



Gospodarski susret Male hidroelektrane, biplin i biomasa u Hrvatskoj

Mladen Perkov

09.04.2014., Čakovec



inteligentna
energija

klaster
OIE

Inteligentna energija d.o.o.
Oreškovića 8J
HR-10010 Zagreb
www.inteligentnaenergija.hr



markoja
Telecom & Data Solutions

PB PROJEKTI
BIRO
SPLIT

SOLVIS



solarni sistemi
h^orvatić



natura lux d.o.o.
snaga prirode – obnovljivi izvori energije

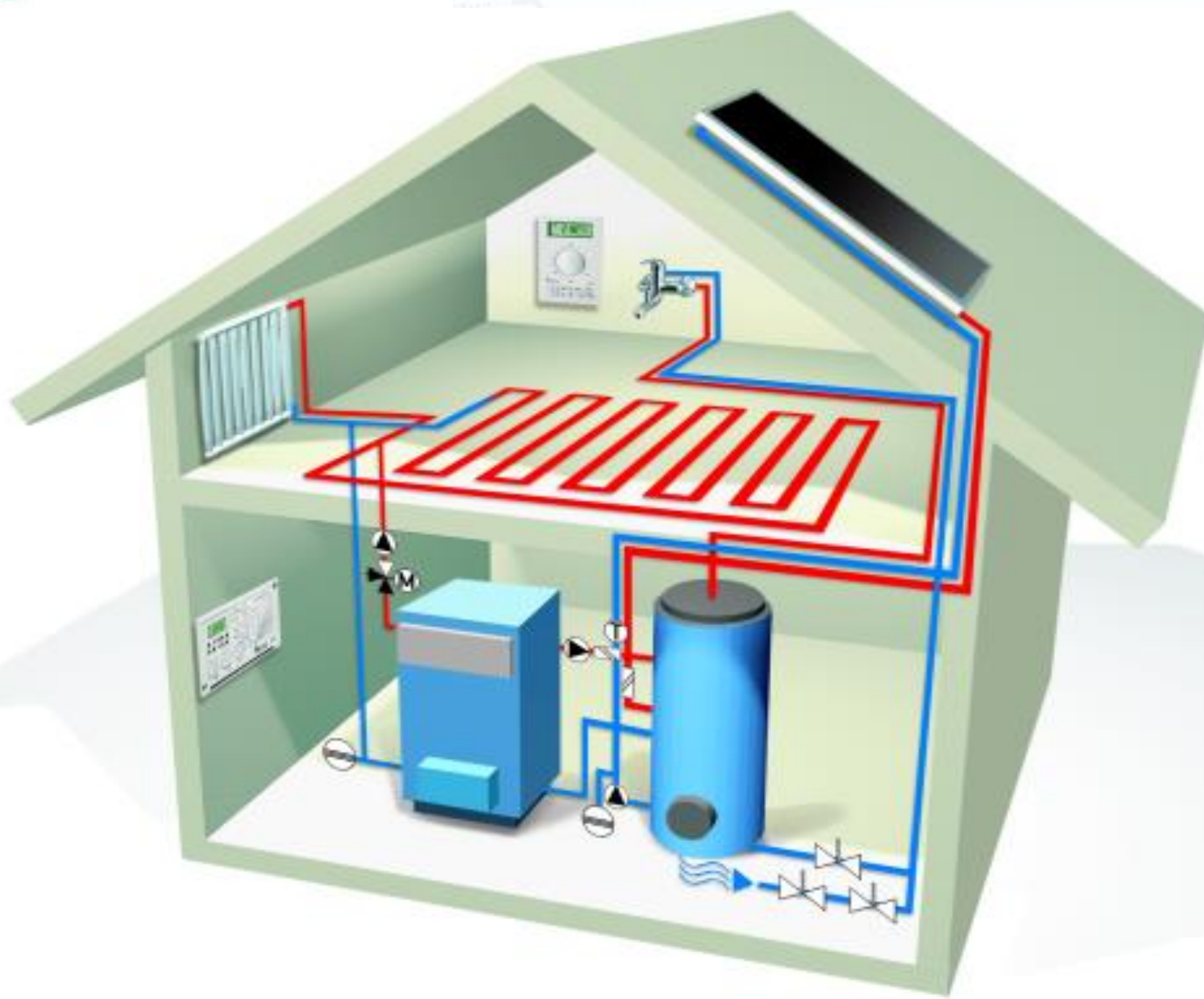
PROINTEGRIS
INŽENJERING



- CTT
- Centrometal
- Doking-energo
- El-ur
- HELB
- Intralighting
- Lega
- Regea
- Telektra
- Vodolim

MISIJA

- Klaster “**Inteligentna Energija**” je **poslovna mreža** koja okuplja male i srednje tvrtke, znanstvene institucije, stručnjake i nevladine udruge s ciljem jačanja domaće industrije obnovljivih izvora energije i energetske učinkovitosti.
- Klaster “**Inteligentna Energija**” ima **misiju** otvaranja novih zelenih radnih mjesta kroz proizvodnju rješenja i sustava te isporuku i kontinuiranu brigu o instaliranim objektima i tehnologiji.



SOLARNA PRIPREMA POTROŠNE TOPLE VODE U HOTELU ADRIA – BIOGRAD NA MORU

320 KREVETA, UNUTARNJI I VANJSKI BAZEN (KORISTI SE 6 MJESECI U GOD.)
ZAGRIJAVANJE POTROŠNE TOPLE VODE PRIJE REKONSTRUKCIJE
EKSTRA LAKIM LOŽIVIM ULJEM 40 000 L GODIŠNJE = 196.000,00 kn



