Colac Otway Shire

Development of a Carbon Neutral Plan

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Roadmap for a Carbon Neutral Plan

ARUP

Contents

Executive Summary

In 2010, Colac Otway Shire Council (the 'Council' or the 'Shire') set a goal to achieve carbon neutrality by 2016. With support from the Victorian Sustainability Accord, the Shire engaged Arup to develop a Carbon Neutral Options and Cost-Benefit Report and Roadmap for the Council's next Carbon Neutral Plan (Roadmap).

The Roadmap provides the basis for developing the operational Carbon Neutral Plan. It has been developed through a systematic process of:

- Identifying emissions reduction initiatives.
- Prioritising them on a financial basis.
- Consultation with Council's project team and Councillors, and
- Staging to account for practical implementation over time.

The Council's project team and Arup presented the findings from the cost-benefit analysis to Councillors on 27 February 2013.

Following the presentation, Councillors agreed to:

- Extend the carbon neutral target to 2020.
- Investigate and implement the emissions reduction initiatives shortlisted by the Council project team, and
- Further investigate the potential for local offset projects.

The resultant Roadmap provides a strategic view of the steps Council should consider to achieve its carbon neutral target in 2020.

The contents of the Roadmap are as follows.

Section 1 – Description of Roadmap Options

Section 1 is an overview of the Carbon Neutral Plan options, including preferred Option 2. Option 2 includes all emissions reduction initiatives that pay back within 10 years. The initiatives are allocated for implementation between 2014 and 2020.

By 2020, Option 2 reduces Council's carbon footprint by approximately 15% compared to its 2011/12 baseline.

Section 2 – Summary of Carbon Reduction Measures

Section 2 provides the quantitative detail of each emissions reduction initiative including costs, savings and greenhouse gas reductions. This section also outlines the steps to implement each initiative.

Section 3 –Foundations for Roadmap Implementation

Section 3 describes immediate next steps to lay the foundations for implementing the Roadmap through a Carbon Neutral Plan. Recommendations include:

- Site-specific cogeneration study for Blue Water Fitness Centre.
- Feasibility study into the development of a local offsets project.
- Training program to build the capacity of Council staff for carbon management and data collection, and
- Review of diesel usage data collection and analysis.

This Roadmap provides the foundations for implementation by outlining the steps between now and 2020 for achieving carbon neutrality. It also recommends the immediate steps to be taken to establish strong foundations for the Carbon Neutral Plan.

1 Description of Roadmap Options

On 27 February 2013, the Council's project team and Arup presented the following three approaches to meet the Council's carbon neutral target:

- **Option 1 –** Offset total emissions from 2016 with no additional investment in reduction initiatives.
- **Option 2 –** Implement financially attractive emissions reduction initiatives to achieve 15% carbon emissions reduction by 2016, the remainder of which will be offset in the target year.
- **Option 3 –** Implement all measures with a 10-year payback to achieve a 23% reduction in carbon emissions by 2016.

Following the presentation, Councillors agreed to:

- Adopt Roadmap Option 2.
- Extend the carbon neutral target to 2020.
- Investigate and implement the emissions reduction initiatives shortlisted by the Council project team, and
- Further investigate the potential for local offset projects.

The Option 2 priority reduction initiatives are described in Table 1.

Table 1 Priority Reduction Initiatives for Roadmap (Option 2)

Category	Initiative	Description
Energy Supply	Solar photovoltaic (PV) - Large sites	Solar PV panels reduce electricity requirements for lighting and appliances.
	Gas hot water replacement for electric hot water heater	The replacement of instantaneous electric hot water boilers with gas hot water replacements.
	Cogeneration	The installation of a 70kWe cogeneration facility at Bluewater Fitness Centre
Building fabric	Roof insulation - Large sites	Upgrading of roof insulation to reduce heating and cooling requirements.
	Draught proofing – Large sites	Draught proofing of vents and openings of buildings with seals.
Lighting	Sensor lighting	Sensors may be installed to control when lighting system in certain facilities is turned on, such as meeting spaces.
	Lighting upgrades	Convert old lighting to more efficient T5 fluorescent lamps.
Heavy Fleet	Purchase B20 Biodiesel fuel	Biodiesel is a lower carbon intensity option then other commonly used fuels such as LPG. B20 accounts for 20% of the diesel being from biodiesel.

Category	Initiative	Description
	Adopt LGP fuelled vehicles	LPG is a lower emission fuel than standard petrol.
Lighting	T5 Lighting Replacement	Replacement of 42W CFL's with T5s within toilet blocks.
	32W CFL Lighting Replacement	Replacements of both 42W and 80W lights with 32W CFLs.

