



## Case study

# PRISMIC<sup>®</sup> ECPMS on world's largest ultra-deepwater & CCUS project

## #1

Largest ultra deepwater field

Largest Carbon Capture Utilisation & Storage project

## 180,000

Barrels per day oil production capacity

## 7,200,000

M<sup>3</sup> per day gas processing capacity

### Energy Transition

Supporting a major South American company in their mission to transform the petroleum and gas industry, PRISMIC<sup>®</sup> ECPMS was selected to ensure reliable supply of power for this project, cementing a relationship with the customer going back over a decade.

Ambitious targets include a forecast production output of 2 mmbbl per day by the year 2030 from extensive offshore opportunities in the pre-salt Santos basin.

With a total of 12 FPSOs planned, this platform will be the sixth to be deployed with another 6 in construction for delivery by 2027.

### The Challenge

Located in the largest deepwater oil field in the world, 230km offshore at drilling depths over 2000m, the FPSO is truly an exceptional project. 13 wells will be interconnected to the platform, 6 of them producers and 7 injectors, through a subsea infrastructure composed of rigid production and injection pipelines and flexible service pipelines.

Power reliability is critical to the platform, which boasts world-leading emission reducing technologies. Two trains with aeroderivative gas turbines drive centrifugal compressors to reinject CO<sub>2</sub> back into the reservoir. This ensures efficient operation and carbon capture with the reinjection technologies minimising emissions and reducing gas flaring.

Compression of the main gas, export gas and injection gas is provided through eight trains of compressors driven by an electric motor.

The Electrical Control and Power Management System is required to manage the power supplied by four sets of gas turbines and also control the extreme high load required at startup.

In addition to providing critical power to production equipment, a hotel load supports the living quarters comprising the control rooms, temporary refuge, emergency safety systems, offices, dining & recreation lounges for 240 personnel.

# PRISMIC® Electrical Control & Power Management System

## Solution

### Custom programmed

The PRISMIC® ECPMS was programmed to the specific needs of the platform, leveraging decades of subject matter expertise with FPSO requirements.

### Reliability

Reliable supply of power and power quality to all systems operating on the platform is ensured by a configuration that proactively identifies potential issues.

### Redundancy

A hot standby controller ensures redundancy and provides assurance that mission and safety critical systems remain operational at all times.

### Rapid calculations

The processor-based solution ensures rapid calculation of algorithms and delivers intelligent load shedding, at an industry leading response time exceeding the performance requirements of the customer.

### Field Forcing

The extreme loads at compressor train start-up were managed by implementing field-forcing technology. This requires in-depth knowledge of generator system design, providing pre start-up voltage boosting by modifying the performance of the generator's excitation systems

### Simulator

The PRISMIC® ECPMS simulator allows for pre-despatch configuration and testing as well as scenario-modelling for load or power generation disruptions and for use in training programs.



### Power generation

- 4 off 13.8kV Topside Gas Turbine Generators
- 2 off 6.6kV Hull Diesel Generators

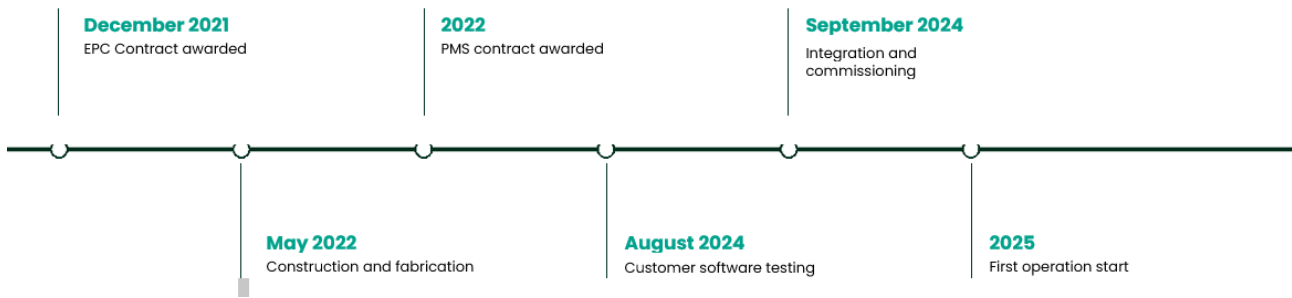
### Functionality

- Redundancy / Hot standby
- System voltage and frequency control
- Active and reactive load control between generators
- Generator starting and stopping – Manual from the HMI (Human Machine Interface)
- Fast Acting Load shedding
- Large motor start inhibits (MW & MVAR spinning reserve)
- Pre-Start Voltage Boosting (Field Forcing)
- Turbine capability & Step Load Limit
- Group Synchronizing (Semi and Fully Automatic)

### Communications:

- Modbus TCP (Client & Server)
- IEC61850 (MMS)
- OPC UA
- SNMP
- Microsoft RDP interface to ECPMS Panel HMI





## Project overview

### Close co-operation in contract execution

In 2021 the customer awarded a \$2.3 billion contract to build the floating production, storage, and offloading vessel.

Construction began in 2022, the design leveraging advanced engineering with topside modules fabricated in Singapore, China, and Brazil.

Having previously worked with PRISMIC® ECPMS for four of the customer’s existing FPSOs, early conversations took place to identify ways that the unique challenges of the project could be addressed.

A contract for the PMS was awarded in 2022 and a project team assigned with weekly update meetings to ensure smooth execution of the contract.

Several challenges with component availability as a result of the 2020–2023 global chip shortage were overcome by close communication, pragmatic problem solving and re-engineering where required.

The final construction of the FPSO involves the transportation of multiple modules from global locations, with integration and commissioning occurring offshore Brazil in 2024.

## Benefits

### A strong partnership delivering reliable power

The PRISMIC® ECPMS solution was delivered on time and to budget with the customer software test taking place at the Ashby facility in August 2024.

Positive feedback from the customer and the EPC was given at the acceptance test, validating the hard work by the teams in delivering this challenging project.



The project further cements a strong relationship between the BRUSH Power Generation team and the customer with PRISMIC® ECPMS in reliable service on the customer’s FPSOs for over 15 years.

With an ongoing commitment to the sustainable development of the Santos basin, further orders for PRISMIC® ECPMS have been received for the next two platforms in the customer’s expansion program.



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