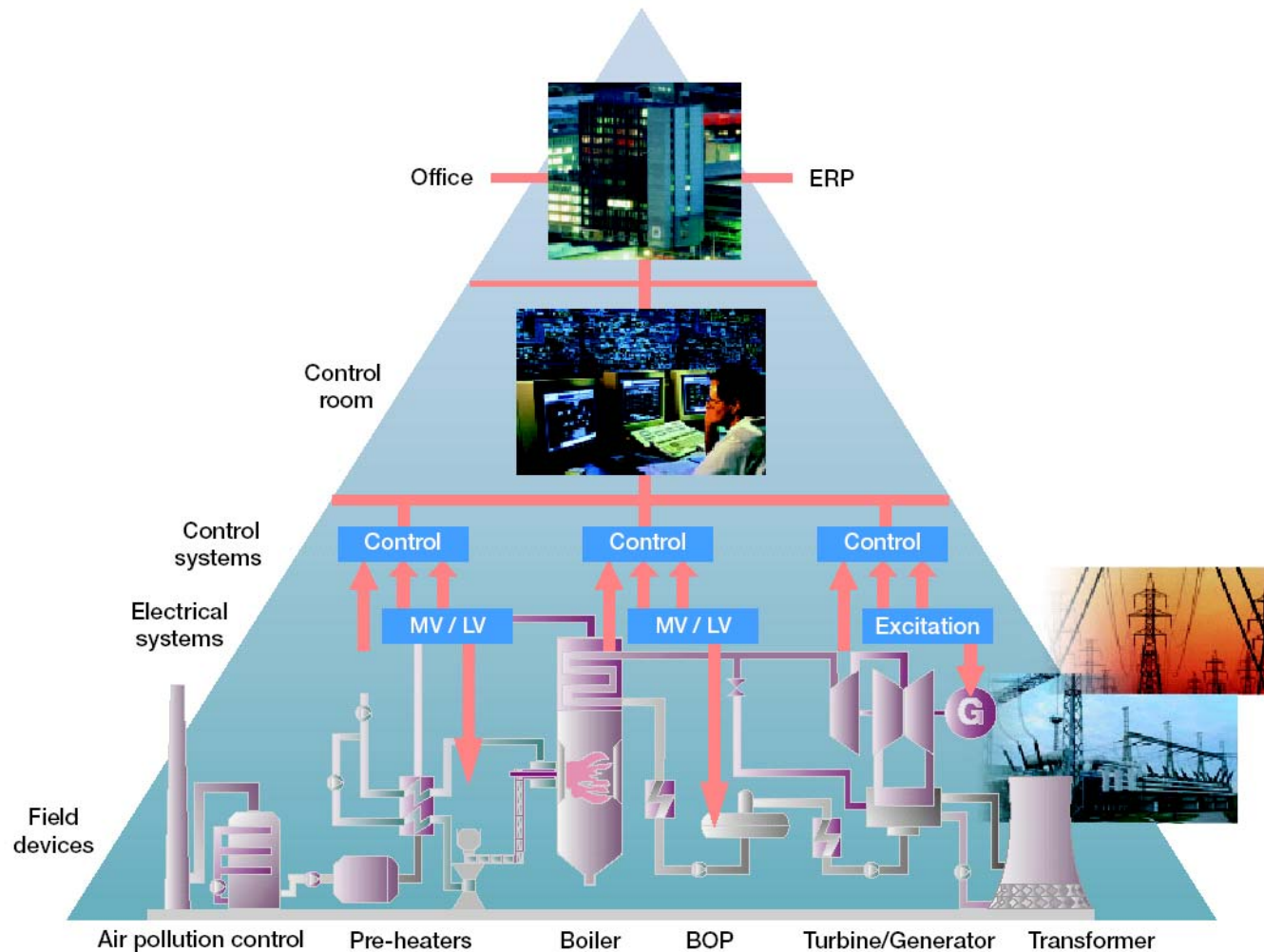
ساختار سلسله مراتبی کنترل فرایند

- سطوح ۰، ۱ و ۲ شامل همان المان های کنترل با تعریف کلاسیک هستند.
- سطح ۳، MES، بخش رو به رشد و با ارزش مهندسی کنترل است.
- سطح ۴، ERP عمدتاً شامل فانکشن هایی است که در مدیریت، مهندسی صنایع، و اقتصاد مطرح است.



ساختار فیزیکی سلسله مراتبی کنترل فرایند

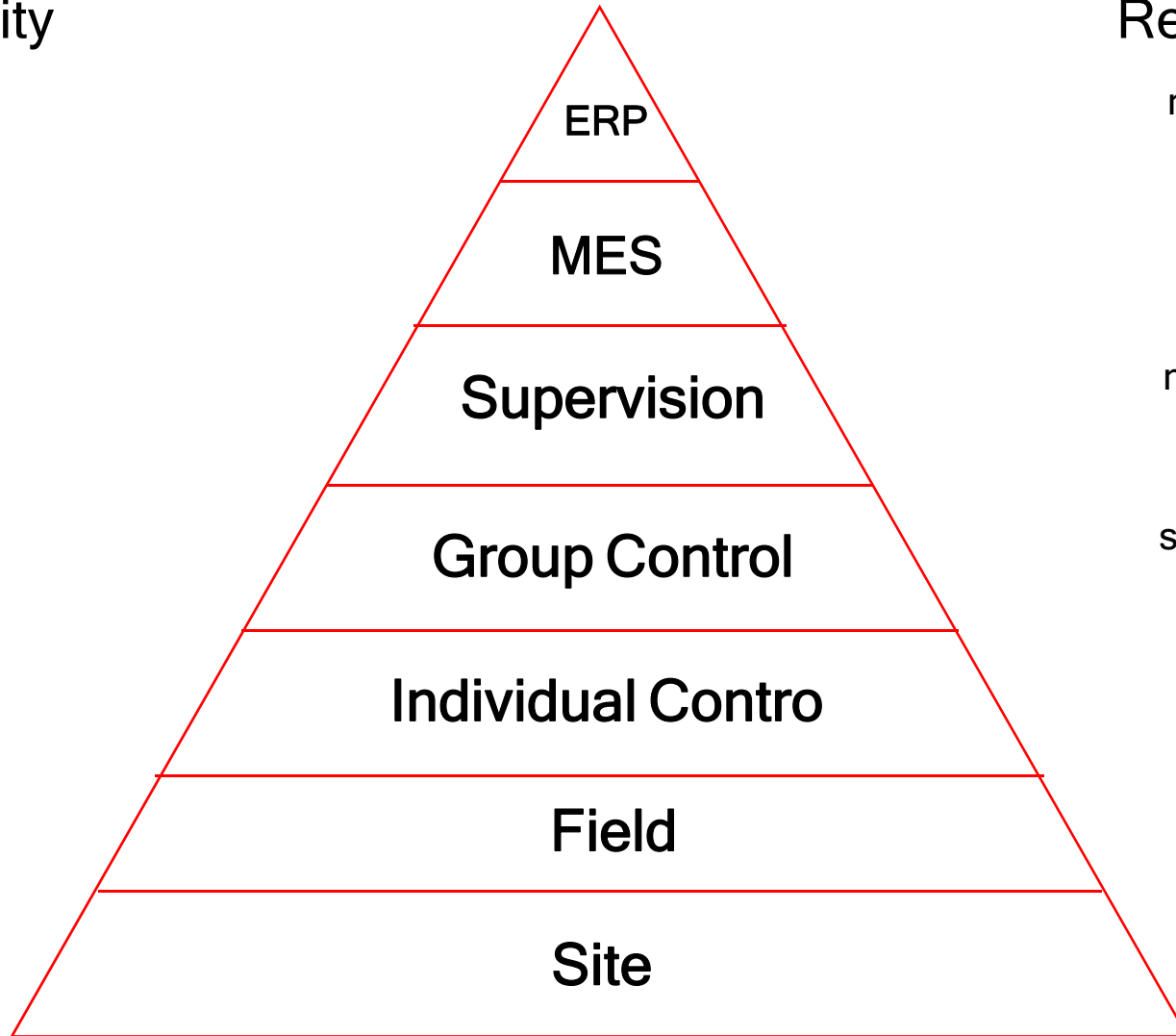
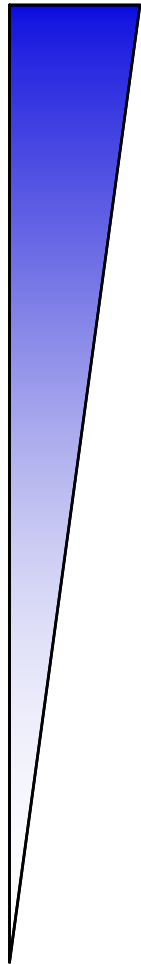
www.samanenergy.ir





ویژگی های مقایسه ای سطوح کنترل فرایند

Complexity



Reaction Speed

months

days

minutes

seconds

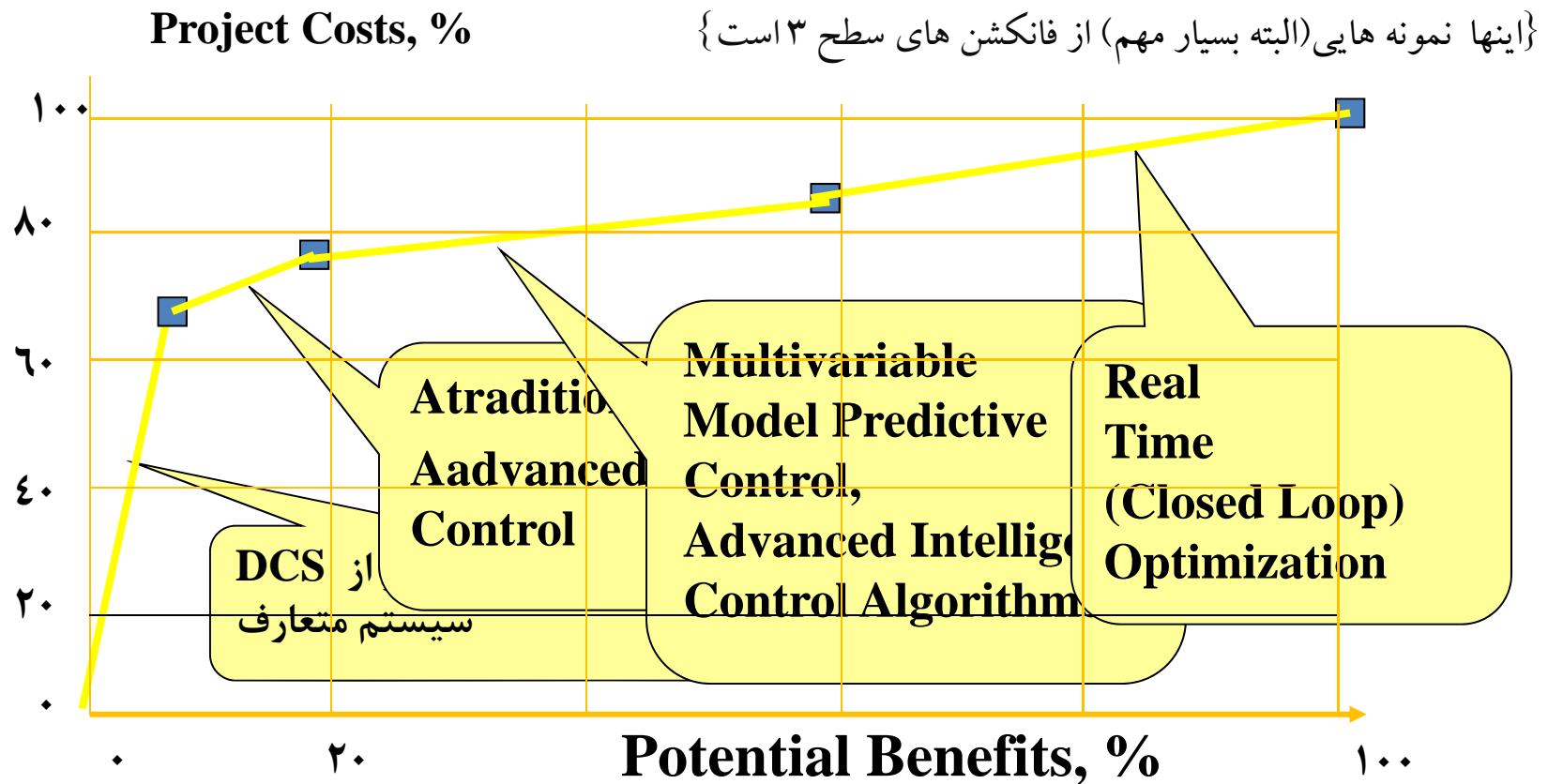
0.1s

0.1s



قاعده ۲۰-۸۰ معکوس

80% of Benefits Come From:
Last 20% of investment!





