

Energy Management Portfolio

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Portfolio Submitted to:

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Contents

INTRODUCTION: 3

SECTION 1: Energy Management Service Providers..... 4

 1.1 TEAM Sigma 4

 1.2 STC Energy..... 7

 1.3 SystemsLink10

 1.4 EnergyCap Enterprise.....12

 1.5 Credit360.....14

 1.6 Optima16

 1.7 STARK20

SECTION 2: Coupling of Services23

SECTION 3: Recommendations to Council24

Resources:.....25

INTRODUCTION:

This document was prepared for the Croydon Council by a team of students from Worcester Polytechnic Institute (Massachusetts), to present a list of possible energy management software providers for BWH. In advance of changes to the Facilities Management Department in 2016, the Sustainable Development and Energy Team feels it important to consider all options for meeting the Council's energy management and utility bill-paying needs. Below, our team identifies the services currently offered by TEAM as well as a collection of possible other service providers. A description of each software provider, their service schemes, the benefits of their services, an example of the visuals they can produce, and their company contact information, collected on their company websites, can be found in section one. The second section details the coupling of services that was found to be utilized in several other boroughs. The final section provides the council with recommendations for three future scenarios.

SECTION 1: Energy Management Service Providers

1.1 TEAM Sigma

Targeting, Energy Auditing and Monitoring (TEAM), is the energy-auditing agency that currently monitors and tracks the billing of utilities in the Croydon Council. Some of the features that the TEAM Sigma package provides include accrual management, analysis and browsing, bulk bill checker, budget management, performance map, performance overview, reporting, and an overview dashboard ("TEAM," 2014).

Services Offered:

TEAM offers three product and services: Energy and Carbon Management Software, Energy Bureau, and Energy Services. The council might be interested in the first two services.

Energy and Carbon Management Software:

TEAM Sigma offers functions including regression and CUSUM analysis techniques; the software also provides extensive choice of:

- Reporting and Analysis
- Sharing information
- Query Management
- Exception Management
- Carbon footprint
- Electronic Data Interchange (EDI) billing for utilities
- Measurement and Verification
- Project Modeling
- Tenant Billing
- Web Dashboards and Digital Signage Solutions
-(Turvey, 2011)

Energy Bureau:

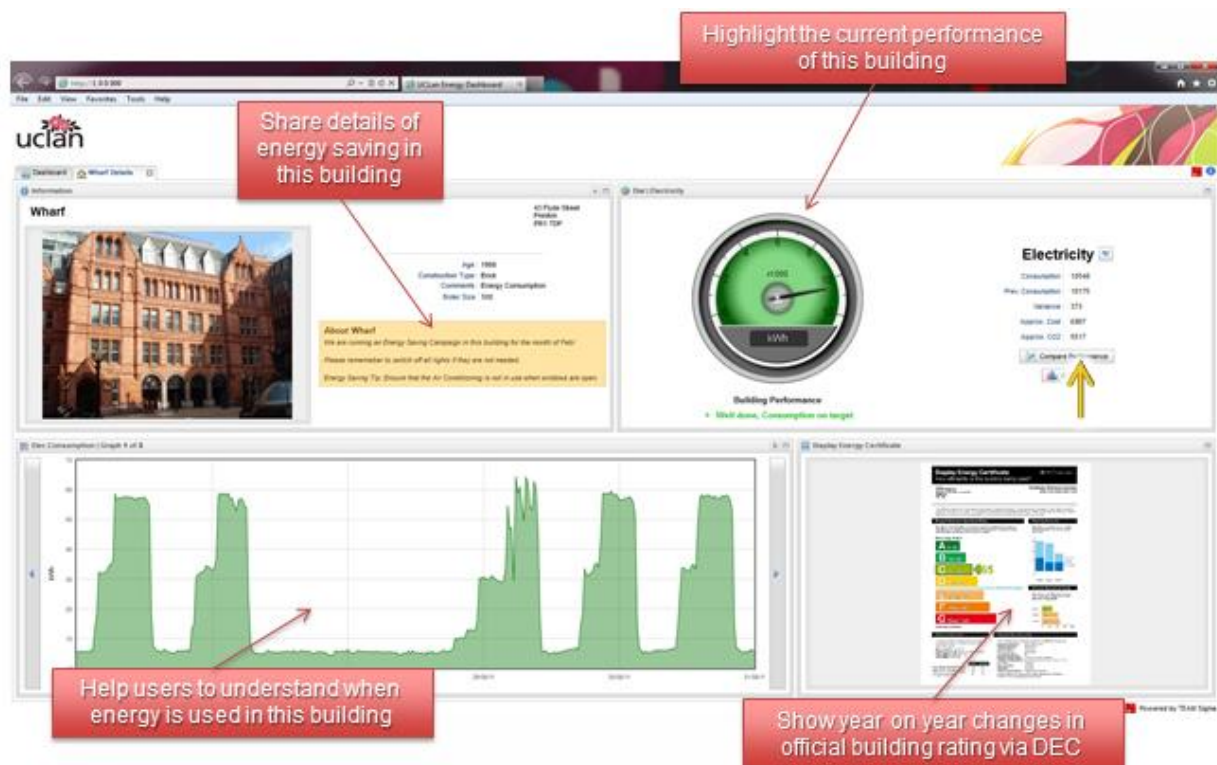
TEAM would manage the Energy Bureau service as an external resource to the council. It includes the following services:

