High-Fidelity Modelling and New Technologies to Reduce Inhibitor Injection Requirements for Long Subsea Tiebacks

Bruce Norris [C, S], David Zhu, Eric May and Zachary Aman

Fluid Science & Resources Cluster, Department of Chemical Engineering, The University of Western Australia, Crawley, WA, Australia

bruce.norris@uwa.edu.au

The future of energy exports will increasingly be intertwined with the ongoing push for emissions reduction, where modern LNG and future hydrogen systems will begin to replace more traditional fuel sources. Western Australia is well positioned to be at the forefront of this revolution, where our abundant reserves may be exploited to enable fuel replacement for our major trading partners. To produce these assets, a new generation of production systems are needed, where long subsea tiebacks will form the transport backbone to supply onshore facilities with feedstock.

Design of these systems has typically relied on the use of thermodynamic inhibitors such as MEG to prevent hydrate formation, where the ability to optimise or reduce the volume of inhibitor will be key to the economics of new developments. This will require deployment of a new suite of high-fidelity modelling and analysis technologies to accurately predict fluid behaviour in flowlines. In this work we demonstrate how a new set of multiphase tools allow us to interrogate hydrate formation margins, where they may be tailored for specific systems.

In addition to optimising existing developments, these new tools will be particularly useful in evaluating a suite of new subsea production technologies. These range from advanced smart sensors and new pipeline materials through to novel subsea processing methods, distributed renewable offshore power, local chemical storage and next generation green inhibitors. While the immediate goal is MEG dosage optimisation, further technological gains may enable inhibitor free operation to fuel an affordable clean energy future.