# Introduction of a Carbon Component for Small Gas Customers in the Albury/ Murray Valley

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# 1 Introduction

On 8 November 2011, the Commonwealth Government passed legislation to introduce a Carbon Price Scheme (the Scheme) from 1 July 2012. The Scheme requires liable entities, such as Origin Energy LPG Limited (Origin), to surrender carbon units equivalent to its emissions. The legislation includes a fixed price path for the first three years of the Scheme before transitioning to an emissions trading scheme based on market prices. The Scheme is designed to provide price signals to incentivise new behaviours and encourage the adoption of low carbon alternatives from both businesses and consumers.

Origin is a standard retail gas supplier to over 20,000 small customers in the Albury/Moama and the New South Wales Murray Valley districts. Default prices and miscellaneous charges for these small customers are regulated through an existing voluntary transitional pricing arrangement (VTPA) agreed between the Independent Pricing and Regulatory Tribunal (IPART) and Origin. The current VTPA expires on 30 June 2013.

Following the introduction of a Carbon Price Scheme, Default Prices under this VTPA can be varied to include a specific Carbon Component that reflects the Scheme costs relating to supplying small gas customers.

## 1.1 Purpose of this Application

The purpose of this application is to advise IPART that:

- Origin is intending to introduce a Carbon Component into the Default Prices for Albury and Murray Valley small gas customers from 1 July 2012; and
- provide details on the methodology used to calculate the Carbon Component.

# 2 Background

## 2.1 Carbon Price Scheme Framework

On 1 July 2012, the Carbon Price Scheme will commence in Australia. The obligations and requirements in relation to the Scheme are set out in the primary legislative instrument, the *Clean Energy Act 2011*, which is accompanied by 19 other legislative instruments.

Initially the Scheme will cover stationary energy (including Origin's generation and supply of natural gas and electricity), industrial processes, fugitive emissions and non-legacy waste. Separate measures will also cover some business transport emissions (eg by reducing the rebate for diesel fuel) and synthetic greenhouse gases. It is intended that the number of liable parties will increase as the Scheme progresses.

For the first three years of the Scheme, the carbon price will be fixed like a tax. Liable entities need to submit carbon units for every tonne of pollution that they produce – the total amount of pollution is not pre-determined (or capped). The carbon unit price has been set at $23 per tonne for 2012-13 increasing by around 5 per cent for the following two financial years.

If a liable entity fails to acquit its obligations under the Scheme in each year, a penalty charge of 1.3 times the fixed price or double the annual average price of carbon units will be applied to the entities as shortfall penalties.

## 2.2 Basis of Carbon Component Application

Origin is a standard retail gas supplier in New South Wales with prices for small customers regulated under a VTPA on a three year forward basis. In the current VTPA, default retail prices are not set per se, but the formula for calculating default prices is determined under clause 3.1.

*3.1 (b) on and from the commencement of a Carbon Pollution Reduction Scheme: the Default Prices will be comprised as follows:*

*R + N + C;*

*where*

*R refers to the Retail Component;*

*N refers to the Network Component; and*

*C refers to the Carbon Component.*

Given the introduction of the Carbon Price Scheme, Origin intends to introduce a Carbon Component into the default retail prices from 1 July 2012 and is seeking to advise and inform IPART under 4.10 of the current VTPA[1].

*4.10 If a Carbon Pollution Reduction Scheme is introduced and Origin Energy intends to introduce or change the Carbon Component, Origin Energy:*

*(a) must advise IPART of the Carbon Component no later than 2 months before the date of the proposed use of the Carbon Component or date of effect of the proposed increase (eg by 1 May for 1 July increase);*

*(b) can vary the period for notification with IPART's agreement; and*

*(c) must provide IPART with sufficient information to demonstrate and verify:*

*(i) how it has calculated the Carbon Component; and*

*(ii) that the Carbon Component is reasonable.*

[1] IPART, Voluntary transitional pricing arrangements for Origin Energy Retail Limited for supply of natural gas to small gas customers, 1 July 2010 to 30 June 2013, p4.

