Able-Energy

Enabling Efficient Energy Use Maximum Potential

Integrated and Interoperable Energy and Utilities Management Model

CONTENT PAGE

Executive Summary

This document describes Able-Energy's integrated approach for the management of energy, utilities and operations in any individual, group or geospatially disparate facilities. Integrated systems require interoperability of all measurement, control, billing and analysis of all energy usage and its presentation on a central management and operational dashboard. This allows single / multiple local or geospatially disparate sites to be monitored, billed and managed using any desired key performance indicators using operational and management dashboards. Typical examples are multi-tenant shopping centres, malls, flats, industrial and commercial buildings. Interoperability allows integrated operational management to better understand and visualise the impact on service levels, operational costs and cash flow. With interoperability and through careful and integrated planning one may leverage returns on utilities infrastructure for downstream maintenance and investment in energy efficient and renewable energy technologies.

Many projects are executed by project developers who are primarily Capex focused and all too often such projects or developments are handed over to Opex focused landlords and / or management agents. They in turn outsource "non-core" functions such as electricity and water meter reading, HVAC, BMS, security, IT etc. resulting in operationally interoperable systems which render them both inefficient and ineffective through poor utilities and energy management planning. The old adage "you cannot control what you cannot measure" comes to the fore despite modern and green rated developments as many developers and landlords lack the operational experience and know how to integrate and specify interoperability within their Capex project procurement to ensure highest downstream operational efficiency for the landlord.

Background

Most landlords focus on passive property rental income. Non-core matters such as energy, security, tenants, tenant billing, and facility management were/are largely outsourced under service level agreements. However, climate change and a shortfall of generation capacity have led to changes in national energy policy and legislation which impact the property development and leasing landscape through the introduction of energy efficiency, energy levies, carbon taxes and Green building and municipal utility legislation and compliance.

Together these have served to escalate both development and operational costs which impact on profitability, tenant service levels, client retention and occupancy levels. Green Building compliance, energy efficiency, renewable energy all serve to escalate costs and the impending Carbon Taxes will require mandatory annual reporting to the department of energy. As such the need to monitor and report will form an integral part of property and facility management and with some careful planning and foresight may be readily achieved. Some larger listed property groups have this in place but use expensive enterprise systems which are impractical for smaller or emerging property developers/owners. With the availability of many existing solutions enterprise integration may be achieved whilst avoiding large and unnecessary costs. Property owners who invest in utility and communication infrastructure may leverage further downstream client income through appropriate business models which when considered over a number of separate geo-spatially located properties reduces costs due to economy of scale rather than piecewise type solutions. Such systems are key for future expansion of one's property portfolio.

This proposal addresses these latter issues to show how one may leverage benefits from both new and existing utility infrastructure and services and the integrated management of such services together with appropriate application of energy efficient and renewable energy technologies.

Traditional Model

As mentioned many property developers focus on rental as the main source of tenant income. Where justified utility services and operational functions such as metering, utilities and rental billing, security etc. have been outsourced under service level agreements and only a core centre management team retained. As such most tenants install their own independent communication infrastructure and many had credit accounts with, and were directly billed, by the municipality.

However, changes in municipal bylaws now require and hold the landlord responsible for all utilities which imposes cash flow risk in terms of the statutory three-month deposit and client payment recovery delay. Likewise, services such as HVAC which traditionally run during normal working hours and which are normally the largest energy user in commercial facilities are now proving to be costly and more operationally cost efficient solutions are required. The advent of load shedding has highlighted many operational shortcomings of traditional SLA's as service providers never envisaged high levels of service due to spurious tripping and even equipment malfunction under load shedding. This led to a spate of backup systems such as standby generators and UPS's all which they had to regularly maintain and monitor. This led to a number of disparate engineering type systems each of which has vendor specific approach and solution. This meant that metering, standby generators, HVAC, security and other disparate system could not communicate with one another and required expensive vendor integration. All this being non-core business has required property owners to rethink matters as it impacted on revenues, client service levels and client retention. Thus models which worked but relied upon a secure and stable supply have had to be revisited and prior non-core matters re-evaluated to ensure an alternative means whereby investment in such capital expenditure could be recovered through reduced operational expenditure. Many tenants seek properties which afford operational continuity and

which enhance their corporate sustainability, reputation, and reporting status and hence landlords are under pressure to comply. Green building compliance, energy efficiency and renewable energy all entail significant capital investment and alternate ways to supplement return on investment are becoming increasingly important.

Proposed Model

If one examines the various technologies deployed for utilities and operations as well as the many services required by tenants a common factor are utilities and communication infrastructure. No matter whether property owner, facility manager, service provider or tenant communications form the operational backbone for marketing, banking and daily operations. Whether it be security cameras, escalators, security alarms, metering, servers and many others all require and rely upon a communication infrastructure. Such communications afford internet connectivity and allow business enabled environment, and is a core tenant requirement.

Likewise, such communication infrastructure forms the backbone for integrated utilities and facilities management operational cost recovery model for investment in such infrastructure. For example, if one invests in such communication infrastructure it may be used for facility operations as well as for tenants. Thus metering systems, HVAC systems, video security systems, tenant security systems, online banking and many others could all utilise such common or shared infrastructure. This would require computer server systems which could accommodate all these hence significantly reducing costs for property owner and tenants alike.

A greater benefit is when one extends this to other remote properties where one may connect through the cloud thus ensuring all services and operations are easily and readily accessible. Key operational and management data may be captured and stored either both locally or centrally. New carbon reporting requirements could then be easily integrated as could many others aspects.

Such communication infrastructure is key for effective and sustainable energy management and operational savings. If for example one decides to move to a more cost effective time of use tariff this significantly shifts the goalposts as the cost of energy moves from how much to how much and when it is being used. Such time of use based tariffs require constant monitoring to ensure correct operation at the right time of day failing which one may incur high costs or penalties. This requires online monitoring and real-time control of systems such as HVAC and so on. As such a robust and reliable communication infrastructure is required but which may readily support a range of tenant services such as point of sale. Such networks may be managed so any user data is secure so that metering, HVAC, standby generators, security, security video, banking etc. are on virtual private networks. It is a matter of integrating the many and varied services to run on a common communication backbone rather than many individual systems. For example, if each tenant uses ADSL for example it will cost each in the region of R500/m, which for say 100 tenants is R50K per month and possibly R500-R300 for hardware. A single high bandwidth TELKOM line is far cheaper and reselling will provide adequate return on investment.

Thus functions such as utility metering, HVAC control, standby generator, SCADA monitoring and control, security may be integrated using a common communication backbone to provide tangible value added services and alternate income revenue income stream for service one considered non-essential. Thus establishing what was previous non-core infrastructure and underutilising it does not make economic sense akin to building a highway for one car.

In the past meters were read manually and tenants billed either by the landlord or metering / utilities service provider but with electronic metering data now readily available at each property or centre this may easily be automated. All utilities including electricity, water, gas, diesel, refuse, telephone, rentals etc. may be managed and reported on using readily accessible databases which may be integrated as desired. If economy of scale applies a landlord or landlords may establish their own cloud based service and do same. All this may be done using readily available tools and today there is no need to go to great expense on formal enterprise systems especially for smaller or emerging property developers.

Whilst all this make sense a major problem is integrating various vendor's technologies all of which use propriety protocols and different databases, and database structures. Many service providers provide specialised business information services and are unable to develop and establish platforms which integrate engineering, business intelligence, analytics and finally data visualisation and dashboards. This leads to unnecessarily complex systems which require specialist developers and high annual maintenance and licence fees.

This is where Able-Energy play's a key role in using standard software to establish an integrated system which is able to communicate and span the vendor boundaries. More important the software may be further developed in house as no in depth programming skills are required. This is outlined in the next section.

Integrated Energy and Utility Management

The integrated nature of energy management is captured in **Figure 1** which shows the flow of data from meter to reporting dashboard. The key for successful energy management is reliable operational and historical data. This data is used to inform the development of strategies, projects and action plans for implementation and savings against established baselines to be able to quantify savings through operational improvements, energy awareness, energy savings retrofits or new build.

