



"Every dollar that I save in energy use goes right into the Gross Operating Profit. Hotel occupancy is very dynamic. The hotel is not full every day. There are floors and wings of the building that don't have guests. If 60 percent of the hotel is vacant, I don't need to run the systems there."

-JoJo Estrada  
Chief Engineer at the Westin

#### PROJECT AT A GLANCE

Project Type:  
BMS

Location:  
Macau, China

Number of Buildings:  
1

Number of Rooms:  
208

Total Square Meters:  
33,672 of air-conditioned floor space  
(362,454 square feet)

#### Applications:

- HVAC: Temperature and ventilation User Interfaces
- 1 Infinity SX 8000 workstation
- Facility Architecture
- 10mb Ethernet LAN over CAT5
- Legacy BMS over CAT5 and twisted pair

Network Controllers:  
1 – CX 9200

System Network Repeaters:  
3 – Infilink200

System Controllers:  
4 – LCX 800i  
51 – TCX 851  
14 – TCX 853  
23 – TCX 870

Expansion Modules:  
26 – EMX 150  
52 – EMX 160

## The Westin Resort Macau Profit from Smart Energy Management

Looking at the Westin resort and conference center in Macau, one might think that tight energy management isn't as critical as in many hotels. This impressive luxury complex suggests that resources are limitless. However, the hotel must exercise precise facility management to remain competitive, as well as create a superior guest environment. The TAC® building management system is key to the facility's financial success and enables it to realize impressive, expanding energy savings.

Opened in 1993 for upscale business and vacation guests, the 208-room hotel boasts sumptuous guest rooms, fine restaurants, state-of-the-art meeting areas, indoor squash courts, a heated pool and an adjoining 18-hole golf course. The hotel is located on the island of Coloane and sits on Hac Sa Beach across the South China Sea from Hong Kong.

According to Mr. JoJo Estrada, Chief Engineer at the Westin, "Every dollar that I save in energy use goes right into the Gross Operating Profit. Hotel occupancy is very dynamic," he says. "The occupancy of the hotel changes. Sometimes there are floors that don't have guests. If 60 percent of the hotel is vacant, I don't need to run the HVAC there."

The weather can fluctuate dramatically. "Here in Macau, the outside temperature can change suddenly," says Estrada. Most important, the Westin must maintain a very comfortable environment for guests. In the very popular Macau marketplace, the Westin must do everything it can to make guests happy and keep costs down.

#### NEW TECHNOLOGY AND A NEW APPROACH

In 1995, the Westin hired Energy Resources Management (ERM) of Hong Kong to help reduce energy consumption. After an exhaustive energy audit, ERM identified opportunities for improved energy management as well as issues with the old building automation system, says Robert Allender, CEM, Managing Director at ERM. "One clear weakness was that the system installed two years earlier only sent alarms and allowed remote on-off functionality," he says. The TAC solution solved these problems, created new opportunities and enabled new management procedures.



ERM brought in TAC partner BAS Engineering Ltd. to install an Infinity building system to enable progressive energy management. According to Mr. K.F. Cheung, BMS Engineer, the original Westin building management system required continued expensive repairs. The challenge for Cheung and his team was to implement ERM's recommendations and salvage as much of the old system architecture as possible. Subsequently, the TAC solution has been the key to remarkable energy savings and unparalleled control.

### TAC DELIVERS IMPRESSIVE BENEFITS

As a result of the Westin's new energy management regime and the TAC system, the hotel saved \$649,000 from 1995 – 1998. From Estrada's first day in 1998 through 2001, he estimates the hotel will have saved an additional \$800,000. That's a total of \$1,449,000 in six years. "In 1999, energy savings helped quite a bit," he says. "We would have had a negative year otherwise. In 1998 and 1999 all the hotels in Macau had a gross operating loss, but we managed to be on top with a gross operating profit."

