INTRODUCTION

Energy consumption and greenhouse gases emissions from urban water utilities in Australia are fairly significant. In 2010-11, Water Corporation (Western Australia, WA) and Sydney Water ranked top 110th and 126th GHG emitter (Scope 1 & 2) in Australia. For grid electricity-related greenhouse emissions they ranked 43rd and 56th. Out of around 525 carbon liable entities in Australian, 25% belongs to waste disposal sector. The Carbon Price Mechanism (Scheme) and accompanying legislation establishes a carbon price by way of an emissions trading scheme (ETS), designed to provide price signals to incentivise new behaviours and encourage the adoption and consumption of low carbon energy alternatives. The Scheme imposes obligations on industry to reduce greenhouse gas emissions through the surrender of tradeable permits and undertake projects that generate carbon credits. It is not a “carbon tax” which is simply a fixed impost on emissions.

Clean Energy Act 2011 (CEA Act) and the National Greenhouse and Energy Reporting Act 2007 (NGER Act) and associated regulations, and legislative instruments provide the framework for greenhouse (carbon) accounting and carbon pricing in Australia. They aim to meet:

- Australia’s obligations under the United Nations Convention on Climate Change (UNFCC), the Kyoto Protocol, and supporting international action to contain global temperature rise within 2 degrees Celsius above pre-industrial levels.
- Taking action in a flexible and cost-effective way to reducing Australia’s net carbon emissions to 80% below 2000 level by 2050 through pricing carbon, renewable energy, energy efficiency and action on land.

Under the CEA Act, from 1 July 2012, there has been a pricing of $23 per tonne of carbon emitted that will increase by 5% every year till 30 June 2016, and beyond that period, market will determine the carbon price. Objective of this paper is to define the processes and procedures for estimating carbon liability for a water utility.

The carbon pricing mechanism (CPM) will only apply to around 350 of the biggest polluters in the country. They will pay for each tonne of carbon pollution they release into the atmosphere. If a business can lower its pollution then it will lower the carbon costs that it pays. This will create economic incentives for businesses to reduce their pollution, and to do so in the cheapest possible ways. It will also make lower-polluting technologies, especially clean energy, more competitive by boosting investment in, and take-up of, these technologies. In this way, introducing a price on carbon will trigger the transformation of the economy towards a clean energy future. Revenue from the carbon pricing mechanism will be spent on household assistance, investment in renewable energy and technologies, energy efficiency and supporting emissions intensive trade exposed (EITE) industries to adopt greener technologies (Fig. 1).
Activity, facility and operational control

As shown in Figure 2, in this study, Water Utility 1 (WU1), 2 (WU2) and Water Utility Finance Corporation (WUFC) are constitutional corporations (to which paragraph 51(xx) of the Australian constitution applies) registered in Australia. Controlling corporation WU1 has three corporate groups WU1CG1, WU1CG2 and WU1CG3.

1. WU1CG1 has operational control over Desalination Plant 1 (DSP1) and Catchment 1 Wastewater Treatment Plant (WWTP) 1 (WWC1) and Catchment 2 WW2.

2. WU1CG2 has operational control over Water Treatment Plant (WTP) 1 (WTP1) and WTP2 and Catchment 3 Wastewater Treatment Plant (WWC3).

3. WU1CG3 has operational control over Water Treatment Plant (WTP) 3 and Catchment 4 Wastewater Recycling Plant (WWC4).

WUFC has financial control over DSP1 and holds more than 50% DSP1 shares and derives economic benefits from DSP1 operations.

DSP1 supplies drinking water to Water Delivery Area 1 (WDA1); WTP 1 and WTP 2 supplies WDA2; and WTP 3 and DSP2 supply WDA3. Wastewater from customers in WDA1 are treated in WWC1 and WW2 and disposed into ‘deep ocean’ and river respectively. Wastewater from customers in WDA2 are treated at WWTP 1 (WWC1) and Catchment 2 WWC2. Similarly, wastewater from customers in WDA3 are treated at Wastewater Recycling Plant WWC4 and the treated effluent from there is beneficially recycled and reused by customers in WDA3 and the left over is disposed into an estuary.

Water Utility WU1 and WU2 formed a joint venture (JV) that owns Desalination Plant DSP that supplies water to customer in WDA3. The JV operates a natural gas powered electricity generator to meet electricity requirements of DSP2.

A facility can be defined when all of the following criteria are satisfied (NER Act, s54):

1. A facility is an activity, or a series of activities (including ancillary activities); and
2. Activities must produce greenhouse gas emissions or produce or consume energy; and
3. Activities are part of a primary production process (principal activity) that: (i) results in the creation of a product or service for sale on the market; and (ii) produces the greatest value of all the activities in the series; and
4. All activities identified as being part of the single undertaking or enterprise should be attributed to the same ANZSIC industry classification as the principal activity; and
5. Activities occur at a ‘single site’ or adjacent site.
6. Not an activity, or a series of activities, in the exclusive economic zone of Australia, except an oil or gas extraction activity(s); or
7. declared by the Clean Energy Regulator (CER) (NER Act, s54)

A liable entity for a facility must have either of: (i) operational control over the facility; or (ii) a participant in a mandatory or designated joint venture (JV); or (iii) holds liability transfer certificate (LTC) for the facility; or (iv) holds obligation transfer number (OTN); or (v) a large gas consuming facility (LGCF); and (vi) has emissions greater than or equal to 25,000 tonne/year.

An entity has operational control of a facility if:

- they have the authority to introduce and implement any or all of the operational, environmental and health and safety policies for the facility; or
- in the case that more than one person has this authority, the person with the greatest authority to introduce and implement the operational and environmental policies for the facility; or
- they are declared by the CER to have operational control of the facility.

Entities that don’t meet the operational control test and expect to have an interim emissions number, must nominate operational control by 30th April in that financial year.

