The Institution of Engineers, Malaysia

**WEBINAR**
**PRE - AGM TALK**

BEM APPROVED CPD HOURS: 1.0
REF. NO.: IEM21/HQ/354/T (w)

# DEVELOPMENT AND IMPLEMENTATION OF AI-DRIVEN LIVE ADVISORY FOR LNG PLANT START-UP

## SATURDAY | 18 SEPTEMBER 2021
## 11:30AM - 01:30PM MYT

Organised by
CHEMICAL ENGINEERING TECHNICAL DIVISION

**SPEAKERS:**
**Ir. Dr. Chan Tuck Leong &**
**Mr. Lee Kian Seng**

**Register online at www.iem.org.my**

MyIEM HQ | MyIEM HQ Official - General | myiem_official

**REGISTRATION:**
**IEM Members: RM15**
**Non-IEM Members: RM70**

# SYNOPSIS

**LNG plant start-up is a challenging process that requires simultaneous control and monitoring of different units. Any wrong decision or miscommunication could cause delays to rectify issues, costly maintenance and loss of production opportunity. Typically, different panel operators have different approaches to start-up the plant based on their individual experience and tacit knowledge, yielding varied results. To capture the valuable tacit knowledge from experienced operators and leverage on data insights from over two decades of operating the facilities, an AI-driven live advisory was developed to provide panel operators with real-time parameters control advisory in response to actual unit conditions, enabling consistent and optimised plant start-up.**

**Combination of machine learning algorithms was used to learn from historical data of over 180 million data points from around 400 sensors readings for the past 17 years. The model built predicts the main cryogenic heat exchanger (MCHE) temperature profile with respect to input parameters. The predictive model is then augmented with optimisation algorithms to generate real-time advisory of the parameters control that would result in optimum cooling down of MCHE, given the actual state of the plant. Inputs from experienced panel operators and engineers were also codified in the algorithms to ensure the advisory generated is feasible considering process and equipment limitations.**

**The solution was deployed to two actual start-ups of in PETRONAS LNG Complex (PLC), successfully reducing the pre-cooldown duration by 40%, which translated into more than 4 million USD in production value, yielding an impressive ROI of above 10 in the same year. These start-ups also emerged as the top executions when benchmarked against all historical start-ups in the past 17 years using well-established criteria. Backed up by the success story, this innovative solution is being scaled up to all 9 trains in PLC and eventually to other LNG and gas plants in PETRONAS.**

# ABOUT SPEAKERS

**Ir. Dr. Chan Tuck Leong** is one of the Digital Accelerators in PETRONAS. He currently leads the digital program that aims to improve safety, reliability and efficiency of operating plant facilities. He and his team partner with the businesses to pilot and scale digital initiatives and more importantly, introduce and embed new ways of working. Dr. Chan holds a PhD in Chemical Engineering and is a registered Professional Engineer with the Board of Engineers Malaysia.

**Mr. Lee Kian Seng** is currently a product manager in Digital Portfolio, Group Digital, PETRONAS. He was a visiting scholar of Erasmus Mundus Masters in Vision and Robotics in France and had presented numerous research papers on autonomous drone control at international conferences in Europe and Asia. After joining PETRONAS, he led multiple big data analytics projects for refinery, petrochemical and LNG plants in the domain of production yield optimization, energy optimization and plant start-up execution, which had successfully realized millions in business value for the organization. He also contributed in designing and building enterprise data platform to accelerate the monetization of data for PETRONAS.