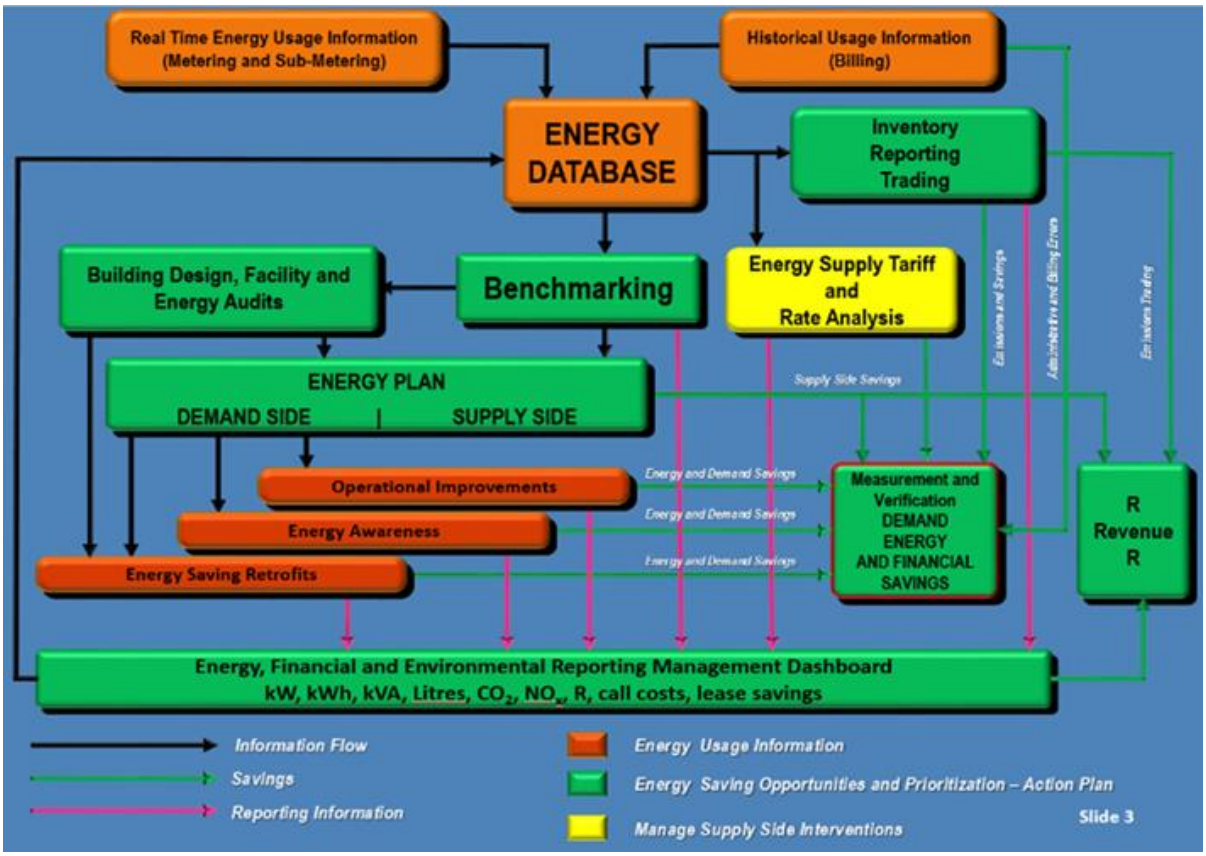


Figure 1 Energy Management Systems

Typically, much of this information is not available to property owners as metering is still mostly done manually. As such operational information gaps exist. The above information flow applies to individual and multiple properties and it shown more clearly in **Figure 2.** As may be seen the backend systems become far more economical as they may cover multiple sites thus avoiding the need for replication at each site level. At site level only site specific historical and live operational data is required and as one moves up one gets a greater overview and appreciation of overall operations and performance. Here too data needs to be aggregated and key performance indicators agree upon to categorise data into useful information.

As may be seen real-time, historical and utility billing data (from utility, AMR, BMS/BAS) form the basis for the ENERGY DATABASE. This database is then used to develop an ENERGY PLAN based on industry standards and internal benchmarks. The ENERGY PLAN consists of DEMAND and SUPPLY side components to ensure optimised costs at all times. All DEMAND and SUPPLY side interventions are then subject to Measurement and Verification and all energy and financial savings are then posted on / to either / or OPERATIONAL or MANAGEMENT dashboards with defined Key Performance Indicator's (KPI). Measurement and Verification thus forms the wrapper around which ENERGY MANAGEMENT operates and thrives as shown in the diagram below.

As is noted the key aspect in the ENERGY DATABSE contains the historical, operational and billing data. Currently much of this data resides with external AMR vendors and in-house with many BMS/BAS systems. The diagram below shows the strategic program framework for any Energy Management System (EMS). As may be seen many of the Service Components and their respective Services probably exist within The Client's facility but are probably not structured to run under the integrated and cross cutting environment required by an EMS. It would require a clear policy and clearly delegated responsibilities to institute this across the group. So much so that many think that outsourcing this to external AMR vendors will resolve matters when in fact it adds an extra layer with external vendors unable to assume or enforce internal behaviour. As such it leads to internal personnel being non cooperative. Thus energy management is not just about data and systems it is also about managing internal change and perceptions towards responsible and sustainable energy management which benefit any client as a proactive energy and environmentally aware organisation.

Strategy	**Strategic Program Framework**					
Integration	**Program Management**					
Service Components	Supply Side	Demand Side Management	Utility Billing and Management	Property Management and Lease Holding	Energy Information	Regulatory Compliance
Services	▸ Portfolio Analysis ▸ Rate Analysis ▸ Risk Management Strategy Develop. ▸ Energy Procurement ▸ Contract Negotiation ▸ Market Knowledge	▸ Energy Audits ▸ Project Development ▸ Energy Savings Technology ▸ Project Management ▸ Capital Planning ▸ Operational Changes ▸ Performance Tracking ▸ Asset Financing ▸ Market Knowledge	▸ Invoice Processing ▸ Bill Payment ▸ Historical Cost Tracking ▸ Seasonal Energy Usage ▸ Operations and shifts ▸ Invoice Validation ▸ Recovery of Incorrect Charges	▸ Property and Facilities Management ▸ Leasehold Agreements ▸ Tariff Optmisation ▸ Tenant Sub-billing and management ▸ Maintenance planning and Life Cycle costing	▸ Data Collection ▸ Performance Monitoring and Reporting ▸ Data Analytics ▸ Management Dashboard Reporting ▸ Data Mining and Problem Identification ▸ Targeting and monitoring ▸ Continuous improvement ▸ Life Cycle Costing	▸ Current Regulatory Requirements ▸ Regulatory Risk Assessment ▸ Compliance Methodologies And Technologies ▸ Compliance Measuring And Validation ▸ Tax Rebates ▸ Carbon Credits ▸ Energy Trading ▸ Carbon Trading
Interventions	Project identification, technology application					
Roll Out	Cross Cutting Program Interventions					

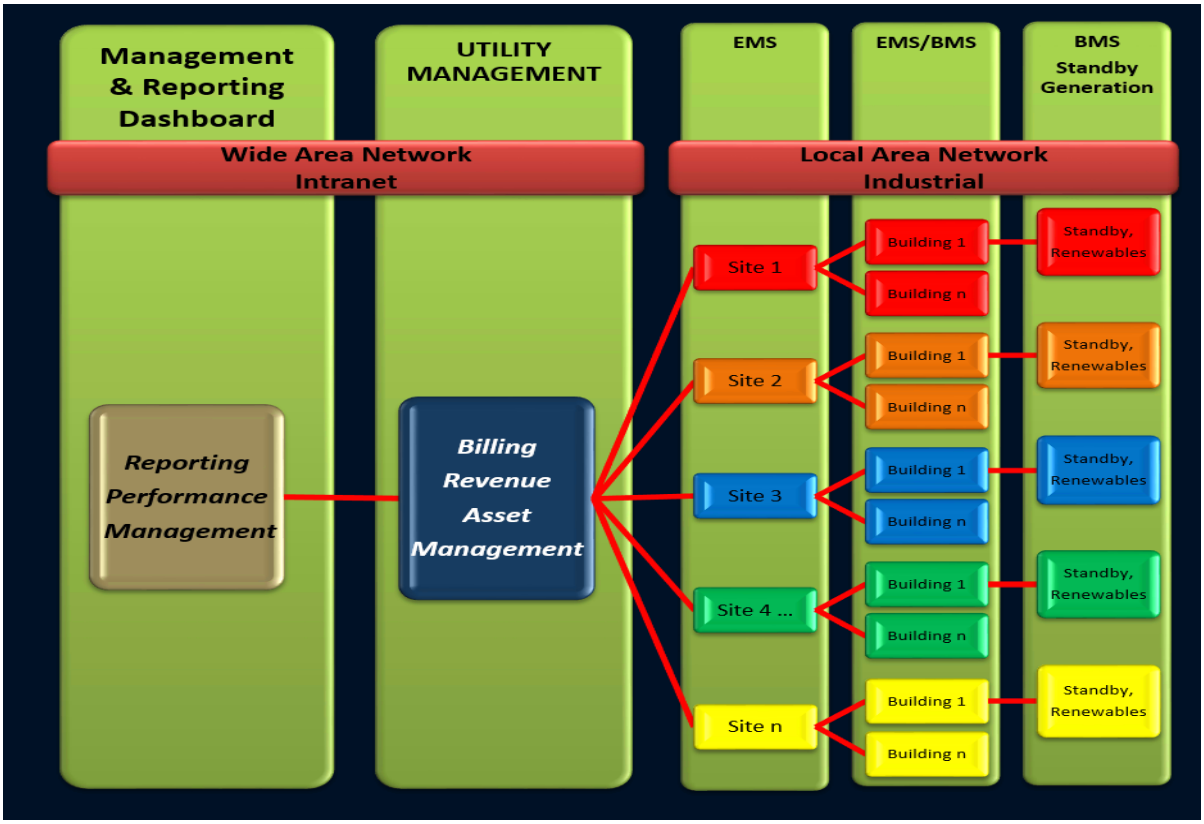
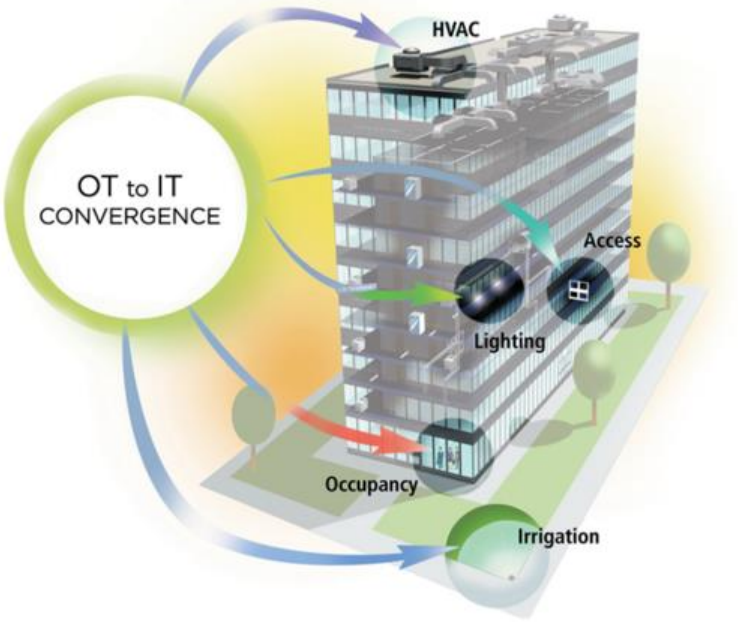


