

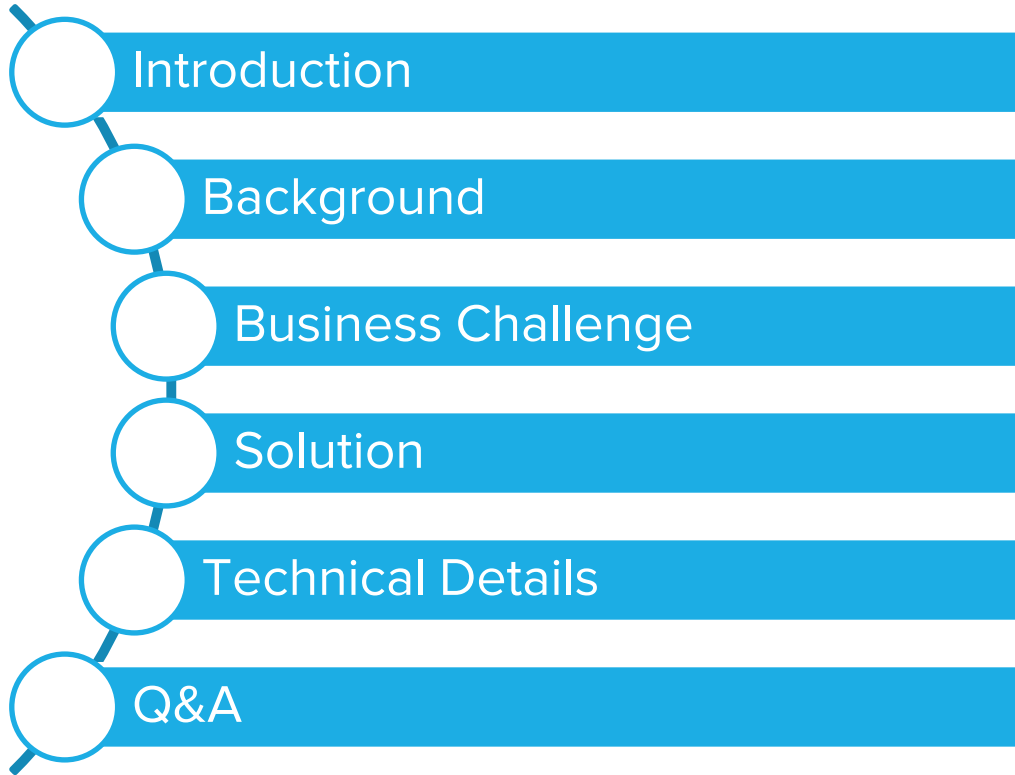


Reducing Reserved Daily Natural Gas Capacity Through Operational Intelligence

Presented by Gábor MUCSINA



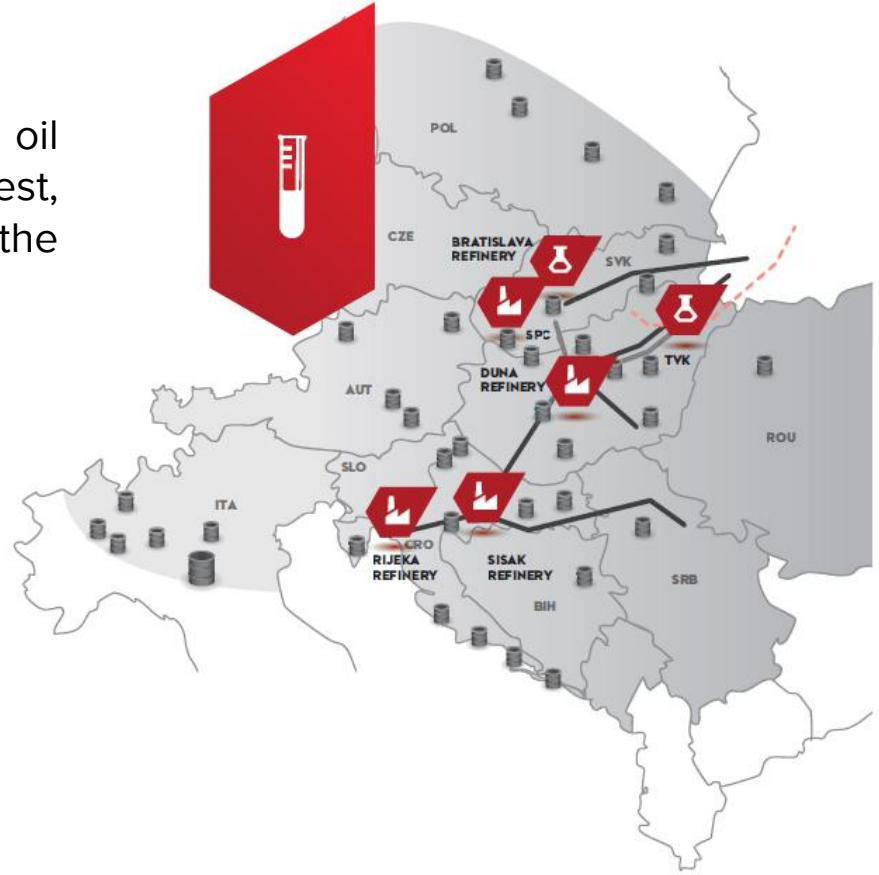
