PI System
for Improved Education:
A Case Study from the Czestochowa University of Technology

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WYDZIAŁ ELEKTRYCZNY

Politechnika Częstochowska

Presentation Agenda:

- About Czestochowa University of Technology, Faculty of Electrical Engineering
- OSIsoft and CUT – how did it start?
- PI System in Computer Science courses
- Students Club – what have we done?
- Educational process
  - Engineering thesis
  - Work with real proces data
- CUT for business – students' benefits
- Next steps

Czestochowa University of Technology
Faculty of Electrical Engineering

- „A" category
  government ranking of research units

- BSc studies in:
  - Electrical Engineering
  - Electronics and Telecommunications
  - Computer Science
  - Automation and Robotics
- Master studies in:
  - Electrical Engineering
  - Computer Science

- FEANI accreditation
  - The graduate students can apply for the European Engineer title (EUR ING)

- ERASMUS +
  - Slovakia, Germany, Italy, Great Britain, Romania

Faculty key research directions

- Research and implementation of measurement and diagnostic devices used in electrical and power engineering
- Optimization, modeling, intelligent management and forecasting methods in the power industry
- Modern measurement methods, thermal imaging diagnostics and materials engineering
- Modeling and analysis of electromechanical systems, diagnostics systems of renewable energy sources
- Numerical and analytical methods in computer science and electrical engineering

CUT - cooperation with business and industry

Licensed software used in teaching and research (among others)

Cooperating agreements (teaching, research and development)

Using the PI System by Faculty of Electrical Engineering

- Monitoring & management of Faculty assets
  - smart meters, photovoltaic panels, wind turbines, weather station

- Research and development
  - Automation and optimization of industrial processes
  - Predictive Maintenance
  - Forecasting of power generation
  - Data validation

- **Education/Teaching**
  - **Student workshops**
  - **OSIsoft PI science club**
  - **Part of the curriculum (gradually implemented as elements of selected curriculum)**
  - **PI System as a stand-alone course as part of standard curriculum (in the future)**

OSIsoft and Częstochowa Tech – How did it start?

- December 2014 – Educational & Research Software License Agreement

- February 2015 – first PI Workshop in Częstochowa Tech for students and teachers Faculty of Electrical Engineering
  - Three days' workshop including basis of PI PocessBook, PI DataLink PI Coresight and AF Server (lecturer Tadeas Marciniak OSIsoft)

- March 2015 – PI in the Students' Science Club
  - After workshop a part of students decide to continue learning PI System

OSIsoft for Faculty of Electrical Engineering

- April 2015 – now
  - Cooperation with (PI System integrator)

- October 2015 – now
  - OSIsoft Academic Program (Nicolas Peels)

- January 2016
  - open lecture for Faculty's students, workshop for students of Computer Science (lecturer Tadeas Marciniak – OSIsoft, about 65 students attended)

- June 2016
  - Set up of the PI-to-PI Interface with ENGIE (Polaniec Power Plant)
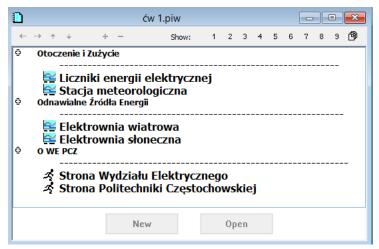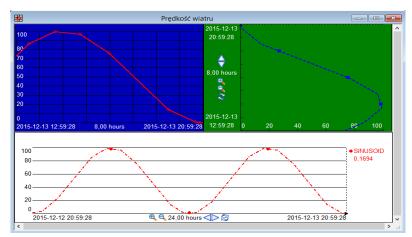
PI System in Computer Science courses

The course sylabus remains the same but the tool was replaced with the PI System!

Source materials to prepare exercises – Osisoft Learning

- October 2015 – February 2016
  - first elements of PI System in courses:
    - Network systems course
    - Management and information processing course