Figure 2 Integrated Energy, Utilities and Reporting

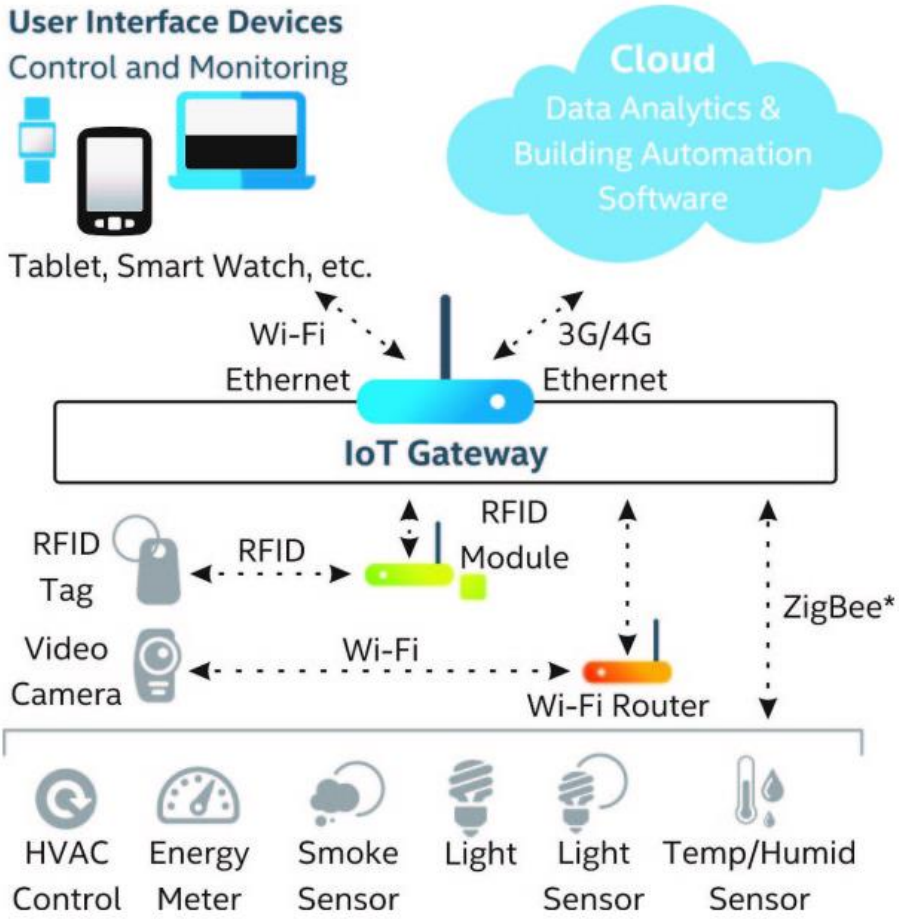
The diagram above shows the relationship between operational, historical and utility data and highlights the need and importance for metering and integration of data between Energy Management (EMS) and Building Management (BMS) systems and Automated Meter Readings (AMR) systems. This is termed INTEROPERABILITY and the modern catchphrase is now IoT or Internet of Things. Below are some example dashboards.

As shown above any facility will have Building Managements Systems (BMS) for control of HVAC, security and access control etc. and AMR systems for municipal check billing and Tenant Billing at each of sites. The AMR function will be outsourced to vendors such as RMS, MOL and so on and each site will have its vendor specific BMS/BAS (Johnson Controls, Niagara, Honeywell etc.) with each BMS/BAS in turn might be utilising different HVAC systems (Trane, Carrier, LG, Schneider, Ingersoll Rand etc.) as well as security and access control.

As the diagram above shows a Central Energy Management System (EMS) integrates the BMS/BAS and Electrical Metering AMR functions so as to enable it to access real-time and historian (non-revenue grade operational data) data from the BMS/BAS and revenue grade data from (AMR) system to be integrated and hosted under the proposed centralised client EMS to allow for M&V and baseline development.
The typical BMS/BAS scenario at facility level is shown below noting that smart metering for main incomer and billing is excluded, which is the typical scenario.



The envisaged scenario for The Client is shown below where the IoT framework is overlaid to yield the functionality shown in the above diagram. Note it is inclusive of the energy meter.



Using the above approach, methodology and frameworks The Client may use this as the basis upon which to develop an Energy Management System (EnMS) compliant with ISO 50001 with the high level functionality and decision making capability shown in the diagram below.

The above diagram depicts the requirements that future legislation and corporate responsibility will require and impose on larger organisations and energy consumers. This will allow The Client to embrace and leverage the IoT developments that are rapidly emerging and changing the face of conventional AMR, BMS/BAS systems due to global competitiveness and the emerging local system integrator market. This will allow The Client to embrace web developments as shown below.

So any system must be designed to provide the relevant information at the relevant point where some might require both operational and historical details which are site specific.

Shown below is a typical wired and 3G / ADSL network which allows meters, HVAC systems operations, security alarms and video to be monitored both at site and remotely to be monitored and collected. As may be seen there is no reason why tenants may not be allowed to utilise such infrastructure as any site will have low bandwidth requirements and be mostly under underutilised. As such it offers the ability to add value added services and a source of secondary income. Landlords may also offer other Landlords and property owners in which case one grows the economy of scale to make the infrastructure costs revenue neutral. This is what Able-Energy proposes and the value added services that we may provide.

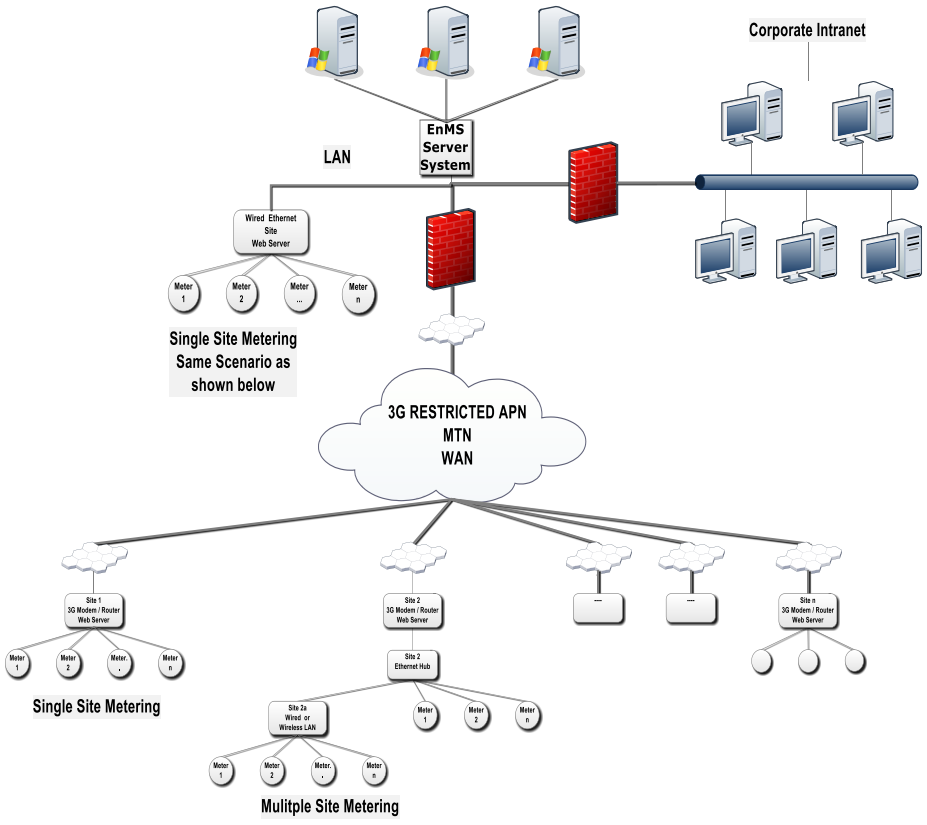


Figure 3 Example Communications Network Infrastructure

Once this platform has been established it is then left to place the approrite systems to do billing, control HVAC, lighting and other systems such as alarms and video recording and backup and in so doing have a central operations repository. Monthly billing is automated through meter readings stored in the system database and bills generated and e-mailed to clients and payment tracked to keep track of and on top of cash flows.