- Commercial Utility Bill Validation and Cost Recovery
- Data Processing Service
- Database Management to Support Compliance
- Benchmarking and Exceptional Reporting for Waste Identification
- Finance and Energy Management Reporting
- Energy Procurement
-("Energy Bureau Service: What do we do?," 2017)

Service Benefits:

1. Software accepts data inputs from any source
2. Hosted Services give the option to access data from outside the corporate network
3. Can do half hourly metering
4. Reports delivered online or by email and can be downloaded to Excel
5. Key Benefits of energy dashboards
 - a. Raises energy awareness amongst building occupants to influence behaviour and reduce energy consumption
 - b. Demonstrates an organization's corporate commitment to sustainability
 - c. Entirely custom designed to match customer's requirements
 - d. Wide range of applets can increase the building occupants interested in the display
 - e. Option to convey non-energy related content (Turvey, 2011)

Examples of Visuals Produced:



<http://www.teamenergy.com/products-and-services/energy-and-carbon-management-software/energy-carbon-web-dashboards/>

Examples of Visuals Produced (Continued):



<http://www.teamenergy.com/driving-engagement-with-an-energy-dashboard/>

Service Links:

Energy and Carbon Management Software

<http://www.teamenergy.com/products-and-services/energy-and-carbon-management-software/>

Energy Bureau Service

<http://www.teamenergy.com/products-services/energy-bureau/>

Energy Services

<http://www.teamenergy.com/products-and-services/energy-services/>

Contact Information:

TEAM (Energy Auditing Agency Ltd)

34 The Forum

Rockingham Drive

Linford Wood

Milton Keynes

MK14 6LY

United Kingdom

Tel: +44 (0)1908 690018

1.2 STC Energy

Services Offered:

STC Energy provides a wide variety of energy management services to its customers. These services include energy management, energy procurement, energy bureau services, metering, and energy software management ("STC Energy," 2014). To fulfil the energy management requirements for the BWH, it is recommended that the Bureau services are utilized by the council. The bureau services provided by STC Energy are shown below.

- Database set up and estate definition
- Utility invoice collection
- Preparation of electronic invoice payment files
- Bill validation and correction
- Management of Changes of Tenancy
- Dealing with all disconnection notices and invoice reminders
- On-line energy reporting
- On-line meter reading service
- Half-hourly data management
- AMR smart metering data management
- Energy management estate performance reports
- Exception Reporting and alerts
- Water analysis
- Energy and building surveys
- Carbon management surveys
-("STC Energy," 2014)

The council could also take advantage of STC Energy's Energy Management Consultancy services. This would provide the council with energy audits and surveys, water audits and surveys, energy management training for staff and awareness campaigns, energy management strategies, and environmental reporting ("STC Energy," 2014).

