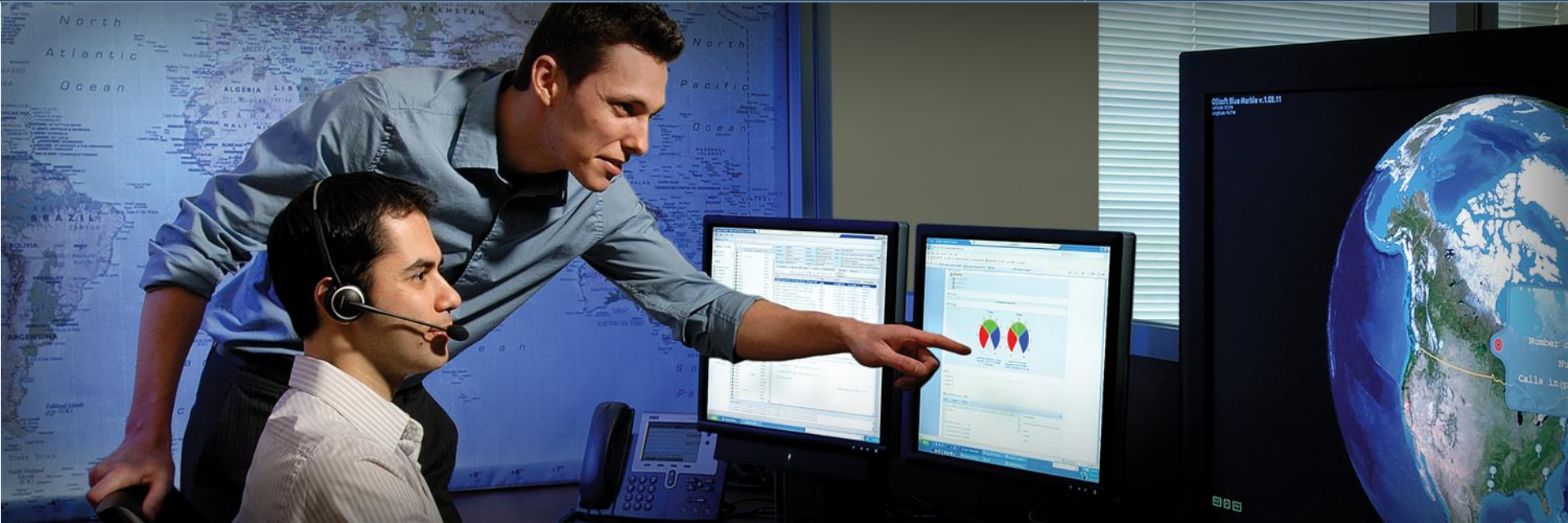




# Regional Seminar Series Bucuresti, Romania



## INFORMATII COMPLETE - SOLUTII REALE

Ana-Maria Ciuculan  
Administrator PI  
Rompetrol Rafinare

25 NOIEMBRIE 2010

Real Time Information - Currency of the New Decade

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- Rompetrol Rafinare
- Produse OSIsoft folosite
- Fara PI - cum a fost ?
- De ce PI?
- Schema functionala sistem
- De unde ? Cine ?
- DECIZII in TIMP REAL bazate pe INFORMATII REALE
- Solutii: PI ProcessBook si PI DataLink
- Beneficii
- Concluzii
- Ce urmeaza?

- Parte a grupului Rompetrol NV.
- Construita intre anii 1975-1977
- Tehnologie romaneasca si straina
- Conceputa sa proceseze o mare varietate de titeiuri
- Capacitatea de rafinare = 5.300.000 tone/an
- Sisteme moderne de control si informare:
  - DCS
  - Sisteme de Informare =OSIsoft Plant Information



- PI Server
- PI AF
- PI ProcessBook
- PI DataLink
- PI System Management Tools (PI SMT)
- PI SDK
- PI API
- PI OPC DA/HDA Server
- PI OPC HDA Interface
- SRP = Software Reliance Program

----- >> pana in 2004

- DATE din sistemul de control ACCESATE DOAR de catre OPERATORI
- Numeroase activitati de colectare manuala a datelor
- NU erau disponibile INFORMATII IN TIMP REAL
- NU existau RAPOARTE ONLINE
- DECALAJ intre EVENIMENTE si DECIZII, respectiv ACTIUNI

**2004 - Implementarea PI**



2004 ----- >> Prezent

- Extindere permanenta :
  - 60.000 tag-uri
  - 120 utilizatori
  - > 10 surse diferite pt date
- Upgradare soft
- Solutii noi

**GESTIONAT si ELIMINAT**

# Fara PI - cum a fost ?

TELEFON

MAIL

CALCULE  
NUMEROASE

ARHIVA

OSIsoft  
PI

- **Standard** pentru monitorizarea datelor de proces
- **Date in timp real din orice sursa**
- **Ce face ?**
  - Colecteaza
  - Arhiveaza intr-o baza unica de date
  - Proceseaza
  - Prelucreaza si pune la dispozitia utilizatorului
    - Prin aplicatiile client
- **Pentru cine ?**
  - Operatori
  - Ingineri, specialisti
  - Manageri



