



PRELUDE FLNG

AN AUSTRALIAN GAS PROJECT

THE PROJECT

Prelude is a floating liquefied natural gas project located approximately 475km north-north east of Broome in Western Australia. The Prelude project is the first deployment of Shell's Floating Liquefied Natural Gas (FLNG) technology, which will see a giant floating facility extracting, liquefying and storing gas at sea, before it is exported to customers around the globe.

The Prelude FLNG facility is currently under construction and commissioning in Geoje, South Korea. The next phase of the project will see Prelude towed to the gas field, where further hookup and commissioning activities will be completed. The Prelude FLNG facility will produce 3.6 million tonnes per annum (mtpa) of LNG, 1.3 mtpa of condensate and 0.4 mtpa of LPG. The Prelude FLNG facility is 488m long and 74m wide, making it the largest offshore floating facility ever built.

A team of between 120-140 people will work on board Prelude during operations. The project will also be supported by teams and contractors across Perth, Darwin and the Kimberley – providing long-term steady Australian jobs both directly and indirectly. Approximately 100 contracts are required for Prelude's operations and maintenance and a majority of these have been awarded to local companies.

The Prelude FLNG facility will be operated by Shell in joint venture with INPEX (17.5%), KOGAS (10%) and OPIC (5%).

FLOATING LIQUEFIED NATURAL GAS

Floating LNG consolidates the traditional offshore to onshore LNG infrastructure into a single facility that is based over the fields. The FLNG facility gathers, processes, stores and offloads natural gas and condensate products at sea.

FLNG removes the need for pipelines to shore, dredging and onshore works and therefore significantly limits the disturbance to the surrounding environment and in the right conditions, reduces development costs. It is also a competitive solution for fields like Prelude, that are very remote and hard to access.

The Prelude FLNG facility will be moored near to the Prelude field location in 250 metres of water, by four groups of mooring chains. Each mooring chain will be held to the sea floor by piles. The facility has been designed to withstand severe weather, including up to a '10,000 year' storm, and will remain onsite during all conditions. Seven production wells will feed gas and condensate from the reservoirs via four flexible risers into the facility. All subsea connections join the facility via the turret. The turret's swivel design enables the facility to pivot according to wind and sea conditions while it remains fixed to the sea floor.

The Prelude FLNG facility has thrusters to ensure it remains steady during production and offloading, but it is a fixed facility, with no means of propulsion. The management of subsea wells and manifolds is carried out via umbilicals connected through the turret to the control room on the facility.

The processing of gas and condensate occurs in modules onboard that occupy an area approximately one quarter the size of a typical onshore LNG plant. Shell's Dual Mixed Refrigerant (DMR) process is used to liquefy the gas. Prelude's LNG and LPG will be offloaded via a side by side vessel configuration using specially designed cryogenic loading arms. Ships will load condensate from the rear of the facility using a floating hose arrangement. The products will then be shipped directly to customers around the world.

Safety of the FLNG facility has been paramount during its design, and its safety profile is predicted to be inline with modern offshore oil and gas facilities. The FLNG design has gone through extensive testing programs and simulations to ensure it has the ability to remain connected and moored to the sea floor throughout all weather conditions.



RT Roebuck Bay, Infield Support Vessel



CHC Helicopters



Skandi Darwin, Platform Supply Vessel



Collaborative Work Environment, Perth



PRELUDE LOCATIONS

BROOME

Prelude FLNG will be located 475km North-North East of Broome. The town of Broome will serve as a base for aviation and marine services for the project. Personnel will fly to and from the FLNG facility on helicopters that leave from the Broome International Airport. For the outbound flights, this will include a refuelling stop at the Djarindjin Airport on the Dampier Peninsula. These helicopters are being operated by CHC Helicopters.

Once the facility is towed from South Korea to the Prelude location, Shell will complete the hook-up and commissioning phase of the project. This will see a higher volume of people and helicopters leaving Broome. When Prelude is operating, there will be approximately four helicopter flights from Broome per week.

KT Maritime will operate three infield support vessels (ISVs) out of the Broome port. The 42 metre-long vessels will support the berthing and loading of the LNG, LPG and condensate carriers who transport the products to customers. They will also provide emergency response capability. The Prelude ISVs were named; RT Roebuck Bay, RT Kuri Bay and RT Beagle Bay by a St Mary's College student as part of a community competition.

KT Maritime has contracted the manning, operation and routine maintenance of the ISVs as a partnership model which has created over 50 maritime roles for Australians. Five of these roles are based in Broome.

DARWIN

Prelude's Darwin Onshore Supply Base is now operating, housing equipment and spare parts for the project under the management of contractor ASCO. Equipment from the facility requiring overhaul or repair will either be sent to workshops in Darwin or to specialists interstate and overseas.

A multi-purpose platform supply vessel, the Skandi Darwin, will be based in Darwin and will make weekly trips to the facility. The vessel will deliver supplies to Prelude and will also support Prelude's subsea inspections and maintenance – a critical part of ongoing operations.