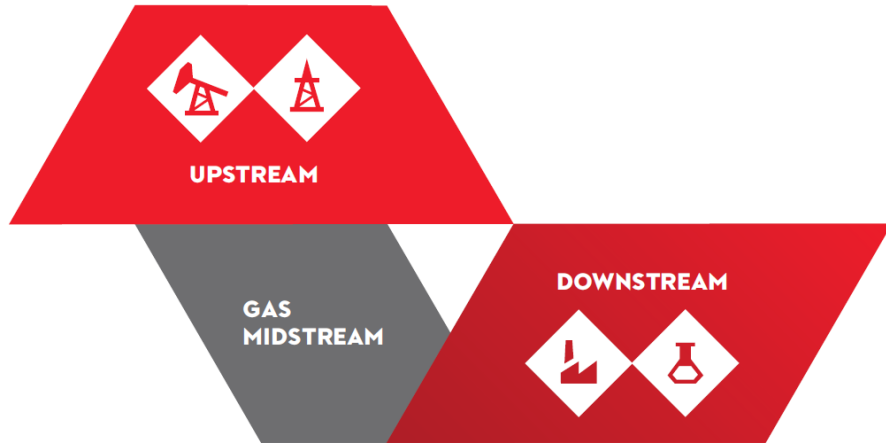
Agenda



MOL Group

MOL is an integrated, independent, international oil and gas company, headquartered in Budapest, Hungary with a track record of over 100 years in the industry.