FINANCIRANJE, CIJENA INVESTICIJE, UŠTEDE

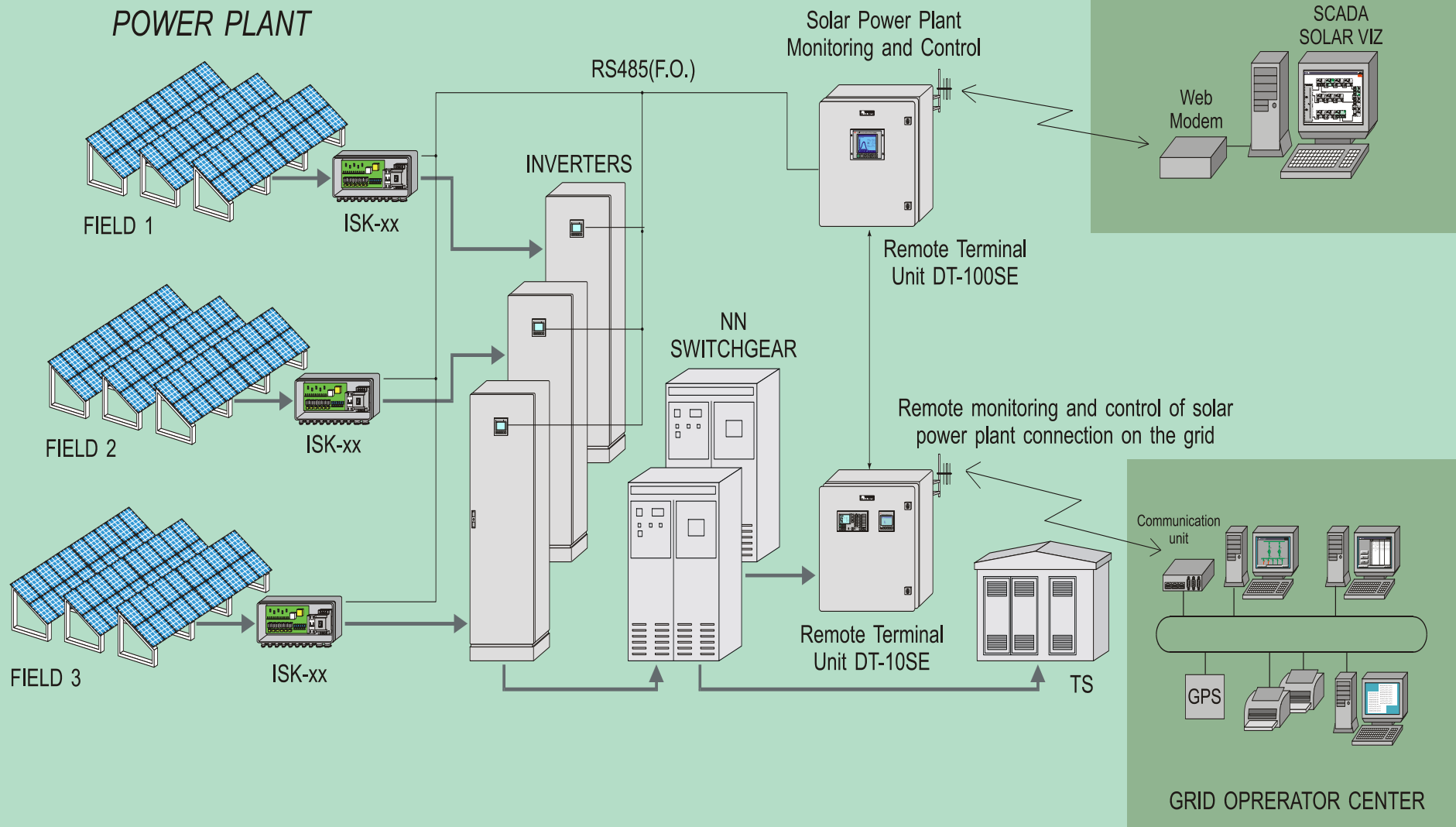
KREDIT KOJI SE VRAĆA IZ UŠTEDA U ENERGIJI (Esco model).
IZNOS INVESTICIJE cca 100.000,00 €.
PLANIRANA GODIŠNJA UŠTEDA EKSTRA LAKOG LOŽIVOGLA IZNOSI
30 000 L ŠTO JE 75 % UKUPNE DOSADAŠNJE POTROŠNJE.
UKUPNA GODIŠNJA FINANCIJSKA UŠTEDA IZNOSI 160.000,00 kn.
PREDVIĐENI POVRAT INVESTICIJE IZNOSI 5 GODINA.
GODIŠNJA EMISIJA UGLJIČNOG DIOKSIDA U OKOLIŠ MANJA ZA 78 700 kg.



PROVOĐENJE MJERA ENERGETSKE UČINKOVITOSTI U MESNOJ INDUSTRIJI "MILIVOJ MEDVEN" U KRAŠIČU



PHOTOVOLTAIC SOLAR POWER PLANT

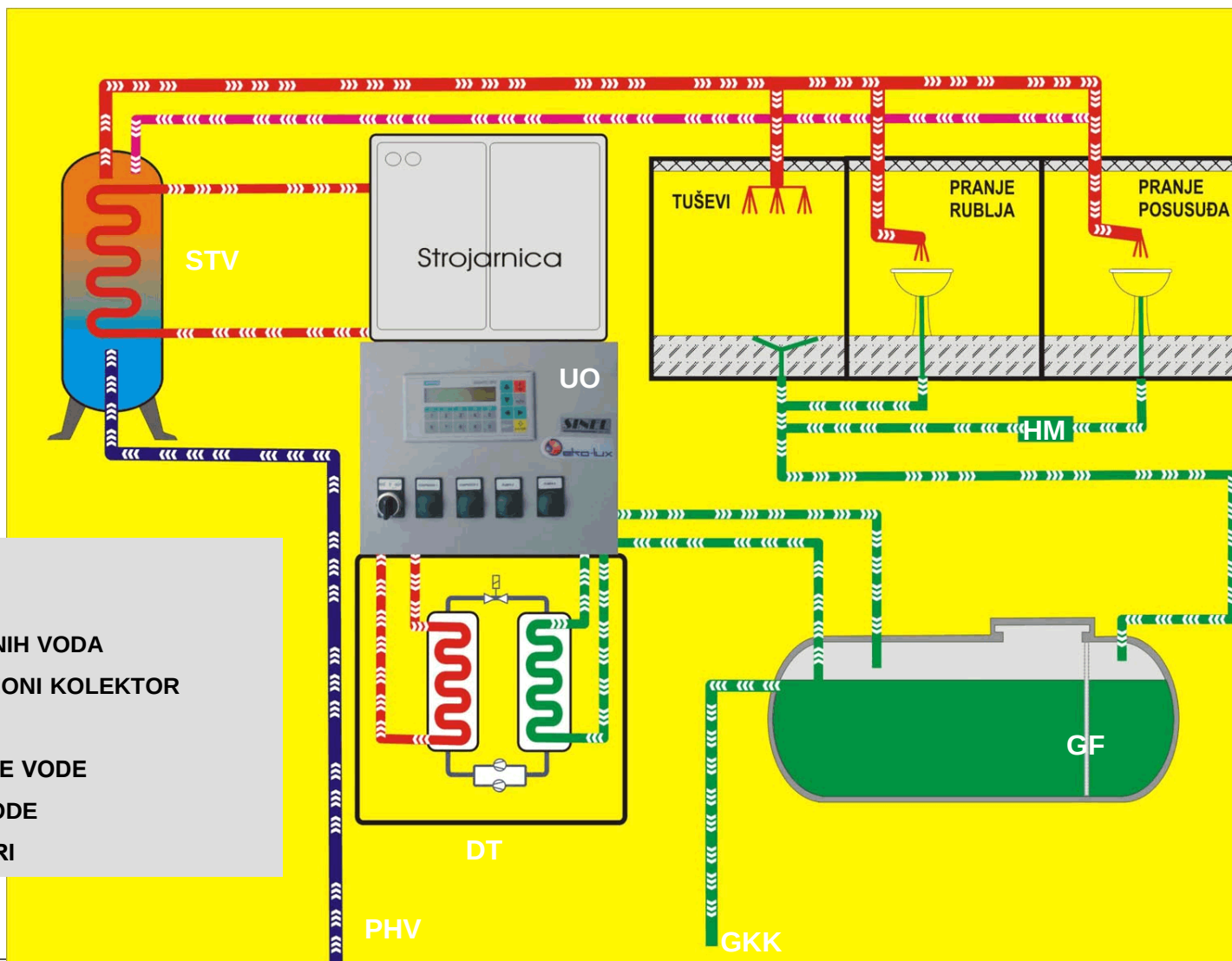


FN i hibridne elektrane





PRIMJENA DIZALICE TOPLINE – PRINCIPNA SHEMA



LEGENDA:

DT- DIZALICA TOPLINE

GF- GRUBI FILTER OTPADNIH VODA

GKK - GLAVNI KANALIZACIONI KOLEKTOR

HM - HVATAČ MASNOĆA

PHV - PRIKLJUČAK HLADNE VODE

STV - SPREMNIK TOPLE VODE

UO - UPRAVLJAČKI ORMARI

SUSTAV ZAGRIJAVANJA SANITARNE VODE AC POLITIN, KRK

- Zagrijavanje tehnološke ili sanitarne vode dizalicom topline
- Primjena – svi objekti (hoteli, kampovi, bazeni i slično) s potrošnjom sanitarne vode većom od 3000 m³/god.
- Industrijska postrojenja s velikom potrošnjom tople vode
- Ušteda energije od 50 do 75 %



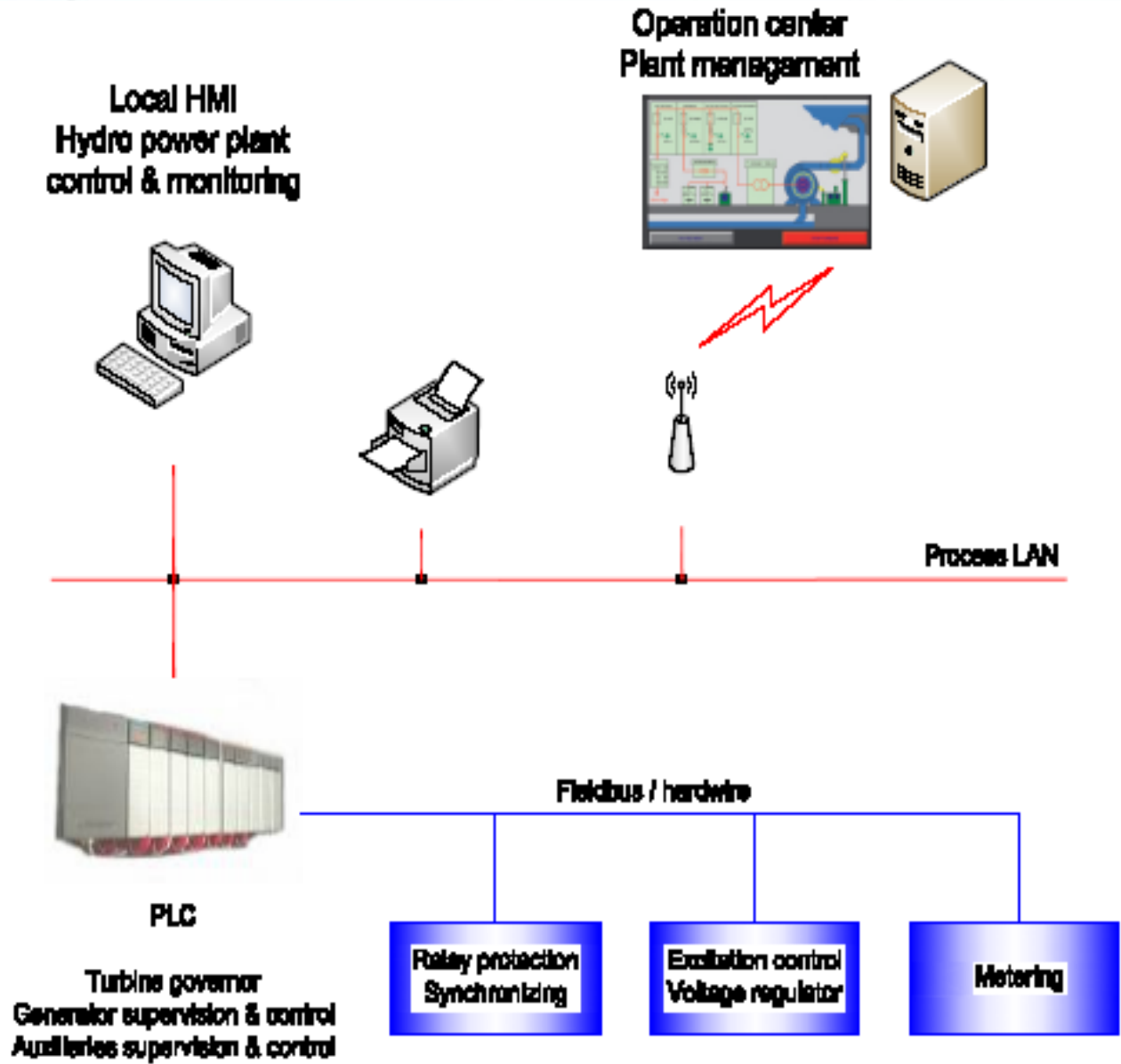
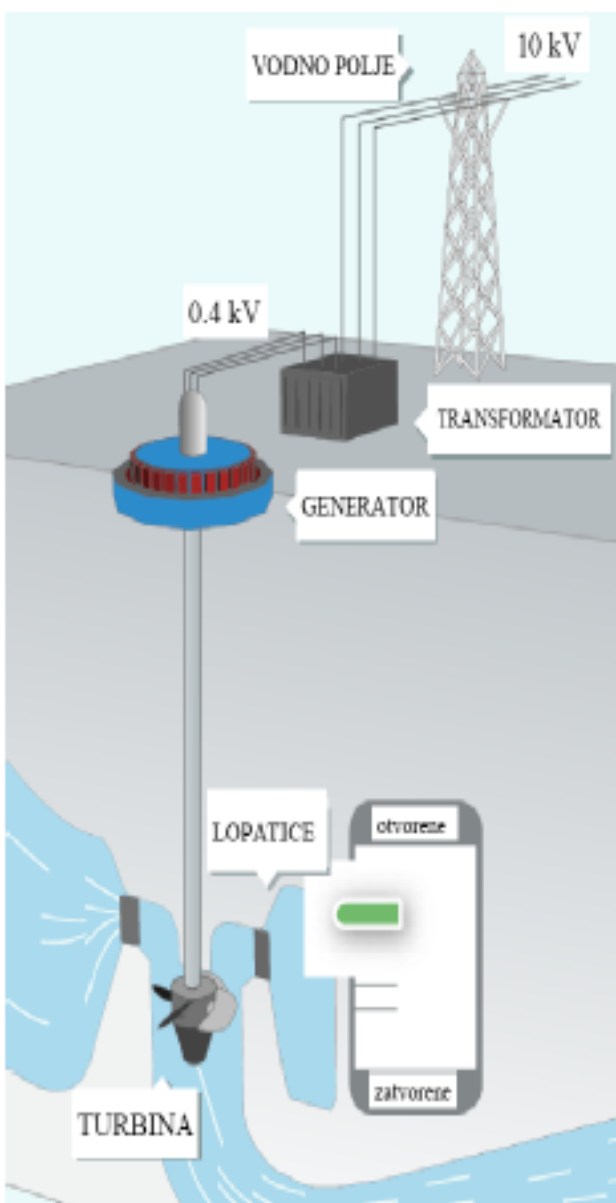
PROJEKT UŠTEDE ENERGIJE U SUSTAVU ZA SUŠENJE POLJOPRIVREDNIH KULTURA

