175 YEARS SUPPORTING THE COMMUNITY

AGL Energy in action®

# AGL Gloucester Gas Project Overview and plans May 2013

## About us.

Formed in 1837, AGL Energy Ltd is Australia's largest renewable energy company, selling gas, electricity and energy related services to about 3.5 million customers across NSW, SA, VIC, and QLD.

AGL is committed to creating a sustainable energy future for our customers, investors and communities. The company is Australia's largest private owner, operator and developer of renewable generation assets.

AGL is expanding its gas exploration and production to facilitate long term supplies for its domestic customers.

## Overview

The Gloucester Gas Project is located about 100 kilometres north of Newcastle near Stratford. The project is wholly owned and operated by AGL.

AGL is currently exploring for natural coal seam gas (CSG) to support the development of its Gloucester Gas Project, which includes:

- A concept plan area, including the Stage 1 gas field development area of up to 110 gas wells and associated infrastructure;
- A central processing facility to treat gas and water;
- A 15 megawatt gas-fired electricity generating facility;
- A gas transmission pipeline between the central processing facility and the existing gas supply network at Hexham; and
- A delivery station at Hexham to connect the transported gas to the existing Sydney-Newcastle trunk pipeline.

The first gas from Gloucester could potentially be available to the homes and businesses of New South Wales from late-2016.

## Benefits

Natural gas, also known as methane, is widely considered to be the cleanest and most environmentally acceptable fossil fuel. When burned, it produces only 55% of the greenhouse gas emissions compared to the burning of coal.

Demand for energy continues to grow across NSW, and the project will help meet the state's future energy needs with resources from within the state. The project will benefit the community, the region and the state by:

- Creating employment opportunities during both construction and operation;
- Securing supply for AGL's gas customers;
- Developing NSW's natural resources in an environmentally sustainable manner; and
- Reducing greenhouse gas emissions.

In New South Wales, coal mining companies are already removing gas from coal seams and flaring or venting the gas directly to the atmosphere. CSG extraction captures that gas which can be used by customers.

# Project snapshot at May 2013

- 12 production test wells completed, and a further four drilled
- 24 exploration wells plugged and abandoned
- 40 water monitoring bores and stream gauges
- Five separate water studies
- 3D seismic survey over Stage 1 area
- 154 km of 2D seismic
- 669 PJ of 2P reserves
- Potential to meet the annual gas demand of more than a million Australian homes. All the gas produced from this project will be for domestic supply.

# Irrigation trial

An irrigation trial is underway on AGLs Tiedman's farm to assess the sustainability of irrigating crops with produced water blended with fresh water sources. The aim is to irrigate with a brackish water mix across 16 individual plots (about 12 hectare in total area) and to grow salt tolerant crops over several years. Approvals to conduct the trial have been received New South Wales Department of Trade and Investment (Division of Resources and Energy), the New South Wales Office of Water, and the Environment Protection Authority.

The trial involves substantial soil improvement measures (four different treatments) and the use of a large linear-move irrigator. Crops being trialled include lucerne, forage sorghum, a variety of cereals and various improved pastures.

To assess background conditions and the impact of irrigating with this blended water mix, a soil and water monitoring network was established and baseline monitoring completed over the last 12 months. Further soil and water sampling during the irrigation program is underway.

# Water matters

## Understanding the project area's hydrogeology

AGL recognises that water is a key issue for the community.

Since acquiring the project in 2008, AGL has undertaken water investigations as part of the development of its Gloucester Gas Project, including extensive field studies since 2010. To date, five water studies have been published on the Gloucester project website.

An independent expert, Dr Rick Evans, was chosen by the Gloucester Community Consultative Committee (GCCC) to examine AGL's surface water and groundwater studies. His independent expert report along with AGL's responses were distributed by the GCCC and published on AGL's website in early 2012. Most of Dr Evans' recommendations have been or will be addressed in AGL's work program.

## AGL's water study approach

AGL's water studies have been designed to help the community better understand the groundwater in the project area and what effects, if any, there might be on the groundwater from natural gas exploration. AGL uses a phased approach to its water studies. The investigations within the Stage 1 area comprise the following phases:

Phase 1 (completed for Stage 1, commenced for remainder of the basin): Desktop studies that review existing information to develop an initial understanding of the hydrogeological characteristics of the area.

