

Our Journey with OSIssoft for University Education and Research

Presented by **Dr Michael Cregan**



Queen's University Belfast



Lanyon Building (Founded 1845)

Queen's University Belfast

Energy, Power and Intelligent Control Research Cluster (EPIC)



- **Russell Group Member**
- **Students 25,000**
- **Staff 1,500**
- **Degree Courses 300+**

The Journey



Research



Teaching

First Introduction to PI System

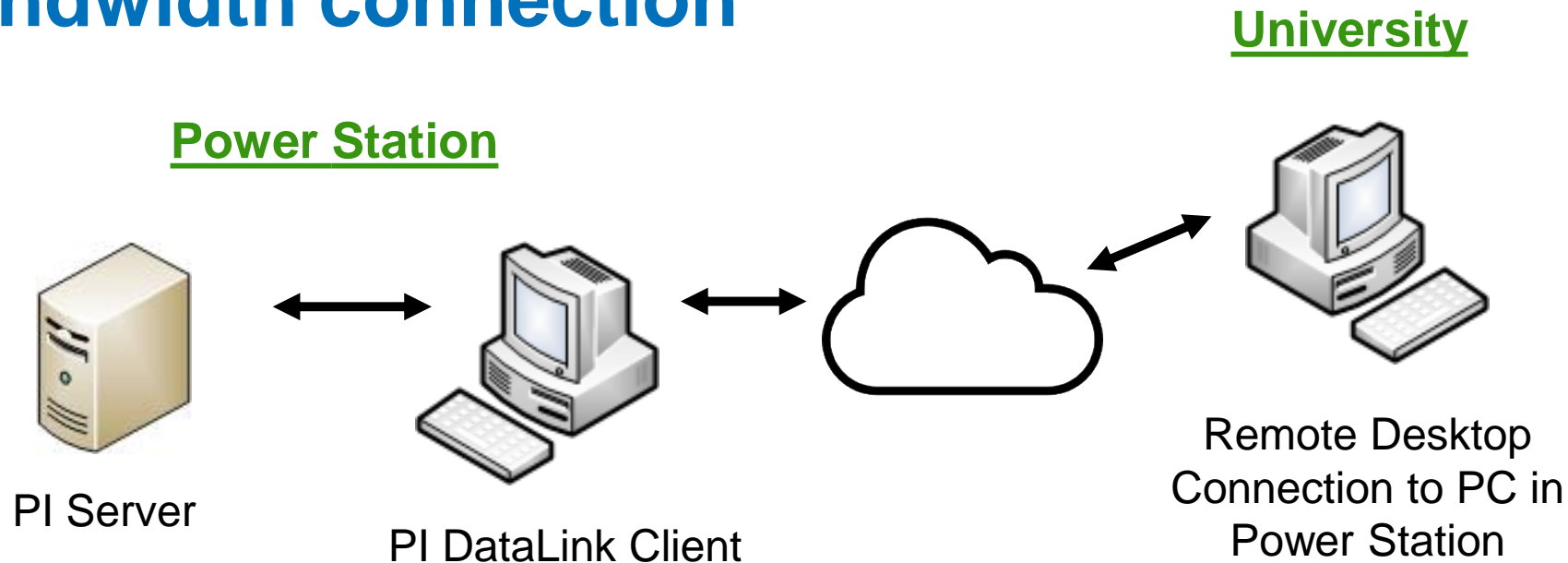


Joint Research Project with

- **Premier Power (BG Group)**
- **Iberdrola (Spanish Utility)**

**“Investigating the Performance of
an Expert System on Generator
Efficiency.” 1998**

Accessing PI System Data with limited bandwidth connection



Results of First PI Project

University

- **Publications**
- **Strengthened Industrial Links**
- **Future Research Opportunities**
- **Building Trust with Industry**

