



Do It Yourself Simple Actions - Significant Impact

Jakub Fudyma / Piotr Wiśniewski



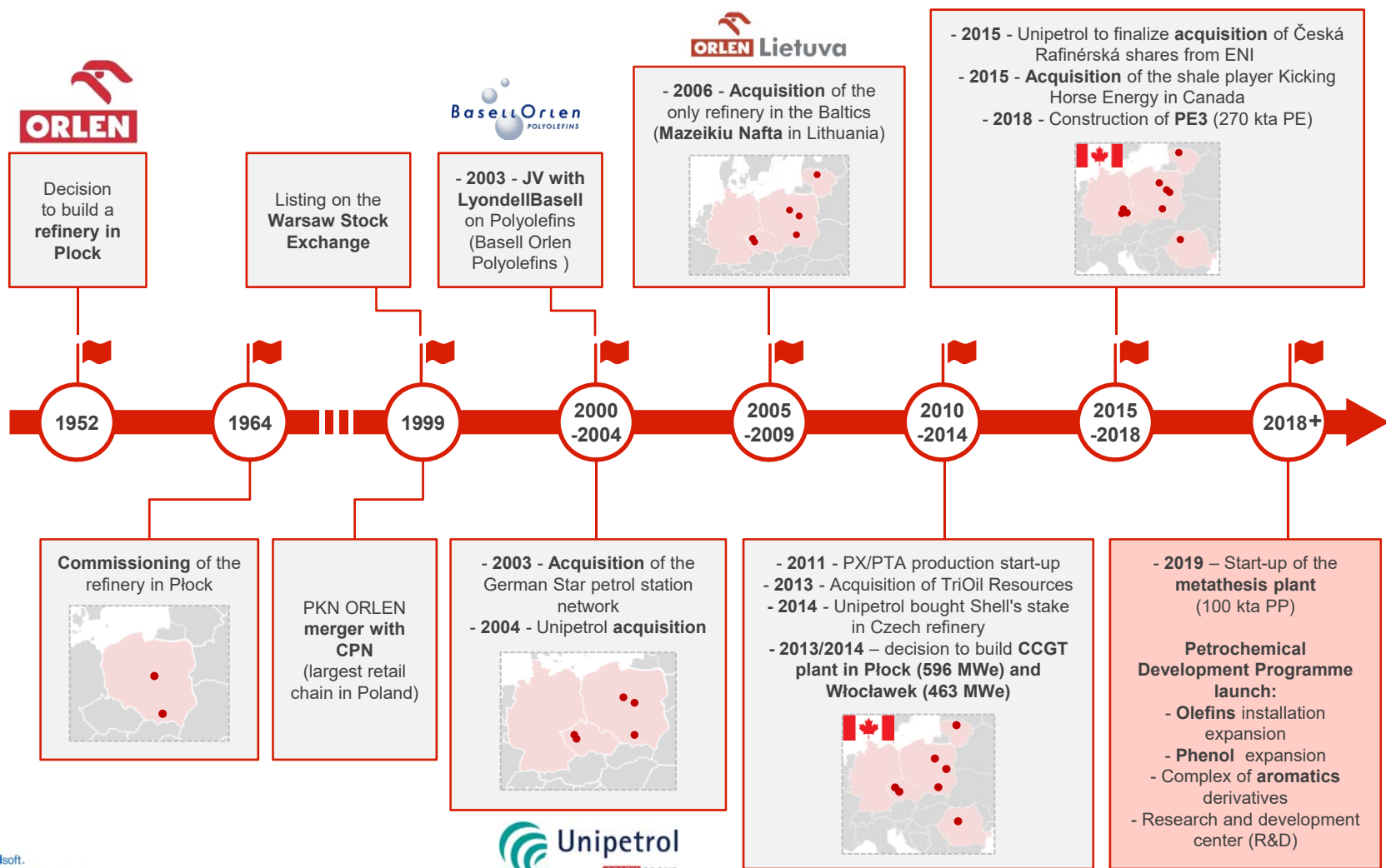
AGENDA

1. WHO WE ARE

2. OUR TRANSFORMATION

3. DO IT YOURSELF – STEP BY STEP

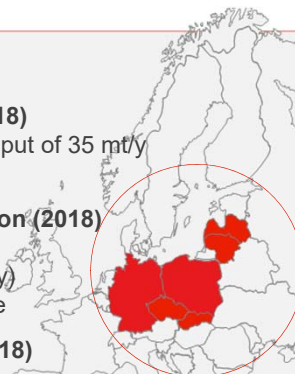
- PUT SPREADSHEETS ASIDE
- MASS BALANCE AND PROCESS VARIABLES DIGITALIZATION
- INSTANT CALCULATIONS AS A SOURCE OF SAVINGS
- DO YOUR OWN DASHBOARDS - TAKE MORE BENEFITS





Downstream segment

- **#6 European refining company, biggest in the CEE region (2018)**
 - 4 refineries in Poland, Lithuania and Czechia with a total throughput of 35 mt/y
 - c. 1% of the global crude consumption
- **#8 European petrochemical company, biggest in the CEE region (2018)**
 - two steam crackers with the total ethylene capacity of 1,3 mt/y (one in Plock, PL – 0,7 mt/y and the other in Litvinov, CZ – 0,6 mt/y)
 - further extension into PE, PP, PTA, PVC, PX, EO, EG, butadiene
- **#6 in the European PVC market, biggest in the CEE region (2018)**
- **#7 European nitrogenous fertilizers* producer (2018)**
- **#4 Power company in Poland (2018)** with more than 1000 MWe from new CCGT plants in Włocławek and Plock



Retail segment

- **TOP 10 European retail chain player, biggest in the CEE region**
 - operating c.a. 2800 petrol stations, PKN ORLEN holds a particularly strong position in the region with already established presence in Poland, Germany, Lithuania, Czechia and lately in Slovakia



Upstream segment

- **PKN ORLEN is present in the upstream segment - average production ~18.2 thousand boe/d**
 - Production assets located in Canada mostly for know-how for Polish shale



* ammonium nitrate (AN) and calcium ammonium nitrate (CAN) - Source: Fertilizers Europe (2017)

USD 10 bn

Market capitalization of PKN ORLEN as of 2019

TOP 5 position

PKN ORLEN is ranked among TOP 5 on Warsaw Stock Exchange by market cap

USD 2,3 bn

EBITDA generated by PKN ORLEN in 2019

USD 1,7 bn

EBITDA generated by downstream segment in 2019

43.3 million tonnes

Record high final product sales volume in 2019

4,1 % dividend yield

Dividend yield of PKN ORLEN in 2019

TO WHOM PRESENTATION IS DEDICATED?