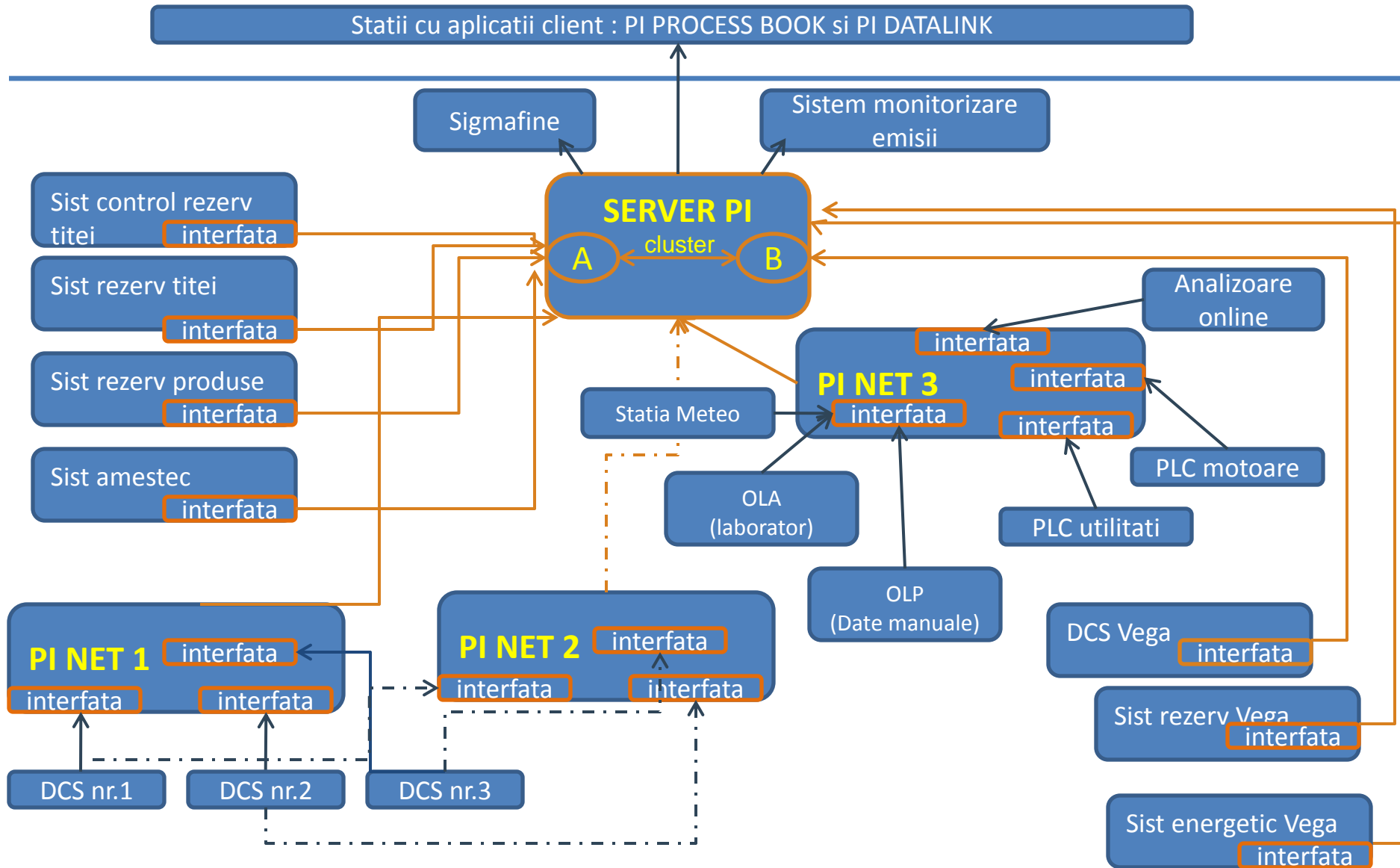
SURSA UNICA DE DATE

TRANSFORMA DATELE IN INFORMATII

ISTORIC

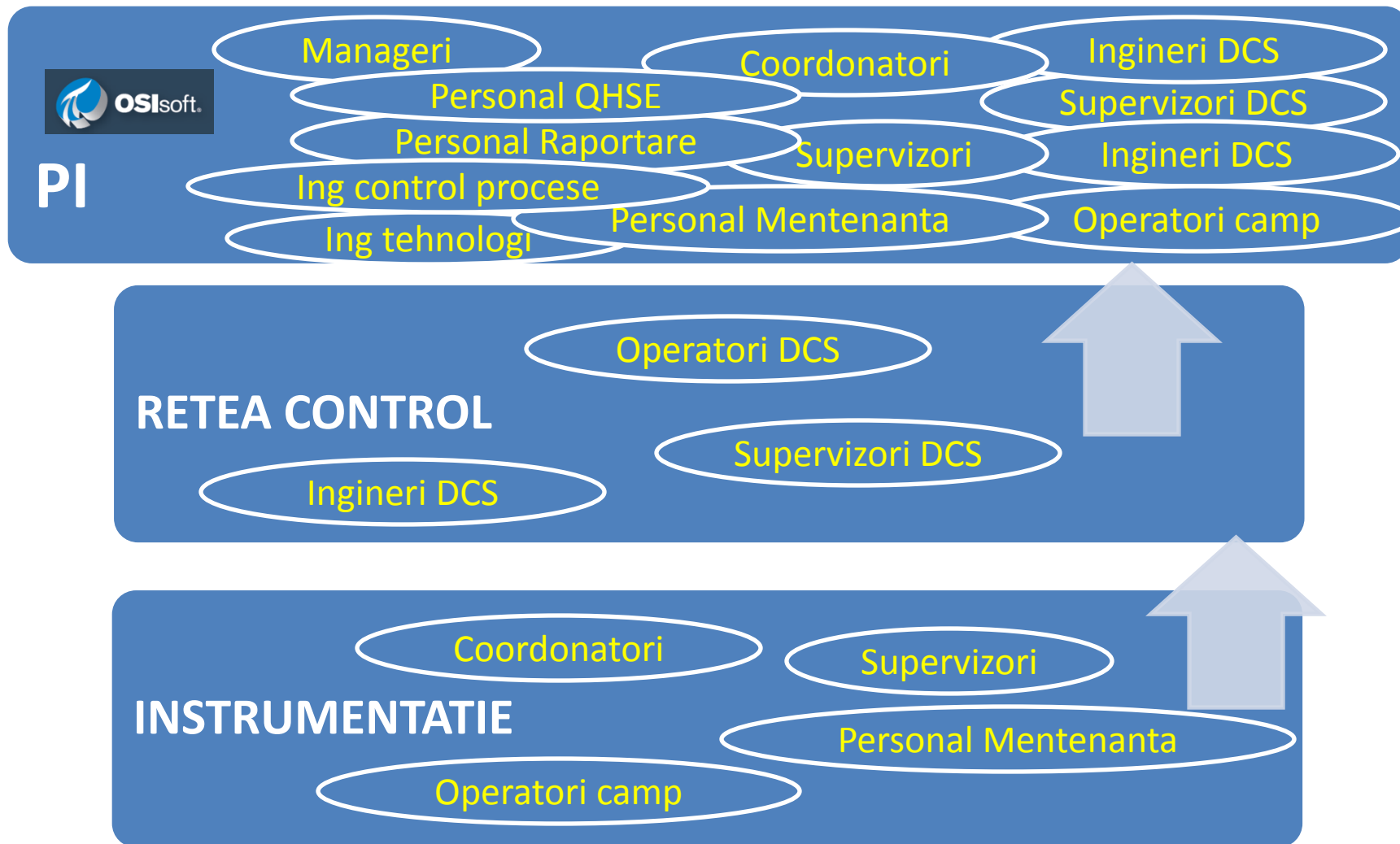


# Schema functionala sistem





# De unde ? Cine ?



# DECIZII in TIMP REAL bazate pe INFORMATII REALE



## Nevoia de informatie

- Consistentă
- Rapida
- Direct de la sursa

