



# Facilities Monitoring at Griffith University

Presented by **Brian Hobby**  
**Campus Life**



## What I will be covering

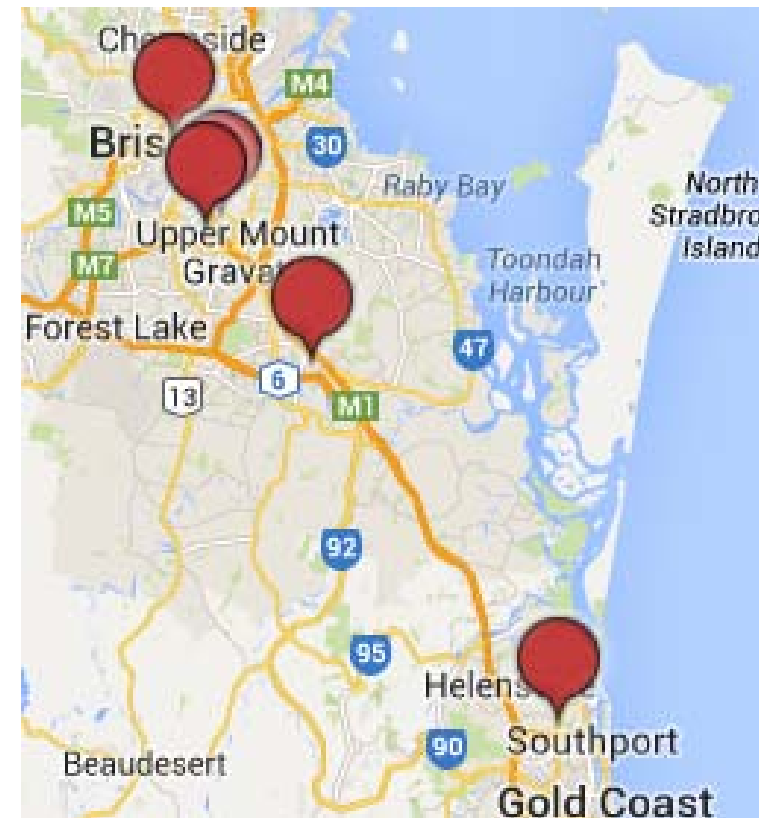
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- Who are we
- Why do this
- Where is the value
- Why OSIsoft PI
- What are we using Software and Hardware
- Where are we at in our journey
- Some quick wins
- Conclusion

## Who is Griffith University?

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- Established in 1971 and officially opened in 1975, the University is named in honour of Sir Samuel Griffith (1845-1920), a former Premier and Chief Justice of Queensland and the first Chief Justice of Australia.
- We are home to over 43,000 students from all over the world supported by nearly 4,000 staff.
- Griffith offers more than 300 degrees including undergraduate degrees, postgraduate and research degrees.
- We have five campuses: Gold Coast, Logan, Mt Gravatt, Nathan and South Bank.



## Why did we investigate collecting the data?

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From the Griffith University Sustainability Plan 2013-2015:

**5% Reduction in Greenhouse Gas Emissions by 2020**

If we don't have long term accurate data  
how do we “**know**” we have improved  
or met our plan?

If we refurbish or renew structures, how do we prove we did it better  
this time?