YOU USE EXCELL SPREADSHEETS TO PERFORM SUPERVISORY TASKS

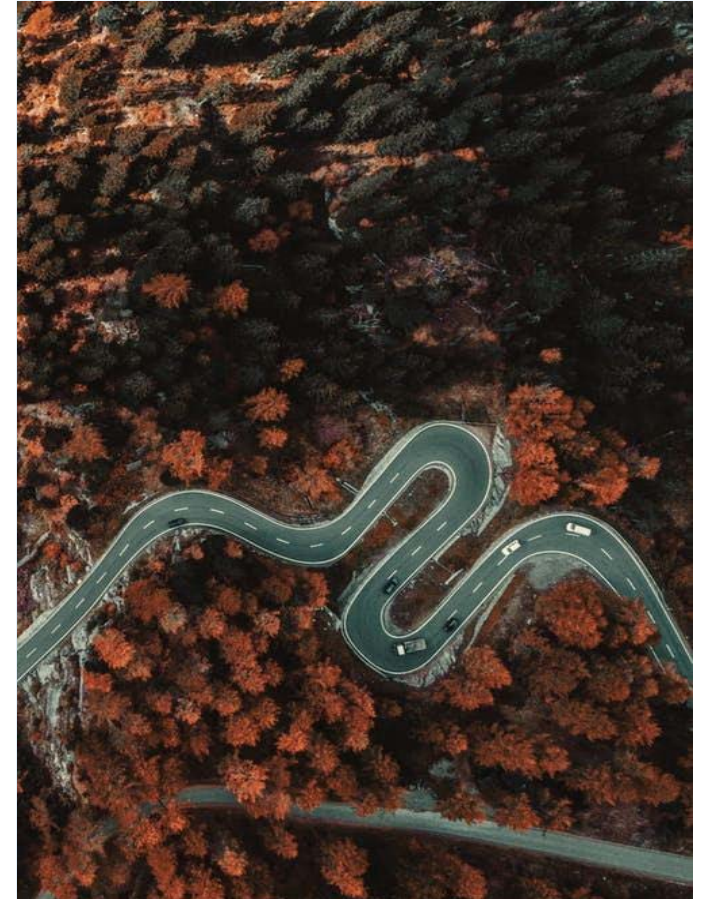
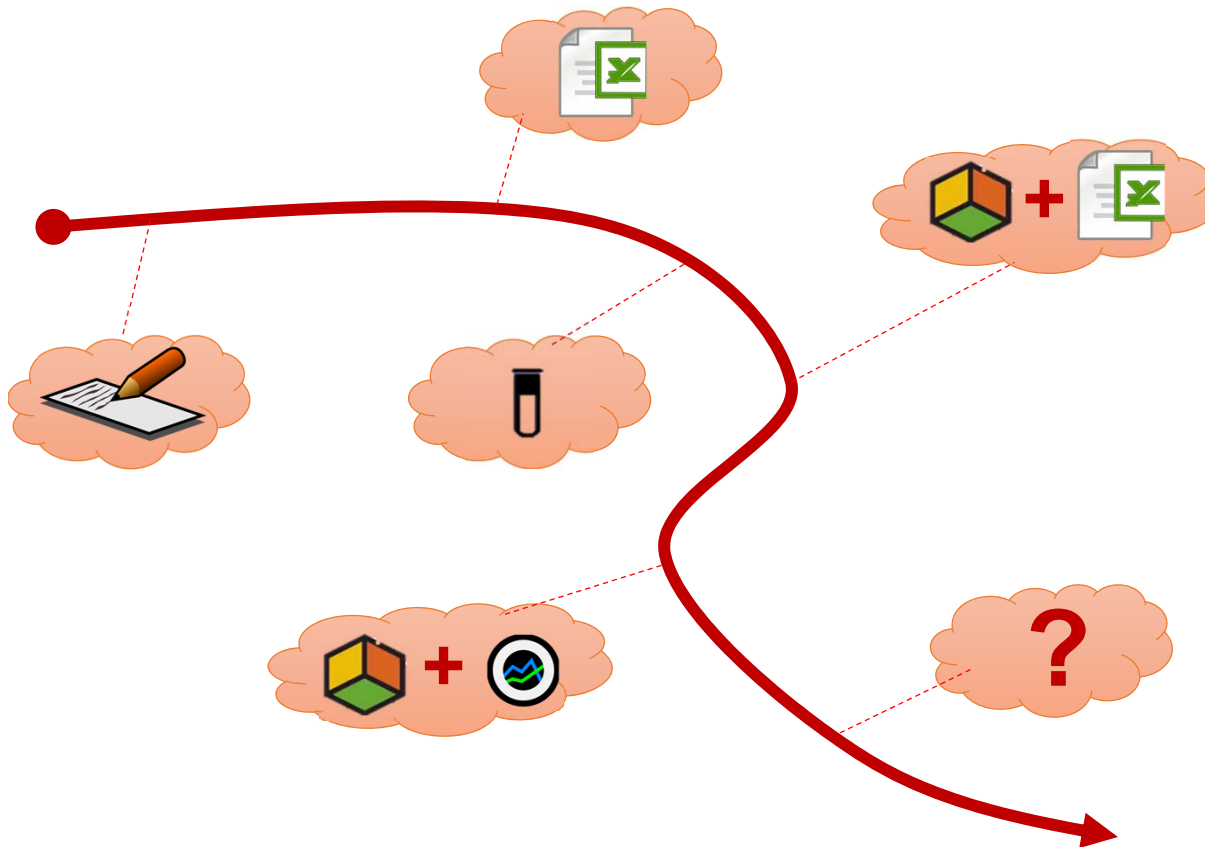
COMPANY FROM YEARS HAS BEEN GATHERING PROCESS DATA

