Ahlstrom-Munksjö Oyj
⚲ Helsinki, Finland

ICONICS

AHLSTROM MUNKSJÖ

About Ahlstrom-Munksjö Oyj

Ahlstrom-Munksjö Oyj, Helsinki, Finland, is a global manufacturing company that provides fibre-based products, such as decor paper, filters, release liners, abrasive backings, non-woven fabrics, etc.

System Requirements

Ahlstrom-Munksjö Oyj is a global company that provides fibre-based products who required a management system to report on their energy usage across their 45 installed sites. This was required for several reasons, principally to comply with legal environmental regulations regarding energy usage and to reduce energy and carbon consumption levels, whilst keeping any EU Compliance fines to a minimum. Ahlstrom-Munksjö Oyj also wanted to be able to validate what their energy provider was charging them. To achieve this, Ahlstrom-Munksjö Oyj needed a system that was able to unify their data.

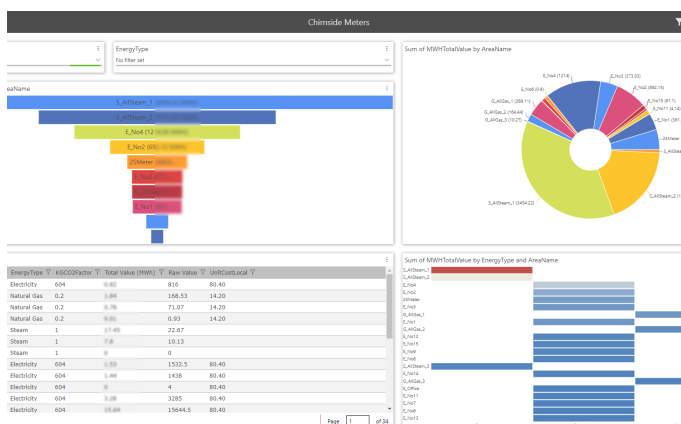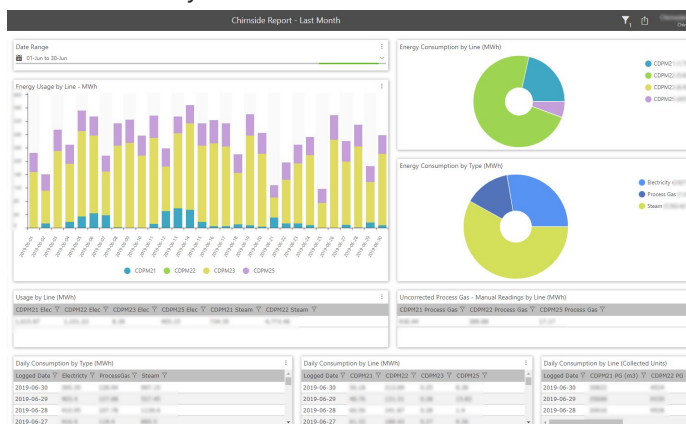## Part 1: Energy Management System

Key Goals of the EMS:

Legislative - Most of the countries in which Ahlstrom-Munksjo Oyj operates will have strict regulations about the amount of carbon dioxide released into the atmosphere. This system will allow them to monitor the amount produced and allow them to stay within these limits.

Reduce Energy Consumption and Unnecessary Costs - By understanding which factors contribute the highest amounts of energy usage, Ahlstrom-Munksjo Oyj can plan which products are produced at which sites, lines, and times to ensure that only the most efficient practices are undertaken.

System Architecture

Selecting Azure Cloud - Due to the worldwide scale of the solution, it was decided that the selected ICONICS

Energy Management Overview Dashboard – MWh Consumption by Line and Energy Type

Site Energy Overview Charts – MWh Consumption by Zones and Machines

automation software solutions would be hosted in the cloud, specifically the Microsoft Azure environment. Each site would have a local system, which would push the regional consumption data into the cloud system for storage and processing. The consumption data would cover the electric, gas and steam meters installed across the different assets at the different sites. ICONICS' Hyper Historian™ application was chosen as the storage mechanism, and consumes the data from the different sites in a number of different formats, as listed below:

Real-time OPC Data Access

Some of the Ahlstrom-Munksjo Oyj sites have meters on site, which provide the data via Modbus OPC DA. The ICONICS Hyper Historian natively consumes this data. To support extraction from a remote site at the real-time rate (15 minute), a local server was installed on the site network along with the ICONICS Hyper Historian Collector. This application collects the data at the requested rate and sends it to the Azure instance using Reverse HTTPS Port Forwarding in an ICONICS proprietary encrypted format. The data is also buffered locally in the event of the server being inaccessible.

Periodic Data Extraction

The majority of the sites do not have OPC DA compatible meters. Instead, the most recent meter reading data (15 minute) will be stored in a local database. To support extraction of this data, a local server was installed on the site network, which connected to the database via ODBC/OLEDB and extracted the data into a flat-file format using ICONICS' BridgeWorX™ application.

