

Case Study

Building Management Solution for Electoral Commission of Namibia

Industry

Building Automation

Partners

inCharge Control Solutions

Hardware

Daikin air conditioning units, Clipsal C-Bus lighting system, Modbus-enabled power meters, GE Alliance access control system



inCharge Control Solutions Company Background

inCharge Control Solutions is a Namibian company delivering automation, monitoring and management solutions for business facilities, equipment, and people. inCharge specializes in developing and deploying highly customized, stable, scalable and flexible hardware and software projects.

inCharge offers solutions in diverse areas:

- Industrial and Building Automation
- RFID-based Tracking and Tracing
- Network Monitoring and Management
- Device Monitoring and Management
- Software Development
- System integration

Challenges

The Electoral Commission of Namibia (ECN) is an exclusive authority to direct, supervise and control the conduct of elections in Namibia in a fair and impartial manner.

When the Electoral Commission of Namibia moved to new premises in Windhoek, one of the requirements was the automated management of Lights and Air Conditioning units in the building in order to reduce energy usage and save on utility expenses.

The new ECN building consists of roughly 250 offices, a basement parking area and several outside areas. The offices are fitted with lights and air conditioning units, while some other areas only have lights.

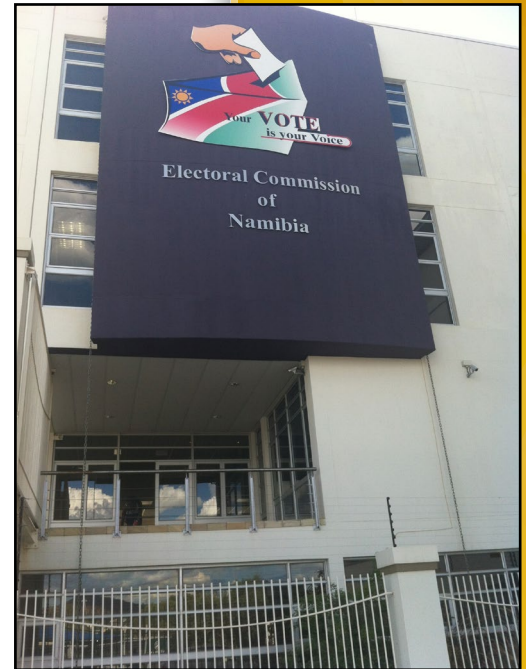
Depending on the type of area, the Building Management System is required to make control decisions based on occupancy or time schedules. In certain cases, time schedules are used during the day and occupancy is directing the BMS operation outside business hours.

Electricity usage of the building is constantly monitored, and in case of over-usage, the temperature of air conditioners is increased or trivial units are switched off.

Requirements

Initial customer requirements were summarized to several office and common area automation tasks:

- Switching on lights and air conditioners for 30 minutes after a door was opened
- Extending light/conditioner activation time for further 30 minutes upon every subsequent activation of a Passive Infrared Sensor (PIR)
- Making those activation periods configurable through a Graphical User Interface (GUI)
- Displaying status of door contacts and room occupancy on floor plans and per-room screens
- Supporting UI-based manual operations for lights and air conditioners, as well as setpoint management
- Enabling scheduled operations for selected areas
- Auto-deactivating conditioners if a balcony door was opened
- Monitoring building-wide power consumption and automatically taking power saving actions if an over-usage is detected
- Detecting room occupancy via integration with the Access Control System (GE Alliance)
- Providing two-role security and internal access control for users that are only allowed to view status/alarms and system engineers



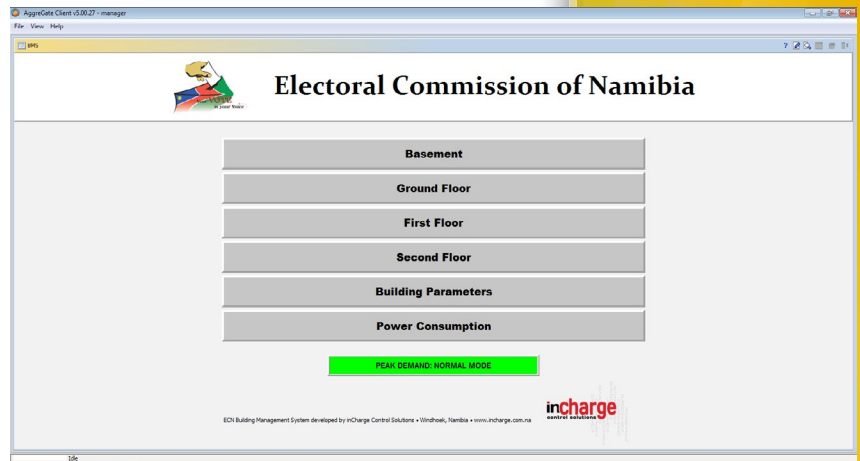
Solution

The ECN has raised a lot of requirements for the BMS and supporting systems, such as the Access Control System. However, the Light Bus System and air conditioning units were already installed and allowed only minor changes in the infrastructure.