Regulacija i kontrola manipulacije otpadnim zrakom

Trenutna potrošnja plina u procesu sušenja je $1.200 \text{ m}^3/\text{procesu}$. U ukupnim troškovima proizvodnje troškovi energije sudjeluju s cca 35%.

Testiranje postrojenja je u tijeku i prvi rezultati pokazuju da će se potrošnja plina kretati između $500\text{-}600 \text{ m}^3/\text{procesu}$.





OIE – Male hidroelektrane

YEAR	PLANT	LAND	UNIT	TURBINE	POWER	SCOPE OF SUPPLY
2010	SHPP DRUGOVO	MACEDONIA	1	PELTON	750 kVA	Design, delivery and commissioning
2010	SHPP BRBUŠNICA	MACEDONIA	1	PELTON	720 kVA	Design, delivery and commissioning
2011	SHPP KRIVA REKA	MACEDONIA	1	PELTON	730 kVA	Design, delivery and commissioning
2012	SHPP KAMENIČKA REKA	MACEDONIA	1	PELTON	1500 kVA	Design, delivery and commissioning
2012	SHPP BRAJČINO	MACEDONIA	1	PELTON	880 kVA	Design, delivery and commissioning
2012	SHPP KRANSKA REKA	MACEDONIA	1	PELTON	730 kVA	Design, delivery and commissioning
2012	SHPP KRKLJANSKA REKA	MACEDONIA	1	PELTON	480 kVA	Design, delivery and commissioning
2012	SHPP SLATINSKA REKA	MACEDONIA	1	PELTON	700 kVA	Design, delivery and commissioning
2013	SHPP SELEČKA REKA	MACEDONIA	1	PELTON	2150 kVA	Design, delivery and commissioning
2012	SHPP DINC	TURKEY	2	2xPELTON	2x1150 kVA	Design, delivery and commissioning
2013	SHPP POBREG	ALBANIA	2	2xFRENCIS	9500+4200 kVA	Design, delivery and commissioning

mHE Pobreg



Opći podaci mHE Pobreg:

TURBINE:

1. FRANCIS, $P_t = 8771 \text{ kW}$;
 $H_n = 95,43\text{m}$; $Q_a = 10,00\text{m}^3/\text{s}$
2. FRANCIS, $P_t = 3551 \text{ kW}$;
 $H_n = 96,60\text{m}$; $Q_a = 4,00 \text{ m}^3/\text{s}$



Opseg isporuke:

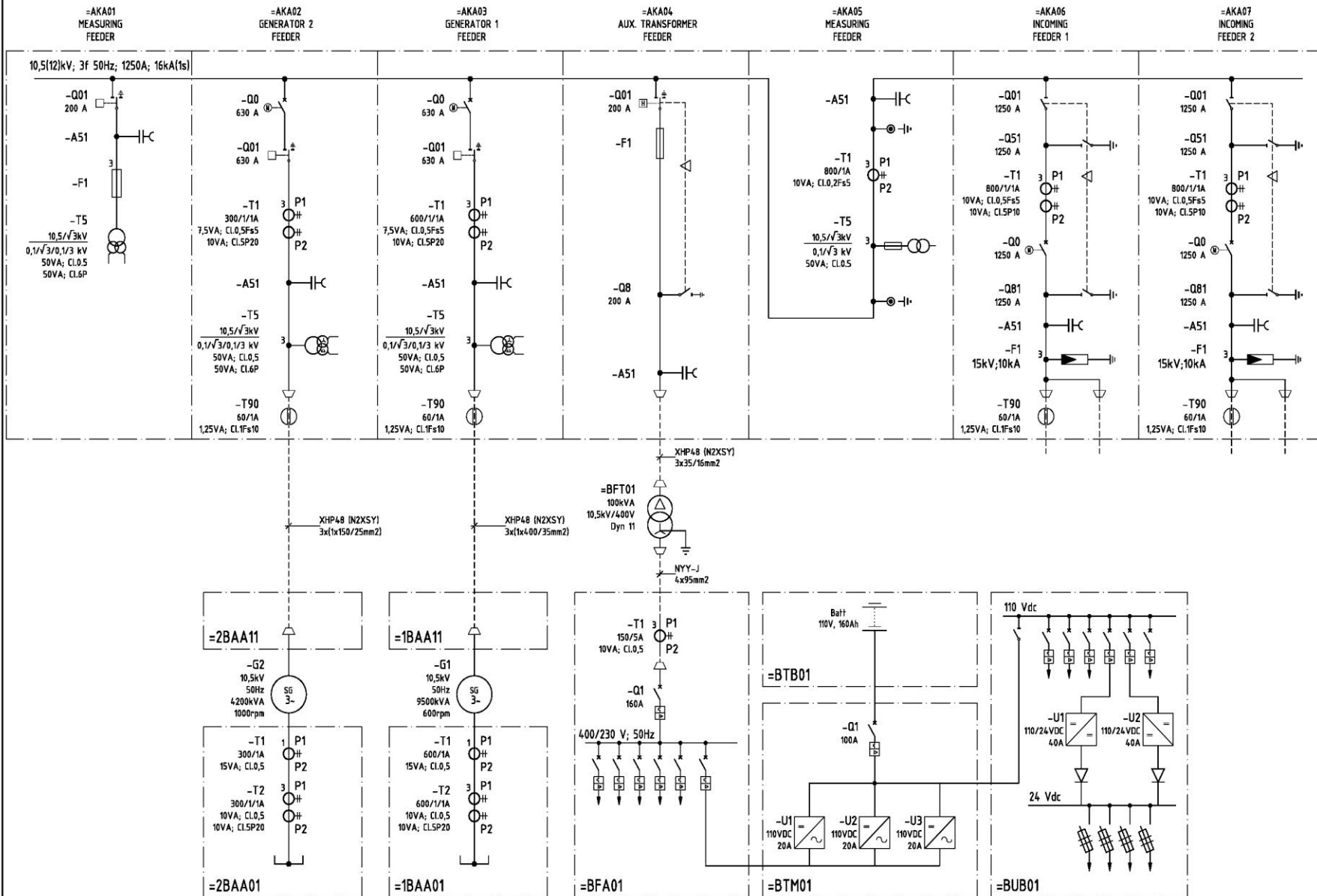
- SN postrojenje i transformator
- AC i DC napajanje
- Upravljanje elektranom
- SCADA sistem
- Sustav zaštite i sinhronizacije
- Turbinska regulacija