# 3 Carbon Component

Origin is seeking to introduce a Carbon Component into the retail prices of small gas customers as allowed for under sections 4.10 and 4.11 of the VTPA. In introducing this cost component, Origin is required to provide IPART with sufficient information to demonstrate and verify[2]:

- how it has calculated the carbon component; and
- that the carbon cost is reasonable.

## 3.1 Details of the Carbon Price Scheme

As set out in section 2.1 of this submission, the Carbon Price Scheme will be introduced by the Commonwealth Government on 1 July 2012. The Scheme places a cost on carbon emissions and is aimed at encouraging liable industries to reduce pollutions from their activities as well as sending a price signal to consumers to reduce overall consumption. The obligations are extensive and require full implementation to ensure the requirements of the Scheme are met. Due to the Scheme, Origin will be subject to additional costs through:

- the cost of carbon permits that Origin will be required to purchase related to customers' gas consumption;
- increased costs arising from third party liabilities under the Scheme (eg. gas suppliers and transmission pipelines);
- additional costs associated with the extensive administration and reporting requirements of complying with the Scheme; and
- increase in gas networks costs.

This application deals with items 1 and 2 for the remaining year (2012-13) of the current Voluntary Transitional Pricing Arrangement. Under the VTPA, the impact on distribution network charges (item 4) will be treated as a direct pass through cost to customers. At this time, compliance costs (item 3) cannot be estimated with any accuracy as many details of the Scheme are yet to be finalised. Origin will consider the impact of the Scheme's compliance costs in any future pricing decision.

## 3.2 Estimated cost of the Carbon Price Scheme

The Scheme's framework sets out 3 cost categories but only two of the three cost categories are relevant to natural gas. These being:

- **Scope 1 - Direct emissions**: These occur onsite or from sources that a company owns and controls. This includes customers' combustion costs from the use of natural gas; and
- **Scope 3 - Indirect emissions:** This includes emissions associated with the extraction, manufacture and production of products a company purchases. For Origin as a gas retailer, this will include the costs of emissions related to the extraction of natural gas from supply fields and the network costs related to transmission pipelines[3].

It should be noted that references to scope 1 and scope 3 costs in this application are specifically in relation to Origin's obligations as a gas retailer supplying natural gas to standing contract customers under the Origin Energy LPG Limited licence. The references are not in relation to the wider corporate entities operated and owned by Origin. That is, as a retail licence holder, our direct costs (scope 1) arise from customers' consumption of natural gas while scope 3 costs will include all costs that are incurred upstream from customers'

[2] IPART, Voluntary transitional pricing arrangements for Origin Energy Retail Limited for supply of natural gas to small gas customers, 1 July 2010 to 30 June 2013, p4.
[3] $CO_2$ Australia Website, Glossary of Terms.

meters. These scope 3 costs will include some liabilities from Origin's own production activities as well as counterparty costs under gas supply and transportation agreements.

Origin has forecast its direct carbon costs (Scope 1) with reference to the published National Greenhouse Accounts (NGA) factors[4]. The NGA factors were developed to provide guidance to industries in estimating greenhouse gas emissions for the purposes of reporting under the National Greenhouse and Energy Reporting system.

Origin has forecast its indirect carbon costs (Scope 3) using a combination of actual data as well as the published NGA intensity factors. The different costs are:

- wellhead supply costs which have been calculated using the actual emission intensities of the supply fields contracted by Origin. These were provided by the gas field operators; and
- transmission costs which combine combustion and fugitive emissions. Combustion emissions are based on the consumption of gas during pipeline compression activities while fugitive emissions are calculated based on the actual length of the pipelines and the NGA published emission intensity factors relevant to transmission.

Origin's wellhead supply and transmission pipeline counterparties have foreshadowed that carbon costs will be passed through in all existing contracts commencing 1 July 2012. However, the costs will not be known until the relevant price increases for these services are made clear to Origin.