Total Site Production Data for Energy Analysis

A Web Gateway has been installed on the Azure instance, which supports file transfer from a remote ICONICS BridgeWorX installation via SSL in an ICONICS Proprietary format. This data is also buffered locally in the event of the server being inaccessible. ICONICS' MergeWorX™ tool supports reading a flat text file and importing the contained data into Hyper Historian.

Manual Data Entry

Each site has some meters that have no programmatic way of extracting reading values. To accommodate this, a data entry page has been created on the Azure instance, which each site engineer can access via a HTTPS URL. They can select their site, enter the timestamp and value of each meter and commit this directly to the ICONICS Hyper Historian instance on the Azure Server.

Bulk Data Import

When the solution was first installed, there was historical data collected prior to this point in a SQL database. This database data was extracted into a flat text file and imported into the Hyper Historian using the MergeWorX tool.

Energy Data Roll-Up and Value Conversions

Data Hierarchy - ICONICS' AssetWorX™ and Hyper Historian applications support creating a logical hierarchy. For the Ahlstrom-Munksjo Oyj solution, these applications were configured to match each site logically. This allows for the rollup of data from the meter level all the way up to the enterprise level. The raw data is logged at the meter level with a Hyper Historian calculation tag to convert the raw value into the required value. The following value conversions are possible:

1. Conversion to Differential Value
Each value logged by the meter will be an increasing value, which will roll over when it reaches a set threshold. Using historical calculations, these numbers will be converted into the differential consumption for that period. For example, if the two logged values are 15 and 17, then the consumption for that period is 2.
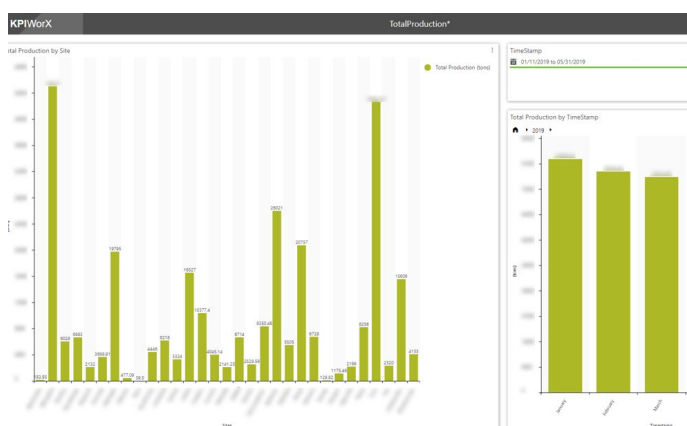
2. Unit Conversion

Each logged value may be in a different unit to what is required (e.g. KWh rather than GJ). The Hyper Historian calculation engine can convert these.

3. Ratio Conversion

Some meters may serve multiple lines on the site and, as such, their value will need to be ratioed between these lines at a set fraction. The Hyper Historian calculation engine can convert these values.

4. Derived Calculations

Due to sub-meter positioning, some meter values may need to be subtracted from other meters to accurately record the line usage. The Hyper Historian calculation engine can convert these values.

Energy, Cost, and Carbon Consumption Dashboards Using KPIWorX™

The EMS system will contain the energy consumption across the different sites. With this information, the Cost and Carbon values can be calculated in real time and the production datasets can be joined as well. This information will allow Ahlstrom-Munksjo Oyj to compare the grades of produced product against the different costs (actual and carbon) to produce it. A series of dashboards has been created in the ICONICS self-service HTML5 application, KPI-WorX™, to expose the data within the EMS system to the different users within Ahlstrom-Munksjo Oyj. Site users will see the energy consumption of the site across the individual lines, with breakdowns across the different energy types, whilst global users will see rolled up values of the different sites, as well as the different production types of the sites.
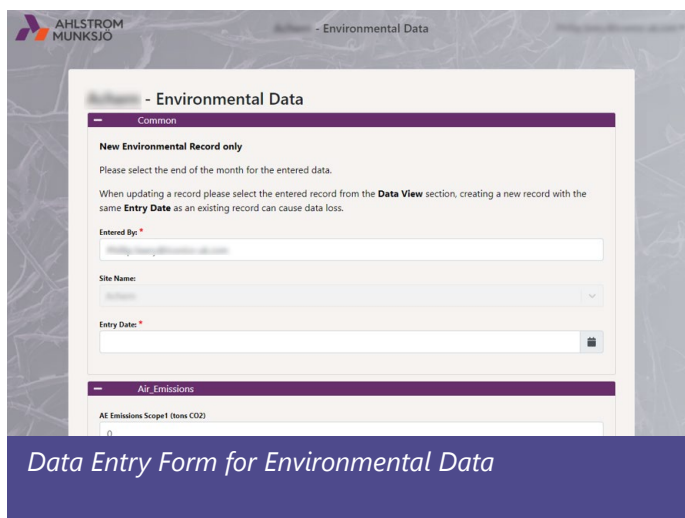
Data Entry Form for Environmental Data

Part 2: Environmental System

Environmental Data Collection and Storage

Across all of the sites, a super-set of environmental readings have been gathered, and each site will have these available for collection. Not all sites will collect the same readings, so sites will have certain readings disabled so that they cannot be collected. These readings are all manually entered by the Site Environmental Manager once per month into a HTML5 website.