The above initiatives have been prioritised on the basis of:

- Arup's calculation of a payback period of 10 years or less, and/or
- Other contextual factors as advised by the Shire. In particular these are:
    - *Solar PV - Large sites* has been included due to Council's advanced investigations into the installation of PVs on Council's main office site. Council has sourced a cost estimate to supply and install these panels, and found that these may be financially viable.
    - *Gas hot water replacement for electric hot water heater* has been prioritised due to the success of past installations on Council buildings.

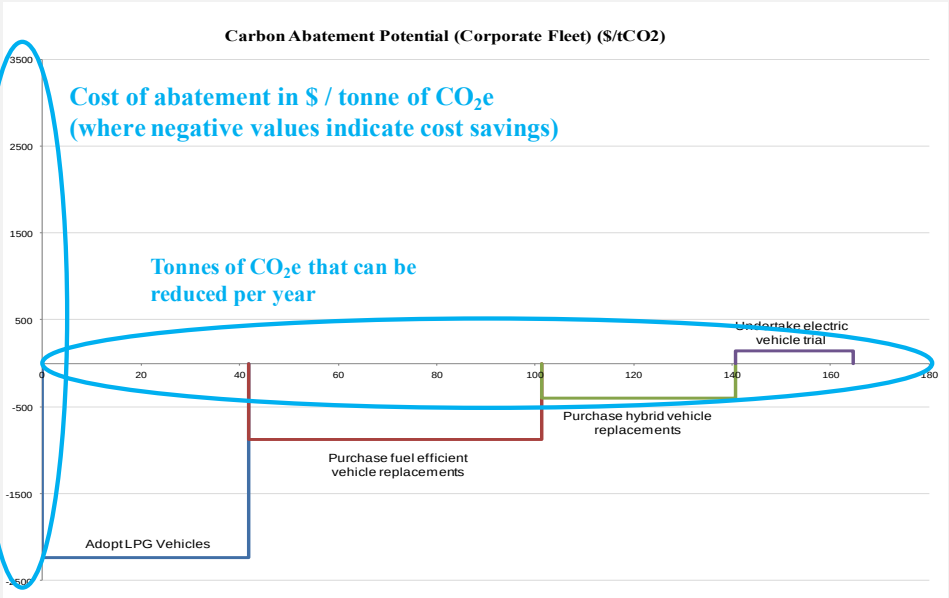
Some priority initiatives have high upfront costs and will require external funding and/or local supply chain capacity :

- *Cogeneration* provides significant emissions reductions and will require a feasibility study. The feasibility study would provide the technical and financial basis for external funding applications.
- *Electric vehicle trial* is an emerging strategy that is prioritised for long term implementation. Current barriers to implementation include the initial costs and lack of infrastructure and capability to maintain electric vehicles (such as the provision of appropriate charging stations in the region).

The initiatives comprising Option 2 are summarised in the Marginal Abatement Cost Curve (MACC) (Figure 1). The MACC considers the measures stated in Table 1, except for "gas hot water replacement for electric hot water heater" as no analysis was undertaken.

Box 1 provides a description of how the MACC should be interpreted.

Box 1 Reading Marginal Abatement Cost Curves



A Marginal Abatement Cost Curve (MACC) describes initiatives and the relative cost of carbon abatement, as well as the total greenhouse gas emissions reduced per annum.

The **vertical axis** represents the cost of reducing greenhouse gas emissions. If the cost is negative, this indicates cost savings associated with greenhouse gases (for example, reducing electricity reduces energy costs, as well as greenhouse gas emissions).

The **horizontal axis** represents the amount of carbon emissions that can be reduced by implementing an initiative across one year, in tonnes of CO_2e.

The most viable initiatives are those below the horizontal axis of the graph with the greatest width. These initiatives indicate the greatest financial benefit, and have the largest potential reduction in carbon emissions.

