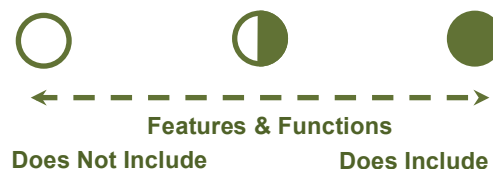


SOFTWARE EVALUATION SUMMARY

Product name: Real-Time Environmental Solutions for Flare & Emission Monitoring & Control
 Company name: Industrial Prosperity
 Product review date: September 2018



GHGMI SOFTWARE EVALUATION SUMMARY



FEATURES	OUTCOME	ASSESSMENT HIGHLIGHTS
Set-up, navigation and consolidation of organization and sources	●	<p>Industrial Prosperity (IP)'s Real-Time Flare & Emission Monitoring & Control software for air pollutants consists of the following elements: Real-Time Flare Monitoring Solution ("FMS"), and Emission Monitoring Solution ("EMS"). When implemented together, the software will be capable to automatically capture and process smart meter data and integrates with manually entered data to deliver real-time dashboard displays and reports. The Software allows rigorous process modeling of hundreds of valves, tanks, pipes, vents, and other devices common to oil, gas and petrochemical facilities, but can be applied to other industries as well.</p> <p>For GHGMI's review and testing, Industrial Prosperity organized a series of conference calls to walk GHGMI subject matter experts through the system design using built in sample and metering data to illustrate what a fully implemented system would look like.</p> <p>The software uses an organizational structure that provides flexibility to allow users to consolidate emissions as follows: data ⇒ device ⇒ equipment ⇒ plant ⇒ facility ⇒ admin area ⇒ business line ⇒ company corporate level.</p> <p>This structure allows users the flexibility to aggregate and disaggregate GHG emissions as desired to mimic a variety of organizational structures, and these are easily navigated when entering or accessing data.</p> <p>An extra data entry field ("Facility equity percentage") is currently being implemented in the facility configuration menu to allow for modeling joint ventures and to support organizational boundaries based on equity share reporting.</p> <p>The next release of IP EMS shall include "Facility equity percentage" data field in facility configuration menu to allow for modeling joint ventures and to support organizational boundaries based on equity share reporting.</p>
GHG gases, sources and scope	●	<p>The EMS software is configured to cover all Kyoto Protocol GHGs as well as local air pollutants. It incorporates a database of over 3,000 emission factors (EFs) including those established by the IPCC, as well as EFs for local air quality pollutants such as VOCs (volatile organic compounds), NOx, SOx, CO, PM, and (particulate matter). The system is flexible and allows for entering additional pollutants defined by the user.</p> <p>The software supports common emission sources and enables separate calculations for scope 1, scope 2 and scope 3 emissions for each device (activity source). See Configurations> device details > scope selection menu.</p>

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Activity data	●	<p>The FMS software design anticipates that most activity data will be collected automatically from distributed field instruments or other networked metering devices which are continually reading real-time process conditions. The Software uses real-time data historians to translate available measurements of process conditions - such as control valves openings, pressure, and temperature - and uses the data to determine flared quantities in standard cubic feet. By monitoring these measurements, users are able to optimize the operation of their plants more effectively, resulting in minimization of hydrocarbon loss through flaring which in turn mitigates environmental impacts of the release of GHG and non-GHG gases during the various stages of production.</p> <p>In absence of sufficient instrumentation, data can be entered manually or can be imported from (excel) files into the solution for FMS & EMS.</p>
Availability and use of emission factors and GWPs	●	<p>The software includes a large database of emission factors and GWPs, and allows for users to add to this database. The EFs and GWPs are contained in the system library and are appropriately sourced from documented references such as IPCC SAR, 2009 API Compendium, US EPA's AP-42, etc. Users can set up a download of the EF database and GWP database which our reviewers found very useful. Chemical property data for numerous compounds are also contained in system databases.</p>
GHG emissions calculations	●	<p>A model plant calculation using a spreadsheet was performed by GHGMI testers based on the chemical composition of gas in a fictitious flare header, and then the same conditions were modeled in the FMS Software. The results from the software were hand benchmarked using the software's output against the results of manual calculations. Upon testing the IP FMS EMS software produced accurate results in accordance with the methods in the IPCC Tier 3 methodology for flaring.</p> <p>The software also contains standard tables for unit conversions which can be viewed or downloaded.</p>
GHG emissions reporting	●	<p>The FMS and EMS Software modules have the ability to display real time plant data, real time emissions curves, dashboard displays, alerting capability, and can generate custom reports. The system has standard reports which can be accessed and IP can create additional reports based on user needs. The software allows users to define and retrieve any time period by selecting starting and ending days from a built-in calendar. Reports can be downloaded to exportable MS excel, CSV and PDF templates.</p>
Targets, policies and programs	●	<p>The FMS Software is designed to identify and alert, when plant behavior falls outside expected norms as established by company or regulatory policy. This is primarily accomplished by flagging source activity (such as valve opening or flare volume events) that leads to higher emissions than expected/allowed. Corporate targets and related documents can be uploaded and context sensitive comment boxes allow for documentation to be added. Plants can utilize the software output to measure against company established Key Performance Indicators (KPI), and allow for performance benchmarking accordingly.</p>
Uncertainty analysis capability	●	<p>Users can specify separate values for "activity data uncertainty" and "emissions factor uncertainty" (entered as percent uncertainty) in Configuration > GHG methods menu. The results of our research will be made available as enhancements which will be available in the future releases.</p>