Phase 2 (completed for Stage 1, commenced for remainder of the basin): Detailed groundwater investigations that use existing and new water bores to measure levels, quality, age and characteristics of the surface water and groundwater, analysis of the information collected and establishment of an extensive monitoring network. The studies involved geological appraisals, drilling, permeability testing, water level monitoring, water quality sampling, isotope studies, data collation, analysis and reporting. Results include identification of the different groundwater systems and development of a conceptual flow model that describes recharge, discharge and flow.

Phase 3 (commenced for the whole basin): A numerical model is developed to represent the different surface water and groundwater systems to understand their behaviour under different natural and project development scenarios.

Phase 4 (on going): A monitoring program that includes long-term monitoring and compliance reporting.

Phase 5 (commenced for Stage 1): Further site investigations and additions to the monitoring network as required.

In addition to the comprehensive groundwater studies that will be completed for the Stage 1 development, AGL is committed to completing similar comprehensive groundwater studies for future development beyond the Stage 1 area. Over time, the AGL studies will build a basin-wide assessment of groundwater conditions in the Gloucester Basin.

# Exploration

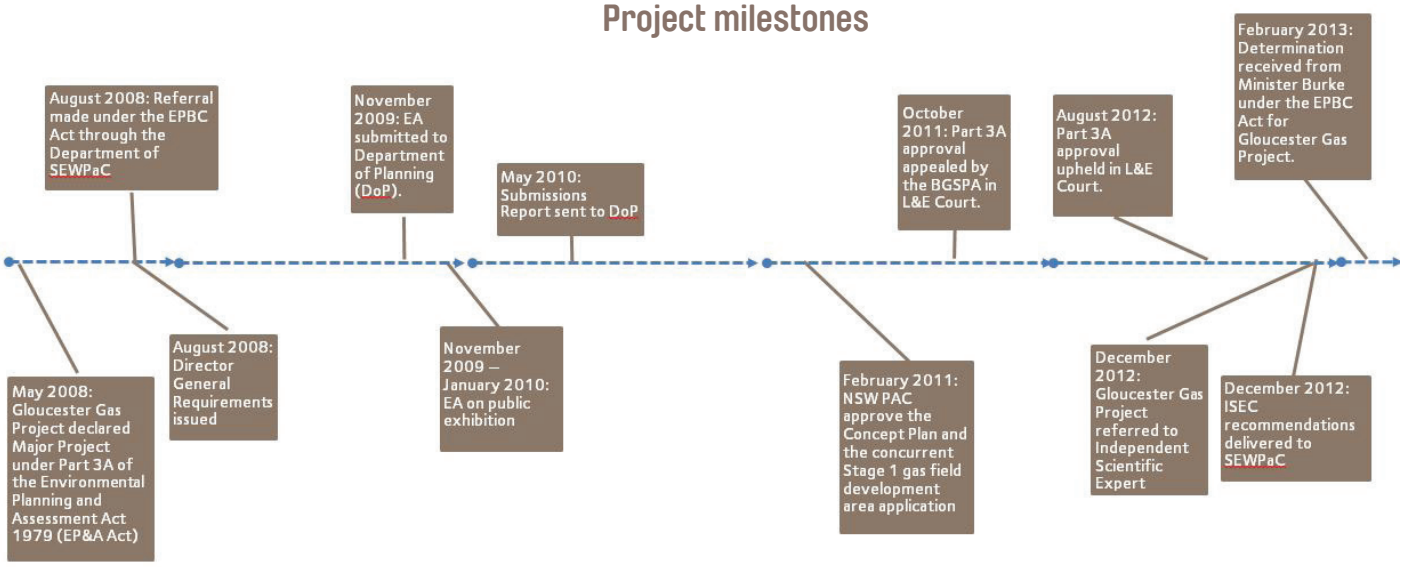
While awaiting approvals of its pipeline and production licences, AGL will continue its exploration activities. Additional hydrogeological and geological programs will continue to increase AGL's understanding of the Gloucester Basin.

## Production pilot programs

In October 2011, the NSW Government granted the necessary exploration approvals for AGL's Waukivory pilot program near Forbesdale, a four-well program which will assess the natural gas potential of the area and gather additional information about the surrounding hydrogeology. Further pilot testing will be undertaken when relevant hydraulic fracturing and flow testing approvals have been obtained.

CSG pilots are usually made up of a small cluster of wells and are used to assess the local gas production potential within an exploration field. A pilot well is constructed and operated in a very similar manner to a CSG production well.