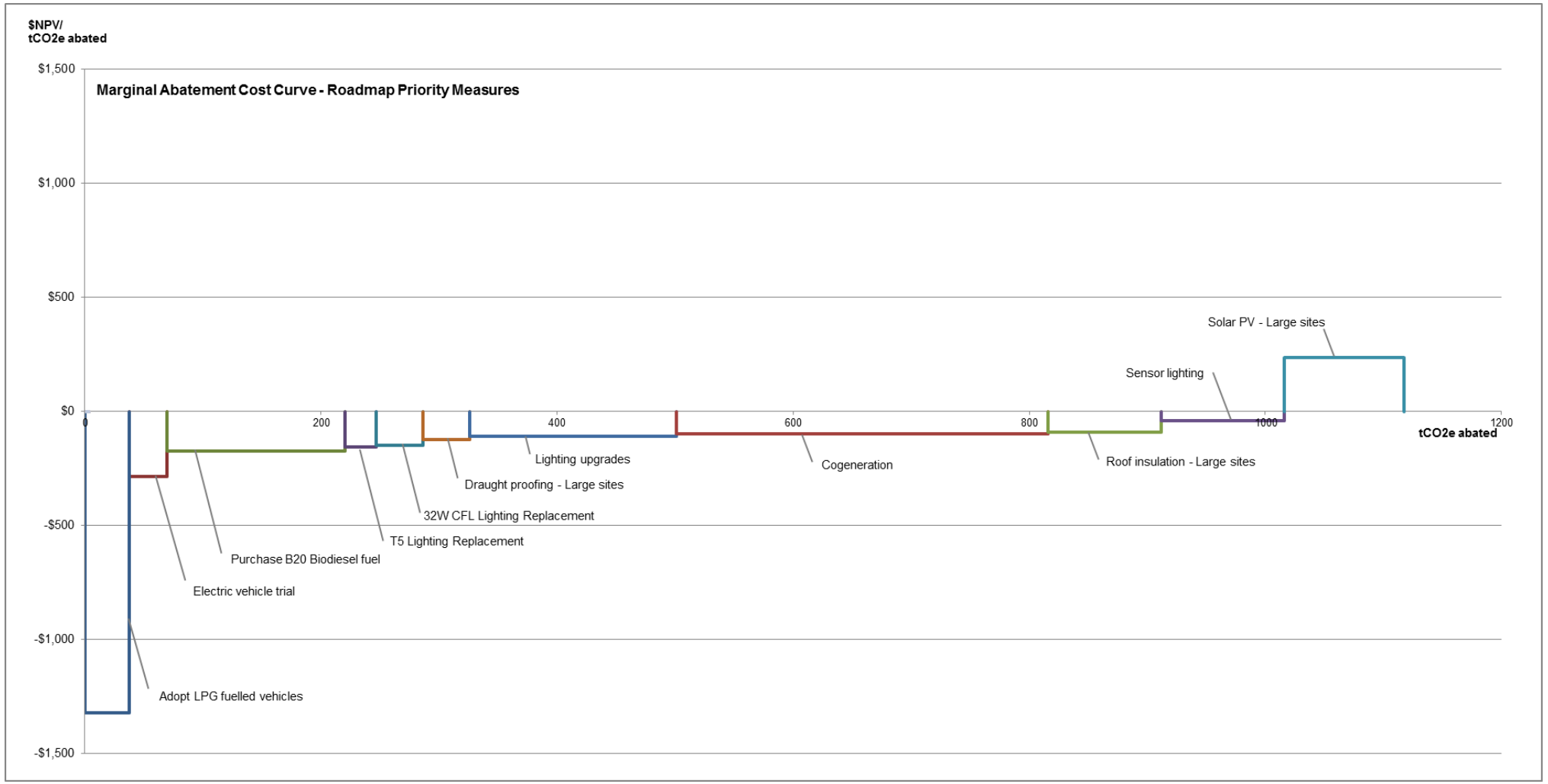


Figure 1 Roadmap of Priority Initiatives - Marginal Abatement Cost Curve for Option 2

2 Details of Emissions Reduction Initiatives

Table 2 provides details of the priority emissions reduction initiatives including annual reductions in greenhouse gas emissions by 2020 and financial savings accumulated in the period 2013-2020 depending on the staging of implementation.

The initiatives have been staged to limit annual implementation costs to around $150,000. This upper limit excludes the initial costs of cogeneration and electric vehicles, for which Colac Otway Shire Council would seek external funding.

Capital costs are indicative, based on Arup general databases and experience on similar projects. Over time and due to site-specific conditions, costs may be higher or lower than estimated. Table 3 outlines steps to implement the priority initiatives.

Table 4 considers the adoption of cogeneration and electric vehicles, which require feasibility studies before they can be priority.