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Quality assurance & quality control	●	The software design ensures all data inputs (other than those captured by the solution) and all changes are traced to user accounts through audit reports. The system allows configuring users administrative privileges to support each user/viewers roles and responsibility. Documentation facilities are available through context sensitive comment boxes and provision to upload design documents. The FMS software was designed to support mission-critical health and safety monitoring at oil and gas facilities and is also critical to process optimization. The software can support verification activities through granting of user access rights to third parties, allowing them to view the data and any attached supporting documentation.
Documenting choices, tracking changes	●	The software provides opportunity to document methodological choices and boundary decisions through context sensitive comment boxes and provision to upload design documents. Changes in calculation methodologies, operational boundaries, base year, etc can be tracked similarly, but require manual operations and post processing.
Ease of use	●	<p>The software is a highly flexible solution built on industry-standard relational database technology. The software is organized and well-designed system capable of modeling highly technical and complex gas flows in refineries and gas plants, and now extended to other industries as well. The Software is powerful, but requires investment of time and thought to set up. However, given the sheer number of sources and devices found in oil and gas operations, it is inevitable that a software platform designed to service this industry will be complex and require a considerable set up, and initial definition, to operate.</p> <p>The Software allows rigorous process modeling of hundreds of valves, tanks, pipes, vents, and other devices, all common to oil, gas and petrochemical facilities. This functionality results in a steep learning curve for the user when first setting up, and users should be knowledgeable and experienced in oil and gas operations. Industrial Prosperity is addressing these challenges with plans to deploy a Competency Learning Center (online and classroom-based training) and formally structured process to engage with new customers, providing training and support to help users initiate process models and enter relevant company data into the system.</p>
Training, documentation and support	●	This software set-up process is logical and flexible to accommodate user needs. The strength of the system is its power, flexibility, and ability to support management decisions in real time, but flexibility usually comes at a cost of greater complexity. User training and support during plant set-up is critical, and Industrial Prosperity is skilled at helping customers understand the system and can customize the software for each user. The company also offer software maintenance and support license post sales of software based on service contract with clients.
Workflow management functionality	●	The FMS system setup uses schematic drawings to illustrate the linkages between devices and equipment, and provides a graphical representation of piping leading to flare headers (Process Display Book). The system's workflow starts with entering data using a schematic to help with data entry and continues to the day-to-day use that allows users to monitor flare systems at multiple processing facilities using the real time display. This use of 'process based organizational structure' makes the set up and use of the software match on-the-ground reality in plants and facilities. The ability to develop custom schematics that match plant design is a major strength of the Software.

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GENERAL COMMENTS:

The GHG Management Institute evaluated Industrial Prosperity's Software, called *Real-Time Environmental Solutions for Flare & Emission Monitoring and Control*, in accordance with GHGMI's Software Evaluation Test Protocol. Based on the application of this protocol, our evaluation produced a positive finding indicating that the Software provides the functionality required for a competent professional to configure, calculate, and manage data in support of reporting an accurate emission inventory in a manner that is fully consistent with Tier 3 of the *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

No significant concerns with usability of this software were encountered. Log in process was simple and did not require installing software, or use of virtual private network or other specialized software. The software was available every time we attempted to log in and access it for test purposes, which included many times outside normal office hours.

A GHG emission inventory can serve as an important foundational analysis on which to build strategies for reducing environmental impacts. A GHG emission inventory can help to benchmark past performance and track progress towards goals, but often the data is unsuited or unused for strategic planning and executive decision making. During our review of the Industrial Prosperity Software we noted that it is housed within, and part of, a 'mission critical' system that is integral to plant operations, health and safety considerations, and process optimization efforts. Connecting real time analytics to GHG accounting and monitoring means GHG emissions reporting can be 'actionable' and dynamic, as opposed to an afterthought, or unpleasant task that is done at the end of each year and promptly forgotten for the next 12 months.

This Software not only helps track emissions, but also it provides plant operators with better information on flared quantities and helps to pinpoint whichever valves, devices and equipment are venting methane and VOCs into flare headers. In the past, this has been difficult due to the many pipes and processes that are connected to flare networks and the lack of flow meters to identify the source of flared gas. By helping to identify the root causes of flare gas venting into flare headers, the Software assists in quantifying the volume of valuable gases burned and the financial impact that loss entails. **This functionality in the IP-FMS/EMS Software has not found in any other GHG accounting software package and is a distinguishing feature.**

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INDUSTRIAL PROSPERITY COMMENTS:

GHGMI has conducted a detailed analysis of our software with a dedicated team which has quickly understood and evaluated each and every functionality of our Flare & Environmental Monitoring and Control Solution. IP appreciates the valuable comments and improvement suggestions from GHGMI and have a plan in place to implement them in the next release.