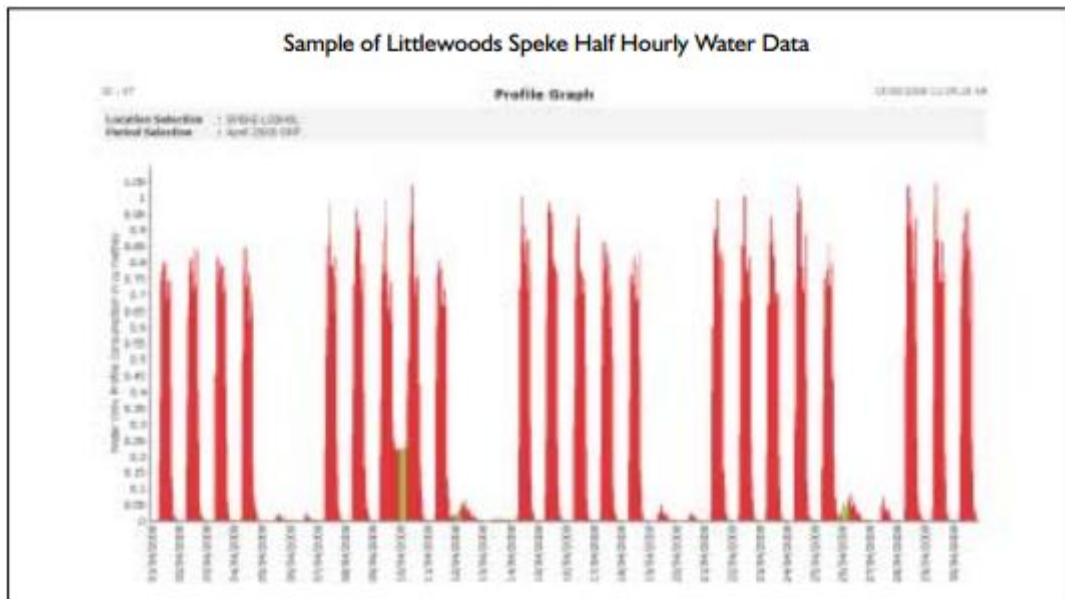
With the Bureau service, STC could generate several different visual reports for the council. The exact format of the report could be decided upon by the council but typical reports include the following sections:

- Summary of utility consumption and expenditure on month by month basis
- Number of invoices processed in the month along with statistics such as number or percentage of estimated readings
- Estate size variations
- Tonnes of CO₂ produced and other key environmental parameters
- Summary of the utility usage, consumption, cost, key performance indicators (£/m²/pa or kWh/m²/pa)
- Degree data benchmarking reports
- Comparisons with previous years in terms of both energy and cost
- Logs of billing problems and savings achieved
-("STC Energy," 2014)

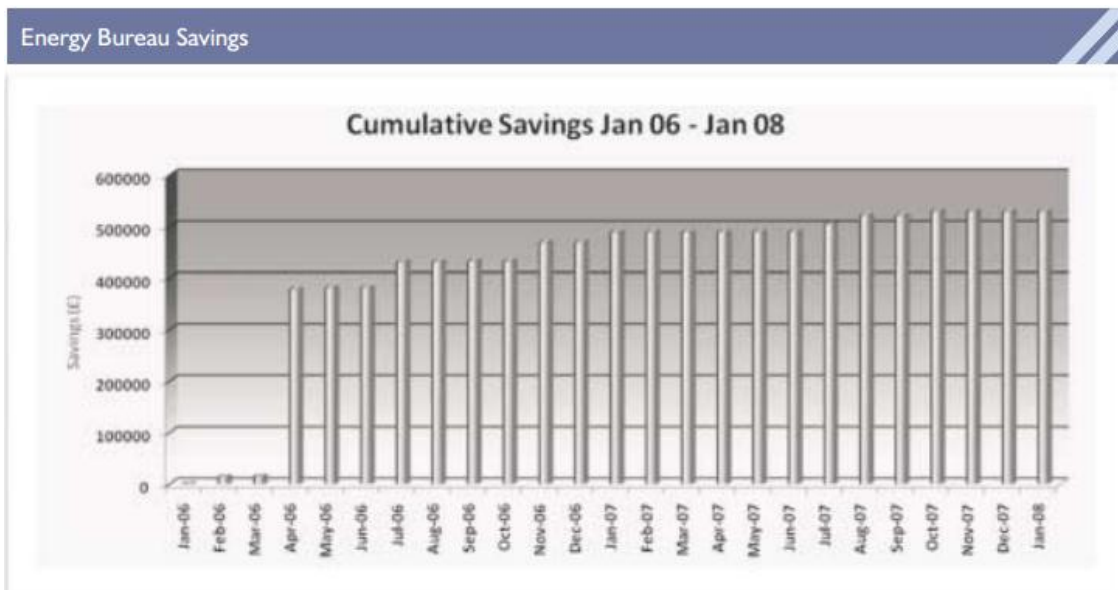
Service Benefits:

1. Half hourly data collection and sub-metering available
 - a. Data output can be aggregated into a daily format
2. Able to work with current BEMs system
3. Reports delivered online or by email and can be downloaded to Excel
4. Provides a comprehensive 24/7 online reporting and graphical analysis service
5. Able to aggregate water, gas, and electricity together