Application of facility definition for water utility

- A water utility carries out most of the activities (a specific deed, action or function) in the water supply chain or life cycle except consumption or use by customers (Fig. 3).
- They carry out the following two groups of activities within the Australia and New Zealand Standard Industry Classification (ANZSIC) 281- “Water supply, sewerage and drainage services”, which are involved in energy consumption, production and carbon emissions (NER Act s9):

  1. (i) water operations: bulk water extraction (from nature, e.g. dam, river, ocean), transmission to and treatment at water treatment/ desalination plants, potable/ drinking water transmission and distribution (water networks) to customers
  2. (ii) wastewater operations: collecting wastewater from customers (wastewater networks), treating them at wastewater treatment plants and water recycling plant, supplying recycled water to customers and disposing the
remaining treated effluent to the nature again including supporting maintaining environmental flows in rivers.

Table 1: Summary of facilities for energy and greenhouse reporting and carbon pricing

- Co-location/ interconnection of activities
- Operational/ processing interdependence in the activities
- Production of similar products/ services from the activities
- Shared personnel for the activities
- Shared customers, suppliers and competitors for the products/ outcomes of the activities
- Combined immediate management (that is, non-central office – these are dealt with as ‘listed’ activities)
- Shared production/ operational facilities for the activities

Based on the above criteria analysis for defining facilities, there are seven facilities for which water utility 1 and 2 needs to

Figure 2 Operations of an urban water utility

Thus ‘water’ and ‘wastewater and recycled water’ operations are two separate ‘series of activities’ to deliver ‘drinking water’ and ‘sanitation service’ with customers in between them in the water supply chain.

The concept of ‘water delivery area’ applies for water operations or for a water treatment plant which implies the customers in the geographical area that is supplied with potable water from the WTP or DSP and its associated water networks. On the other hand, the concept of ‘catchment’ applies to wastewater treatment/ water recycling plants. Catchment is an area of land over which water flows by gravity to its lowest point to discharge into a creek, river or ocean. WWTPs/ WRPs are normally located at the lowest point of the catchment to receive wastewater from customers by gravity. Thus there is geographical separation of a ‘water delivery area’ for a ‘WTP & its networks’ from the ‘catchment’ of a WWTP/ WRP & its networks (NGER Regulation ss1.03, 2.16). Thus ‘water operations’ is not collocated with ‘wastewater/ recycling operation’. Applying the policy criteria for defining ‘facilities’ under the NGER Act as stated below, number of liable entities has been determined in Table 1.

1. Co-location/ interconnection of activities
2. Operational/ processing interdependence in the activities
3. Production of similar products/ services from the activities
4. Shared personnel for the activities
5. Shared customers, suppliers and competitors for the products/ outcomes of the activities
6. Combined immediate management (that is, non-central office – these are dealt with as ‘listed’ activities)
7. Shared production/ operational facilities for the activities

Water supply chain/ Life cycle

(Cradle to cradle / Grave)

Figure 3: Activities carried out by a water utility
account for energy consumption, production and greenhouse emissions for NGE reporting and carbon pricing purpose.

**Carbon pricing scope**

A facility is liable for carbon price, if the covered emissions from a facility exceed 25,000 tonnes or more of CO₂-e in the financial year (1 July to 30 June) or equivalent pro-rata threshold. Carbon pricing only includes Scope 1 emissions of carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O) and perfluorocarbons (attributable to aluminium production only). Scope 1 emissions are released into the atmosphere as a direct result of activities at a facility. Scope 1 greenhouse emissions from urban water utilities include: (i) combustion of biogas, biomass, biofuel; (ii) custom and/ or excise paid liquid petroleum fuel, liquid petroleum gas, liquefied natural gas, compressed natural gas; (iii) N₂O from effluent discharge; (iv) CH₄ from sludge treatment (e.g. lagoons, anaerobic digesters); and (v) CH₄ from sludge drying and stockpiling. Under the CE Act, urban water utilities to directly pay for carbon price for its covered emissions that include fugitive methane and nitrous oxide emissions (ii, iii, iv and v) only. However, carbon price due to emissions from fossil fuels like diesel, natural gas, gasoline and LPG (Scope 1), grid electricity (Scope 2) and from upstream supply chain inputs (Scope 3) to be paid indirectly through upstream supply chain carbon-cost transfer mechanism.

CEA 2011 applies across Australia, its external Territories, exclusive economic zone, continental shelf and the Joint Petroleum Development Area.

For urban water utilities, CEA 2011 excludes Scope 1 emissions from: (i) combustion of biogas, biomass, biofuel; (ii) custom and/ or excise paid liquid petroleum fuel, liquid petroleum gas, liquefied natural gas, compressed natural gas; (iii) agriculture emissions; (iv) sulphur hexafluoride (SF₆) in electrical switch gear and circuit breakers; (v) emissions from closed landfill facilities; (vi) emissions from legacy waste deposited before 1 July 2012 for a landfill facility; (vii) natural gas consumption without quoting Obligation Transfer Number (OTN) to the supplier; and (viii) emissions of hydrofluorocarbon (HFCs) and perfluorocarbon (PFCs).

**Liabilities under carbon pricing**

NGER Act creates registration and reporting obligations for controlling corporations (CC) and its group members for facilities under its ‘operational control’ for exceeding corporate relation to covered emissions only (subset of NGER scope 1 emissions). A liable entity is defined as a person that could be an individual, a corporation, a trust, a body corporate, a body politic or a local governing body. Liable entities either:

1. Are responsible for facilities that give rise to a liability (direct emitters); or
2. Supply natural gas (indirect emitters) or are Obligation Transfer Number (OTN) holders.

Controlling corporation WU1 and its corporate group members (WU1CG1, WU1CG2 AND WU1CG3), WU2 and WUFC need to register under NGER Scheme (NGERS) if they exceed corporate group or facility threshold (NGER Act, s13) or ‘liable entity’ threshold.