## What is the value?

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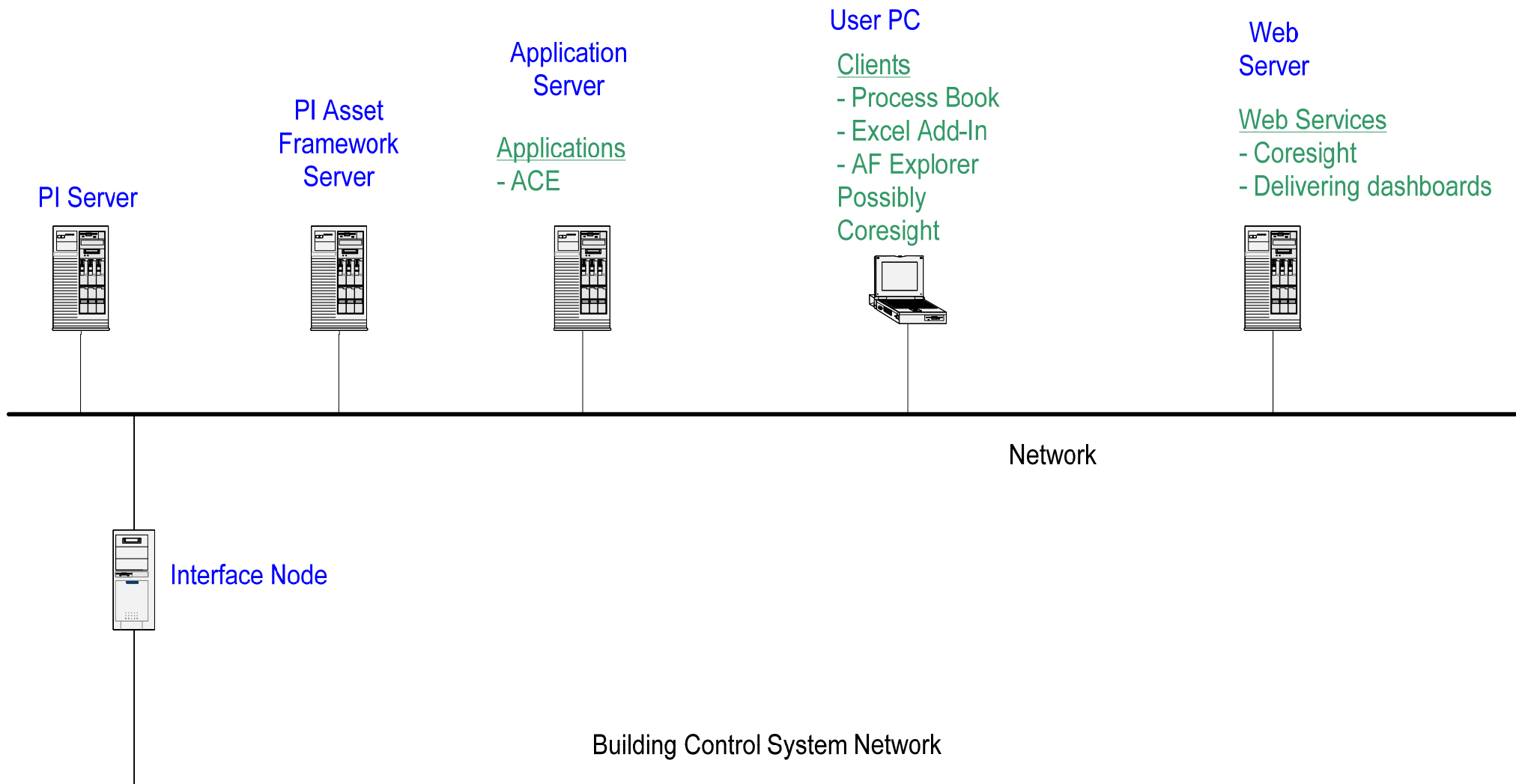
- Energy costs money; no matter whether it is electrical, mechanical, heat or compressed air
- Minimising our energy consumption lowers our carbon footprint as well as potentially saving money
- By understanding how we use energy we can potentially find smarter ways of using our spaces and environments
- Currently we “trend” values post event from the building management systems - the aim is to have the data to examine what changed and why we had the event

## Why OSI PI Server?

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- We require long term, multiyear analysis of information for analysing building operating strategies for energy minimisation
- The University is spread across SE Queensland, if needed local interface servers could be installed to aggregate the data before communication with the PI Server
- Our energy data is time series for the most part and is a good match for the PI Server storage approach
- We are effectively 2 medium sized towns and 3 villages thus needed to go to enterprise scale data handling