YOU ARE CONSIOUSS OF PI POSSIBILITIES

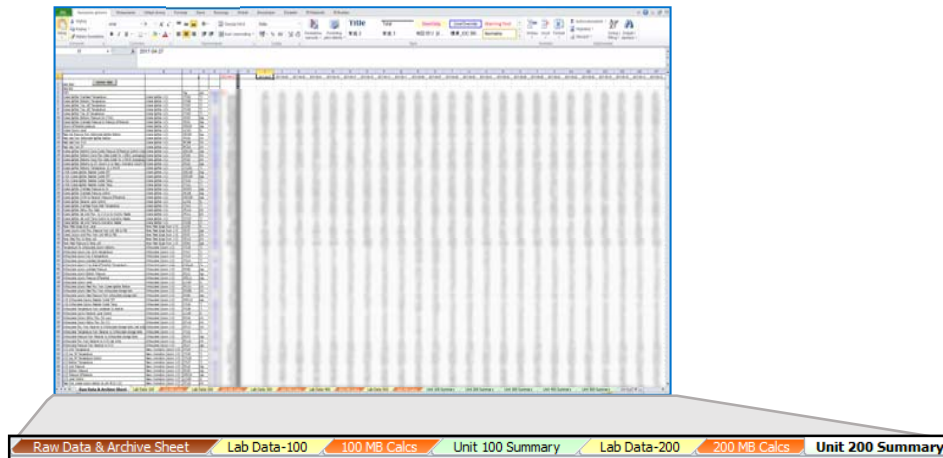
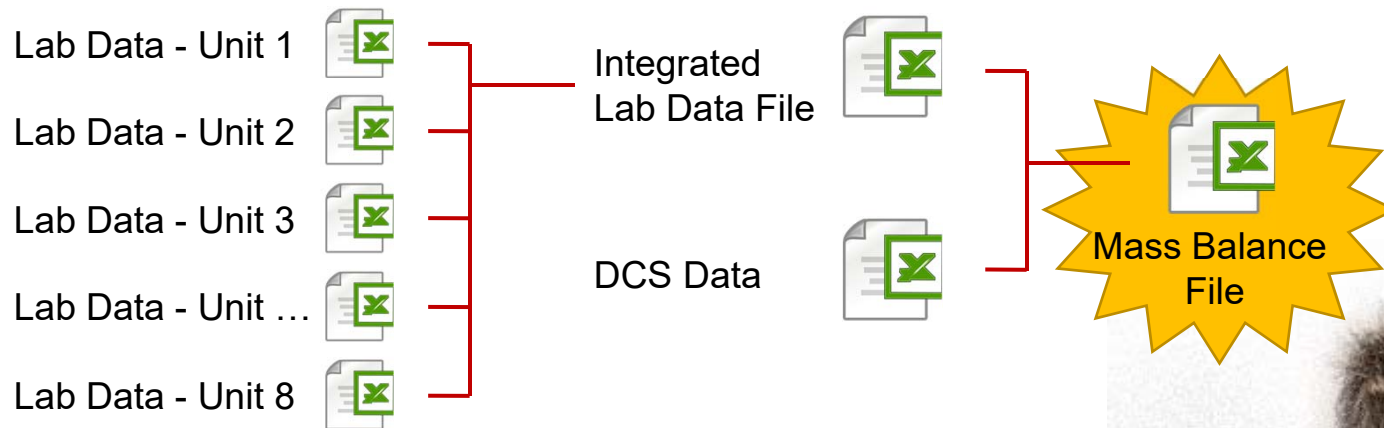
YOU WANT TO IMPROVE YOUR DAILY ROUTINE AND SAVE SOME HOURS