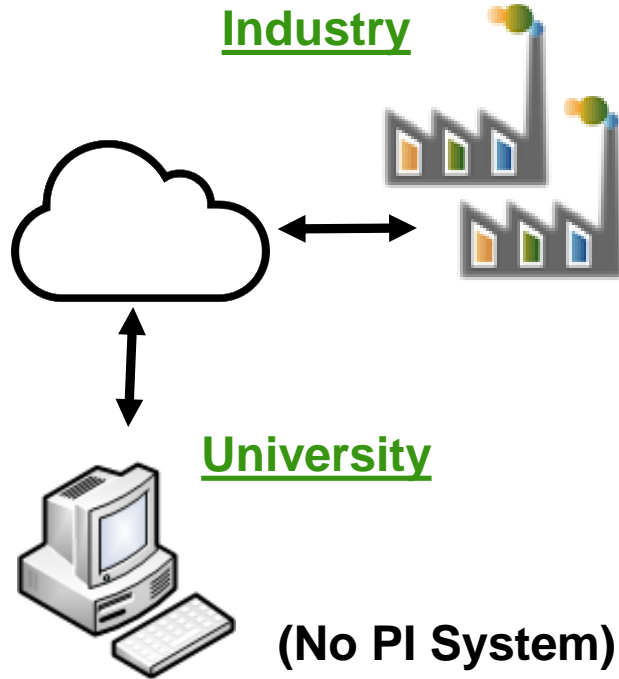
Industry

- **Performance Monitoring Software**
- **Potential to Increased Plant Efficiency**

Industry Funded Research Using PI Data

- **Thermal boiler modeling using neural networks.**
- **Condenser modelling for maintenance scheduling.
(Genetic Algorithms Optimization)**

Challenges with Early Projects



- **Data Collection**
- **Data Storage (Continuity)**
- **Limited Plant Access**

Academic License (2008)

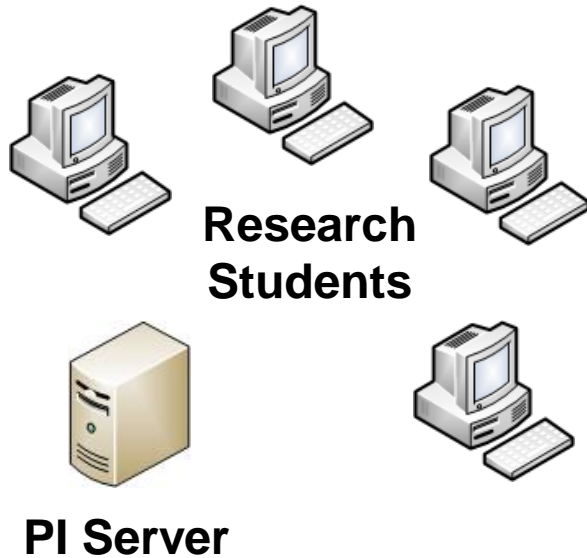


Advantages

- **Free OSISOFT software (Retail cost \$320,000)**
- **Free software support**
- **Access to PI Square (VCampus)**

Advantages of an Academic License

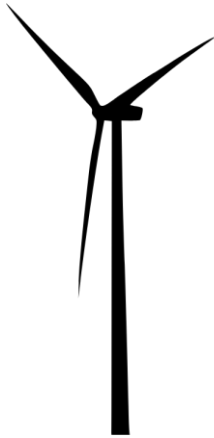
University



- Researchers could directly connect to remote PI Systems (VPN)
- Local Servers for data storage.
- Data Visualisation using PI ProcessBook and PI DataLink.

Advantages of an Academic License

Assist with new Industrial Links.



- **SSE (Grid Stability)**
- **Eirgrid (Impact of Wind Generation)**
- **AES (Energy Storage)**

Eirgrid (Impact of Wind Generation)

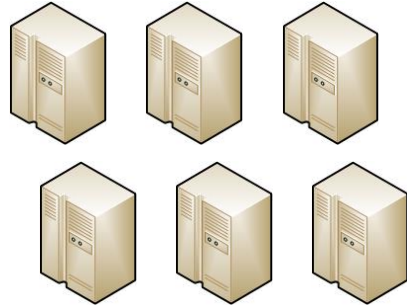
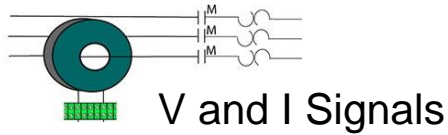


