

### CONTEXT

More and more production lines are equipped with comprehensive sensors. The data is collected, processed and stored, but an open challenge remains to draw the full benefit from this rich source of information.

Data, which is often used only for online monitoring, has the unexplored potential to help in many areas. Identifying of root causes for production failures and early maintenance signals, planning, and general process optimization, to name a few.



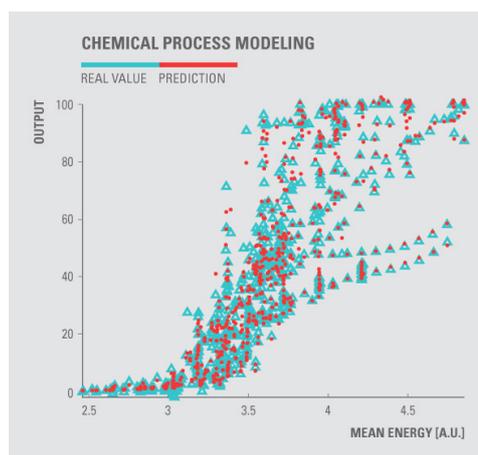
For the above mentioned topics, an algorithmic understanding that takes into account the multitude of real-world effects (e.g. aging, deterioration, noise, changing operating conditions ...) is needed. This very often goes far beyond what can be delivered by parameter fitting of known theoretical models and therefore has to be derived from experimental data that carries the crucial information about the real system behavior.

### RECONSTRUCTION OF SYSTEM DYNAMICS

**Q-USD:** QLAYM UNSUPERVISED SOLUTION DISCOVERY™ was developed by QLAYM as a technology platform to meet such challenges. The data is processed to concentrate the relevant information into a representative system tailored in size to represent all major facets of the actual dynamics. In this process, interference from outliers, faulty data points, and noise is significantly reduced.

### Q-USD™ IN THE FIELD

A series of experiments were conducted to simulate the behavior of an industrial chemical process under real-world conditions. Qlaym was tasked with creating an algorithmic model, based solely on the experimental data. The figure below shows how accurately the resulting system model could predict the output of the underlying process (shown here as a function of the systems mean energy).



*Comparison of the original output and the model for a complex chemical process.*

QLAYM provided a realistic model of the involved dynamics thus enabling realistic simulations of the system.