1. **Direct emitters** will be liable for a facility if during that financial year the facility released covered emissions of 25,000 tonnes of CO₂-e or more from operations of the facility; or from combustion of natural gas from a large gas natural gas consuming facility (LGCF), e.g. natural gas operated mini-electricity generator at DSP2; or from the combined covered plus legacy emissions of its landfill facility.

2. **Obligation Transfer Number (OTN) holders** OTNs can be used for covered emissions of 25,000 tonnes of CO₂-e or more from combustion of natural gas from: (i) Large gas consuming facilities (LGCF); (ii) facilities where gas is used as a feedstock; (iii) facilities where gas is used to manufacture CNG, LPG, LNG; and (iv) facilities where the gas is received by a person who also receives gas at a large gas consuming facility. Only gas withdrawn and metered from a natural gas supply pipeline is treated as ‘supply’ and eligible for OTN. An OTN is used to allow eligible consumers of natural gas to be responsible for their own emissions OTN is not transferable e.g. from a subsidiary to its ‘controlling corporation’ through a liability transfer certificate (LTC). Each time an OTN holder quotes its OTN in relation to the supply of natural gas, the amount of potential greenhouse gas emissions embodied in the gas, is a preliminary emissions number (PEN) of the OTN holder. An OTN holder’s provisional emissions number (PoEN) is the sum of its preliminary emissions numbers (PEN) for the period 1 July to 31 March in that financial year, and must report by 15 June for each fixed price financial year to the CER under the NGER Act s22AA (‘liable entity interim emissions report’). It also requires submitting a liable entity emissions report (ER) under section 22A of the NGER Act for the eligible financial year by 31 October following the reporting year.

A facility of a water utility such as Desalination Plant 2 (DSP2) that emits > 25,000 tonne CO₂-e from combustion of natural gas or on pro-rata, in a financial year from 1 July 2010, is a ‘large gas consuming facility’, and must apply for OTN registration by 1 April of the first financial year that they are liable. OTN cannot be applied for retrospectively. OTN Holder need to open an Australian National Registry of Emissions.

<table>
<thead>
<tr>
<th>Financial year starting</th>
<th>Corporation Threshold</th>
<th>Facility Threshold</th>
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<tr>
<td></td>
<td>GHG (CO₂-e) emission, kilo tonnes</td>
<td>Energy produced, terajoules</td>
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<tr>
<td>2010-Onwards</td>
<td>&gt; = 50 or</td>
<td>&gt; = 200 or</td>
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or facility level NGE reporting (NGER Act, s.13) or carbon liability threshold (CE Act, s20.4) (> 25 kilo tonne CO₂-e or pro-rata in a financial year) by 31 August following the year in which the threshold is met.

Registered corporations must report (NGER Act s19 report) by 31 October each year that contains data relating to the corporate group’s scope 1 and scope 2 emissions, and energy production and consumption.

Clean Energy Act introduces the concept of a ‘liable entity’ in
Units (ANREU) account and notify the natural gas supplier 28 days in advance, the intention to quote OTN. It is mandatory for DSP2 to quote its OTN when purchasing natural gas and mandatory for natural gas suppliers to accept the quotation; breach by either party can lead to a civil penalty on their part (NGER s55A and s55B). GHG emissions from natural gas combustion, purchased with an OTN are to be included in carbon pricing for the facility.

Natural gas is combusted at a facility and no OTN was quoted, then emissions counts towards facility threshold test but not for the calculation of the Provisional Emissions Number (PrEN) for that facility.

Controlling corporation and corporate group members, whose facilities exceed CE Act liability threshold will appear on the Liable Entities Public Information Database (LEPID), which is a publicly available database of liable entities, accessible through the Clean Energy Regulator’s website (www.cleanenergyregulator.gov.au).

Where natural gas is withdrawn and combusted at a facility and OTN was quoted, and where natural gas is made available to another person ‘facility,’ and this does not amount to a supply of gas (not from a natural gas supply pipeline) any use of the natural gas by the second person is taken to be use by the first person. For example, if DSP2 holds an OTN and supplies a quantity of natural gas through its internal pipeline to WTP3 then emissions from this natural gas will be treated as if combusted by DSP2 and to be accounted for its PEN and PrEN.

Where a facility such as ‘WWC1 & WWC2’, WWC3 and WWC4 receives ‘supply’ of natural gas without quoting OTN and combust them, resulting emissions counts towards facility threshold test but not for the calculation of the PEN or PrEN.

Carbon pricing is being introduced in two stages (Fig. 4): 

**Stage 1: Fixed price period** 1 July 2012- 30 June 2015
- Liable entities purchase units up to emissions levels
- Units cannot be traded or banked
- Starting at $23 per tonne for 2012-13; then will rise to five percent every year to $24.15 for 2013-14 and $25.40 for 2014-15
- Australian Carbon Credit Unit (ACCUs) can be used up to 5 per cent of obligation
It must report its provisional emissions numbers (PrENs) and emissions number by 31 October after the end of the relevant financial year or through the NGERS process, if it is registered on OSCAR.

A liable entity’s emissions number is the total of all Provisional Emission Numbers (PrENs).

PrENs are the total:

- covered emissions from a facility for which the liable entity is liable or a share of the total covered emissions as a participant in a JV (MDJV or DDJV); and
- potential natural gas emissions (OTN) for which the liable entity is liable

For the ‘fixed charge period’, a liable entity to report an interim emissions number (IEN) to the CER for a facility (s22AA report) if:

- the facility had covered emissions >= 35,000 tonnes in the previous financial year; or
- the facility is reasonably expected to have covered emissions >= 35,000 tonnes in the current financial year

IEN = 75% of the PrENs for the facility in the last financial year, or

IEN is a reasonable conservative estimate of the PrEN for the facility for this financial year; it may be subjected to unit shortfall charge for an underestimate).