ویژگیهای نرم افزارهای مدیریت انرژی

- گرفتن اطلاعات تولید و انرژی قوی
- گزارشات و تحلیلهای انرژی و کربن
- نظارت بر روند مصارف انرژی و پایش هدفمند آنها
- پیاده سازی مراحل مورد نظر صدور گواهینامه مدیریت انرژی
- مدیریت پروژه و نمونه اقدامات اصلاحی و پروژههای بهبود انجام گرفته
- ارزیابی اثر بخشی اقدامات اصلاحی



پیش نیازهای نرم افزارهای مدیریت انرژی



سلسله مراتب ثبت و ارسال پارامترهای کلیدی و محاسبه شاخص های عملکردی



Optimax Performance Monitoring (ABB)

Your Plant
OPTIMAX PERFORMANCE MONITORING
OVERVIEW 10

Last display update: 07/02/2005 19:15:45
 Last time of calculation: 17.04.2003 10:42:40
 G = Humidity [%] T = Temperature [degC] P = Pressure [bar]
 W = Power [MW] F = Flow [kg/s] dP = Pressure difference [mbar]

GT 11 on: ●
 Calculation criteria fulfilled: ●
 Calculation status: ●

Plant Net Power [MW]: 375.6
 Plant Aux. Power [MW]: 4.8
 Plant Net Efficiency [%]: 54.9

| POWER [MW] | ACTUAL | EXPECTED | DELTA [%] |
|---------------------|--------|----------|-----------|
| 10 Unit Gross Power | 380.3 | 386.9 | -1.7 |
| 10 Unit Net Power | 375.6 | 381.1 | -1.5 |
| 10 Unit Aux. Power | 4.8 | 5.8 | -17.9 |
| 11 GT Power | 243.9 | 243.9 | 0.0 |
| 18 ST Power | 140.9 | 147.5 | -4.5 |

| EFFICIENCY [%] | ACTUAL | EXPECTED | DELTA [%] |
|--------------------------|--------|----------|-----------|
| 10 Unit Efficiency Gross | 55.6 | 56.6 | -1.7 |
| 10 Unit Efficiency Net | 54.9 | 55.7 | -1.5 |
| 11 GT Efficiency | 35.7 | 35.7 | 0.0 |
| 11 W/S Cycle Efficiency | 39.5 | 39.7 | -0.5 |
| 11 HRSG Efficiency | 82.8 | 86.3 | -4.1 |

INFLUENCE ON UNIT GROSS EFFICIENCY:

Overview Trends

AMBIENT CONDITIONS
 T: 15.1 TCW1N1: 20.9
 G: 55.8 TCW1N2: 21.0
 P: 972.3 [mbar]

10WUNN_OUT: Unit Net Power Output 246.748 MW

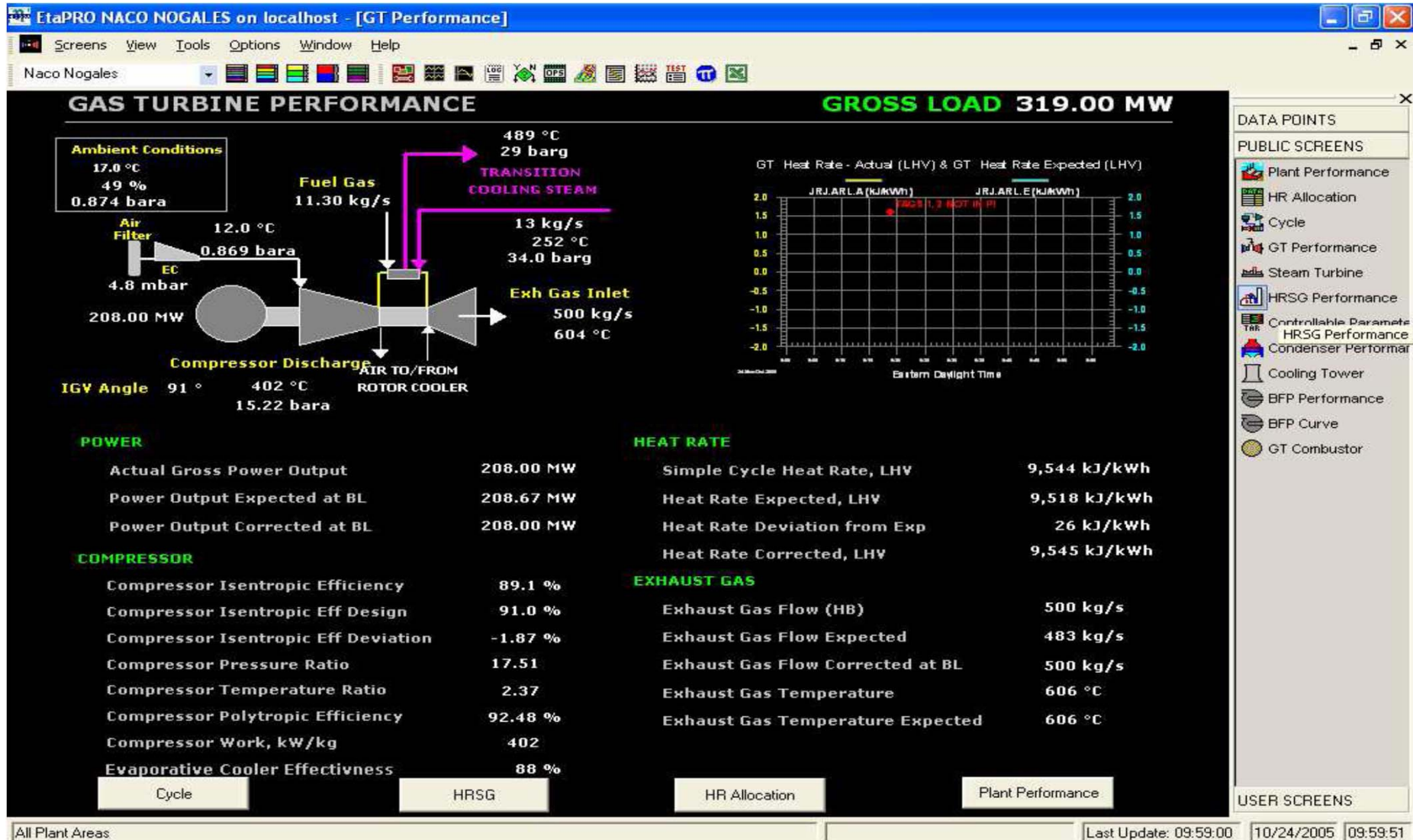
Main Menu
Overview
Manual Inputs

GT 11
ST 18
HRSG 11
FWT 18
COND 18

What - If



EtaPro (General Physics)





PCS 7 (SIEMENS)

| Date | Time | Class | Status |
|----------|--------------|---------|--------|
| 06/19/08 | 15:49:47.835 | Warning | C |

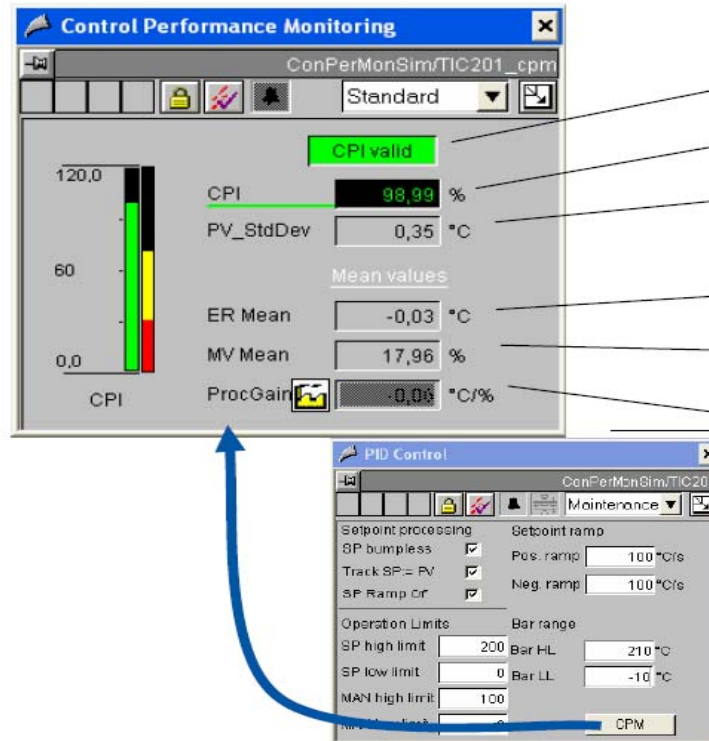
The screenshot displays the Siemens PCS 7 Control Performance Monitoring (CPM) interface. At the top, the system title bar shows the date '06/19/08', time '15:49:47.835', and process name 'ConPerMonSim/TIC201_cpm'. The main interface is divided into several sections. On the left, there is a process overview window showing a reactor icon and a 'ConPerMonSim/TIC201' window with a temperature of 120.29 °C and a CPI of 31.8%. The central 'Control Performance Monitoring' window is titled 'CPM' and contains several panels. The top panel shows 'CPI valid' and '69.89 %'. Below this is a table of alarm events, with the first row circled in red, showing an alarm on '06/19/08' at '15:49:47.835' with a 'Warning' class and 'C' status. The right side of the CPM window shows 'Time/Win' set to 130 s and various reference values. The bottom right panel contains a trend plot showing a signal fluctuating around a setpoint. The bottom left panel shows a scatter plot of PV vs MV. The bottom of the screen features a standard Windows taskbar with various application icons.



Control Performance Monitoring

SIEMENS

Control Performance Monitoring:
One Faceplate says it all



Control Performance Status

Control Performance Index

Standard Deviation of
Process Variable

Mean value of Control Error

Mean value of Manipulated
Variable

Estimated Steady State
Process Gain

OS faceplate
of PID controller



AVRReporter (KONSys International)