Table 2 Emissions Reductions, Energy Savings and Capital Costs Over Time for Priority Initiatives, Plus Cogeneration and Electric Vehicles

	Emissions Reduction Initiative	Annual Emissions Reductions at 2020 (tCO_2e p.a.)	Total Capital Cost ($)	2014	2015	2016	2017	2018	2019	2020	Cumulative Energy Cost Savings ($NPV)
Priority initiatives	Draught proofing - Large sites	39	$16,000	$16,000							$44,000
	T5 Lighting Replacement	26	$4,000	$4,000							$33,000
	32W CFL Lighting Replacement	40	$9,000	$9,000							$49,000
	Sensor lighting	104	$126,000		$42,000	$42,000	$42,000				$89,000
	Lighting upgrades	175	$110,000		$37,000	$37,000	$36,000				$149,000
	Gas hot water replacement for electric hot water heaters	Not determined	Not determined	Not determined							Not determined
	Purchase B20 Biodiesel fuel	151	$-	$ -	$ -	$ -	$ -	$ -	$ -		$235,000
	Adopt LPG fuelled vehicles	38	$75,000		$15,000	$15,000	$15,000	$15,000	$15,000		$247,000
	Roof insulation - Large sites	95	$62,000					$31,000	$31,000		$35,000
	Solar PV - Large sites	102	$366,000	$61,000	$61,000	$61,000	$61,000	$61,000	$61,000		$65,000
	Cogeneration[1]	315	$178,000		$178,000						$173,000
	Electric vehicle trial[1]	32	$126,000					$63,000	$63,000		$64,000
	Purchase of offsets for remaining emissions	3,330	-							$73,000	-
	GRAND TOTAL		**$1,072,000**	**$90,000 +**	**$333,000**	**$155,000**	**$154,000**	**$170,000**	**$170,000**	**$73,000**	**$1,183,000**

[1] These initiatives will require further feasibility studies and funding, as described in Section 1.

Table 3 Steps to Implement Priority Initiatives – Immediate, Medium and Long Term

Emissions Reduction Measure		Steps for Implementation	
		2013	**2014**
Priority initiatives – immediate	Draught proofing - Large sites	1. Consult Council's Sustainable Assets Team 2. Identify large sites with potential for draughts 3. Engage Sustainable Assets Team to incorporate draught proofing activities in 2014 plans	4. Procure draught proofing materials 5. Implement draught proofing scheme
	T5 Lighting Replacement *and* 32W CFL Lighting Replacement	1. Consult Council's Sustainable Assets Team 2. Identify potential light and light fitting replacements in public areas such as toilets 3. Engage Sustainable Assets Team to incorporate public lighting replacement scheme in 2014 plans	4. Procure T5/CFL lighting replacements for suitable public lights 5. Implement public lighting replacement scheme

Carbon Reduction Measure		Steps for Roadmap Implementation				
		2013	**2014**	**2015**	**2016**	**2017**
Priority Initiatives – medium term	Sensor lighting *and* Lighting upgrades	1. Engage Council Sustainable Assets Team to undertake lighting audit	2. Develop plan to identify sites with fittings for replacement	3. Implement building lighting upgrades – light fittings and sensors on 33% of planned sites.	4. Implement building lighting upgrades – light fittings and sensors on 33% of planned sites.	5. Implement building lighting upgrades – light fittings and sensors on the remaining planned sites.
	Gas hot water replacement for electric hot water heaters	1. Engage Council Sustainable Assets Team to undertake electric water heater audit on small sites (or all sites)	2. Replace electric hot water heaters with gas hot water replacements on small sites			

