TEKASA'I PLANT PERFORMANCE ANALYZER

specialized software for plant performance analysis and trending

Tēkasa'i
innovative ideas and sustainable solutions
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Tracks and draws Trends of overall Plant KPI as well as individual engines KPI's more accurately and keeps you informed about the up-to-date performance of your production facility in detail

About the Program:

TP_2A is a computer program, specially customized for Power Plant Performance Analysis and Trending with assured accuracy. We believe, it will assist you to manage/process your plant operational data faster than ever before. You will have a close insight not only on the overall plant KPI's but also on individual generating unit's performance. Through its interactive trending system you will be able to visualize the performance of overall plant as well as existing performance of individual gen-sets graphically. The sophisticated report generator will let you generate all reports almost instantaneously with progressive trends.

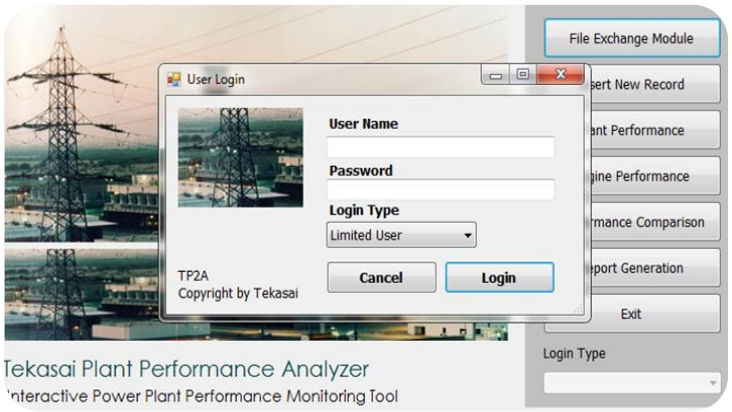
How TP_2A implementation will accelerate your operational data analysis and trending jobs?

- You will be able to see in which directions the Overall Key Performance Indicators (KPI) are moving over time
- You will not only be able to track overall plant performance but also will be able visualize individual engines performance
- You will be able to determine the contribution of individual generating units on overall plant performance
- From Trend Analysis you will be able to determine the deviation of generating units from their rated capacities
- It will track the outage hours and let you know the unit which has consumed max reserve shutdown hours
- From Trend Analysis you will be able to forecast your annual load pattern and schedule outage periods accordingly

Interactive Trending: It will draw trends of every parameter

- Availability (Daily Availability, Monthly Average Availability, Yearly Average Availability)
- Reliability
- Utilization
- Heat Rate
- Thermal Efficiency
- Operational Efficiency
- Total Outage
- SFC
- SLOC
- … more

In this brochure we have shown the Implementation of TP2A in an engine based Power Plant Performance Analysis and Trending but it can be customized for other types of production facilities to monitor the Key Performance Indicators more closely. On request we can show you how it can be customized for your business



Monitoring not only overall plant performance but also tracking individual generating units performance

What TP_2A Will Do?

Noon to Noon Input Parameters

- Equipments Running Hours
- Energy Meter Readings
- Scheduled Outage Hours
- Forced Outage Hours
- Fuel Consumption
- Lube Oil Consumption
- Net Calorific Value of Fuel

Output Parameters

- Plant Load Factor
- Gross Generation
- Net Generation
- Net Electrical Output
- Station Load
- Average Plant Load
- Availability
- Reliability
- Utilization
- Heat Rate
- Thermal Efficiency
- Operational Efficiency
- Total Outage
- SFC
- SLOC
- CO_2 Emission

Today:	4-Jan-17	Cut-Off Time:	12:00PM			Main Meter Reading (Export):	8505.60	Mair
PARAMETERS	Units	ENG#01	ENG#02	ENG#03	ENG#04	ENG#05	EN	
Engine Running Hours:	h	79	82	81	84	73		
Scheduled Outage:	h	0.00	0.00	0.00	0.00	0.00		
Forced Outage:	h	0.00	0.00	0.00	0.00	0.00		
Energy Meter Reading:	MWh	1145.50	1189.00	1174.50	1218.00	1058.50	111	
Fuel Consumption:	MT	48.02	54.03	39.02	60.03	15.01	57.0	
Lube Consumption:	L	104.40	117.45	84.83	130.50	32.63	123.98	