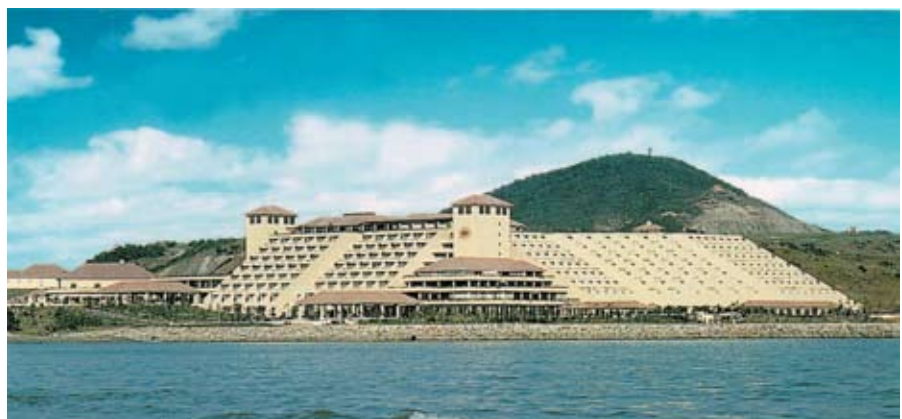
Infinity has also allowed him to streamline his staff. "I have saved between two and three men because the hotel runs 24/7," he says. "With our old system, it was very hard to monitor every area. I had to have one man walk around to every location in the hotel just to check temperatures and turn equipment on and off. If I didn't have the TAC system, I would have to add one more man for each of our three shifts."

Hotel guests have benefited as well. Estrada explains that complaints in public areas such as the restaurants have dramatically decreased. "I had to manually control a lot of mechanical equipment. With TAC, I was able to look at the result and manage the equipment remotely, setting the temperature, turning it on and off. The end result was far fewer complaints from guests and staff."

### A DAY OF SMART ENERGY MANAGEMENT

In addition to ERM's weekly energy audit, Estrada and his staff monitor every system every day, looking for opportunities to conserve. Kilowatt hours, oil and water consumption are closely watched. In conjunction with Estrada's routines, BAS Engineering provides basic programming for chiller sequencing and generating weekly energy usage logs that are sent to ERM. According to Cheung, "The custom TAC program senses the cooling load. If the load is less than cooling capacity, it shuts down one of the chillers." Moreover, BAS Engineering Ltd. created a host of special programs for the PAUs and AHUs, which also use TAC's Plain English® programming language. The ventilation program employs a schedule to strategically turn specific fans on and off. And, the temperature control programs compare air temperatures with set points to actuate the HVAC equipment to meet them.

Estrada outlines his day: "In the morning I have to make sure equipment is not set at a low cooling level. It's a waste of money and adds a lot of load to the chillers. I also have to make sure equipment that is not supposed to be on is off."



"I usually make sure that meeting rooms and the lobby and restaurants are at the proper temperature. It's very quick for me to get on the PC and click on the TAC BMS and look at the situation. What's the temperature? What's the humidity? Without it, I would have to send men with various hand-held calibration and checkout tools to check these areas. It would take them one hour to come back and tell me that something is wrong."

### COMPLETING THE TRANSITION TO TAC

The Westin Macau currently has three chillers, 25 PAUs, 16 AHUs, 15 VAVs and 330 FCUs. Cheung explains that the TAC technology was able to interface with the old system architecture without interfering with its operation. That's critical, since 50 percent of the equipment is from the old BMS. In addition to testing and replacing wiring, Cheung was able to use just three TAC Infilink 200 System Network Repeaters to ensure robust and clear signals from NetControllers. The retrofit is flawless.

"Ninety percent of my staff have been here a long time, six years and over, using the TAC system," says Estrada. "They like it because it's easy to quickly view information rather than going from one area to another." Estrada is quite pleased. "I would like to replace the old BMS points with TAC, since that BMS technology is already 12 years old. In the second phase, I want to incorporate the rest of the HVAC system, the pumps, lighting systems and the fire control panel."

### NEW STANDARDS IN SMART ENERGY MANAGEMENT

The process began in 1995 but the Westin continues forward. According to the Westin Macau Resort, their energy management program improves each year and reduces pollution, thus having a very positive impact on the natural environment. As Allender points out, "The hotel has been the proving ground for many hotel-industry-specific management concepts that have since resulted in major savings to other ERM clients."



Estrada stresses that he now has total control. The TAC front-end workstation at the engineering office provides instant access to every unit on the system. Estrada uses it to tour the hotel, change set points, monitor temperatures, turn equipment on and off, and access any other capability or data point in his HVAC system. Whether it's

temperature or ventilation, this system provides great ease. "I can do all this in five to ten minutes a day," he says. "Without it, I would not be able to do it." With the continued rollout of the TAC system, the Westin Macau is sure to add to its \$1,449,000 energy savings and stay very competitive.



---

Copyright © 2007-2008, TAC  
All brand names, trademarks and registered trademarks  
are the property of their respective owners. Information  
contained within this document is subject to change without  
notice. All rights reserved.

PP-HO-WESTIN-A4  
August 2008

[www.tac.com](http://www.tac.com)

**t.a.c.** <sup>®</sup>  
by Schneider Electric