The integrated energy and utility management model poposed requires the property owner to take full ownership of the communication and metering infrastructure and payment of utilities but if done correctly and in acordance with municipal bylaws it will allow three months utility deposits to be retained which will more than adequately cover any cash flow due to tenant recoveries whilst still allowing tenants to operate on a credit account basis. Although prepayment is attractive any malfunction and operational losses incurred by any tenant will in any case be the responsibility of the landlord and why we do not favour this approach and it is more applicable for residential type tenant use.

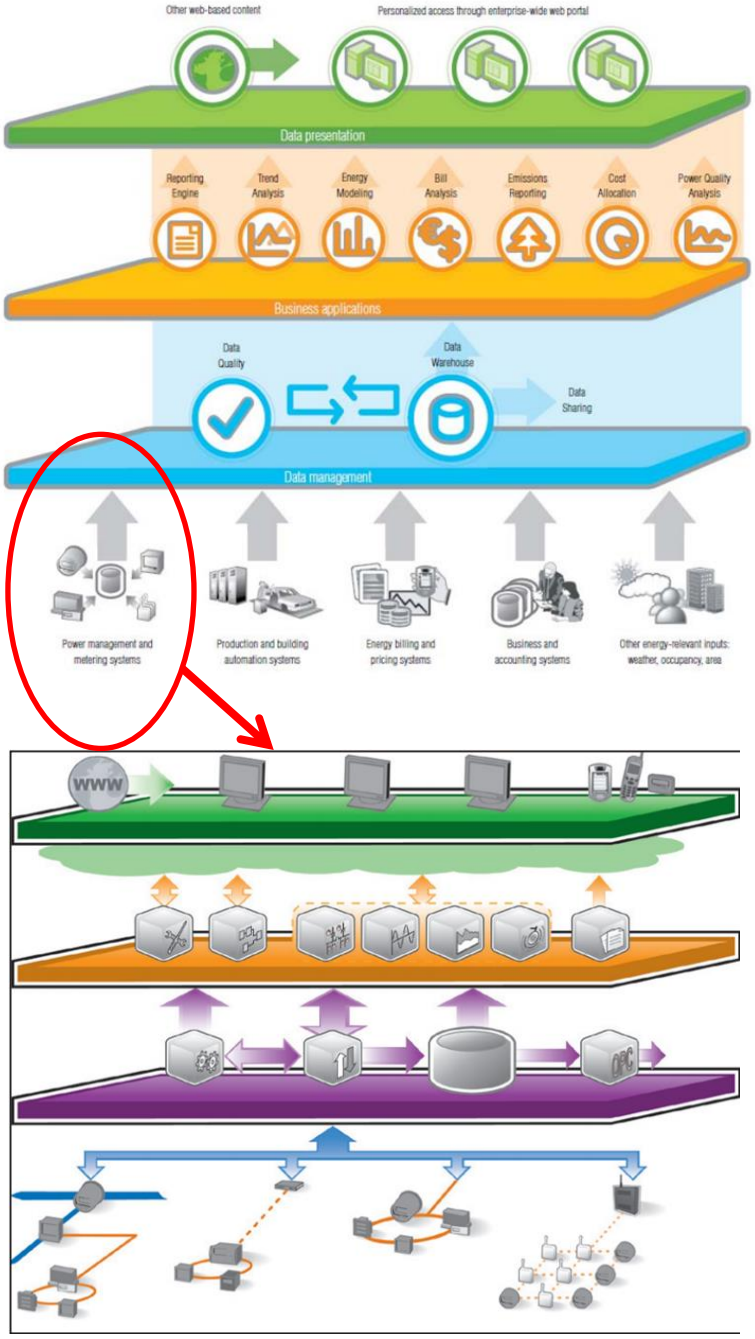


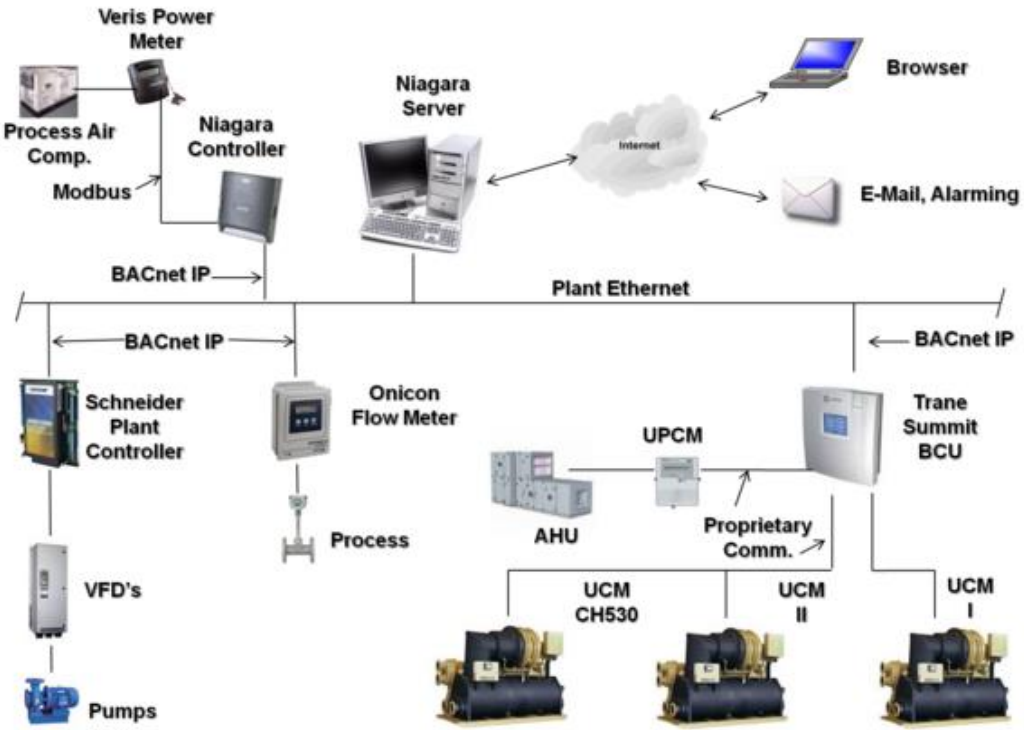
Figure 4 Integrated Energy Management Hierarchy

As **Figure 4** shows the utilities metering systems shown at the lower end forms an integral component of the overall system. Data from other sources may also be merged so that a central overview of operations and management may be kept track using whatever desire key indicators one requires. With all such information readily available property owners may then develop dashboards of which some examples are shown in the Appendix.

Having identified the various components which are required for an integrated EMS with M&V for managing daily energy operations and management and sustainability performance the matter of AMR, BMS/BAS integration is addressed.

Firstly, the matter of integration for BMS/BAS and HVAC systems has been addressed. Although multivendor HVAC technology suppliers provide their own custom solutions but the growing global need for larger organisations to have equitable and demonstrable procurement which support multivendor technologies this sector has addressed this as what is termed **INTEROPERABILITY.** To allow interoperability requires a common communication framework or backbone that allows multi-vendor equipment and technology to communicate to and with one another. Such a framework has been developed by TRIDIUM and is known as the NIAGARA FRAMEWORK as shown below.

Since NIAGARA equipment and licencing is expensive as the system scale many smaller low cost third party solutions are becoming available which avoid such licensing costs and models. This then allows Energy Management to be applied to much smaller sites where only local Niagara controllers are utilised and third party systems used to develop easy to program and use dashboard systems as shown previously. Some fully integrate into Niagara controllers which make the upstream ERP system unnecessary and significantly reduces costs. Thus a network of smaller low cost systems at site level may expose such site data at enterprise level allowing data access at enterprise level to allow for integrated EMS and M&V. An example is shown below.

