Lattice Energy values stakeholder consultation and feedback and it is an important part of the process of preparing Environment Plans. This information sheet has been prepared to inform stakeholders, invite feedback and seek consultation with those who may be affected by or who have an interest in the seabed site assessments and drilling program.

**Background**


The Otway Gas Plant operated by Lattice Energy is a major contributor to Victoria's gas market. Lattice Energy is planning to carry out further activities in the Otway Basin to ensure continued production at the Otway Gas Plant, which will help ensure gas supply for Victorian households and businesses. Three development phases have been completed to enable production at the Otway Gas Plant: construction of the gas plant; construction of the Thylacine offshore platform; and the development of the currently producing gas wells. To maintain gas production, a fourth phase to develop additional offshore wells is being planned.

The unique geological characteristics of the Otway Basin mean it is an abundant source of natural gas which has been produced in the region for many years. Further offshore drilling is being planned for the Otway Gas Development and this information sheet provides an overview of the proposed activities, the regulatory framework for safety and environment protection, potential impacts and risks in carrying out these operations, and measures to reduce and manage these, in accordance with Commonwealth regulations.
Otway Gas Development
Seabed Assessment and Drilling Program

Legend

- **Bathymetry**
- **Gas field**
- **Production facility**
- **Gas pipelines**
- **Marine Reserves Collaborative Australian Protected Area Database (CAPAD) Area**
- **Proposed seabed site assessment, appraisal wells, and production well drilling areas**
- **Proposed seabed site assessment and exploration well drilling areas**

(Final seabed site assessment locations to be confirmed)
Overview of activities
As part of the fourth phase, in mid-2018 Lattice Energy plans to drill up to seven wells in various locations in the offshore Otway Basin. These wells include one proposed production well, three appraisal wells and three exploration wells. This work is expected to be completed by early 2019 depending on weather and sea conditions.

Prior to commencing drilling activity, Lattice Energy plans to carry out seabed site assessments in early 2018 to determine the suitability of the seabed conditions for drilling operations.

Lattice Energy will submit an Environment Plan for the seabed site assessments and a separate Environment Plan for the drilling program for approval by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA), the Commonwealth body which regulates gas exploration and production activity.

Locations
All work will take place in Commonwealth waters between 15 and 80 kilometres south of Port Campbell, within existing Commonwealth offshore exploration permits and production licences. There will be up to seven locations of approximately 4 x 4 kilometres. Exact locations of three seabed assessment and drilling areas may vary after completion of planning. Exact coordinates of all well sites will be confirmed after completion of the seabed site assessments. Refer to map for indicative locations.

Project timeline
This diagram shows the current proposed timeline for the Otway Gas Development seabed site assessment and offshore drilling program. This timeline is up-to-date at August 2017 and is subject to change.
Environment protection

Lattice Energy recognises and values the important ecosystems, heritage, social and economic values in the communities in which we operate.

The environment is characterised by:

- Water depths ranging from 60 metres to 200 metres
- Periods of rough sea state and high energy waves
- A variety of marine fauna including the potential presence of:
  - Blue whales, humpback and fin whales, particularly during the summer months
  - Southern right whales and minke whales, particularly during the winter months
  - Common dolphins and sharks species throughout the year
  - Foraging leatherback New Zealand and Australian fur seals throughout the year
  - Foraging leatherback turtles throughout the year
  - Commonwealth Marine Reserves: Apollo to the east; and Zeehan to the south of the well site areas
  - State Marine Reserves: Twelve Apostles Marine National Park; and the Arches Marine Sanctuary to the north of the well site areas
  - Commonwealth managed fisheries, including: southern and eastern scalefish and shark; and southern squid jig fishery
  - Victorian managed fisheries, including: rock lobster and giant crab
  - Significant commercial shipping activity.

Lattice Energy is in the process of developing two Environment Plans (one for site assessment and one for drilling) which must be approved by NOPSEMA before any works can commence. Each Environment Plan will be a comprehensive document that details the existing environment and how we will conduct all of the activities to avoid, minimise or manage any potential environmental risks to the “As Low As Reasonable Practicable” standard (ALARP). All activities will be conducted to industry best practice standards and carried out in accordance with all relevant Commonwealth and State safety and environmental legislation and regulations.

In developing the Environment Plans, relevant up-to-date technical studies will be taken into consideration, along with stakeholder feedback.