Measure V and I Phasors at:

- **Power Stations**
- **Large Windfarms**
- **Interconnectors**

PI System for Phasor Measurement

Electrical Grid



Phasor Measurement Network
(openpmu.org)



University



PI Server



Student Workstation

Utility Company



PI Server

Results of Eirgrid Wind Generation Project

University

- **Publications**
- **Strengthened Industrial Links**
- **Future Research Opportunities**

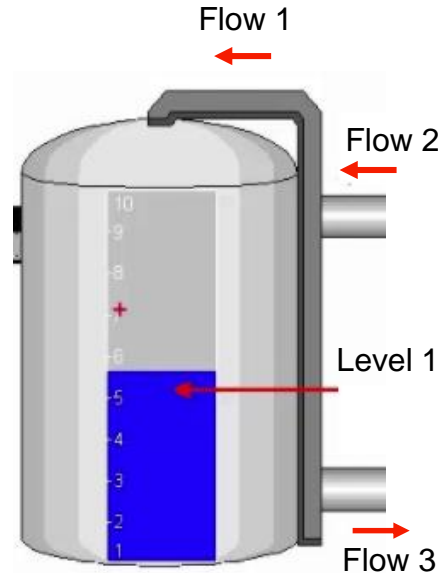
Industry

- **Phasor measurement network**
- **Evidence of network stability during period of high wind generation.**

The PI System in the Classroom



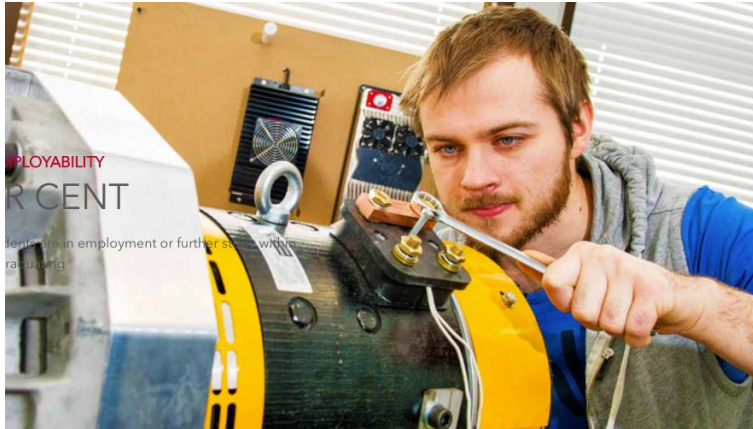
Undergraduate Teaching



Reaction Tank

- **Most Suitable for Chemical Engineering or Control Courses.**
- **Plant Simulation Demo.**
- **Process Control Simulation.**
- **Plant Performance Simulation and Calculations e.g. heat transfer.**

Challenges for Electrical Eng. Courses



“Who needs data?”

- **Process/Control is not a core subject.**
- **Limited to final year studies.**
- **Often students don't understand how important data is to plant operations.**

Benefits of PI system for Teaching



- **Enhanced student experience.**
- **Modernization of teaching courses.**
- **Utilization of real world software tools.**
- **Enhanced employability.**
- **Transferable skills.**

Student Employment



Queen's University Student Testimonial

- **Mr Stephen Brownlees**
(AES C&I Manager)



“Experience with PI at university is a valuable skill that can be easily transferred to the workplace.”

Academic Objectives

Research

Develop industrial links that will promote research opportunities.

Teaching

Enhance the learning and teaching experience for students.

Solution

- Build trust with current industrial partners.
- Participate in OSIsoft Academic Program.
- Develop in-house expertise in PI.
- Develop student projects using PI.
- Share our experience.

Results

- Multiple new Industrial Links.
- Improved data acquisition and for research projects.
- Transferable skills for students.
- Enhanced student experience.

Questions

Dr. Michael Cregan

m.cregan@qub.ac.uk

Electrical Engineering Lecturer
Queen's University Belfast