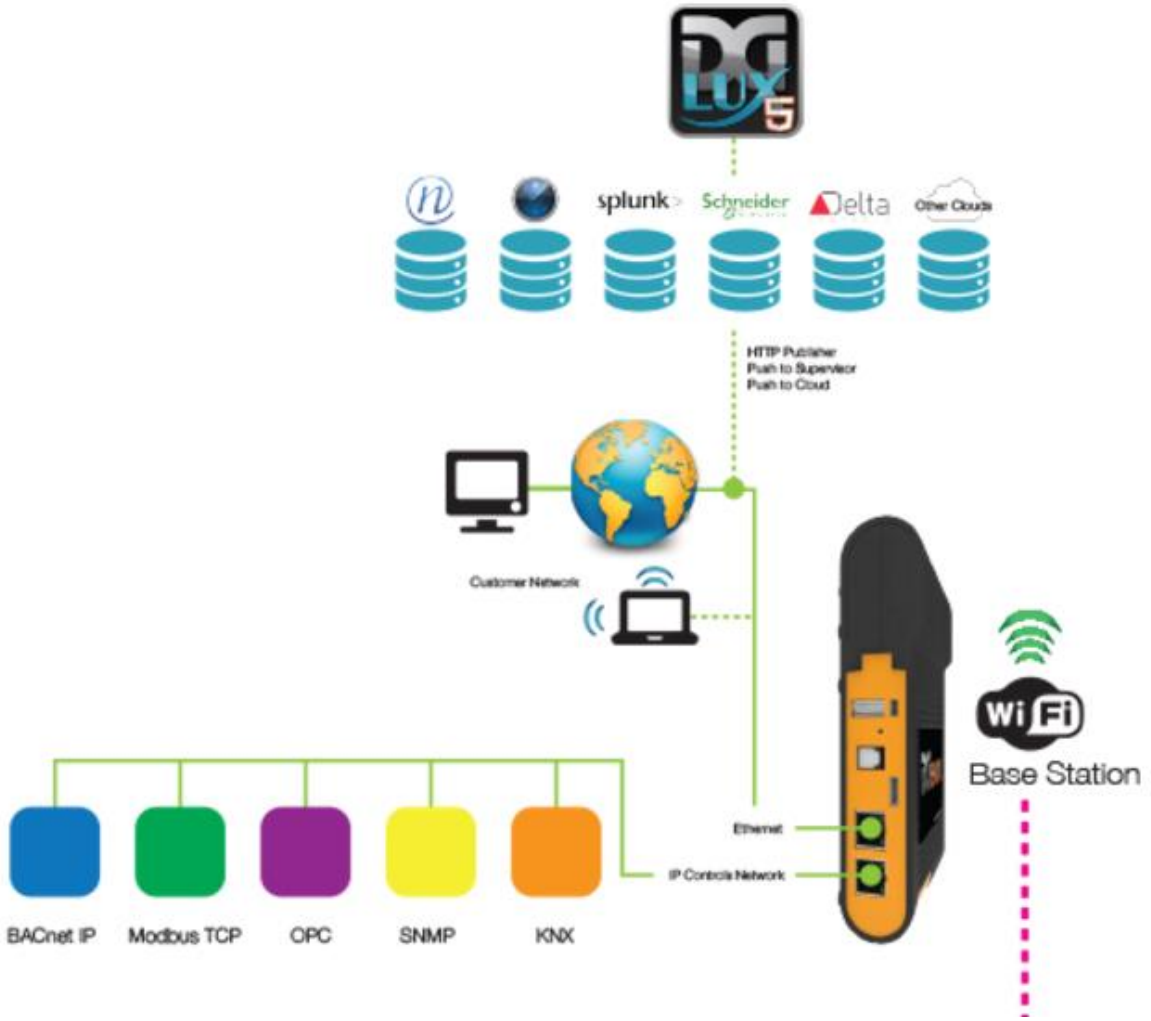


The diagram shown above shows how the NIAGARA framework may be applied to any multivendor technology deployed at any site. As is shown the basis for this is the TCP/IP based communication backbone which is able to support multiple protocols such as the popular BACNET, LONWORKS and MODBUS and is even able to support various energy meters for revenue grade data required for billing.

It should be noted that the above system requires a TRIDIUM NIAGARA server but which may be either complimented with or superseded by the third party controller shown below. A zoom is shown first to show how data may be obtained via a mix of standard BMS/BAS, HVAC and DVR vendors to The Client's own local or cloud based servers. This data may then be easily stored in any standard database (MSSQL, MYSQL, ORACLE etc) which they most probably have with existing ERP system databases. As such there is no need to re-invent the wheel or duplicate expensive resources.

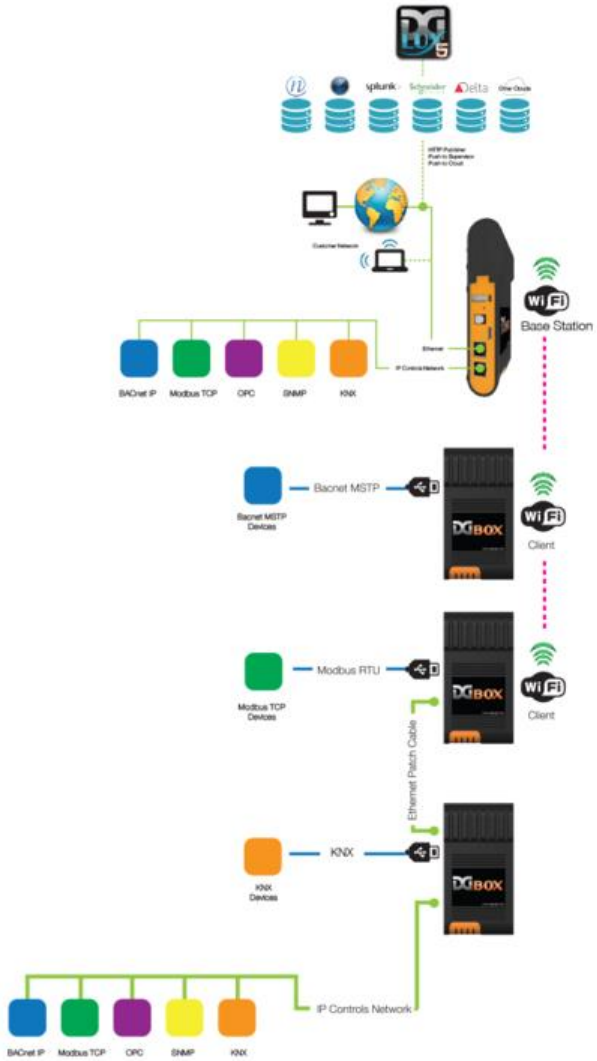
A similar scenario exists for AMR systems where it is not necessary to have large centralised AMR systems as smaller site level based systems and their data may also be mirrored to a central database to form the ENERY DATABASE defined above. Historical AMR data need only be read every half hour and with revenue grade meters having several months' internal data log storage capability it places a very low load on the communication system and SQL servers.

For daily operational purposes the BMS/BAS data is semi real-time being able to transmit every 1-5 sec.'s to enable local and remote control of HVAC, security etc. This data need not be time or safety critical and where this is a requirement should be done at the embedded controller level.



The various BMS/BAS and IoT protocols supported would allow The Client a great degree of INTEROPERABILITY and such integrated operation would offer a wide range of procurement options and vendor sources.

ASCII File Reader / Serial	OPC DA	Scripting
Bacnet MSTP/IP	SNMP	POP3 Email
Enocean	Philips Hue	Pachube
Insteon	MAMAC Maverick	Virtual Data Source
KNX	Mbus	VMStat Data Source
Modbus TCP / RTU	SQL	Persistent TCP
SNMP	HTTP Retriever/Receiver	



Visualization Platform Embedded

DGLux embedded right in the Box: Take advantage of the full functionality of DGLux to build dashboards and graphics right in the box itself.

Tagging

Standard automatic tagging as well as custom tagging across all data sources allows for valuable meta-data to be created and utilized in device templates, user interface templates and dynamic content creation.

OEM

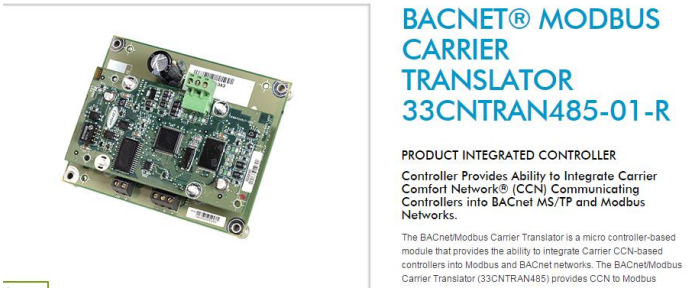
Run the DGBox software stack on your own hardware. The DGBox software stack is capable of running on any hardware that is capable of running a JVM (Java Virtual Machine). If you would like to become an OEM and have your own solution consisting of your own hardware and the DGBox software stack, contact us to discuss the details.

So as may be seen with careful planning and foresight one may leverage from what one already has and enhance this through the use of very powerful, easy to use, easy to program readily available third party tools using readily available and modern IoT resources rather than vendor specific solutions. Able-Energy specialises in specifying such centralised EMS with the requisite IOT framework that seamlessly integrates with existing site based AMR, BMS/BAS systems thereby reducing costs and providing a wider range of vendors for the purposes of broad based procurement.

