DATA SHEET

AI for a sustainable future

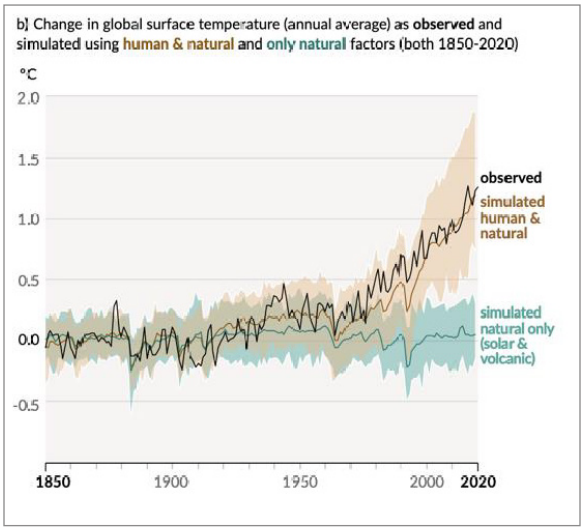
The earth's environment is in a code red status and new digital solutions are required to meet the challenge.

United Nations body for assessing the science related to climate change issued results of the 6th Working Group Report in August of 2021. The key highlights were:

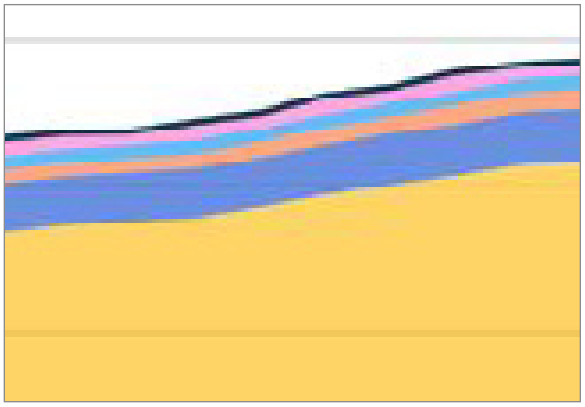
- Greenhouse gas concentrations are at their highest levels in 3 million years and continue to rise. As a result, the earth is now 1.2°C warmer than it was in the late 1800s. The **last decade was the warmest on record.**
- The current path of carbon dioxide emissions will increase global temperatures by 3-5°C by the end of the century.
- Over 90% of people breathe unhealthy levels of air pollution, largely resulting from and continue to rise.
- The consequences of climate change now include, among others, intense droughts, water scarcity, severe fires, rising sea levels, flooding, melting polar ice, catastrophic storms, and declining biodiversity.
- The 10 largest emitter countries contribute 68% of all emissions.
- While a growing coalition of countries is committing to net zero emissions by 2050, about half of emissions cuts must be in place by 2030 to keep warming below 1.5°C. **Fossil fuel production must decline by roughly 6% per year between 2020 and 2030.**

To meet the challenge, the world eventually needs to move towards more sustainable sources of energy (energy is the major contributor of human greenhouse gas emissions). But until non-polluting sources and technologies of energy production mature and become widespread, the need to produce and utilize energy more efficiently is also extremely important.

Read on to see how SymphonyAI Industrial's **Performance360** solution addresses these challenges through cutting edge AI-based solutions.



Human contribution to global temperature change has been dramatic over the last half century.
Source: IPCC, 2021: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change . Cambridge University Press. In Press.

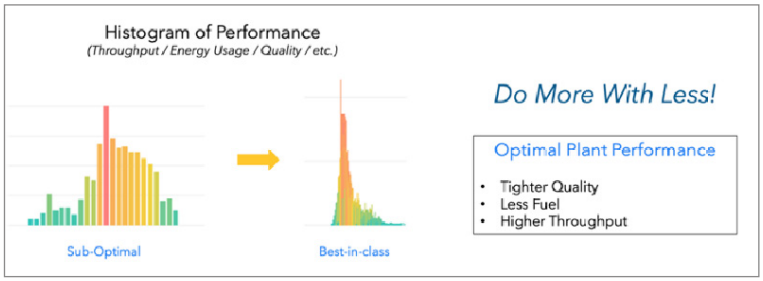


Energy and Industrial Processes are key contributors to the total human Greenhouse Gas (GHG) emissions of the planet.
Source: World Resources Institute. (2020, December 10). Historical GHG emissions [Graph]. https://www.wri.org/insights/interactive chart shows changes worlds top 10 emitters