YOU ALREADY USE PI AF AND LOOKING FOR FURTHER POSSIBILITES

OUR TRANSFORMATION



PUT SPREADSHEETS ASIDE



Step 1 – Find the way to save your time



CHALLENGES

- Few hundreds „clicks”
- 11 different „raw” files
- Difficulties due to changes in the source files
- Limited space in the spreadsheet (number of columns)
- Activity performed daily (takes ~10 min)

SOLUTION

- Integration of Laboratory Data Base with PI Archive
- Inventorying of data required for Mass Balance File
- Creation of lacking tags

BENEFITS

- Significant simplification of the whole process
- Only 1 file
- Activity performed daily (takes ~ 2 min)



Without any investment I saved up to one hour weekly which I could sacrificed for further developments



DIY

YOU NEED



PI DataLink



PI ProcessBook



LIMS system (ELIOT)



Expert's knowledge



Source file

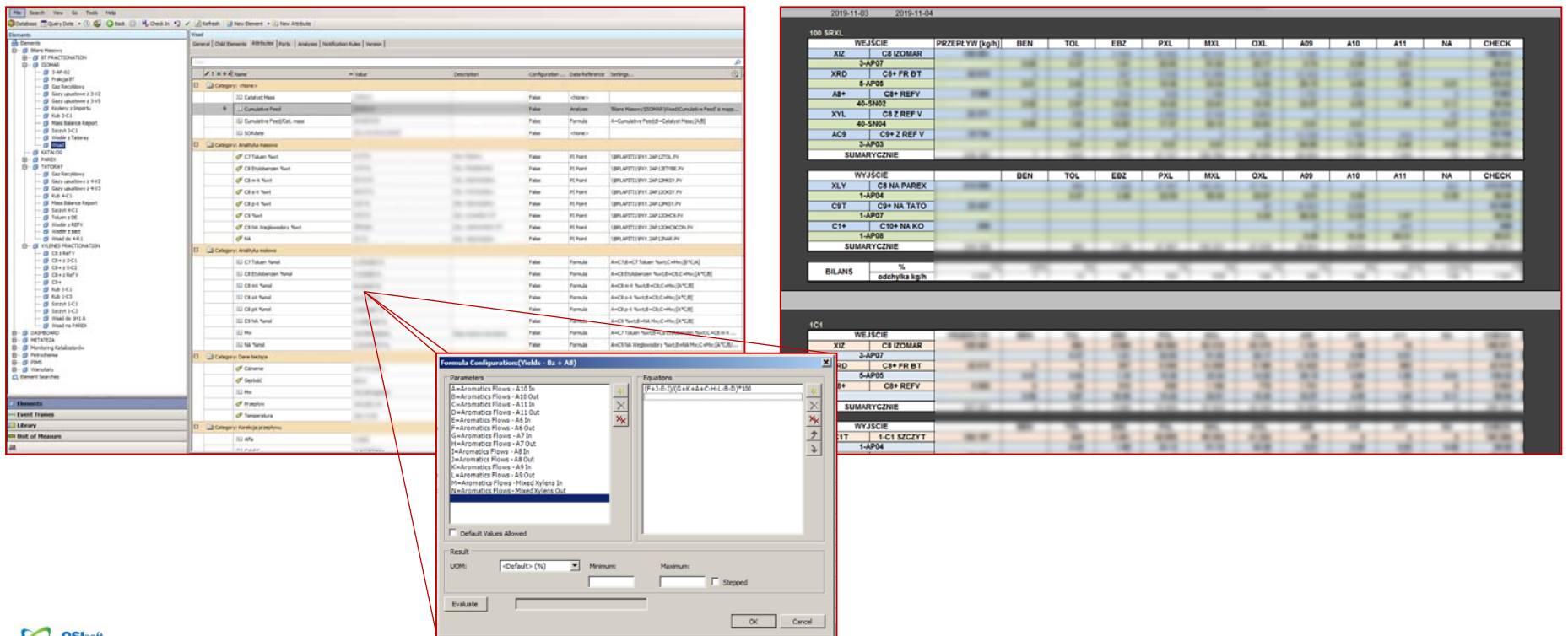
ACTIVITIES

1. Define your goal
2. Check if all required data is digitalized and tags are created
3. Use PI DataLink to substitute all data „manually” or „semi-manually” provided by PI tags and set properly calc's expressions.
4. Compare results and sort potential discrepancies out.

ADVISE

Pay attention to difference between time and event weighted averages especially in calc's which deploy periodical lab results

