

# Optima Energy Cloud: Visualizer Next Generation Energy Reporting



.....transform energy data into information.

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## EXECUTIVE SUMMARY

Optima have been building Energy Management Software since 1988, and the current production version, Optima 7, is a Windows rich-client software suite that provides a huge feature set covering virtually all aspects of managing and analysing energy and utilities data.

Over the last three years OPTIMA have been developing the next generation of Optima Software which we call **Optima Energy Cloud**. It's been built on a web based .NET platform and modern architecture that allows us to take advantage of the latest technologies that scale effortlessly to handle massive amounts of energy data in the Big Data age.

Replacing all of the existing Optima 7 Desktop functionality is an ongoing major undertaking which is scheduled for completion in 2017. By utilising the same underlying database, we are able to start delivering our next generation of **Optima Energy Cloud™** software today to complement the existing Optima 7 software.

Data is absolutely fundamental to energy management and is at the core of all decisions that are made. Validating the data that is received from suppliers, data collectors and sub-meters is paramount to ensure that the information we act upon is correct.

Optima 7 will remain for the time being as the main engine for validating and managing your data, in the form of invoices, meter data, contract analysis, budgets and tenant recharging.

The first release of the Optima Energy Cloud platform provided the **Energy Portal** which allows users to view their Data and pre-processed Optima 7 reports. Integral to this is data security which allows administrators to control the data that each user is allowed access to. This enables all users in an organisation to have secure access to the data that is relevant to them.

The next step was to address the challenge of how to deliver a new reporting experience that didn't require ongoing report development to meet customers requirements.

Within Optima Desktop there were over 100 reports, but this was never enough to satisfy the requirements of all our customers and a constant stream of change requests to amend existing reports or create new ones was not a cost effective way of addressing these demands or driving product development forward.

We decided to adopt a completely different approach to the traditional application method of writing software code to query the database for each specific report or dashboard.

A team of developers and analysts started working on this in mid 2014, and the first

version of Optima Energy Cloud Visualizer went live in March 2016.

## OBJECTIVES & PHILOSOPHY

Our objectives in meeting the challenge of delivering a ground-breaking reporting experience were based around listening to our customers and looking at how the technology available had evolved rapidly with the advent of the cloud.

The goals that we set ourselves for this are as follows:

- ❖ Fully Web based for ease of deployment;
- ❖ Advanced reports and dashboards that users could build themselves;
- ❖ Self-service dashboards, reports and analytics tools to meet the needs of everyone;
- ❖ Scalable to handle massive data volumes;
- ❖ Reporting variety: pixel-perfect, dashboards, data discovery, mobile, and ad hoc analytics
- ❖ All figures based around one version of the data;
- ❖ Custom themes for white label branding;

The starting point for this was the data and how it is currently stored.

Fundamentally, the Optima Software is a platform for validating and storing all data required for an organisation to understand its utility (energy and water) costs, consumption, and Greenhouse Gas emissions. This encompasses a wide spectrum of activities:

- ❖ Energy Procurement;
- ❖ Utility Bill Validation;
- ❖ Energy Performance, Targeting & Benchmarking;
- ❖ Metering Data Storage (Fiscal and Sub-Meters)
- ❖ Forecasting of Financial Budgets;
- ❖ Recharging of Utilities to internal or external Tenants;

Optima has evolved to provide a platform for storing all of this information and, just as importantly, the means to **validate the data** to ensure that the resulting reports and information are correct. This is fundamental to our mantra “*turning data into information*”.

The Optima Database design is therefore comprehensive and complex, consisting of hundreds of relational tables. This means that it is inherently complex to build a report

directly from the Optima Database itself.