CORE ACTIVITIES



MOL Group in numbers



OSIsoft and MOL Hungary



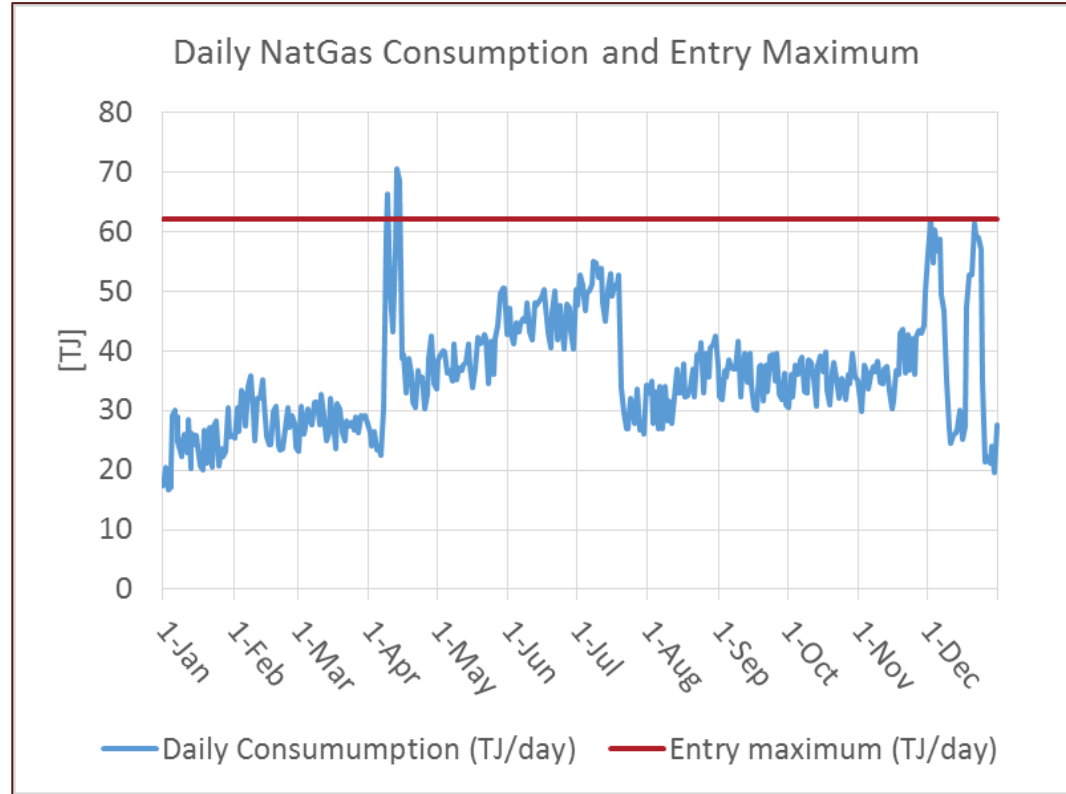
Background

High natural gas consumption

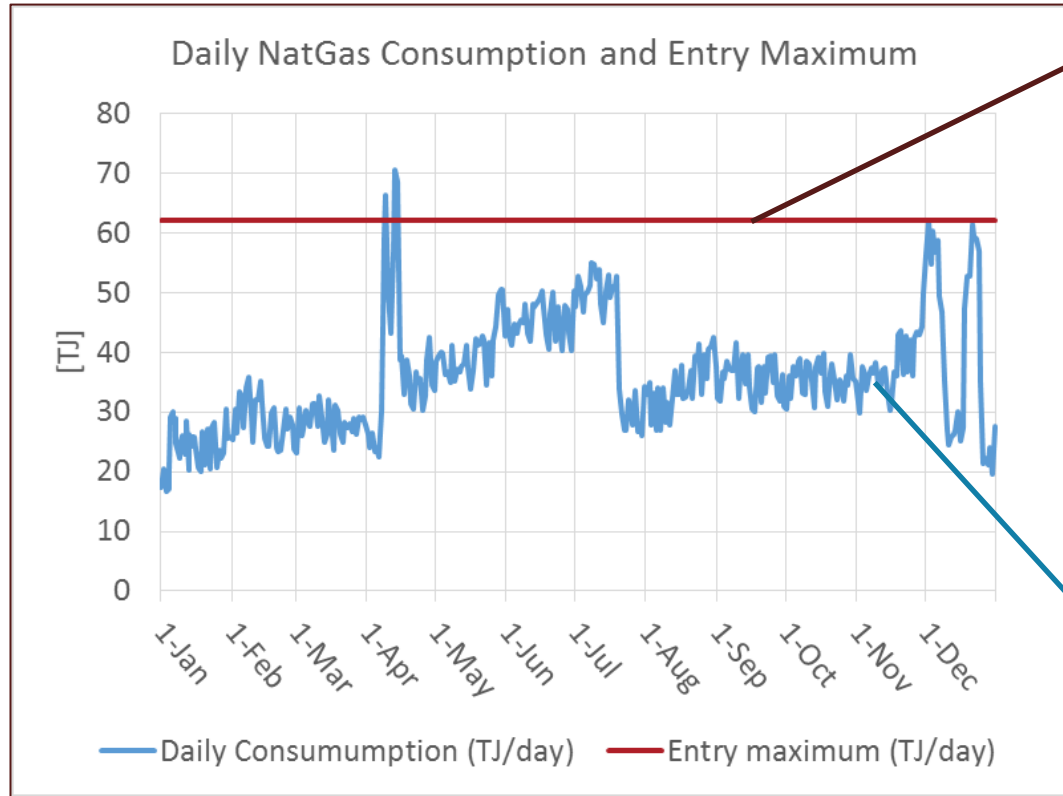
Reserved capacity has to be purchased (Entry maximum)