Go2Plant Scope | Go2Engine

INDIVIDUAL ENGINE KPI	Units	ENG#01	ENG#02	ENG#03	ENG#04	ENG#05	ENG#06	ENG#07	ENG#08
Specific Fuel Consumption -- SFC:	g/KWh	207.00	207.00	207.00	207.00	207.00	207.00	207.00	207.00
Specific Lube Oil Consumption -- SLOC:	g/KWh	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41
Availability -- A:	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Reliability -- R:	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Equipment Utiliztion -- U:	%	66.67	75.00	62.50	83.33	20.83	79.17	62.50	58.33
Heat Rate -- HR:	kJ/KWh	8327.61	8327.61	8327.61	8327.61	8327.61	8327.61	8327.61	8327.61
Thermal Efficiency -- TE:	%	40.98	40.98	40.98	40.98	40.98	40.98	40.98	40.98
Operational Efficiency:	%	59.55	67.00	48.39	74.44	18.61	70.72	55.83	52.11
CO2 Gas Emission:	kg CO2	149537.23	168229.38	121499.00	186921.53	46730.38	177575.46	140191.15	130845.07
CO2 Gas Emission:	lb_m CO_2	329729.59	370945.78	267905.29	412161.98	103040.50	391553.88	309121.49	288513.39
CO2 Gas Emission:	Short.Tonnes	164.86	185.47	133.95	206.08	51.52	195.78	154.56	144.26

OVERALL KPI & HEAT RATE	UNITS		PLANT SUMMARY		THERMAL EFFICIENCY	UNITS	
Daily Plant Hours:	h	15.25	Total Plant Hours	Refresh	CO2 Emission:	Short Tonnes	1236.49
Gross Energy Generated:	MW	1740.00	70.75 h		Plant Thermal Efficiency:	%	40.98
Net Energy Exported:	MWh	1559.40	Total Gross Generation		Plant Operational Efficiency:	%	65.91
Net Energy Imported:	MWh	0.00	9149.50 MWh		OUTAGE SUMMARY	UNITS	
Net Billable Energy:	MWh	1559.40	Total Net Export		Total Service Time:	h	15.25
Station Load:	MWh	180.60	8325.60 MWh		Total Scheduled Outage:	h	0.00
Station Load:	%	10.38	Total Net Import		Total Forced Outage:	h	0.00
Average Plant Load:	MWh	64.98	0.00 MWh		Total Outage:	h	0.00
Plant Capacity Factor -- PCF:	%	59.07	Net Electrical Output		Reserve Shutdown Taken:	h	0.00
Plant Load Factor -- PLF:	%	59.07	8325.60 MWh		Total Idle Time:	h	8.75

Noon 2 Noon Data Entry by Shift Charge Engineer / OM

TP_2A PROGRAM INSTALLED AT PLANT PC

Saving calculated data

Noon to Noon Input Parameters

- Equipments Running Hours
- Energy Meter Readings
- Scheduled Outage Hours
- Forced Outage Hours
- Fuel Consumption
- Lube Oil Consumption
- Net Calorific Value of Fuel
- Main Billing Meter Readings

MAIN DATABASE AT PLANT PC

TP_2A PLANT PERFORMANCE MONITORING

TP_2A ENGINE PERFORMANCE MONITORING

TP_2A ENGINE PERFORMANCE COMPARISON

TP_2A FILE EXCHANGE MODULE

For overall plant and Individual Engines

- Plant Load Factor
- Gross & Net Generation
- Net Electrical Output
- Station Load
- Average Plant Load
- Availability
- Reliability
- Utilization
- Heat Rate
- Thermal Efficiency
- Operational Efficiency
- Total Outage
- SFC
- SLOC
- CO_2 Emission