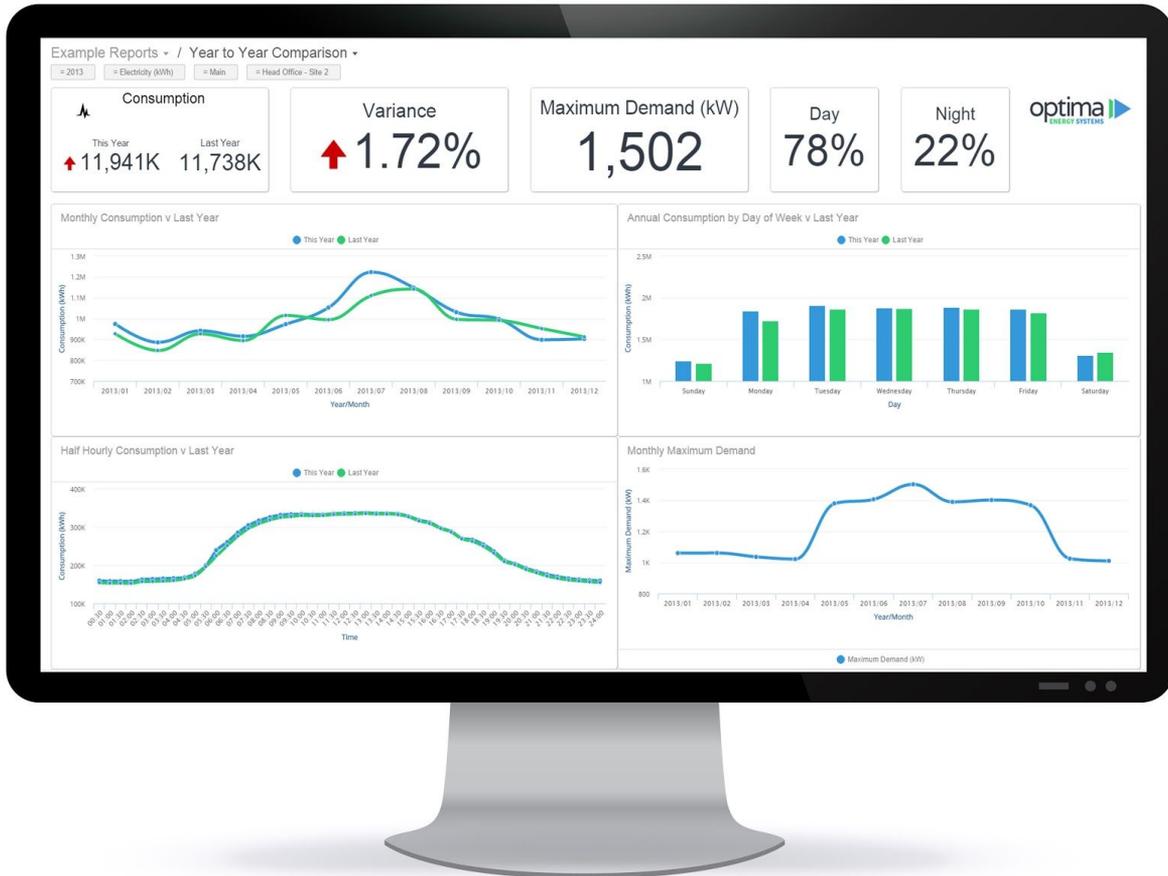
The only approach to take is to adopt the same methodologies used in Business Intelligence (“BI”) reporting, and build a semantic user data tier that flattens the data to make it more user friendly for reporting purposes.

The starting point for this was to build a Data Warehouse and an ETL layer (Extract, Transform, Load) to move data from the Optima Database into the Optima Data Warehouse.

Once the architecture for this had been developed, we then commenced an evaluation of BI reporting products that we could integrate with our Data Warehouse and embed within Optima Energy Cloud. After a three month trial of three products, there was a clear winner that met all of the criteria that we had set out and more besides.

2015 saw our team of developers integrating this BI reporting platform into Optima Energy Cloud to provide a feature set and is now available for our users.

## INTRODUCING VISUALIZER



Optima Visualizer is a fully web based self service reporting platform that delivers stunning reports and dashboards that are fully user configurable.

Built on a massively scalable cloud based analytics platform, users can report and analyse their Optima data quickly and easily.

Visualizer provides a rich user experience to discover insights into your data, allowing everyone in the organisation to understand what's going on.

Managers can use aggregated reports for any number of meters to view the big picture, whilst operations staff can see what's happening at the most granular level.