Fluctuation in consumption

Entry maximum has to be high enough



The Entry Maximum



Entry maximum

- Maximum allowed daily consumption
- Fixed for 2 years
- If the daily actual consumption is higher than the Entry Maximum
→ Penalty


Daily consumption

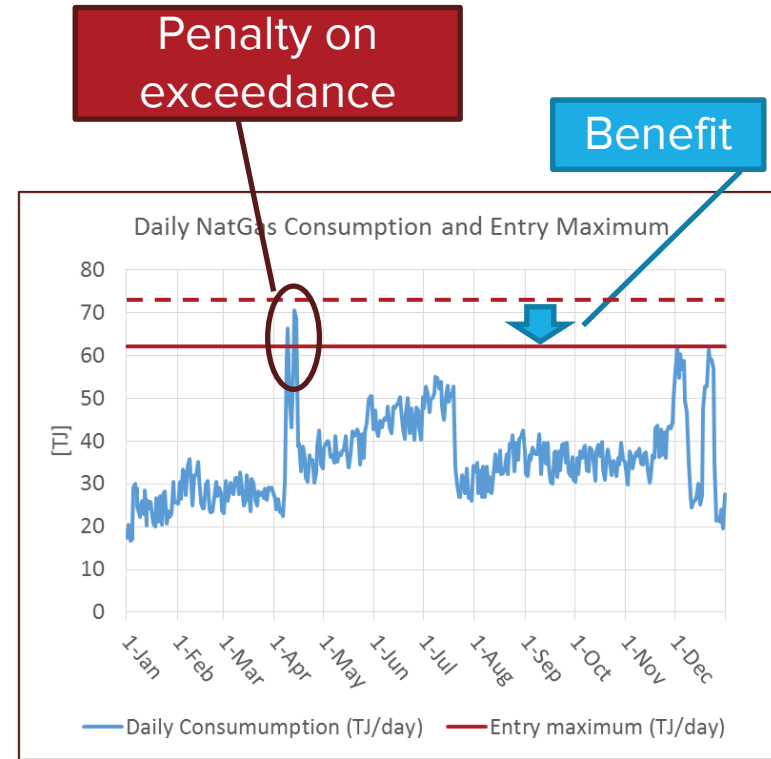
Business Challenge

New MOL Hungary level contract

- Entry Maximum decrease → potential saving
- Entry Maximum fixed for two years
- High penalty on any exceedances
- Fluctuation in consumption

Objective

- Decrease the entry maximum
 - Eliminate the chance of exceedance
- 
- Eliminate the peaks of consumption