Carbon Reduction Measure		Steps for Roadmap Implementation						
		2013	2014	2015	2016	2017	2018	2019
Priority Initiatives – long term	Purchase B20 Biodiesel fuel	1. Engage Council Major Contracts Team to review compatibility of B20 biodiesel with heavy fleet 2. Source regional supplier of B20 biodiesel	3. Bulk-purchase, manage and implement B20 biodiesel in compatible heavy fleet	4. Bulk-purchase, manage and implement B20 biodiesel in compatible heavy fleet	5. Bulk-purchase, manage and implement B20 biodiesel in compatible heavy fleet	6. Bulk-purchase, manage and implement B20 biodiesel in compatible heavy fleet 7. Re-investigate potential of B100 biodiesel compatibility with fleet, and regional availability	8. Bulk-purchase, manage and implement B20 (or B100 where available) biodiesel in compatible heavy fleet	9. Bulk-purchase, manage and implement B20 (or B100 where available) biodiesel in compatible heavy fleet
	Adopt LPG fuelled vehicles	1. Engage Council Major Contracts Team to review corporate fleet 2. Identify suitable LPG conversion vehicles	3. Develop plan to convert or replace suitable vehicles with LPG	4. Implement LPG conversion or purchase on 20% of suitable vehicles	5. Implement LPG conversion or purchase on 20% of suitable vehicles	6. Implement LPG conversion or purchase on 20% of suitable vehicles	7. Implement LPG conversion or purchase on 20% of suitable vehicles	8. Implement LPG conversion or purchase on remaining suitable vehicles
	Roof insulation - Large sites				1. Engage Sustainable Assets Team to review of large sites with inadequate roof insulation	2. Incorporate plan for roof insulation installation on large sites	3. Procure and implement roof insulation on 50% of appropriate sites	4. Procure and implement roof insulation on remaining 50% of appropriate sites
	Solar PV - Large sites	1. Engage Capital Works Team to identify potential sites	2. Procure and install approximately a sixth of potential sites (or estimated roof area coverage) with Solar PV	3. Procure and install approximately a sixth of potential sites (or estimated roof area coverage) with Solar PV	4. Procure and install approximately a sixth of potential sites (or estimated roof area coverage) with Solar PV	5. Procure and install approximately a sixth of potential sites (or estimated roof area coverage) with Solar PV	6. Procure and install approximately a sixth of potential sites (or estimated roof area coverage) with Solar PV	7. Procure and install approximately a sixth of potential sites (or estimated roof area coverage) with Solar PV

Table 4 Steps to Implement Priority Initiatives that require Further Investigation and Funding

	Carbon Reduction Measure	Steps for Roadmap Implementation							
		2013	2014	2015	2016	2017	2018	2019	2020
Priority Initiatives – further investigation and funding	Cogeneration	1. Review feasibility of cogeneration installation at Blue Water Fitness Centre 2. Design in capability for cogeneration to be installed in redeveloped Centre.	3. Seek external sources of funding 4. Construct Centre with flexibility to install cogeneration	5. Procure and install cogeneration at renovated Blue Water Fitness Centre					
	Electric vehicle trial					1. Engage Council Major Contracts Team to review corporate fleet 2. Investigate potential for electric vehicle trial 3. Incorporate a limited number of electric vehicles to replace small corporate fleet vehicles	4. Procure half of planned electric vehicles in trial	5. Procure remaining half of planned electric vehicles in trial	

3 Foundations for Roadmap Implementation

This section details discrete, immediate projects which the Council may undertake to implement a Carbon Neutral Plan on the basis of this Roadmap.

3.1 Updated Cogeneration Study for Bluewater Fitness Centre

Arup's desktop analysis identified cogeneration at the Blue Water Fitness Centre as potentially financially attractive however, this option has previously been discounted as part of the design of the redeveloped centre.

Arup recommends that cogeneration be re-investigated in more detail. The updated study would be supported by recent work Arup has undertaken with the councils of Boroondara, Yarra, Darebin and Monash to develop a structured approach to investigating site-specific cogeneration study for leisure centres.

The output of this process – *Tools to support Victorian councils streamline cogeneration feasibility studies* – will soon be released to local government through Department of Environment and Primary Industries (previously Department of Sustainability and Environment) and the Municipal Association of Victoria and can form the basis of updating the Shire's previous cogeneration study.

3.2 Review of Diesel Consumption Data

Reflecting that nearly half of the Shire's emissions come from bulk diesel associated with vehicles, Arup recommends that Council investigates the collation, accuracy and completeness of data. The review may also seek to understand how diesel is used and further opportunities for fuel cost savings. The investigation may require the briefing of operational staff or an independent review by a third party.

In addition to the bulk diesel review, Arup recommends that the Council implement procedures to record fleet card data.

In other similar organisations, the use of fleet cards often requires the purchaser of fuel to state the odometer reading of the car (in which the fleet card is specific to that vehicle). The implementation of the procedure will provide Council accurate and detailed data for specific vehicles. This enables Council to identify opportunities for improvement through targeted vehicle management or replacement.

As a minimum, Arup recommends that Council audits corporate vehicles and heavy fleet vehicle every six months to make an accurate distance record.

3.3 Foundation Carbon Management Training Across Council

The Carbon Neutral Plan will involve staff across the Council's organisation and so represents an opportunity to build climate change awareness and capacity amongst a wide range of internal stakeholders.

Such awareness raising and capacity building may be undertaken through a tailored, foundation training program which may comprise:

- A 2 hour training sessions for Councillors, executive staff and senior management.
- A half day training session for operational staff with responsibilities to implement reduction initiatives (staff identified in Table 3 and Table 4).