- January 2016 – at the end of semester one day workshop (lecturer Tadeas Marciniak – OSIsoft, about 15 students attended)
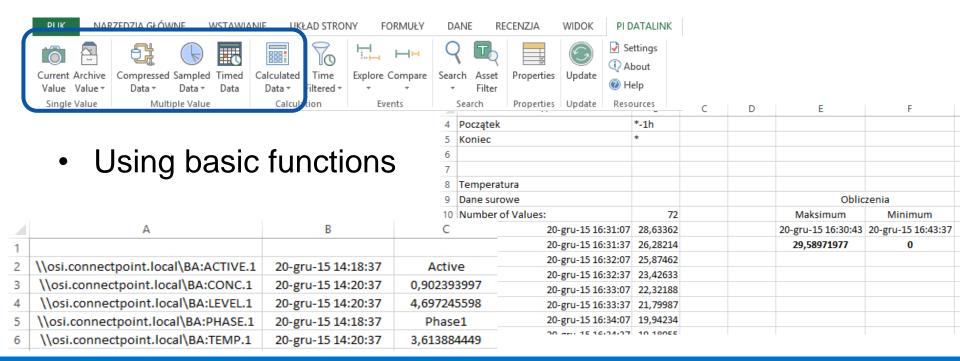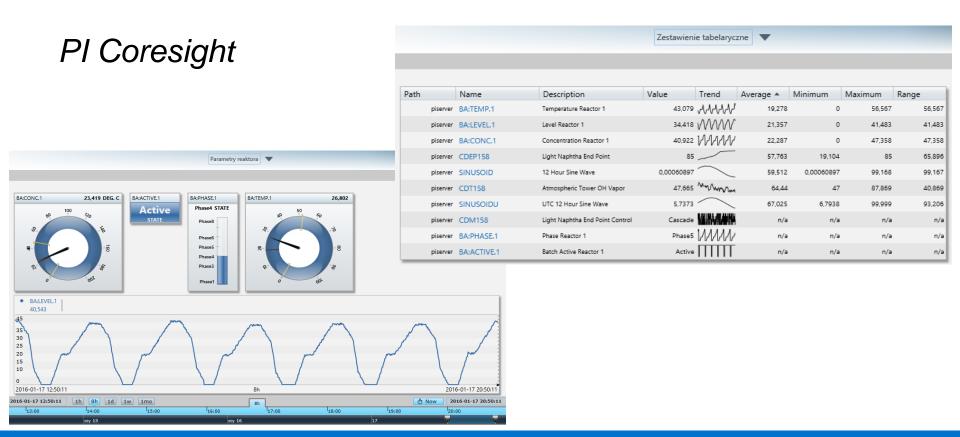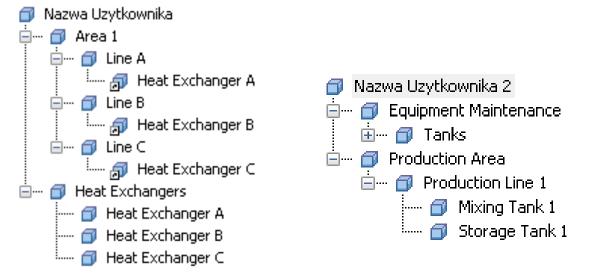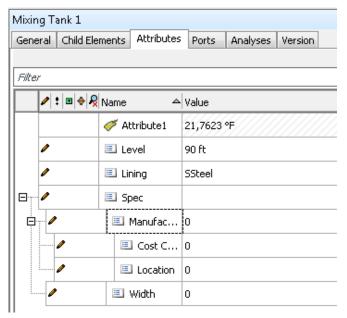
PI System in Computer Science courses (exercises)

PI ProcessBook

PI System in Computer Science courses (exercises)

PI DataLink

- Using basic functions

PI System in Computer Science courses (exercises)

PI Coresight

PI System in Computer Science courses (exercises)

PI Server – Asset Framework

What have we done?
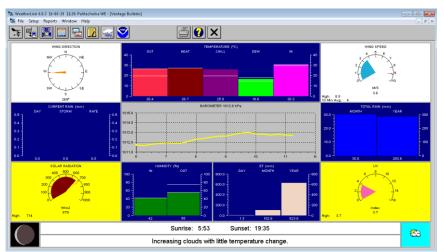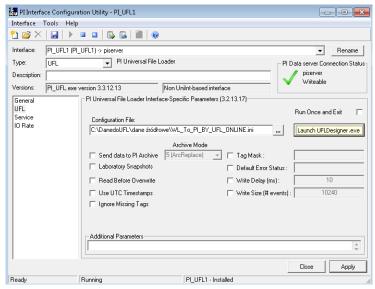## Monitoring of Faculty assets – Weather Station

Visualization and store data from meteo station (part of engineering thesis):