Engine to Engine Performance Comparison and Analysis

TP_2A REPORT GENERATION MODULE

Other Reports

Generate Daily Report

Generate Monthly Report

Generate Yearly Report

UPLOAD

DOWNLOAD

DATABASE IN WEB SERVER

DOWNLOAD

Database in Remote PC

TP_2A AT REMOTE PC-1

Plant Manager

Database in Remote PC

TP_2A AT REMOTE PC-2

Managing Director

Database in Remote PC

TP_2A AT REMOTE PC-3

Operation Manager

Database in Remote PC

TP_2A AT REMOTE PC-4

Results Engineer

ALL USERS WILL SEE THE MOST UPDATED STATUS OF THE OVERALL PLANT AS WELL AS INDIVIDUAL ENGINES

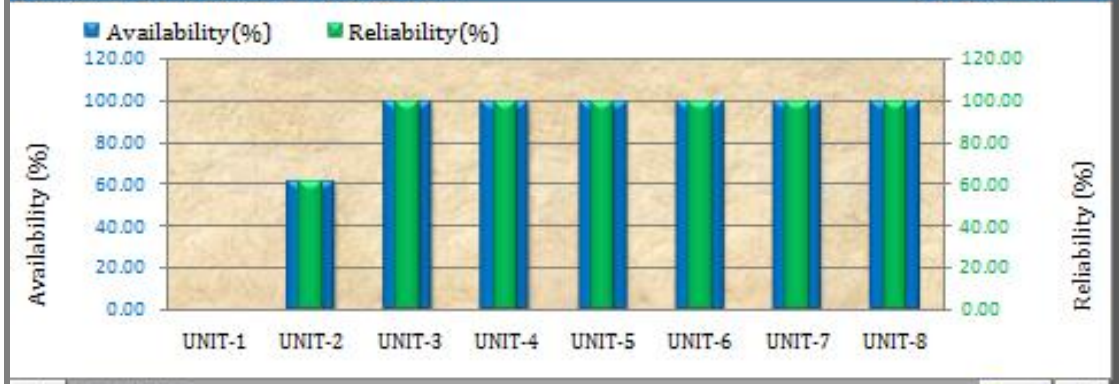
● ● ● *and more*

TP_2A WORKING PROCEDURE

TP2A FOR ENGINE TO ENGINE PERFORMANCE COMPARISON

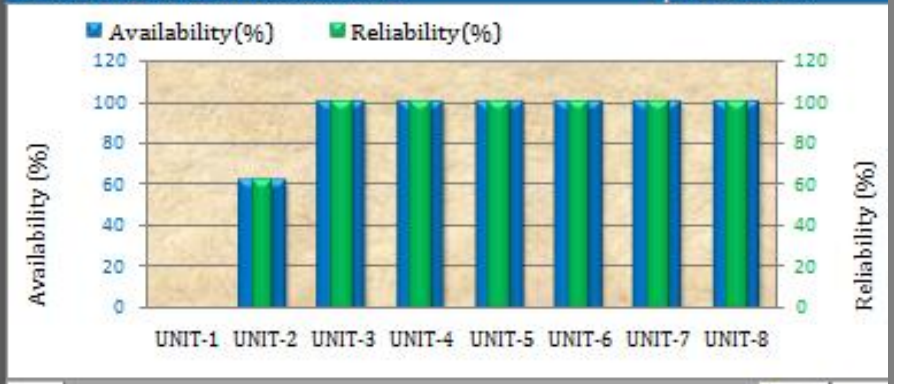
Compare Engine to Engine performance data and identify their individual contribution to overall plant performance