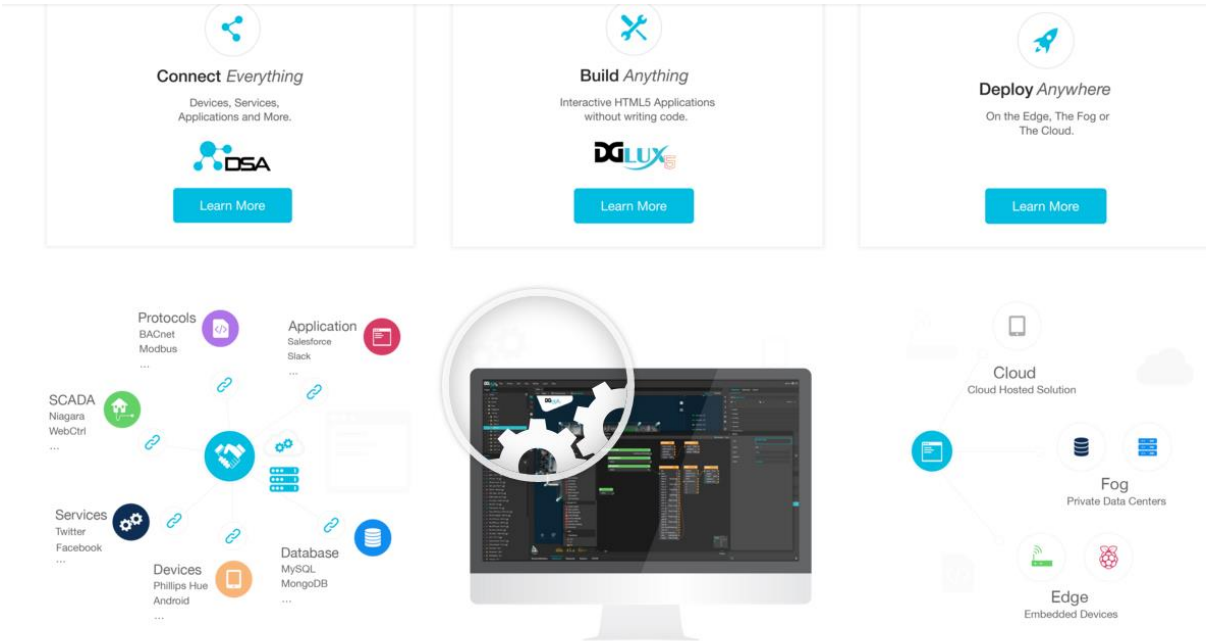
What is not commonly known is that many HVAC systems and controllers as well as much other equipment such as VSD's etc. may be fitted with the relevant communication cards to enable such INTEROPERABITY. This is shown in the diagram below and all that The Client must ensure is that they select vendors who offer such INTEROPERABILITY as the downstream integration is easier and lower cost much like having a UNIVERSAL TV REMOTE.

It such underlining technical details which will have to be understood and co-ordinated within the technical and procurement divisions of the The Client all of which should be underpinned and underwritten by/in an Energy Management Policy. Failure to do this and to get organisation buy in and enforcement will simply lead to NON INTEROPERABILITY and high costs due to disparate systems. Although the outputs of any EMS system are high level reporting it relies on basic technical matters like is the meter or sensor connected correctly and of the correct class and are the CT and VT connection ratios and connections correct. Failure here is simply unacceptable yet many AMR vendors and municipalities make many such basic errors sometimes resulting in lengthy and unnecessary litigation costs

Far too often management, procurement and operation spend pennies to save pounds and end up suffering the consequences of having to pay municipal recoveries and refund tenants. Such equipment must therefore not only be correctly chosen, but correctly installed, maintained and offer INTEROPERABILITY.



As may be seen through correctly specifying equipment, sensors and metering systems all such data from such equipment, sensors and metering may be retrieved and integrated into a central data repository or ENERGY DATABASE through the use of appropriate engineering based communication frameworks and web based enterprise based frameworks and technologies as shown below.



Service Offering

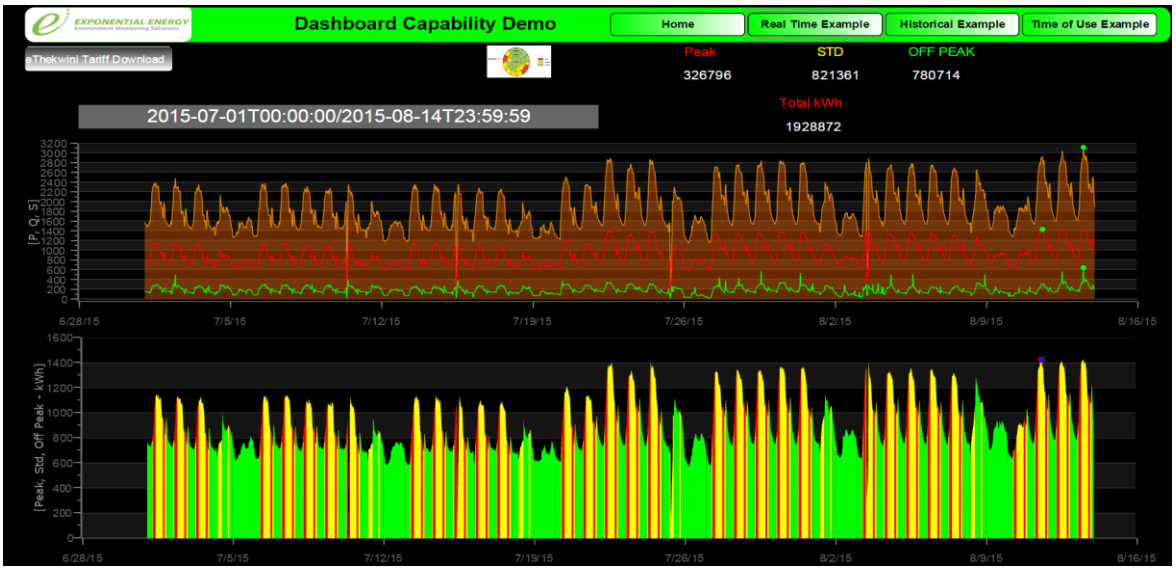
In terms of the above Able-Energy is able to offer the following range of services to ensure interoperable and integrated utility and energy management:

1. High level systems Utility modelling and plant level operations planning during project development and prior to implementation.
2. Energy management program and organisational policy and operational strategy.
3. Pay for services or shared savings model.
4. Thermal storage systems for optimal operational cost benefit for bulk HVAC and Hot Water usage.
5. Municipal and Tenant Tariff Analysis and Optimisation.
6. Interval Metering and Billing using Echelon meters and mains Bourne Echelon NES system. Typically, R200 per meter per month.
7. Interval and real-time metering, billing and energy management using Schneider metering and Power Monitoring Expert. Typically, R200 per meter per month.
8. Integration of interval and real time metering with HVAC and other BMS and Baw systems
9. Billing, management and operational dashboard systems using DGLux.

Conclusion

Able-Energy hopes this proposal provides an indication of how our proposed portfolio of interoperable integrated energy management services will not only meet your current requirments but also allow other functions and services to be integrated to allow for future growth. Our shared savings utility model ensures any capital outlay and subsequent operational savings will self fund both our services and contribute towards future investment in energy efficiency and re-enable energy to ensure the property potfolio remains current, responsive, compliant and attractive to large anchor tenants band investment partners. We hope that we can share in this success and look forward to your favourable consideration.