## De ce ?

- Decizi rapide si corecte

## SOLUTII



- ECRANE in PI PROCESS BOOK
- RAPOARTE cu PI DATALINK

# PI PROCESS BOOK

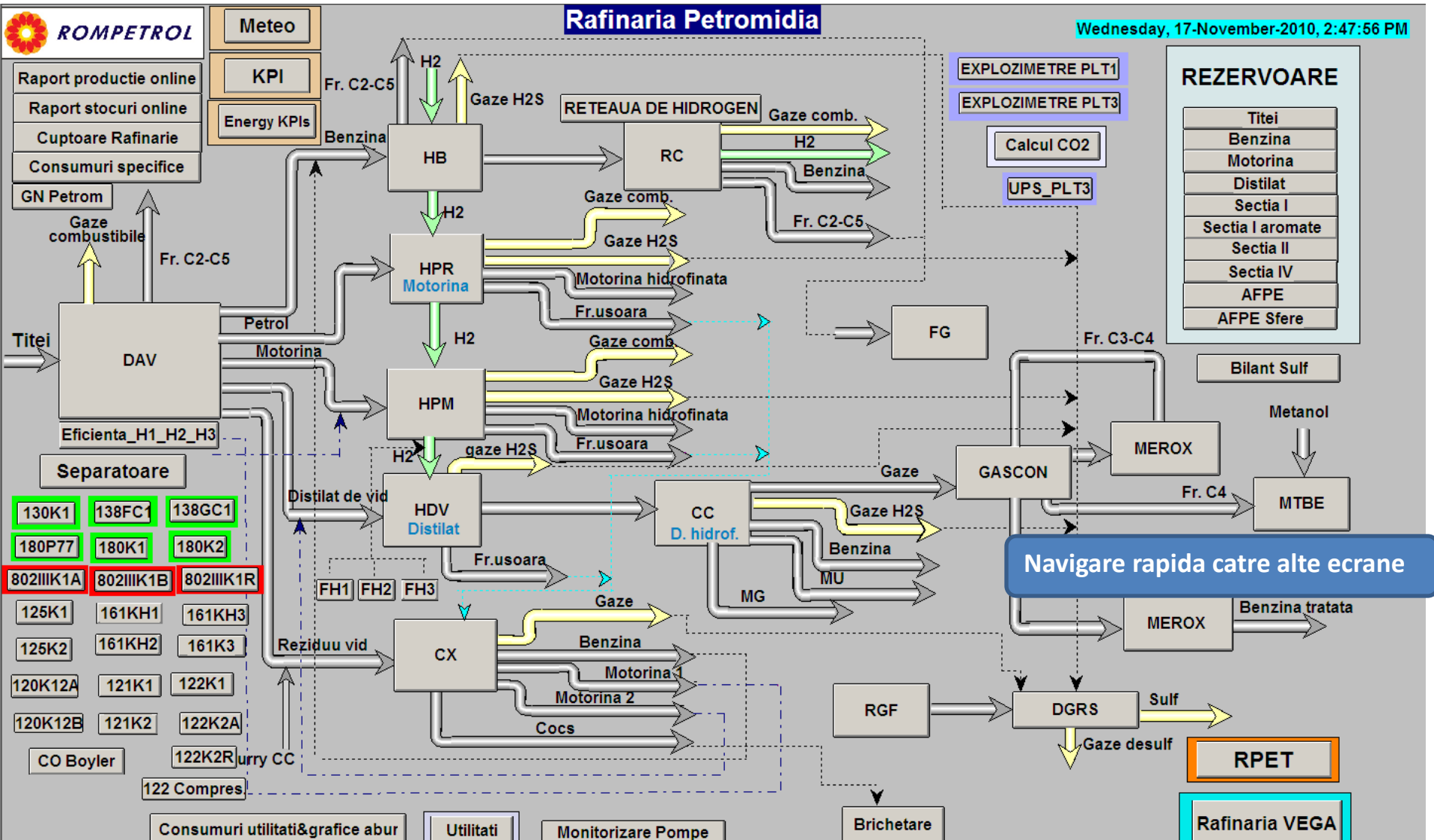


## Vizualizare:

- Parametri procese
- Informatii despre echipamente
- Arhitectura instalatii

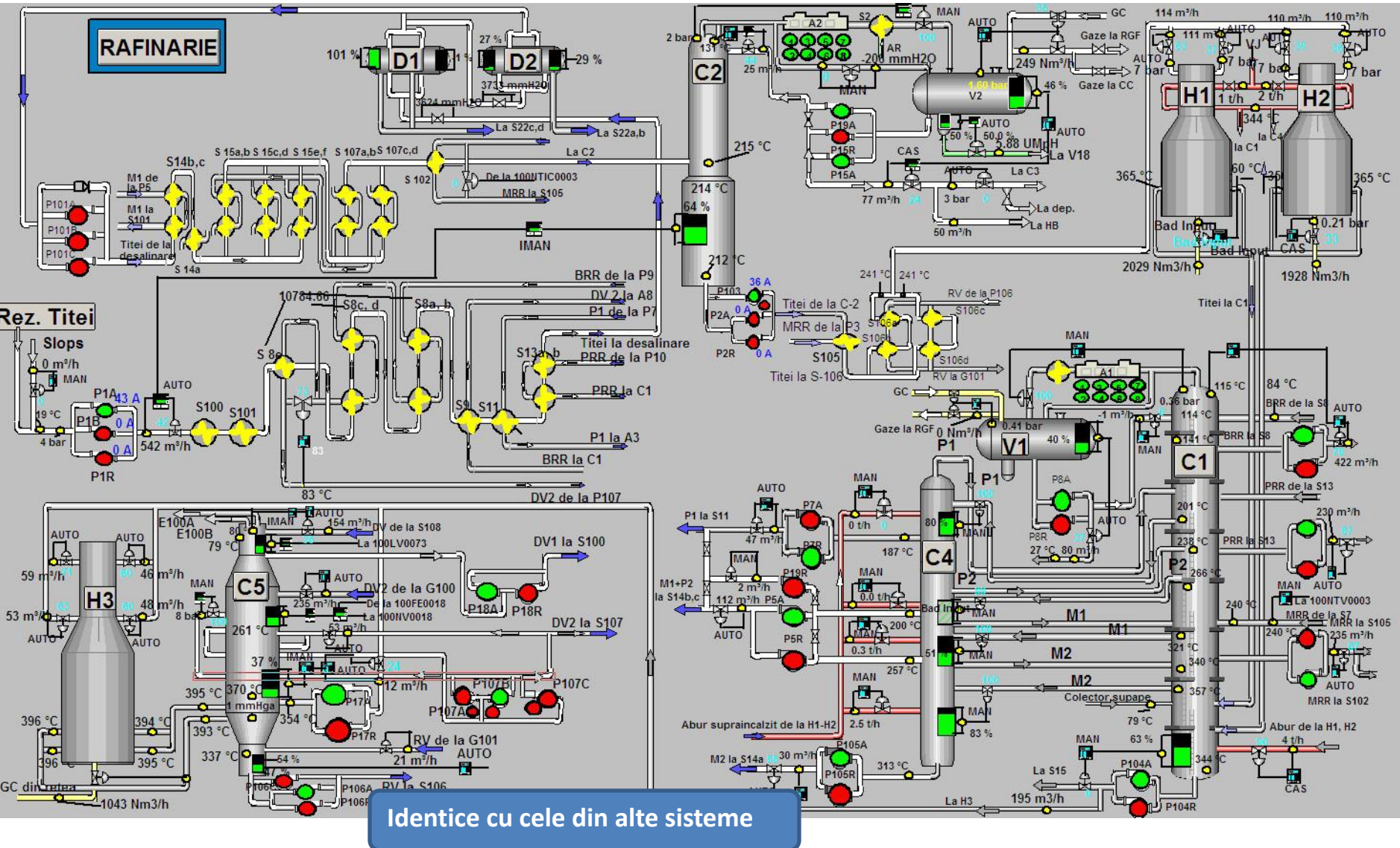
## De unde ?