For large gas consuming facility, IEN for natural gas emissions is the amount of potential emissions for 1 July to 31 March of the relevant financial year.

A liability facility can meet its carbon liability through either:

1. Acquiring and surrendering interim emissions units (if any) on or before 15 June in the financial year and on or before 1 February in the year following the relevant financial year its full or balance liability. The process for surrendering units at two points for a fixed price year is known as ‘progressive or provisional surrender’. CCUs/ EUs are surrendered from liable entity’s account in the Australian National Registry of Emissions Units by an electronic notice transmitted to the CER.

2. Paying a unit shortfall charge for the amount of its liability that it did not meet by surrendering eligible emissions units by 15 June and 1 February within five days after 1 February.

The unit shortfall charge is a number representing the difference between its total liability and the amount it actually surrendered through ‘progressive or provisional surrender’, which is then multiplied by a specified amount.

The specified amount is calculated as follows:

- during the fixed price period- 130 per cent of the fixed price payable for carbon units of the vintage of the carbon units not surrendered; and
- For ‘fixed price period’, Unit short fall change (USFC) = 1.30 * fixed price payable for carbon units of the vintage not surrendered.
- During the flexible price period- either an amount specified in regulations, or 200 per cent of the ‘benchmark average auction charge’ for the previous financial year.
For ‘flexible price period’, USFC = 2 * ‘benchmark average auction charge’ for the previous financial year or an amount specified in CE Regulations.

Failing to pay the unit shortfall charge within 15 June + 5 business days and 1 February + 5 business days, the liable entity will also be subject to a late payment penalty, which is equal to 20 per cent per annum of the value of the shortfall charge, unless otherwise specified in regulations.

Therefore, it is cost effective to surrender units than paying unit shortfall charge.

If it is a ‘large gas consuming facility’ like DSP2, it must report its interim emissions number for natural gas emissions, also known as called NGER Act s22AA Report, for the period 1 July to 31 March of the relevant financial year by 15 June of the financial year.

It must report its provisional emissions numbers (PrENs) and emissions number by 31 October after the end of the relevant financial year or through the NGERS process, if it is registered on OSCAR.

A registered entity by electronic notice to the Regulator can surrender its holding eligible emissions or carbon units during the current notice or an earlier eligible financial year.

For fixed charge period (1 July 2012- 30 June 2015), a carbon unit can only be surrendered for its vintage year; otherwise, a carbon unit can be surrendered for its vintage year or its immediate preceding or next following eligible financial year (only after publishing its emission number).

For fixed charge period, eligible international unit can not be surrendered. Only 5% of the emissions number of the entity for the eligible financial year can be through eligible Australian carbon credit units (ACCUs) before 15 June.

For fixed charge years, before the end of 15 June in the relevant eligible financial year, a carbon liable entity gives the Regulator, in writing reasonable estimate of its interim emissions number (CEA 2011, subsection 126(4)

Interim emissions number = 0.75 X Provisional emissions number

For flexible charge period 1 July 2015- 30 June 2018, eligible international unit can be surrendered with an additional ‘surrender charge’.

Transfer of carbon unit between two registered persons (in Australian and international agreement- compliant foreign Carbon Registry) can be carried out through electronic request to the Clean Energy Regulator (CER).

Applicable amount for the financial year means: (a) an amount equal to the per unit charge applicable for the issue of a carbon unit with a vintage year of that fixed charge year; or (b) an amount equal to the benchmark average auction charge for the previous financial year.

Borrowing limit Before the end of 1 February next following the relevant eligible financial year, the entity surrendered, in relation to the relevant eligible financial year, carbon units (the borrowed units) that have a vintage year that next follows the relevant eligible financial year; the number of borrowed units must not exceeds 5% of the entity’s emissions number for the relevant eligible financial year.

Transfer and share of carbon liability and reporting

Normally, a liable entity is the one who has operational control over a facility. However, liability can be transferred to an entity which does not have operational control by way of a liability transfer certificate (LTC) and the LTC holder is now liable for the facility. Reporting transfer certificate (RTC) can be used to transfer reporting responsibilities only but not liabilities. Liabilities and reporting responsibilities is shared or transferred for a joint venture (JV) of two or more controlling corporations. The following section describes these processes.

Liability transfer certificate (LTC) there are two types of LTC that the CER can issue: Corporate Group LTC (CG LTC) and Financial Control LTC (FC LTC). LTC is not applicable when a ‘declared/ mandatory joint venture exists’ for a facility.

Corporate group LTCs is issued to a person (a registered company under Part 2A.2 of the Corporations Act 2001), which is a member of a corporate group and the facility is under the operational control of another member of the same corporate group. It transfers liability for a facility from one group member to another within the same corporate group (e.g. WUCG1, WUCG2, WUCG3, WUCG4). It allows for consolidation of liability under NGER ss 22A and 22AA reporting obligations, with NGER s19 reporting obligations. An application for an LTC cannot be made without the consent of the group member in writing that has operational control over the facility. The applicant must have the capacity, access to information and financial resources to comply with the obligations imposed on it. CG LTC transfers liability under the Clean Energy Act and the NGER Act ss22A and 22AA but does not remove NGER Act s13 threshold and NGER Act s19 reporting obligations. CG LTC allows for all liability for individual group members, to be transferred to a single member in the corporate group, for example to group member who is better placed to manage the financial obligations.

Unless the LTC holder is also the controlling corporation, s22A reports are submitted by two different entities within the same corporate group (e.g. WU1CG1, WU1CG2 and WU1CG3).

A controlling corporation can transfer its NGER Act s19 reporting obligations in relation to a particular facility, to a member of its group, if it either has operational control of the facility; or holds a corporate group liability transfer certificate (LTC) in relation to the facility (NGER Act s22X report that contains Scope 1, 2 emissions, energy consumption and production reports). Reports under s22X have no impact on liability. S22X Report is an administrative provision for transferring s19 reporting and does not impact on liability. Data that is reported under s22X will still count towards the controlling corporation’s s13/ s19 thresholds.