Why Cloud? Why Azure Table Storage?

The environmental system at Ahlstrom-Munksjo Oyj is stored outside of the Hyper Historian and instead is stored within Azure Table Storage. There are several reasons for this, as listed below:

1. Data Collection Rate

The environmental-specific data is only collected once per month. The ICONICS Hyper Historian was designed for fast data collection and a monthly sample rate wouldn't be an effective use of the product.

2. Data Collection Mechanism

None of the environmental data can be automatically collected Instead, only manual data entry is supported, as the data doesn't need to be stored within Hyper Historian. A different manual data entry mechanism was needed to store the data in Azure Table Storage. This was achieved using a HTTPS web page, as well.

3. Data Conversion

Unlike the EMS system, there were no complex calcu-
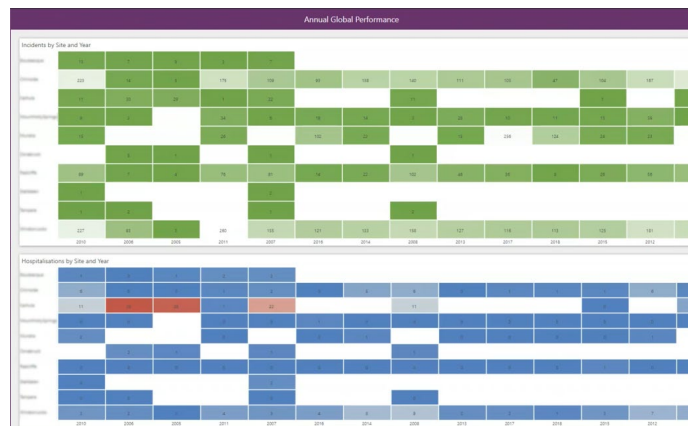
Global Annual Health and Safety KPI Dashboard - Incidents by Site and Year

lations required against the environmental data and, as such, the data could be stored in a column-based structure instead.

Environmental Dashboards

As with the EMS system, the environmental data has been exposed from the storage into a series of KPIWorX dashboards. These dashboards are both site- and global-specific, wherein site managers can view the raw environmental data, as well as rollups based on the reading type. On the global level, the aggregates of all sites' data can be viewed.

Part 3: Health and Safety

System Overview

Cloud-based Health & Safety Repository - Alongside the mechanism provided to manually collect the environmental data, this system is also utilised to collect health & safety information from each of Ahlstrom-Munksjö Oyj's sites. As with the environmental system, this data is collected and stored inside Microsoft Azure Table Storage via a manual data entry HTML5-based web form interface, which provides all 8,000 Ahlstrom-Munksjö Oyj employees with a platform to report incidents, as they occur, via any compatible modern web browser.

Data Security - Once data has been collected, Quality, Health & Safety, and Environmental officers, or department managers, use the same security-controlled interface to manage the records through a defined workflow. A key benefit of using a single cloud storage repository for this data was that this will allow Ahlstrom-Munksjö Oyj to normalise their health & safety data collection

practices and workflow globally. The system also integrates with Microsoft Azure Active Directory to allow all 8,000 Ahlstrom-Munksjö Oyj employees to authenticate against the application using their corporate credentials.

Main Health & Safety Functions - Currently deployed modules of the health & safety system allow Ahlstrom-Munksjö Oyj to collect and fully manage health & safety incidents, including accidents, near misses and behaviour-based safety interactions, and to provide supporting records of actions undertaken to investigate or resolve issues, including attachments such as training documentation or photographs of hazards.

Health & Safety Dashboards

Similar to both the energy and environmental monitoring solutions, ICONICS KPIWorX platform uses the provided data to provide dashboards at global, business area, business unit, and site levels, which will allow QHSE managers at each plant a view of their performance, while also automating the generation of the monthly key performance indicators against which Ahlstrom-Munksjö Oyj report; such as Near Miss Rate, which calculates the number of near misses in relation to the number of hours worked at each plant.

Part 4: Future System Development

Further module additions which are currently under development for the health & safety system include: Chemical Registry (COSHH), Safety Inspections, Safety Training, Work Permits, Risk Assessments and Document Records.

Health and Safety Incident Dashboard at Site Level

Data Entry Form for Health and Safety Data