- Instalatii - zone din instalatii - echipamente





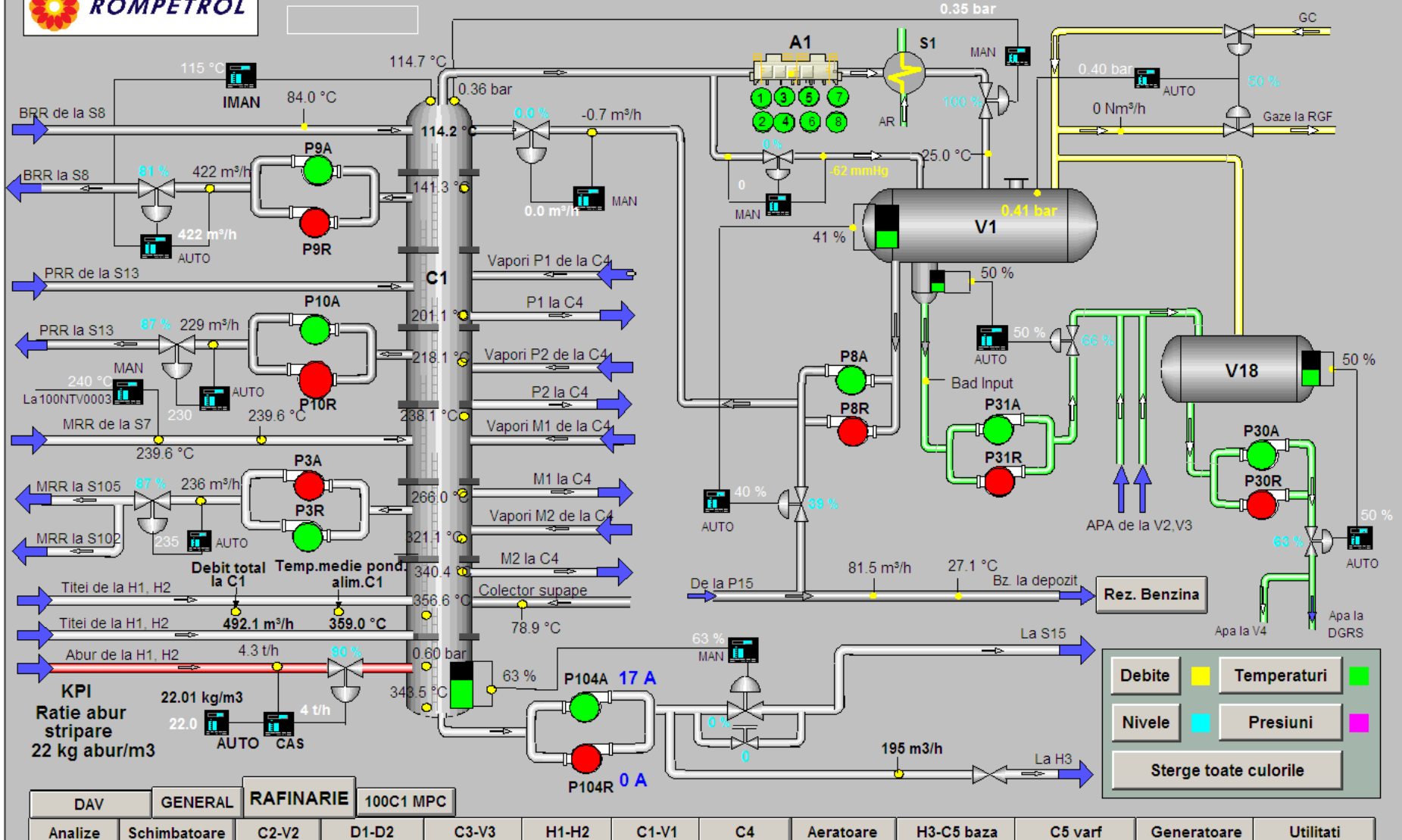
# Schema generala instalatie



Identice cu cele din alte sisteme



Wednesday, 17-November-2010, 3:10:26 PM





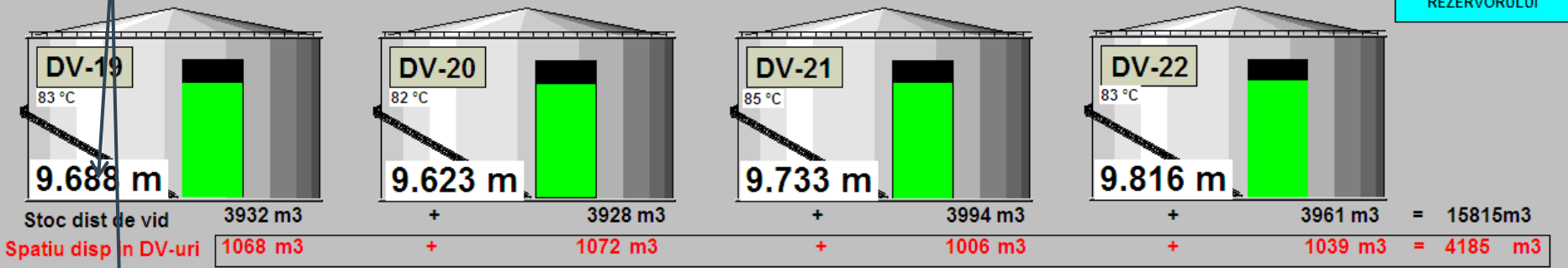


## DISTILAT DE VID

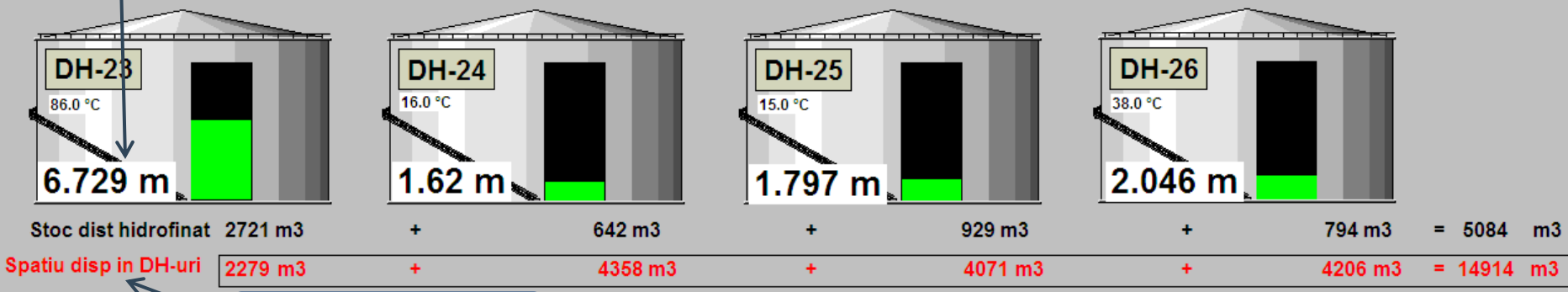
RAFINARIE

PENTRU DETALII  
CLICK PE DENUMIREA  
REZERVORULUI

Date reale

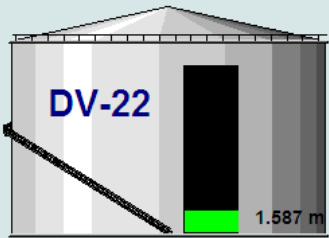


## DISTILAT DE VID HIDROFINAT



Informatii complete

# Detalii rezervor

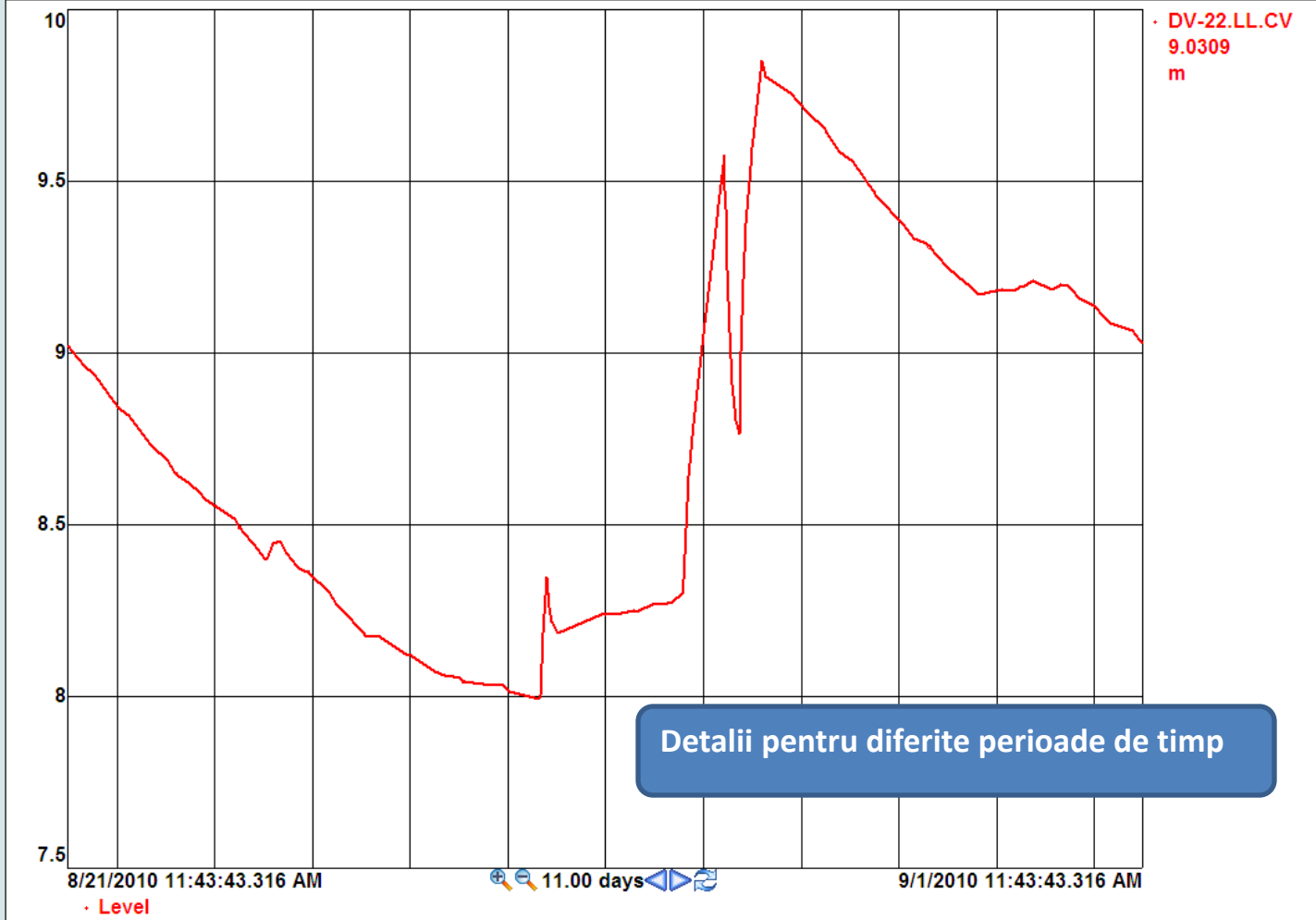


Level

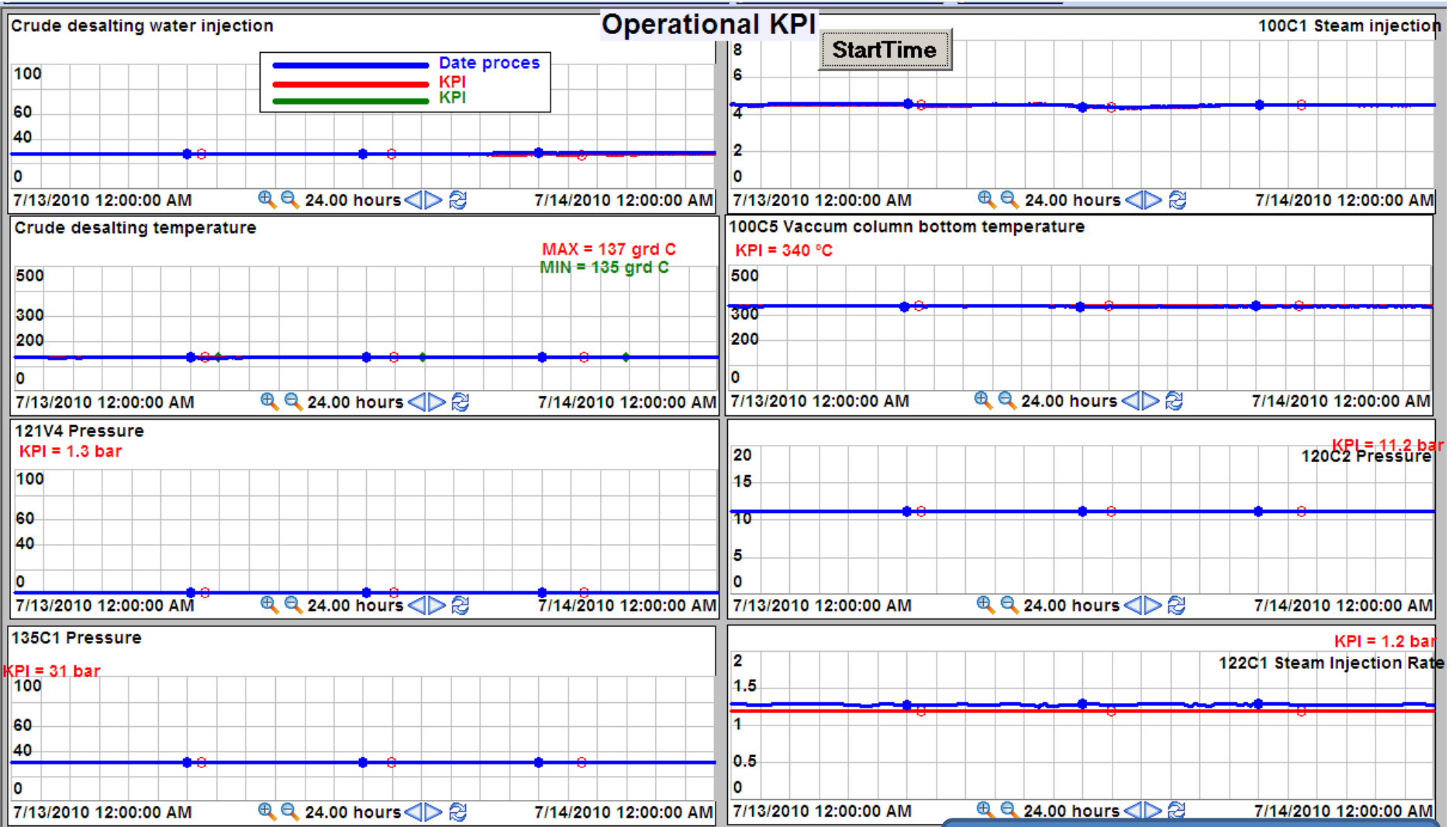
**ALEGE PARAMETRUL**

	Valoare	UM
Diametru	22.88	m
Inaltime	11.95	m
Capacitate	5000	m <sup>3</sup>