Parties (controlling corporation, liable entity and potential LTC holder for a facility) must jointly notify in writing to the CER regarding the facility, the agreement to transfer reporting obligations before the end of the financial year to which the agreement relates.

Financial control LTCs (FC LTCs) can be issued to a person who passes the ‘financial control test’, is not an individual, not a foreign person and not in the same corporate group as the person with operational control of a facility; it transfer both
Reporting transfer certificates (RTCs) transfer a controlling corporation’s scope 1 and scope 2 emissions, and energy production and consumption reporting obligations to WUFC. WU1 must grant a financial control LTC. RTC transfers liability and s22A/22AA reporting obligations to WUFC. WU1 must not include the facility DSP1 in its s19 report.

**Joint venture** is a study in which a joint venture exists between two separate and independent controlling corporations WU1 and WU2 to have financial control over DSP1. RTCs can assume responsibility only for the controlling corporation’s scope 1 and scope 2 emissions, and energy production and consumption report for facility DSP1 (s22G Report). Corporations holding RTCs, that wish to transfer liability, will need to surrender their RTCs for the facility for a financial control LTC.

Where a facility is a JV, a nomination is required under the NGER Act, and if the nominated entity is a **controlling corporation**, it will be responsible for registering and providing an s19 report in relation to the facility. If the nominated entity is a **member** of a controlling corporation’s group, then a **controlling corporation** will be responsible for registering and providing an s19 report in relation to the facility.

Nominations of operational control in relation to JV’s facilities only apply to a controlling corporation’s s13 thresholds and s19 Reports.

A **Mandatory Designated JV (MD JV)** exists where there is a facility of a JV and no one person has operational control; none of them has greater ability to introduce and implement operating, environmental and health and safety policies for the facility. The participants in the MD JV must jointly notify the CER by 31 July 2012 or within 30 days of a mandatory JV coming into existence. If a MD JV ceases to exist on or after 1 July 2012, participants in the MD JV must jointly notify the CER within 30 days. Failure to notify by the required dates can lead to a civil penalty.

Where a MDJV exists, liability for the covered emissions from the facility is shared between the JV participants and all participants (WU1 and WU2) are liable entities. They must apply for registration (under the NGER Act) accompanying a ‘participating percentage determination (PPD)’. Each MD JV participant must submit a:

- **s22A report** that will include data on: (i) total covered emissions for the facility; and (ii) individual participant’s participating percentage of the total amount of the facility’s covered emissions that give rise to a liability. Participants have the option to have one participant submit the ‘full’ Section 22A report; that allow the remaining participants not to provide facility data again and to refer the earlier report.

- **s22AA (person’s interim emissions number (IEN))** for the relevant financial year, if either the facility had liable covered emissions less than 35,000 tonnes (and lodged NGER Act s19, 22G or 22X report to the CER) in the previous financial year; or the facility is reasonably expected to have liable covered emissions >= 35,000 tonnes in the current financial year.

The IEN for participants in a MDJV will be either: (i) 75% of the participant’s participating percentage of the facility’s liable covered emissions from the previous year; or (ii) conservative estimated 75% of the participant’s participating percentage of the facility’s liable covered emissions for the current year.

Once a nomination of operational control has been made, s19 reporting obligations could be transferred via an RTC to a person (applicant) who: (i) has financial control over the facility; (ii) not part of the same corporate group as the person with operational control of the JV facility. However, RTC would not affect liability for s22A/22AA reporting obligations. Participants in a MDJV cannot transfer their liability and associated reporting obligations via either type of RTC.

### Declared Designated JV (DD JV)

**A Declared Designated JV (DD JV)** is a mechanism that allows for the transfer of liability, from the person with operational control of a facility, to the participants in a JV. A DDJV only exists where one person has operational control and s19 reporting obligations remain with the controlling corporation of the facility.

However, the controlling corporation of a DDJV can use NGER Act s22X report (contain Scope 1, 2, energy consumption and production) to allow its group member to provide reports for the facility. DDJV has a facility (e.g. DSP2) that is operated exclusively for the JV, where none of the participants (WU1 and WU2) are individuals; participants are parties to an agreement that relates to the facility. WU1 and WU2 may jointly apply to the CER to be a ‘DD JV’ accompanied by an application for a ‘participating percentage determination (PPD)’. The CER to declare the JV to be a ‘Declared Designated JV’. In this study, DSP2 is a DDJV with 50% PPD for each of WU1 and WU2.