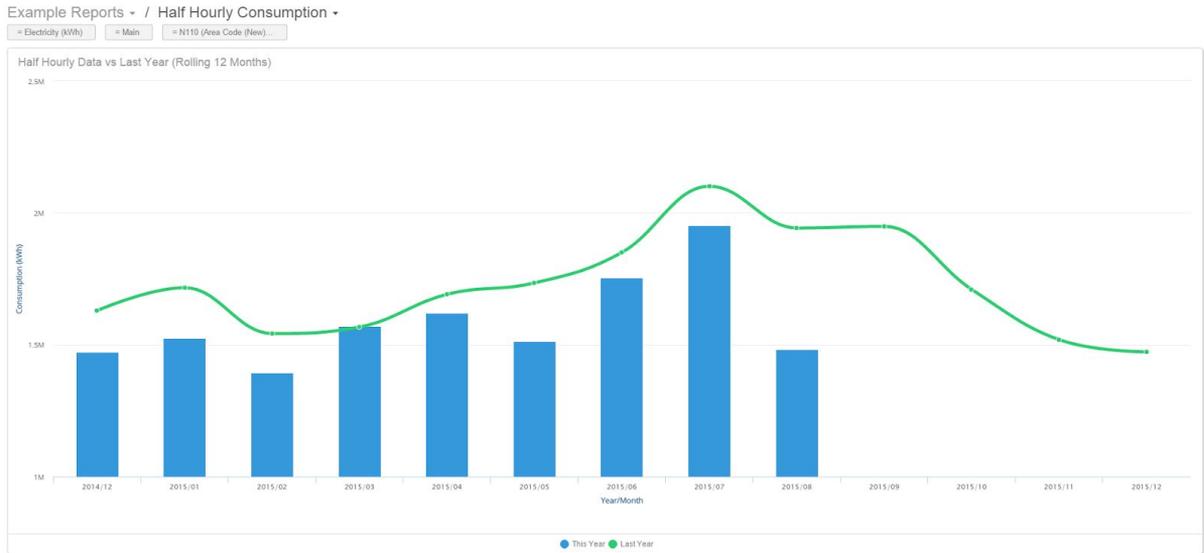
## VISUALIZER BENEFITS

- ❖ True self service: users build and deploy own reports & dashboards.
- ❖ Fully Web based for ease of deployment.
- ❖ Modern and intuitive user interface based on pure HTML5.
- ❖ Unify all energy data into a single trusted version of the truth.
- ❖ Aggregates data for thousands of Accounts or Meters.
- ❖ Full drill down capability.
- ❖ Ad hoc analysis & data discovery.
- ❖ Create your own calculations.
- ❖ Build your own League Tables.
- ❖ Cross Tab Reports that export to Excel pivot tables.
- ❖ Data mashups with external data sources.
- ❖ Cloud scale to handle massive data volumes.
- ❖ Unify all your energy data into a single trusted view.
- ❖ Custom themes for white label branding.
- ❖ Mapping functions.
- ❖ Collaboration features for commentary.
- ❖ iOS and Android compatible.

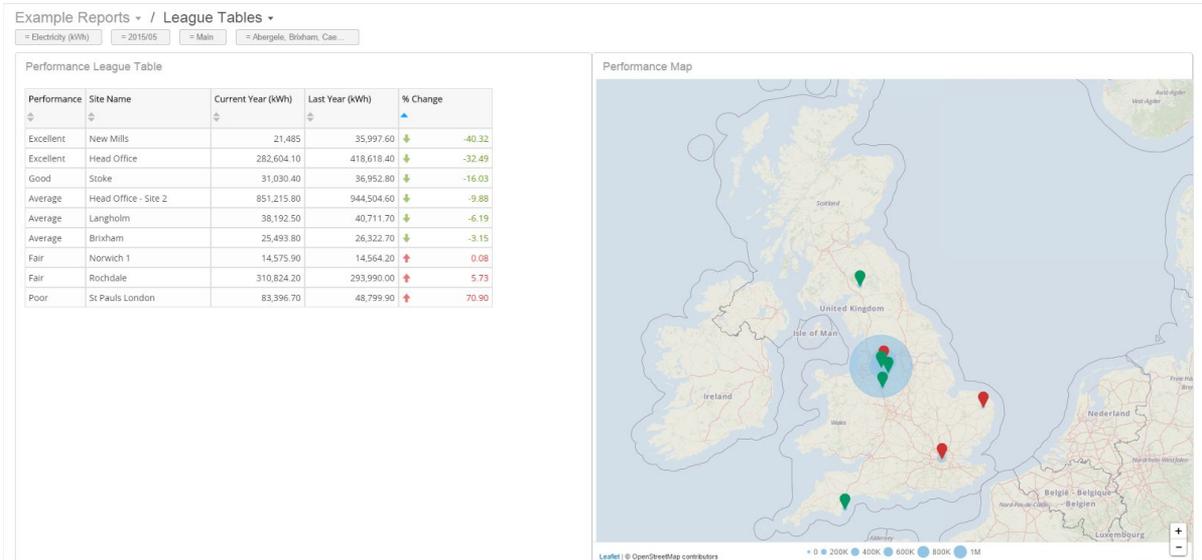
**The Dashboards that you can create are only limited by your imagination and design flair.**

Half Hourly Data can viewed for a single meter channel up to an aggregated sum of thousands of channels. Drill down capability allows users to see a high level view of interval data consumption and then drill down to Weekly, then Daily, and the Half Hourly Consumption.

