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# Smart Gas Production System Optimising Gas Delivery for Sarawak

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### Abstract

The Smart Gas Production System (SGPS) is an integrated production system model of the offshore Malaysian Sarawak gas production network. The model combines reservoir, wellbore and surface network information to optimise gas production to the onshore processing facilities at Bintulu. The unique feature of the model is it also takes into consideration the gas demand for the overall network as well as requirements of the individual gas contracts. This paper will concentrate on the features of the integrated model, complexities of the Sarawak production system and how the model is used to meet LNG delivery demand.

The model is used by the Reservoir Management Team to optimise production of the fields, as well as by the Production and Programming Team to produce short term and medium term gas production forecasts. The shutdown and maintenance activities are incorporated into the forecasting model which then optimises production from the on-stream wells and fields over a number of time steps. This workflow ensures correct scheduling of platform shutdown activities to minimise gas deferral and maintain gas delivery according to the demand.

Demand for LNG is increasing and therefore the pressure to increase output from the Sarawak production network is also increasing. Optimisation of the network is vital to deliver year on year increases in the number of LNG cargoes whilst sustaining maintenance activities, all within the same 365 days. The SGPS model provides optimisation of the network to assist in meeting the delivery targets to maintain the reputation of Malaysia as a consistent and reliable source of energy.

The development of fields and energy supplies is becoming more complicated. More difficult, high CO<sub>2</sub> and H<sub>2</sub>S gas is being developed in Sarawak requiring offshore blending to ensure the gas is delivered to Bintulu within specification. Integrated modelling is a key element to deliver targets taking into consideration contractual agreements, gas demand, gas quality and maintenance activities. The model requires teamwork and discipline integration to extract the best from the production system and the best for Malaysia.

### Introduction

The Sarawak Gas Asset supplies gas to three LNG plants at Bintulu (MLNG-1, 2 and 3) as well as to the Shell Middle Distillate Synthesis plant (gas to liquids plant), electricity supplier (SESCO), fertiliser company (ABF) and domestic customers. The Asset operates 11 producing fields which are 120 to 280 kilometres offshore. Over 70 wells supply at peak capacity approximately 4Bscf/d to the LNG plants through more than 900 kilometres of offshore pipelines.

The gas and condensate from the fields is dehydrated at the main platform hubs. The water is reinjected into aquifers, or cleaned and disposed overboard. The gas from lower pressure fields may undergo booster compression before arriving at a hub and being mixed with other fields. The hub gas is generally compressed (but not at all hubs) and exported along with the condensate in the two-phase pipelines to shore.

Production is regulated under Production Sharing Contracts (PSC) which stipulate the nominated plant to which the gas is to be sold. The PSCs have different partners, equity splits and expiry dates. There are also borrowing agreements which allows gas to be redistributed between the LNG plants to maximise plant utilisation and gas production.