JV participants must have the consent of the operator of the facility (WU1). They must have the capacity, access to information and financial capacity to meet their obligations.
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<thead>
<tr>
<th>Date Range</th>
<th>Statutory Requirement</th>
<th>Description</th>
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<tbody>
<tr>
<td>1 April of the first financial year that it is liable</td>
<td>Registering on CER's OTN Register for large gas consuming facility.</td>
<td>Nominate operational control for the first nine months of financial year, for entities that don’t meet the operational control test and expect to have an interim emissions number. Register if not already registered under the NGER. If the entity has covered emissions in the current financial year equal to or more than 35,000 tonnes CO₂-e, it has an interim emissions number (for fixed price year only).</td>
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<tr>
<td>30 April (fixed price year only)</td>
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<tr>
<td>1 May in the financial year (for fixed price year only)</td>
<td>Registration for Carbon Liable Entity</td>
<td></td>
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<tr>
<td>1 April to 15 June of the eligible financial year</td>
<td>Eligible emissions units are available for purchase.</td>
<td>Carbon pollution cap (CPC) number will be declared for each of the next four flexible charge years by 31 May every year commencing on 31 May 2014 under the CEA Regulation.</td>
</tr>
<tr>
<td>31 May</td>
<td></td>
<td>1.75% of previous year's total emissions numbers; or 2. current year's conservative estimated (provisional) emissions numbers if covered emissions in the current financial year equal to or more than 35,000 tonnes CO₂-e.</td>
</tr>
<tr>
<td>15 June of the eligible financial year (fixed charge period)</td>
<td>NGER Act s22AA Interim emissions number report to be submitted by the Liable Entity under the CE Act s.127 in a 'fixed charge year'.</td>
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<tr>
<td>15 June in the financial year and by 1 February following the financial year</td>
<td>Notify of existing mandatory designated joint venture</td>
<td>If a water utility has a 'mandatory designated joint venture', it must notify the CER by 31 July 2012.</td>
</tr>
<tr>
<td>31 July 2012</td>
<td>Registration for Carbon Liable Entity, following the financial year it became liable.</td>
<td>Contain data relating to the controlling corporation’s scope 1 and scope 2 emissions, and energy production and consumption.</td>
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<tr>
<td>31 August following the financial year</td>
<td>NGER Act s19 report (OSCAR) to be submitted by the controlling corporation for all facilities under its operational control.</td>
<td>Contain data relating to the corporate group’s scope 1 and scope 2 emissions, and energy production and consumption.</td>
</tr>
<tr>
<td>31 October following the eligible financial year</td>
<td>NGER Act s22A Liable entity report or Provisional Emissions Number Report (PEN) for covered emissions for all facilities under its operational control.</td>
<td>Contain data relating to the facility’s scope 1 and scope 2 emissions and energy production and consumption.</td>
</tr>
<tr>
<td>31 October following the eligible financial year</td>
<td>NGER Act s22E Financial control liability transfer certificate holder report for facilities subject to FC LTC for the financial year for Scope 1 &amp; 2 emissions, energy consumption and production.</td>
<td>Contain data on the facility’s scope 1 and scope 2 emissions and energy production and consumption for the facility.</td>
</tr>
<tr>
<td>31 October following the eligible financial year</td>
<td>NGER Act s22X Transfer of a controlling corporation’s s19 reporting obligations to a group member. Members of a Controlling Corporation’s Group that has operational control or LTC for a facility subject to s22X agreement. It contains facility’s scope 1 and scope 2 emissions, and energy production and consumption.</td>
<td>S22X Report is an administrative provision for transferring s19 reporting and does not impact on liability. Data that is reported under s22X will still count towards the controlling corporation’s NGER s13/s19 thresholds.</td>
</tr>
<tr>
<td>31 October following the eligible financial year</td>
<td>NGER Act s22G RTC holder’s report for facilities subject to RTC for a financial year for scope 1 and scope 2 emissions and energy production and consumption (s22G Report).</td>
<td>A controlling corporation (WUFC) who has financial control over a facility (DSP1), can transfer facility’s (DSP1) scope 1 and scope 2 emissions, and energy production and consumption report (s22G Report) to WU1 who has operational control.</td>
</tr>
<tr>
<td>1 February + 5 business days</td>
<td>Pay unit shortfall charge</td>
<td>If not enough units are surrendered to cover interim emissions numbers, a unit shortfall charge is due and payable and late payment penalties start to accrue.</td>
</tr>
</tbody>
</table>
and must have a satisfactory record of compliance with the CE Act.

Each participant in the DDJV will be a liable entity, and be required to register under the NGER Act. Liability will be shared in accordance with each participant’s PPD. Each participant must submit s22A/22AA reports.

The RTC can be used to transfer Section 19 reporting obligations in relation to the DDJV facility from the controlling corporation of the person with operational control of the facility to a person outside its corporate group who has financial control over the facility. However, RTC would not impact on who has CER liability and the associated s22A/s22AA reporting obligations.

A declaration as a DDJV and a liability transfer certificate (LTC) may not be used concurrently. Participants in a JV that meets the DDJV test must choose whether to:

- Stay with the default position (liability and the associated s22A/s22AA reporting obligations with the person with operational control);
- Transfer liability (and the associated reporting obligations) to the participants in the JV by applying for a declaration of a DDJV; or
- Transfer liability and the associated Section 22A and Section 22AA reporting obligations to another member within its corporate group (via a corporate group LTC); or
- Transfer liability the associated Section 22A, Section 22AA and Section 22E reporting obligations to a person outside its corporate group, provided that person has financial control over the facility.

Participating percentage determinations

A PPD is the way in which liability for a facility is divided between the participants of a DDJV and MDJV.

When MDJV/ DDJV participant notify the CER of its existence, it must also apply to the Regulator for a PPD stating appropriate PP for each JV participants based on:

- Each participant’s share of goods for the facility; or
- Each participant’s share of access to services for the facility; or
- Some other percentage, that equally or better represents the way the economic benefits from the facility are shared among the participant.

Key dates, liabilities and reporting obligations for an urban water utility is provided in Table 3.

Eligible carbon or emission unit

A carbon unit is issued by the CER for the purposes of satisfying liabilities under the CE Act. An eligible emissions unit is a carbon unit, an eligible Australian carbon unit (ACCU), or an eligible international emissions unit. Each carbon unit (CU) has a unique identification number, vintage year and represents one tonne emissions of carbon dioxide equivalent (CO$_2$ e). A carbon unit is personal property and is transmissible by assignment, by will and by devotion by operation of law. A holder of a carbon unit in the Australian National Registry of Emissions Units (ANREU) is the legal owner of the unit under the CE Act and ANREU Act.

Australian carbon credit unit (ACCU)

Eligible Australian carbon credit unit (ACCU) includes Kyoto Australian carbon credit unit (under the Carbon Credits (Carbon Farming Initiative) Act 2011) and non-Kyoto Australian ACCU under the CEA 2011. An ACCU is a unit issued by the CER for greenhouse gas abatement activities undertaken as part of the Carbon Farming Initiative (CFI). CFI covers activities and emissions not covered by carbon price. Credits can be generated by projects such as: reducing legacy waste emissions from landfills—flaring, power generation, diversion to composting on the land—reducing emissions from livestock, planting trees, preventing land clearing.