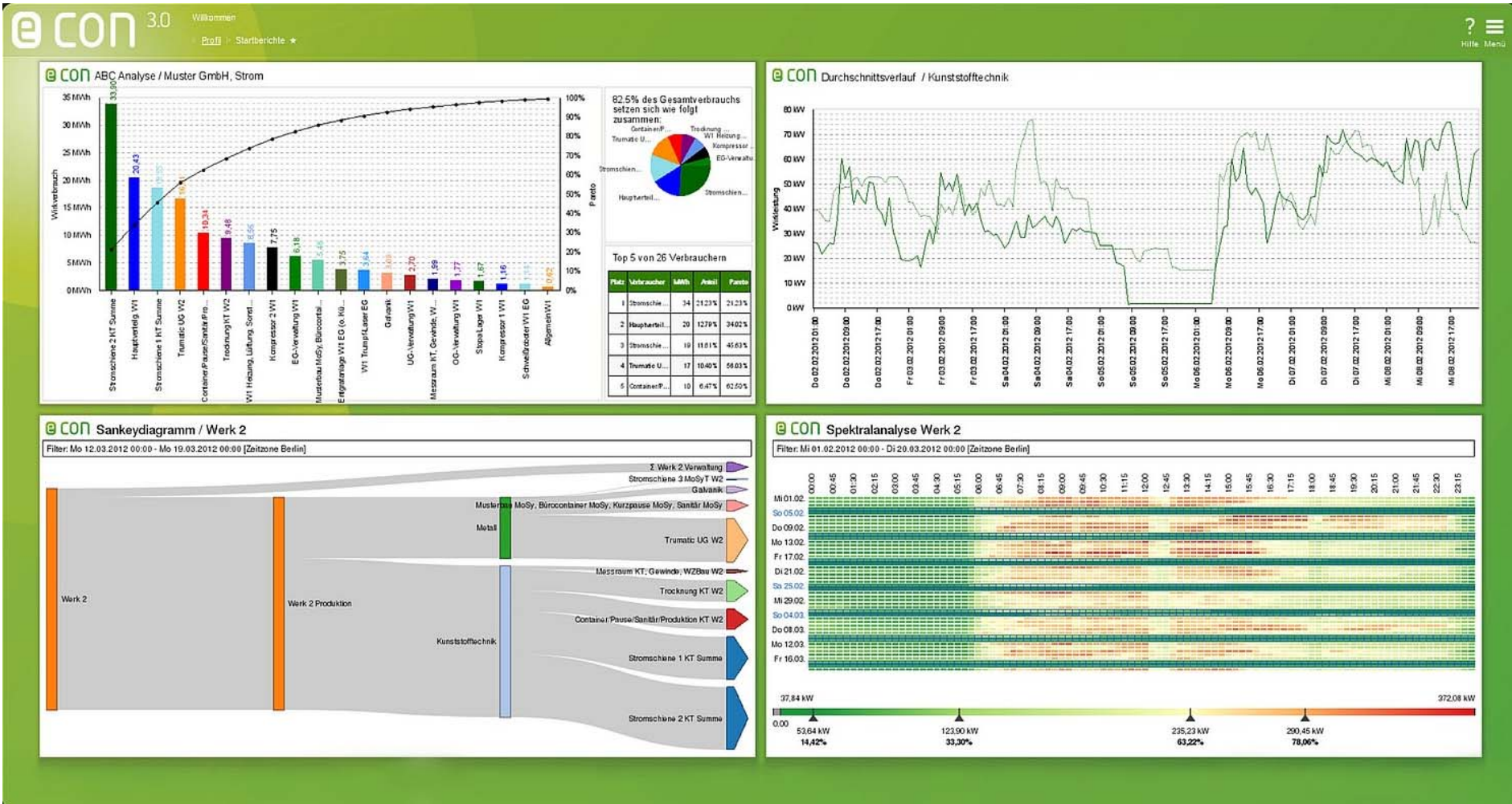
The screenshot displays the AVRReporter software interface. On the left is the 'Desktop Manager for AVRReporter' with a sidebar menu containing options like 'AVRReporter settings', 'Man Settings', 'Manage Plugin modules', 'Scheduler settings', 'Registration', 'AVRReporter reports', and 'Packaging Plant'. The main area shows a 'Connecting' dialog with 'English' selected and options to 'Connect to Device' and 'Connect to Data Concentrator'. In the background, the 'AVR Connection Center' window is visible, showing 'Configuration groups' and 'CSV Data Input'. The foreground features a 'Compressed Air Efficiency Report (Oxygen)' window with two tables of data. A mobile app interface is overlaid on the right, showing a 'Product Category Analysis' for 'Air' with a total value of \$5,312,520 and a bar chart. The system name 'KONSYS' is visible at the bottom left, and the timestamp '2016.05.04.22:41:16' is at the bottom right.

| Date | Compressed total Oxygen (kg) | Medical total Oxygen (kg) | Loss of Oxygen (kg) | Loss of Oxygen (%) |
|------------|------------------------------|---------------------------|---------------------|--------------------|
| 2016-04-11 | 21,795.28 | 22,623 | 295.78 | 1.36 |
| 2016-04-12 | 22,984 | 23,284 | 434 | 1.87 |
| 2016-04-13 | 27,982.28 | 22,884 | 2,097.22 | 7.51 |
| 2016-04-14 | 154,010 | 23,762 | 442.58 | 0.19 |
| 2016-04-15 | 228,010 | 22,884 | 2,097.22 | 0.92 |
| 2016-04-16 | 28,010 | 22,884 | 2,097.22 | 0.92 |

| Date | Compressed total Oxygen (kg) | Medical total Oxygen (kg) | Loss of Oxygen (kg) | Loss of Oxygen (%) |
|------------|------------------------------|---------------------------|---------------------|--------------------|
| 2016-04-11 | 21,795.28 | 22,623 | 295.78 | 1.36 |
| 2016-04-12 | 22,984 | 23,284 | 434 | 1.87 |
| 2016-04-13 | 27,982.28 | 22,884 | 2,097.22 | 7.51 |
| 2016-04-14 | 154,010 | 23,762 | 442.58 | 0.19 |
| 2016-04-15 | 228,010 | 22,884 | 2,097.22 | 0.92 |
| 2016-04-16 | 28,010 | 22,884 | 2,097.22 | 0.92 |

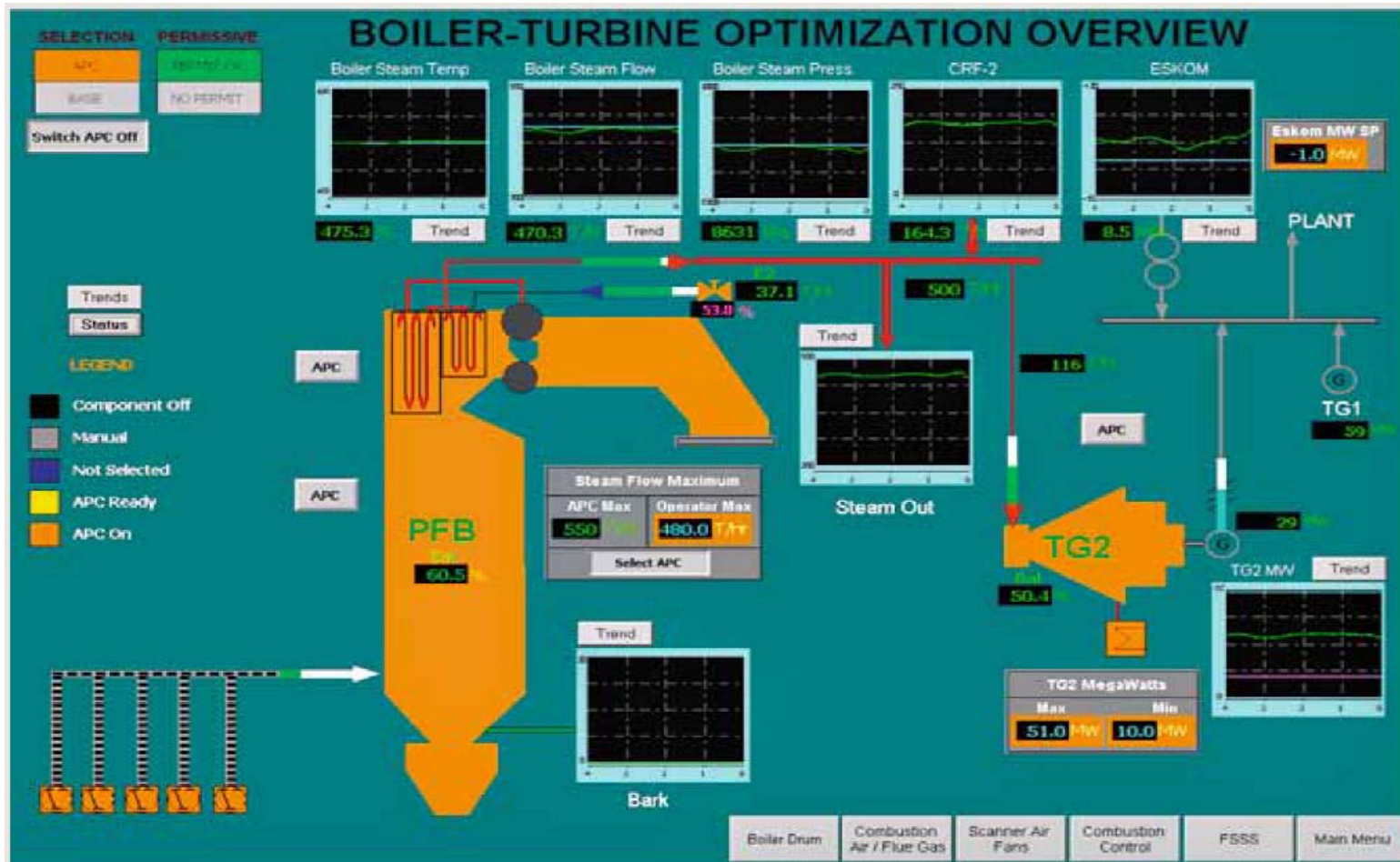


ECON SENS3(FACHWELT VERLAG)



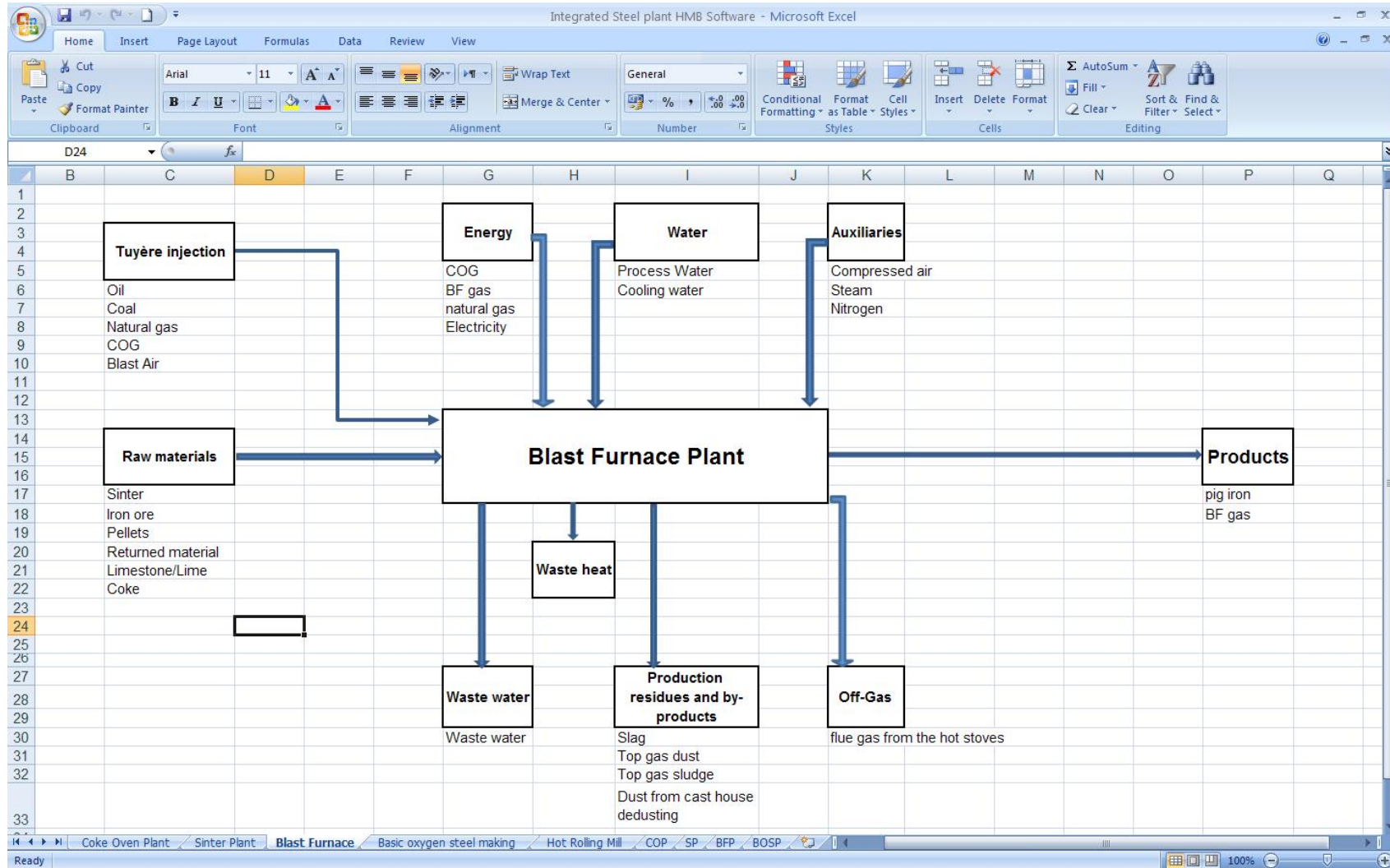


Boilr Performance Monitoring(ABB)