This document remains the exclusive property of the PRO INTEGRIS Ltd. Reproduction or any use not in conformity with the intended application is not permissible.

Ovaj dokument ostaje u isključivom vlasništvu PRO INTEGRIS d.o.o.
Prehvać i uporaba izvan namjene nisu dopušteni.

Form:
PI-ENG-03



Date: 07/2012		GUGLER Water Turbines GmbH		HPP POBREG		Project no. 0162		=	
Drawn: Ž. Ribičić		PRO INTEGRIS		SINGLE LINE DIAGRAM		Format: A3		+	
Checked: T. Miljak		Pro Integris, Croatia							
Approved: S. Smoljo		HPP POBREG, Albania						PI-0162-B101-00	
Rev.	Remarks	Rev. date	Name	Approved					Sheet 1 of 1

mHE Pobreg

HPP
POBREG

Home

Unit 1

Unit 2

Single Line
Diagram

Alarm List

Event List

Previous
Screen

Acknowledge
Flashing

System Info

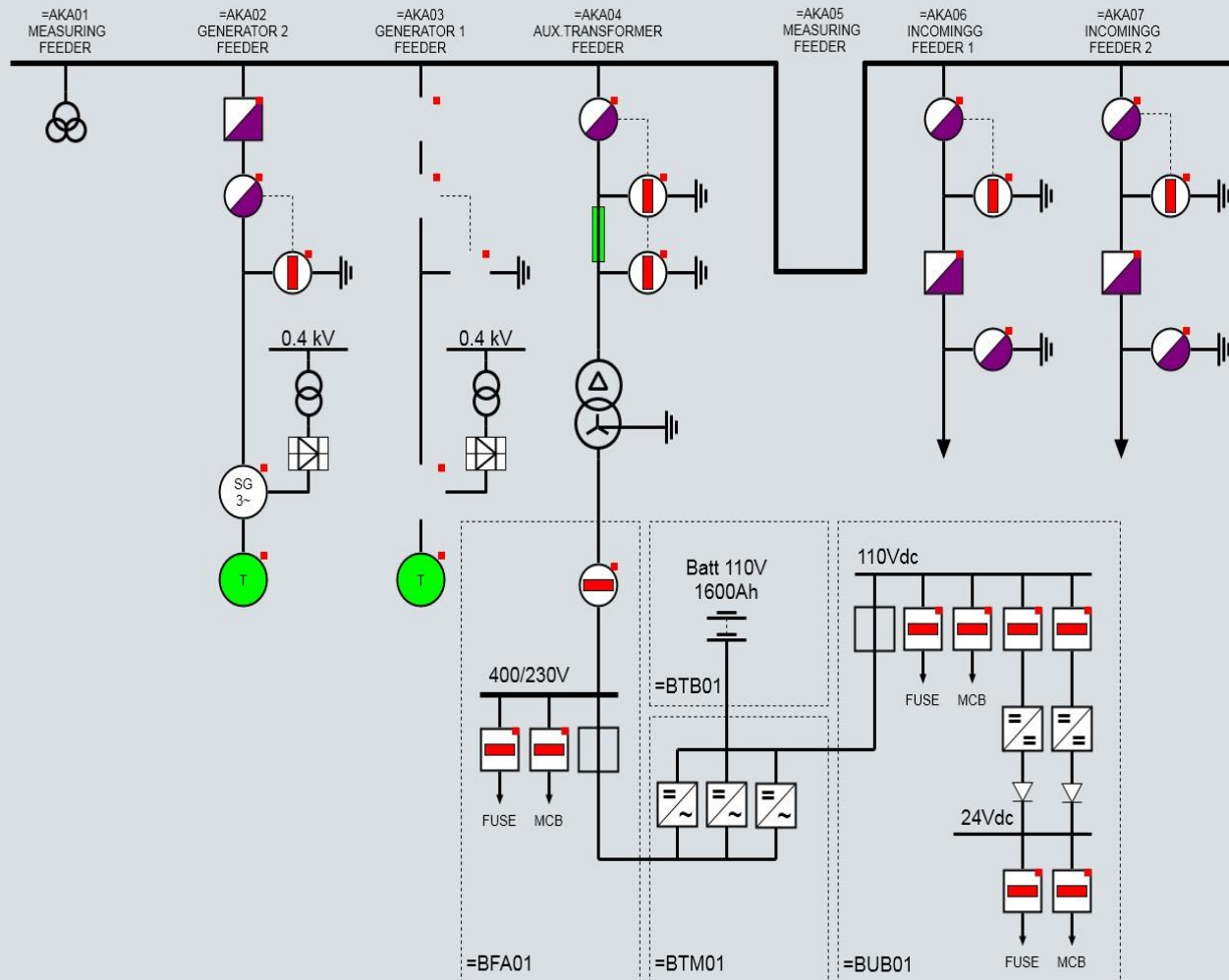
Archived
Data

Stop Runtime

Reload

4:12:54 PM
3/28/2014

Single Line Diagram



Not Acknowledged Alarms: 0

Free Memory [%]: 35 %

Free Disk Space [%]: 22 %

Start screen

Unit 1

Overview

Mode

Operation Mode: UNDEFINED

Total Energy (MWh)

0.000

Turbine Stopped

Total Working Hours

0.0

Butterfly/Bypass

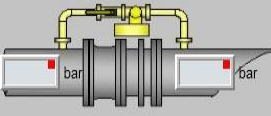
Opened - 90°

Bypass Opened

Intermediate - 85°

Bypass Closed

Closed - 0°



Active Alarms

Lubrication Alarms

HPU

Lubrication Oil Flow

Hidrostatic

Lubric. Water Cooler

Speed/Level

0 rpm

m

Overspeed

Measurements

P = 0.000 MW

Q = 0.0 MVAr

U12 = 0.000 kV

I1 = 0 A

f = 0.0 Hz

cosphi = 0.00

Distributor Hydraulic Cylinder = 0.0 %

HPU Oil Pressure = bar

Inlet Cone = bar

Spiral Inlet = bar

Temperatures

Stator Winding Ph U = °C

Stator Winding Ph V = °C

Stator Winding Ph W = °C

D.E. Axial 1 Bearing = °C

D.E. Axial 2 Bearing = °C

D.E. Radial Bearing = °C

N.D.E. Radial Bearing = °C

Gen. Lubric. Oil Tank = °C

1MKC10 Winding 1 = °C

Turbine Case Temperature = °C

GROUP CONTROL

ON

OFF

One turbine flow (m3/sec)

Turbine 1

Turbine 2

Total flow (m3/sec)

Best efficiency diagram for both turbines calculated from the flow/power table.