Solution

Daily forecasting system

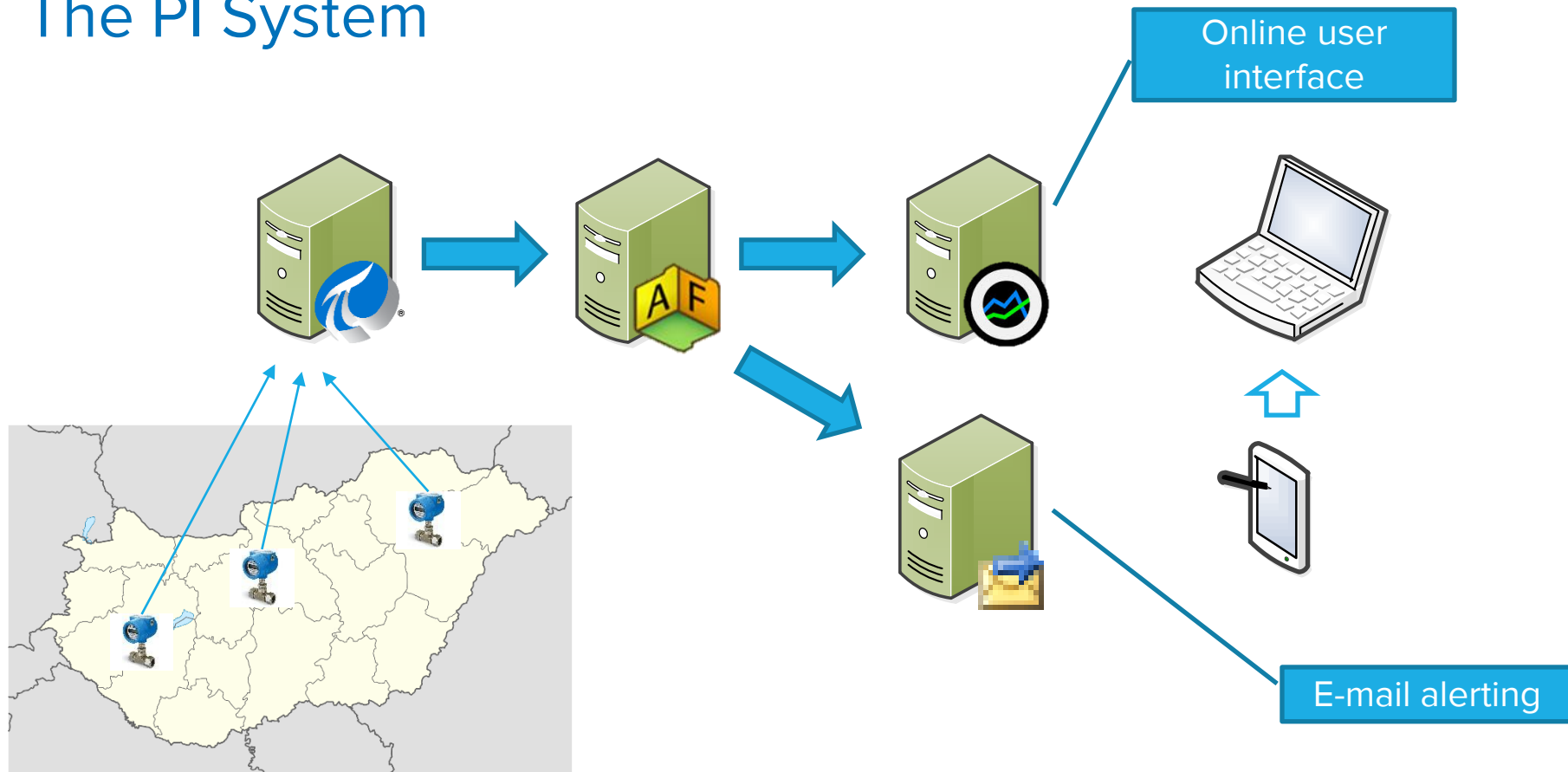
- Continuous calculation
- Based on consumption data
- **PI Asset Analytics**

New tool to improve cooperation

- Different sites accross the country
- Alerting system
- Up to date, valid information
- **PI Coresight**



The PI System



Technical details – data, calculation

The planned system

- Online calculation (extrapolation for one day)
- Input:
 - online sensor data
 - static data and
 - periodically filled manual data

Tools

- Asset Analytics
- AF Tables and Lookup calculations

The screenshot displays the OSIsoft PI System configuration interface. The main window shows a tree view of the system structure, including categories like 'CoreSight Link', 'Auxiliary Calculations', 'Consumption Calculations', 'Exceedance Calculations', and 'Limits'. The 'Consumption Calculations' category is expanded, showing a table of calculations. The 'PredictedDailyConsumption' calculation is selected, and its configuration is shown in the right-hand pane. The configuration includes a table of calculations and a section for the expression used to calculate the value.