Performance360™

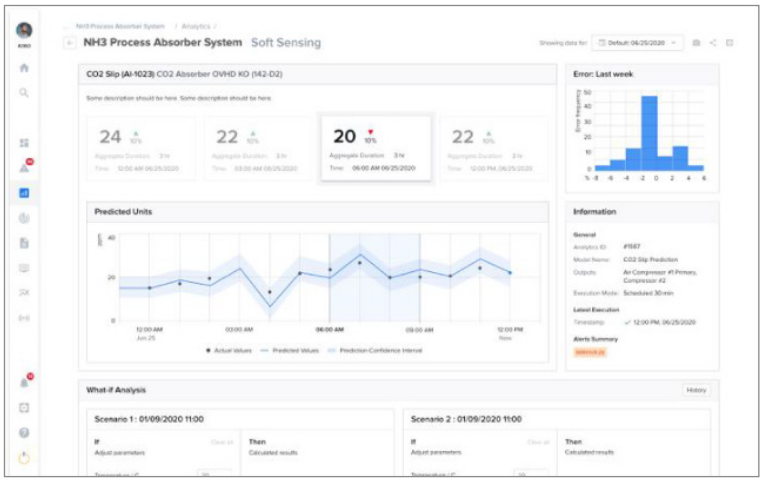
AI-based optimization and process control

To help achieve these goals, SymphonyAI Industrial's **Performance360** uses AI-based performance optimization to enable manufacturers to increase energy efficiency and throughput while reducing overall energy usage and emissions. In a real-world manufacturing operation scenario, there are constant changes occurring with a process that make it difficult for any non-adaptive control system to consistently produce high throughput, low energy usage, and low emissions. However, with the ability of cutting-edge AI to process vast amounts of data in real-time, adaptive control trajectories can be generated in real-time that constantly push processes towards their maximum entitlement.



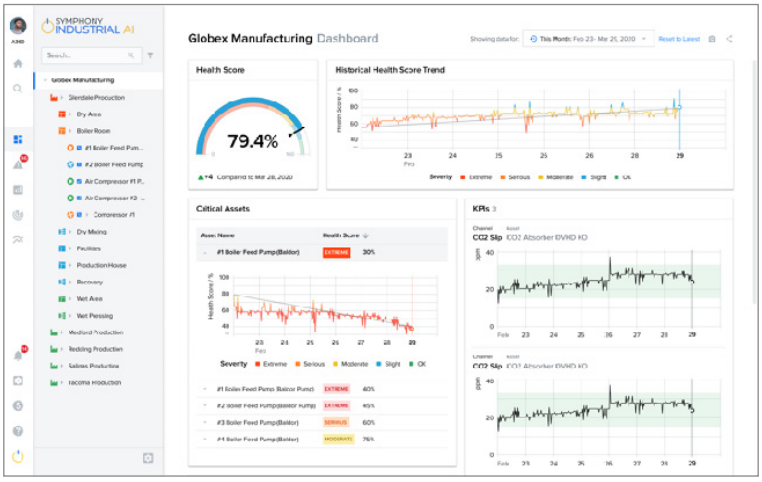
Increase predictability and reduce process variability with Performance360's adaptive, real time, AI based process optimization software. Optimize various KPIs at the same time using vast amounts of data that produce high fidelity models.

In energy intensive processes such as milling and melting, Performance360 has been shown to reduce energy usage by 1-3% while maintaining or improving product quality and throughput. In processes where emissions must be controlled, Performance360 can monitor emissions in real-time, forecast future emissions, and even suggest control strategies that would keep emissions in control while getting maximum possible throughput in the process. This includes choosing between multiple energy sources, ensuring the ideal process conditions for chemical reactions, and reducing the overall unit cost of production.



Forecasting process parameters using AI. These forecasts are fed back into the AI optimization models that can generate optimal control trajectories that optimize multiple objectives.

Process and asset health management



Performance360's health dashboard that helps monitor equipment and process health. KPIs related to energy, quality, output, and environmental performance can also be monitored in real time.

To run a manufacturing operation in an optimal way, manufacturers must not only focus on cutting-edge control systems but also ensure that their equipment is functioning optimally. Ageing of equipment over time has significant impacts on energy consumption and environmental performance. Performance360's AI-driven predictive models can assess machine health, provide real-time monitoring and prescriptions, and recommend predictive maintenance for furnaces, compressors, pumps, and forming machines. It leverages IIoT, AI, and FMEA to provide anomaly detection, automated cause analysis, and action recommendations to ensure increased reliability, uptime, and performance.

Industry	Opportunities	Savings
Metal and mining	Smelter efficiency, milling circuit	$3-6MM
Oil and gas/refinery	Energy efficiency, pre-heat train efficiency	$2-4MM
Petrochemicals	Reformer efficiency, emissions reduction	$2-4MM
Power generation	Heat-rate, emissions reduction	$1-3MM
Glass	Energy mix, furnace efficiency, product quality increase	$1MM
Cement	Energy mix, kiln energy efficiency, emissions reduction	$1MM

Opportunities and outcomes of digital sustainability initiatives in different industries. Above numbers on annual per plant basis assuming average size capacity.

About SymphonyAI Industrial

SymphonyAI Industrial, a SymphonyAI business, is an innovator in industrial insight, accelerating autonomous plant operations. The industry-leading EurekaAI/IoT platform and industrial optimization solutions connect tens of thousands of assets and workflows in manufacturing plants globally and process billions of data points daily, pushing new plateaus in operational intelligence. SymphonyAI Industrial solutions provide high value to users by driving variability out of processes and optimizing operations for throughput, yield, energy efficiency, and sustainability.

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