Steel Plant HMB Software





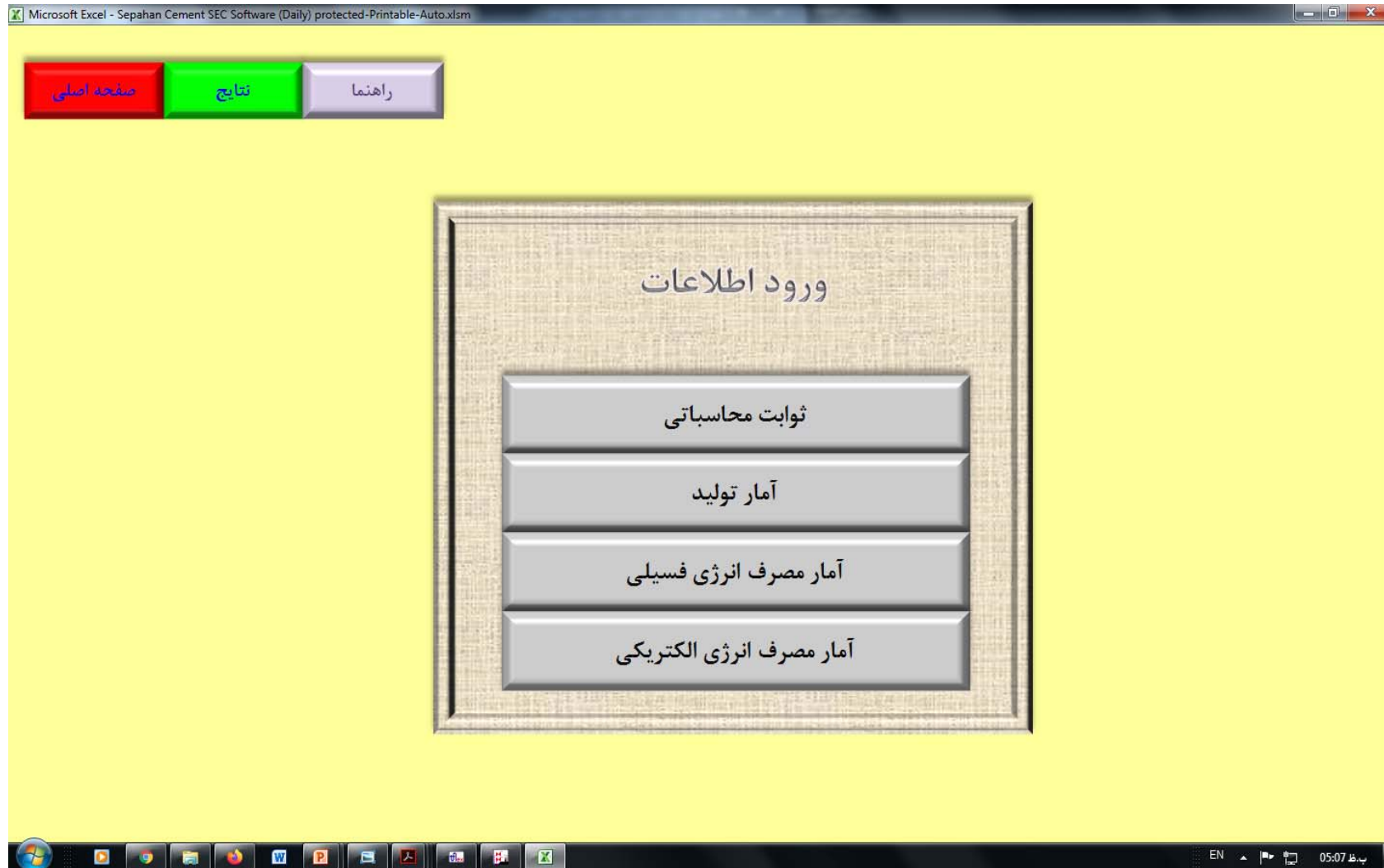
Steel Plant HMB Software

Integrated Steel plant HMB Software - Microsoft Excel

| Inputs | | | | | | Outputs | | | |
|--------------------------|--------|---------|---------|---------------|--|--------------------------|---------|-------|--------|
| Raw materials | | | | | | Products | | | |
| | | Minimum | Maximum | Average input | | | | | |
| Sinter | kg/tHM | 116 | 1621 | 1088 | | Hot Metal | kg/tHM | | 1000 |
| Iron ore | kg/tHM | 0 | 684 | 180 | | BF gas | MJ/tHM | 3377 | 6061 |
| Pellets | kg/tHM | 0 | 972 | 358 | | Electricity | MJ/tHM | 40 | 91 |
| Returned material | kg/tHM | 0 | 106 | 20.1 | | waste/by-products | | | |
| Limestone/Lime | kg/tHM | 0 | 80 | 25.7 | | Slag | kg/tHM | 150 | 346.6 |
| Coke | kg/tHM | 282 | 515 | 359 | | Top gas dust | kg/tHM | 3.4 | 18 |
| Tuyère injection: | | | | | | Top gas sludge | kg/tHM | 2 | 22.3 |
| Oil | kg/tHM | 0 | 116 | 30.1 | | Dust from cast house | kg/tHM | 0.6 | 5.1 |
| Coal | kg/tHM | 0 | 232 | 162 | | off Gas flow from stoves | Nm3/tHM | 400 | 1000 |
| Natural gas | kg/tHM | 0 | 5.6 | 2.2 | | Waste water | m³/tHM | 0.096 | 13.736 |
| COG | kg/tHM | 0 | 46.9 | 1.1 | | | | | |
| Oxygen (BA) | kg/tHM | 0 | 85.1 | 54.4 | | | | | |
| Others | kg/tHM | 0 | 73.5 | 3.6 | | | | | |
| Energy | | | | | | | | | |
| To stoves: | | | | | | | | | |
| BF gas | MJ/tHM | 1.2 | 2287 | 1536 | | | | | |
| COG | MJ/tHM | 0.024 | 817 | 284 | | | | | |
| Natural gas | MJ/tHM | 0 | 819 | 168 | | | | | |
| BOF gas | MJ/tHM | 0.124 | 259 | 213 | | | | | |
| Electricity | MJ/tHM | 107 | 850 | 268 | | | | | |
| Auxiliaries | | | | | | | | | |
| Oxygen | m³/tHM | 4.6 | 67 | 43 | | | | | |
| Compressed air | m³/tHM | 0.008 | 35 | 9.1 | | | | | |
| Steam | MJ/tHM | 14.8 | 435 | 48 | | | | | |
| Nitrogen | m³/tHM | 33 | 59 | 46 | | | | | |
| Cooling water | m³/tHM | 0.37 | 22.4 | | | | | | |
| Process water | m³/tHM | 0.28 | 13 | 3.4 | | | | | |



Cement EM Software





Cement EM Software

Microsoft Excel - Sepahan Cement SEC Software (Daily) protected-Printable-Auto.xlsm

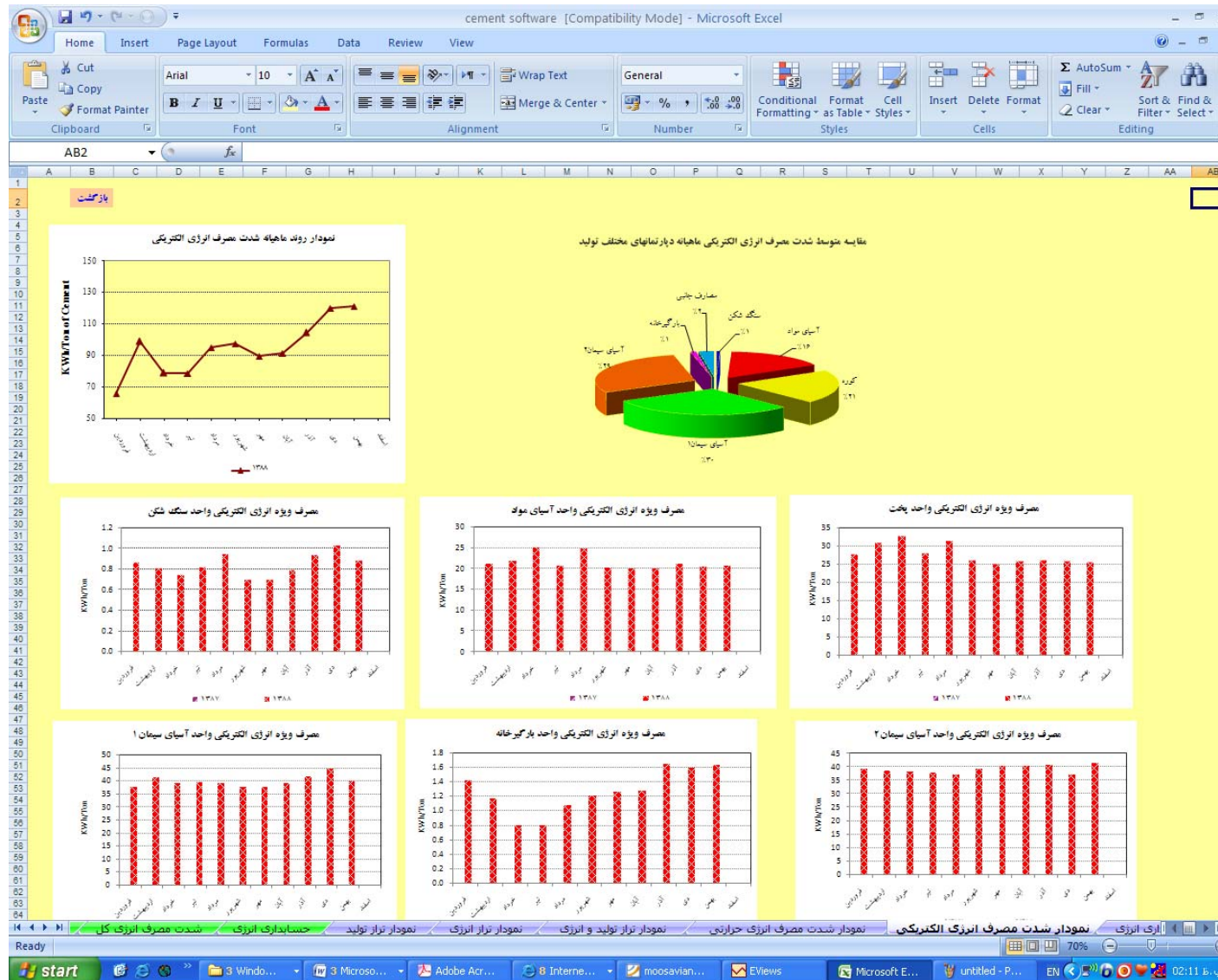
Total Consumption
From: 01.06.2013 00:15 **To: 30.06.2013 24:01 (Last Month)**
Electricity