Name	Configuration	Schedule
AlertAndExcCalculations	AlertState := If 'Predicted...	Frequency=12
Auxiliary Calculations	RemainingDayRatio := In...	Frequency=12
CumulatedDailyConsumption	CumulatedDailyConsum...	Frequency=12
CurrentConsumption	CurrentConsumption := T...	Frequency=12
PredictedDailyConsumption	SecondsToNextGasDayTu...	Frequency=12

The 'PredictedDailyConsumption' calculation is configured with the following expression:

```
Int((80d('*-6h'))+30h-'*')
```

The output attribute is 'PredictedDailyConsumption'.

Scheduling: ☐ Event-Triggered ☒ Periodic

Period: 00h 02m 00s, Offset: 00h 01m 40s

Advanced...

Connected to the PI Analysis

Technical details – Attributes, Analyses

Category: <None>	CoreSight Link	http://molszhhpicore/Coresight/#/PBDisplays/3308
Category: Auxiliary Calculations		
	RemainingDayPart	0.3604166666666666
	RefDayStart	2015.08.12 00:00:00
	RefDayEnd	2015.08.13 00:00:00
Category: Consumption Calculations		
	Predicted Daily Consumption	35754944 MJ
	Current Consumption	1514700 MJ/h
	Cumulated Daily Consumption	22646724 MJ
Category: Exceedance Calculations		
	HI Limit Exceedance	0 MJ
	Alert State	4
Category: Limits		
	LOLO Alert	0 MJ
	LO Alert	0 MJ
	HIHI Alert	61000000 MJ
	HI Alert	59500000 MJ

MOLHU NatGas Cons

General Child Elements Attributes Ports Analyses Version

Name: PredictedDailyConsumption

Description: Napi várható fogyasztás számítás

Categories:

Analysis Type: ☒ Expression ☐ Rollup ☐ Event Frame Generator

Name	Configuration	Schedule
AlertAndExcCalculations	AlertState := If 'Predicted...	Frequency=12
Auxiliary Calculations	RemainingDayRatio := In...	Frequency=12
CumulatedDailyConsumption	CumulatedDailyConsum...	Frequency=12
CurrentConsumption	CurrentConsumption := T...	Frequency=12
PredictedDailyConsumption	SecondsToNextGasDayTu...	Frequency=12

Name	Expression	Value	Output Attribute
SecondsToNextGasDayTurn	Int(Bod('*-6h')+'+30h'-**')		Click to map
PredictedDailyConsumption	'Cumulated Daily Consumption'+Current Consumption*SecondsToNextGasDayTurn/3600		Predicted Daily Consumption

Add a new expression

Scheduling: ☐ Event-Triggered ☒ Periodic

Period: 00h 02m 00s, Offset: 00h 01m 40s

Configure

Advanced...

Connected to the PI Analysis

Technical details – alerting system

Challenge

- Only a few alerts
- Users can not be experienced
- Straightforward, simple system is crucial

Solution

- Notification e-mails contain all of the relevant information
- A link is also sent to the user interface

The screenshot shows an email composition window with a 'Design' tab selected. The email is titled 'Energiafogyasztás előrejelzés értesítés'. The body contains several form fields for user-defined values:

- Név:** Target:Name
- Leírás:** Target:Description
- Várható energiafogyasztás:**
 - Predicted Daily Consumption:Value
 - Predicted Daily Consumption:Units
- Riasztási szint:**
 - HI Alert:Value
 - HI Alert:Units
- Szerződéses limit:**
 - HIHI Alert:Value
 - HIHI Alert:Units