With this in mind, inCharge had to select a Building Management Platform that supports creating Human Machine Interfaces (HMIs), as well as accessing various device types, such as:

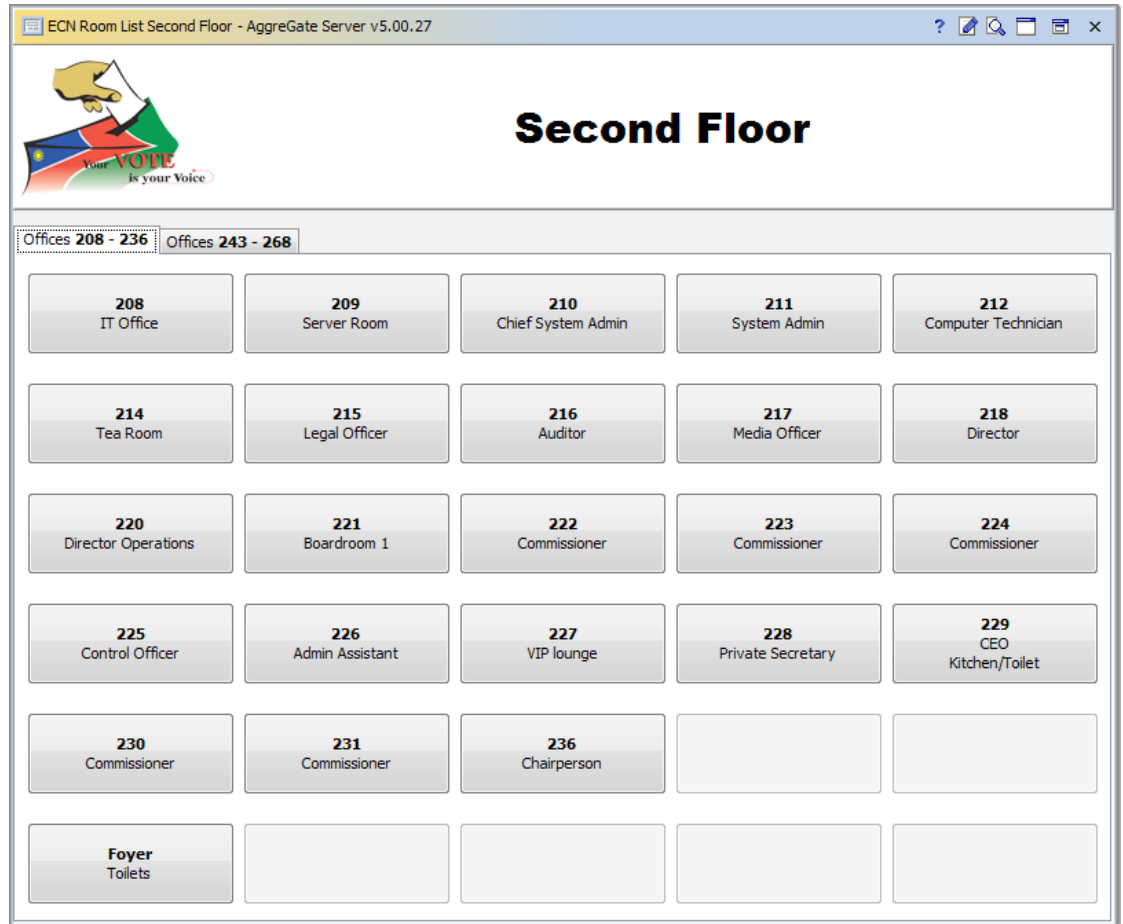
- A Microsoft SQL Server database to get the occupancy from the Access Control System
- A Daikin BACnet Gateway to access the air conditioners
- A Clipsal C-Bus system to access the lights
- Power meters connected via Modbus protocol

inCharge has selected AggreGate Building Automation system from Tibbo Technology to implement the Building Management Solution for the Electoral Commission of Namibia. AggreGate BMS supports creation of Graphical User Interfaces and allows deep visual configuration and script development, as well as role-based user access control. The underlying AggreGate Platform ensures connectivity with a wide variety of different device types, thus, being a perfect match for this project.



The AggreGate-based Building Management Solution developed for ECN makes use of numerous AggreGate BMS modules:

- Every piece of equipment (Sensors, Lights, Air Conditioners) has a corresponding device account
- All configuration options and statuses are saved in Common Tables
- Scripts running in the background are used to manage lights and air conditioners
- Room Monitoring and Configuration HMIs provide the fine-grained control
- Power Management dashboard is used to overview building's power consumption
- Many other widgets were created to implement the first-line operator interface of the BMS



Room / Area Selection

“ I didn’t think this was possible. The solution completely exceeds my expectations! This Building Management System will greatly contribute to lowering our electricity expenses.”