MASS BALANCE AND PROCESS VARIABLES DIGITALIZATION



Step 2 – MB DIGITALIZATION



CHALLENGES

- Limited possibilities of Excel spreadsheets (especially related with charts)
- Even minor changes during data analysis might be time consuming
- Lack of ad-hoc trends
- Different people may use different data in the same equation

SOLUTION

- Transfer excel calc's to PI Asset Framework
- Generate PI Tags for important calculated process variables

BENEFITS

- Ad-hoc trends
- Share created tags across company to use the same data
- Easy, adjustable time range for analysed data
- Forget about time-consuming reports



Use the same data across your organisation by digitalization of the most important calc's



DIY

YOU NEED



PI Asset Framework



Source file






Expert's knowledge



LIMS system (ELIOT)

ACTIVITIES

1. Get familiarized with these symbols:

 Attribute1 /  Element2 /  PI Point

2. Plan the elements structure of your database

3. Incorporate equations

Data Reference:	<input type="text" value="<None>"/>
	<input type="text" value="<None>"/>
	<input type="text" value="Formula"/>
	<input type="text" value="PI Point"/>

4. Check data and generate PI-tags from your attributes

ADVISE

- Visit Osisoft's YouTube channel to quickly catch-up AF basics
- Start working with „Formulas”
- Try to use Templates