Nivel max.	11.6	m
Tip capac	Fix	

	Valoare	UM
Average Temperature	63.5	°C
Available Room	4179.08	m <sup>3</sup>
Observed Density	869.2	Kg/m <sup>3</sup>
Free Water Volume	0.00	m <sup>3</sup>
Gross Observed Volume	596.171	m <sup>3</sup>
Gross Standard Volume	573.695	m <sup>3</sup>
Level	1.587	m
Net Standard Volume	573.695	m <sup>3</sup>
Total Observed Volume	595.635	m <sup>3</sup>
Weight In Air	517.53	t



# KPI Operationali



**DATE PROCES vs TARGET**

# PI DATALINK



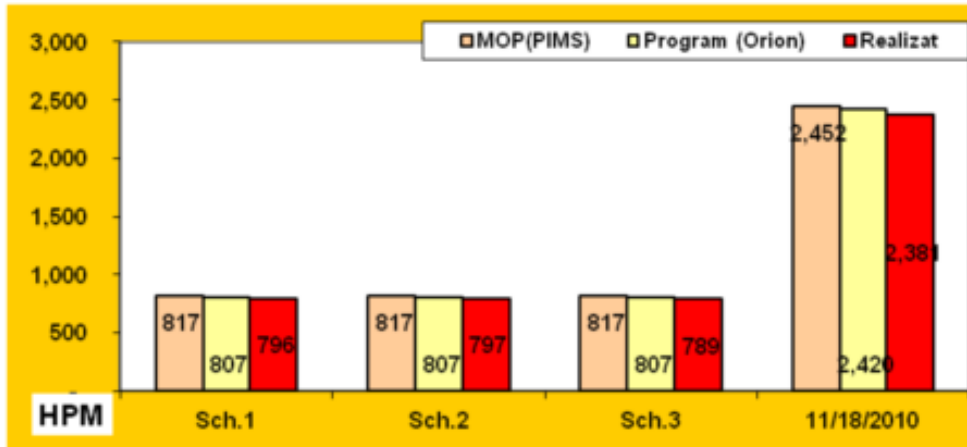
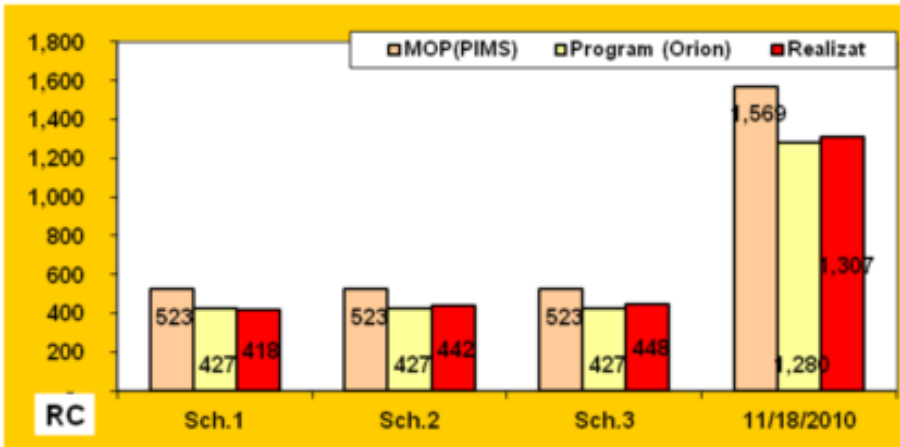
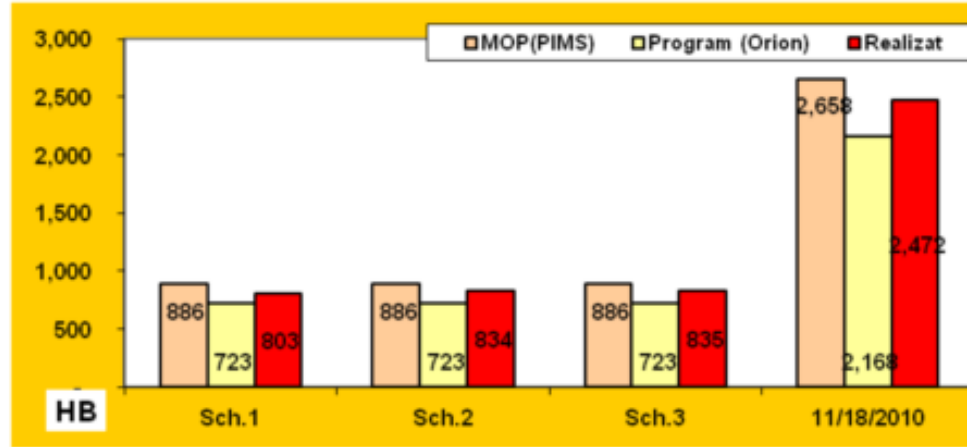
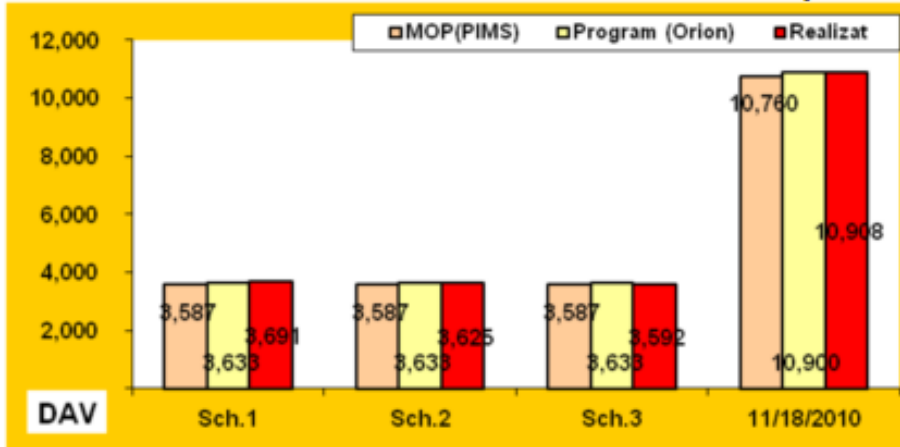
Rapoarte online pentru :

