

ENEOS and PFN Begin Continuous Operation of AI-Based Autonomous Petrochemical Plant System

TOKYO – August 07, 2023 – ENEOS Corporation (ENEOS) and Preferred Networks, Inc. (PFN) announced today that their artificial intelligence (AI) system, which they have been continuously operating since January 2023 for a butadiene extraction unit in ENEOS Kawasaki Refinery’s petrochemical plant, has achieved higher economy and efficiency than manual operations.

Jointly developed by ENEOS and PFN, the AI system is designed to automate large-scale, complex operations of oil refineries and petrochemical plants that currently require operators with years of experience.

The new AI system is one of the largest for petrochemical plant operation according to PFN’s research, with a total of 363 sensors for prediction and 13 controlled elements. The companies co-developed the system to improve safety and stability of plant operations by reducing dependence on technicians’ varying skill levels.

Following the successful two-day trial of autonomous operation as [announced](#) in December 2021, the two companies conducted repeated tests for the butadiene extraction unit. During these tests, the AI system continuously monitored 13 key operational factors such as internal temperature, pressure, flow rate and product conditions while it adjusted 9 valves simultaneously. The results showed that the AI system stabilized the whole unit’s operational changes due to material throughput and other factors, and made a significant contribution to its economy and efficiency.

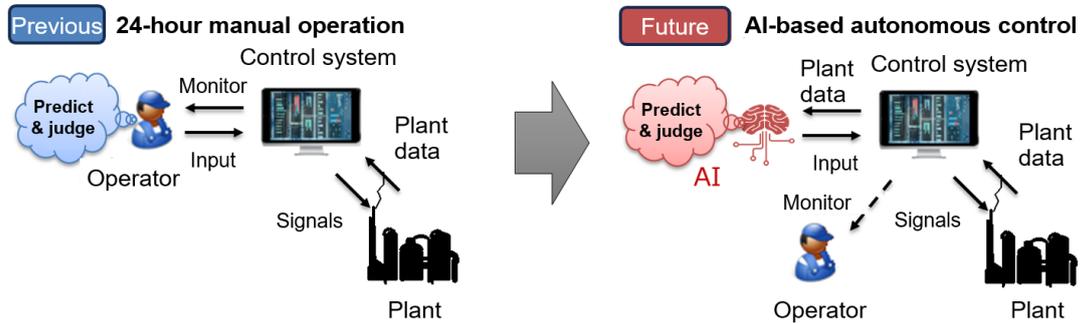
The two companies are also developing autonomous AI systems for atmospheric distillation units and other parts of petrochemical plants in addition to butadiene extraction units, with plans to deploy the systems to other ENEOS refineries and later sell them as a solution package to external parties.

Through this collaboration, ENEOS and PFN will also support the United Nations’ Sustainable Development Goals including Goal 9 (“Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation”).

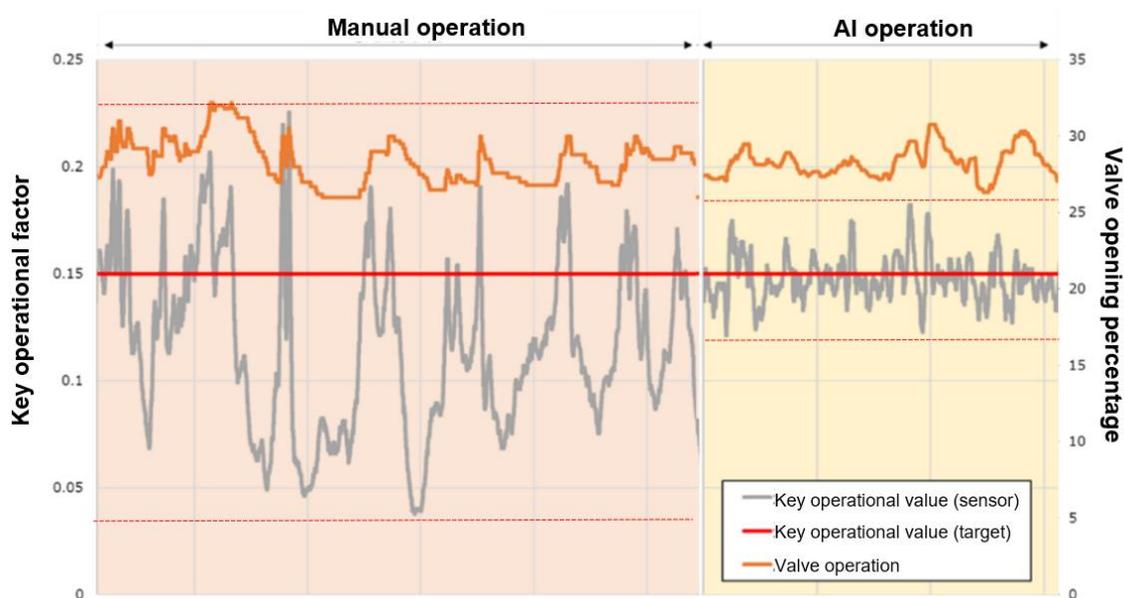
Butadiene extraction unit



AI-based autonomous plant operation



Stability of key operational factor (product property value) achieved by AI-based autonomous plant operation system



The AI system successfully controlled the stability even under external disturbances by maintaining the key operational value close to the target value.

About the ENEOS Group

For ENEOS Group to continue to be a company that society continues to need, we need to respond to the changing world and times in a speedy and flexible manner, and based on our mission of the stable supply of energy, resources and materials, promote an energy transition away from fossil fuels and to contribute to the formation of a decarbonized, recycling oriented society. Through the realization of our Long-Term Vision to 2040, we aim to steadily accomplish these initiatives and maximize corporate value.

About Preferred Networks

Preferred Networks (PFN) was established in March 2014 with the goal to develop practical, real-world applications of deep learning, robotics and other advanced technologies. PFN's business domains include transportation, manufacturing, life sciences, robots, plant optimization, materials discovery, education and entertainment. In 2015, PFN developed Chainer™, the open-source deep learning framework. PFN's MN-3 supercomputer, which is equipped with the MN-Core™ deep learning processor, topped the Green500 list three times in 2020 and 2021. <https://www.preferred.jp/en/>

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