1.0 MONTHLY AVAILABILITY & RELIABILITY | Mar-2016



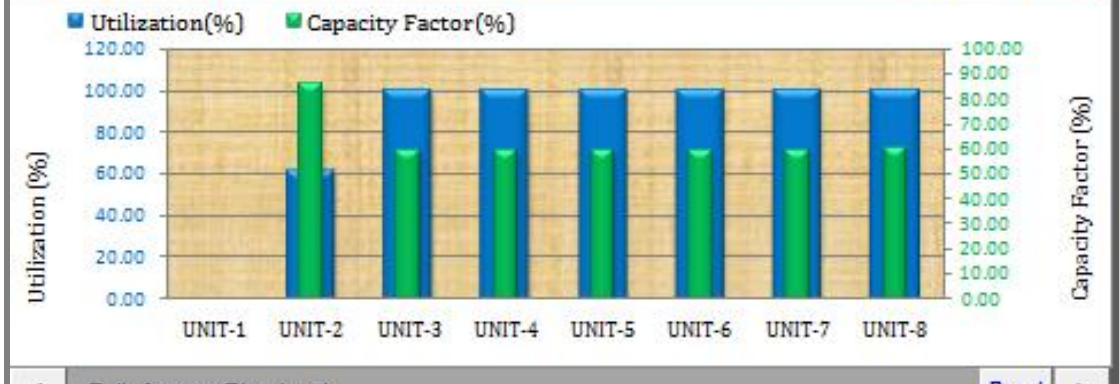
< Daily PLF Reset >

YEARLY AVAILABILITY & RELIABILITY | Year 2016



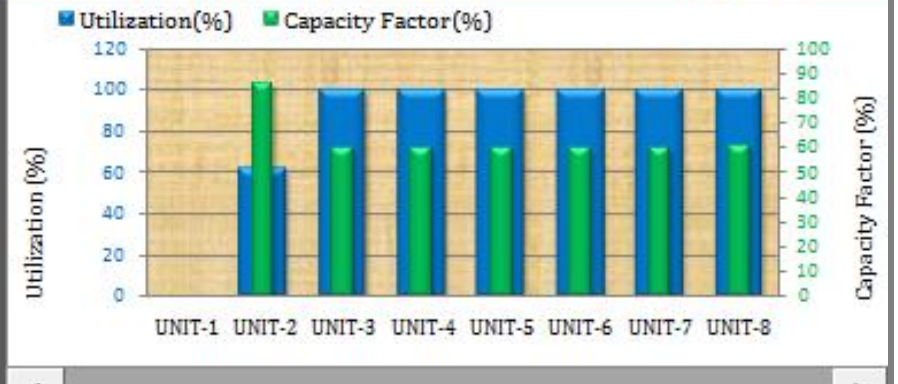
< Reset >

2.0 MONTHLY UTILIZATION & CAPACITY FACTOR | Mar-2016



< Daily Average Plant Load Reset >

YEARLY UTILIZATION & CAPACITY FACTOR | Year 2016



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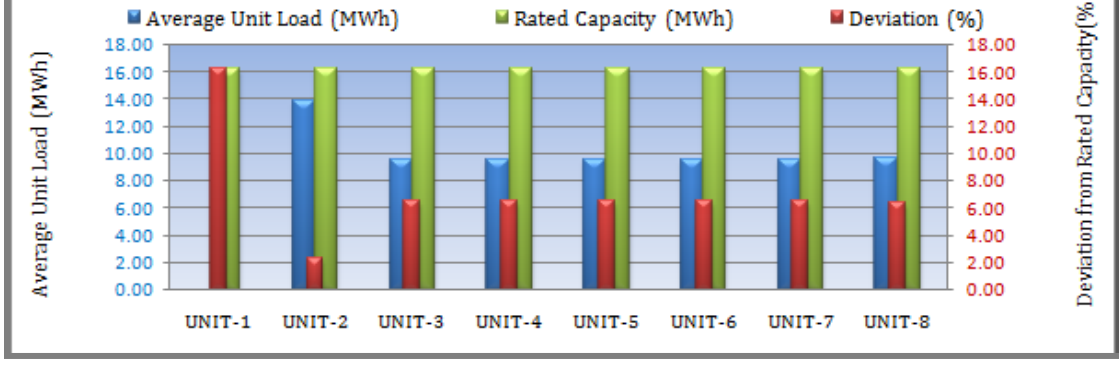
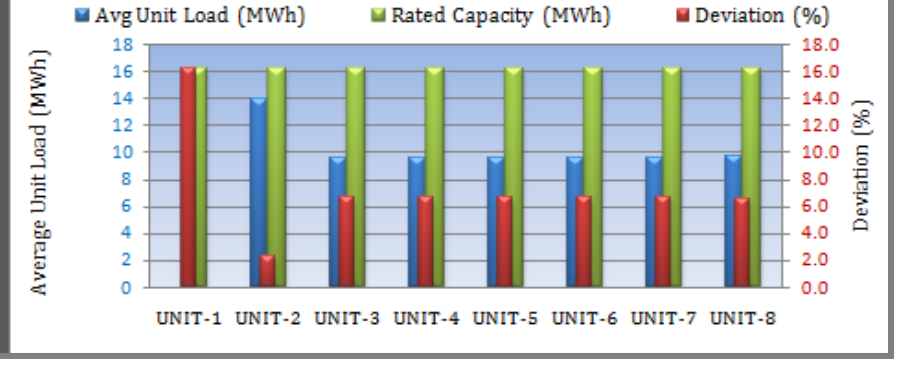
8.0 MONTHLY AVERAGE DEPENDABLE CAPACITY | Mar-2016

