



Wireless M2M Solutions

By Edge Power



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M2M market

-Definition

- Machine To Machine
 - ❖ Let your machines talk (By Nokia)
 - ❖ Technologies that allow both wireless and wired systems to communicate with other devices (By Wikipedia)
 - ❖ The internet of 50 billion devices
 - ❖ M2M is about adding connectivity to the “dumb devices”



M2M market

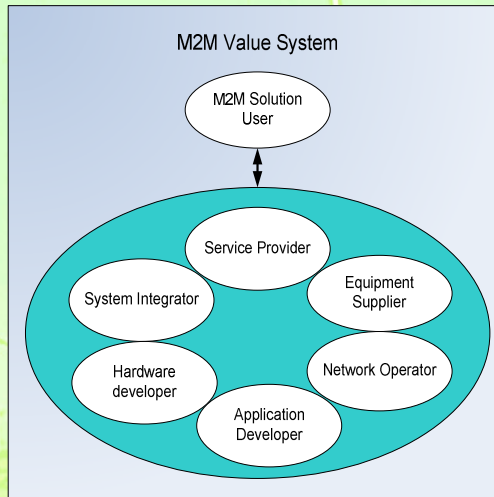
-Applications

- Smart City
 - Improve emergency responses, **traffic light** and parking, maintenance efficiency.
- Smart Grids
 - Enable energy efficiency, minimize greenhouse gas emissions, accommodate alternative energy, **reduce pollution**
- Smart Home
 - Improve home safety and security, remote meters (i.e. water, electricity), **remote health care**.



Position on M2M market

-M2M value system



- Service provider
 - Party offer M2M Service
- System integrator
 - Party make the M2M connection
- Hardware developer
 - Party make the hardware
- App developer
 - Party develop the software
- Network Operator
 - Party offer network services
- Equipment Supplier
 - Party make network equipment



Position on M2M market

- The roles in the value chain

- Edge Power's roles in M2M value system
 - System design/developer
 - Hardware developer
 - Software developer



M2M Solution (by Edge Power)

-Current position

- Installation Bases (in Hong Kong)
 - Traffic signal control system for Shing Mun Tunnel
 - Signaling system for sewage pump station
- End-to-End solution
 - Ready to use hardware platform with powerful 32 bit processor
 - Firmware, drivers ready for wide range of application
 - Host application



M2M Solution (by Edge Power)

- Current success

- Tunnel signal control system (Smart city)
 - Traffic control
- Signal system for sewage pump station (Smart city)
 - Environment protection
 - Maintenance efficiency



Current success

-Tunnel Control Signal System

- Background

Mountain is the natural divider of Kowloon and New Territory area. Shing Mun tunnel makes the connection of the two area.



While control tower is located in the Kowloon side, two tunnel control signals have been added in the new tunnel entrance and both of them are in New Territory side. The control tower controls the signal.



Tunnel signal control system

- Site map





Current success

-Tunnel Control Signal System

- Solution from Edge Power
 - Wireless remote control from control tower
 - Connected the sites with GSM network
 - Control the traffic signal devices on each site
 - Monitor the operations remotely
 - Status of the traffic signal devices
 - Status of the site (i.e. temperature and power supply)
 - Operation environment (i.e. light intensity) and made adjustment accordingly
 - Easy to operate
 - Just push the buttons



Tunnel signal control system

-Configuration

Control Box
(at control tower)



Photo Sensor

Tunnel Control Sign

Lane Control Sign

200 mm Wig-Wag

Site 1



Site 2



Flood Light

125 mm Wig-Wag

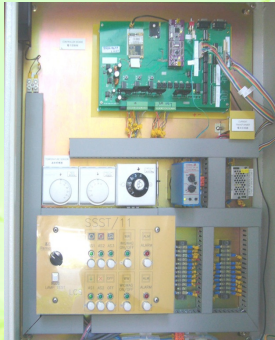
Tunnel Control Sign



Tunnel signal control system

-Control Box

- Site 1



- ✓ Local/Remote control and monitoring
- ✓ Devices control and feedback monitoring
- ✓ Temperature sensor and monitoring
- ✓ Humidity sensor
- ✓ Automatic fan control
- ✓ Main circuit break sensor and monitoring
- ✓ Light intensity sensor and auto adjust