When conducting offshore activities, although it is unlikely, there is always the risk of an oil spill. Therefore, Oil Pollution Emergency Plans will be included in each of the Environment Plans. Preparing an Oil Pollution Emergency Plan involves completing an oil spill modelling study for the local area using advanced three-dimensional modelling. The modelling calculates the transport, spreading, entrainment and evaporation of spilled hydrocarbons over time, based on the prevailing wind and current conditions and the volume and physical and chemical properties of possible spills from a vessel, pipeline or well. The plans also assess the likelihood and consequences of any oil spill which must be reduced to ALARP through a range of control measures, and include detailed response plans.

Further information on the environmental requirements for offshore natural gas drilling may be found on NOPSEMA’s website: www.nopsema.gov.au

An example of a survey vessel used in seabed site assessments. Image used with permission of EGS Survey.
Consultation

Lattice Energy values stakeholder consultation and feedback, and it is an important part of preparing our Environment Plans for approval. The purpose of consultation is to understand how different stakeholders’ functions, interests and activities may be affected by the seabed site assessments and drilling program.

Lattice Energy will consider all feedback, including any concerns and objections. Measures will be explored to reduce any impacts and risks, and responses will be provided to stakeholders. All feedback will be considered alongside technical and environmental assessments as the Environment Plans are prepared for approval.

Maritime safety

The marine vessels involved in the activities will operate in accordance with Australian Maritime Standards, regulated by the Australian Maritime Safety Authority (AMSA). This includes adherence to the following protocols at sea:

- Notifications to AMSA will be issued by the survey vessel contractor and drilling rig operator before it mobilises to the permit areas, and before it demobilises
- Communication with other vessels and water users will occur using standard maritime protocols
- Safe operating distances will be maintained around all vessels at all times

Exclusion zones

During the seabed site assessments a safe operating zone will be in place for all vessels. The safe zone will apply to each 4 x 4 kilometre assessment area, three to five days at a time, depending on weather conditions. Vessel-to-vessel communication will also be in place during the survey period. Commercial fishers who may operate in the area will be informed of the locations and requested to avoid the area.

When the drilling rig has been mobilised, all vessels will be required to avoid a declared exclusion zone of 500 metres around the drilling rig. This formal exclusion zone will be communicated via a ‘Notice to Mariners’ placed with AMSA outlining the exclusion zone and timeframe for works. The exclusion zone will be monitored by supporting vessels that will remain in the area once the drilling rig is anchored into position.

Lattice Energy will consult with commercial fishers on arrangements to ensure each other’s operational plans are understood, helping to minimise any impacts to fishing activities and to the seabed site assessments.

The Thylacine platform in the offshore Otway Basin (showing drilling rig and tug boats in the background).
Seabed site assessment phase

Objective
The objective of the seabed site assessments is to determine suitable locations for anchoring and rig placement for drilling operations. Various techniques such as the use of echo sounders and sonars will be used to study the seabed and identify possible hazards from man-made, natural and geological features.

Timing
Each seabed site assessment will take around three to five days, depending on weather conditions. Work is expected to start in early 2018 with the exact date depending on regulatory approval, contractor availability and fair sea state conditions. The whole assessment process is expected to take around four to six weeks.

Approach and equipment
Seabed site assessments use a variety of methods to:
- Map the seabed and features immediately underneath it
- Accurately measure water depth and topography across the seabed
- Identify any objects on the seabed which may compromise the positioning of a drilling rig.

During the seabed site assessment, the survey vessel may use a range of equipment, such as:
- Single-beam dual-frequency echo sounders, to measure water depths
- Motion-corrected multi-beam echo sounders, to conduct bathymetry mapping of water depths
- High-resolution side scan sonars, for delineating seabed features
- Sub-bottom acoustic profilers, used to acquire and assess features just below the seabed
- Marine magnetometer, to detect and map ferrous objects such as sunken ships, anchors, and pipelines.

There is a range of commonly used techniques and equipment suitable for different marine environments, and these will be finalised once a contractor is appointed. The diagram below shows a common set-up.

Once the seabed site assessment data has been gathered, it will be analysed to provide detailed information of any constraints to potential future drilling activity.

As part of developing the Environment Plan for the seabed site assessments, Lattice Energy will undertake sound and frequency modelling in order to identify any possible impact the assessment techniques and equipment may have on marine life and the local habitat.

Common site assessment equipment. Source: Innerspace Exploration Team
The offshore Otway Basin gas exploration and development program will drill up to seven wells using a contracted semi-submersible drill rig.