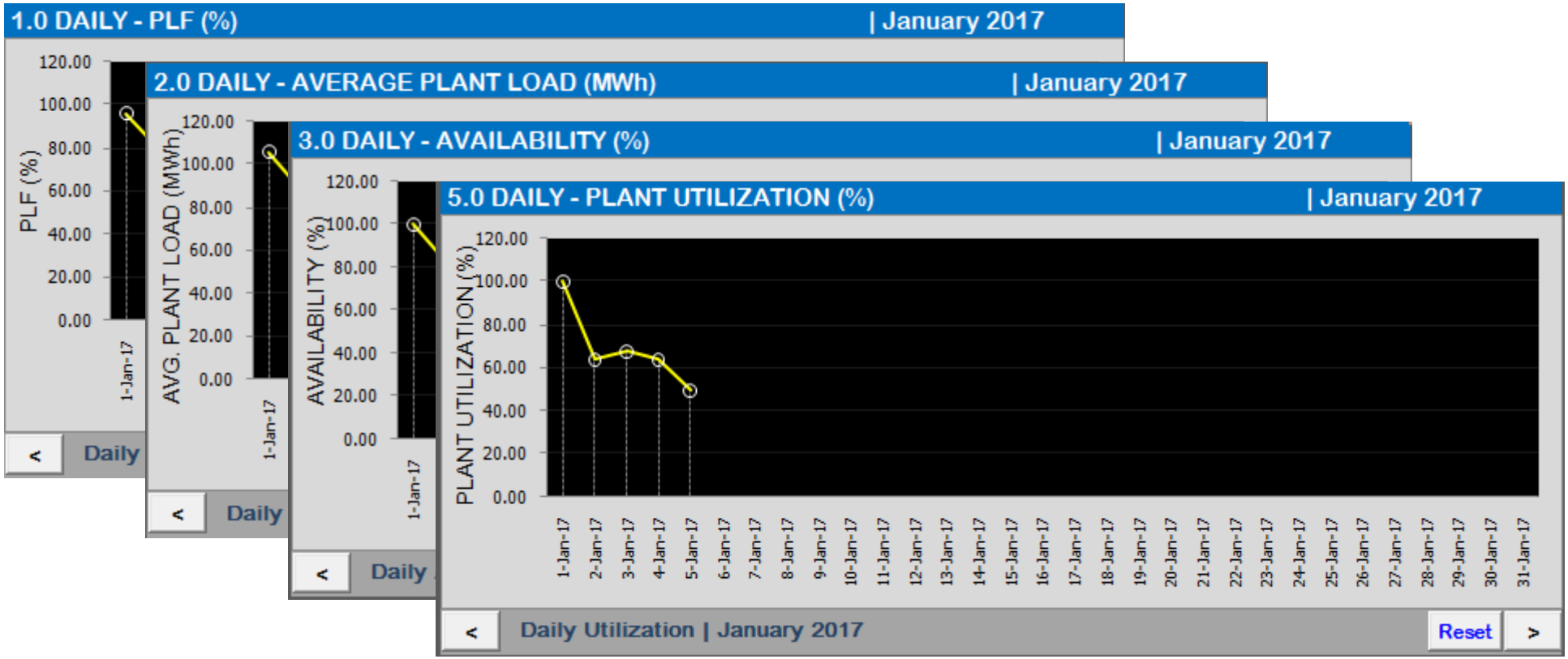


YEARLY AVERAGE DEPENDABLE CAPACITY | Year 2016



TP2A FOR AUTOMATIC SCROLLABLE TRENDING

Trending System lets you review the plant performance graphically from the beginning.... **Just click and See!**



Similarly the program will automatically generate trends with Monthly Average and Yearly Average data.

You will only need to click on the buttons to explore your overall plant as well as your individual engines performance

TP2A FOR ANALYZING ENGINE BY ENGINE PERFORMANCE

The program will also track the performance of your individual engine performance in detail.

You will be able to review your engines performance one by one simply clicking on designated buttons

ENG#01 | ENG#02 | ENG#03 | ENG#04 | ENG#05 | ENG#06 | ENG#07 | ENG#08

Installation Location: Tekasai Diesel Electric Power, Dhaka, Bangladesh
Engine No: 02
Engine Brand and Model: Wartsila 18V46 GD
Serial No: 9999
Rated Capacity (MWh): 16.232
Specified SFC (g/kWh): 194.0
Specified SLOC (g/kWh): 0.50

	14-Mar-16	M2D	Y2D	COD2D
Gross Generation (MWh):	205.00	2870.00	15170.00	15170.00
Engine Running Hours (h):	14.72	206.08	1089.28	1089.28
Scheduled Outage (h):	0.00	0.00	0.00	0.00
Forced Outage (h):	9.28	129.92	686.72	686.72
Total Outage (h):	9.28	129.92	686.72	686.72
Average Engine Load (h):	13.93	13.93	13.93	13.93

REFRESH

	Started From	1-Mar-16	1-Jan-16	1-Jan-16
	14-Mar-16	M2D	Y2D	COD2DATE
Availability (%):	61.33	61.33	61.33	61.33
Reliability (%):	61.33	61.33	61.33	61.33
Utilization (%):	61.33	61.33	61.33	61.33
Capacity Factor (%):	85.80	85.80	85.80	85.80
Thermal Efficiency (%):	57.97	57.97	57.97	57.97
Operational Efficiency (%):	52.62	52.62	52.62	52.62
Heat Rate (kJ/kWh):	5887.32	5887.32	5887.32	5887.32
Fuel Consumption (MT):	30.00	420.00	2220.00	2220.00

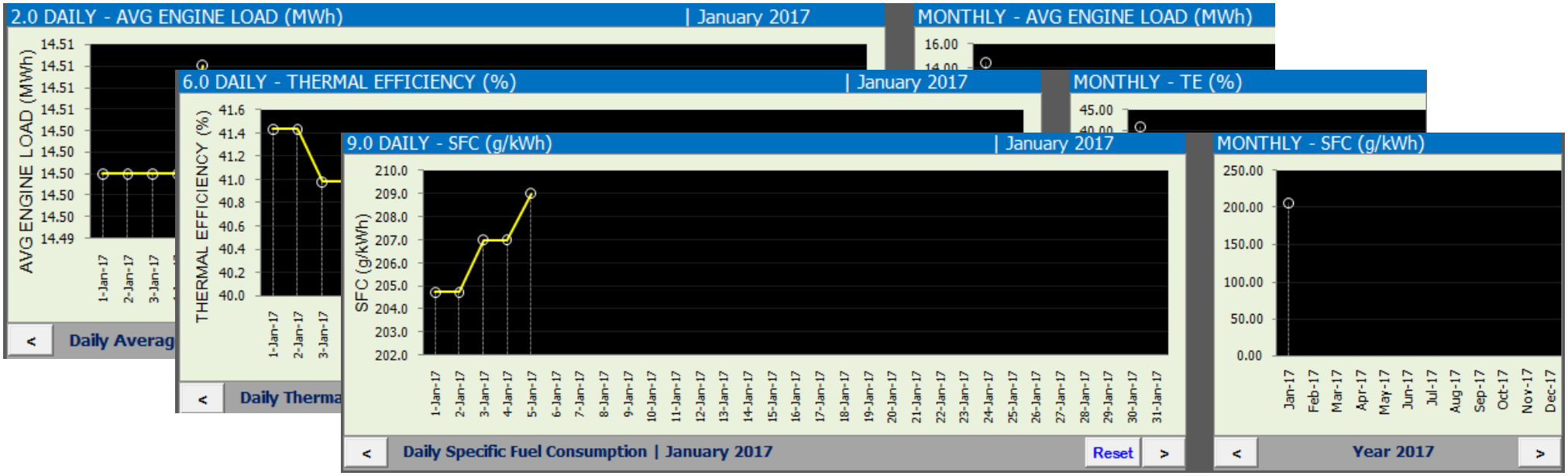
	Started From	1-Mar-16	1-Jan-16	1-Jan-16
	14-Mar-16	M2D	Y2D	COD2DATE
SFC (g/kWh):	146.34	146.34	146.34	146.34
SLOC (g/kWh):	0.45	0.45	0.45	0.45
CO2 Emission (Short Tonnes):	102.99	1441.85	7621.19	7621.19
Total Lube Oil Consumption (L):	100.00	1400.00	7400.00	7400.00
Total Generation Loss:		102.99	101.49	101.49
Proportion of Total Outage:		102.99	101.49	101.49
Deviation from Rated Capacity:		102.99	101.49	101.49
Contribution to Gross Generation:		102.99	101.49	101.49