صفحه اصلی نتایج ورود اطلاعات راهنما

| Location | System Unit | Channel Name | Consumption Total | Electricity, Electricity, Price List 0, Tariff 0 (Missing Tariff) Unit | Peak | Unit | Time |
|----------------------------------|-------------|-------------------------|-------------------|--|------|--------------|---------------------|
| Sepahan C Electrical/Electricity | SMC3 | BB27 [PANEL PASARG | 131,345.42 | 131,345.42 kWh | | 316.67 kW | 25.06.2013 14:45:00 |
| Sepahan C Electrical/Electricity | SMC3 | Line1_Mvar [Energy_Varl | 10,111.80 | 10,111.80 MVarh | | 36.00 MVar | 11.06.2013 08:00:00 |
| Sepahan C Electrical/Electricity | SMC3 | Line1_MWH [Line1 Ener | 10,111.80 | 10,111.80 MWh | | 36.00 MW | 11.06.2013 08:00:00 |
| Sepahan C Electrical/Electricity | SMC3 | Line2_MWH [Line2 Ener | 10,130.40 | 10,130.40 MWh | | 38.40 MW | 19.06.2013 07:45:00 |
| Sepahan C Electrical/Electricity | SMC3 | L2_POWER [LINE2_PO | 101.30 | 101.30 MWh | | 0.38 MW | 19.06.2013 07:45:00 |
| Sepahan C Electrical/Electricity | SMC3 | Slag_kWH [Slag Depart | 0.00 | 0.00 MWh | | 0.00 MW | -- |
| Sepahan C Electrical/Electricity | SMC3 | line2_Mvar [Varh] | 10,130.40 | 10,130.40 MVarh | | 38.40 MVar | 19.06.2013 07:45:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA2 [OUTGOING CRUS | 120,883.33 | 120,883.33 kWh | | 940.00 kW | 18.06.2013 11:00:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA16 [INCOMING LINE2 | 4,158.80 | 4,158.80 MWh | | 11.20 MW | 19.06.2013 15:00:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA20 [PANEL 2CL] | 232,069.33 | 232,069.33 kWh | | 402.67 kW | 15.06.2013 22:00:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA8 [RAW MILL3 FAN] | 313,610.67 | 313,610.67 kWh | | 994.67 kW | 10.06.2013 16:30:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA10 [PREHEATER FA | 327,029.17 | 327,029.17 kWh | | 770.00 kW | 01.06.2013 00:30:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA11 [PREHEAT FAN54 | 341,760.83 | 341,760.83 kWh | | 846.67 kW | 01.06.2013 05:45:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA1 [PANEL 05] | 6,864.67 | 6,864.67 kWh | | 98.67 kW | 01.06.2013 07:45:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA07 [RAW MILL4] | 247,508.33 | 247,508.33 kWh | | 2,180.00 kW | 13.06.2013 16:30:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA03 [PANEL 2CC] | 289,597.33 | 289,597.33 kWh | | 762.67 kW | 01.06.2013 08:00:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA05 [CRUSHER4] | 63,645.00 | 63,645.00 kWh | | 206.67 kW | 09.06.2013 06:15:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA09 [RAW MILL4 FAN] | 329,795.33 | 329,795.33 kWh | | 858.67 kW | 09.06.2013 05:00:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA12 [PANEL 2CD] | 351,396.00 | 351,396.00 kWh | | 773.33 kW | 26.06.2013 03:45:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA06 [RAW MILL 3] | 607,835.00 | 607,835.00 kWh | | 2,160.00 kW | 19.06.2013 04:00:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA04 [CRUSHER3] | 52,672.33 | 52,672.33 kWh | | 196.00 kW | 16.06.2013 06:15:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA13 [ROTOY KLIN2] | 284,691.67 | 284,691.67 kWh | | 683.33 kW | 13.06.2013 12:00:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA41 [PANEL 1CC] | 185,168.00 | 185,168.00 kWh | | 581.33 kW | 22.06.2013 10:15:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA40 [IMPACT CRUSHE | 79,713.00 | 79,713.00 kWh | | 332.00 kW | 30.06.2013 18:45:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA34 [PREHEAT FAN 5: | 401,215.00 | 401,215.00 kWh | | 916.67 kW | 22.06.2013 18:45:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA33 [PREHEAT FAN 5: | 363,755.00 | 363,755.00 kWh | | 860.00 kW | 16.06.2013 01:15:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA31 [PANEL 1CD] | 361,338.67 | 361,338.67 kWh | | 837.33 kW | 17.06.2013 11:00:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA30 [ROTORY KLIN1] | 200,511.67 | 200,511.67 kWh | | 500.00 kW | 01.06.2013 10:00:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA35 [RAW MILL2 FAN | 323,219.33 | 323,219.33 kWh | | 970.67 kW | 14.06.2013 07:00:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA24 [PANEL 1CE] | 212,894.67 | 212,894.67 kWh | | 453.33 kW | 04.06.2013 00:45:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA19 [PANEL 2CE] | 274,007.00 | 274,007.00 kWh | | 600.00 kW | 21.06.2013 04:45:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA42 [HYBRID FILTER] | 259,565.00 | 259,565.00 kWh | | 588.00 kW | 17.06.2013 01:45:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA37 [RAW MILL2] | 820,840.00 | 820,840.00 kWh | | 2,593.33 kW | 14.06.2013 08:15:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA36 [RAW MILL2 FAN] | 256,796.67 | 256,796.67 kWh | | 882.67 kW | 03.06.2013 09:15:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA27 [INCOMING] | 2,821,850.00 | 2,821,850.00 kWh | | 11,066.67 kW | 28.06.2013 12:45:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA39 [IMPACT CRUSHE | 84,628.00 | 84,628.00 kWh | | 234.67 kW | 22.06.2013 10:00:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA38 [RAW MILL1] | 728,193.33 | 728,193.33 kWh | | 2,640.00 kW | 23.06.2013 03:00:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA21 [HYBRID FILTER I | 392,435.00 | 392,435.00 kWh | | 924.00 kW | 01.06.2013 00:30:00 |
| Sepahan C Electrical/Electricity | SMC2 | BA32 [CRUSHER 05] | 5,868.00 | 5,868.00 kWh | | 324.00 kW | 25.06.2013 14:45:00 |
| Sepahan C Electrical/Electricity | SMC1 | BD25 [LOKUJ] | 1.38 | 1.38 MWh | | 0.01 MW | 26.06.2013 14:30:00 |
| Sepahan C Electrical/Electricity | SMC1 | BD26 [LOJH] | 3,298.00 | 3,298.00 kWh | | 20.00 kW | 07.06.2013 04:45:00 |