Three different types of wells are proposed as part of the drilling program:

**Exploration well**
- The first well drilled into a prospective gas reservoir to prove if hydrocarbons exist. Up to three exploration wells are proposed and if successful they may be accessed in the future.

**Appraisal well**
- Drilled to enable a more accurate estimate of the gas reservoir capacity, well productivity and hydrocarbon properties, then either developed as a production well in the future or abandoned.
- Up to three appraisal wells named Thylacine North, Thylacine West and Geographe-4, are proposed in the drilling program.

**Production well**
- A well that has successfully reached a proven reserve and will supply raw gas for processing. The Geographe-3 well is the only proposed production well as part of this drilling program.
- A small tie-in would be constructed from the well to an existing subsea pipeline, which crosses the shore near Port Campbell and connects to the onshore gas pipeline (PL250) through to the Otway Gas Plant.

**Timing**
- The offshore Otway Basin drilling program is planned to start in mid-2018, with the exact date dependent on financial investment decision, regulatory approval, contractor availability and fair sea state conditions.
- It is expected that the drilling rig will operate at each individual well site for between 30 and 40 days. For the Geographe-3 production well, this will take between 70 and 80 days.
- The whole drilling program will take approximately five to nine months to complete.

**Approach and equipment**
- A semi-submersible drilling rig will be used to drill each well.
- Broadly, the steps involved in mobilising the drilling rig and drilling a well include:
  - Using up to two tugs to tow the rig into place using designated shipping channels where possible
  - Anchoring the rig to the seabed at sites that are environmentally and physically suitable, determined from the seabed site assessment
  - Drilling the well to access the gas reservoir beneath the seabed
  - Moving the rig from one well to the next at the completion of each drill and repeating the anchoring and drilling process
  - Towing the rig to an agreed demobilisation point once all wells have been drilled safely and successfully.

- Vertical Seismic Profiling is an evaluation method that may be used for one of the wells after it is drilled.
- This technology produces a high-resolution image of the geology of the well, and enables the well data to be matched to existing seismic data. The technology works by using a small seismic energy source generated near the well to travel to a receiver placed down the well. The sound energy is approximately 1/8 lower than conventional 3D seismic surveys.
- Nevertheless, sound modelling of drilling activities will be carried out to develop a comprehensive noise impact assessment for inclusion in the Environment Plan, along with any mitigation and control measures that may be required.
Drilling operations

Offshore drilling typically uses water based mud and non-aqueous drilling fluids to lubricate and stabilise the wellbores at different drilling sections (depths).

Water based mud will be used in the upper drilling section and produces extracts of sedimentary layers called cuttings. These cuttings will not require any treatment and will be deposited onto the seabed.

Non-aqueous fluid will be used in the lower drilling section and produces cuttings that will require treatment as the fluid used has a mineral base. The cuttings will be processed on the drilling rig before the residual cuttings will be returned to settle rapidly on the seafloor around the well site. The cuttings will contain small levels of base fluid, which will quickly biodegrade.

Lattice Energy will commission cuttings modelling to enable a full impact assessment and control measures for inclusion in the Environment Plan to be assessed by the regulator.

Offshore drilling also requires the installation of some equipment to stabilise the drilling rig. Prior to drilling, a surface hole on the seabed will be constructed and equipment such as a marine riser and blow out preventers will be installed in order to prepare for drilling the reservoir.

Once the drilling of a well is complete, the well will start to produce gas to be piped to shore (a production well) or cased and suspended for future access (exploration and appraisal wells).

How it all works

1. Rig towed to site
2. Anchors laid on seabed
3. Surface hole constructed (drilled and cased)
4. Marine Riser and Blow Out Preventers (BOP) run to seabed
5. Drill and construct well to gas reservoir
6. Well suspended or abandoned and rig towed away

An outline of the drilling process that will be used in the offshore Otway Basin drilling program
Frequently asked questions

Why was this area chosen for gas exploration and development?

Lattice Energy holds exploration permits in the offshore drilling areas and is required to complete exploration activities within timeframes set by the Commonwealth National Offshore Permit Titles Administrator (NOPTA). Lattice Energy also has existing offshore gas facilities in the area already extracting hydrocarbons and operates a gas processing plant near Port Campbell producing natural gas from these reservoirs. The seabed site assessments and subsequent drilling program will enable ongoing gas supply for the Victorian market.

What is an Environment Plan and who will assess it?

An Environment Plan is required under the Commonwealth Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009 (the Regulations) to conduct petroleum activities in Commonwealth waters.