Examples of Visuals Produced:



<https://www.stcenergy.com/PDFs/Littlewoods%20-%20Approved.pdf>



<https://www.stcenergy.com/PDFs/Living%20Ventures%20-%20Approved.pdf>

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Resource Links:

Company Website:

<https://www.stcenergy.com/index.php>

Energy Management Brochur:

https://www.stcenergy.com/PDFs/7031_Bureau%206pp%20WEB.pdf

Contact Information:

STC Energy Management Southern Office

STC House

38 Croydon Road

Beckenham

Bromley

Kent

BR3 4BJ

Phone Number: +44 (0) 208 662 6500

Fax Number: +44 (0) 208 662 6501

1.3 SystemsLink

Services Offered:

The SystemsLink software package is a cost effective option for an Energy Monitoring and Targeting System. The software provided by SystemsLink is a fully integrated modular system with seven main modules. These include Energy Manager, CRC Reporting, Web and Dashboards, DECs, AMR Data, Financial Export, and Tenant Billing ("SystemsLink," 2000). The Energy Manager module is the core to the operation and is the basis for all of the other modules. The Council could be interested in the CRC Reporting Module, which is concerned with monitoring the compliance with the UK's carbon reduction commitment scheme. The Web and Dashboards service offers displays and external access to the central database via any web browser. The AMR Data Collection module would aggregate data collected by the Trend system and transfer it the SystemsLink software package to be analysed. Finally, the Tenant Billing module allows for the creation of invoices for payments on utilities as monitored through the AMR Data Collection module ("SystemsLink," 2000).

Service Benefits:

1. Able to bundle all utilities (electric, gas, water, solid fuel, biomass, waste)
2. Reports in both graphical and tabular formats
 - a. 1 or 2 year comparisons. Data may be compared over many years with Degree-Day adjustment used on heating or cooling supplies. Data accrual allows estimates where data is unavailable
 - b. Regression Analysis
 - c. Cumulative Sum Control Chart (CUSUM) to monitor change
 - d. All Graphs and Reports display usage, cost or CO2 figures
 - e. Specific Energy Ratio. Displays energy used per adjustment index. e.g. Barrels of beer per kWh
 - f. AMR on day, week on week and month on month
-("SystemsLink," 2000)
3. Viewed on web browser or emailed
4. Can view reports on excel
5. Can take data from BEMs

Examples of Visuals Produced:



http://www.sl2000.com/web_reports/default.html



http://www.sl2000.com/web_reports/default.html

Resource Links:

http://www.sl2000.com/energy_manager/default.html

Contact Information:

SystemsLink
Bedford i-Lab
Priory Business Park
Stannard Way
Bedford
MK44 3RZ
Telephone: +44 (0)1234 834650
Fax: +44 (0)1234 834649

1.4 EnergyCap Enterprise

Services Offered:

Automatic Exported Approved Bill Records- EnergyCap automatically processes the bill and passes it on to the accounts payable. It can also send the bills as a report to a list of members via email.

Bill Auditing- Bills are automatically analysed by the system and are run through fifty different audits and are flagged if they don't pass. This system ensures that the energy billed is accurate to the energy used. This auditing system prevents mis-metering and overbilling.

Billing Forecasts- EnergyCap looks at past years energy billing in order to predict the future energy bills. It will automatically create a future budget for energy consumption, which can help make budgets for the building

Normalization of Energy Usage- In the energy reports, there are options to normalize the energy data. You can see the energy usage as per area. This allows the user to compare buildings of different sizes to get a fair comparison. There is also an option to normalize the usage to the outside temperature. This function standardizes the energy usage to weather so the building energy performance can be analysed over the course of a year.

Service Benefits:

EnergyCap is a billing management geared towards corporate usage. It has the ability to measure several different resource streams such as electric, natural gas, propane, oil, water, sewer, steam, refuse, recycling, and telecom. It automatically prepares the energy bills and can email the reports out to a user list. EnergyCap can also automatically prepare payable bills. EnergyCap distinguishes itself through its billing audit system.

The auditing system analyses the bills and flags the bill if the bill seems abnormally high. This system has saved several of its clients over \$100,000 each on mis-metered bills. According to the website, large organizations aggregate several buildings energy bills into one large bill. If one building is metered too high, this will not show greatly on the overall bill and thus will go unnoticed. EnergyCap will pick up on these irregularities and flag them. This feature may or may not be applicable for this situation. If the council only desires to monitor the BWH, then this feature would not be utilized to its fullest. If the council wishes to monitor many of its buildings, then this system could be appropriate.