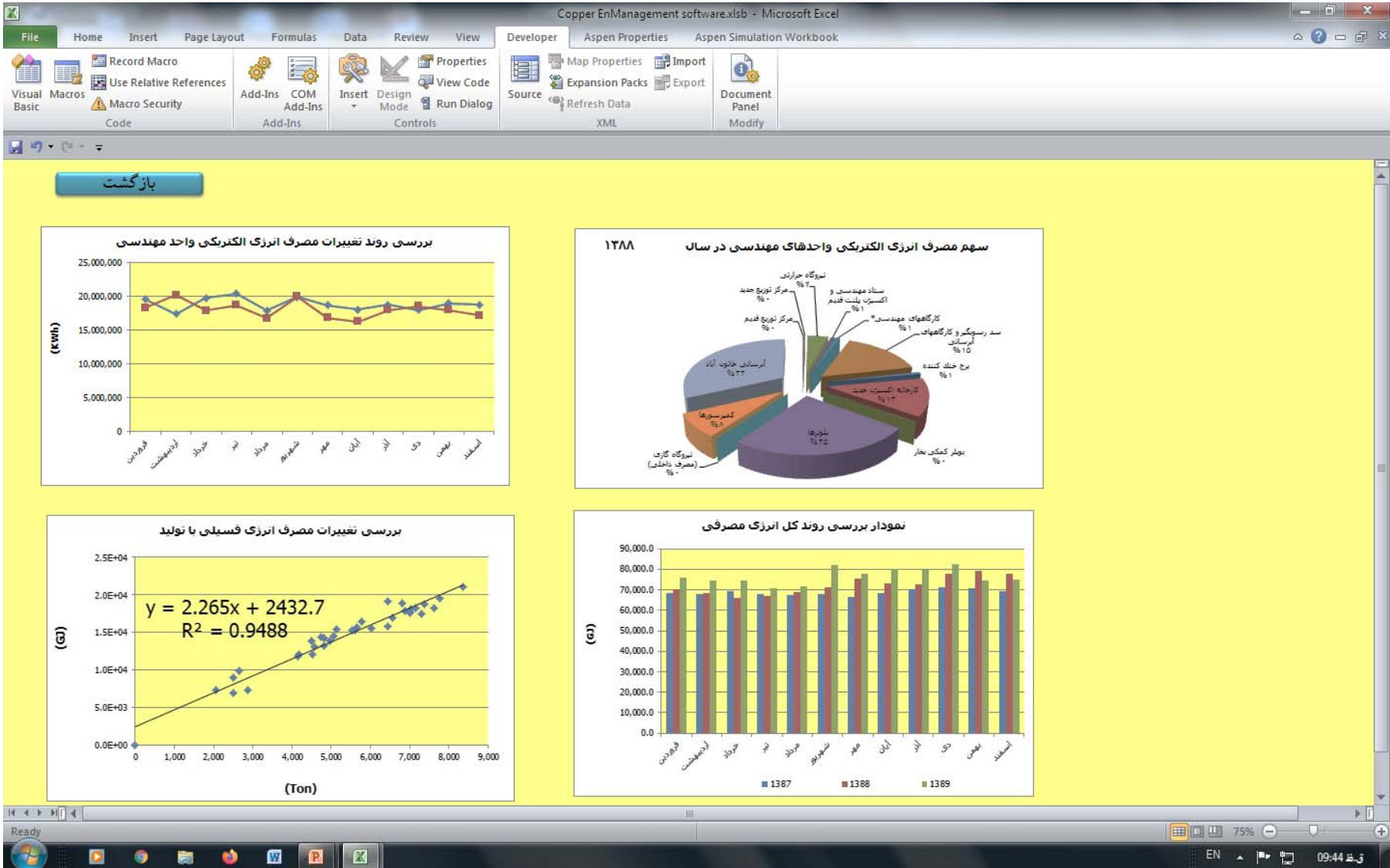


Cement EM Software



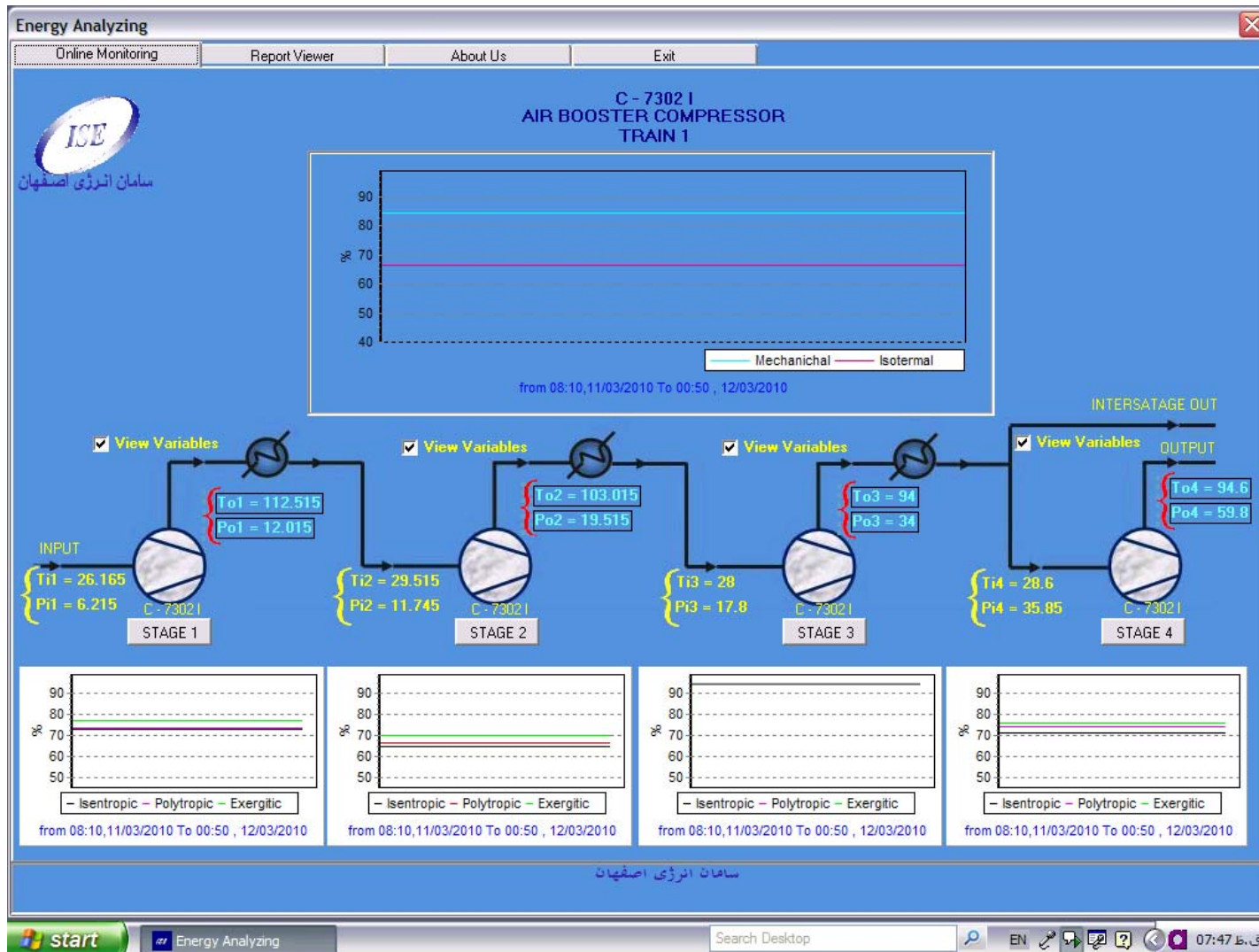


Copper EM Software



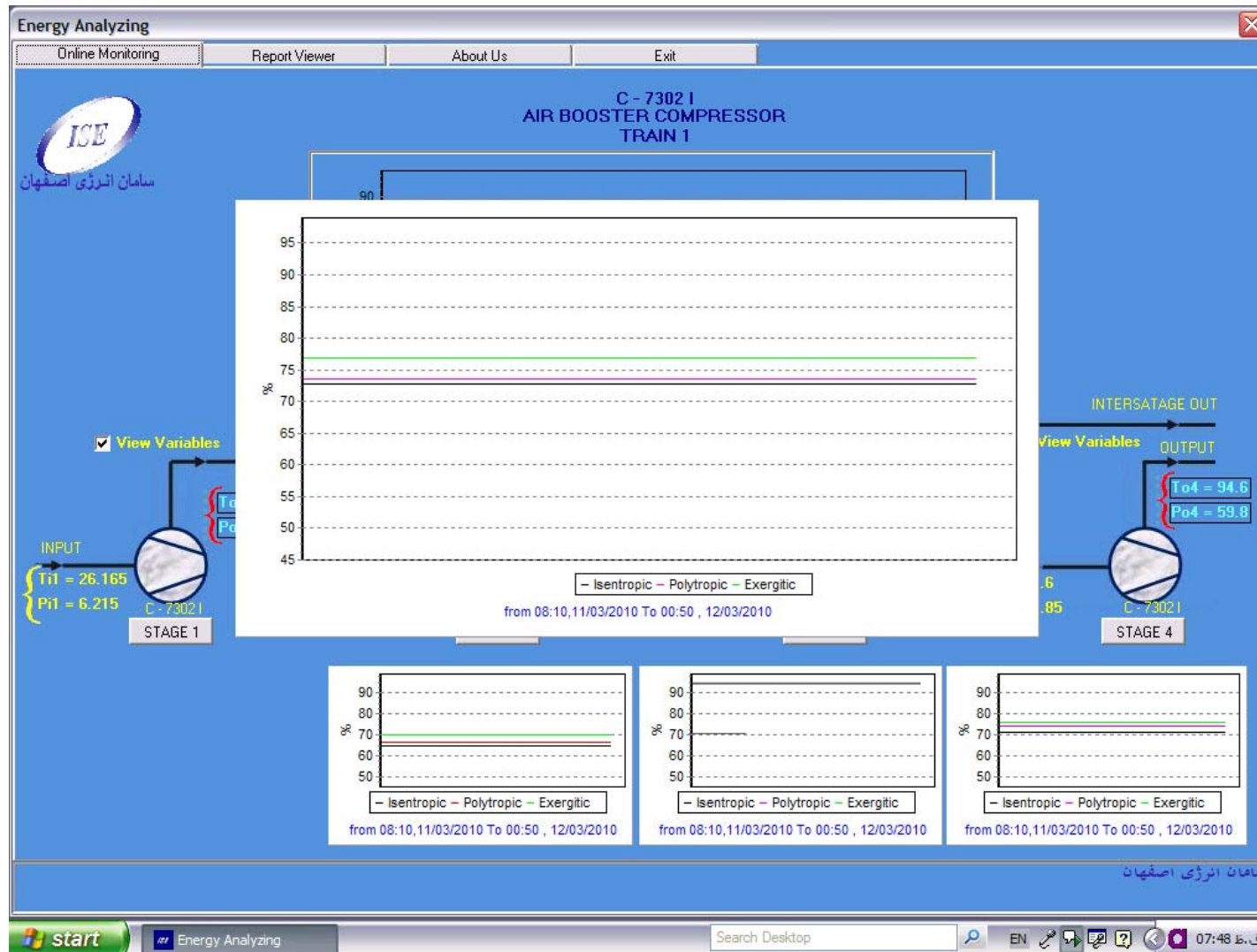


Energy Analyzing(Saman Energy)



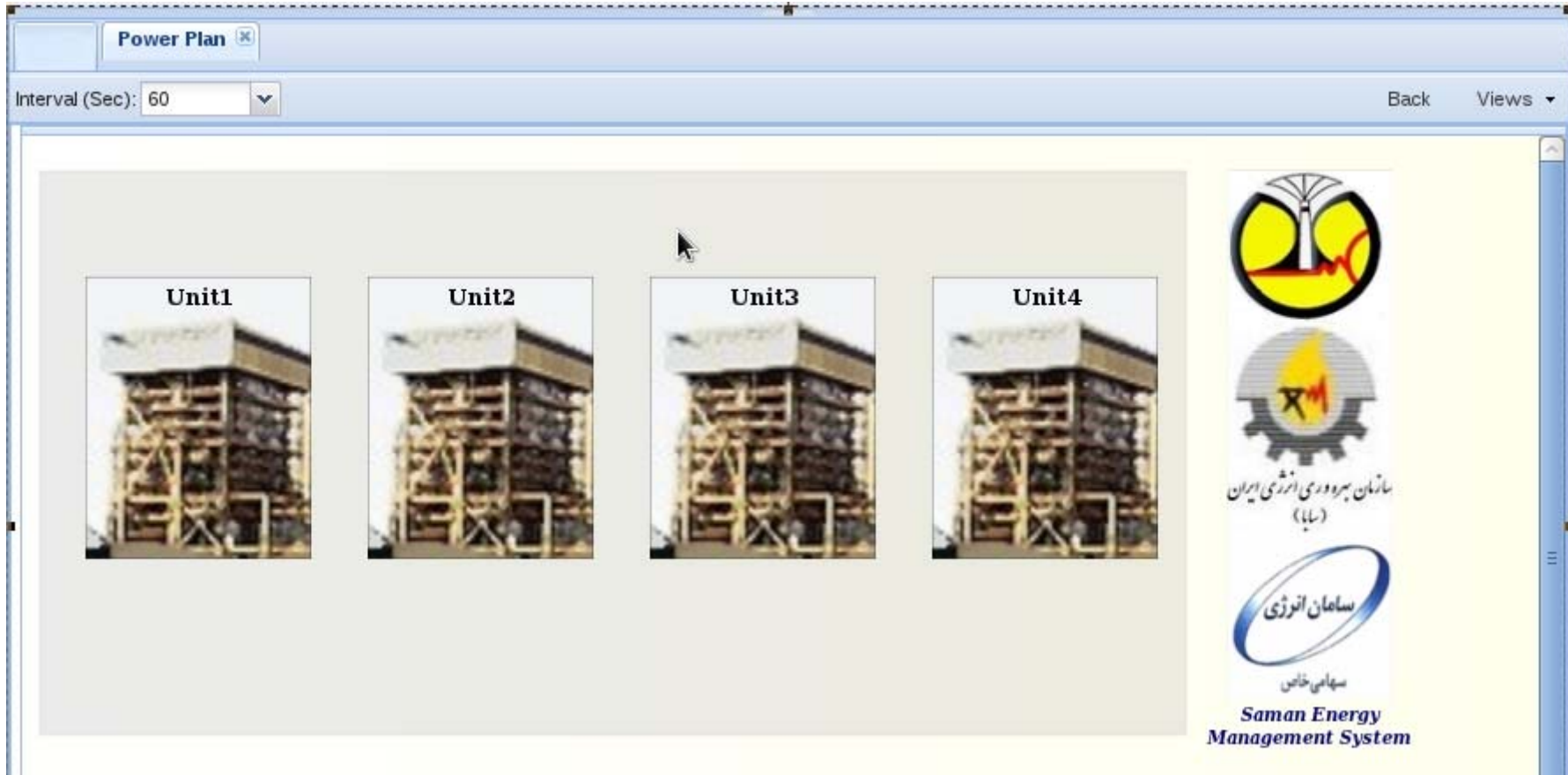


Energy Analyzing(Saman Energy)





SEEMS(Saman Energy)





SEEMS(Saman Energy)

Dashboard unit4

Filter By Name/Tag Normal HP Turbine Ou Save Values

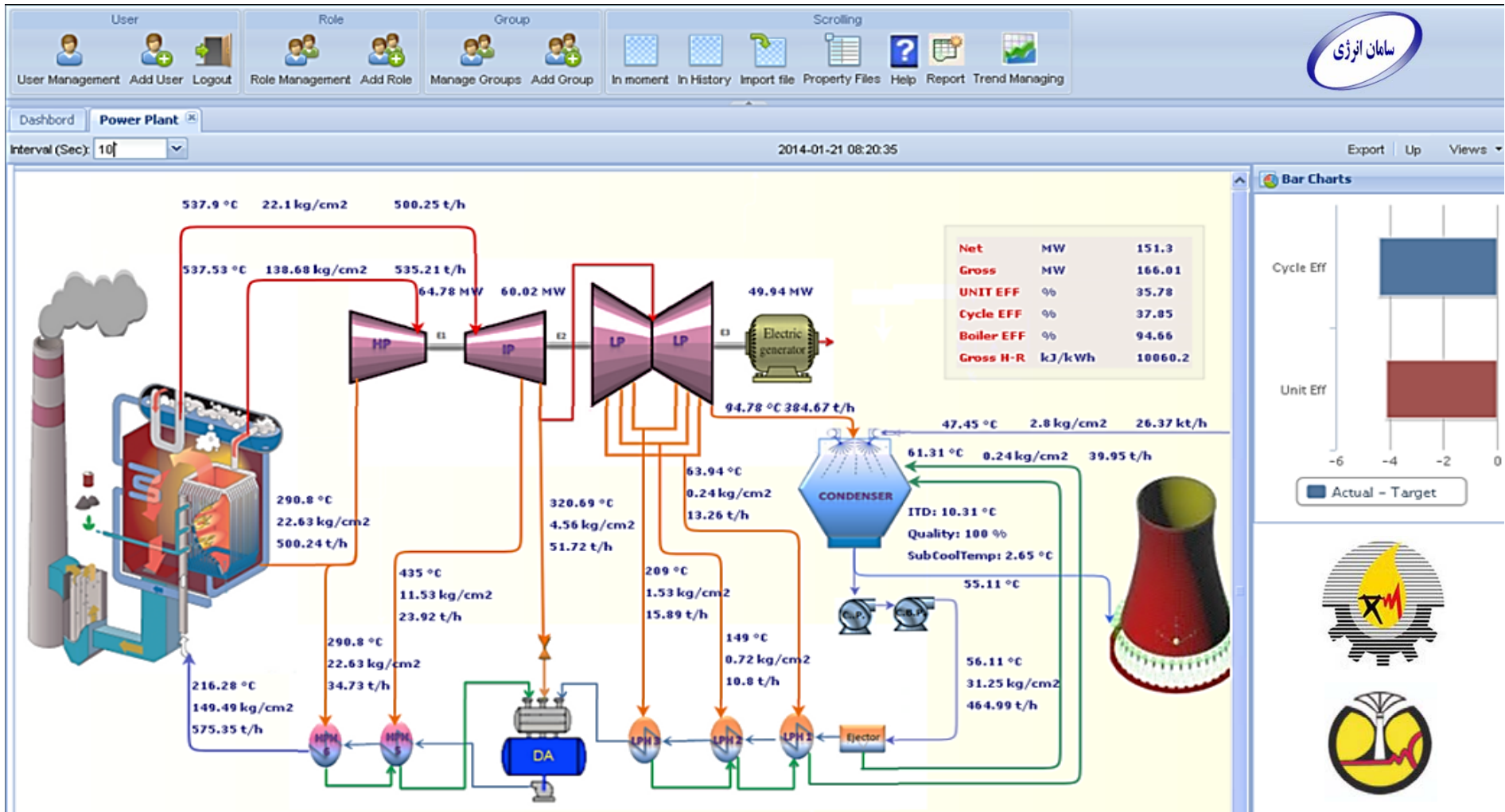
Shahid Rajaei Power Plant

- Unit4
 - Generator
 - Fuel Analysis
 - Boiler
 - Condenser
 - Turbine
 - Main Steam To HP Turbine Temp.
 - HP Turbine Outlet Press.**
 - HP Turbine Outlet Temp.
 - P Turbine Outlet Press.
 - P Turbine Outlet Temp.
 - Feed Water
 - Heater No.6 Extraction Steam Press.
 - Heater No.6 Extraction Steam Temp.
 - No.4 Extraction Steam Press.
 - Heater No.5 Extraction Steam Press.
 - Heater No.5 Extraction Steam Temp.
 - Heater No.3 Extraction Steam Press.
 - Heater No.3 Extraction Steam Temp.
 - Heater No.2 Extraction Steam Press.
 - Heater No.2 Extraction Steam Temp.
 - Heater No.1 Extraction Steam Press.
 - Heater No.1 Extraction Steam Temp.
 - Heater No.6 Extraction Steam Boiler Feed Pump Suction Press.
 - DEAE Storage TANK Temp.
 - Boiler Feed Pump Discharge Temp.
 - Boiler Feed Pump Discharge Press.
 - Heater No.1 Water In Temp.
 - LP Heater No.1 Outlet Temp.
 - LP Heater No.2 Outlet Temp.
 - LP Heater No.3 Outlet Temp.
 - HP Heater No.5 Outlet Temp.
 - Condensate Water Drain Temp. From Heater No.2 To Heater No.1
 - Condensate Water Drain Temp. From Heater No.3 To Heater No.2
 - Condensate Water Drain Temp. From Heater No.5 To DEAE
 - Condensate Water Drain Temp. From Heater No.6 To Heater No.5

| Active | Name | Value | Unit |
|--------------------------|--------------|-------|--------|
| | DefaultValue | 34 | kg/cm2 |
| <input type="checkbox"/> | InterfValue | 0 | kg/cm2 |
| | Load-100 | 16.86 | kg/cm2 |
| | Load-75 | 26 | kg/cm2 |
| | Load-50 | 26 | kg/cm2 |