The forecast carbon cost also needs to be adjusted for retail margin allowance as IPART determined that a reasonable retail margin of between 7.2 and 7.6 per cent on total revenue is appropriate. Consequently, the forecast carbon costs of $1.38 per GJ has been uplifted to maintain an appropriate retail margin on total revenue.

The methodology and specific calcuations underpinning the estimation of the Scope 1 and Scope 3 costs are discussed in more detail in section 4. However, Table 1 summarises Origin's estimate of the financial impact of the Scheme in 2012-13.

**Table 1: Costs in 2012-13**

| ($/GJ) | 2012-13 |
|---|---|
| **Direct Costs - Scope 1** | $1.18 |
| **Upstream Costs - Scope 3** | |
| Wellhead | $0.17 |
| Transmission | $0.03 |
| **Total Carbon Cost** | **$1.38** |
| Retail Margin Adjustment | $0.10 |
| **Total Cost** | **$1.48** |

## 3.3 Origin's Carbon Component

Origin has estimated a Carbon Component for small gas customers in the Albury and Murray Valley districts of $1.48 per GJ in 2012-13.

It is proposed that the variable charge of the relevant natural gas default prices are increased by the Carbon Component. This approach ensures customers will pay an appropriate amount that reflects Origin's liability relevant to these customers under the Scheme.

[4] NGA factors are published by the Australian Government, Department of Climate Change and Energy Efficiency (July 2011).

# 4 Methodology for estimating the Carbon Component

This section provides greater detail on Origin's methodology for estimating the costs associated with the Scheme in the 2012-13.

## 4.1 Assumptions

Regulations finalising the gas framework for the Carbon Price Scheme are not expected to be published until April 2012[5]: It has therefore been necessary for Origin to make assumptions on definitions regarding what is;

- a natural gas supply pipeline;
- the withdrawal of natural gas; and
- the point at which supply of natural gas occurs.

Origin has also assumed that retailers will be directly liable for pipeline combustion emissions while pipeline operators will be liable for pipeline fugitive emissions. It is also expected that all pipeline costs will be passed through to gas retailers under existing gas transmission agreements. However, counterparties' indirect costs have not been considered in this application.

Origin has used the default and prescribed alternative methods of determining emissions embodied in natural gases currently described. This methodology has been based on the best available information at this time, however, there may need to be a review cost inputs if the Regulations differ substantially from Origin's understanding.

## 4.2 Direct Liability from Customers' Combustion – Scope 1

Under the Clean Energy Bill, natural gas suppliers are liable where it may be reasonably expected that the customer will consume all or part of the gas[6]. This is relevant to all natural gas customers who consume less than 1 TJ of natural gas per annum in New South Wales.

The Commonwealth Government, through the *NGA Factors* report, have published emission factors from the combustion of different fuel sources (ie $CO_2$, $CH_4$, $N_2O$)[7] as shown in Table 2. The report also identifies the formula that is used to estimate greenhouse gas emissions[8]:

$$E = \frac{EF \; x \; Q}{1000}$$

where, ***E*** = $CO_{2\text{-}e}$ tonnes of emissions, *EF* = emission factors, and ***Q*** = quantity of fuel in GJ.

Therefore the emissions of greenhouse gases $tCO_{2\text{-}e}$ for each GJ of natural gas consumption is 0.05133 $tCO_{2\text{-}e}$ per GJ. Table 2 also shows the emissions of greenhouse gases converted to a $/GJ impact using the cost for a $tCO_{2\text{-}e}$ as directed under the Scheme.

**Table 2: Emission Factors and Customer combustion liability**

| | $CO_2$ | $CH_4$ | $N_2O$ | t $CO_{2\text{-}e}$ | $/t$CO_{2\text{-}e}$ | $/GJ |
|---|---|---|---|---|---|---|
| | (t CO2-e/TJ) | | | | ($/GJ) | |
| Natural gas (distributed) | 51.2 | 0.1 | 0.03 | 0.05133 | $23.00 | $1.1806 |

Origin's liability for customers' usage of natural gas is therefore $1.18/GJ in 2012-13.