Example of Visual Produced:



<http://www.energycap.com/products/energycap-enterprise-features/account-tracking1>

Resource Links:

<http://www.energycap.com/products/energycap-enterprise-features/account-tracking1>

Contact Information:

EnergyCAP Inc.

110 Radnor Road, Suite 101

State College, PA 16801

PHONE 877.327.3702

FAX 719.623.0577

Hours: 8:00 AM – 5:00 PM (Eastern)

1.5 Credit360

Credit360 is a worldwide company consisting of sustainability professionals who work to provide the tools to manage sustainability data. This includes the recording and management of energy, carbon, and other utilities. The steps performed within the Energy and Carbon Service is showed below:



http://www.credit360.com/credit/site/en/energy_carbon.acds

Services Offered:

The Energy and Carbon scheme provided by Credit360 allows for the monitoring of energy use as well as planning for future usage targets. This service monitors daily data

- Flexible tools that help you work out your major impact areas and track your impacts across energy and travel
 - Flexible estimations methodologies for when you can't get all your data
 - Real time meter reading and management for when you can
 - Import files or feeds from existing enterprise reporting platforms
 - In-built carbon factor management across global carbon factor sets
 - Planning and reporting on reduction initiatives
- ("Credit360," 2014)

Service Benefits:

1. Able to be implemented in-house or Bureau Service
2. Training for in-house users
 - a. Online or personal course training for all levels of software use
3. Assigned a dedicated account manager within the company
 - a. Manages reconfigurations
 - b. Creates reports
 - c. Available for monthly briefing meetings
4. Web-based system allows for easy access anywhere anytime
5. Managed by Credit360 rather than IT department
6. This company focuses heavily on environmental impact of utility consumption and can report on facility's carbon footprint

Example of Visual Produced:



<http://www.igd.com/our-expertise/Sustainability/Greenhouse-gases/3760/Produce-World-Group-Managing-non-financial-information-to-drive-sustainability/>

Resource Links:

http://www.credit360.com/credit/site/en/energy_carbon.acds

Contact Information:

Credit360 Ltd
 Compass House
 Vision Park
 Cambridge
 CB24 9BZ
 United Kingdom
 Tel: +44 (0)1223 237 200
 Fax: +44 (0)1223 233 818

1.6 Optima

Services Offered:

Optima Energy Management specializes in the simplification and transformation of energy data into meaningful information (“Optima Energy Management”). By working closely with their clients, Optima can locate and address building underperformances saving energy and reducing carbon generation, thereby decreasing the cost for building maintenance. The following is a list of services offered by Optima Energy Management:

- Energy Procurement Services
- Invoice Validation Services
- Budget Reporting Services
- Query Resolution Services
- Metering and Siteworks
- Energy Management Reporting
- Tenant Billing Services
- Carbon Reporting
- (“Optima Energy Management”)

Based on the services provided by Optima, the council should especially consider the areas of Metering and Siteworks and Energy Management Reporting. Optima Energy Management offers high-accuracy automated meters to ensure accurate billing. The Metering and Siteworks service also provides sub-metering to accurately determine specific building inefficiencies (“Optima Energy Management”). This information is reported through Optima’s Energy Management Reporting service; these reports include both half-hourly data and energy use forecasts (“Optima Energy Management”).

Optima Energy Management also offers a variety of software for energy, carbon, and budget management. This software is designed to handle large volumes of data, such as half-hourly data, and process that data into useful data for decision making. The software provided by Optima is as follows:

- Automatic Monitoring & Targeting Software
- Budget Software
- Carbon Management Software
- Contract Analysis Software
- Document Management Software
- Enhanced Capital Allowances
- Escrow Solutions
- Invoice Validation Software
- Monitoring and Targeting Software
- Optima Cloud
- optima™ Consultants’ Edition
- Tenant Billing Software
- (“Optima Energy Management”)

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Since many of these are consistent with the services provided by Optima Energy Management, the council should specifically note the Automatic Monitoring & Targeting Software (AM&T) and the Carbon Management Software. The AM&T Software automatically collects energy usage on a half-hourly basis and points out specific building inefficiencies (“Optima Energy Management”). The reason the Carbon Management Software should be considered is that it quickly generates “accurate energy consumption data” (“Optima Energy Management”) for carbon regulations.