TOTAL ENG R/H
1089 h

TOTAL OIL R/H
1089 h

R/H AFTER LAST O/H
1089 h

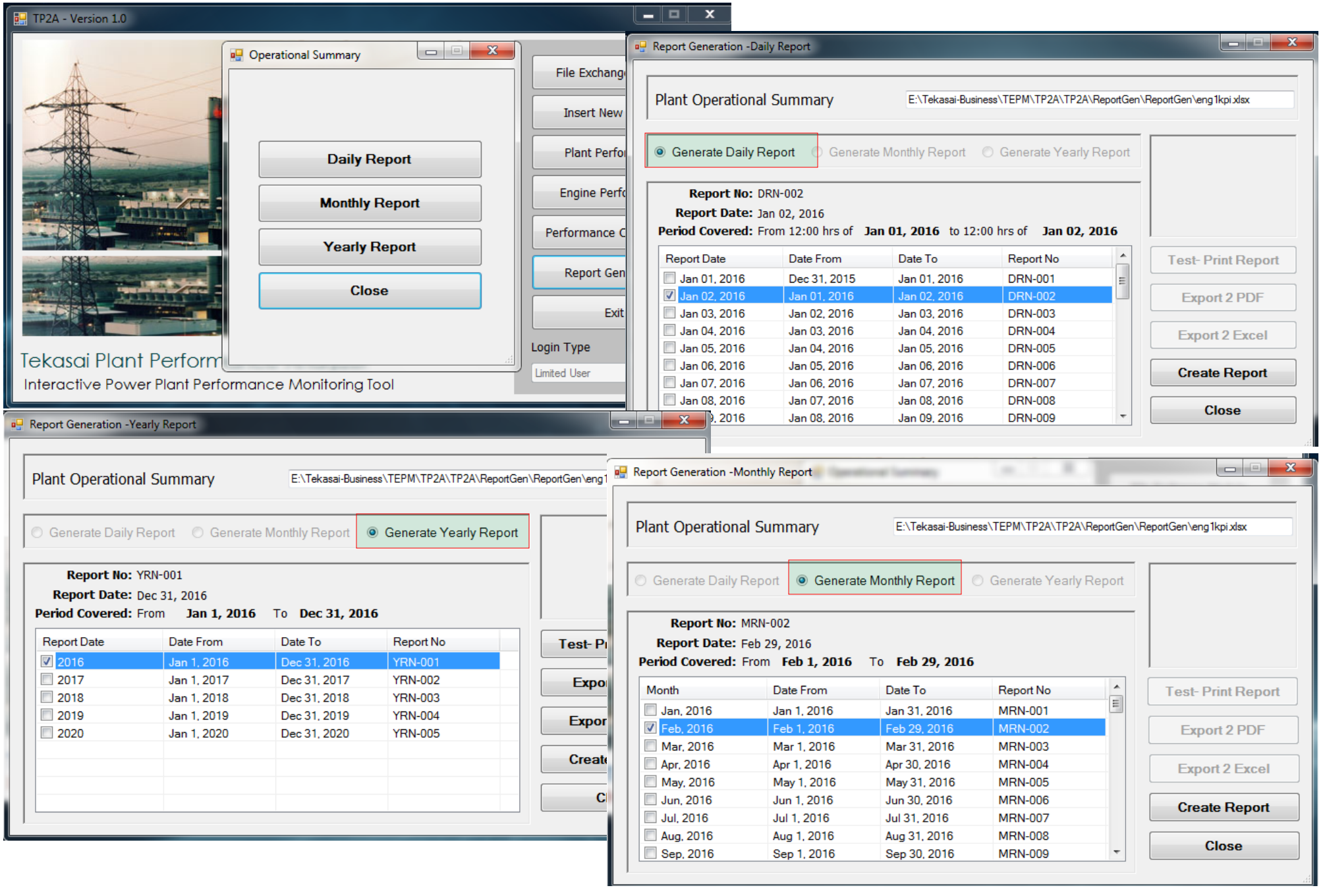
TP2A FOR TRENDING ENGINE BY ENGINE PERFORMANCE



TP2A WILL GENERATE DAILY, WEEKLY, MONTHLY AND YEARLY REPORTS INSTANTANEOUSLY

The report generation module will unbelievably simplify your reporting activities.