Kyoto eligible credits can be used:

- 100 per cent liability for landfills during fixed price period
- 5 per cent of liability for all other entities during fixed price period
- Unlimited for all entities during flexible price period

In the fixed price period, a liable entity can surrender no more than five per cent of its total liability through eligible ACCUs. However, if the majority (at least 50 per cent) of its liability comes from landfill emissions, it can surrender ACCUs to meet its full liability for the landfill during the fixed price period.

In the flexible price period, there will be no limit on the surrender of ACCUs.

Eligible international emissions units (EIEU)

Eligible international emissions units (EIEU) under the ANREU Act 2011 are: (i) certified emission reductions (CER), not temporary or long-term CERs; (ii) emission reductions units (ERUs); (iii) removal units (RUs); (iv) a prescribed unit issued in accordance with the Kyoto rules; and (v) prescribed international units.

Certified emission reductions (CER) or emission reduction units (ERU) generated by the following activities cannot ever be used: nuclear energy projects; destruction of trifluoromethane (HFC-23); destruction of nitrous oxide from an adipic acid plant; and large-scale hydro-electric projects not consistent with criteria adopted by the European Union (based on the World Commission on Dams Guidelines).

One cannot use eligible international emissions units to satisfy liability in the fixed price period. In the flexible price period, until 2020/21 one can satisfy its liability using no more than 50 per cent of eligible international emissions units.

Eligible emissions units are surrendered from an account of the liable entity in the Australian National Registry of Emissions Units by an electronic notice transmitted to the CER

Carbon pollution caps

<table>
<thead>
<tr>
<th></th>
<th>2015-16</th>
<th>1 Jul 2016 onwards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Default carbon pollution cap (CPC) number or limits (in absence of regulation)</td>
<td>12,000,000</td>
<td>38,000,000</td>
</tr>
</tbody>
</table>

A carbon pollution cap (CPC) will be introduced in the flexible charge year commencing 1 July 2015. CPC number for vintage year is the sum of number of auctioned carbon units, free carbon units (under the Jobs and Competitiveness Program,
JCP and coal fired electricity generators (CFEJ) in a ‘flexible charge year’. JCP and CFEJ do not apply to water utilities. CPC number will be declared for each of the next four flexible charge years by 31 May every year commencing on 31 May 2014 under the CEA Regulation.

**Carbon market and governance**

The carbon market is comprised of primary, secondary and derivative carbon markets (Fig. 5). The primary market comprises the original issues of carbon units by the CER during 1 July 2012 and 30 June 2015, which can be purchased by liable entities for a fixed price upon application in writing to the CER, or free under assistance programs. Post 1 July 2015, carbon units will be available for all liable and non-liable entities – to acquire via auctions of original issues by the CER. Exchange (buying and selling) of carbon units after the initial entry of carbon units in the primary market, establishes the secondary market. The secondary market encompasses over the counter (OTC) transactions and transactions on licensed and exempt financial markets. All carbon units other than fixed price carbon units may be acquired by anyone and hence the secondary market for carbon units will be open to all. The CE Act also permits markets in futures, derivative and other structured or synthetic products, known as the forward or derivative market.

Governance of the carbon pricing is shared among the Australian Government, the Parliament, Clean Energy Regulator (CER), Climate Change Authority (CCA) and Productivity Commission (PC) as shown in Fig. 6.

The CER works in close partnership with other regulatory agencies that have regulated responsibilities under climate change and other legislation. This includes sharing of relevant information, intelligence gathering, and referring matters for law enforcement.

CCA to provide independent advice to the Government on the performance of: the carbon price; the CEA Act; Australia’s medium and long-term emissions targets and carbon budget; and functions and powers of the Clean Energy Regulator (CER), portfolio and other Ministers.

Productivity Commission (PC) to review and report on International carbon pollution reduction actions, JCP and fuel excise and taxation regime.

An overview of significant activities and events with key dates that could influence the evolution of the Australian carbon market is shown in Fig. 8.

**Assistance to Industries**

A number of industry assistance programs e.g., (i) Jobs and Competitiveness Program (JCP); (ii) Energy Security Fund (ESF) or Coal-fired Generators Assistance Package (CGAP); and (iii) Clean Technology Investment Program (CTIP) are available. However, urban water utilities are not eligible for these programs.

**Sale/auction of carbon units**

A water utility that has carbon liability or intend to buy or sell CUs for carbon offset, must register in the Carbon Registry ANREU. A liable entity having a registry account can apply to the CER for the issue of a specified number of carbon units at designated price (Table 3) that is equal to (entity’s emissions number or total interim emissions number for the vintage year – total number of eligible emissions units surrendered by the entity in relation to the vintage year).

For flexible charge period commencing 1 Jul 2015, CER issues carbon units to registered liable entity through auction provided the person has tendered or lodged a deposit covering total amount of charges payable for the units; otherwise it is a debt due to the Commonwealth; and recovered by the CER by court action. In the auction, an entity must be willing to pay above the ‘reserve price’ a for carbon unit (CU), which are $15, $16 and $17.05 for vintage year beginning 1 July 2015, 2016 and 2017 respectively.

**Figure 5: Structure of the carbon market**
The Regulator must ensure that not more than 15 million carbon units with a particular vintage year are issued through auctions:

- during a financial year if the financial year begins more than 12 months before the vintage year starts; or
- during first 6 months of the financial year immediately preceding the vintage year; and
- there are regulations for carbon pollution cap for the vintage year.