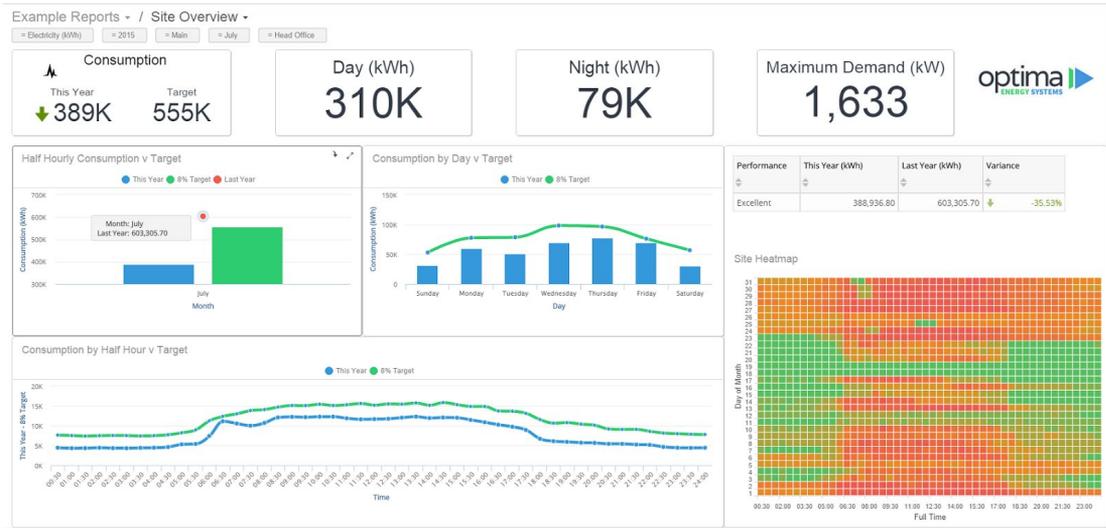
(The system is configured to go down to 5 minute resolution at the moment if required).



League Tables can built and data can be represented on maps to provide a visual indication of good and underperforming Sites.



KPI's allow you to prominently display key metrics and statistics.  
Heat maps give a high level view of performance.  
There is an extensive array of charting options.