5 Department of Climate Change website, Appendix 2A Clean Energy Regulations
6 Clean Energy Bill (2011), section 33(1) , p66
7 NGA factors, table 2, p14
8 NGA factors, p14-15

## 4.3 Costs Arising Upstream of Customers' Meters – Scope 3

For a gas retailer, scope 3 emissions for natural gas include any emissions related to the extraction and production of natural gas from the various gas supply fields as well as the emissions related to the transport of natural gas through the transmission pipelines.

### *4.3.1 Wellhead Supply Costs*

Wellhead costs are the increased cost of supplying gas at the wellhead that are associated with field and processing emissions and subsequent carbon pricing liabilities.

Origin has access to confidential carbon intensities for gas fields that it operates. Origin also has carbon intensities for other non-operated fields where it is a joint venture party as this information has historically been collected from its joint parties for environmental reporting purposes. These actual carbon intensity factors for Origin's supply fields have been used to determine direct wellhead supply costs for the Albury and Murray Valley districts.

The field carbon intensities are then converted to a carbon cost ($/GJ) by multiplying by the cost for $tCO_{2\text{-}e}$ as directed under the Scheme. These field costs are then weighted based on the forecast volumes from each field that Origin will use to supply the Albury and Murray Valley small gas customers in 2012-13.

**Table 3: Carbon Costs - Wellhead Supply 2012-13**

| Supply Contract | Carbon Intensity (t CO2-e/TJ) | Carbon Cost ($/GJ) |
|---|---|---|
| **Weighted Average** | **7.44** | **$0.171** |

### *4.3.2 Transmission costs*

Transmission costs are the increased cost of shipping gas due to the carbon costs associated with compressor combustion emissions and fugitive emissions.

To calculate the expected carbon intensities of pipelines, Origin has used a combination of relevant data related to pipeline length (km), compression use of gas and pipeline volumes being transported. There are two main transmission related costs which are summarised in Table 4.

Carbon Cost of Combustion

Combustion emissions are calculated based on the consumption of gas during pipeline compression activities which has been assumed to be 2 per cent.

$$E = \frac{EF\ x\ CR\ x\ Q}{1000}$$

where, ***E*** = $CO_{2\text{-}e}$ tonnes of emissions per GJ, *EF* = emission factor (51.33 $tCO_{2\text{-}e}$ /TJ), CR = compression requirements (2%) and ***Q*** = quantity of fuel in GJ.

This results in emissions of greenhouse gases for each GJ of natural gas transported of 0.00103 $tCO_{2\text{-}e}$ per GJ which is converted to a carbon cost using the price of $tCO_{2\text{-}e}$.

Carbon Cost of Fugitive Emissions

Fugitive emissions are calculated based on the actual length of the pipelines and the NGA published emission intensity factors relevant to transmission. This result in a fixed cost per pipeline which is converted to a variable cost by dividing by each pipelines forecast volumes.

$$E = \frac{L \; x \; FI \; x \; Q}{V}$$

where, ***E*** = $CO_{2\text{-}e}$ tonnes of emissions, *L* = length of pipeline (km), *FI* = fugitive intensity factor (8.72 $tCO_{2\text{-}e}$/km), and ***V*** = quantity of fuel in TJ.

The emissions per GJ are converted to a carbon cost using the using the price of $tCO_{2\text{-}e}$. The costs to Origin of supplying Albury/ Murray Valley small gas customers in 2012-13 have been derived based on the forecast volumes for each pipeline.

**Table 4: Carbon Costs by Pipeline 2012-13**

| Pipelines | Combustion Costs ($/GJ) | Fugitive Emission Costs ($/GJ) | Total Carbon Cost ($/GJ) |
|---|---|---|---|
| Victorian Transmission System | $0.024 | $0.002 | **$0.026** |