Just Select the date range and generate your desired report without any time delay!



Sample: Generated Monthly Report with Trends (Reports will be generated in pdf format)

Tekasai Plant Performance Analyzer

Interactive Power Plant Performance Monitoring Tool

Designed and Developed By: Tekasai Services

Tekasa'i

Monthly Plant Operations Summary

Period Covered: from 12:00 hrs of **February 1, 2016** to 12:00 hrs of **February 29, 2016**

Overall Generation Summary

		November-2015	December-2015	January-2016	February-2016
Gross Generation	MWh	0.00	0.00	49421.44	49421.44
Net Generation	MWh	0.00	0.00	45337.50	45337.50
Energy Import	MWh	0.00	0.00	0.00	0.00
Net Export	MWh	0.00	0.00	45337.50	45337.50
Station Load	MWh	0.00	0.00	4083.94	4083.94
Station Load	%	0.00	0.00	8.26	8.26
PLF	%	0.00	0.00	55.40	55.40
Average Plant Load	MWh	0.00	0.00	60.94	60.94

Overall Plant Availability & Utilization

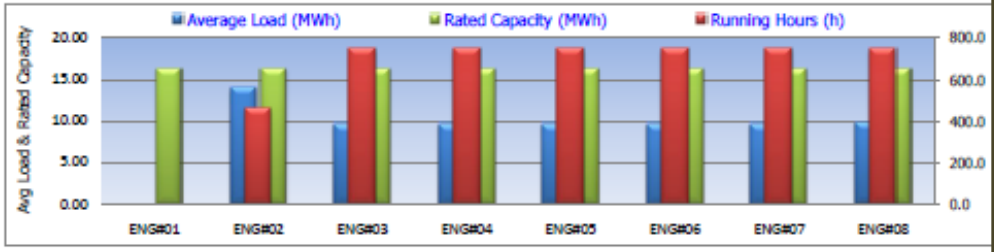
		November-2015	December-2015	January-2016	February-2016
Running Hours	h	0.00	0.00	486.08	486.08
Reserve Shutdown	h	0.00	0.00	128.96	128.96
Schedule Outage	h	0.00	0.00	93.00	93.00
Forced Outage	h	0.00	0.00	35.96	35.96
Plant Availability	%	0.00	0.00	82.67	82.67
Plant Reliability	%	0.00	0.00	94.48	94.48
Plant Utilization	%	0.00	0.00	0.00	65.33

Overall Heat Rate & Thermal Efficiency

		November-2015	December-2015	January-2016	February-2016
SFC	g/kWh	0.00	0.00	0.00	212.01
Heat Rate	kJ/kWh	0.00	0.00	0.00	8084.21
Thermal Efficiency	%	0.00	0.00	0.00	40.01
Operational Efficiency	%	0.00	0.00	0.00	60.39
Capacity Factor	%	0.00	0.00	0.00	0.40
SLOC	g/kWh	0.00	0.00	0.00	35970.63
CO2 Gas Emission	Short Tonnes	0.00	0.00	0.00	34810.28

Enginewise Monthly Generation & Outage Summary — February-2016

		ENG#01	ENG#02	ENG#03	ENG#04	ENG#05	ENG#06	ENG#07	ENG#
Gross Generation	MWh	0.00	5330.00	7161.00	7161.00	7161.00	7161.00	7161.00	7161
Average Engine Load	MWh	0.00	13.93	9.63	9.63	9.63	9.63	9.63	9.7
Engine Running Hours	h	0.0	456.3	744.0	744.0	744.0	744.0	744.0	744
Scheduled Outage	h	744.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Forced Outage	h	0.00	287.68	0.00	0.00	0.00	0.00	0.00	0.0
Availability	%	0.00	61.33	100.00	100.00	100.00	100.00	100.00	100.
Reliability	%	0.00	61.33	100.00	100.00	100.00	100.00	100.00	100.
Utilization	%	0.00	61.33	100.00	100.00	100.00	100.00	100.00	100.
Capacity Factor	%	0.00	85.80	59.30	59.30	59.30	59.30	59.30	60.
SFC	g/kWh	0.00	146.34	216.45	216.45	216.45	251.08	216.45	213.
Thermal Efficiency	%	0.00	57.97	39.19	39.19	39.19	33.79	39.19	39.
Operational Efficiency	%	0.00	52.62	59.30	59.30	59.30	59.30	59.30	60.