The training content may be based on the Municipal Association of Victoria's successful carbon management training program which Arup developed and delivered to over 50 councils in 2012.

The training program may be adapted to address the specific priorities of Council staff, potentially:

- For the **Sustainable Assets Team** the training may focus on accurate building energy use data collection, and an audit of the existing condition of building assets regarding lighting fixtures, insulation and draught proofing opportunities.
- For the **Finance and Customer Service Team**, and in particular accounts payable and receivable staff who may have direct contact with utility bills and fuel usage cards, training may assist finance staff to identify the most useful information regarding the monitoring of carbon reduction measures.
- For the **Capital Works Team** the training may focus on fleet management, and in particular the importance of collecting accurate data on fuel usage (both bulk purchasing and fleet fuel cards).

3.4 Offset Policy and Procurement

The Options and Analysis Report (accompanying this Roadmap) describes the considerations associated with procuring offsets. The selected offset or suite of offsets will take into account Council's preference in relation to:

- Locality – e.g. local, Australian or overseas.
- Project type – e.g. energy efficiency, reforestation.
- Project co-benefits – e.g. community awareness, biodiversity.
- Cost.
- Reputation implications.

Arup recommends that the Council consults internal and external stakeholders to understand people's preferences when procuring offsets; potentially culminating in an offset policy.

Given the complexity of offset products and processes, Arup recommends an initial workshop with Council stakeholders to:

- Share information regarding the costs and benefits of different types of offsets.
- Gather information about the offset-related preferences of the stakeholders.

Once a draft Offset Policy is circulated and confirmed amongst stakeholders, it will provide a robust basis for a tendering process. This may initially be for Expression of Interest from partners for a local offset project and/or a Request for Quote for commercially available offsets.

Council has priority the project team's recommendation to investigate the development of a local offset project which has the potential for community development and biodiversity benefits. Local offsets are typically vegetation management projects.

Establishing local offsets as a Council may be a complex task, and requires clear systems and agreements for the long term management of land dedicated for offsets. Offset projects may be registered as a Carbon Farming Initiative (CFI) project. Registration allows offsets to be sold to third parties seeking offsets that comply with the National Carbon Offset Scheme (NCOS) however, registration involves legal and financial commitments which Council may not wish to adopt.

Arup recommends that the Council undertake an investigation into the requirements for establishing a local offset project. The scope of the investigation is outlined in Table 5.

Table 5 Steps for Investigating and Implementing Local Offsets

Year	Step to Implement
2013	***1. Investigate approved CFI methodologies related to local offset projects*** Whether or not Council wish to register a project under Australia's CFI, the CFI methodologies provide a best practice guide for projects. Council may decide to register as an offset entity. ***2. Quantify the amount of land required to achieve carbon neutrality for the Council by 2020*** Arup recommend the use of the Department of Climate Change and Energy Efficiency's Full Carbon Accounting Model (FullCAM) to analyse the land requirements to quantify offsets from land. The analysis should account for the necessary time taken for any land used for offsetting to reach a state where sufficient carbon is sequestered by 2020 in order for Council to meet its carbon neutral target. **3. *Identify appropriate areas of land suitable for local offsets*** This may include Council land, Crown land or private land. Where non-Council land is being investigated, initial conversations with the land's stakeholders and/or owners should begin. ***4. Develop a business plan for establishing local offsets*** The business plan should contain the following information: • The relevant stakeholders of the land. • The Council (or community or outsourced) personnel required to manage the land. • A business case with capital and operational costs until 2020 and beyond. • A governance structure to the local offsets regarding ownership of land and ownership of its offsets. • A detailed investigation to the appropriate type of offset (type of vegetation, length of time of maturity, re-calculation of estimated carbon capture from local offset), and • A detailed implementation plan from 2014 to 2020.

Year	Step to Implement
2014	***5. Select area of land for local offsets*** Detailed discussions with relevant stakeholders of selected land should have been underway or undertaken. The selection of the appropriate area of land will be dependent on the outcomes of the business plan in Step 4. Implementation of the business plan should be underway. This may include entering contractual arrangements for long term land management. ***6. Begin management of land for local offsets*** This may include the necessary clearing and preparation of the land for seed planting. 7. ***Facilitate or organise planting of selected vegetation***
2015-2020	***8. Undertake land management and monitoring activities of local offsets*** This should be undertaken on an ongoing basis as per the implementation plan developed in Step 4.
2020	***9. Claim local offsets for achievement of carbon neutrality of Council in 2020***

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