# Implemented OSI Products – Coresight in progress



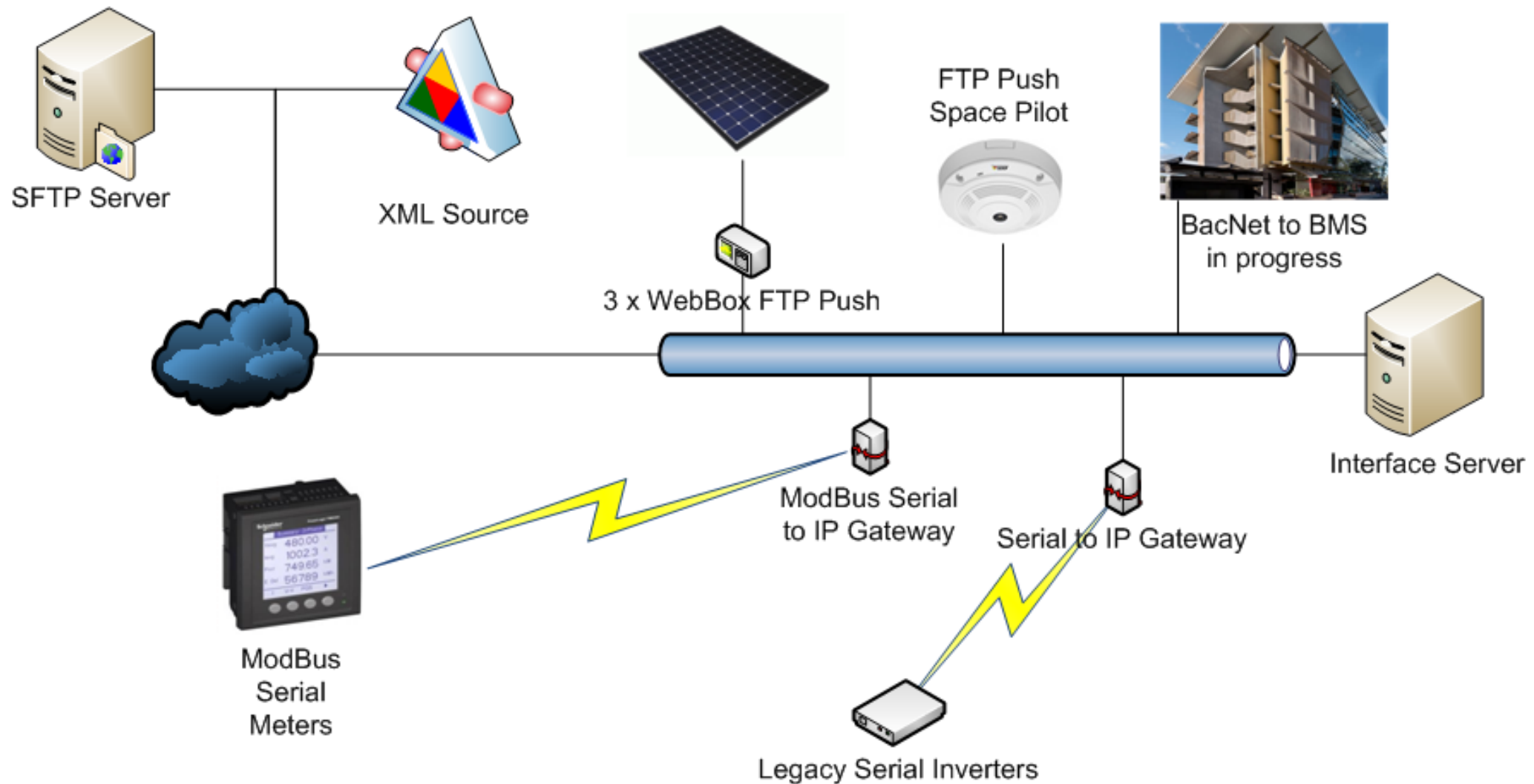
## Data Collection approach

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- 2 x standard interfaces, ModBus TCP and BacNet on a standalone PI Interface server
- Custom Service via IP to Serial gateway for legacy solar inverters
- FTP push from 3 x SMA Webbox solar installations and pilot embedded cameras assessing space utilisation
- SFTP client collect from external Water Meter data provider (WaterSave)
  - » agreed data format and handshake
- URL/XML from Temperature Alert for 3G remote monitored cool room sensing
  - » We want the long term data for energy analysis.....



## Data Collection approach



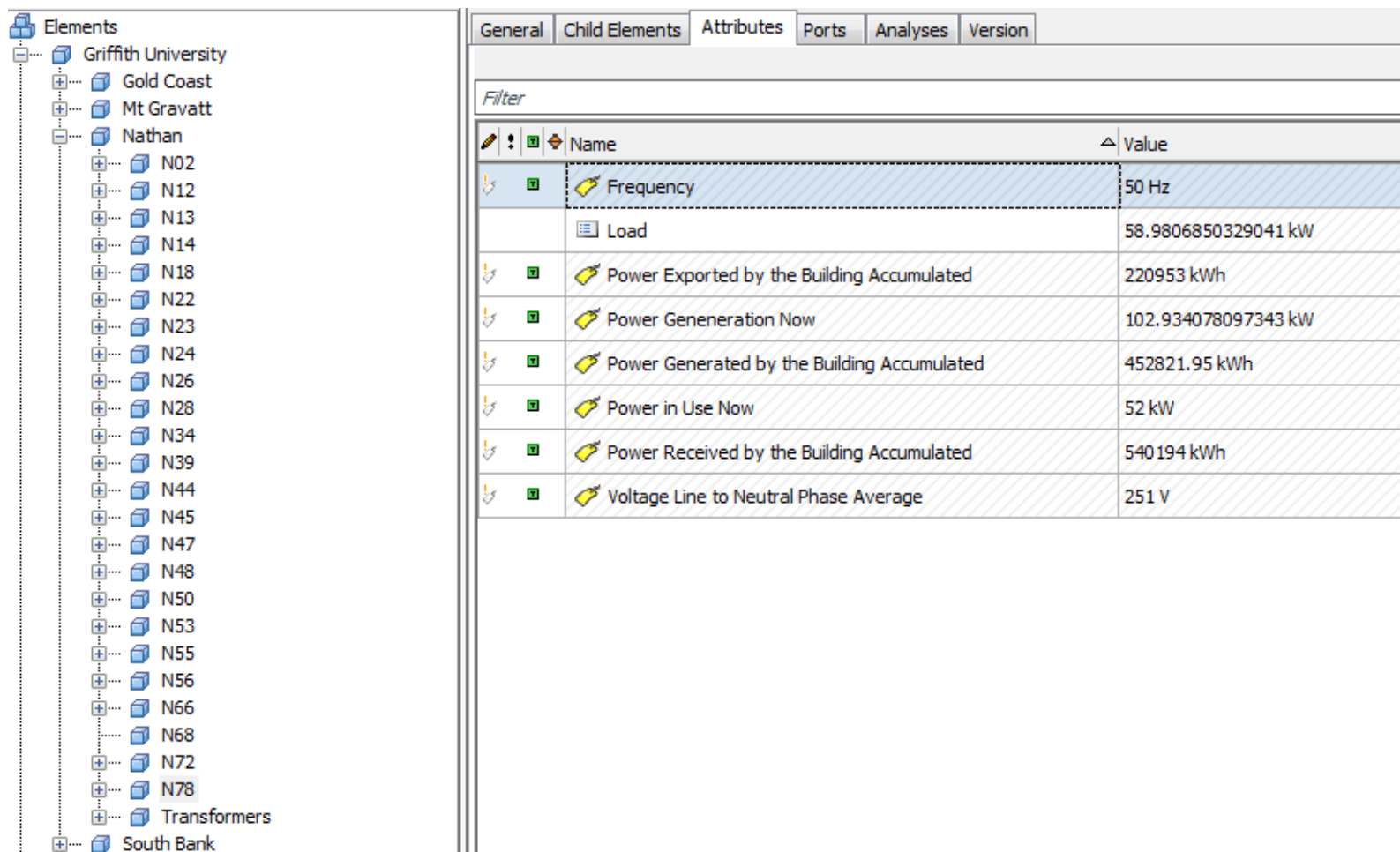
## Where are we at.....