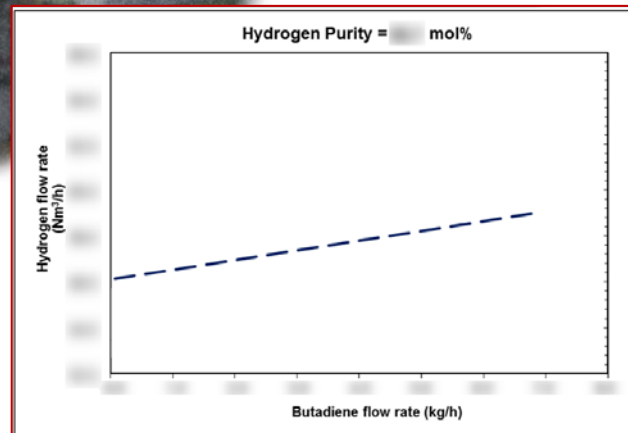
INSTANT CALCULATIONS AS A SOURCE OF SAVINGS

Category: Profili ciśnienia					
	(delta) Ciśnienia R-210 1A		False	PI Point	VBPLAPI
	Ciśnienie na wlocie		False	PI Point	VBPLAPI
	Ciśnienie na wyjściu		False	Formula	A=(delta)
Category: Profili temperatury					
	(Delta) Temperatury		False	Formula	A=Tempe
	Temperatura na wlocie		False	Formula	A=ITerm
	Temperatura na wyjściu		False	Formula	A=ITerm
	Termopara - poziom 1 średnia		False	Formula	A=ITerm
	Termopara - poziom 2 średnia		False	Formula	A=ITerm
	Termopara - poziom 3 średnia		False	Formula	A=ITerm
	Termopara - poziom 4 średnia		False	Formula	A=ITerm
Category: Zapotrzebowanie wodoru					
	Stechiometryczne zapotrzebowanie wodoru + ...		False	Formula	A=Stech
	Stechiometryczne zapotrzebowanie wodoru (1...		False	Formula	A=#2110
	Stechiometryczne zapotrzebowanie wodoru (A...		False	Formula	A=JAcet
	Stechiometryczne zapotrzebowanie wodoru (B...		False	Formula	A=JBut
	Stechiometryczne zapotrzebowanie wodoru (N...		False	Formula	A=JStech
Category: Zużycie wodoru					
	Stechiometryczne zużycie wodoru na reakcje n...		False	Formula	A=Jn-But
	Stechiometryczne zużycie wodoru na reakcje u...		False	Formula	A=JAcet
	Stechiometryczne zużycie wodoru na reakcje u...		False	Formula	A=JBut
	Teoretyczne zużycie wodoru		False	Formula	A=JStech

Data Reference: Formula

Settings...

A=Wodór do reakcji;
B=[H2]/Mw;
[A/B*22.4]



Data Reference: Formula

Settings...

A=[n-Butan]/((delta)n-Butan;
[(A*2.02)/58.1]

Step 2.5 – Stoichiometric calculations



CHALLENGES

- Adjust adequate rate of hydrogen is difficult based on graphical manuals
- Over hydrogenation causes losses
- Lack of ad-hoc trends
- Different people may use different data in the same file

SOLUTION

- Use PI AF possibilities to implement and develop your expert knowledge
- Expand AF Data Base Structure

BENEFITS

- Relaxed process parameters which are beneficial for catalyst life
- Yields Maximization
- Decreasement of Utilities consumption
- Data archivisation



You can save money and relax process conditions by relatively simple calc's in PI AF



DIY

YOU NEED



PI Asset Framework



LIMS system (ELIOT)