SEEMS(Saman Energy)

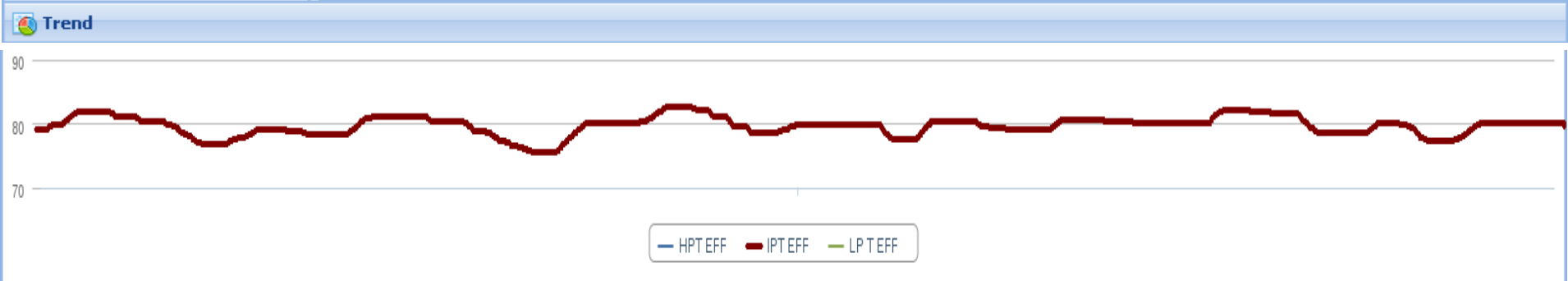
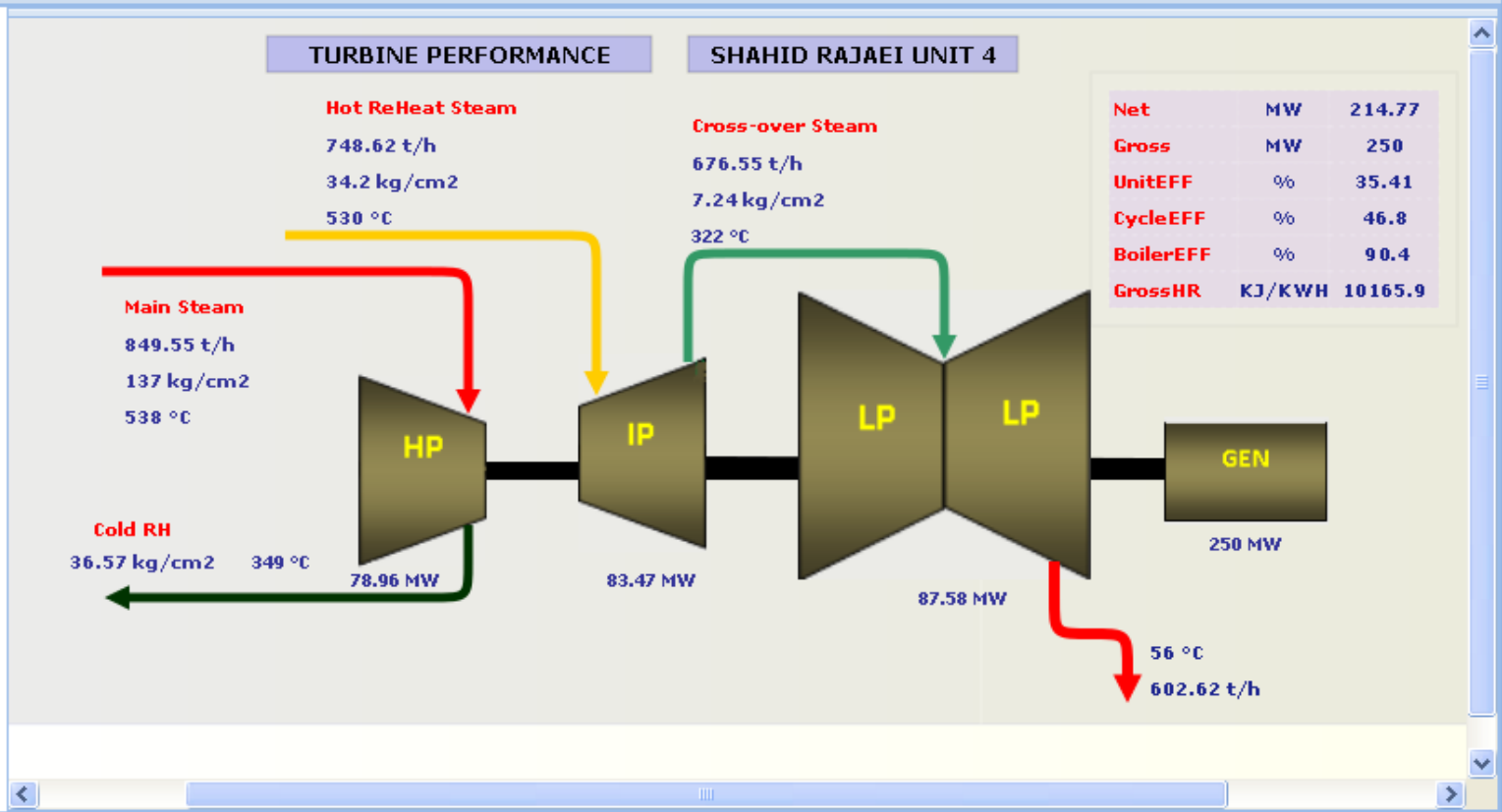


User Management Add User Logout
Role Management Add Role
Manage Groups Add Group
In moment In History Import file Property Files Help Report Trend Managing

Dashboard **Power Plant**
 Interval (Sec): 60
 2013-02-03 07:54:23
 Export Up Views

Properties

| Title | Value |
|----------------|---------|
| HP Turbine ... | 85.6 % |
| IP Turbine EFF | 87.2 % |
| LP Turbine ... | 70.55 % |





سندورها



قابل ها



گزارش



تجهیزات



واحدها



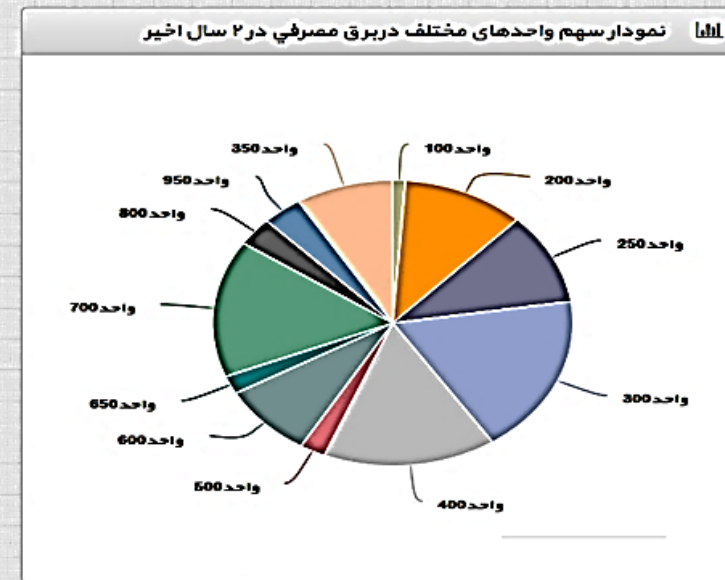
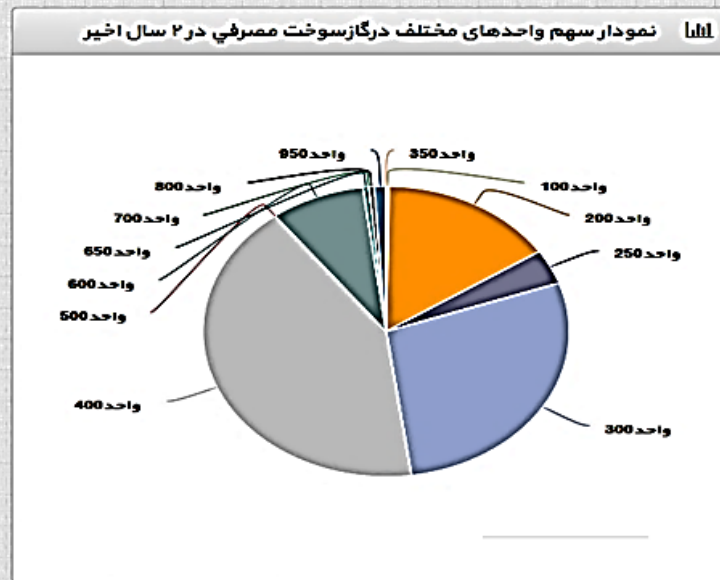
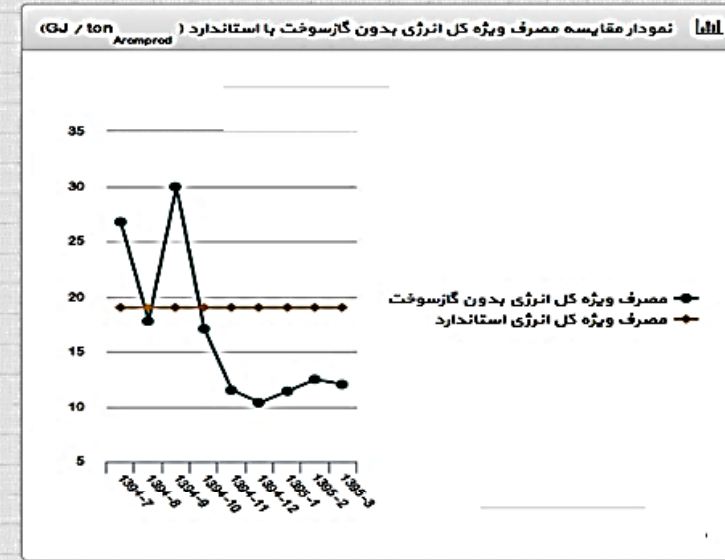
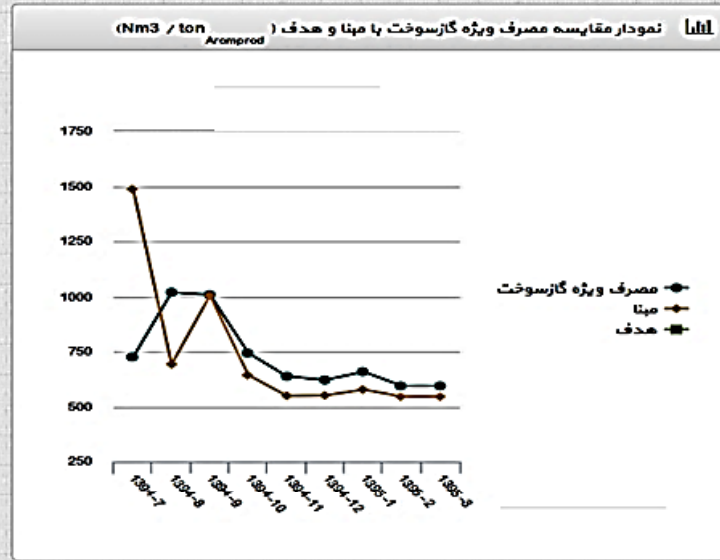
اطلاعات انرژی



