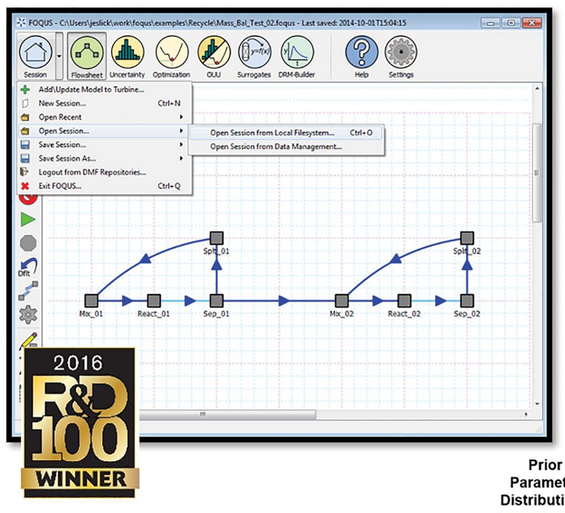
Reducing Technical Risk of Carbon Capture Technology Scale-Up in TCM and NCCC Pilot Campaigns

Better quality data from test campaigns at Technology Centre Mongstad (TCM) and National Carbon Capture Center (NCCC) greatly accelerates commercialization of carbon capture technologies.

CCSI² Carbon Capture Simulation for Industry Impact

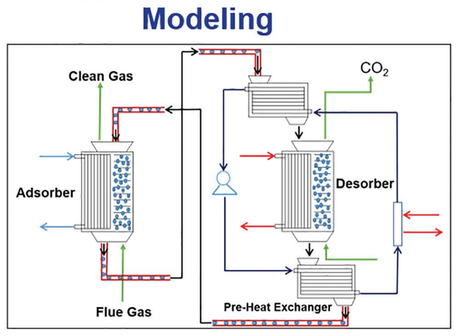
Process Simulators and Modeling Environments

OPEN SOURCE CCSI TOOLSET



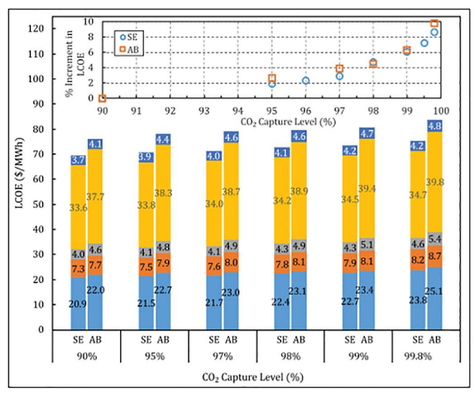
2016 R&D 100 WINNER

High Fidelity Process Modeling

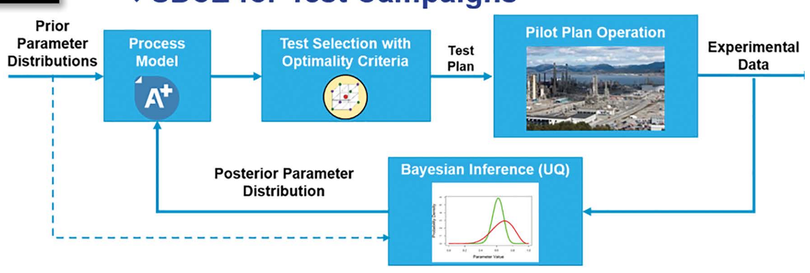


❖Advanced Analysis of Process Systems

TEA Optimization → Uncertainty Quantification → Robust Optimization → SDoE



❖SDoE for Test Campaigns



Better quality data from test campaigns greatly reduces uncertainty (30-60%) of carbon capture predictions over a testing window of weeks, as opposed to years.

CCSI² utilizes cutting-edge computational tools and an integrated modeling hierarchy to examine and mitigate the impacts of process uncertainty. This accelerates carbon capture technology scale-up and deployment and reduces the cost to commercialize.

- Using sequential design-of-experiments (SDoE), the value of the data produced during pilot campaigns is maximized by statistically comparing model predictions to real-time data, with discrepancies systematically informing which subsequent test runs will most effectively improve predictive capabilities.
- Results of open pilot campaigns suggest that using SDoE can avoid uninformative test runs and therefore eliminate years from conventional pilot timelines, with commensurate savings in budget, to accomplish the same improvement in knowledge gained.Pilot test campaigns that included CCSI² involvement: test campaigns at NCCC for PNNL's novel solvent system, TCM for Research Triangle Institute's novel non-aqueous solvent system, Nucor facility for University of Kentucky's novel solvent system, and TCM for NETL membrane testing.

DOE PROGRAM

Point Source Carbon Capture

NETL PARTNERS

Pacific Northwest NATIONAL LABORATORY

BERKELEY LAB

Lawrence Livermore National Laboratory

Los Alamos NATIONAL LABORATORY

Carnegie Mellon University

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