APPENDIX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Historical Example
Time of Use Example
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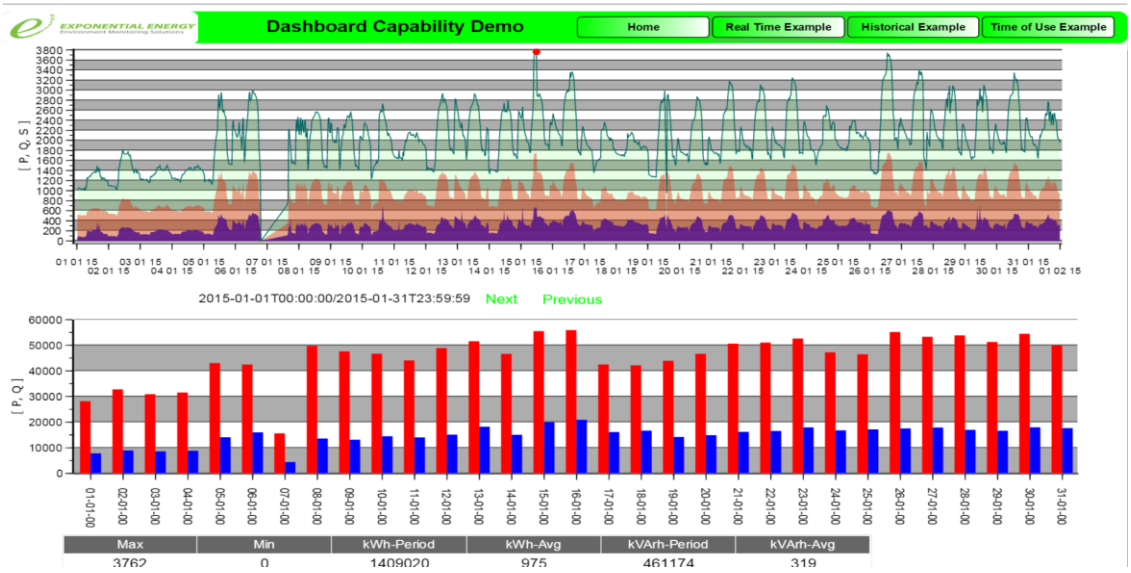
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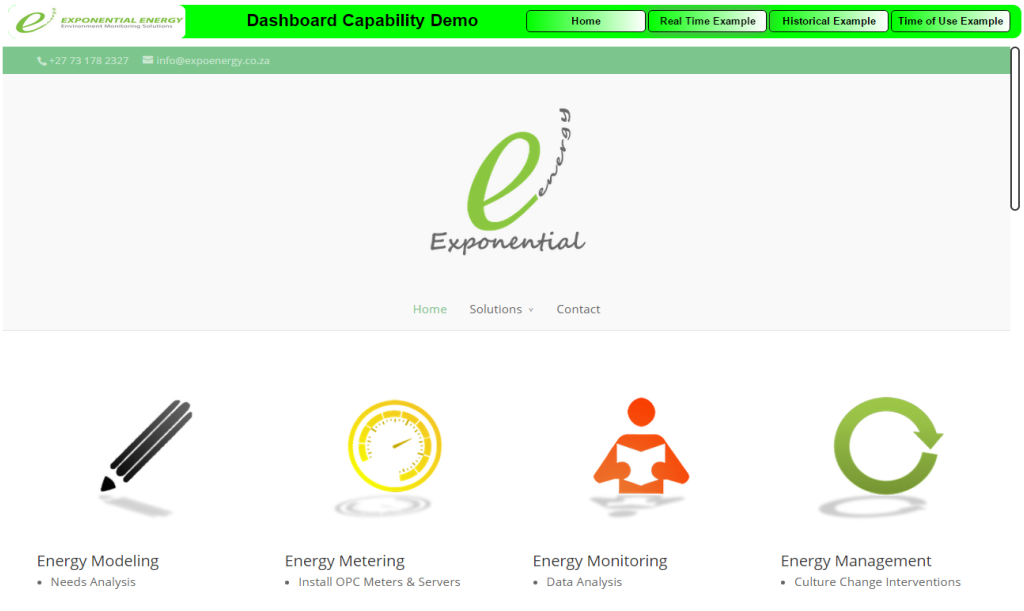
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Dashboard Capability Demo
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Historical Example
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Solutions
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Energy Modeling
Needs Analysis
Energy Metering
Install OPC Meters & Servers
Energy Monitoring
Data Analysis
Energy Management
Culture Change Interventions


South Campus
Indianapolis
IN
93°
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Occupancy: 9,311
Occupied: 73%
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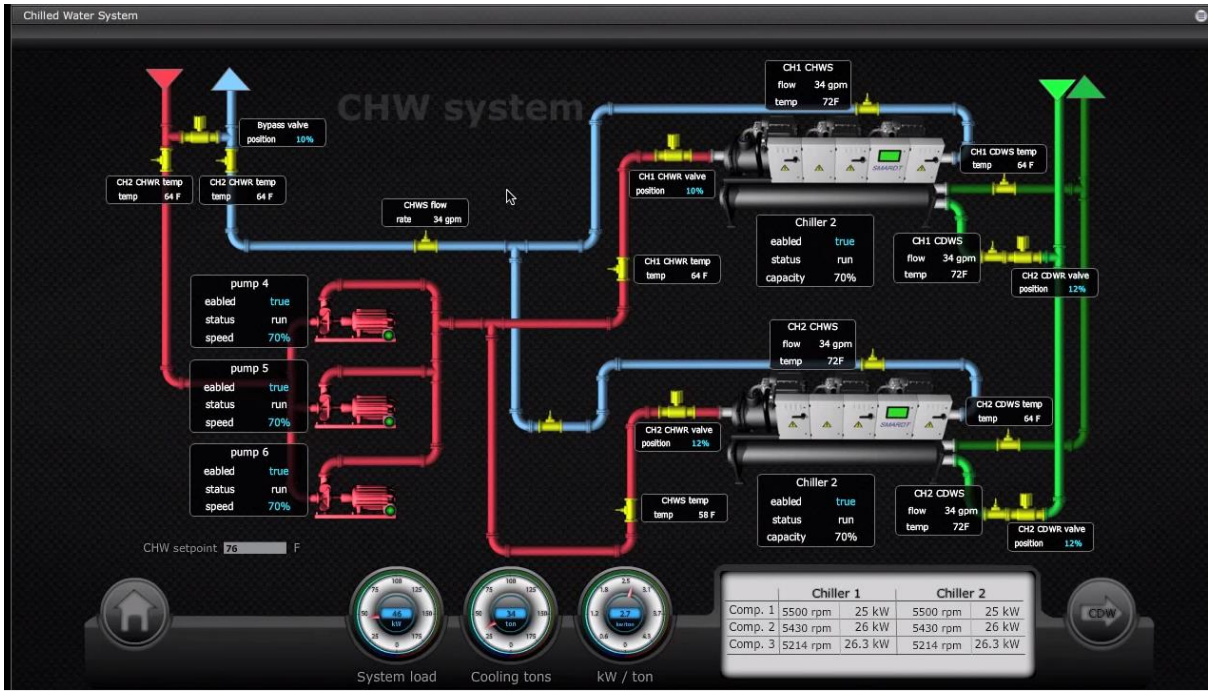
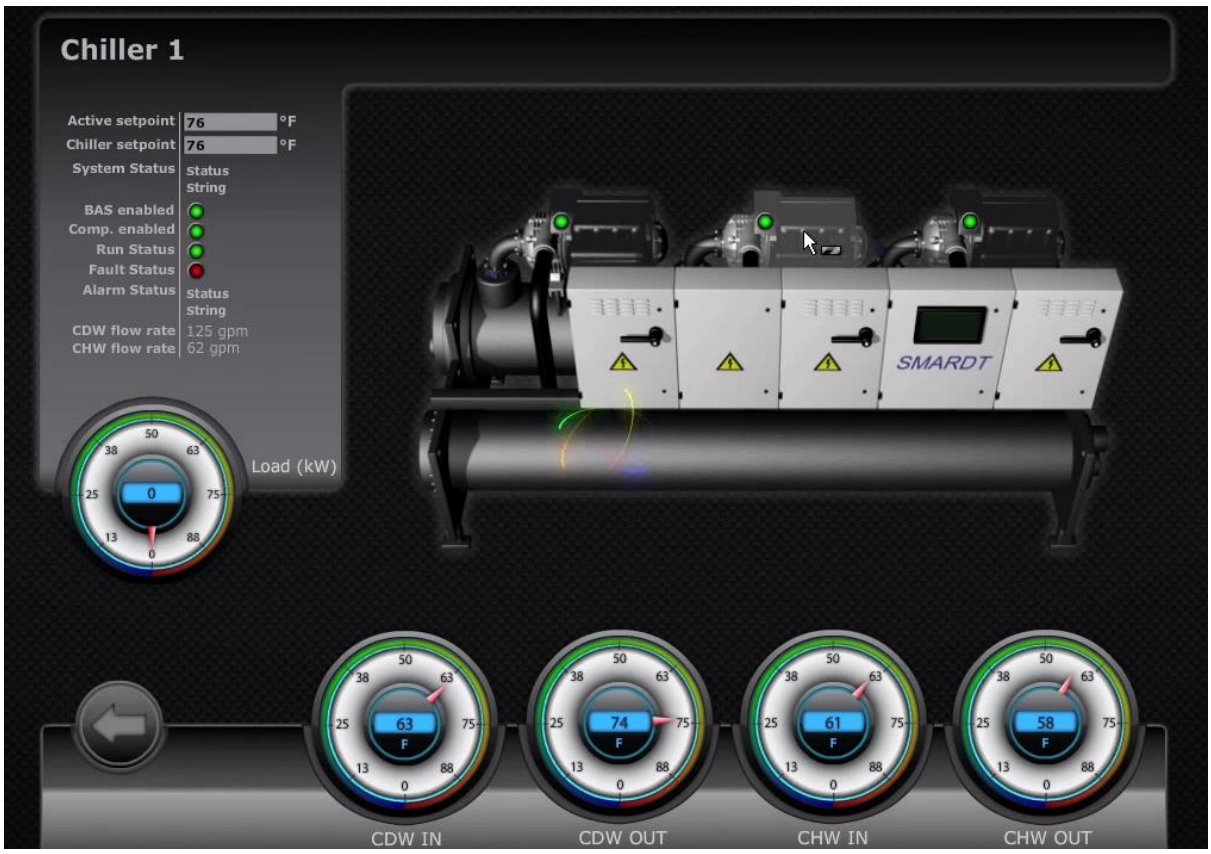
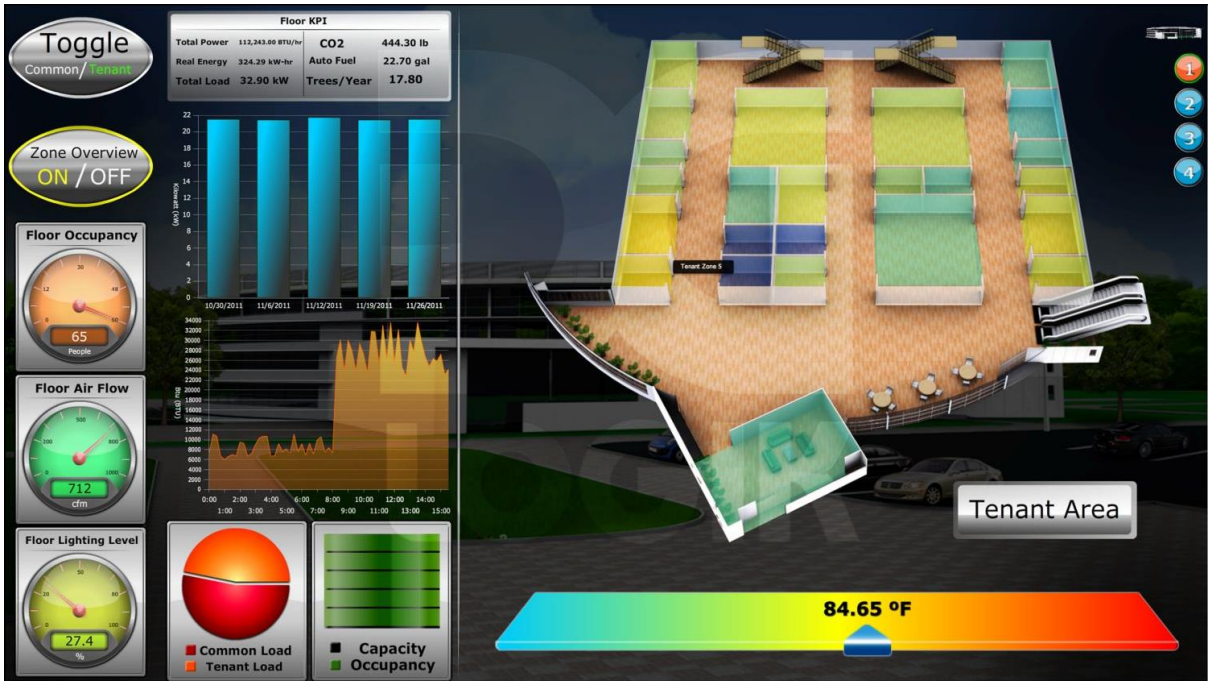
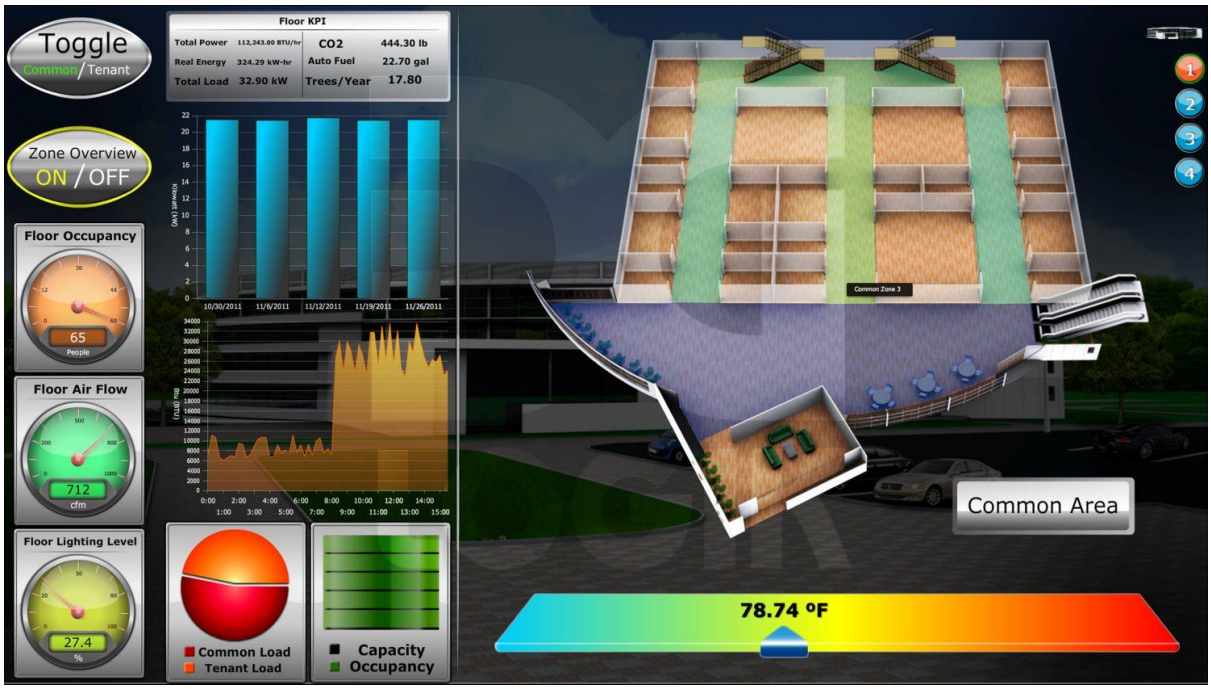
HVAC
occupancy
running costs
lighting
energy
CO2
summary