## Project milestones




Each well in the pilot will be fracture stimulated and the coal seam will be dewatered until gas production occurs; the gas is then flared. Gas and water production data is collected throughout this dewatering and flaring process to enable modelling of the reservoir to aid in final production well placement.

AGL has also planned additional pilot testing at Wards River and Weismantel. Pilot tests will continue for at least six months, and maybe as long as 12 months, to gather the necessary information.

## Groundwater monitoring and surveys

AGL is proposing a baseline survey of groundwater features on private properties within and surrounding the Stage 1 area in the coming months.

The survey will provide a snapshot in time of the water level and water quality characteristics. A range of information and data will be collected during the survey which will include water samples for laboratory analysis to provide a comprehensive water chemistry report, current water levels and photos of the specific features. All participating landowners will receive a report of the information.

AGL will use the information as baseline information in advance of future drilling, hydraulic fracture stimulation and flow testing in the Stage 1 area. The data will also be incorporated as additional geographic data for AGL's computer model of the project area.

AGL will also be commencing groundwater investigations in areas outside of the Stage 1 area.

## Core hole program

AGL recently completed core hole drilling on its Pontilands property. The core hole will be completed as a deep water monitoring bore.

Core holes are one type of exploration drilling, a geological method used to sample rocks beneath the earth's surface. A core hole is a hole drilled to take a sample of coal and the rocks surrounding it. Once core samples have been collected AGL performs a variety of tests to understand the rock, coal and gas properties including the amount and type of gas contained within the coal.

## Aeromag Survey

In May 2013, AGL will conduct an aeromagnetic (aeromag) survey using a helicopter over the Gloucester Geological Basin and its immediate surrounds from Gloucester in the north to just north of Stroud Road in the south.

An aeromag survey is one of the exploration methods geoscientists use to map the structures that lie beneath the Earth's surface. It enables the collection of information over a large area to be gathered quickly and with very little surface activity.

To conduct the survey, a magnetometer and spectrometer are attached to a helicopter. The helicopter then flies approximately 40 metres above the ground in grid-like lines over the survey area.

AGL owns 1600 acres in Gloucester, including the Tiedman's, above.

# Keeping the community informed

Feedback from the local community plays an important role in our planning.

The GCCC regularly meets to provide a forum to advise all stakeholders on all aspects of the exploration and development programs. Meeting are an opportunity for both the community and AGL to identify and discuss issues of concern about the project. Minutes from the GCCC meetings are available on the Gloucester project website.

We also conduct community information sessions and advertise on project activities in the local paper. Please check the Gloucester Gas Project website to stay informed about the upcoming exploration program.

# Project Approvals

## State project exploration approval

The project operates exploration activities within Petroleum Exploration Lease 285 (PEL285), issued under the Petroleum (Onshore) Act 1991 (NSW). All Category 3 exploration activities require a merit-based environmental assessment which must be approved under Part 5 of the Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act) and Petroleum (Onshore) Act 1991 (NSW). Most exploration activities require the submission of a Review of Environmental factors to the NSW Department of Planning and Infrastructure (DOPI). All of the REFs for the project can be read on the Department of Resource and Energy's website at:

› resources.nsw.gov.au/environment/ref.

## State project development approval

In February 2011, the NSW Planning Assessment Commission granted the project approval under Part 3A of the EP&A Act, subject to 92 conditions. Part 3A approvals can be read on the DOPI's website here:

› majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=3194

› majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=2532.

In August 2012, the Land and Environment Court of NSW upheld the validity of the Part 3A approval. That judgment can be read at

› caselaw.nsw.gov.au/action/PJUDG?jgmtid=160393

## Commonwealth project approval

In February 2013, the Federal Environment Minister approved the project's stage 1 development under the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC). The approval contains 36 conditions relating to protecting matters of national environmental significance. The Commonwealth approval can be read at

› environment.gov.au/epbc/notices/assessments/2008/4432/2008-4432-approval-decision.pdf

## Currently under application: PPL and pipeline licence

A Petroleum Production Lease (PPL) under the Petroleum (Onshore) Act 1991 (NSW) is required to develop the approved project. AGL lodged its PPL application in December 2012. Any PPL issued must be consistent with the terms of the Part 3A Project Approval.

Also in December 2012, AGL submitted an application for a pipeline licence to build the Stratford to Tomago Pipeline.

For more information visit
**agl.com.au/gloucester**
or call the project team on
1300 886 170.

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