



## **Team LivNSense**

### **Cognitive Furnace4.0 (enabled by LivNSense iSense4i™)**

#### **Business Case:-**

The petrochemical industry accounts for 6 percent of energy usage in the United States. About half of it comes primarily from oil and natural gas, it is estimated that 60% of energy consumption of the total plant is in Furnaces. A typical 500 KTA capacity ethylene plant, consumes 30 MW-Hrs of electricity per year.

Optimizing (Steam/Gas Cracking) furnace operations in terms of reduced energy intensity will improve overall energy cost to the petrochemical plant and also reduce the carbon footprint of the plant operations, even 1% reduction in energy intensity of the operations by real-time optimization of operations would reduce CO2 equivalent emissions by around ~ 5 billion pounds annually.

#### **Solution objective: -**

By leveraging IoT enabled artificial intelligence solution, Continuous monitoring and performance optimization of furnace operations (increase furnace length, reduce coke formation, reduce energy intensity) can be achieved. Our solution is built using our **iSense4i™ AI based Cognitive Furnace4.0 platform** to capture the real-time process data and generate predictive recommendations for the operator to optimize the furnace operations.

#### **Solution unique value proposition: -**

AI Models are build using industrial grade data simulated from plant operations, models are strengthened by first principles along with advanced analytical approach, estimated profit for a mid-sized petrochemical plant up to ~\$2 Million annually. Solution is enabled by our Smart edge connector that can fetch data from major plant historians, DCS & PLCs and other OT systems. It has four components as part of **Cognitive Furnace4.0** :

- Core AI Process analytics module - Module for data preprocessing suitable for major process industries for statistical analysis
- AI/ML Custom module: - Module for use case specific advanced analytics module, trained for specific process industry.
- Digital Twins: iSense4i™ use a digital twin, which is a virtual representation that matches the attributes and operational metrics of a “physical” production line through the captured production-line data. This enables production teams to quickly pinpoint performance anomalies and their root cause, providing them with actionable insights, and presenting them in the context of the production line.
- **SMARTEDGE™** – AI-Based Edge Firmware for Connectivity, Device and Security management, Deep Learning and AI Vision at the edge for real time OT-IT integration. Ability to support million of events on real-time on custom and 3<sup>rd</sup> party HW platforms and integrate with Azure IoT Platform.

The solution is integrated with MS-Azure and also has plug-ins for SAS VDMML for predictive and prescriptive analytics.