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- We have over 100 building locations to install at least 1 meter into for total building load measurement
- As at 22 August 33 discrete individual buildings were online, with a total of 257 meters being read.
  - » Many meters in newer building such as N78 - The Sir Samuel Griffith Building which is 6 star green star rated
- Expect all meters to be installed by Oct/Nov with data checks carried out and prototype energy dashboards by year end
- Once the metering is settled down we will consider what next...

Where are we at.....

Working through PI AF to set up structures that work for easy location and presentation of the data



The screenshot displays the PI AF (Process Information Architect Framework) software interface. On the left, a hierarchical tree structure shows the project organization. The 'Elements' folder is expanded, revealing a list of locations: Griffith University, Gold Coast, Mt Gravatt, Nathan, and South Bank. Under the 'Nathan' location, a series of numbered nodes (N02, N12, N13, N14, N18, N22, N23, N24, N26, N28, N34, N39, N44, N45, N47, N48, N50, N53, N55, N56, N66, N68, N72, N78) are listed, along with a 'Transformers' folder.

On the right, the 'Attributes' tab is selected, displaying a table of data for the selected element. The table has two columns: 'Name' and 'Value'. The data is as follows:

| Name                                        | Value               |
|---------------------------------------------|---------------------|
| Frequency                                   | 50 Hz               |
| Load                                        | 58.9806850329041 kW |
| Power Exported by the Building Accumulated  | 220953 kWh          |
| Power Generation Now                        | 102.934078097343 kW |
| Power Generated by the Building Accumulated | 452821.95 kWh       |
| Power in Use Now                            | 52 kW               |
| Power Received by the Building Accumulated  | 540194 kWh          |
| Voltage Line to Neutral Phase Average       | 251 V               |

# Where are we at.....

## Trialing PI Notifications for capability and potential application

Notifications

New

Disabled (2)

Running (3)

N78 Solar Continuous checking 0900 to 1700

N78 Solar Generation report 0900

Test N78 Voltage SQC

N78 Solar Continuous checking 0900 to 1700

Overview

Trigger

Message

Subscriptions

History

Name:

N78 Solar Continuous checking 0900 to 1700

Description:

Status:

Running

Template:

Categories:

Trigger

Target: N78

Condition: if '\*+1s'>'T+9h' or 'T+17h'<'\*+1s' then TagAvg('Level 5N78 MSB Inverter Roof Solar PV 1|Real Power Total', '\*-1h', '\*', 80) > -0.1 else 0

Condition: if '\*+1s'>'T+9h' or 'T+17h'<'\*+1s' then TagAvg('Level 5N78 MSB Inverter Roof Solar PV 2|Real Power Total', '\*-1h', '\*', 80) > -0.1 else 0

Condition: if '\*+1s'>'T+9h' or 'T+17h'<'\*+1s' then TagAvg('Level 3N78 DB3A Inverter Awning No1|Real Power Total', '\*-1h', '\*', 80) > -0.1 else 0

Condition: if '\*+1s'>'T+9h' or 'T+17h'<'\*+1s' then TagAvg('Level 3N78 DB3A Inverter Awning No2|Real Power Total', '\*-1h', '\*', 80) > -0.1 else 0

Condition: if '\*+1s'>'T+9h' or 'T+17h'<'\*+1s' then TagAvg('Level 2N78 DB2A Inverter Awning No1|Real Power Total', '\*-1h', '\*', 80) > -0.1 else 0

Condition: if '\*+1s'>'T+9h' or 'T+17h'<'\*+1s' then TagAvg('Level 2N78 DB2A Inverter Awning No2|Real Power Total', '\*-1h', '\*', 80) > -0.1 else 0