The contents of an Environment Plan are set out in the Regulations and must include a description of the existing environment and the proposed activity, an evaluation of the impacts and risks associated with the activities, environmental performance outcomes and standards, implementation strategy, and reporting requirements.

An Environment Plan must also include an Oil Pollution Emergency Plan (OPEP) for managing an oil spill. Environment Plans are assessed by the Commonwealth National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA).

What is ALARP?

ALARP stands for “As Low As Reasonably Practicable”. It is a safety assessment principle commonly used in the oil and gas industry to assess and reduce potential risks and impacts that cannot be completely eliminated. For information on how NOPSEMA assesses ALARP see: https://www.nopsema.gov.au/about/our-regulatory-activities/

What does an Oil Pollution Emergency Plan cover?

An Oil Pollution Emergency Plan describes the arrangements for responding to and monitoring an oil spill and includes:

- The control measures necessary for rapid response
- Arrangements and capability in place to ensure rapid implementation of those control measures and, provide for the ongoing maintenance of capability
- Arrangements and capability in place for monitoring oil pollution to inform response activities as well as monitoring the effectiveness of these activities.

These arrangements are based on the results of scientific modelling of oil spill scenarios from the activities being carried out and local sea and weather conditions.

Is this work the same as a seismic survey? What is the difference?

No, this project is not the same as a seismic survey which uses different technology to map the geology several kilometres below the seabed. The seabed site assessments only map the surface and shallow sub-surface of the seafloor, using echo sounders, sonars and a sub-bottom profiler which operate at a much lower energy (intensity) and medium to higher frequency compared to those used in seismic surveys.

Will an exclusion zone exist?

During the seabed site assessments a safe operating zone will be requested and monitored. The safe zone will be 4 x 4 kilometres for each assessment area, three to five days at a time, depending on weather conditions.

When the drilling rig has been mobilised, a declared exclusion zone of 500 metres around the drilling rig will be communicated via a ‘Notice to Mariners’ placed with AMSA, outlining the exclusion zone locations and timeframes. The exclusion zone will be monitored by the standby vessel that will remain in the area once the drilling rig is in position.

Lattice Energy will consult with commercial fishers on arrangements to ensure each other’s operational plans are understood, helping to minimise any impacts to fishing activities and to the seabed site assessments.

How will you reduce the risk of collision with over vessels?

The marine vessels involved in the activities will operate in accordance with Australian Maritime Standards and ensure safe operations by:

- Having operational and navigation lighting on all vessels
- Maintaining a 24-hour shipping radar watch
- Ensuring vessels have a crew to maintain 24-hour visual, radio and radar watch for other vessels
- Equipping vessels with navigation lighting and movements that comply with maritime standards
- Monitoring and managing safety and exclusion zones.
Will the activities affect whales and dolphins?

Any impact is expected to be low and only in the area around each well site. Due to the slow movements of the vessels within each well site area and the noise generated from the vessels, marine fauna are likely to hear the equipment and vessels and avoid it. The seabed assessment equipment operates at high frequencies generally outside the hearing range of whales. Dolphins may hear the higher frequency sounds. However, given the low intensity downward direction of the equipment’s beam, little or no impact to dolphins is expected during the assessment activity.

Nevertheless, sound modelling and noise impact assessment will be carried out for inclusion in the Environment Plan, along with any mitigation and control measures that may be required. In addition, avoidance of whales and dolphins will be undertaken in accordance with the Environment Protection and Biodiversity Conservation (EPBC) Regulations (2000), including adherence to speed and distance requirements.

What about rock lobsters?

Sound from the seabed site assessments and drilling equipment used during drilling is not the same as the sound from equipment used during seismic surveys for petroleum exploration and is of significantly lower intensity.

Nevertheless, sound modelling and noise impact assessment on rock lobsters will be carried out for inclusion in the Environment Plan, along with any mitigation and control measures that may be required.

There will be minimal impact from drilling activities as drilling locations are usually on flat, sandy seabeds and avoid any rocky areas which is typical rock lobster habitat.

Will the site assessments or drilling impact upon commercial fishing?

The seabed site assessments will be located within existing designated Commonwealth and State fisheries that may be used by commercial fishers. To avoid entanglement and safety risks, nets, lines or pots should not be placed in the vicinity of each assessment area.

Each fishery covers a vast area, whereas the seabed assessments will only require access to each 4 x 4 kilometre assessment area for several days at a time. It is expected that the full process for the various sites will take around four to six weeks, depending on weather.