مدتجم

SIEM 2.0

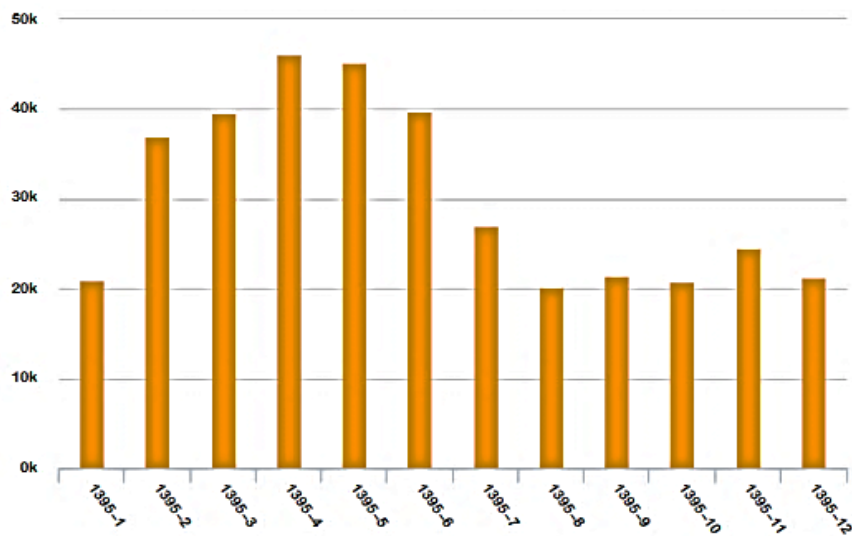
Samanenergy I so50001 E nergy M anagementsystem



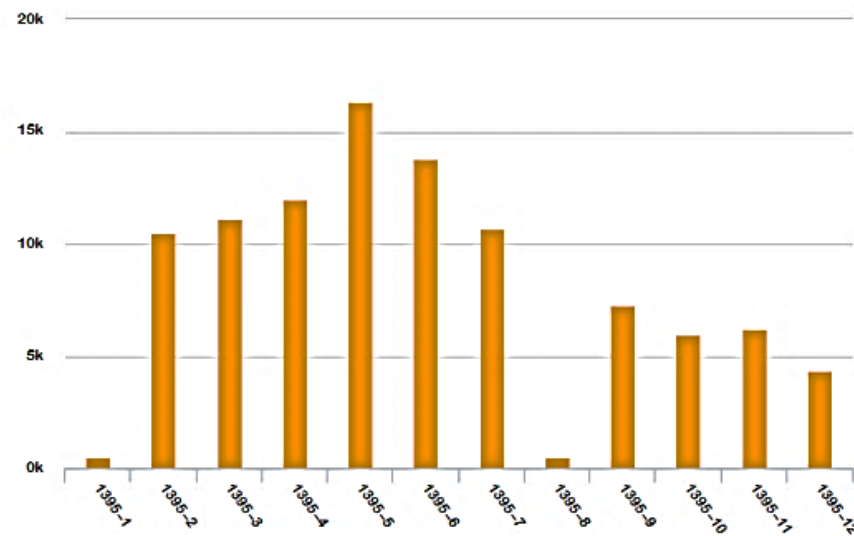
نمونه ای از داشبورد مدیریتی



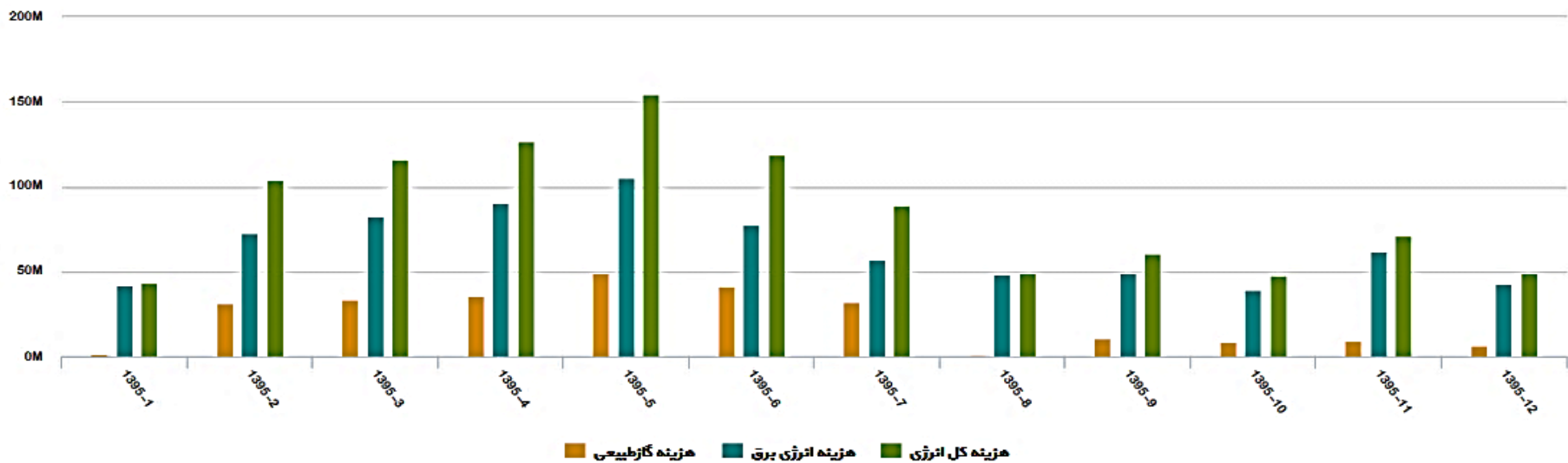
نمودار برق مصرفی (kWh)



نمودار گاز طبیعی مصرفی (Nm3)



نمودار مقایسه هزینه های ماهیانه انرژی (Rial)





اقدامات اصلاحی



گروه بندی شاخص



مستورها



فایل ها



گزارش



تجهیزات



واحدها



اطلاعات انرژی

E

SIEM

Samanenergy ISO50001 Energy Management system

بخار فشار بالای مصرفی ton

143027

گاز طبیعی مصرفی Nm3

10698036

کل تولیدات ton

366867

اطلاعات ماهیانه

خرداد 1397



اعلانات عدم انطباق

| تاریخ | شاخص پایش | واحد فرایندی | مقدار شاخص | مقدار مینا | میزان عدم انطباق | بخش متولی | وضعیت |
|---------------|--------------------------|--------------|--------------|-----------------|------------------|-----------------|--------------|
| 1397 خرداد | مصرف بخار به تولید واحد | CT_3001 | 113.046 | -171.809 | -165.797 | متولی Ref | جدید |
| 1397 خرداد | انرژی بخار مصرفی | E-5006 | 18.363.642.3 | 24.656.351.531 | -25.522 | متولی BTX | جدید |
| 1397 خرداد | انرژی بخار مصرفی | E-6511 | 50.318.879 | -22.776.981.551 | -320.920 | متولی BTX | جدید |
| 1397 خرداد | برق اکتیو مصرفی | P-4004 | 480.804 | 417.765 | 15.090 | متولی مبنای برق | جدید |
| 1397 خرداد | برق اکتیو مصرفی | P-4011 | 362.724 | 291.263 | 24.535 | متولی مبنای برق | جدید |
| 1396 دی | مصرف ویژه برق | مجتمع | 204.030 | 339.418 | -39.888 | متولی مبنای برق | جدید |
| 1396 اسفند | مصرف ویژه بخار فشارپایین | واحد 250 | 283.522 | 125.879 | 125.233 | متولی Ref | رویت شده |
| 1397 فروردین | مصرف ویژه بخار فشارپایین | واحد 250 | 391.664 | 132.975 | 194.540 | متولی Ref | رویت شده |
| 1397 اردیبهشت | مصرف ویژه بخار فشارپایین | واحد 250 | 156.641 | 111.894 | 39.991 | متولی Ref | رویت شده |
| 1396 مرداد | مصرف ویژه برق | واحد 250 | 11.960 | 6.638 | 80.188 | متولی مبنای برق | در دست اقدام |

کار قابل عدم انطباق

بازگشت به صفحه قبل <



اقدامات اصلاحی



گروه بندی شاخص



فایل ها



گزارش



تجهیزات



واحدها

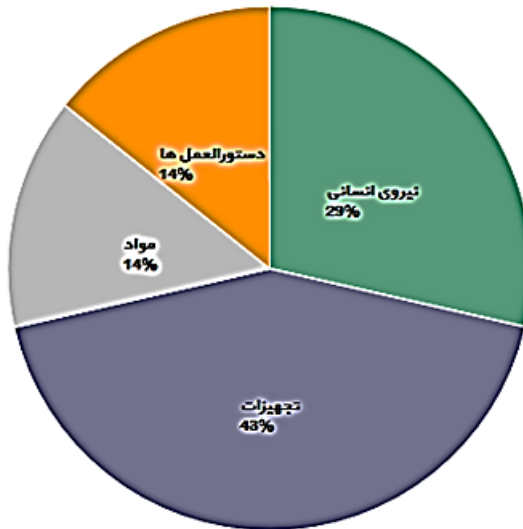


اطلاعات انرژی



مجتمع

نمودار سهم علت‌های عدم انطباق



نوع GU: مجتمع

بازه زمانی:

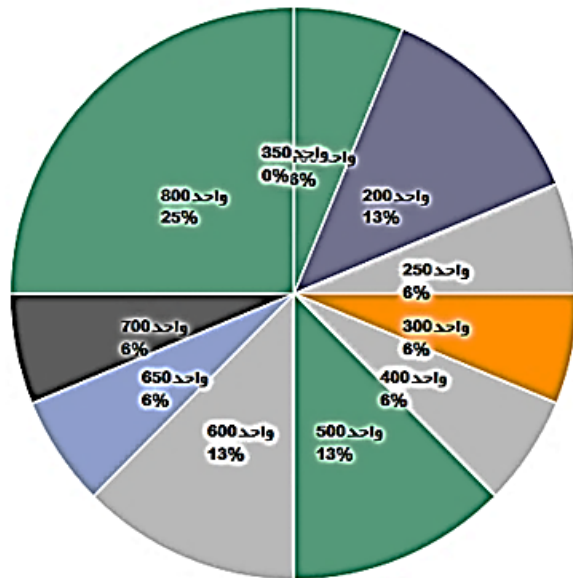
از: 1395-08-01
تا: 1395-08-30

به روزرسانی نمودار

شناسایی نقاط ضعف کارایی در هر بخش
سهم عدم انطباق‌های موجود در هر بخش



نمودار مقایسه علت‌های عدم انطباق



دستورالعمل‌ها

علت عدم انطباق:

بازه زمانی:

از:

تا:

به روزرسانی نمودار

شناسایی نقاط ضعف دستورالعملها در واحدهای مجتمع

سهم عدم انطباقهای موجود در اثر خطاهای دستورالعمل

بازگشت به صفحه قبل <



اقدامات اصلاحی



گروه بندی شاخص



فایل ها



گزارش



تجهیزات



واحدها

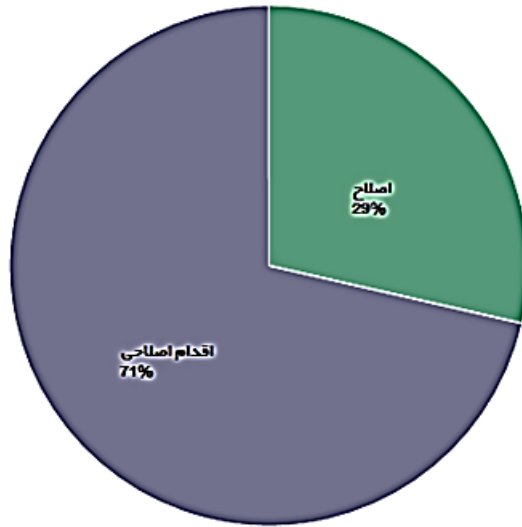


اطلاعات انرژی



مجتمع

نمودار سهم اقدامات اصلاحی



نوع SA: اداری ستاد منطقه

بازه زمانی:

از: 1395-08-01

تا: 1395-08-30

به روزرسانی نمودار

ارزیابی اثر بخشی اقدامات اصلاحی در هر بخش



بیش از یک دهه تجربه موفق

[Over 14 Years Successful Experience]

شرکت سامان انرژی اصفهان

ISFAHAN SAMAN ENERGY



مجری و مشاور خدمات فنی مهندسی، انرژی، محیط زیست و پروژه های اجرایی