- Productii si Stocuri
- Consumuri Utilitati
- Emisii CO2
- Monitorizare Pompe

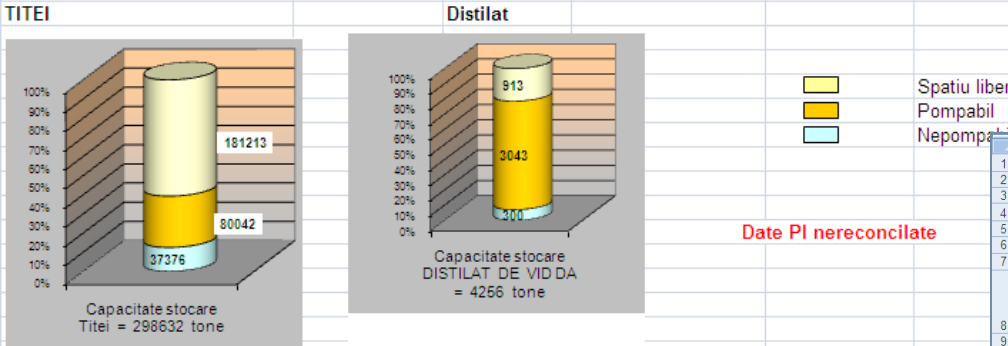
- Sinteze pentru manageri:
  - Productii vs Plan vs Program
  - Stocuri si capacitati de stocare : materii prime si produse
- Rapoarte Detaliata pentru zona operationala :
  - Raport stocuri:
    - Tip produs
    - Densitate
    - Nivel
    - Temperatura
  - Raport productii pt fiecare schimb

Compara automat Realizat vs plan vs program

## Supus instalatii 11/17/10 4:00 AM 11/18/10 4:00 AM



## Stocuri&Capacitati de stocare 11/22/10 11:00 AM

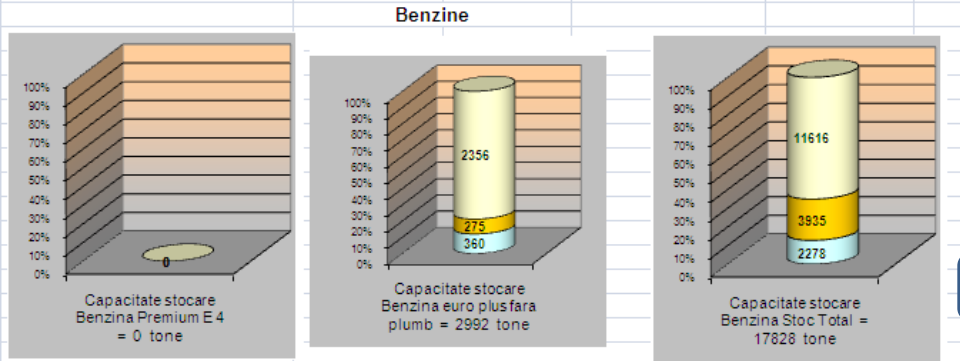
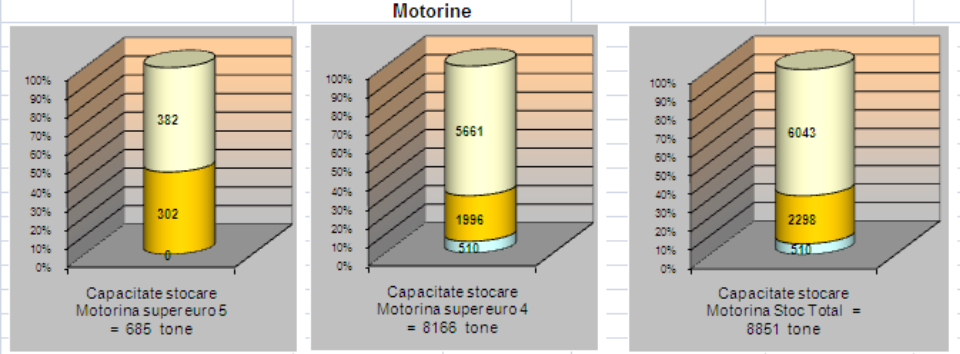


Excel - Operational

Excel - Operational interface showing a data table for Titei storage.

REZ	Nivel de siguranta CM	Nivel produs CM	Nivel apa CM	Temp C	Dens G/CM3	data dens	Stoc total TONE	Stoc pompabil	
Titei	T 1	230	531.5	0.11594	13.8	0.8142	11/11/10 18:01	11833	6833
Titei	T 2	230	982.2	0.0822	14.0	0.8235	10/31/10 12:30	22633	17633
Titei	T 3	235	234.8	1.15801	14.2	0.8385	11/9/10 10:15	5138	0
Titei	T 4	230	1878.0	0.0782	21.0	0.8086	10/31/10 12:00	43017	38017
Titei	T 5	235	865.9	0.33601	12.1	0.8246	10/31/10 9:30	20570	14770
Titei	T 6	235	631.8	1.20201	17.4	0.8636	11/12/10 12:01	15117	9617
Titei	T 7	949.0	1.78106	18.0	0.8708	11/13/10 14:45	22773	17773	
Titei	T 8	230	0.0	1.11384	0.0	0.8763	6/28/10 12:38	0	0
							<b>141081</b>	<b>104643</b>	

HTML - Management



HTML - Management interface showing a data table for Benzine storage.