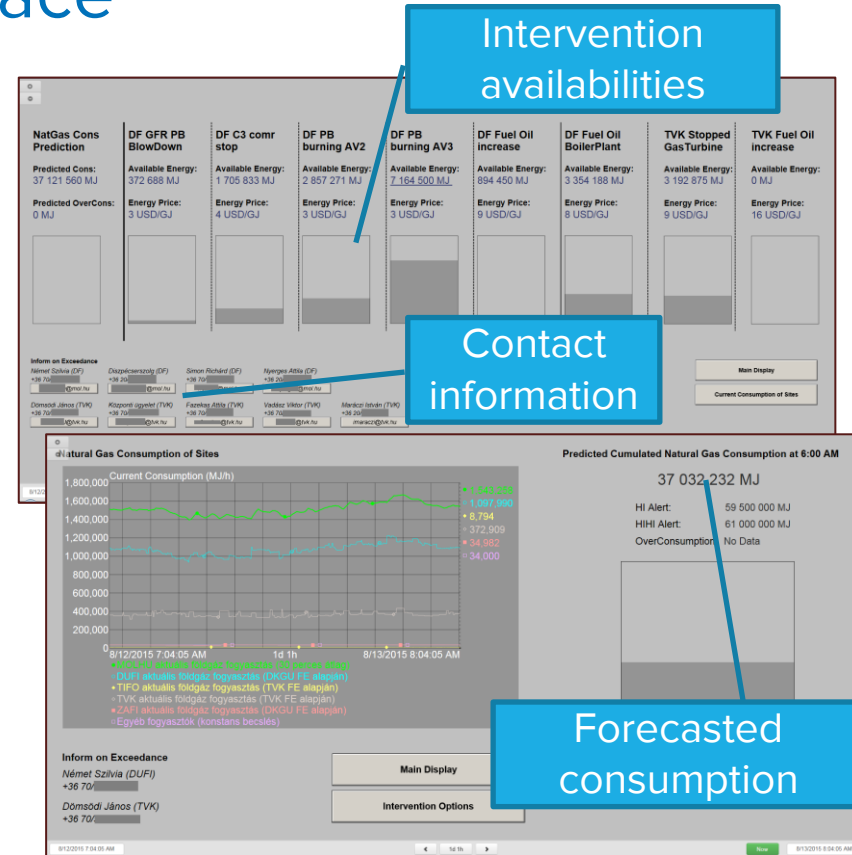
Technical details – user interface

Request

- Comprehensive source of information
- Support collaboration and decision making
- Easy to use surface
- Ensure that only the latest version is in use

Solution

- PI Coresight
- Navigation with buttons
- „Mail to” buttons to inform the decision makers
- Comprehensive displays about the intervention options (availability and price)