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Tekasai Plant Performance Analyzer

Interactive Power Plant Performance Monitoring Tool

Designed and Developed By: Tekasai Services

Tekasa'i

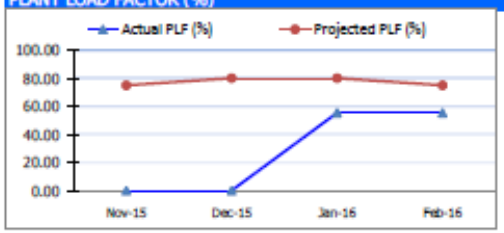
Monthly Plant Operations Summary - Graphical Presentation

Period Covered: from 12:00 hrs of **April 1, 2016** to 12:00 hrs of **April 30, 2016**

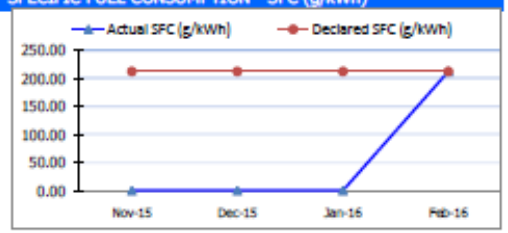
PROJECTED PARAMETERS

		Nov-15	Dec-15	Jan-16	Feb-16
PLF	%	75.00	80.00	80.00	75.00
Availability	%	75.00	80.00	80.00	75.00
Reliability	%	75.00	80.00	80.00	75.00
Utilization	%	75.00	80.00	80.00	75.00
Heat Rate	kJ/kWh	8500.00	8501.00	8502.00	8503.00
SFC	g/kWh	212.00	212.00	212.00	212.00
Max Demand	MWh	110.00	110.00	110.00	110.00

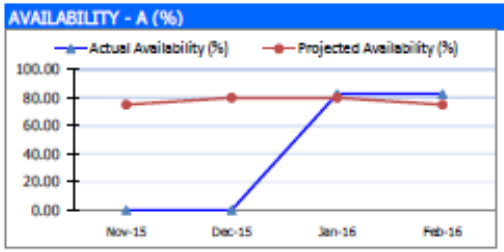
PLANT LOAD FACTOR (%)



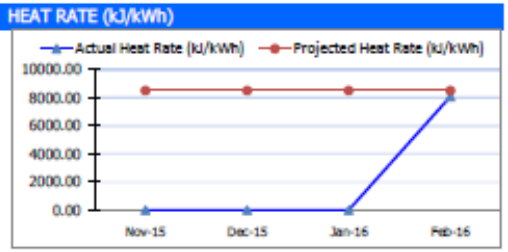
SPECIFIC FUEL CONSUMPTION - SFC (g/kWh)



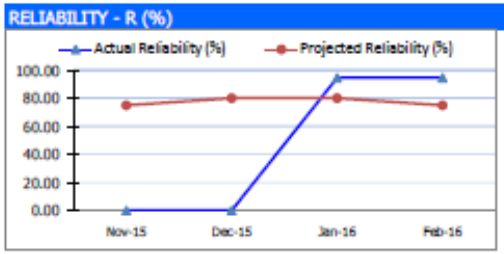
AVAILABILITY - A (%)



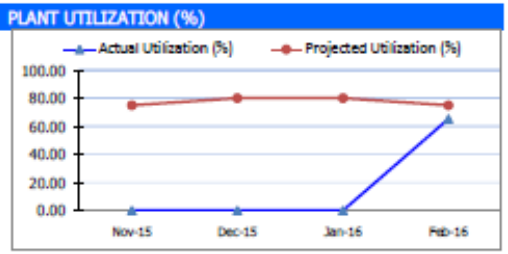
HEAT RATE (kJ/kWh)



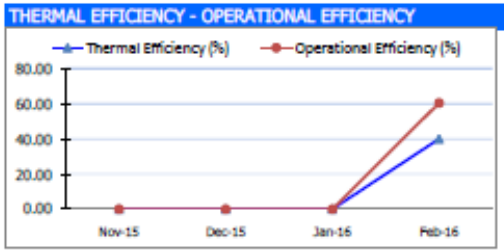
RELIABILITY - R (%)



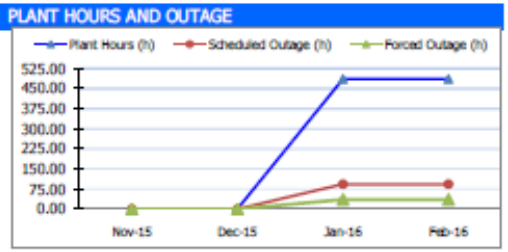
PLANT UTILIZATION (%)



THERMAL EFFICIENCY - OPERATIONAL EFFICIENCY



PLANT HOURS AND OUTAGE



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