Gasifier´s Environmental Credentials are Greatly Improved through Enhanced Monitoring

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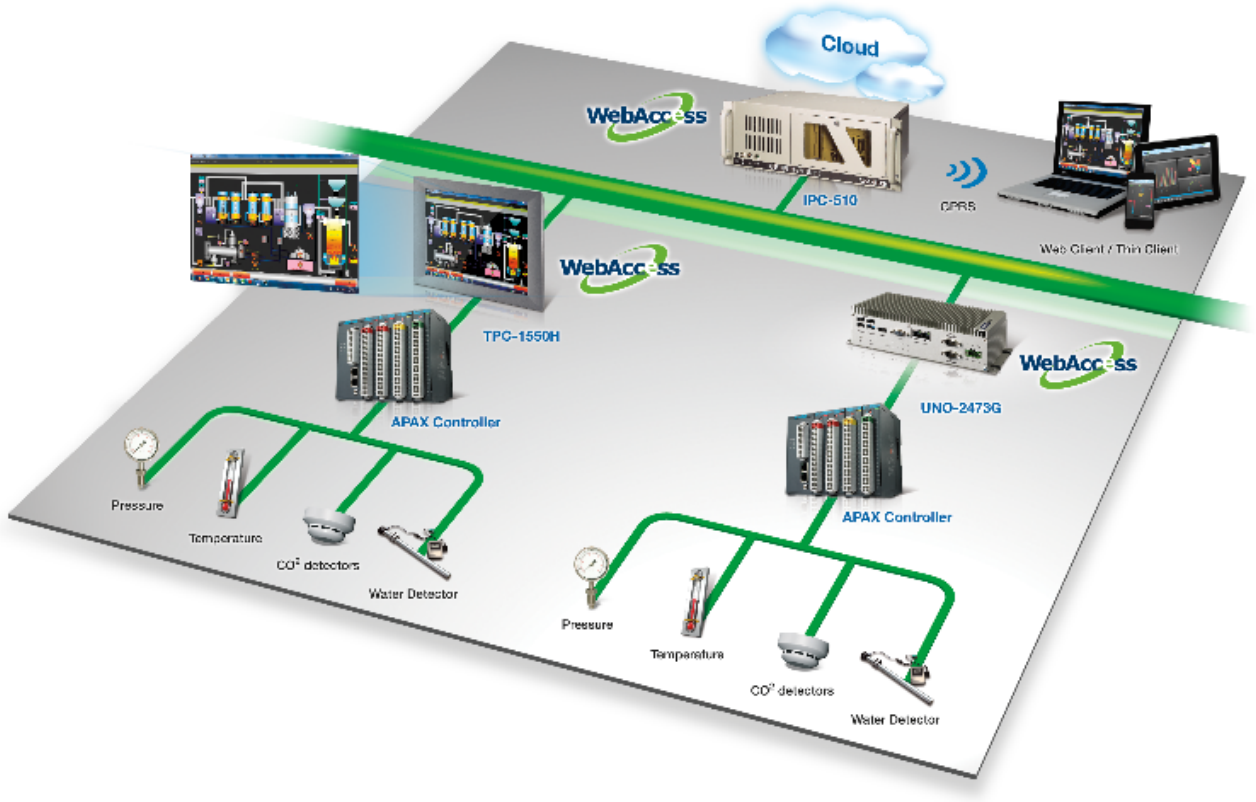


Morbi, Gujarat, India

Project Introduction:

Gas is a major requirement for controlling the temperature of furnaces, so our customer used a coal based Gasifier system. The fixed-bed or up draft Gasifier use a fixed bed of carbonaceous fuel (e.g. coal or biomass)through which the "Gasification Agent" (steam, oxygen and/or air) flows in counter-current configuration. The ash is either removed in the dry condition or as a slag. Slagging Gasifiers have a lower ratio of steam to carbon, achieving temperatures higher than the ash fusion temperature. The nature of the Gasifier means that the fuel must have high mechanical strength and must ideally be non-caking so that it will form a permeable bed. But there are some drawbacks to this Gasifier system in that it

generates byproducts like coal tar, waste water & carbon dioxide. These are hazardous to both the environment and the public, so governments have placed controls and audits on the systems.

Environmental audits comprise of the systematic, documented, periodic and objective evaluation of Waste prevention and reduction, compliance with regulatory requirements, control of environmental practicesby a company?s management and placing environmental information in the public domain. Gasification is a process of partial combustion which converts solid combustible material into Gaseous fuel. The process is known as Thermochemical Conversion. The equipment used for this process is a Gasifier and they are extensively used for bio-mass and coal gasification.

System Requirements:

Legacy Gasifier systems require a room of engineers to continuously monitor the status of all dials of a whole range of analog devices to ensure that everything is working correctly. This is imprecise and doesn?t help with the detailed analysis of information that is now required by governments to meet their environmental commitments.