Chilled Water System
CHW system
Bypass valve position 10%
CH2 CHWR temp 64 F
CH2 CHWR temp 64 F
CHWS flow rate 34 gpm
CH1 CHWS flow 34 gpm temp 72F
CH1 CHWR valve position 10%
CH1 CDWS temp 64 F
Chiller 2 eabled true status run capacity 70%
CH1 CDWS flow 34 gpm temp 72F
CH2 CDWR valve position 12%
CH1 CHWR temp 64 F
pump 4 eabled true status run speed 70%
pump 5 eabled true status run speed 70%
pump 6 eabled true status run speed 70%
CH2 CHWS flow 34 gpm temp 72F
CH2 CHWR valve position 12%
CH2 CDWS temp 64 F
CHWS temp 58 F
Chiller 2 eabled true status run capacity 70%
CH2 CDWS flow 34 gpm temp 72F
CH2 CDWR valve position 12%
CHW setpoint 76 F
System load
Cooling tons
kW / ton
Chiller 1 Chiller 2
Comp. 1 5500 rpm 25 kW 5500 rpm 25 kW
Comp. 2 5430 rpm 26 kW 5430 rpm 26 kW
Comp. 3 5214 rpm 26.3 kW 5214 rpm 26.3 kW
CDW


Chiller 1
Active setpoint 76 °F
Chiller setpoint 76 °F
System Status Status String
BAS enabled
Comp. enabled
Run Status
Fault Status
Alarm Status Status String
CDW flow rate 125 gpm
CHW flow rate 62 gpm
Load (kW)
SMARDT
CDW IN
CDW OUT
CHW IN
CHW OUT


Toggle
Common/Tenant
Zone Overview
ON / OFF
Floor Occupancy
65
People
Floor Air Flow
712
cfm
Floor Lighting Level
27.4
%
Floor KPI
Total Power 112,243.00 BTU/hr
Real Energy 324.29 kW-hr
Total Load 32.90 kW
CO2 444.30 lb
Auto Fuel 22.70 gal
Trees/Year 17.80
Common Load
Tenant Load
Capacity
Occupancy
Tenant Zone 5
Tenant Area
84.65 °F


Toggle
Common/Tenant
Zone Overview
ON / OFF
Floor Occupancy
65
People
Floor Air Flow
712
cfm
Floor Lighting Level
27.4
%
Floor KPI
Total Power 112,243.00 BTU/hr
Real Energy 324.29 kW-hr
Total Load 32.90 kW
CO2 444.30 lb
Auto Fuel 22.70 gal
Trees/Year 17.80
Common Load
Tenant Load
Capacity
Occupancy
Common Zone 3
Common Area
78.74 °F


Climatec Headquarters, Phoenix, AZ
VAVs
AHUs
RTACs
Heat/Cool Demand Map
100% cooling
0%
100% heating
AHU C3
AHU C2
AHU D1
AHU A2
AHU A1
RTAC15
Graphic
Info
Metrics
Airflow:1,305 cfm
Fan Command: Start
Heating:OFF
Damper Pos: 0 %
Supply Temp: 69.4 °F
Room Temp: 69.2 °F
KWH
CO2
FUEL
DEMAND