REZ	Nivel de siguranta cm	Nivel produs cm	Nivel Apa cm	Tmp C	Dens G/CM3	Stoc total T	Stoc Pomp T
Titei	T 1	230	532	0	14	11845	6845
Titei	T 2	230	982	0	14	22628	17128
Titei	T 3	235	235	2	14	5100	0
Titei	T 4	230	1878	0	21	43017	38017
Titei	T 5	235	866	2	12	20231	14431
Titei	T 6	235	632	2	17	15005	9505
Titei	T 7	949	1.78106	18	0.7476	19455	13955
Titei	T 8	230	0	1	0	0	0

Formate diferite in functie de nevoia utilizatorului



# Consumuri Utilitati

Consumurile din aceasta pagina sunt pentru data de :

8 / 18 / 2010

Deoarece ziua energetica se incheie la ora 7.00 , bilantul pe gaze se calculeaza dupa ce Dispecherul introduce valorile contorilor in OLP.  
Pentru aburul de 36ata vandut sau cumparat de la Petrochimie cantitatile au fost calculate cu tagurile din PL.(dupa ora 8.00 poate fi vizualizat in locatia Z:\Groups\Refinery\PI\Pem\_prcbook\Rapoarte)

## Consum apa demi:

	CONSUM APA DEMI			
	[m <sup>3</sup> ]		[m <sup>3</sup> /h]	
	17/Aug/10	18/Aug/10	17/Aug/10	18/Aug/10
UTM	3491	3668.0	145.5	152.8
RAFINARIE	2493	2721.0	103.9	113.4
PETROCHIMIE	1094.0	1126.0	45.6	46.9

## Energie electrica

		ENERGIE ELECTRICA			
		[MWh]		[MW]	
		17/Aug/10	18/Aug/10	17/Aug/10	18/Aug/10
ROMPETROL RAFINARE	INSTALATII	591.9	604.2	24.7	25.2
	UTILITATI	192.6	191.5	8.0	8.0
IMPETROL PETROCHEMIA	INSTALATII	349.8	280.4	14.6	11.7
	UTILITATI	148.1	145.0	6.2	6.0
TERTI		42.2	39.6	1.8	1.6
<b>TOTAL PLATFORMA</b>		<b>1324.6</b>	<b>1260.6</b>	<b>55.2</b>	<b>52.5</b>

## Energia termica

	ENERGIE TERMICA									
	17/Aug/10				18/Aug/10					
	Rafinarie de la :		Rafinarie la:		Rafinarie de la :		Rafinarie la:			
	CET [t]	Petrochimie [t]	Petrochimie[t]	TOTAL [t]	CET [t]	Petrochimie[t]	Petrochimie[t]	TOTAL [t]		
ABUR 6 ata				3				1	0.0	0.0
ABUR 16 ata	12	281	0	1366	92	194	0	1435	45.3	59.8
ABUR 36 ATA	270	0	0	1133	297	0	0	1190	47.2	49.6
<b>TOTAL</b>	<b>282</b>	<b>281</b>	<b>0</b>	<b>2502</b>	<b>389</b>	<b>194</b>	<b>0</b>	<b>2626</b>	<b>92.5</b>	<b>109.4</b>

## Gaze naturale

TOTAL-GAZE NATURALE		CONGAZ		PETROMAR	
[Nm <sup>3</sup> ]	[Nm <sup>3</sup> /h]	[Nm <sup>3</sup> ]	[Nm <sup>3</sup> /h]	[Nm <sup>3</sup> ]	[Nm <sup>3</sup> /h]
267232	11135	27186	1133	240046	10002

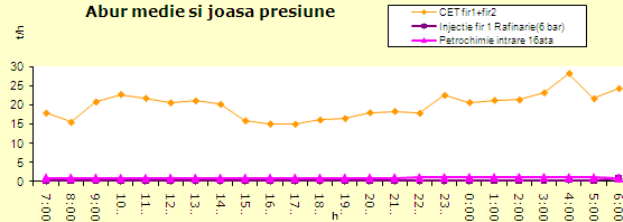
## Gaze combustibile - Rafinarie

Gaz Metan - FH2		Gaz energetic (COBoiler)		Gaz energetic (cuptoare)	
[Nm <sup>3</sup> ]	[Nm <sup>3</sup> /h]	[Nm <sup>3</sup> ]	[Nm <sup>3</sup> /h]	[Nm <sup>3</sup> ]	[Nm <sup>3</sup> /h]
51856	2161	106394	4433	-40529786	-1688741

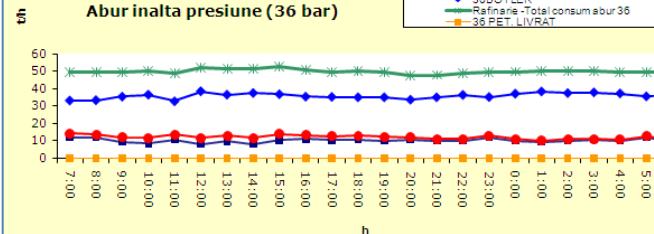
## Gaze de rafinarie

Total productie intrare V7		Gaze de rafinarie - vandute					
		UTM		PETROCHEMICALS		TOTAL	
[Nm <sup>3</sup> ]	[Nm <sup>3</sup> /h]	[Nm <sup>3</sup> ]	[Nm <sup>3</sup> /h]	[Nm <sup>3</sup> ]	[Nm <sup>3</sup> /h]	[Nm <sup>3</sup> ]	[Nm <sup>3</sup> /h]
468204	19508	4100000	1708333	106971	4457	41106971	1712790

Abur medie si joasa presiune



Abur inalta presiune (36 bar)



Grafice - actualizare automata

Forma tabelara : consumuri

## Calculul emisiilor de CO2 in RR

\*\*\*\*\*contur cupatoare vs V7\*\*\*\*\*

Start Time      End Time  
 Din 8 / 1 /2010      8 /31/2010

GoTo CO2-Trend

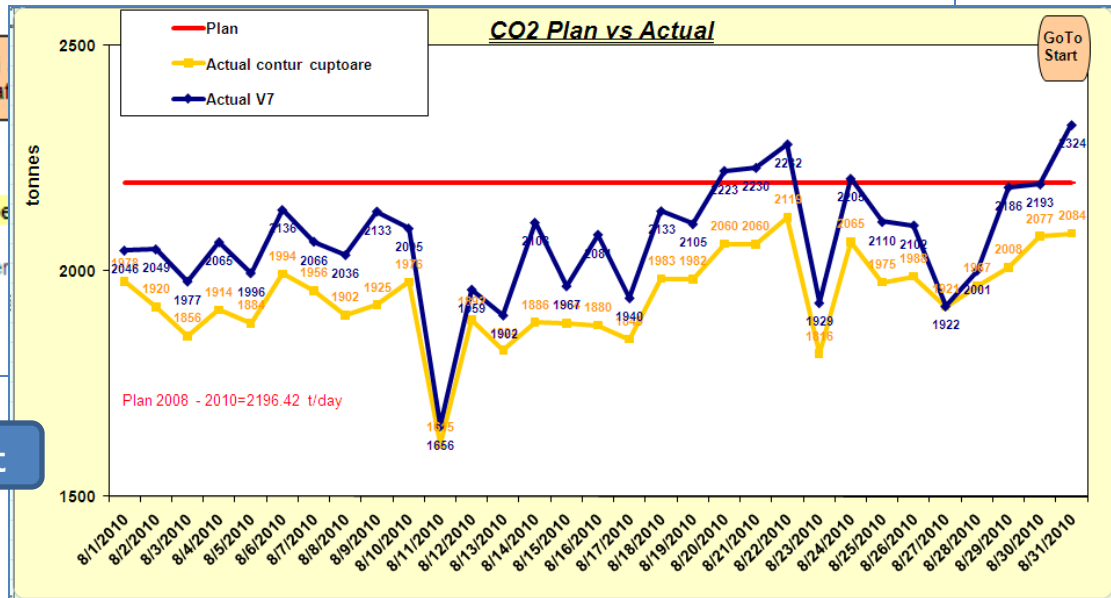
GoTo Summary

contur cupatoare	V7
CO2 de la cupatoare, piloti facla si cazane facla	CO2 de la V7, piloti facla si cazane facla
37,709,938 kg CO2	41,623,604 kg CO2
CO2 din ardere cocs CC	CO2 din ardere cocs CC
20,613,817 kg CO2	20,613,817 kg CO2
CO2 emis de FH2	CO2 emis de FH2
1,916,293 kg CO2	1,916,293 kg CO2
<b>TOTAL emisii CO2 in RR in perioada selectata mai sus</b>	<b>TOTAL emisii CO2 in RR in perioada selectata mai sus</b>
<b>60,240,048 kg CO2</b> 60,240 tone CO2	<b>64,153,714 kg CO2</b> 64,154 tone CO2