Contractor Monadelphous will also provide maintenance, brownfield modifications and turnaround services for Prelude from a fabrication shop based in Darwin.

PERTH

Shell's Perth headquarters houses the Prelude Collaborative Work Environment (CWE), a state-of-the-art operations floor that will support the Prelude facility 24 hours a day. The CWE is already providing surveillance and monitoring activities to the shipyard in Geoje.

OFFSHORE

Perth based contractor Sodexo will oversee the accommodation management, waste management, house-keeping and laundry services for Prelude FLNG, as well as technical and administration support and the implementation of a wellness program on-board.



Rusca Environmental Solutions is a 100% Indigenous owned business based in the Northern Territory that was awarded the waste management services contract for Prelude FLNG.



Training at the Australian Centre for Energy and Process Training at South Metropolitan TAFE (hosted by ERGT Australia).

PRELUDE PEOPLE

Between 120-140 Shell personnel and contractors will work on the Prelude FLNG facility during normal operations. Offshore staff will work on a fly-in, fly-out roster, meaning there will be a team of about 250 in offshore roles. During heavy maintenance periods, up to 300 people may be required to work on board the facility.

150 Australian production technicians are currently based in the Samsung Heavy Industries shipyard in Geoje, South Korea. This team is supporting the commissioning of the facility, preparing the systems and processes for operations and maintenance and they will be working on the facility once it arrives in Australian waters.

PRELUDE PRODUCTION TECHNICIAN TRAINING

Through a partnership with South Metropolitan TAFE in Western Australia, Shell Australia has developed specific FLNG technician training to ensure Prelude personnel have the skills to operate Prelude safely and efficiently.

Via this partnership, the Australian Centre for Energy and Process Training at South Metropolitan TAFE has delivered relevant training to the 150 Prelude technicians across a broad range of critical skills and competencies.

In addition, the Prelude FLNG project is participating in the Energy Apprenticeships Group (EAG), which is an industry collaboration across Shell, Woodside, Quadrant and Vermillion with the objective to recruit and train local apprentices. Now in its second year, Shell is sponsoring six apprenticeships including two apprenticeships from Broome.

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The 2017 Prelude to the Future participants.

PRELUDE IN THE COMMUNITY

Prelude FLNG will rely on onshore services to support its operations. Most of these services will be managed via locations in the Kimberley region and Darwin.

Since 2008, Prelude FLNG has partnered with not-for-profit organisations in both the Kimberley region and Darwin to support the local communities. The Prelude FLNG social investment portfolio aims to build the capabilities of local people who face challenging barriers and improve employment opportunities. Prelude's current Social Investment partners include:

KIMBERLEY LAND COUNCIL BARDI JAWI OORANY (WOMEN) RANGERS

The women rangers undertake activities to support the *Bardi Jawi Healthy Country Plan* on the Dampier Peninsula and skills development is a core component of the project.

KIMBERLEY INSTITUTE

The Kimberley Institute has developed a Collaborative Community Investment framework (known as The Broome Model) that will be taken to corporate and philanthropic investors and potentially underwritten by Government, as a collaborative proposal to address social issues in the region.

NIRRUMBUK ABORIGINAL CORPORATION

Nirrumbuk is leading a strategic partnership of Indigenous organisations to deliver trades based training and employment outcomes to 30 young Indigenous people from the Broome, Dampier Peninsula and Bidadanga communities.

PRELUDE TO THE FUTURE

Prelude to the Future is a Darwin based program that supports Territorians through a traineeship or apprenticeship and into employment. To date 80% of the 38 participants have maintained ongoing employment. Prelude to the Future is a four-way partnership between Shell Australia, the NT Government, Group Training NT and Charles Darwin University.

NORTHERN REGIONAL TAFE SCHOLARSHIPS

Shell supports a scholarship program with the Northern Regional TAFE, based in Broome. The program provides up to \$2,000 for 12 scholarship recipients to encourage Broome residents to undertake vocational training.

WORK INSPIRATIONS BROOME

Shell and INPEX jointly coordinate a Work Inspirations program for Broome high school students which provides awareness of the opportunities in the oil and gas sector, including indirect employment.

FIBRE OPTIC CABLE

The subsea fibre optic cable system, a partnership between Shell, INPEX and Nextgen, will provide the Ichthys and Prelude FLNG projects with access to reliable and high-speed data and voice communication services for the life of operations.

This capability not only provides a high quality connection to onshore support locations and teams, it also will allow those working on the facility to keep in touch with family and friends in real time, via a high-speed internet connection.



WANT TO SUBSCRIBE FOR UPDATES ON PRELUDE OR TO FIND OUT MORE?

Email 'subscribe' to SDA-preludelfng@shell.com

Prelude Community Hotline - 1800 059 152

Website: www.shell.com.au/prelude

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