The well sites are located within existing designated Commonwealth and State fisheries that may currently be used by commercial fishers. During drilling, a declared 500 metre exclusion zone will be in place and will be communicated to all fishing stakeholders.

Lattice Energy is committed to minimising the impact of its activities and will consult with commercial fishers on arrangements to ensure each other’s operational plans are understood, helping to minimise any impacts to fishing activities and to the drilling program.

Will the drilling impact shipwrecks?

The drilling program will not impact any known shipwrecks. Prior to any drilling commencing, Lattice Energy will have conducted a seabed site assessment process to ensure a detailed understanding of the marine environment of each well site. Any new information confirmed will be provided to relevant authorities.

How does the drilling rig work?

Lattice Energy will use a typical semi-submersible drilling rig that is used in Australian waters. It can operate in waters up to 3,000m deep, drill for gas at up to 10,000m deep and can accommodate around 150 crew. Once the drilling rig is in position and anchored at the well site, the drilling process will use up to four stages of drilling, starting with a 36 inch drill head. Drilling will then reduce in diameter to consecutively smaller sizes until it reaches the end target depth. For each section, a casing will be placed in the hole and cemented, then a smaller drill will be run through the casing to drill a smaller hole to the next target depth and the process repeated until the wellbore is completed.

How is the drilling rig secured?

Once the drilling rig has been towed to the well site, supported by an ‘anchor handling vessel’, the tug boats will run out eight anchoring lines which may extend to a kilometre. Standard marine anchors of up to 15 – 20 tonnes each will be used. Positioning of the anchors will be determined by a rigorous mooring analysis of the rig’s mooring equipment, based on the results of the seabed site assessment and year-round weather data for the area.

How long will drilling take and when will you start?

It is expected that the drilling rig will stay at each individual well site for between 30 and 40 days, except for the proposed Geographe-3 site which may take approximately 80 days. Drilling is expected to start mid-2018, depending on final project planning decisions, regulatory approvals and contractor availability. The entire drilling program will take around nine months.
What happens after the wells are drilled?

After the proposed Geographe-3 production well is drilled, the hydrocarbons within this reserve will flow freely through the pipeline to the Otway Gas Plant for processing. This reserve is expected to produce for several years. Other wells in this drilling program will be plugged and suspended for future use, by placing a standard wellhead of around one to two metres high from the seabed. Positions of wellheads will be notified to Australian Hydrographic Service and recorded on sea charts. If a well is to be abandoned due to limited gas prospectivity, a tailored marine grade concrete cover will be installed and over time, become covered by the seabed and marine life.

Will the drilling rig be visible from land?

The drilling rig and support vessels, will have low visibility from the land and may appear similar to other shipping activity. Gas flaring will be required for the Geographe-3 production well. Given the significant distance from shore, the flaring may not be visible.

Flaring is a common and necessary part of the gas production process, carried out to safely burn excess gases which cannot be recycled or recovered.

How many people will work on the drilling rig?

There will be up to 150 crew on the drilling rig at any one time. The crew will be transported to and from the rig via helicopter. The helicopter will take the most direct path to the drilling rig and will fly at an altitude unlikely to cause significant disturbance to activities on the ground or sea surface.

What are drill cuttings? How are they dealt with?

Drill cuttings are the extracts of sedimentary layers that emerge from the drilling process and will range from very fine to coarse sizes. Some cuttings will not require any treatment and be deposited onto the seabed. Cuttings that will contain drilling lubrication fluids will be processed on the drilling rig before the residual cuttings are returned to settle rapidly on the seafloor. Marine mammals and fish may transit through these areas but will usually avoid the disturbance. Any exposure to suspended sediment before it settles on the seabed would be highly localised and temporary due to high dilution and fast dispersal in the water column. Cuttings modelling will be carried out to enable a full impact assessment and control measures for inclusion in the Environment Plan to be assessed by the regulator.

What will Lattice Energy do to ensure safety is maintained on the drilling rig?

Lattice Energy is committed to best practice safety standards. All drilling rig operations will be managed in accordance with the dedicated Safety Case for the drilling rig, approved by the regulator NOPSEMA, as per the requirements of the Offshore Petroleum and Greenhouse Gas Storage (Safety) Regulations 2009 (OPGGS).

For more information on Safety Cases see: https://www.nopsema.gov.au/safety/safety-case/
Please be advised that all stakeholder feedback, records of consultation, copies of correspondence, including emails, will be communicated to NOPSEMA in the preparation of the Environment Plans as required by legislation.