Service Benefits:

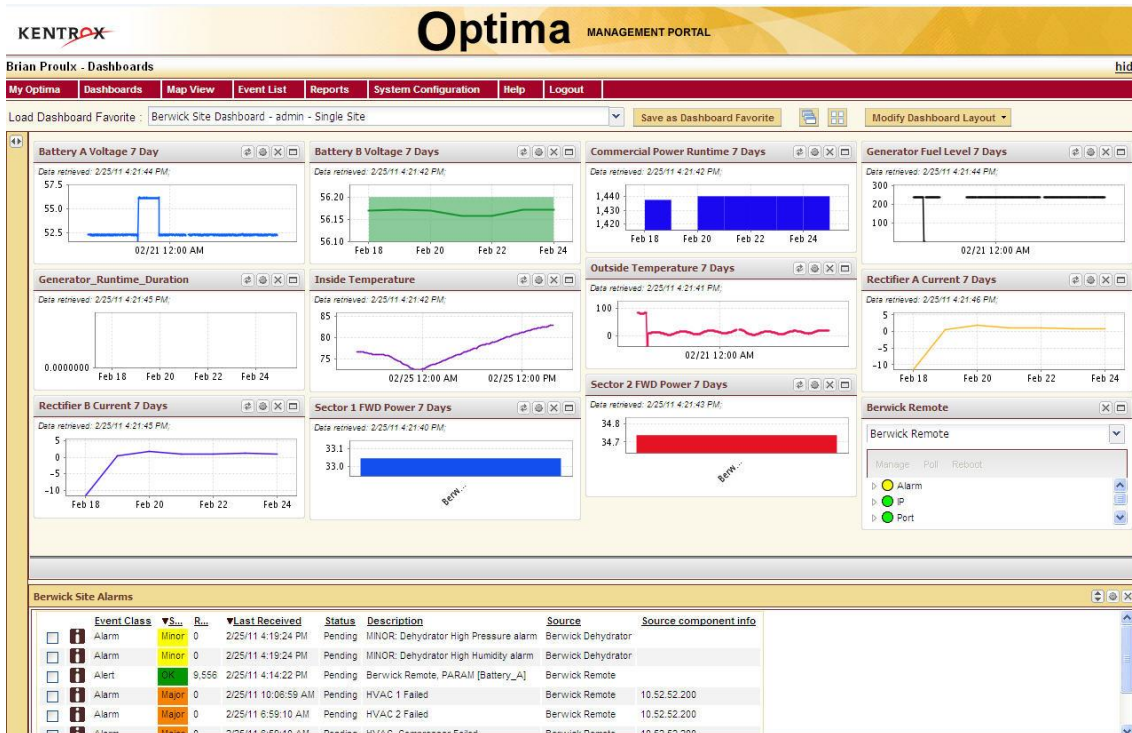
There are numerous benefits listed by the Optima Energy Management team for each of its services. However, these are the benefits that most directly influence the council:

1. Tailored service for individual requirements
2. Detect energy waste early on
3. Produce understanding of where energy is used
4. Half Hourly data in one place
5. Eliminate energy waste
6. Provide accurate data
7. Well presented data
8. Transform data into information
9. Clear reports for all management levels
10. Understand expected and actual costs
- (“Optima Energy Management”)

It seems that Optima team work very closely with its clients in an effort to acquire the most accurate data possible from the building. Not only is the data acquired accurate, but it is also presented in an understandable manner. Moreover, the data is analysed for any specific building inefficiencies, and these inefficiencies’ locations are pinpointed within the building (“Optima Energy Management”). If these are feature the council is looking for, then Optima Energy Management should be considered.

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Examples of Visuals Produced:



http://www-01.ibm.com/software/brandcatalog/content/images/opal/Kentrox_Optima_Dashboard.jpg



http://www.solarnovus.com/uploads/j/stories/Products/Environmental_management_module_report.jpg

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Resource Links:

<http://www.optimaenergy.net/>

Contact Information:

OPTIMA | ENERGY MANAGEMENT

Four Columns

Broughton Hall Business Park

Broughton, Skipton

North Yorkshire BD23 3AE

T. +44 (0) 1756 702 488

F. +44 (0) 1756 633 822

OPTIMA | ENERGY MANAGEMENT

Innovation Centre

1 Devon Way

Longbridge Technology Park

Birmingham B31 2TS

T. +44 (0) 121 222 5617

F. +44 (0) 121 275 6101

1.7 STARK

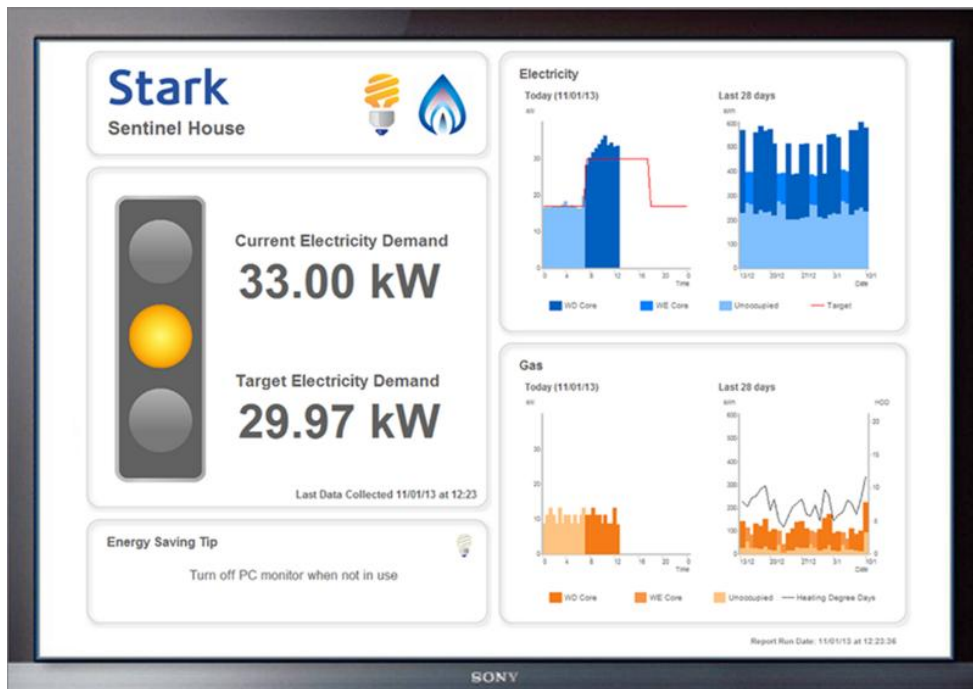
Services Offered:

Stark provides metering services for electricity, gas, and water on a half hourly basis. The company has 3 types of service: main utilities metering, sub metering and renewable energy source metering. Stark offers an independent, timely, and accurate data collection service. Bills are produced and sent to the utility supplier after the energy consumption data is collected and validated. Starks service can also aggregate consumption data using any type of metering or building energy management system. They are able to integrate all the data and provide the Council with a single online platform that gives a unified view of all the energy usage across all the facilities ("A unified view of all the energy you use," 2012). Stark's "SaveenergyOnline" web platform provides a comprehensive, feature-rich, online reporting service. SaveenergyOnline can produce multi-site comparison reports that rank the energy performance of all buildings in the Council's portfolio. Individual site-comparison reports can be published to all building users, raising energy use awareness ("Powerful energy performance reporting for energy professionals," 2012). The online platform service also gives an organization-wide visibility of the energy usage through displays that can be updated every 30 minutes. These displays use visual language that allows the viewer to understand the displayed data more easily ("Give organisation-wide visibility through our Display solutions," 2012).

Service Benefits:

1. Stark is able to collect and integrate utilities data from any meters irrespective of who installed, operates, and owns them.
2. Can take data from existing BEM's.
3. Can provide meter data on a constant basis.
4. Stark is an Elexon accredited electricity Half Hourly and Non Half Hourly Data Collector/Data Aggregator and a ASPCoP accredited gas meter reader
5. Half hourly meter data can be viewed and analysed using a single website.
6. Access rights for meter data and reports can be granted to any member in the Council
7. Dashboards can be quickly updated and re-configured to communicate specific messages about a utility, a site, or about the organization as a whole.
8. The online displays use a clear visual language that facilitates comprehension in a simple and meaningful way.
9. The flow of consumption data in the displays is automatically updated every 30 minutes.

