

*The IPC Shopping Center Malaysia
Reduces Energy Costs, Increases Occupant Comfort and achieved LEED
Certification*



Partner: Optergy Malaysia

Technology Used: S4 Open: BACnet-N2 Router, Optergy Enterprise BMS server, Alerton ACM Controllers

Customer Location

IPC Shopping Centre is Malaysia's first shopping center, anchored by Swedish home furnishing giant IKEA, and the first of many shopping centers in Ikano Group's portfolio in South East Asia region. IPC Shopping Centre is operated by Ikano Corporation Sdn. Bhd., a wholly owned subsidiary of IKEA Southeast Asia & Mexico under the Ikano Group, Sweden.

Customer Requirements

A critical customer goal for this project was to reduce operating expenditure by addressing inefficiencies in their HVAC operations, by either upgrading old equipment or changing HVAC control strategies.

The second goal of this project was to modernize the mall's HVAC and BMS to achieve a high Green Building Index (GBI) and LEED rating, which would in turn reduce operating expenditure. Optergy's scope of work was to take control of the chiller plant and AHU operations, as those were the largest contributors to electrical consumption in the mall.

The client's monthly electrical consumption was taken to be the key performance indicator by which the project would be measured.

About the Project

The initial BMS topology was straightforward. There were a total of 7 Johnson Metasys NAE controllers in the mall. Two NAEs had field devices (such as the Johnson FAC and VAV controllers) connected to each of their N2 bus terminals. Each NAE served about 50 N2 devices. The remaining NAEs were used to connect to BACnet devices (such as VSDs, water meters, electrical meters, and thermal meters).

One of the original considerations was to use the Tridium Niagara platform, with JACE controllers acting as N2 devices. However, the amount of engineering work required was prohibitive, and would also involve downtime when replacing existing client controllers.

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Sam Depogan Dan, Project Manager, commented on the use of the S4 BACnet -N2 Router: “Using the BACnet-N2 router instead allowed saving on time, effort, and cost. We did not have to reconfigure new controllers to match existing JCI controller configurations. We also had a BACnet/IP interface available for our BACnet controllers to read and write to without any modification to our programming.”

He further commented, “By being able to keep the existing JCI controllers, we also did not have to replace sensors which were in working condition but were of the wrong input type for new Alerton VLC controllers (1k Platinum RTD instead of 10k type 2 thermistor). These new controllers were added to cater for new control points in the chiller plant.”

Project Approach

The S4 Upstream N2 interface was used, as the Metasys system would still be used for controls of the mall FCUs and other ventilation systems. The supervisory controller as a BACnet client feature was occasionally used when testing chiller plant control strategies. Optergy was able to switch back and forth between new and old controls easily, which helped in verifying the efficiency gains that were being achieved. Once the control strategies were finalized, the feature was turned off to ensure only the Optergy system would have control of chiller plant equipment.

Technical Objectives

- *Adding flowmeters to the incoming and outgoing headers of the chilled water and condenser water lines in the chiller plant.*
- *Adding variable speed drives to the pumps of the chillers which were originally supplied when the mall was first constructed.*
- *Adding variable speed drives to the cooling tower fans which were originally supplied when the mall was first constructed.*
- *Adding temperature sensors in each mall tenant lot to gain visibility into conditions of the spaces served by the mall AHUs.*
- *Optimizing the AHU control strategies to reduce demand on the chiller plant while maintaining acceptable mall conditions.*
- *Optimizing the chiller plant control strategies to ensure proper unloading of the chiller plant equipment when the AHUs reduce their demand.*

Current BMS Typology

- *All Metasys NAEs are still in place, but the two NAEs with active N2 buses have a BACnet-N2 router inserted between the NAE N2 interface and the N2 field bus. The BACnet-N2 Router becomes the gatekeeper determining which client (N2 or BACnet) gets access to the N2 bus and its devices.*

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- A new IP network was created, which includes the Optergy Enterprise BMS server, Alerton ACM controllers, the S4 BACnet-N2 routers, and existing operator workstations.
- The existing BACnet devices were brought into the Optergy system by adding a Contemporary Controls BAS router into the BACnet MSTP bus of each NAE (in a similar fashion to the S4 BACnet-N2 router). This provided a BACnet/IP interface for the Optergy system.

Outcomes

By the end of the project, the customer obtained a reduction in electrical consumption of 75000kWh per month, which was about 10-15% of their HVAC equipment electrical consumption. Additional reduction in the maximum demand charges being levied on the customer, as well as an increase in the chiller plant efficiency from an average of 0.85kW/ton to 0.75kW/ton.

Currently, the customer has a service contract with Optergy.

About Optergy

Prior to this project, Optergy did not have any prior relationship with the customer; however, we did have a prior relationship with the consultant who was acting on behalf of the client.

We had delivered many projects which have achieved high Green Building Index ratings prior to this. The skills that enabled us to do so were proper knowledge of HVAC systems and the control strategies required to achieve the best possible efficiency for the customer's particular situation.

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About The S4 Group, Inc.

The S4 Group, Inc. is an innovator in software and network appliance development. Products include the S4 Open family of network appliances that unlock legacy BAS to open protocols such as BACnet and OPC.

For additional information, please visit our website at www.thes4group.com or contact Steve Jones, sejones@thes4group.com