Common

Active Alarms

7SJ80_1

7SJ80_2

BFA01 Alarms

BTM01 Alarms

BUB01 Alarms

Measurements

P = 0.000 kW

Q = 0.000 kVAr

U12 = 0 V

I1 = 0 A

cosphi = 0.00

Ep = 0.000 kWh

Eq = 0.000 kVArh

400/230V

FUSE

MCB

=BTB01

Batt 110V

110Vdc

FUSE

MCB

24Vdc

FUSE

MCB

=BFA01

=BTM01

=BUB01

Unit 2

Overview

Mode

Operation Mode: UNDEFINED

Total Energy (MWh)

0.000

Turbine Stopped

Total Working Hours

0.0

Butterfly/Bypass

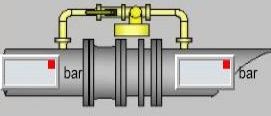
Opened - 90°

Bypass Opened

Intermediate - 85°

Bypass Closed

Closed - 0°



Active Alarms

Lubrication Alarms

HPU

Lubrication Oil Flow

Lubric. Water Cooler

Speed/Level

0 rpm

m

Overspeed

Measurements

P = 0.000 MW

Q = 0.0 kVAr

U12 = 0.000 kV

I1 = 0 A

f = 0.0 Hz

cosphi = 0.00

Distributor Hydraulic Cylinder = 0.0 %

HPU Oil Pressure = bar

Inlet Cone = bar

Spiral Inlet = bar

Temperatures

Stator Winding Ph U = °C

Stator Winding Ph V = °C

Stator Winding Ph W = °C

D.E. Axial 1 Bearing = °C

D.E. Axial 2 Bearing = °C

D.E. Radial Bearing = °C

N.D.E. Radial Bearing = °C

Gen. Lubric. Oil Tank = °C

1MKC10 Winding 1 = °C

Turbine Case Temperature = °C

Not Acknowledged Alarms: 0

Free Memory [%]: 42 %

Free Disk Space [%]: 22 %

mHE Pobreg

HPP
POBREG

Home

Unit 1

Unit 2

Single Line
Diagram

Alarm List

Event List

Previous
Screen

Acknowledge
Flashing

System Info

Archived
Data

Stop Runtime

Reload

4:07:00 PM
3/28/2014

Unit 1 - Overview

Operation Mode Sequences

☐ Manual
☐ Step
☐ Automatic

Turbine

Power (MW) Set Value: 0.000 Act. Value: 0.000
Level (m) Set Value: 0.000 Act. Value: 0.000

Distributor Limitation (%)

Set Value: 0.0 Act. Value: 0.0

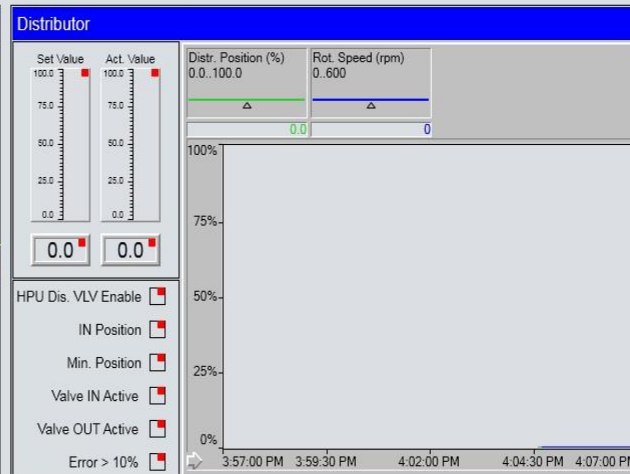
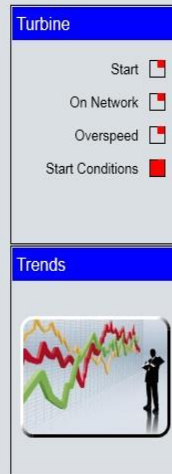
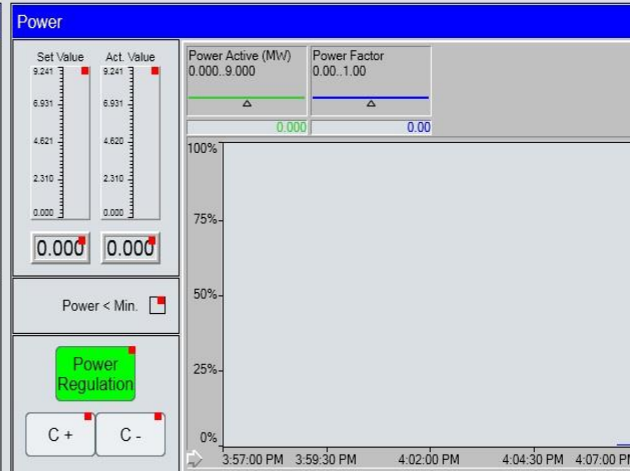
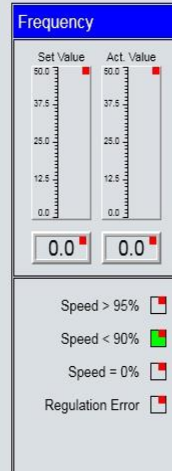
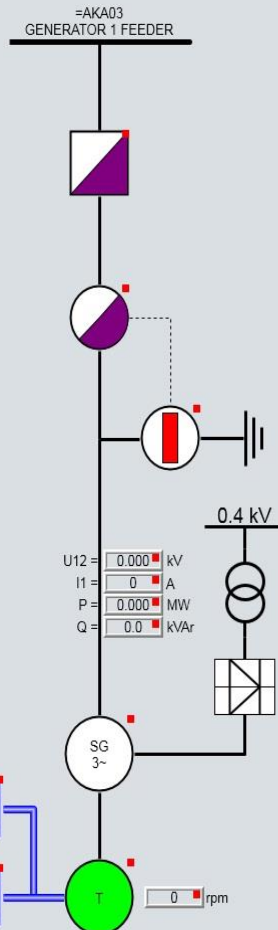
Excitation