- Site 2



Tunnel signal control system

-Tunnel Control Signal System

- M2M advantages

- Location “independent”
 - Seamless point to multiple points connection, miles away and mountains in between
- Low installation cost
 - No wiring for data communication. The project was completed, while the worker were still digging the ground for the permanent power line
- Low running cost
 - Low monthly subscription fee with unlimited SMS



Current success

-Signaling system for pump station

- Background

The Chinese University of Hong Kong is expanding rapidly, hence an increase in number of student and staff. A new sewage pump station was designed with larger sewage discharge capacity.



The pump station is located inside The Chinese university of Hong Kong, and remotely monitor by the "Sewage treatment plant". In an event of any abnormal activities of the pump station, maintenance staff will be notified by SMS for immediate attention. The pump station shall not require on site, 24 hour on duty staff.



Signaling system for pump station

-Site map





Current success

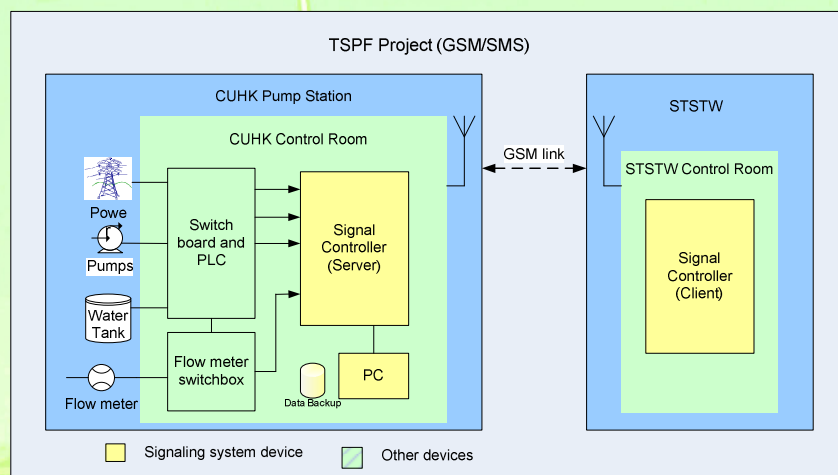
-Signaling system for pump station

- Solution from Edge Power
 - Wireless remote monitor provides real time status of the pump station
 - Send alert SMS to maintenance staff (via mobile phone)
 - Alert SMS are categorized for each SMS subscriber (i.e. utility company for power failure, Pump manufacture for pump failure etc.)
 - Provide management tool to manage the SMS receiver
 - Host interface for data log and reports
 - Battery backup for power failure



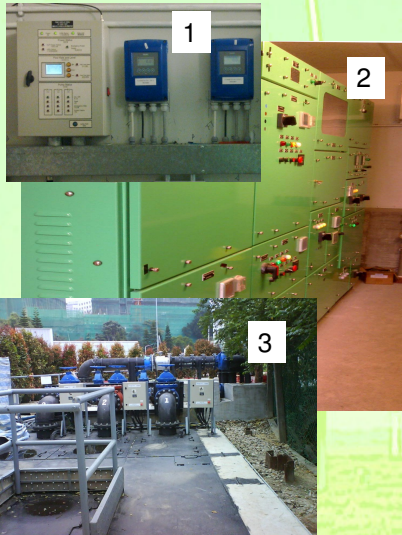
Signaling system for pump station

-Configuration





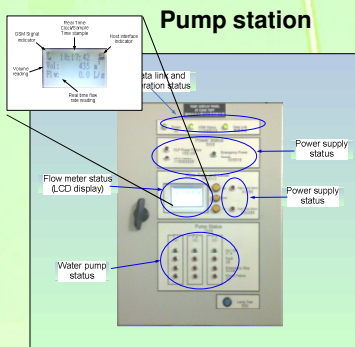
Signaling system for pump station -Installation