Condition: if '\*+1s'>'T+9h' or 'T+17h'<'\*+1s' then TagAvg('Level 1N78 DB1A Inverter Awning No1|Real Power Total', '\*-1h', '\*', 80) > -0.1 else 0

Condition: if '\*+1s'>'T+9h' or 'T+17h'<'\*+1s' then TagAvg('Level 1N78 DB1A Inverter Awning No2|Real Power Total', '\*-1h', '\*', 80) > -0.1 else 0

Message

0 item(s) of custom content available to subscribers

1 customized delivery format(s) configured for Email

Subscriptions

2 subscription(s) to this notification

## Where are we at.....

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Some staff have been trained and have begun using the data already via PI DataLink for Excel and PI ProcessBook

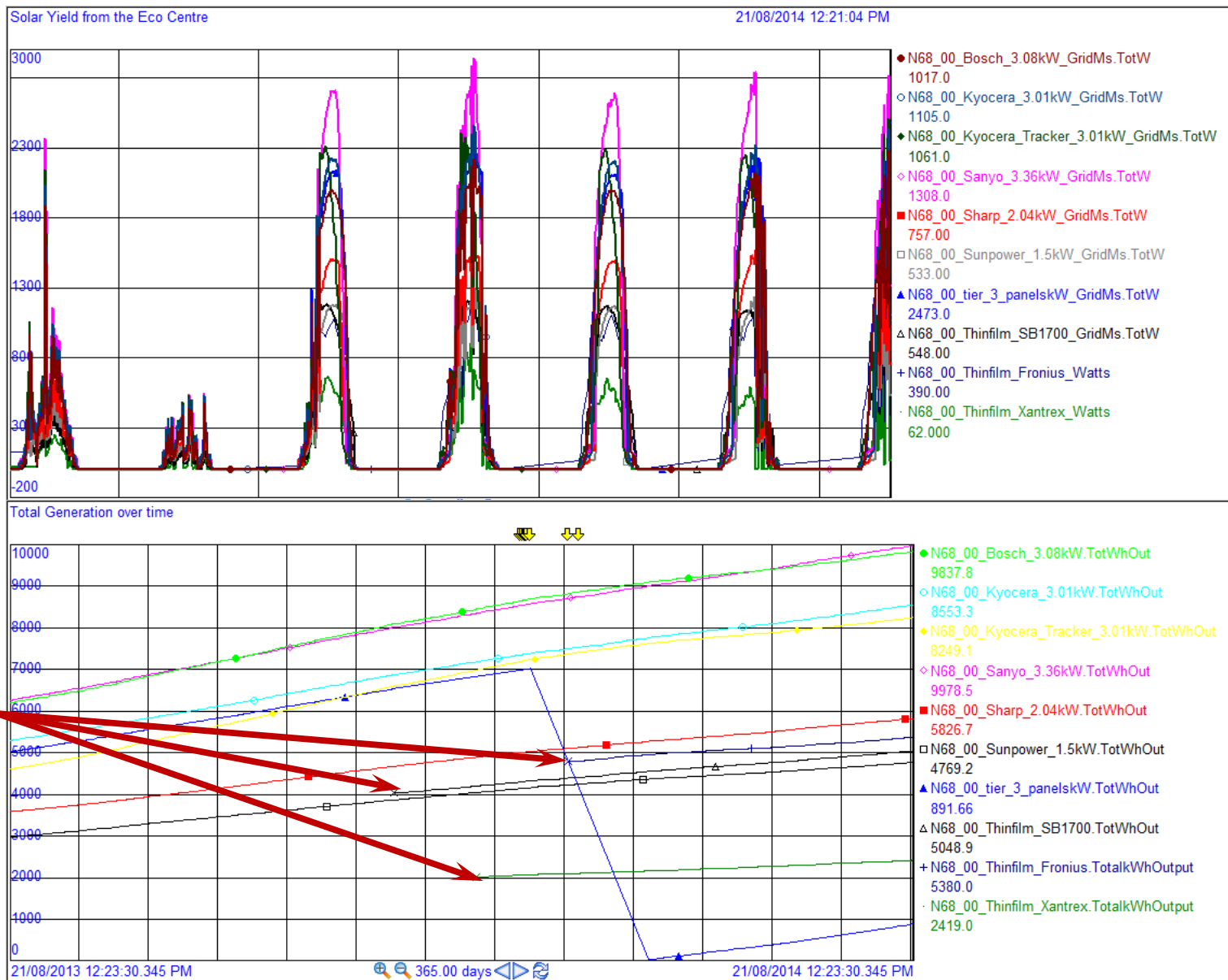
Have connected to other infrastructure such as Chiller High Level Interfaces where possible at low cost as we rollout (a few extra meters of serial cable and DATA)

Some academic work has already been based on data collected; particularly from the Sir Samuel Griffith building.

Interest in the data is being shown by Architecture, Science, Engineering, and Management Schools.