☐ ON ☐ Manual
☐ OFF ☐ Automatic

Voltage Regulation

☐ Q (MVar) 0.0
☒ CosPhi 0.00

Voltage +
Voltage -

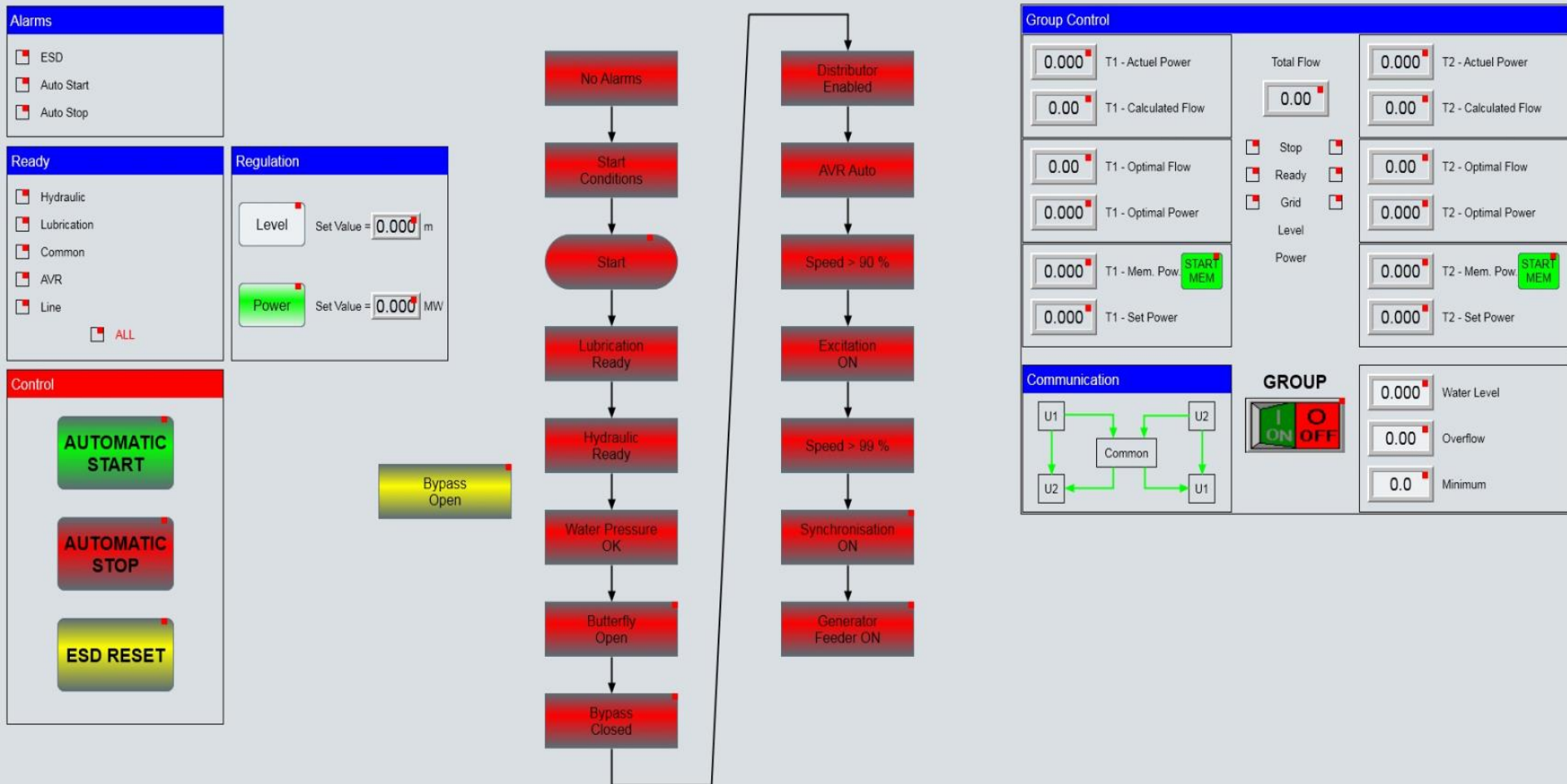


Not Acknowledged Alarms: 0

Free Memory [%]: 41 %

Free Disk Space [%]: 22 %

mHE Pobreg



mHE Pobreg

HPP
POBREG

Home

Unit 1

Unit 2

Single Line
Diagram

Alarm List

Event List

Previous
Screen

Acknowledge
Flashing

System Info

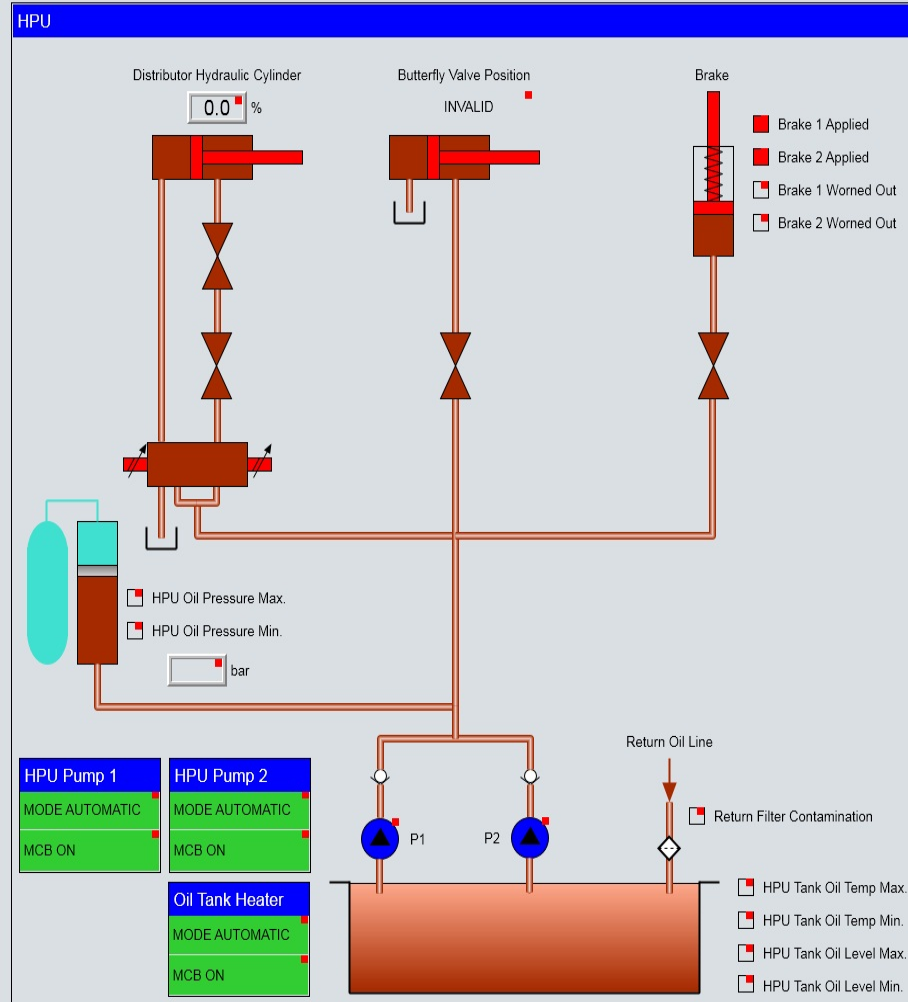
Archived
Data

Stop Runtime

Reload

4:07:49 PM
3/28/2014

Unit 1 - Turbine



Not Acknowledged Alarms: 0

Free Memory [%]: 35 %

Free Disk Space [%]: 22 %

mHE Pobreg

HPP
POBREG

Home

Unit 1

Unit 2

Single Line
Diagram

Alarm List

Event List

Previous
Screen

Acknowledge
Flashing