Calculeaza si gra

### Etape ce trebuie parcurse pe

1. Se selecteaza datele pentru inceputul si sfarsitul inter
2. Se apasa butonul "Calculeaza si actualizeaza grafic"



Compara automat realizat vs alocat

# Monitorizare pompe

- ✓ Montorizare timp de functionare
- ✓ Cresterea disponibilitatii mecanice
- ✓ Reducerea costurilor de intretinere

Suport pentru mentenanta

Sumar- pt fiecare instalatie : numarul pompelor care nu au fost pornite in intervalul selectat

Buton pt acces rapid catre pagina de detalii

USOR DE ACCESAT de catre utilizarii de PI

**ROMPETROL**

START TIME: 7 / 1 / 2009      END TIME: 12 / 3 / 2009

**CALCULEAZA**

Instalatie	Nr pompe care NU au fost pornite in intervalul selectat	Ce pompe nu au fost pornite
DAV	5	<a href="#">vezi pompe DAV</a>
HDV	5	<a href="#">vezi pompe HDV</a>
HB	2	<a href="#">vezi pompe HB</a>
RC	5	<a href="#">vezi pompe RC</a>
FG	3	<a href="#">vezi pompe FG</a>
HPR	1	<a href="#">vezi pompe HPR</a>
<b>HPM</b>	<b>0</b>	<a href="#">vezi pompe HPM</a>
CC	5	<a href="#">vezi pompe CC</a>

## Pompe HPM

Pozitie montaj	Timp de functionare [ORE]	Timp de functionare [ZILE]	Valoarea curenta	Nr porniri in intervalul ales	ACTIUNE
122P001A	1656.36276	69	RUN	1	SE PORNESTE REZERVA
122P001R	139.2677791	5.8	STOP	0	NU NECESITA INTERVENTIE
122P002A	28.06110563	1.1	STOP	1	NU NECESITA INTERVENTIE
122P002R	1737.504991	72.3	RUN	6	SE PORNESTE REZERVA
122P004A	1109.567228	46.2	STOP	0	NU NECESITA INTERVENTIE
122P004R	775.2899858	32.3	RUN	6	NU NECESITA INTERVENTIE
200BP6A	1042.006089	43.4	STOP	0	NU NECESITA INTERVENTIE
200BP6R	707.8177576	29.4	RUN	1	NU NECESITA INTERVENTIE

# Rezultate



- **MONITORIZARE si ARHIVARE DATE** din diferite surse :
  - Sisteme control
  - PLC-uri
  - Sisteme Tank Master
  - Aplicatii pentru date introduse manual
- **TRANSFORMA DATELE in INFORMATII**
- **DECIZII RAPIDE** bazate pe **INFORMATII COMPLETE**

2004

INAINTE DE IMPLEMENTARE PI	DUPA IMPLEMENTARE PI
COLECTARE DATE = ACTIVITATI CONSUMATOARE DE TIMP	TIMP CASTIGAT pt ANALIZA si DECIZII RAPIDE bazate pe INFOMATII COMPLETE
ISTORIC LIMITAT	ISTORIC DATE pentru PERIOADE FOARTE MARI
FEEDBACK LENT	FEEDBACK RAPID catre OPERARE
"INTRODUCERE MANUALA" VOLUM MARE DE DATE pentru RAPOARTE	COLECTARE AUTOMATA de DATE pentru RAPOARTE
DATE cu ERORI	DATE EXACTE
ACCES la DATE LIMITAT	DISPONIBILITATE DATE

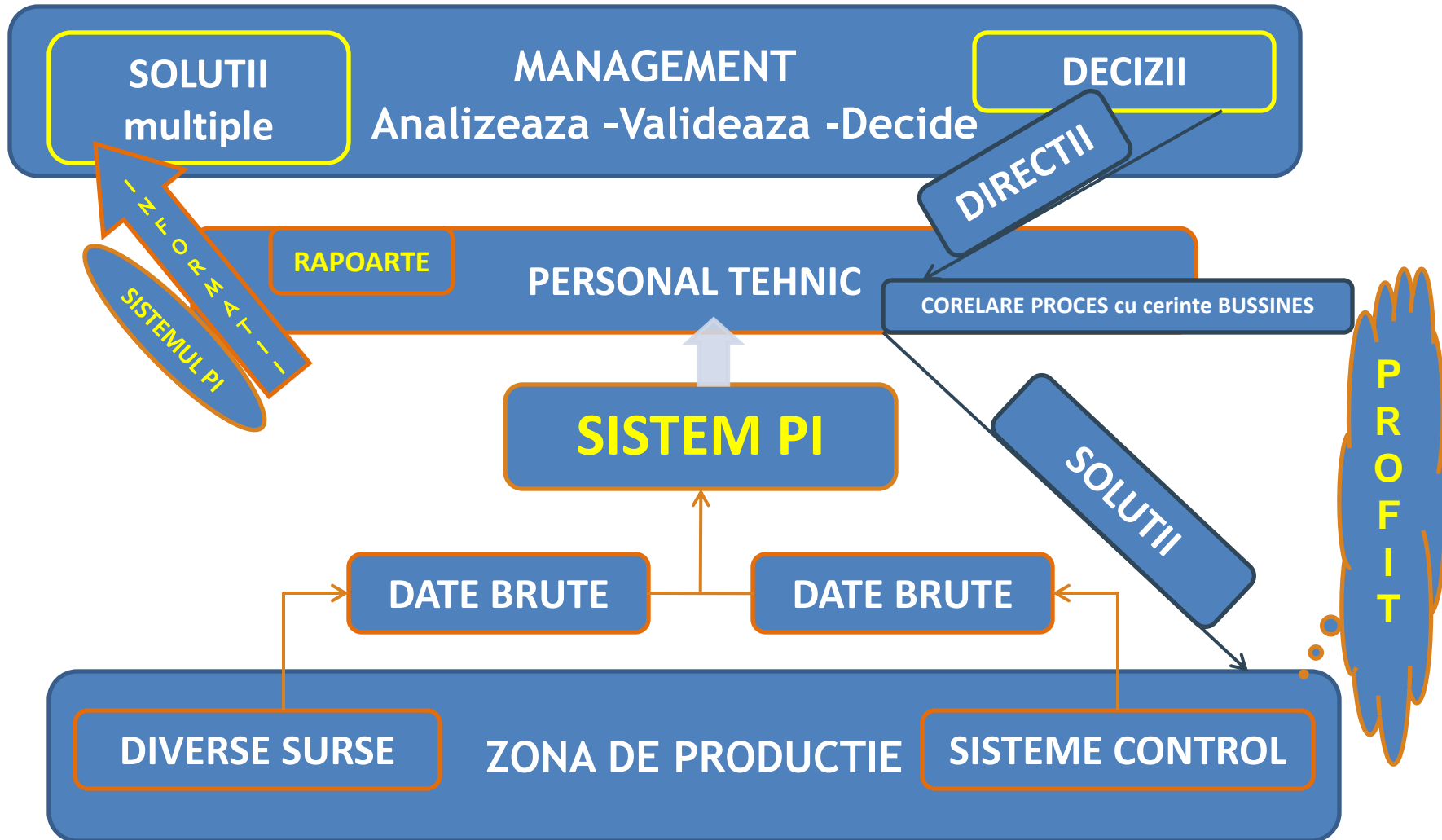
CE A ADUS sistemul PI ?

Monitorizare in TIMP REAL

Acces RAPID

ISTORIC

Suport pt DECIZII



- Vom continua sa aplicam solutiile oferite de sistemul PI
- Vom dezvolta solutii noi folosind sistemul PI
- Extindere sistem pentru preluare DATE din ALTE ZONE
- Vom transforma tot mai multe date in INFORMATII
  
- Implementare module noi
  - ALARME si NOTIFICARI

**Vom furniza la TIMP INFORMATII CORECTE si COMPLETE catre cei care  
iau DECIZII**



**INTREBARI ?**



Thank you

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