– Lood de Jager, Consulting Engineer, Electoral Commission of Namibia

ECN Room Details - AggreGate Server v5.00.27

Room G25

Ground Floor

ROOM OCCUPIED

0008-025 MAGG25: OPEN 0008-025 MAGG25 0009-055 MAGG26: CLOSED 0009-055 MAGG26

LIGHTS

Building Management System Control

Automated switch to Manual

Light Group Local_Network_Lighting_LITG25

Status: **ON** Lights On/Off: On Off

On Trigger: Occupancy-based Time of Day On: 8 Time of Day Off: 17 On Time (minutes): 30 Save

Monday Tuesday Wednesday Thursday Friday Saturday Sunday

AIR CONDITIONERS

Building Management System Control

Automated switch to Manual

On Trigger: Occupancy-based Time of Day On: 0 Time of Day Off: 0 On Time (minutes): 30 Outdoor Time (minutes): 10 Save

Monday Tuesday Wednesday Thursday Friday Saturday Sunday

Air Conditioner Unit 1

Status: **ON** Actual Temperature: 26.3 Alarm: **ALARM PRESENT**

Air Conditioner On/Off: On Off Temperature Setting: 22 Submit °C

Room Status updated on Thu Feb 07 14:41:01 WAST 2013

Room Monitoring and Configuration

ECN Power - AggreGate Server v5.00.27

ECN Power

Window Snip

Actual Total Power		Accumulated Totals	
Apparent Power [kVA]	163.4 kVA	Graph	185939 kVAh
True Power [kW]	159.3 kW		43304 kWh
Power Factor	-0.97		

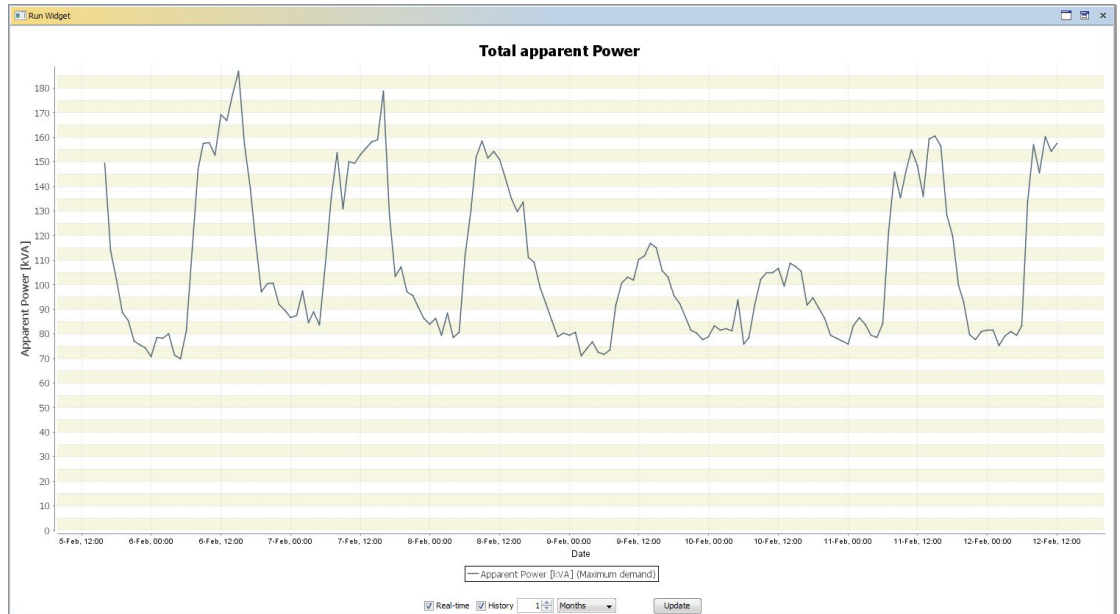
Phase	Voltage	Current	Frequency
A	236.5 V	253.8 A	50.1 Hz
B	235.8 V	208.4 A	50.0 Hz
C	236.5 V	214.9 A	50.0 Hz

Power Management

Benefits

Before the deployment of the BMS, all lights in the ECN building have operated on a fixed time schedule irrespective of different areas' occupancy. Air conditioners were manually operated by individual users causing most of units to continue running during nights and weekends.

With the implementation of the BMS, an immediate drop in electricity usage was observed, up to 25% during daytime and up to 70% during nighttime! This helped the ECN to dramatically lower its power usage and utility costs.



“ The solution is easy to use, yet powerful enough to manage the whole building. We will definitely make use of this system in future projects.”

– Werner Muller, Electrical Contractor, Electoral Commission of Namibia

About Tibbo

Located in Taipei, Taiwan, Tibbo Technology Inc. brings simplicity to the automation world defined by enormous complexity of operating systems, programming languages, and design tools. Tibbo's programmable hardware and the AggreGate Platform offer a complete solution for delivering robust, distributed automation and monitoring systems.