System Info

Archived
Data

Stop Runtime

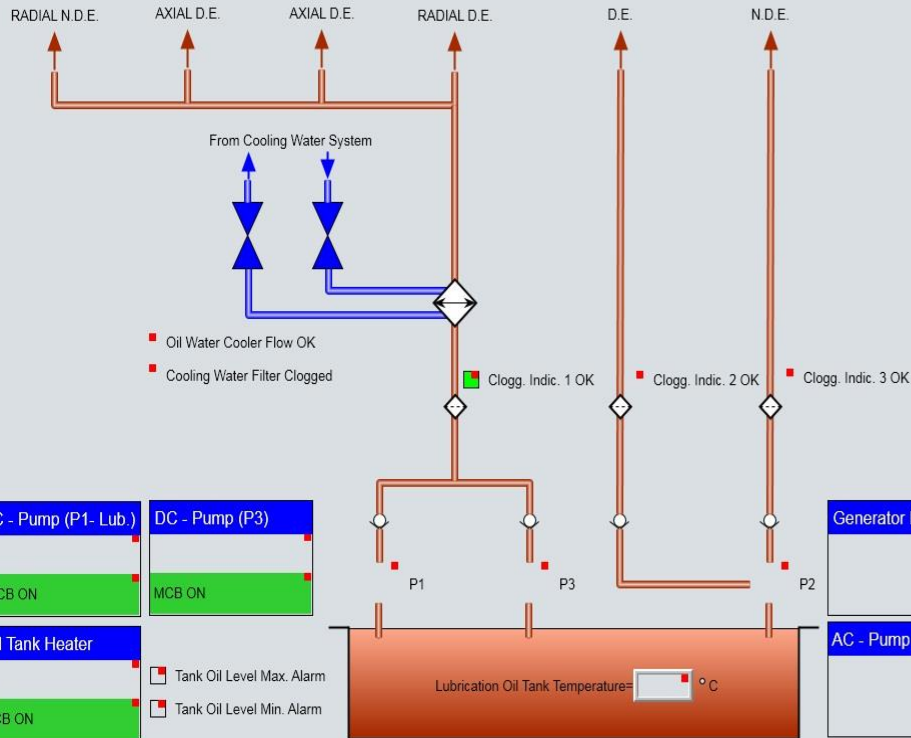
Reload

4:08:23 PM
3/28/2014

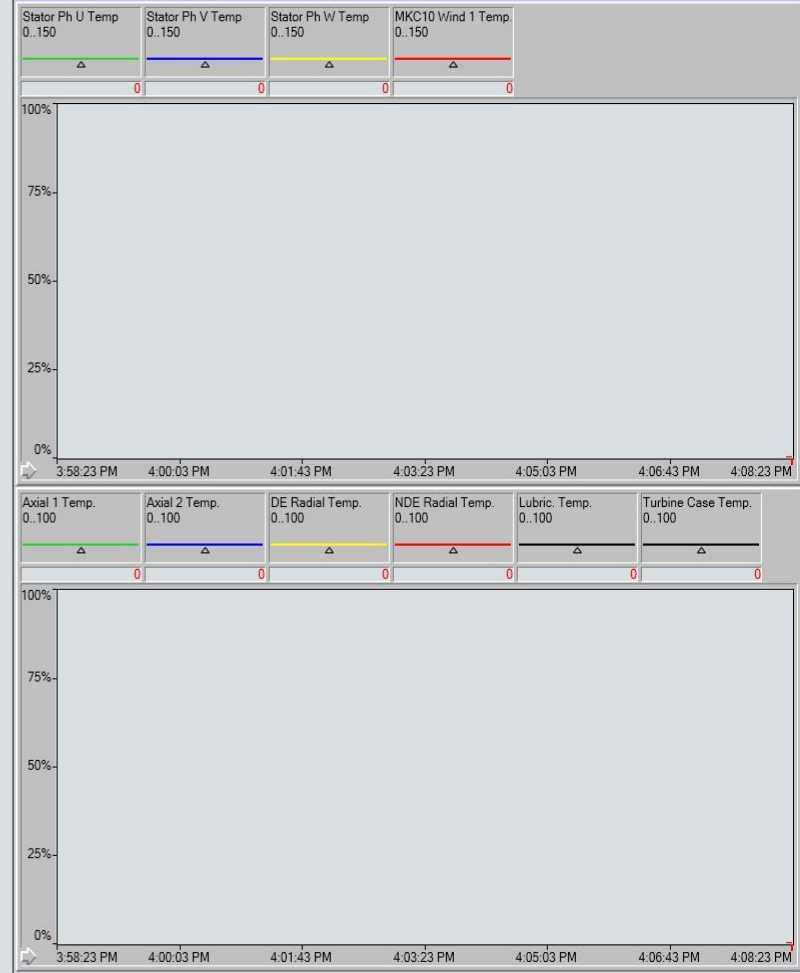
Unit 1 - Generator

Lubrication

- 4 L/min Oil Flow FL1 OK
- 4 L/min Oil Flow FL1 High
- 15 L/min Oil Flow FL2 OK
- 15 L/min Oil Flow FL2 High
- 15 L/min Oil Flow FL3 OK
- 15 L/min Oil Flow FL3 High
- 6 L/min Oil Flow FL4 OK
- 6 L/min Oil Flow FL4 High
- Lubrication System Pressure OK
- Lubrication System Pressure High
- Hidrostatic Lift System Press. Sensor 1 OK
- Hidrostatic Lift System Press. Sensor 2 OK



Trends



Not Acknowledged Alarms: 0

Free Memory [%]: 34 %

Free Disk Space [%]: 22 %

Zahvaljujem na pažnji.

Klaster



PROINTEGRIS
INŽENJERING