### Carbon price and reporting

**Table 3: Issue of carbon units for fixed charge**

<table>
<thead>
<tr>
<th>Item</th>
<th>Issue period</th>
<th>Vintage year: Financial year beginning on</th>
<th>$ per Carbon unit</th>
<th>Max. no. of CU to be issued for the vintage year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 Apr- 15 Jun 2013</td>
<td>1 July 2012</td>
<td>$23</td>
<td>Total Interim emissions no. of the utility – EU surrendered</td>
</tr>
<tr>
<td>2</td>
<td>1 July 2012- 1 February 2014</td>
<td>1 July 2012</td>
<td>$23</td>
<td>Emissions no. of the utility - EU surrendered</td>
</tr>
<tr>
<td>3</td>
<td>1 April- 15 June 2014.</td>
<td>1 July 2013</td>
<td>$24.15</td>
<td>Total Interim emissions no. of the utility – EU surrendered</td>
</tr>
<tr>
<td>4</td>
<td>1 July 2013- 1 February 2015</td>
<td>1 July 2013</td>
<td>$24.15</td>
<td>Emissions no. of the utility - EU surrendered</td>
</tr>
<tr>
<td>5</td>
<td>1 April- 15 June 2015.</td>
<td>1 July 2014</td>
<td>$25.40</td>
<td>Total Interim emission no. of the utility for the vintage year – EU surrendered</td>
</tr>
<tr>
<td>6</td>
<td>1 July 2014- 1 February 2016</td>
<td>1 July 2014</td>
<td>$25.40</td>
<td>Emissions no. of the utility - EU surrendered</td>
</tr>
<tr>
<td>7</td>
<td>1 July 2015- 1 February 2017</td>
<td>1 July 2015</td>
<td>CU $ prescribed by the CE Regulations (CER)</td>
<td>Emissions no. of the utility - EU surrendered</td>
</tr>
<tr>
<td>8</td>
<td>1 July 2016- 1 February 2018</td>
<td>1 July 2016</td>
<td>1.07625 times CU in Item 7 ($)</td>
<td>Emissions no. of the utility - EU surrendered</td>
</tr>
<tr>
<td>9</td>
<td>1 July 2017- 1 February 2019</td>
<td>1 July 2017</td>
<td>1.07625 times CU in Item 8 ($)</td>
<td>Emissions no. of the utility - EU surrendered</td>
</tr>
</tbody>
</table>
NGER Act Scope 1, 2 and CE Act covered emissions from every ‘water treatment and networks’ and ‘wastewater treatment and networks’ are provided in Table 2. However, those emissions at the facility level will determine ‘carbon pricing’ and reporting liabilities. Carbon price and reporting responsibilities for corporate groups is summarized in Table 4. WU1 and WU2’s total covered emissions constitute only 11% of their total Scope 1 and 2 greenhouse emissions. That means 89% of carbon tax or carbon price for water and sanitation services are either coming from upstream supply chain e.g. coal- based electricity generator or are not accounted for in water services pricing.

Compliance monitoring and enforcement
To ensure compliance by liable entities, the CER has range of powers to investigate and enforce the NGER and the Clean Energy legislation, such as:
1. Investigation powers
2. Audits by independent auditors

Figure 7: Key stakeholders’ roles and responsibilities in carbon pricing
Figure 8 Significant events during the evolution of the Australian carbon market
3. Enforcement powers and civil and criminal sanctions:

Enforcement powers range in seriousness from administrative penalties and infringement notices to substantial civil penalties and criminal sanctions for dishonest or fraudulent behaviour. They are:

4. Late payment penalty
5. Fraudulent conduct
6. Court may order relinquishment of a number of carbon units issued as a result of fraudulent conduct by an entity.

A registered holder may relinquish carbon units by electronic notice transmitted to the Regulator, specifying the purpose (Jobs and Competitiveness Program, fraudulent conduct).

If, a liable entity has not relinquished carbon units by the compliance deadline, it is liable to pay to the Commonwealth, a penalty within 30 days after the compliance deadline as follows:

\[
\text{Penalty} = (\text{No. of CUs required to be relinquished} - \text{No. of CUs actually relinquished}) \times \text{Penalty rate per carbon unit}
\]

If a liable entity fails to pay within 30 days after the compliance deadline, it is liable to pay a ‘late payment penalty’ calculated at the rate of 20% per annum; or at other specified rate in the CE Regulation.

7. Anti-avoidance: Under the CE Act or the Carbon Farming Initiative (CFI) Act, where a person has entered into a scheme to avoid an existing, or future liability, to pay an administrative penalty or a unit shortfall charge, that person commits an offence.

An entity entered into a scheme with the intention/knowledge/belief to avoid existing/future liability to pay unit shortfall charge/administrative penalty, commits an offence. Maximum penalty of imprisonment for 10 years or 10,000 penalty units, or both.

Above penalties are debts due to the Commonwealth and may be recovered by the Regulator, on behalf of the Commonwealth, by court action.

**CONCLUSION**

For a water utility, defining its facility boundary is critical to determine its carbon liability and reporting responsibilities. However, facility definition for water utilities must comply with the National Greenhouse and Energy Reporting (NGER) Act and the Clean Energy Act. Otherwise, water utility could be prone to potential regulatory breaches and enforcement actions, both civil and criminal offences, by the Clean Energy Regulator (CER). With the carbon pricing mechanism in its current form, majority (89%) of the carbon cost associated with drinking, recycle water and sanitation services (Scope 1 and 2) are paid by the water utility through fuel taxes, electricity charges in its supply chain upstream. It only pays for fugitive methane and nitrous oxide emissions from sanitation services and emissions from burning natural gas at its large gas consuming facilities (LGCF) through quoting its ‘obligations transfer number (OTN)’ during procurement.

**REFERENCES**

Australian Government, Clean Energy Act 2011
Australian Government, Clean Energy Regulation 2011
Evolution of the Australian Carbon Market