Examples of Visuals Produced:



http://www.stark.co.uk/information_display.aspx



http://www.stark.co.uk/information_display.aspx

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Resource Links:

<http://www.stark.co.uk/index.aspx>

Contact Information:

Stark Software International Ltd
Sentinel House
10-12 Massetts Road
Horley
Surrey RH6 7DE
Telephone: +44 (0) 1293 776 747
Email: office@stark.co.uk

SECTION 2: Coupling of Services

Several of the other boroughs of London have started utilizing a combined service, coupling a procurement service provider and a bill validation and reporting provider. Boroughs such as Ealing and Hammersmith and Fulham utilize utility procurement through LASER with bill validation, analysis, and reporting through SystemsLink services. The Borough of Kingston also utilizes LASER for utility procurement; however, their bill validation, analysis, and reporting is done with STARK services.

Although this method is not as comprehensive as a bureau service, it is still an attractive option that allows for the outsourcing of procurement and/or bill validation, analysis, and reporting. Manual in-house validations of bills would still be necessary throughout this process; however, both LASER and the energy management software provider would also be performing checks. LASER also offers a feature to protect their clients from being wrongly billed. After purchasing the required utilities, LASER collects and pays the utility company's invoices. They then validate the invoice before billing the client. This would ensure that the Council is billed the correct amount and prevents the need to reimburse after payment.

Depending on which energy management software provider LASER is coupled with will determine the level of outsourcing the entire process will achieve. If it is coupled with a company such as SystemsLink or Credit360, the bill validation, analysis, and reporting would be completed in-house using the provided software. If a company such as STARK were selected, bill validation, analysis, and reporting would be outsourced to the provider. The Council would still have access to all of the reports and data collected for this service but would not be responsible for its execution.

SECTION 3: Recommendations to Council

The changes to the Facilities Management Department in 2016 provide the Council with an opportunity to evaluate the energy management services and software they are utilizing at the Bernard Weatherill House. The Council has the opportunity to update or replace their bill processing and reporting services offered by the energy management software provider TEAM. After reviewing several different energy management software providers and understanding the needs of the Council, our team would like to provide a set of recommendations concerning their energy management software. Three scenarios were considered by our team while forming the following recommendations. They include the continued use of TEAM Sigma Energy and Carbon Management software, switching to the TEAM provided Bureau Service, or switching to a completely different provider.

However, before specific recommendations are made for the three scenarios, we would like to provide a general recommendation to the Council concerning the Trend Building Energy Management System. No matter what scenario the Council decides to follow, the evaluation, recalibration, and integration of the Trend monitoring system is highly recommended. This might include further user training within the Facilities Management department to optimize the benefits from using Trend. This Building Energy Management system could be a very valuable tool, both to the Council and their software provider, if properly implemented and maintained.

Scenario 1:

If the Council decides to continue utilizing TEAM Sigma, it is recommended that they either fully use the TEAM Sigma Energy and Carbon Management software services or switch to TEAM Sigma Bureau Services offered by the company. Fully utilizing the TEAM Sigma services would provide the Council with visual reports as well as bill and consumption analysis.

Scenario 2:

If the Council decides to continue utilizing TEAM services, it is recommended that they switch over to the Bureau Services provided by the company. This would completely outsource the billing validation, analysis, and reporting responsibilities to TEAM and lessen the burden on the Facilities Management Department.

Scenario 3:

If the Council decides to switch energy management software providers completely, we recommend that the Council couple LASER with one of the service providers mentioned in the Energy Management Portfolio, preferably SystemsLink or STARK. More information on each provider can be found in our Energy Management Portfolio.

Resources:

- A unified view of all the energy you use. (2012). Retrieved April 8, 2014, from http://www.stark.co.uk/data_integration.aspx
- Credit360. (2014). from http://www.credit360.com/credit/site/en/energy_carbon.acds
- Energy Bureau Service: What do we do? (2017). Retrieved March 27, 2014, from <http://www.teamenergy.com/products-and-services/energy-bureau/>
- Give organisation-wide visibility through our Display solutions. (2012). Retrieved April 7, 2014, from http://www.stark.co.uk/information_display.aspx
- Powerful energy performance reporting for energy professionals. (2012). Retrieved April 7, 2014, from http://www.stark.co.uk/information_pro.aspx
- STC Energy. (2014). *Our Products*. from https://www.stcenergy.com/AB_products.html
- SystemsLink. (2000). *Energy Management Software*. from <http://www.sl2000.com/default.html>
- TEAM. (2014). *Energy and Carbon Management Software*. from <http://www.teamenergy.com/products-and-services/energy-and-carbon-management-software/>
- Turvey, S. (2011). TEAM Sigma: EnMS Solution Software Suite Overview. Retrieved March 31, 2014, from http://www.enms-doc.com/highlights/TEAM_Sigma.html