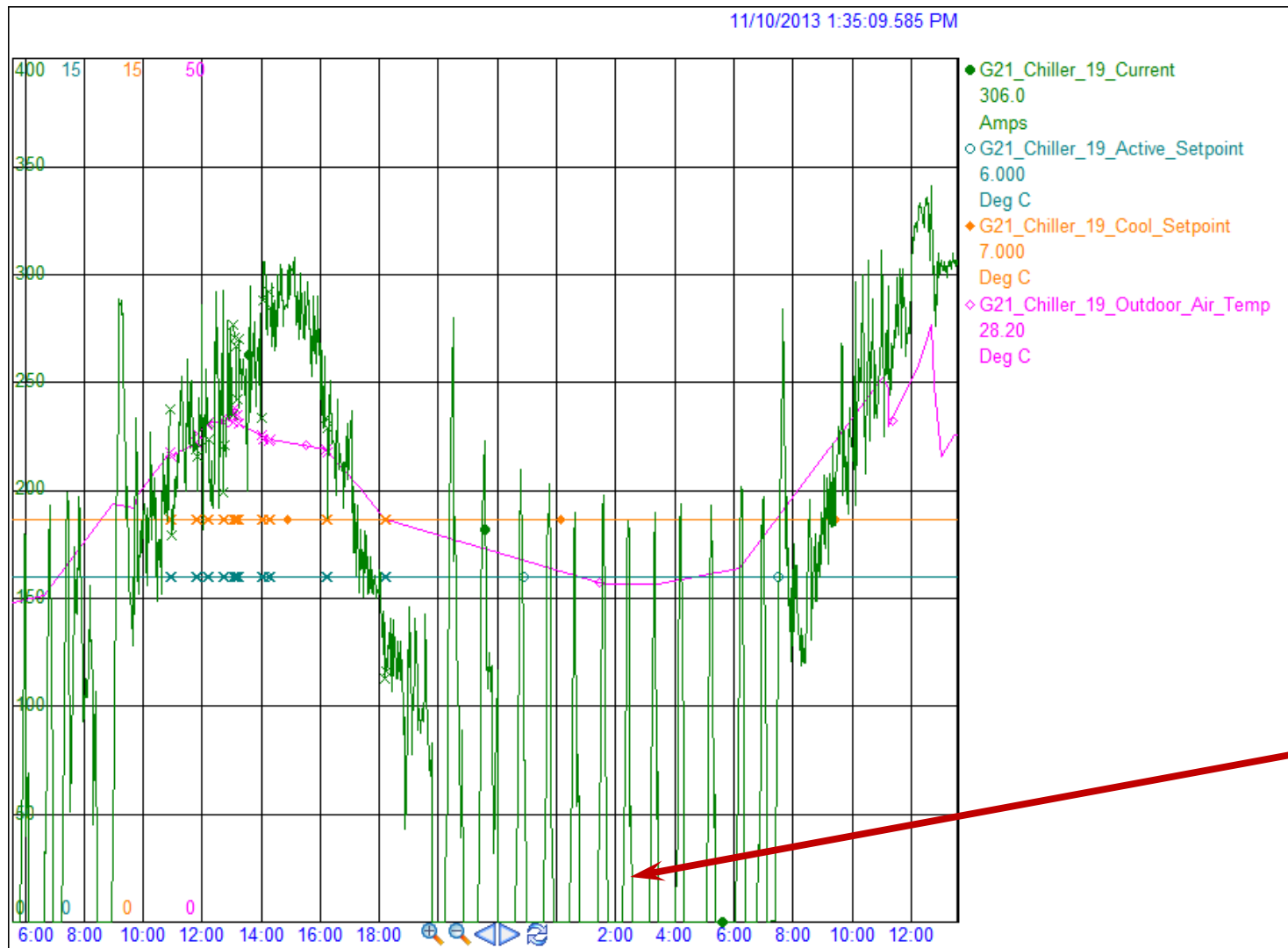
Currently using the PI Historian to store the data for a PhD solar project on N44

