Total E&P Qatar seeks to constantly improve its operations performances. These performances are associated with such indicators as health, safety & environment (HSE) performance, oil production, water management, production costs and energy efficiency. A key tool for reaching this goal is the enhancement of data monitoring and management technology. The smart metering pilot project is run at Total Research Centre - Qatar (TRC-Q) at Qatar Science and Technology Park in close cooperation with Total E&P Qatar Operations and TOTAL Research in France.

At TRC-Q, we are testing a game-changing technology based on data validation and reconciliation (DVR). We integrate real-time measurements and virtual metering in an online monitoring system on our production platforms. The originality compared to equivalent systems is the use of the DVR approach, which consists of using a statistical model to manage uncertainties associated with each measured parameter and of quantifying error propagation. The DVR process allows an automatic real-time correction of both measurements and model parameters, on the basis of their allocated uncertainty and thanks to the information redundancy. Consequently, the resulting output data is more consistent with the available data and associated with a reduced uncertainty. So, for the DVR to be effective we seek to increase the data redundancy and provide high-quality modelling of physical and thermodynamic phenomena occurring over the whole production process.

The achievement so far is a pilot hourly metering system based on online measurements. These measurements and modelling parameters are automatically linked on the basis of their redundancy and the Operations Department is provided with a customised report containing the corrected parameters and their associated uncertainties. We also keep looking for new relevant information to incorporate into the system and for improvement in the quality of the mathematical model associated with each equipment (pumps, flow meters, etc.) model in order to improve the reliability of the output. The results that will be presented cover the initial promising results of the pilot for the virtual metering of oil, water and gas production and the associated uncertainty quantification.