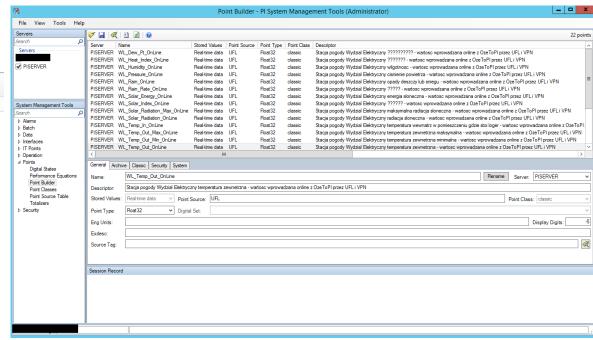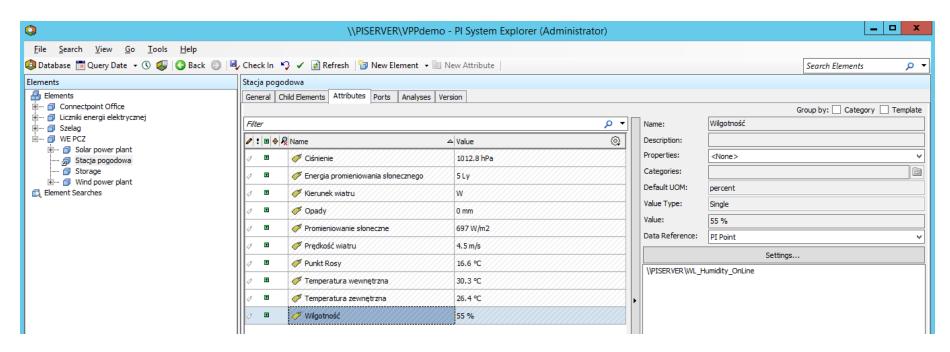- Sending data to PI Server using PI UFL Interface and VPN connection

What have we done?
Monitoring of Faculty assets – Weather Station

- Store data in PI Server

What have we done?
Monitoring of Faculty assets – Weather Station

- Create structure in PI Asset Framework

What have we done?
Monitoring of Faculty assets – Weather Station

Visualization

PI Coresight

PI ProcesBook

What have we done?
Monitoring of Faculty assets – Weather Station
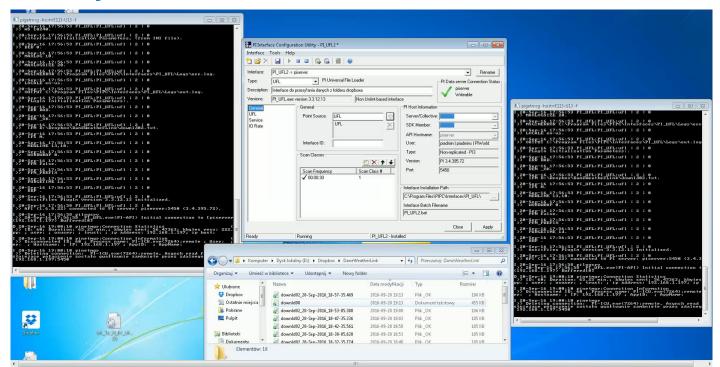

Visualization
on the map

Integration
with other systems – REMS (Real-time and asset data visualization platform)

Education process - engineering thesis

- In autumn 2016
  - Acquisition and visualization data from meteorological station using the PI System

- In spring 2017
  - The use of PI System to monitor the assets Faculty of Electrical Engineering, Technical University of Czestochowa
  - Using Event Frames to find important process information
  - Creating AF Structure of ENGIE Polaniec Power Plant assets

Work with real process data

PI-to-PI Interface between Polaniec Power Plant and CUT

- Autumn 2016 - autumn 2017
    - Tags structure in PI AF,
    - Data validation methods,
    - Efficiency of energy production
    - Dashboards (PI DataLink, PI Coresight)

Work with real process data

Cooperation with ConnectPoint:

- Suggestions consider engineering and master thesis
- IT support of PI System
- Students internships
- Create Faculty structure in AF (smart metres, renewable energy sources)
- Business projects

CUT for business – students' benefits

- Knowledge about real-time processes
- Access (limited) to real systems
- Working on polish language version
  - PI Coresight
  - PI DataLink
- **Participation in business project**
- **Better Chance of getting job**

Next steps

- Prepare courses for student basis on PI System software
- Workshops for students and teachers
- Grants
  - internships program
  - additional courses
- Cooperation with companies using PI System

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감사합니다
谢谢
Danke
Gracias
Merci
Thank You
ありがとう
Спасибо
Obrigado
Dziękuję