1. Signal box and flow meters
2. PLC
3. Water pumps
4. Sewage treatment plan
5. Remote monitor panel



Signaling system for pump station -Configuration



- Pump station status and devices are monitored
 - Pumps
 - Water tank
 - Flow meters
 - Power supply

SMS message



- SMS messages
 - Alert message
 - Device abnormal warning
 - Back to normal message
 - End of the data report

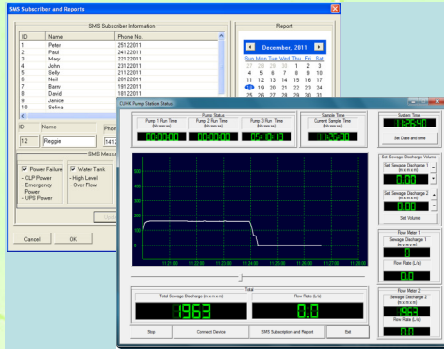
Sewage treatment plant



- Remote monitor
 - Pumps
 - Water tank
 - Flow meters
 - Power supply



Signaling system for pump station -Host application

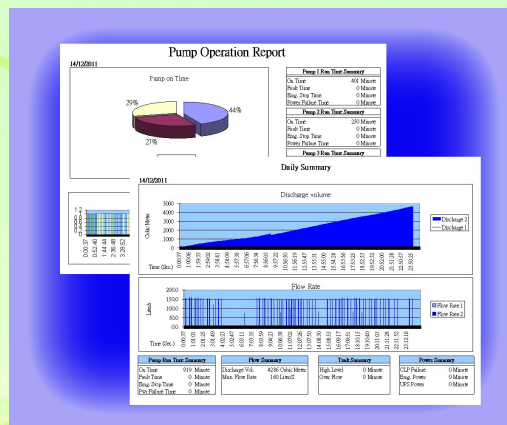


- Host (PC) Application
 - Setup parameters
 - Configure host interface
 - Manage SMS user
 - Manage SMS subscription
 - Generate reports



Signaling system for pump station -Reports

- Reports
 - Data log
 - Daily summary
 - Pump on time
 - Max flow rate
 - Discharge volume
 - Failure time
 - Pump report





Signaling system for pump station

-Advantage

- M2M advantages
 - Low installation cost
 - No wiring required for installation
 - Low maintenance cost
 - Instead checking and recording, the machine will inform you if there is any need attention by SMS
 - Remote monitoring for pump station operation
 - Instant data and records
 - Data are instantly available (i.e. SMS message for discharge volume at pre-defined time every day)
 - Data record and reports in electronic format



Edge Power Advantage

-Why Edge Power

- Solutions are ready and proven
 - Solutions are up and running (statistic shows the success rate of M2M project is 3/10)
- End-to-End solution
 - Design and customize hardware and software for your application. Provide consulting for system design and Integration
- Experience and integrated knowledge
 - Wireless communication, embedded system, control in industrial grade, data base application
 - International projects experience



Road map

- M2M projects
 - Continue our success in traffic control, water pump applications. Extend our M2M to other market segments and countries
- M2M devices (module)
 - Develop M2M enabled hardware devices and become a provider of M2M smart devices
- M2M services
 - Seek partner in system integrator and SP and becomes a service provider of M2M (i.e. customize M2M application and host service)



Road map

-Smart devices





Road map

-Smart devices

- Smart
 - Interface to other machine
 - Interface to human (i.e. voice call, SMS)
 - Interface to host machine (RS232, USB)
- Power with low cost
 - 32 bit MCU with peripheral devices with price compatible with 8 bit MCU (i.e. 8051)
 - Software read for fast turn around
- Ready for cloud
 - Interface to server (GPRS, 3G)
 - Internal TCP/IP stack and internet protocols



Project experiences

-local and international



Vietnam
(SCTV-Vietnam Television)



Madagascar
(Televisiona Fialamboly)



Hong Kong



Argentina
(EscoCable)



Moscow
(Moscow Telecommunications Cop.)



Summary

- M2M is ready
 - Network Infrastructure is ready
 - Technologies are ready
 - Market is ready
- M2M solution from Edge Power is proven
 - Installation base for Smart City
- We are ready for another challenge