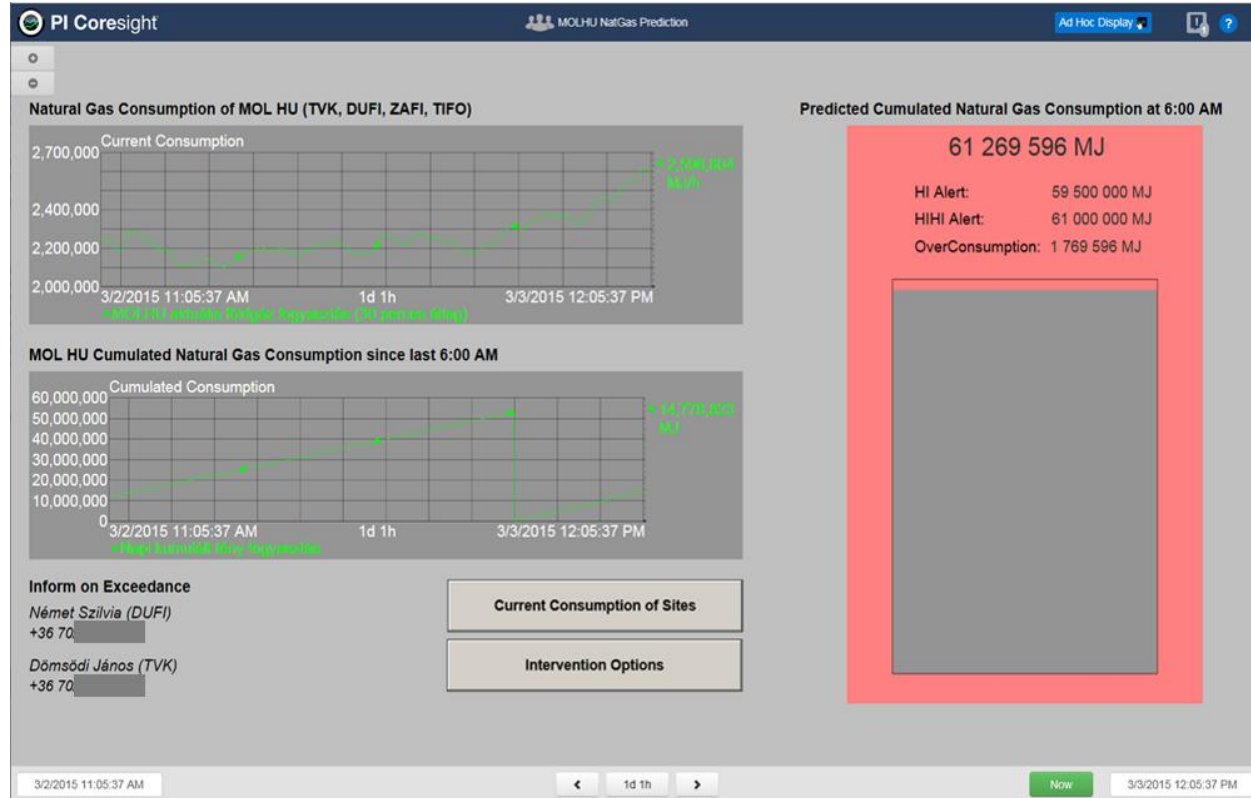
Results - The working system

Alerting

- Conversation started immediately after the alert
- Decision has been made in around 30 minutes
- Employees were informed

Business Impact

- 2 TJ/day Entry Maximum decrease
- 250 000 EUR savings



Future possibilities

Calculation accuracy

- The accuracy of the forecasting calculation can be increased
- Involve daily scheduling data or unit operation mode
- **PI Server 2015 and Future Data**

Other energy types

- Increase the planning accuracy in case of other energy types
- Installation is very simple and fast
- **AF and Template Based Elements**



Summary

„In God we trust. All others must bring data.”

W.E.Deming



BUSINESS CHALLENGES

- A. The goal: minimize the cost of natural gas contract
- B. Cost savings through a lower entry maximum (daily consumption limit)
- C. Higher risk of daily overconsumption had to be handled

SOLUTION

- A. Advanced information system to increase Operational Efficiency
- B. Forecasting calculation, alerting and collaboration support system
- C. Asset Framework, Asset Analytics, Notifications, PI Coresight

RESULTS AND BENEFITS

- 2 TJ/day entry maximum decrease
- 250.000 EUR saving in the 2 years contract
- 5 months after the go-live the system worked perfectly in a real situation

Contact Information

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Questions

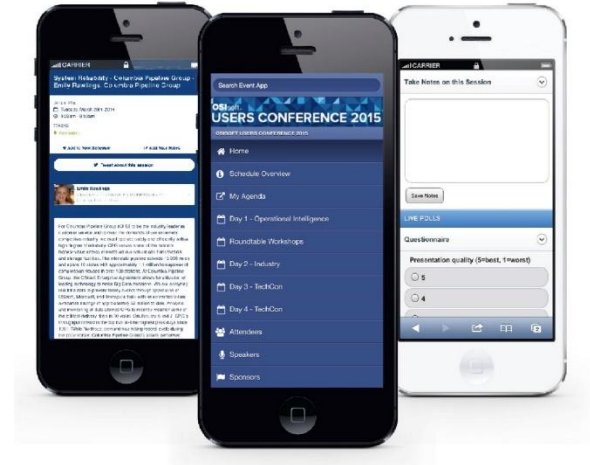
Please wait for the **microphone** before asking your questions



State your
name & company

Please don't forget to...

Complete the Online Survey
for this session



<http://eventmobi.com/emeauc15>



감사합니다

谢谢

Danke

Merci

Gracias

Thank You

Děkuji

Köszönöm

ありがとう

Спасибо

Obrigado

„In God we trust. All others must bring data.”

W.E.Deming