Expert's knowledge

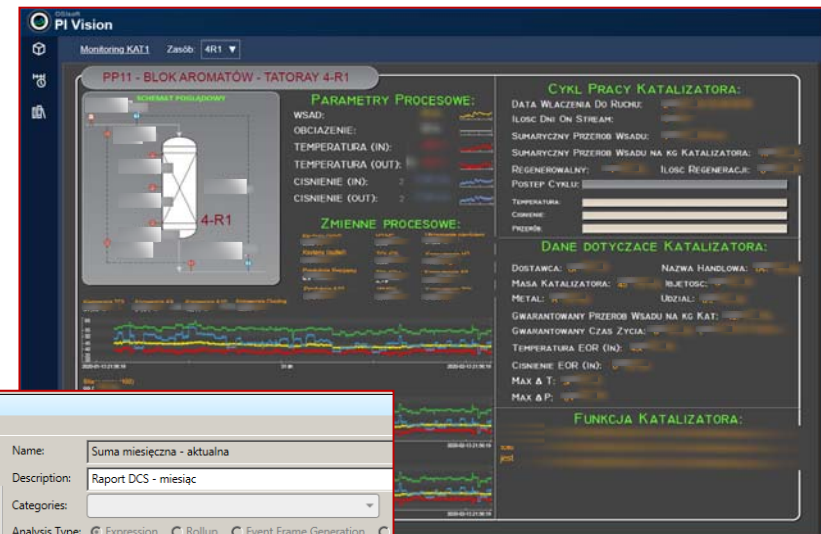
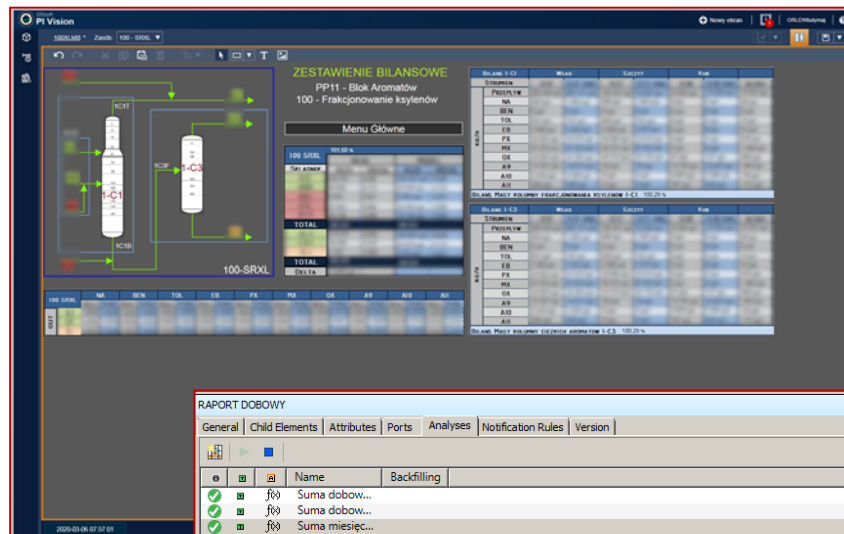
ACTIVITIES

1. Plan an elements structure of your database
2. Write down stoichiometric of reactions and compare if all required data is available
3. Adjust units (from wt% -> mol%)
4. Incorporate equations
5. Control results

ADVISE

Confirm your results with adequate performance tests

DO YOUR OWN DASHBOARDS - TAKE MORE BENEFITS



RAPORT DOBOWY

General | Child Elements | Attributes | Ports | Analyses | Notification Rules | Version

Name	Backfilling
Suma dobowa...	
Suma dobowa...	
Suma miesięcz...	
Suma miesięcz...	
Suma roczna...	
Suma roczna...	

Name: Suma miesięczna - aktualna

Description: Raport DCS - miesiąc

Categories:

Analysis Type: ☒ Expression ☐ Rollup ☐ Event Frame Generation

Add a new variable

Name	Expression	Output Attribute
Miesiac2	'Tag'	Map
SumaDobowa	If(Hour('*')=0 And(Day('*')=1)) Then(TagTot(Miesiac2, '*-1mo', '*')*24) Else(TagTot(Miesiac2, Bom('*'), '*')*24)	TotalMonth

Evaluate

Step 3 – Do your own Dashboards



CHALLENGES

- Obtaining informative visualisations which simplifying process supervision
- Avoiding creation of periodic reports
- Don't oversleep digital transformation

SOLUTION

- Develop your PI-skills
- Use PI AF by yourself
- Deploy PI Vision
- Share within your organisation unique Dashboards

BENEFITS

- Quick process overview (KPI, Production rates and deviations from plans, product quality)
- No need of investments
- Possibilities for further development (like deploying of AI algorithms)
- Extracting much more information from process data



Our aim is to become an active player in current digital transformation and get more value from data we are gathering



DIY

YOU NEED



PI Asset Framework



PI Vision



Expert's knowledge

ACTIVITIES

1. Select a report you would like to digitize
2. Learn how Analyses works
3. Prepare AF structure and implement adequate equations
4. Create graphics required for visualisation
5. Set new window in the PI Vision and develop your dashboard

ADVISE

- Do your Dashboards in a manner which allows you for its further development in the future
- Discover possibilities of analyses and Event Frames in PI AF

Contact details



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Questions?

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the **microphone**

State your
name & company



Save the Date...



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