For this new project, Government guidelines required the customer to monitor all the parameters such as temperature, pressure, carbon dioxide content, tar, waste water flow on a SCADA & cloud system. The cloud system is used to enable engineers to be fully mobile and monitor the information from all of the devices from wherever they are. This is best done through a flexible HTML 5 design which enables analysis to be carried out on any modern mobile device such as tablet or mobile phone.

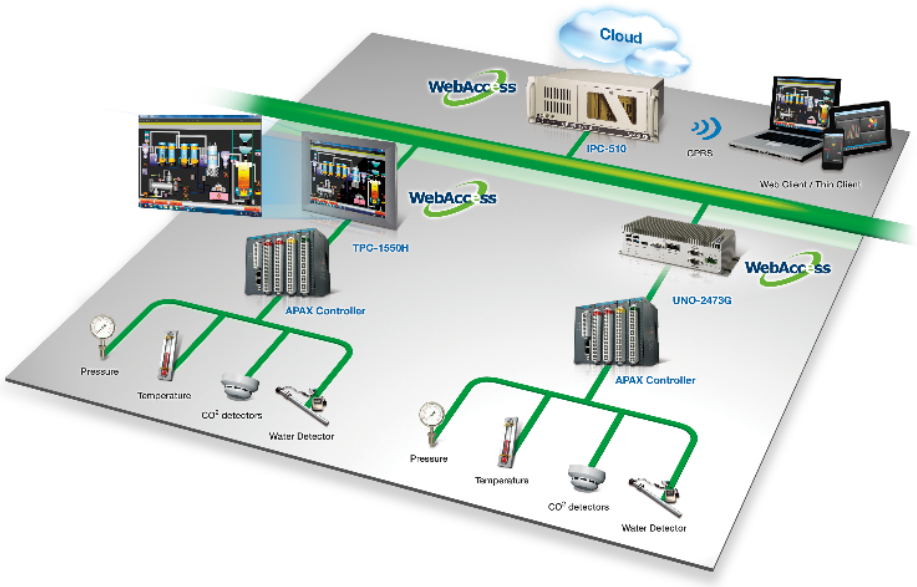
Project Implementation:

Gasifier systems are divided into four sections: the reactor generates coal gas by combusting coal and steam; the tarcatcher captures coal gas from the reactor as it passes it onto the condenser; the tar cracker takes the tar from the Tar Catcher and removes the water from it so it can be used in the cement industry; the condenser cools the coal gas and removes any remaining tar particles where they are sent to the Tar Cracker. The cold coal gas is then passed to the application area. To monitor the system data our customer installed APAX PLCs, an Advantech WebAccess with 150 tags, an UNO-2473G Intel® Atom? N450/D510 High Value Fanless Embedded Box PC with Multiple I/O industrial PCand a 15? TPC-1550H with 15? XGA TFT LED LCD Intel Atom thin client terminal and IPC-510 4U Rackmount Chassiswith Front USB and PS/2 Interfaces. This data was then sent to mobile devices using a wireless

GPRS network. Through the use of pre-developed user configurable widgets, managers and engineers configured the system to meet their precise needs and then sent them to the UNO and IPC where the data is analyzed and sent to Microsoft Access to generate reports. Through the use of a static IP address and WebAccess?s HTML 5 GUI (graphical user interface) all the settings of machinery are configured and monitored remotely using a compatible Web Browser. The GUI is flexible enough for engineers to design the system that exactly meets their needs now and can be easily adjusted as the needs of the business change. WebAccess 8.0?s three open interfaces, allows it to become an IoT Platform and gives developers the opportunity to develop applications from the bottom up. The Web Service interface allows customers to integrate WebAccess data into applications and application system. Thepluggable widget interface lets developers write their own widgets to run from the dashboard. Thirdly, the WebAccess API allows developers to write DLLs touse in Microsoft Windows applications. This open source approach to development gives users the greatest amount of flexibilityfor those who require it.

Advantech WebAccess	Browser-based HMI/SCADA Software
UNO-2473G	Intel® Atom? Regular-Size Automation Computer w/ 4 x GbE, 3 x mPCIe, HDMI/VGA
IPC-510	Economical 4U Rackmount Chassis with Front USB and PS/2 Interfaces
TPC-1550H	15" XGA TFT LED LCD Intel® Atom? Thin Client Terminalsb

System Diagram:



Conclusion:

The winning strategy for Advantech was not only its highly competitive pricing but more importantly was that WebAccess could monitor and control all the location?s devices remotely whilst providing comprehensive reporting functions. By providing these benefits Advantechhas been able to secure over 40 orders for this configuration andwill be in-line to provide more should they be required.