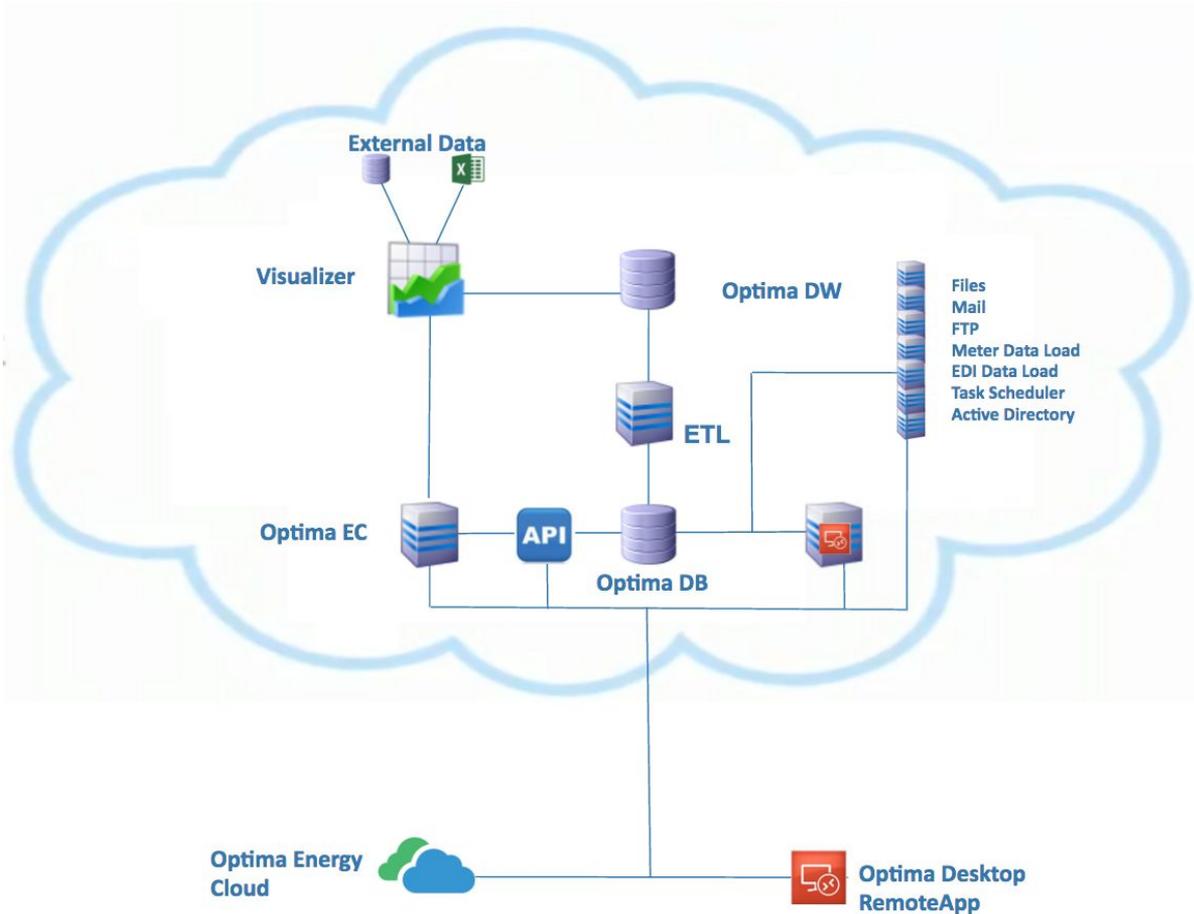


## VISUALIZER VERSIONS

Visualizer is available in three versions:

- ❖ Read Only User
  - view reports and interactive dashboards;
- ❖ Self Service User
  - build reports and dashboards;
  - data discovery and ad-hoc analysis;
  - publish reports and dashboards for users to view;
- ❖ Analyst User
  - access to back end data model;
  - load data from other sources for data mashups.

## ARCHITECTURE



### High level schematic of the Optima Architecture.

- ❖ Optima Database is accessed by user via servers hosting RemoteApp sessions, and will appear to be a Desktop application.
- ❖ Optima Energy Cloud accesses the Optima Database via our REST API, which is also available for external data sources to extract data from the Optima Database.
- ❖ Ancillary servers handle Automatic Data Imports, Emails generated by the Optima, running reports via Task Schedule, FTP data uploads etc.
- ❖ The ETL server manage the loading of data from the Optima Database into the Optima Data Warehouse.
- ❖ From the Optima Data Warehouse the data is then loaded into the Visualizer Analytics Cloud.
- ❖ Visualizer is fully integrated with Optima Energy Cloud to deliver reports and dashboards to users for self-service reporting, reporting building and ad hoc data discovery.

The architecture required to deliver Optima Energy Cloud and Visualizer is significantly more complex than what is currently installed at our hosting facility at Telecity, or what our Customers use for on premise systems, and we are migrating all hosted Optima Database and Application Hosting to the Microsoft Azure Cloud. The Visualizer Analytics Cloud is hosted in the Amazon Web Services Cloud.

This allows us to offer better performance, resilience, and scalability as the volumes of energy data that our customers accumulate continues to grow rapidly.

Once migrated to Microsoft Azure, Optima 7 will not run via Citrix, but via Microsoft RemoteApp which is a derivative of Remote Desktop. It will appear to be an application running as a local installation and you will notice no difference other than better performance since there will be a maximum of four users per hosted application server.

## VISUALIZER DATA

### Data Available for Reporting in Visualizer

The process of making data available for reporting in Visualizer is an ongoing process. Ultimately all of the data in the Optima database will be available for building reports.

We started with the main and most important data for cost and consumption reporting, and are extending this to include all other types. Once the process of extracting a data type has been completed and it's loaded into the Data Warehouse, it's then updated automatically.

It's important to understand that we are not simply uploading the Optima database into the reporting Data Warehouse. We are preparing the data so that it is in a more report friendly format, and performing calculations so that the information users need is available immediately with no time required waiting for reports to do large numbers of calculations.

This means that reporting is significantly quicker for all Optima users.

The data currently available for reporting in Visualizer is:

- ❖ Site Classes.
- ❖ Interval Meter Data Consumption  
e.g. Half Hourly Meter Data, but is available down to 5 minute data;  
This would typically be loaded on a Day+1 basis, though some Customers receive this monthly. Either way, it can be loaded automatically via an FTP or email transfer from the Data Collector or Supplier.
- ❖ Invoice Consumption & Cost
- ❖ Daily Meter Data Consumption;  
e.g. NHH Meter Readings.
- ❖ Budgets
- ❖ Accounting Periods
- ❖ In Site Total Flags
- ❖ AOQ, SOQ, EAC,
- ❖ Daily Actual/Provisional Invoices

All data required for reporting will eventually be made available in Visualizer, and the current schedule for migrating data in 2016 is as follows:

### Data Filters

The data visible to users in Optima Energy Cloud & Visualizer is controlled by flexible data

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filters that are managed by admin users. These can be controlled at a customer or site level.