# N68 - Eco Centre Solar Data Rescued and Expanded

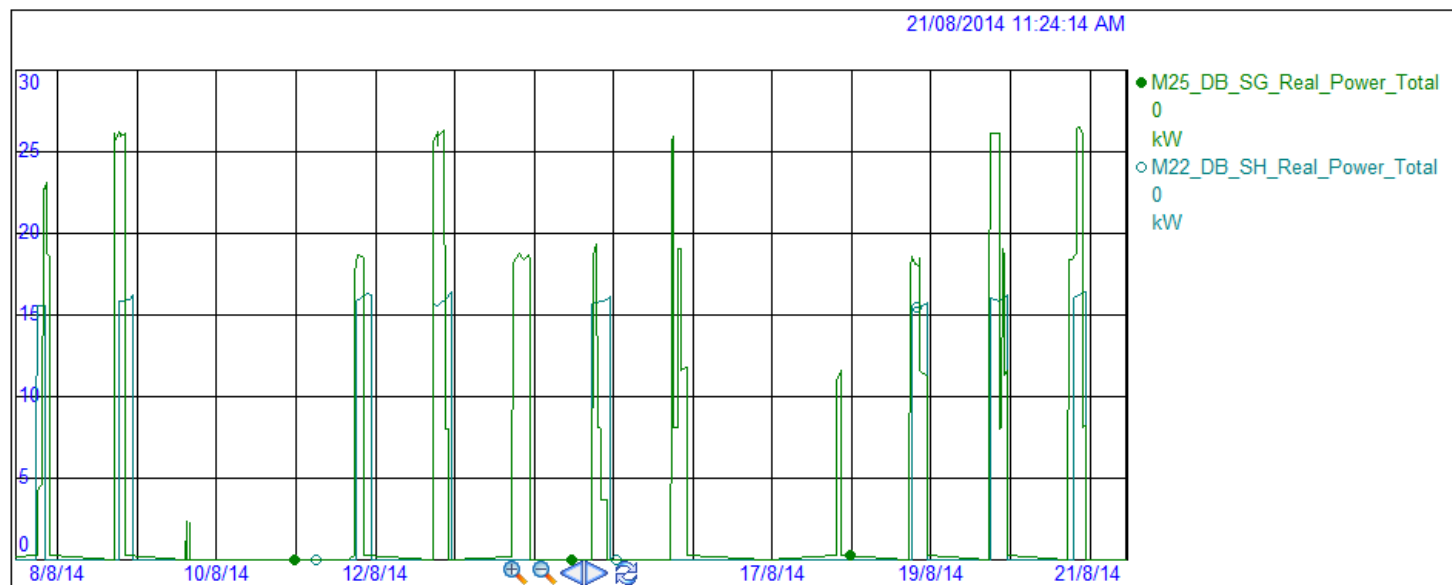
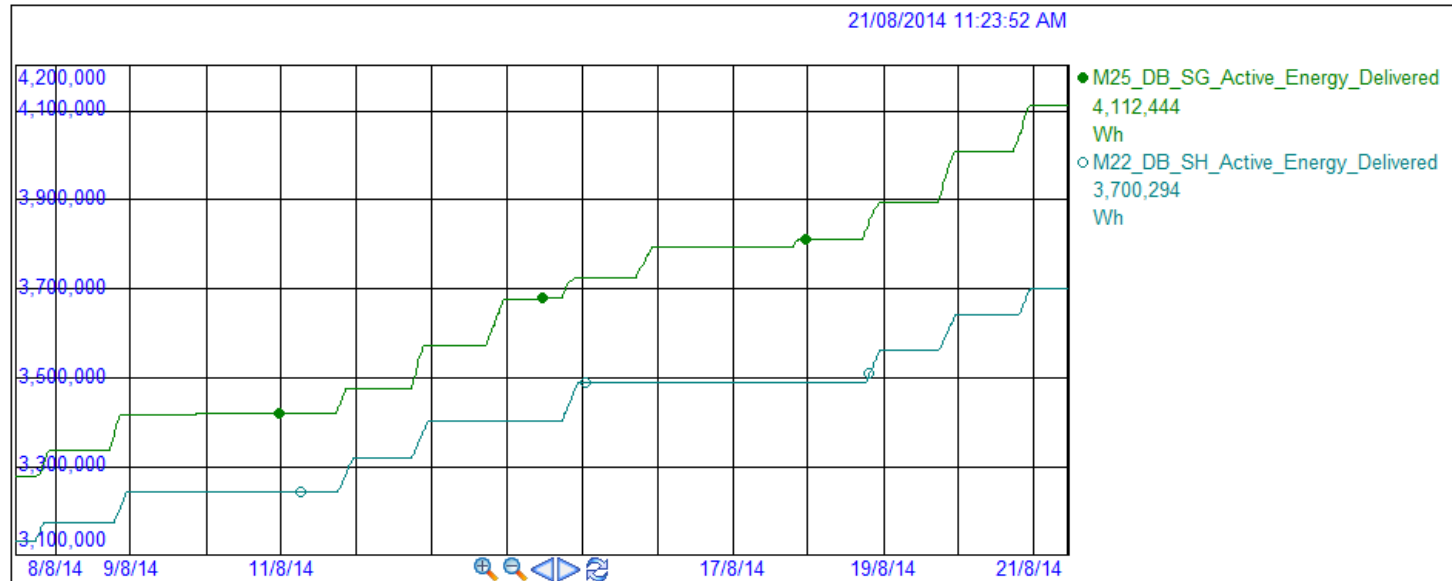


New  
Serial  
Comms

## Some early wins....

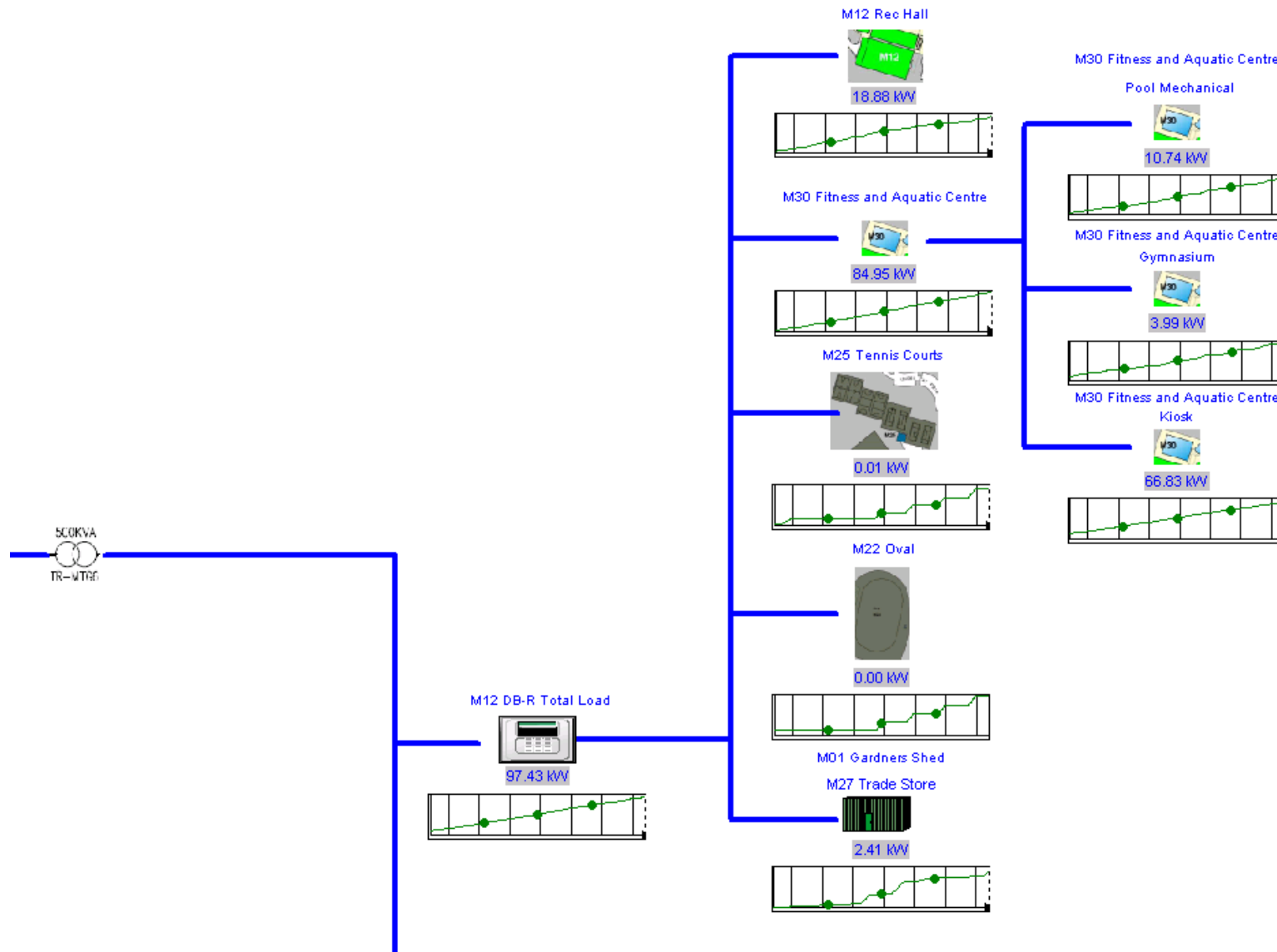


# Tennis Courts and Oval at Mt Gravatt – very distinctive





# Historical complexity - Mt Gravatt partial Single Line



## Conclusions

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- We are on an interesting journey, check back mid next year.....
- As we continue to understand our energy we see more ways to improve our management of it
- Campus Life will be using the data to ensure new builds and refurbishments perform at least as well as our current buildings

# Facilities Monitoring at Griffith University

Until you start to measure your energy you have no idea where to best place your efforts in managing it.

We are starting to see some interesting information from the data – more analysis required once we have a full Campus/University level picture of the consumption patterns



## Business Challenge

- Document improvement in carbon footprint

## Solution

- Rollout energy metering with data capture to PI Historian

## Results and Benefits

- Flagged HVAC investigation immediately
- Proving useful in research into Sir Samuel Griffith Building
- Want to see dashboards? let us know at [BusSysClf@griffith.edu.au](mailto:BusSysClf@griffith.edu.au)

# Brian Hobby

[b.hobby@griffith.edu.au](mailto:b.hobby@griffith.edu.au)

Technical Lead (IT & Engineering)

Campus Life

Griffith University

To be informed when we have public facing dashboards drop us a note at

[BusSysClf@griffith.edu.au](mailto:BusSysClf@griffith.edu.au)



# THANK YOU

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